

Identify accident location

Directly click the Map, or

Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In



- Zoom In



- Zoom Out



- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

I-270/MD 355 Simulator: An Intelligent Online Traffic Management System

Dr. Gang-Len Chang

Nan Zou

Xiaorong Lai

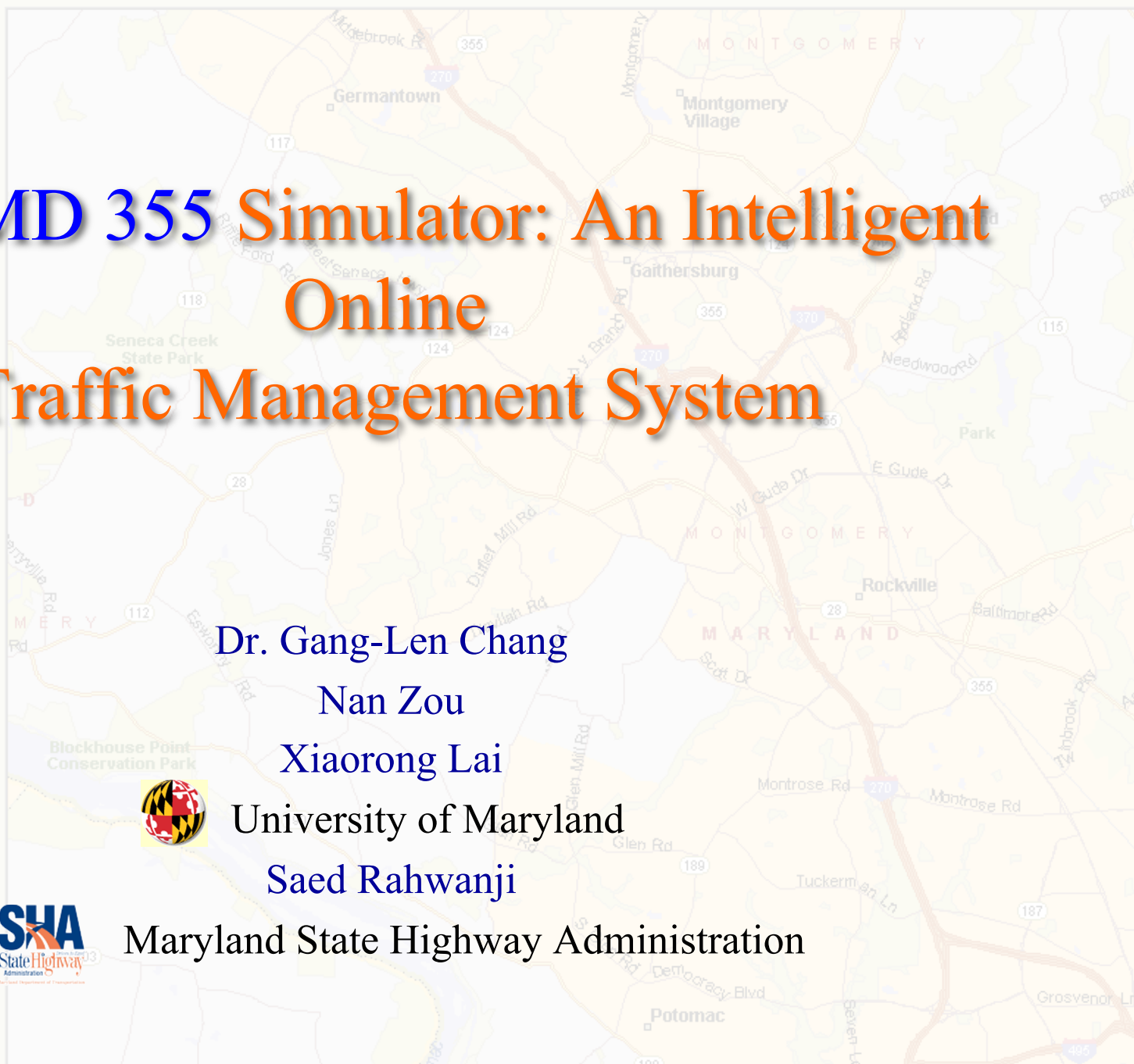


University of Maryland

Saed Rahwanji



Maryland State Highway Administration





Functions

- Incident Management Functions
 - Estimating the incident duration and the maximum impact range
 - Predicting the dynamic evolution of queue length
 - Estimation of travel time vs. departure time during the period of incident management
 - Evaluating the effectiveness of detour operations



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Functions (cont' d)

- Additional functions
 - Changing signal timings
 - Changing the acceleration and deceleration lanes
 - Ramp closure or ramp metering
 - Automatic update of traffic volume from real-time data



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Functions (cont' d)

- Additional functions
 - Changing signal timings
 - Changing the acceleration and deceleration lanes
 - Ramp closure or ramp metering
 - Automatic update of traffic volume from real-time data

Example Scenario



- Date: August 8th, 2003
- Time: 9:25AM
- Location: 2500 feet south of Exit 4
- Traffic Direction: South
- Lane Blockage: 2 right lanes closed

I-270/MD 355 Simulator: An Intelligent On-line Traffic Management System



Accident



Work Zone



Monitoring

(Recurrent Congestion)

Click button to choose function!



Exit

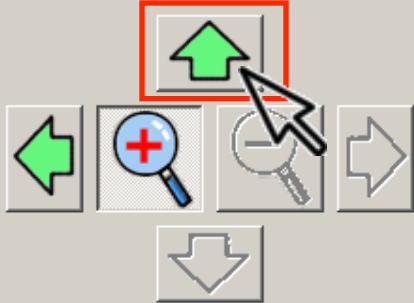
Activate the accident module of the system

Identify accident location

> Directly click the Map, or

> Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In

- Zoom In
- Zoom Out
- Identify Location

Update Volumes

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Management Functions

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Map navigation function

Use arrow buttons to navigate the covered area



Identify accident location

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Map Navigation



Click on the Map to:

Zoom In



- Zoom In



- Zoom Out



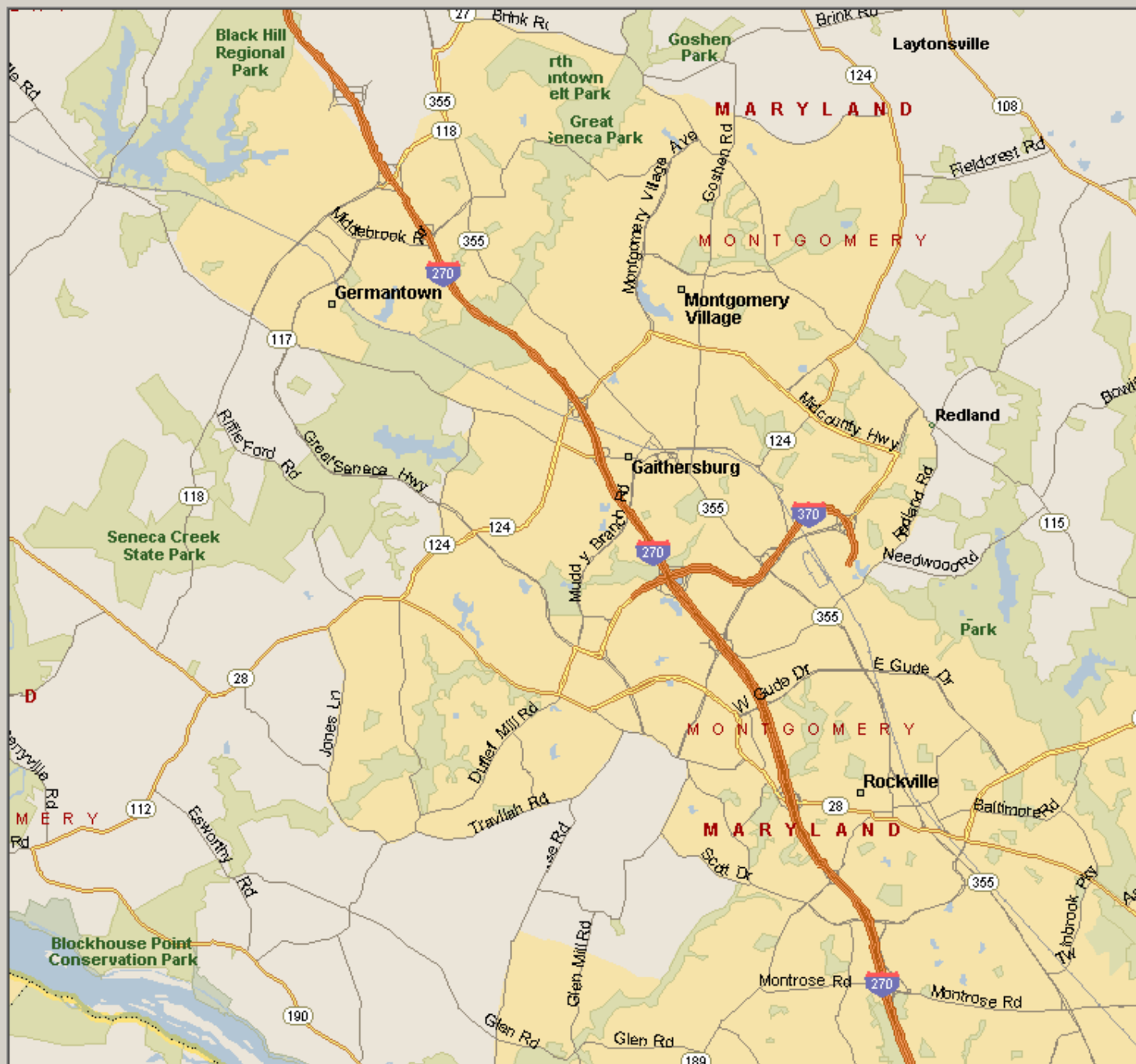
- Identify Location

Update Volumes

Reset Signals

Management Functions

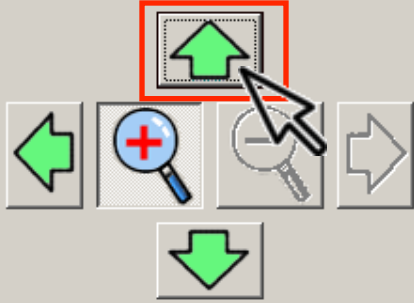
Exit



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Map Navigation



Click on the Map to:

Zoom In

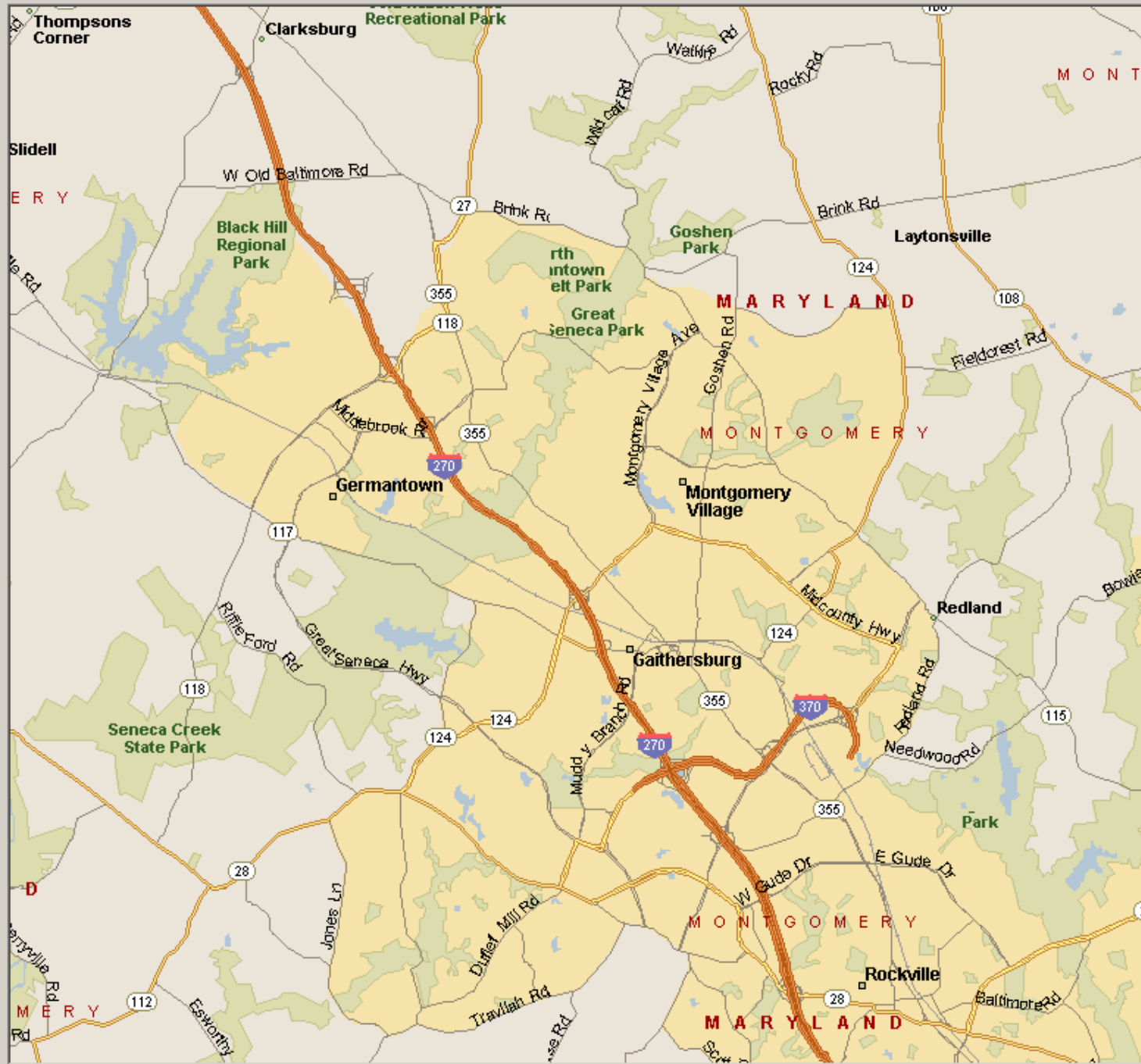
- Zoom In
- Zoom Out
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

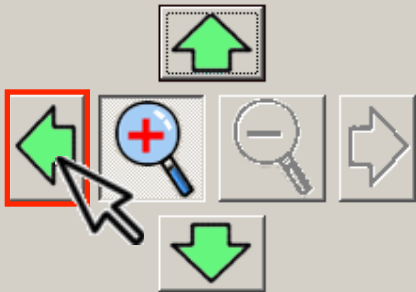


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- Zoom In



- Zoom Out



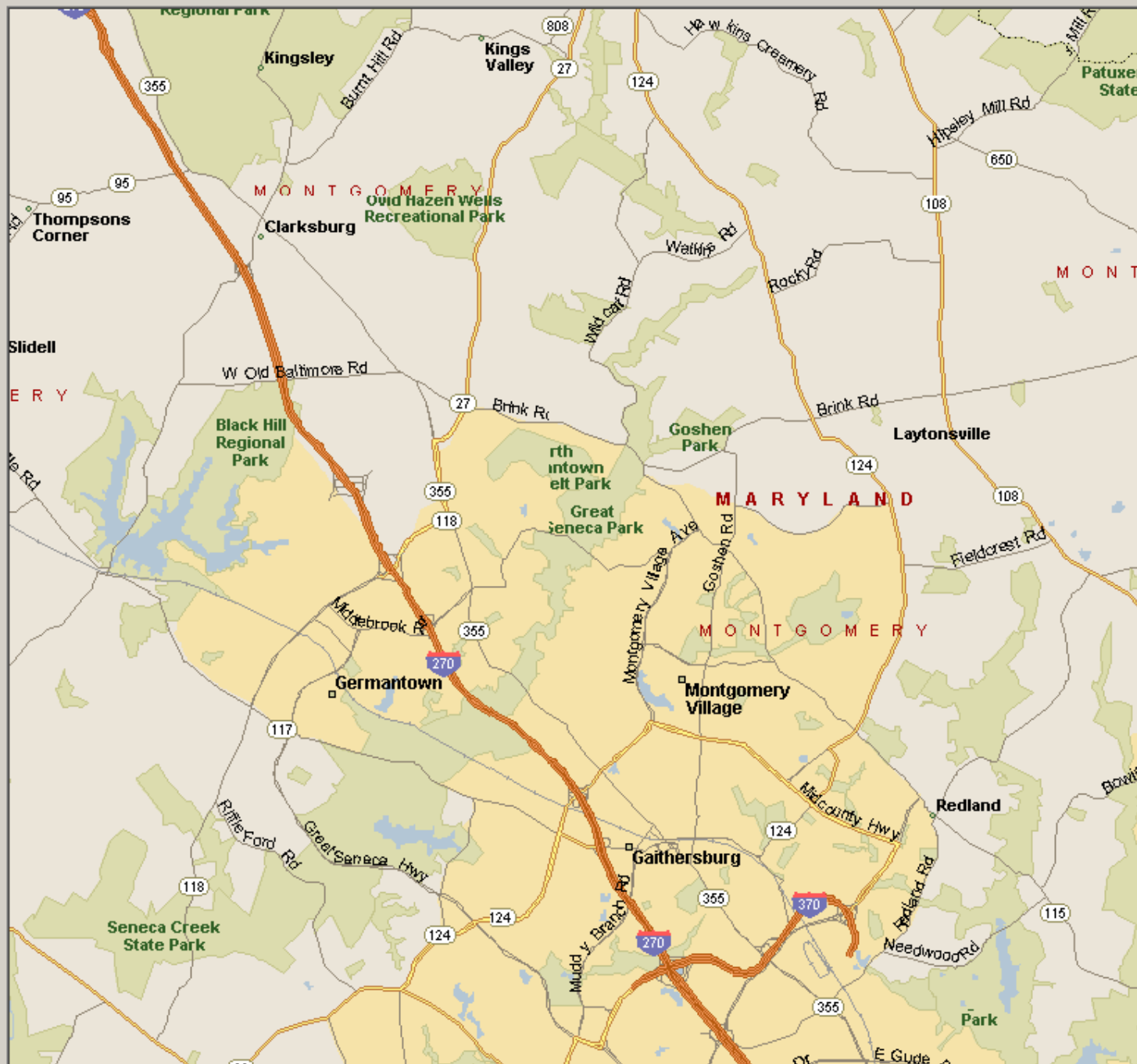
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

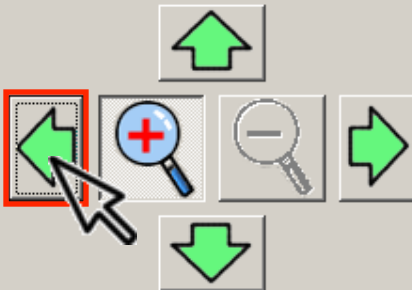


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- Zoom In



- Zoom Out



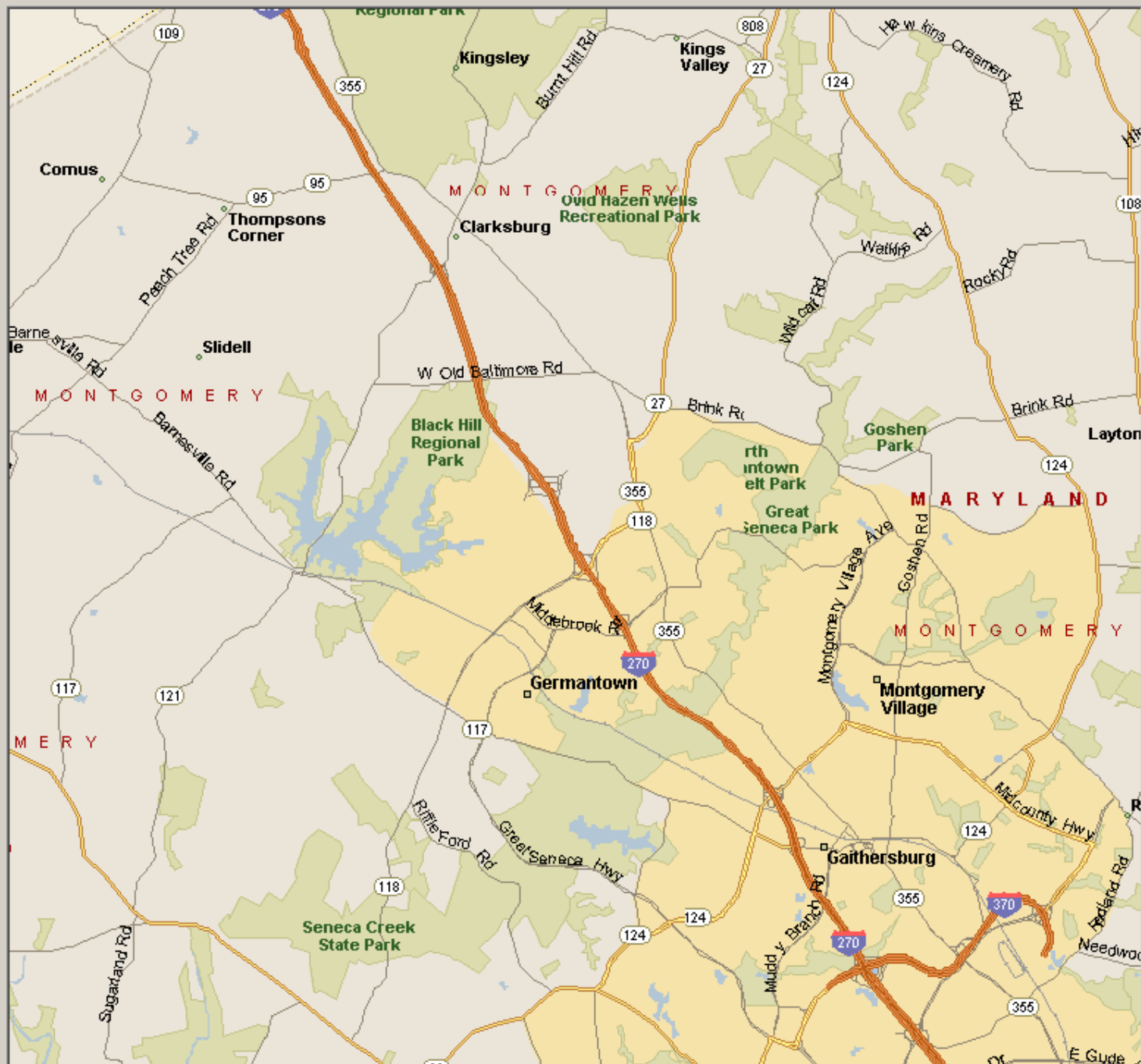
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

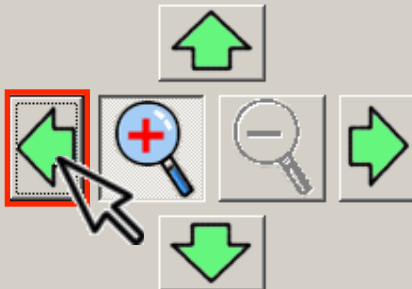


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Click on the Map to:

Zoom In



- Zoom In



- Zoom Out



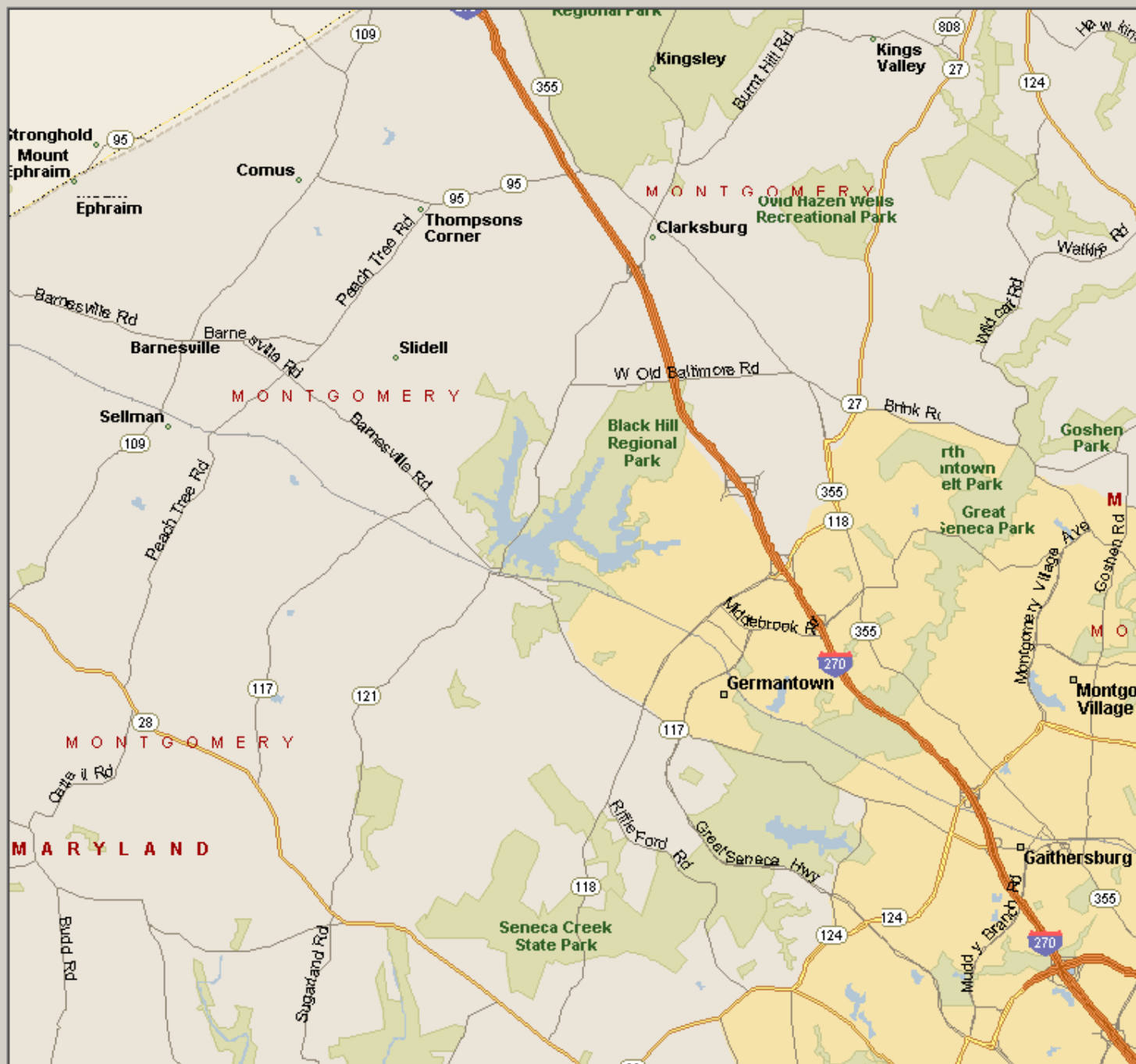
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

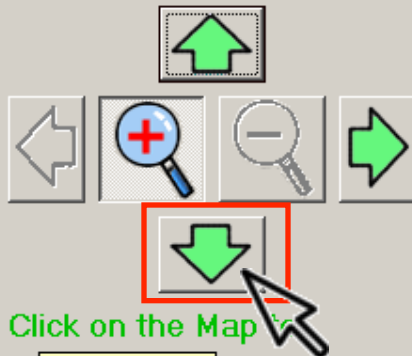


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Map Navigation



Zoom In

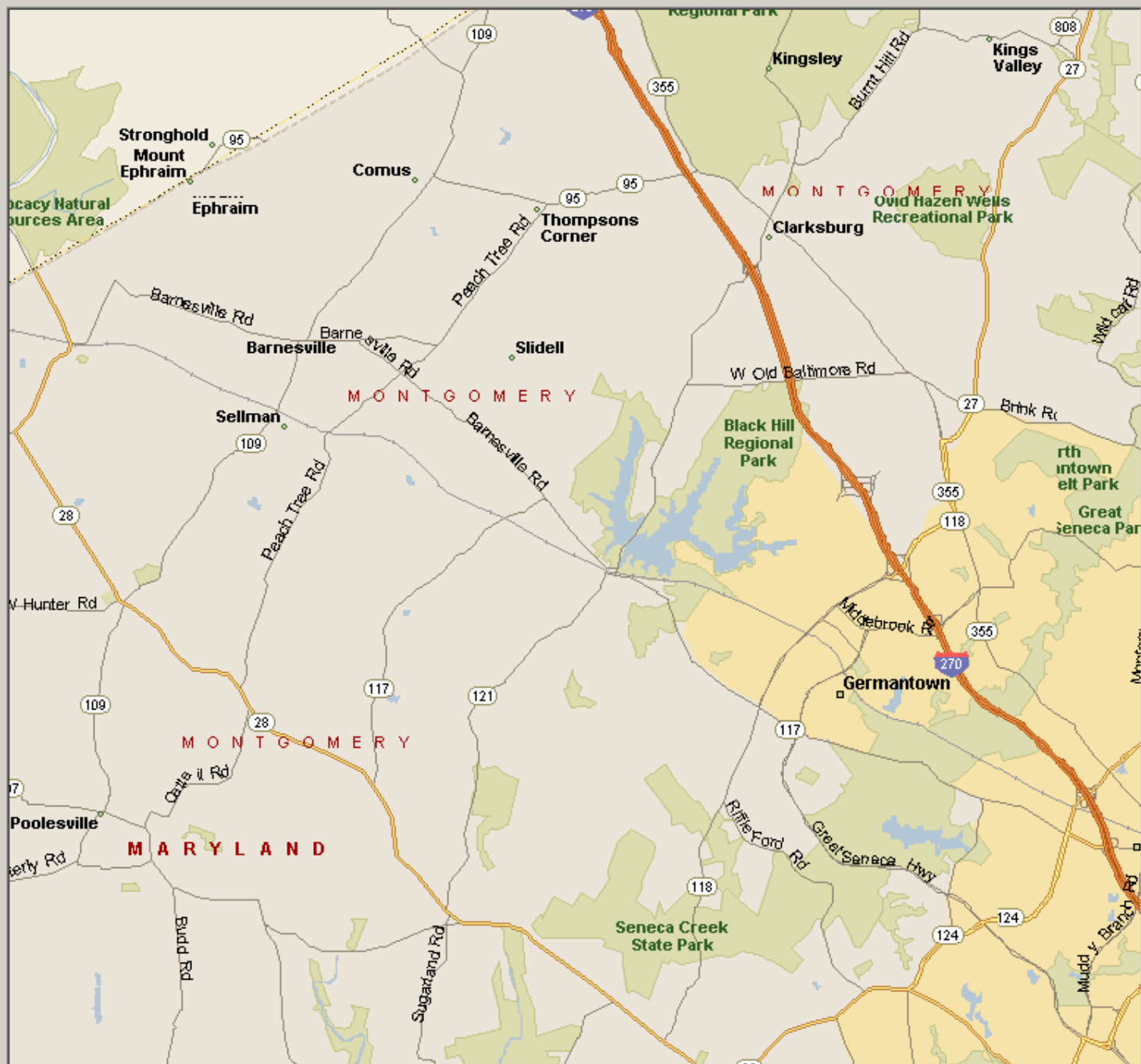
-  - Zoom In
-  - Zoom Out
-  - Identify Location

Update Volumes

Reset Signals

Management Functions

Exit



Identify accident location

- > Directly click the Map, or
- > Use the Map Navigation module

Map Navigation

Click on the Map to:

Zoom In

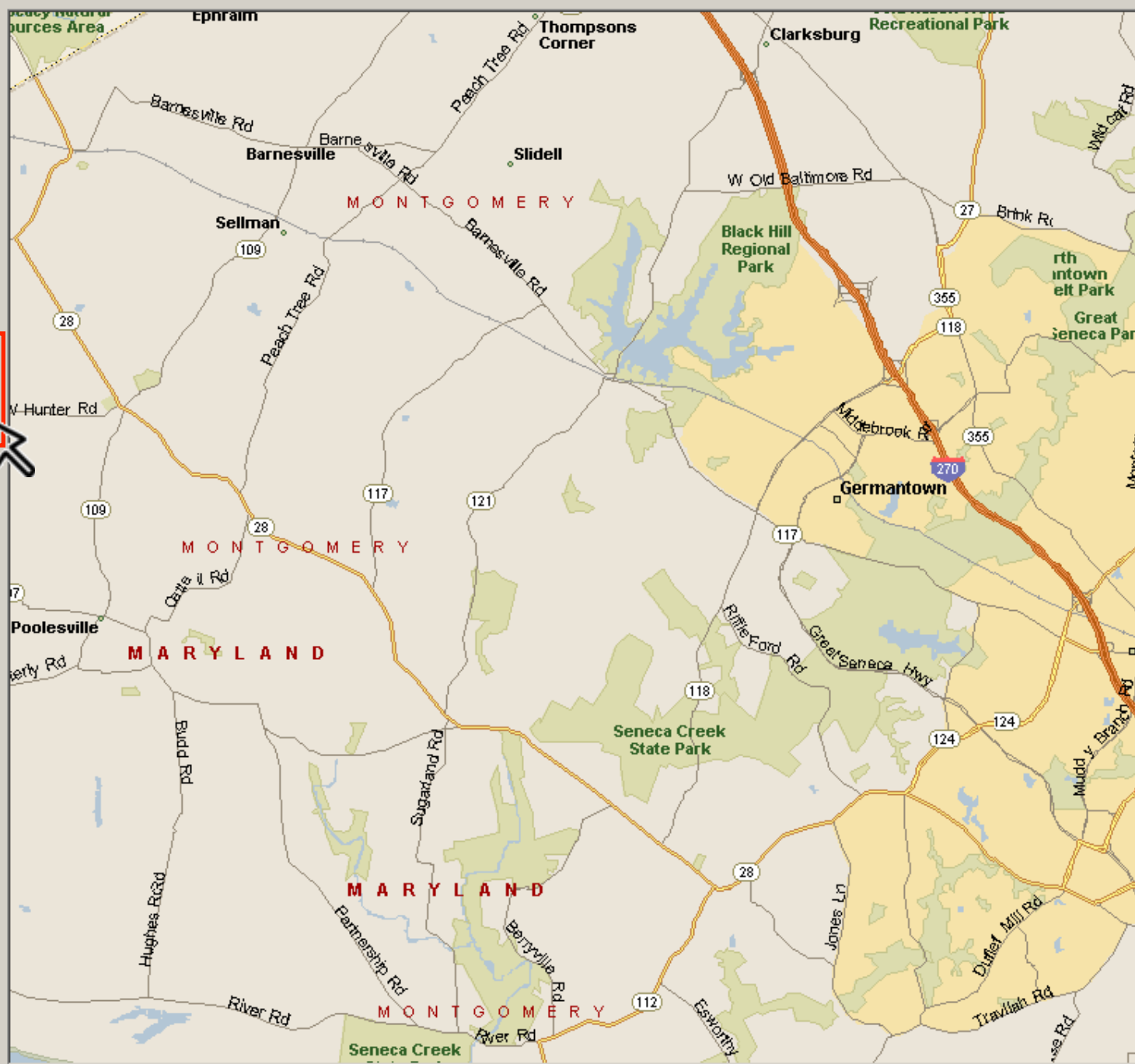
- Zoom In
- Zoom Out
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit



Identify accident location

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Map Navigation



Click on the Map

Zoom In

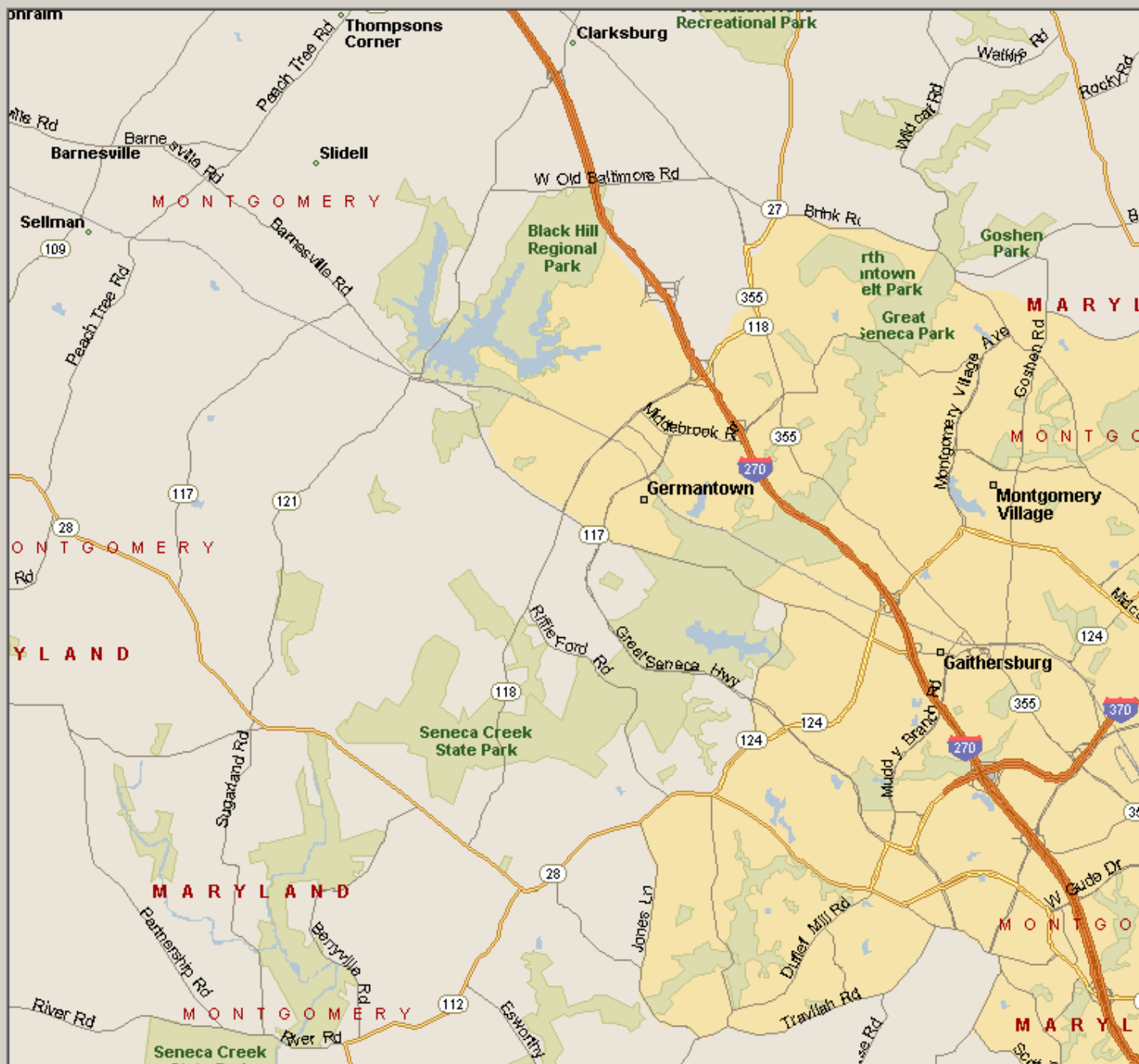
-  - Zoom In
-  - Zoom Out
-  - Identify Location

Update Volumes

Reset Signals

Management Functions

Exit



Identify accident location

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Map Navigation



Click on the Map

Zoom In



- Zoom In



- Zoom Out



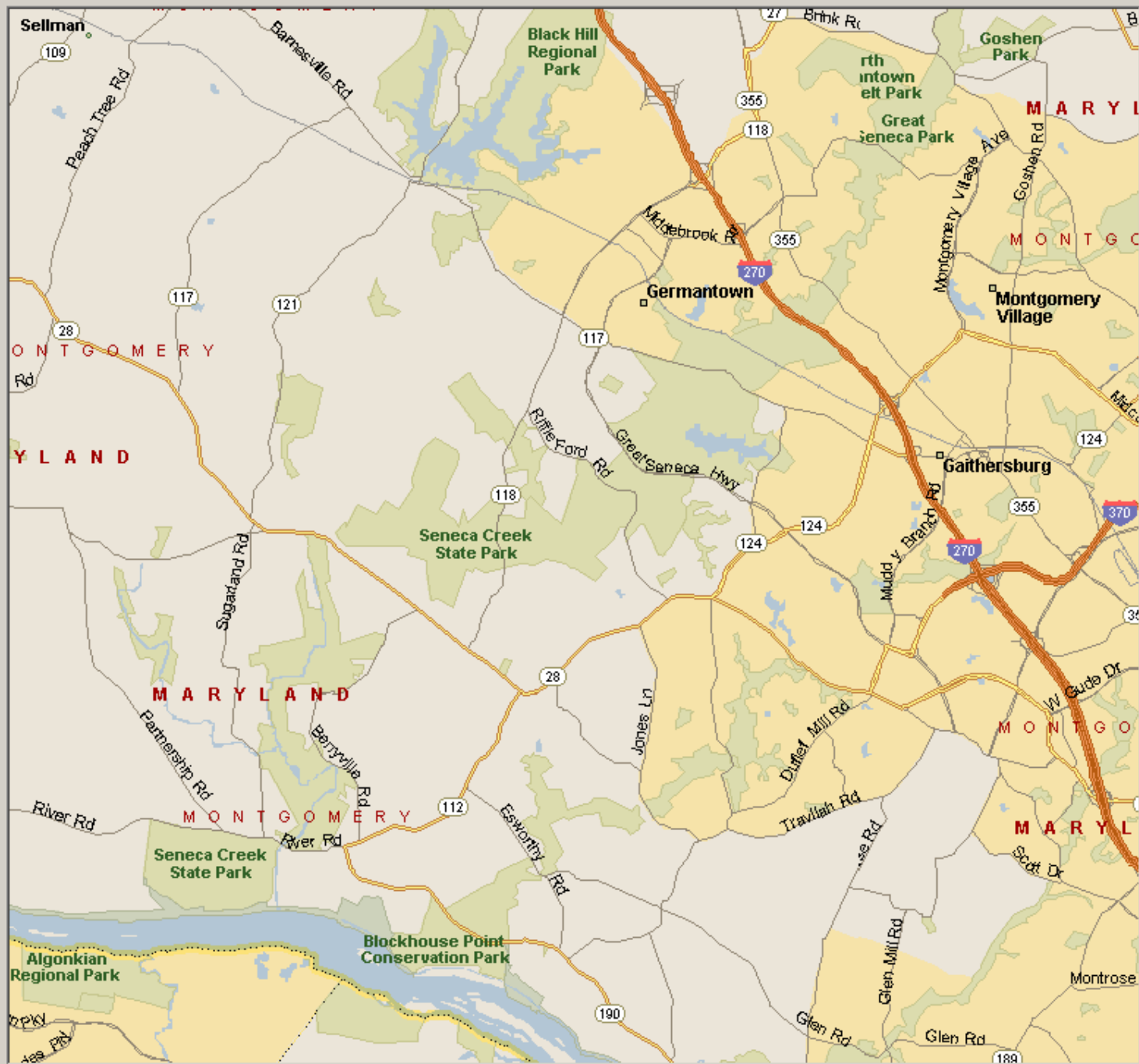
- Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

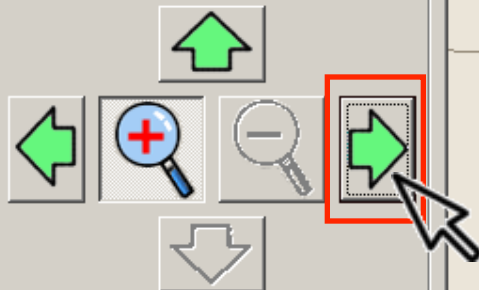


Identify accident location

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Map Navigation



Click on the Map to:

Zoom In

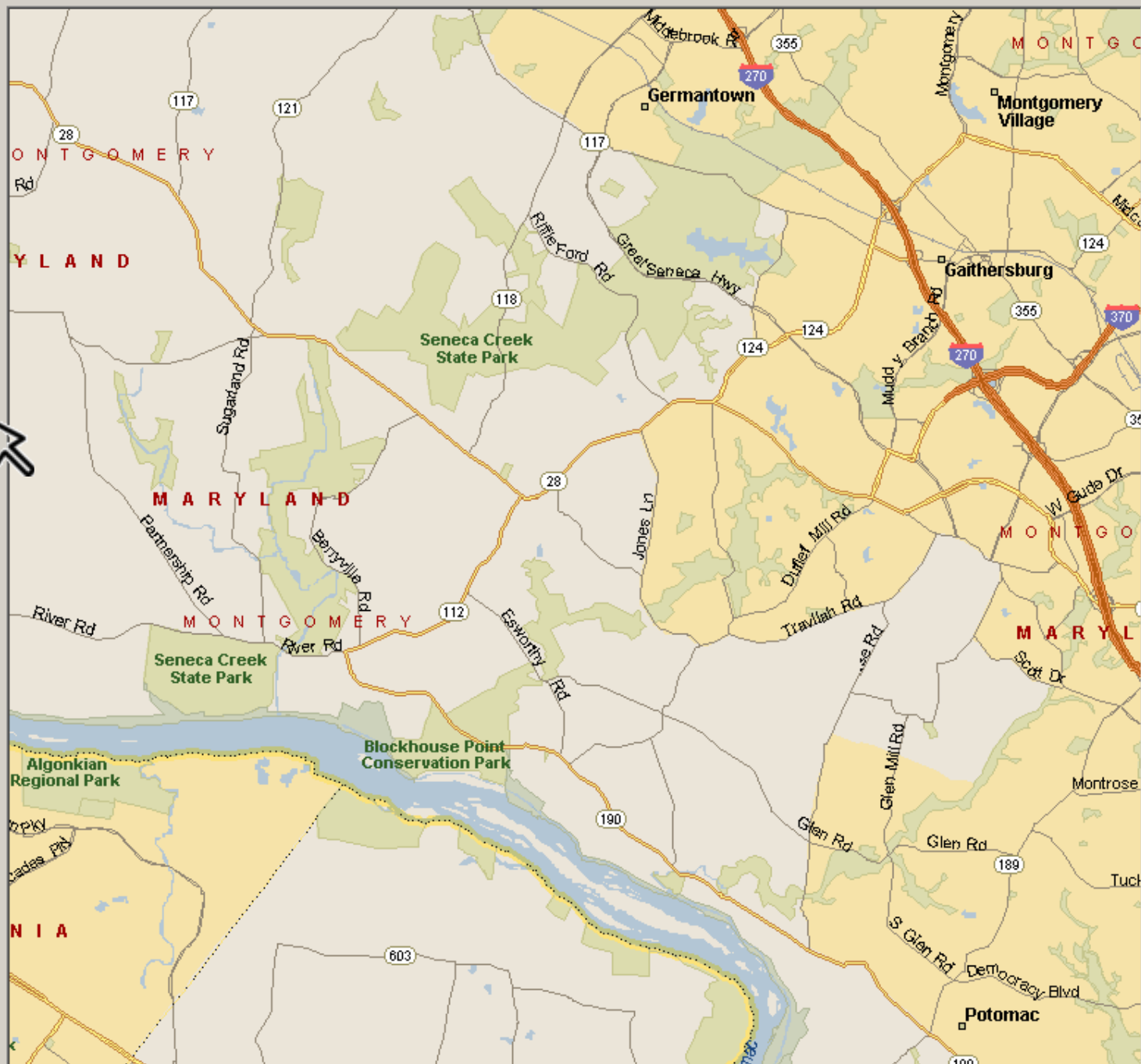
-  - Zoom In
-  - Zoom Out
-  - Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

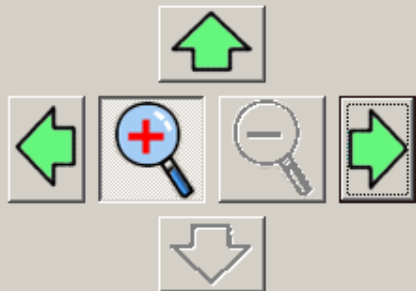


Identify accident location

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Map Navigation



Click on the Map to:

Zoom In

-  - Zoom In
-  - Zoom Out
-  - Identify Location

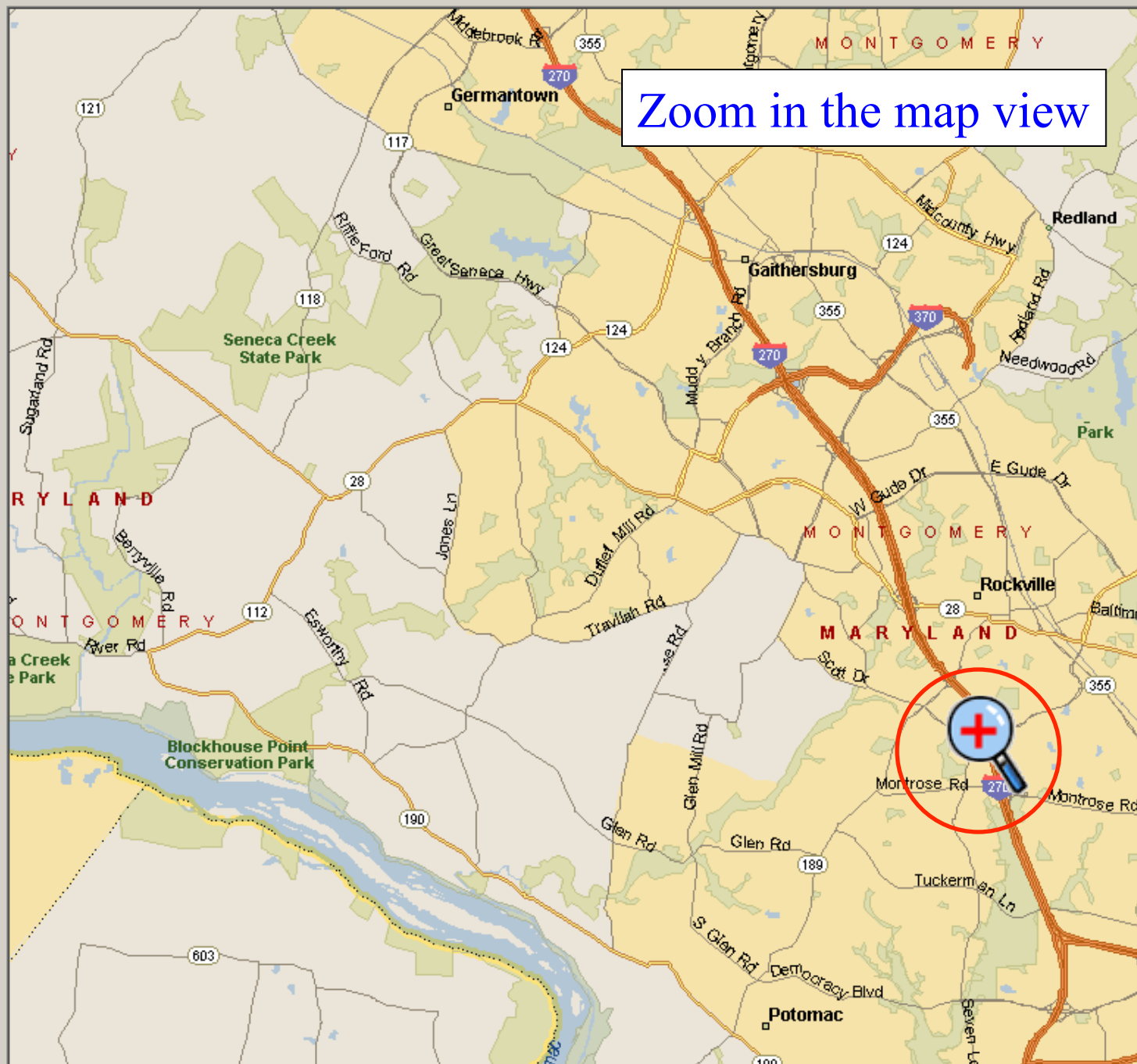
Update Volumes

Reset Signals

Management Functions

Exit

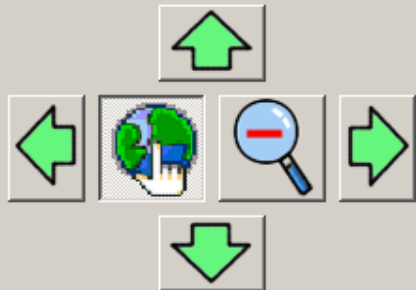
Zoom in the map view



Identify accident location

Please click on the map to identify the accident location.

Map Navigation



Click on the Map to:

Locate in I-270!

- Zoom In
- Zoom Out
- Identify Location

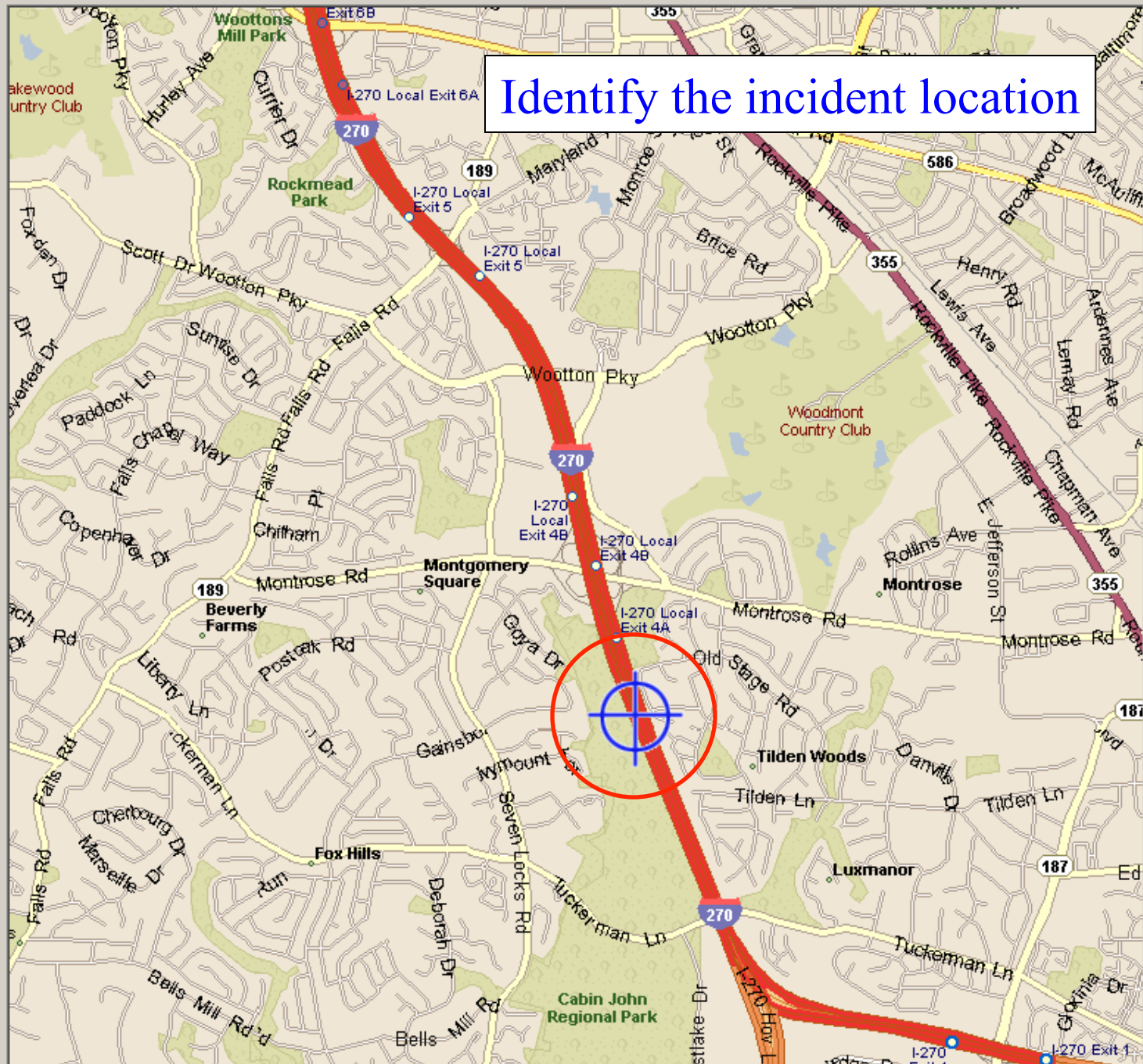
Update Volumes

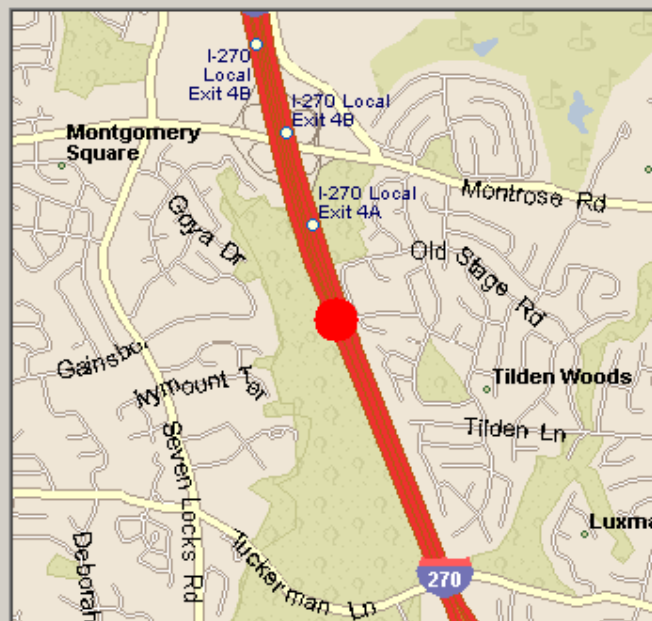
Reset Signals

Management Functions

Exit

Identify the incident location





Selected Information

You have just indicated the accident location at:



Select the traffic direction: South Bound

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!

Please Complete Accident Related Information (Question 1 of 4)

1. The accident is located on:



Interstate 270

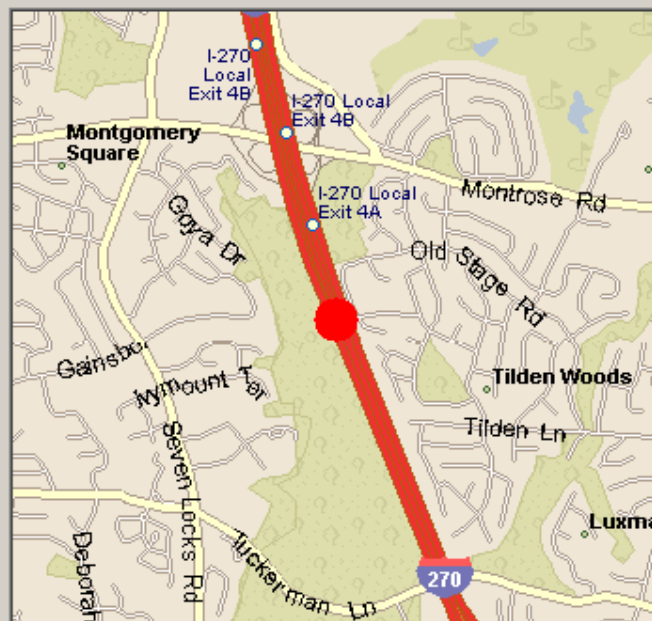
North Bound, from Exit 1(I-495) to Exit 4(Montrose Rd)

Or

South Bound, from Exit 4(Montrose Rd) to Exit 1(I-495)



Next Question →



Selected Information

You have just indicated the accident location at:

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Is this the accident location?


No! → Click to location

Yes! → Please complete the following information!

Next Question

Please Complete Accident Related Information (Question 1 of 4)

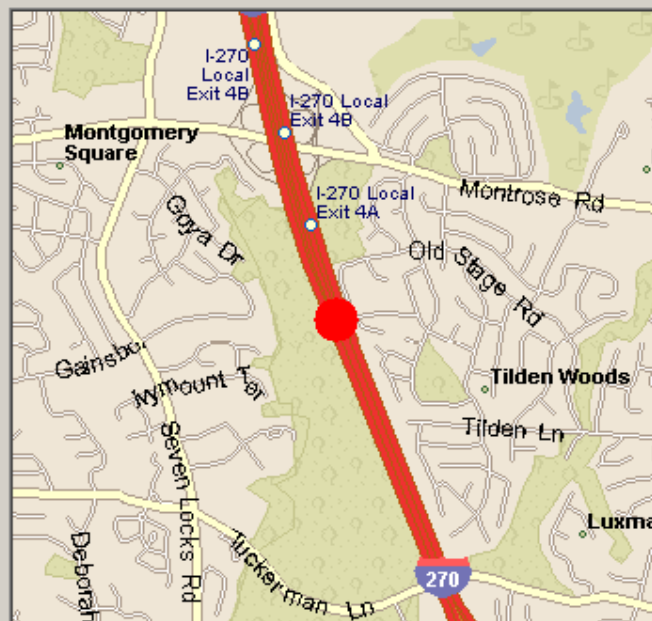
1. The accident is located on:

 **Interstate 270** North Bound, from Exit 1(I-495) to Exit 4(Montrose Rd)

Or

South Bound, from Exit 4(Montrose Rd) to Exit 1(I-495)

Next Question →



Selected Information

You have just



Input the distance from the incident location to Exit 4

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

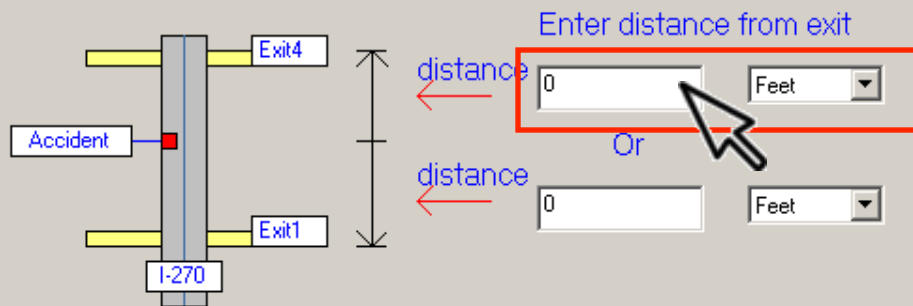
Is this the accident location?

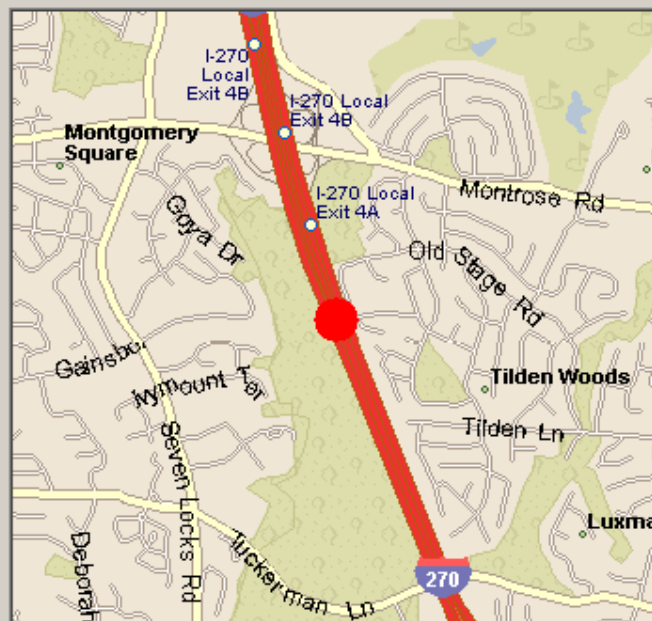
No! → Click to location

Yes! → Please complete the following information!

Complete Accident Related Information (Question 2 of 4)

2. Approximate distance between the accident location and the nearest downstream or upstream ramp:





Selected Information

You have just indicated the accident location at:

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Next Question

Is this the accident location?

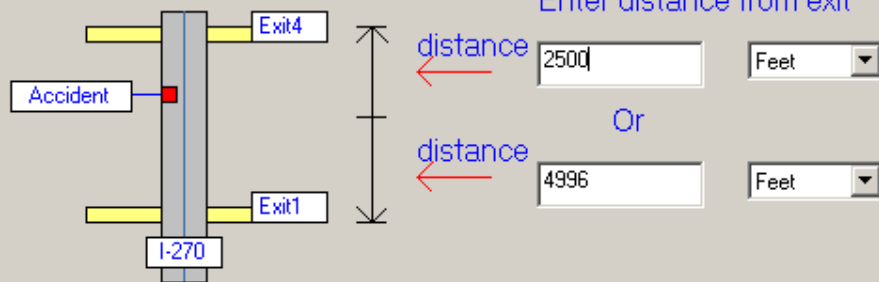
No! → Click to location

Yes! → Please complete the following information!

Complete Accident Related Information (Question 2 of 4)

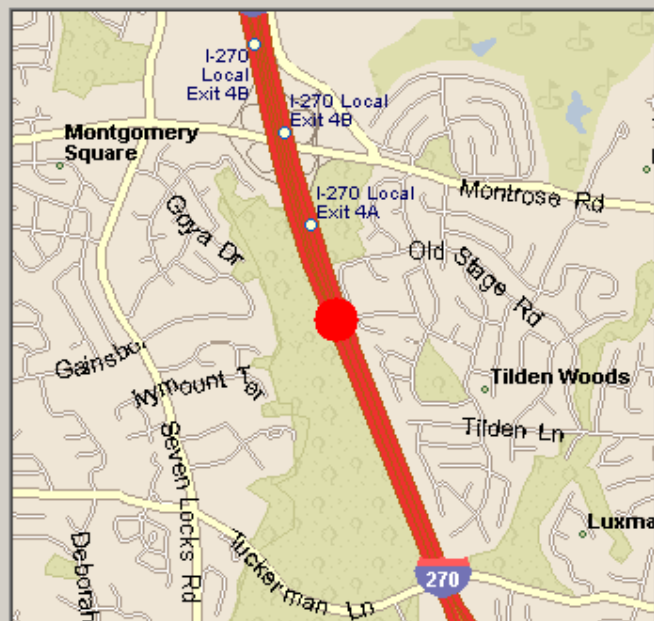
2. Approximate distance between the accident location and the nearest downstream or upstream ramp:

Enter distance from exit



< Previous Question

Next Question →



Selected Information

You

Click on the road to mark blocked lanes

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

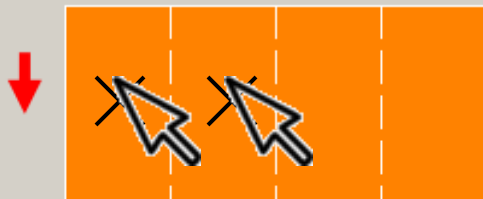
Yes! → Please complete the following information!

Complete Accident Related Information (Question 3 of 4)

3. How many lanes have been closed?

(Click on the lanes blocked by the accident!)

Exit4 (Montrose Rd)



Exit1 (I-495)



< Previous Question

Next Question →



Criteria to select Time Estimate the incident duration based on the historical data

Estimation of the Incident Duration

Criteria

Incident Nature All

No. of Lane Blockage 1 2 3 4 and more All

Time Peak Hours Off-Peak Hours Both

Segment At Current Locations All Locations

Incident Time

Time of Current Incident 9 : 25 AM

Estimation

Average esitimated duration: 13 minutes

Set the estimated incident duration: [] minutes

2 similar cases found in the knowledge base

ID	Time	Nature	Duration
1	4/26/2001 8:12:01 AM	Debris in Roadway	1
2	1/17/2001	N/A	24

Save Setting

Save

Cancel

Search 132 similar cases from the knowledge base

Estimation of the Incident Duration from Historical Data

Criteria

Incident Nature

All

No. of Lane Blockage

1 2 3 4 and more All

Time

Peak Hours Off-Peak Hours Both

Segment

At Current Locations All Locations

Incident Time

Time of Current Incident

9 : 25 AM

Estimation

Average estimated duration: 80 minutes

Set the estimated incident duration: minutes

132 similar cases found in the knowledge base

ID	Time	Nature	Duration
1	2/14/2001 5:23:26 PM	Collision, Property Damage	40
2	3/2/2001 8:48:47 AM	Collision, Property Damage	92
3	3/7/2001 5:01:48 PM	Collision, Property Damage	29
4	3/13/2001 9:33:21 AM	Collision, Personal Injury	35
5	3/13/2001 5:16:42 PM	Collision, Personal Injury	29
6	3/16/2001 7:19:58 AM	Debris in Roadway	1
7	3/16/2001 7:35:47 AM	Collision, Personal Injury	63
8	3/21/2001 6:49:46 PM	Collision, Personal Injury	79
9	3/27/2001 8:40:02 AM	Collision, Personal Injury	40
10	3/28/2001 8:13:05 AM	Disabled on Road	13
11	3/30/2001 5:32:37 PM	Debris in Roadway	15
12	4/3/2001 7:01:04 AM	Emergency Roadwork	12
13	4/3/2001 8:41:58 AM	Debris in Roadway	2
14	6/13/2001 6:19:09 PM	Other No Additional Information	18
15	6/13/2001 6:26:24 PM	Debris in Roadway	3
16	6/15/2001 5:36:27 PM	Collision, Property Damage	17

Save Setting

Save

Cancel

Set the duration to 52 similar cases from the knowledge base

Estimation of the Incident Duration From Historical Data

Criteria

Incident Nature

Collision, Personal Injury

No. of Lane Blockage

1 2 3 4 and more All

Time

Peak Hours Off-Peak Hours Both

Segment

At Current Locations All Locations

Incident Time

Time of Current Incident

9 : 25 AM

Estimation

Average estimated duration: 53 minutes

Set the estimated incident duration: minutes

52 similar cases found in the knowledge base

ID	Time	Nature	Duration
1	3/13/2001 9:33:21 AM	Collision, Personal Injury	35
2	3/13/2001 5:16:42 PM	Collision, Personal Injury	29
3	3/16/2001 7:35:47 AM	Collision, Personal Injury	63
4	3/21/2001 6:49:46 PM	Collision, Personal Injury	79
5	3/27/2001 8:40:02 AM	Collision, Personal Injury	40
6	6/19/2001 8:14:11 AM	Collision, Personal Injury	56
7	8/13/2001 8:30:44 AM	Collision, Personal Injury	31
8	4/19/2001 6:04:32 PM	Collision, Personal Injury	64
9	5/2/2001 4:48:48 PM	Collision, Personal Injury	30
10	5/3/2001 7:20:52 AM	Collision, Personal Injury	59
11	5/4/2001 8:56:20 AM	Collision, Personal Injury	32
12	5/4/2001 5:14:01 PM	Collision, Personal Injury	39
13	5/9/2001 9:49:47 AM	Collision, Personal Injury	53
14	5/11/2001 7:50:51 AM	Collision, Personal Injury	26
15	5/11/2001 4:50:27 PM	Collision, Personal Injury	34
16	5/18/2001 7:18:43 AM	Collision, Personal Injury	63

Save Setting

Save

Cancel

Estimation of the Incident Duration From Historical Data

Criteria

Incident Nature

Collision, Personal Injury

No. of Lane Blockage

1 2 3 4 and more All

Time

Peak Hours Off-Peak Hours Both

Segment

At Current Locations All Locations

Incident Time

Time of Current Incident

9 : 25 AM

Estimation

Average estimated duration: 53 minutes

Set the estimated incident duration: 50 minutes

52 similar cases found in the knowledge base

ID	Time	Nature	Duration
1	3/13/2001 9:33:21 AM	Collision, Personal Injury	35
2	3/13/2001 5:16:42 PM	Collision, Personal Injury	29
3	3/16/2001 7:35:47 AM	Collision, Personal Injury	63
4	3/21/2001 6:49:46 PM	Collision, Personal Injury	79
5	3/27/2001 8:40:02 AM	Collision, Personal Injury	40
6	6/19/2001 8:14:11 AM	Collision, Personal Injury	56
7	8/13/2001 8:30:44 AM	Collision, Personal Injury	31
8	4/19/2001 6:04:32 PM	Collision, Personal Injury	64
9	5/2/2001 4:48:48 PM	Collision, Personal Injury	30
10	5/3/2001 7:20:52 AM	Collision, Personal Injury	59
11	5/4/2001 8:56:20 AM	Collision, Personal Injury	32
12	5/4/2001 5:14:01 PM	Collision, Personal Injury	39
13	5/9/2001 9:49:47 AM	Collision, Personal Injury	53
14	5/11/2001 7:50:51 AM	Collision, Personal Injury	26
15	5/11/2001 4:50:27 PM	Collision, Personal Injury	34
16	5/18/2001 7:18:43 AM	Collision, Personal Injury	63

Save Setting

Save

Cancel

Change the duration of the simulation

Selected In

You have just indicated the accident location at:

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

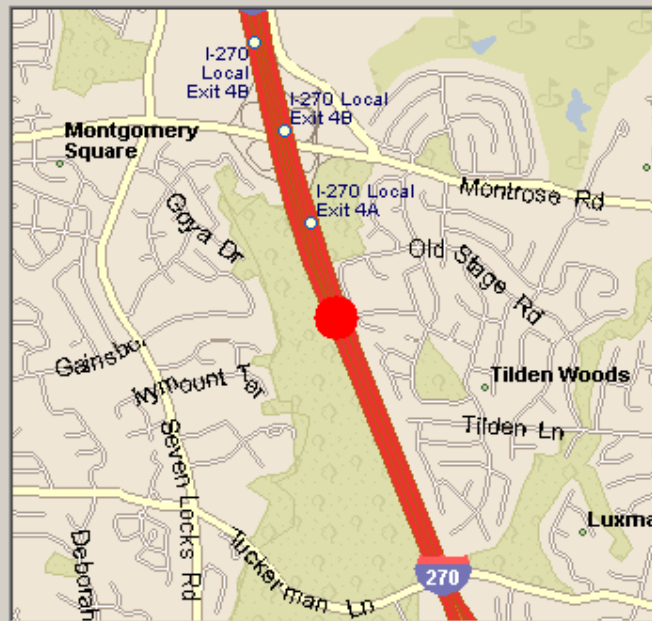
And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!



Complete Accident Related Information (Question 4 of 4)

4. Please complete the time and the duration of the accident:

Time of the accident:

9 : 25

Change

Duration of the incident:

50

minutes

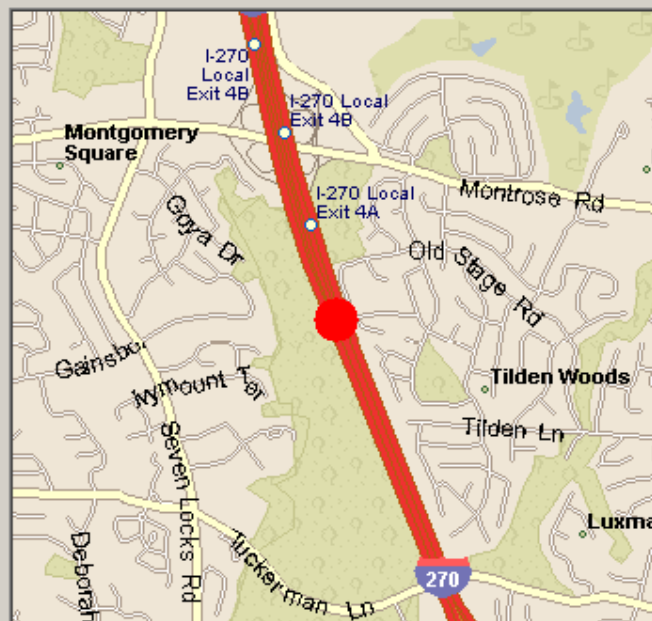
Set the duration of simulation:

80

minutes

< Previous Question

Next Question →



Selected Information

You have just indicated the accident location at:

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!

Next step

Complete Accident Related Information (Question 4 of 4)

4. Please complete the time and the duration of the accident:

Time of the accident:

9 : 25

Duration of the incident:

50

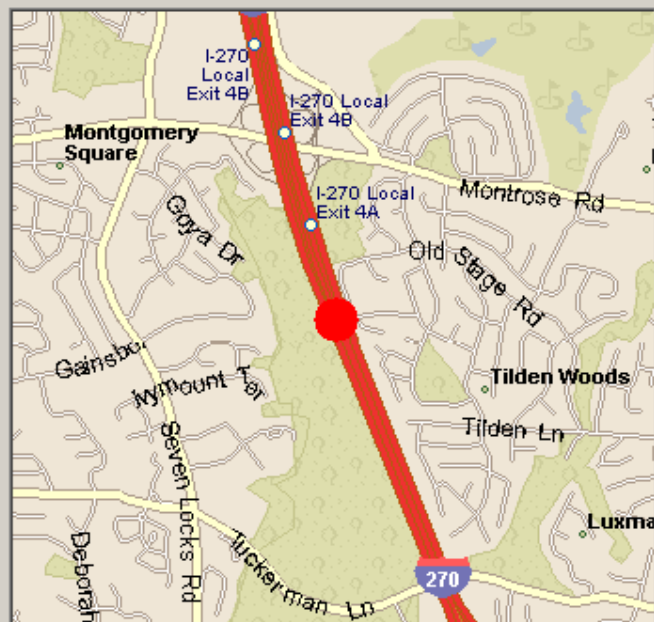
minutes

Set the duration of simulation:

minutes

< Previous Question

Next Question → 



Selected Information

You have



Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

This screen shows the summary of the information for the current incident

Execute the simulation

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!

Summary of Accident Related Information:

Here is the summary for the detailed information of the accident

1. The accident is located on I-270 **SOUTH BOUND**.
2. The accident location is **4996 feet from downstream Exit 4 (Montrose Rd)**.
3. The blocked lane(s) are:   Traffic Direction

4. Approximated starting time of the accident: **9:25**

5. Estimated incident duration: **50 minutes**

If some changes are needed =>

Or, all above are correct => execute the simulation and then show estimated results.

→

Ready to set detour operation? Click below:

Ready to reset signals? Click below:



Initializing data ...

New data from detectors are available.



Retreiving data from on-line detectors ...

Update volume data



Updating volume data ...

Simulation started!



Running simulation ...

Output Selection



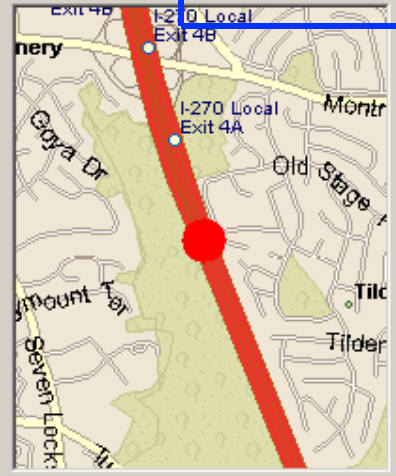
Or



I-270

MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Road Segments

Exit 22 (Old Hundred Rd(MD109))

Traffic Direction

Exit 1 (I-495)

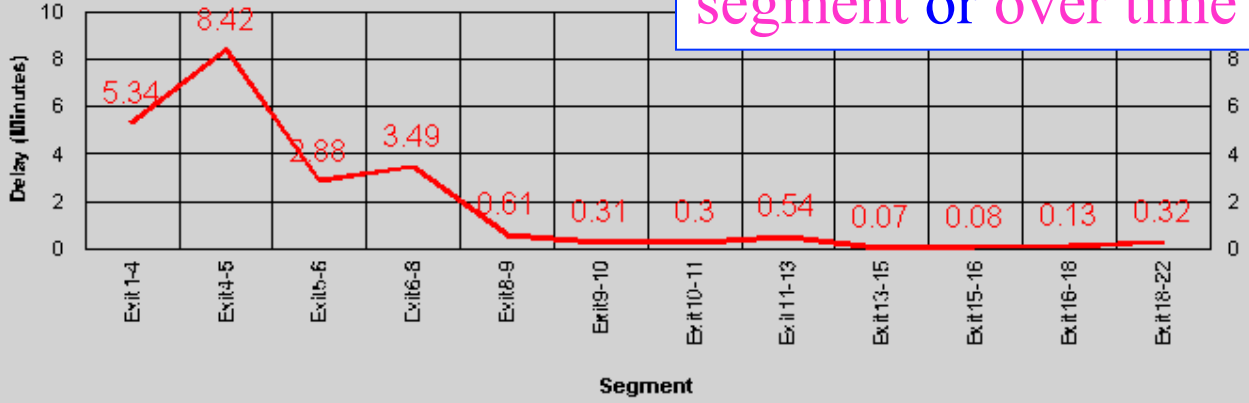
From : 09:20

To : 10:50

Display Type

Display

Distribution of



Display the bar chart

Display the output chart for the selected time period

Display outputs by segment or over time

Map-based output

Animation output

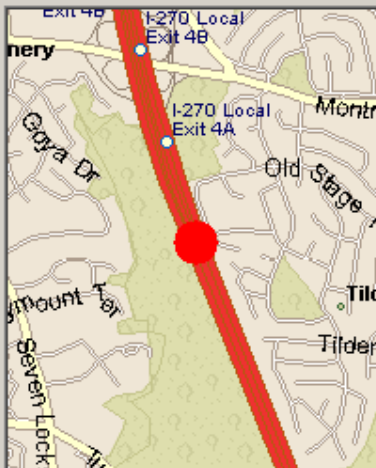
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Road Segments

Exit 22 (Old Hundred Rd(MD109))



Exit 1 (I-495)

Time Period

From : 09:20

To : 10:50

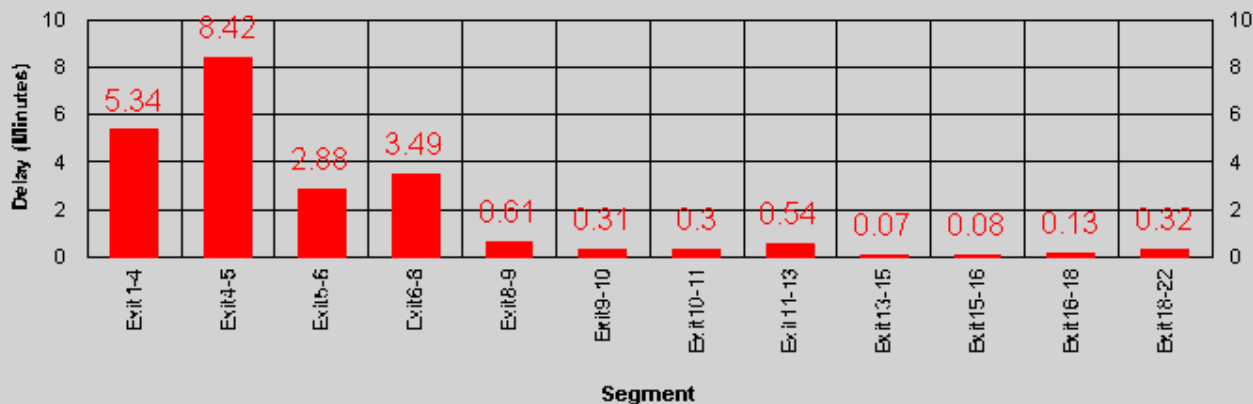
Display Type

- Display Delay by Segment
 Display Delay Over Time

Display of S

Distribution of De

Set the time period
to 9:20 to 10:20



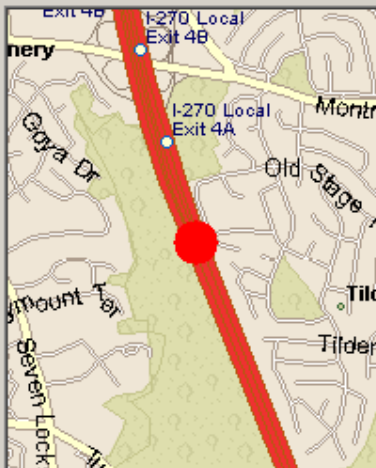
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Road Segments



Exit 22 (Old Hundred Rd(MD109))

From : 09:20

To : 10:20



Traffic Direction



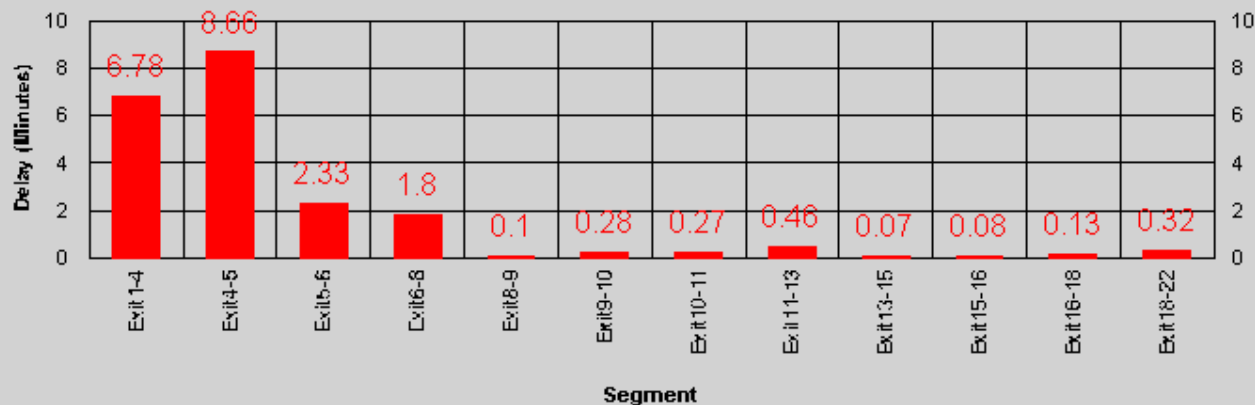
Exit 1 (I-495)

Display Type

- Display Delay by Segment
- Display Delay Over Time

Display of Simulation Results

Distribution of Delay on Each Segment

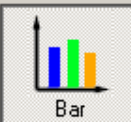


Show the output for MD355

Output Selection

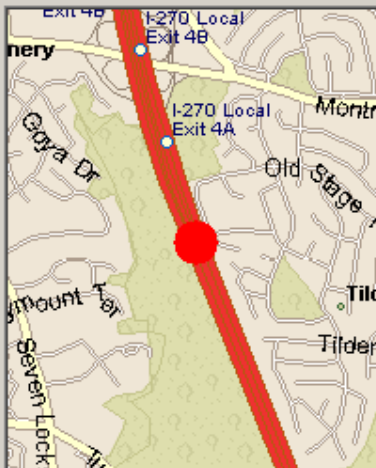


Or


 I-270

 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Display the delay over time on MD 355 segment
from Shady Grove Rd to Grosvenor Ln



Traffic Direction

355

Grosvenor Ln

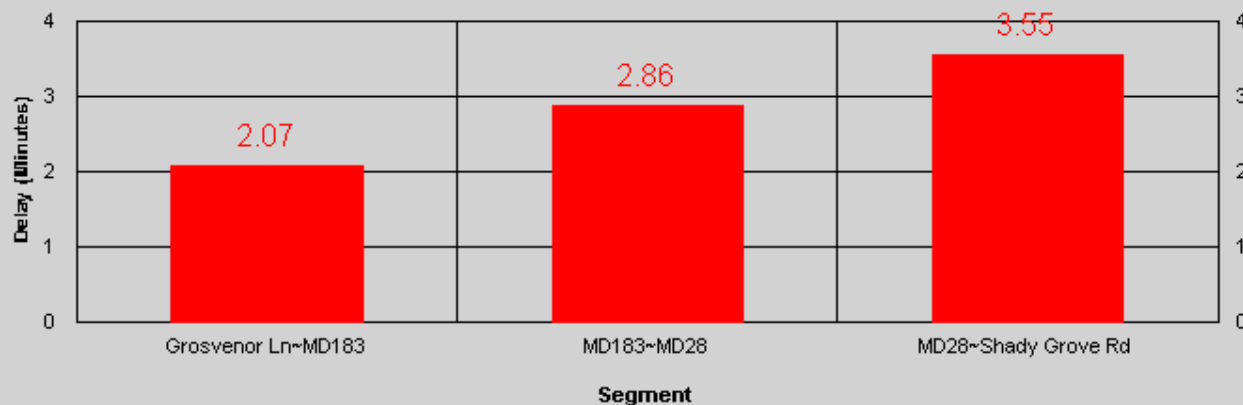
Display Type

 Display Delay by Segment

 Display Delay Over Time

Display of Simulation Results

Distribution of Delay on Each Segment



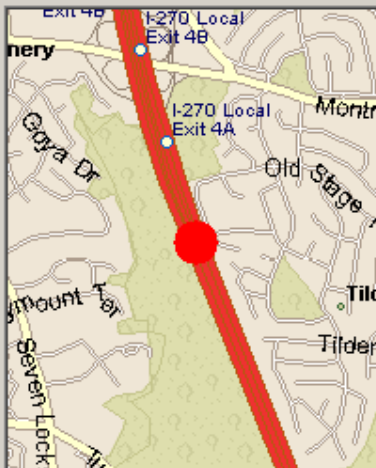
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Road Segments

355 Shady Grove Rd



Traffic Direction

355 Grosvenor Ln

Time Period

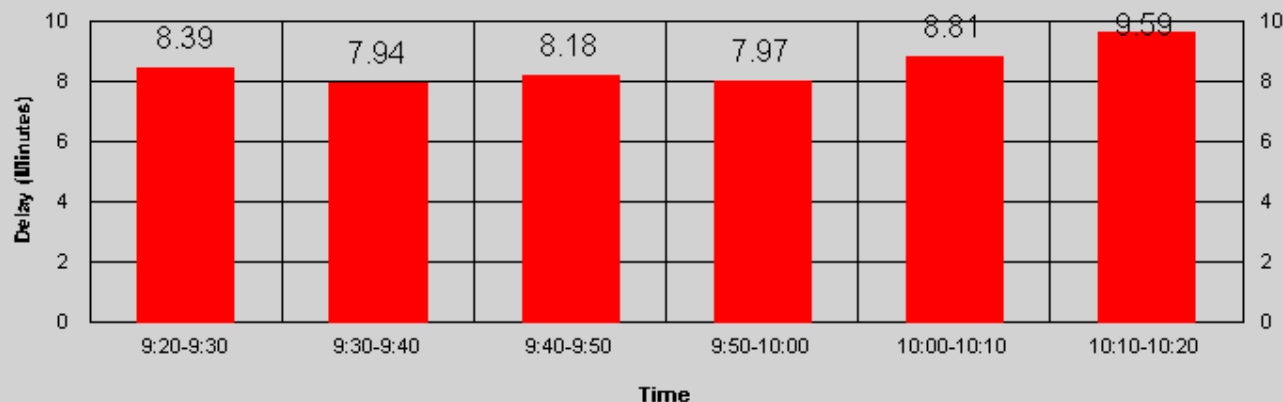
From : 09:20

To : 10:20

Display the output of average speed

Display of Simulation Results

Distribution of Delay over Time



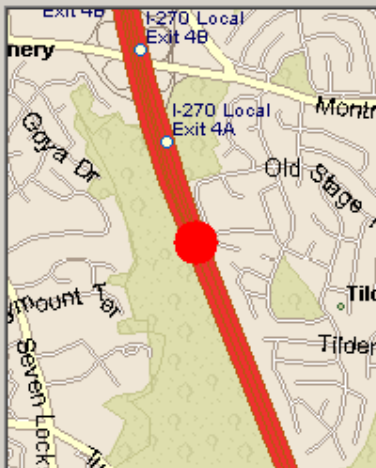
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average

Display the output by segment

Road Segments

355 Shady Grove Rd



Traffic Direction

355 Grosvenor Ln

Time Period

From : 09:20

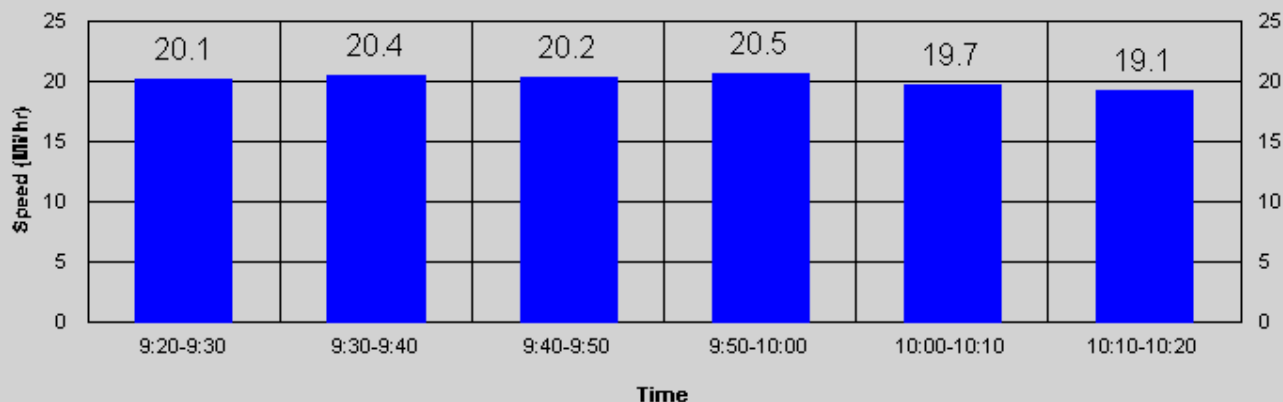
To : 10:20

Display Type

- Display Average Speed Over Segment
 Display Average Speed Over Time

Display of Simulation Results

Distribution of Average Flow Speed Over Time



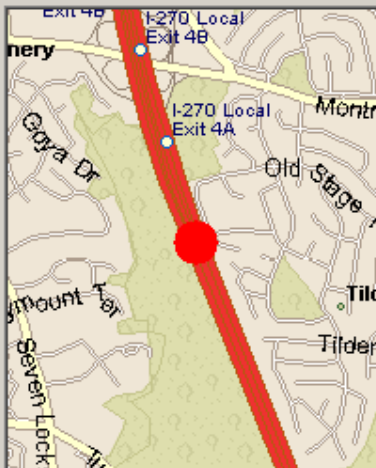
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average

Road Segments

355 Shady Grove Rd



Traffic Direction

355 Grosvenor Ln

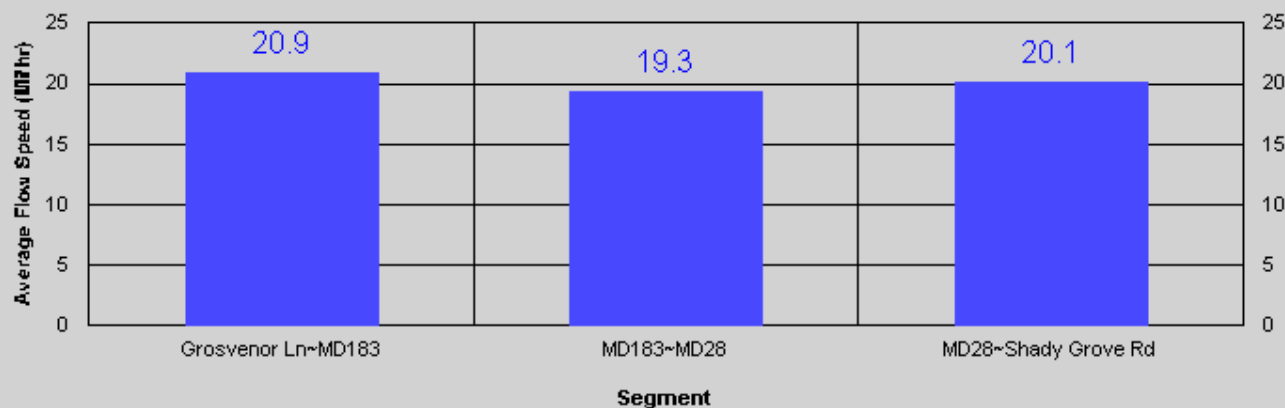
Display Type

- Display Average Speed Over Segment
- Display Average Speed Over Time

Display the output of the average speed by segment for I-270

Display of Simulation Results

Distribution of Average Speed on Each Segment



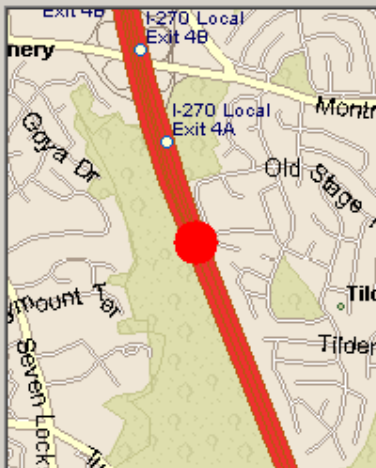
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Road Segments

Exit 22 (Old Hund



Exit 1 (I-495)

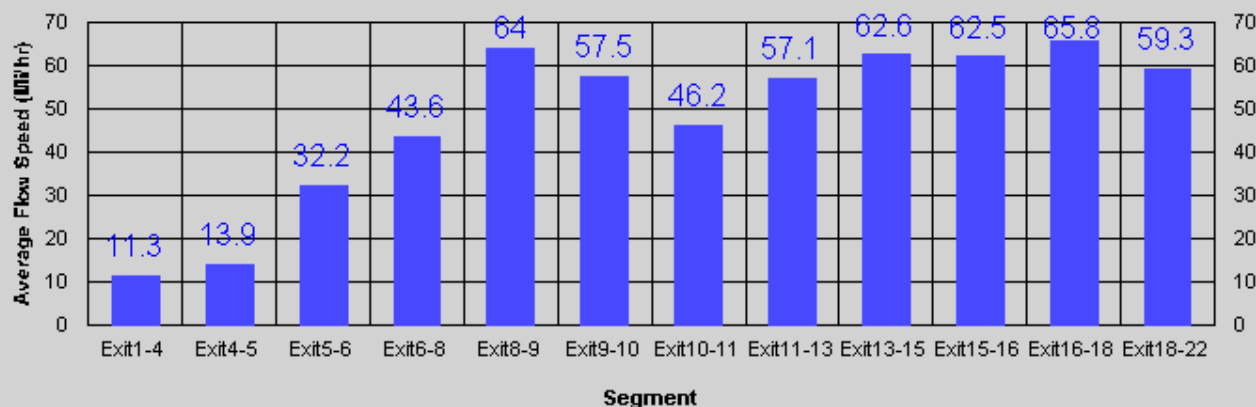
Time Period

Display the output for distribution of the queue length

Display Average Speed Over Time

Display of Simulation Results

Distribution of Average Speed on Each Segment



View the segment between Exit 9 and Exit 1

Output Selection

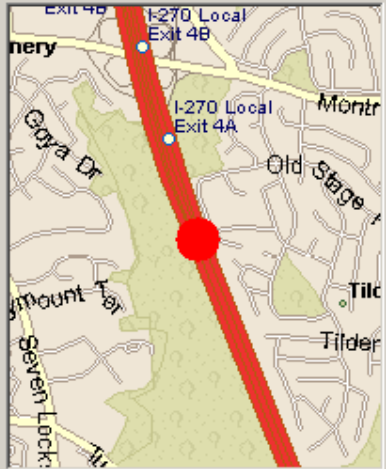


Or



I-270 MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

[Map-based Output](#)

[View Animation](#)

[Detour / Signals](#)

[Back to Main Menu](#)

Road Segments

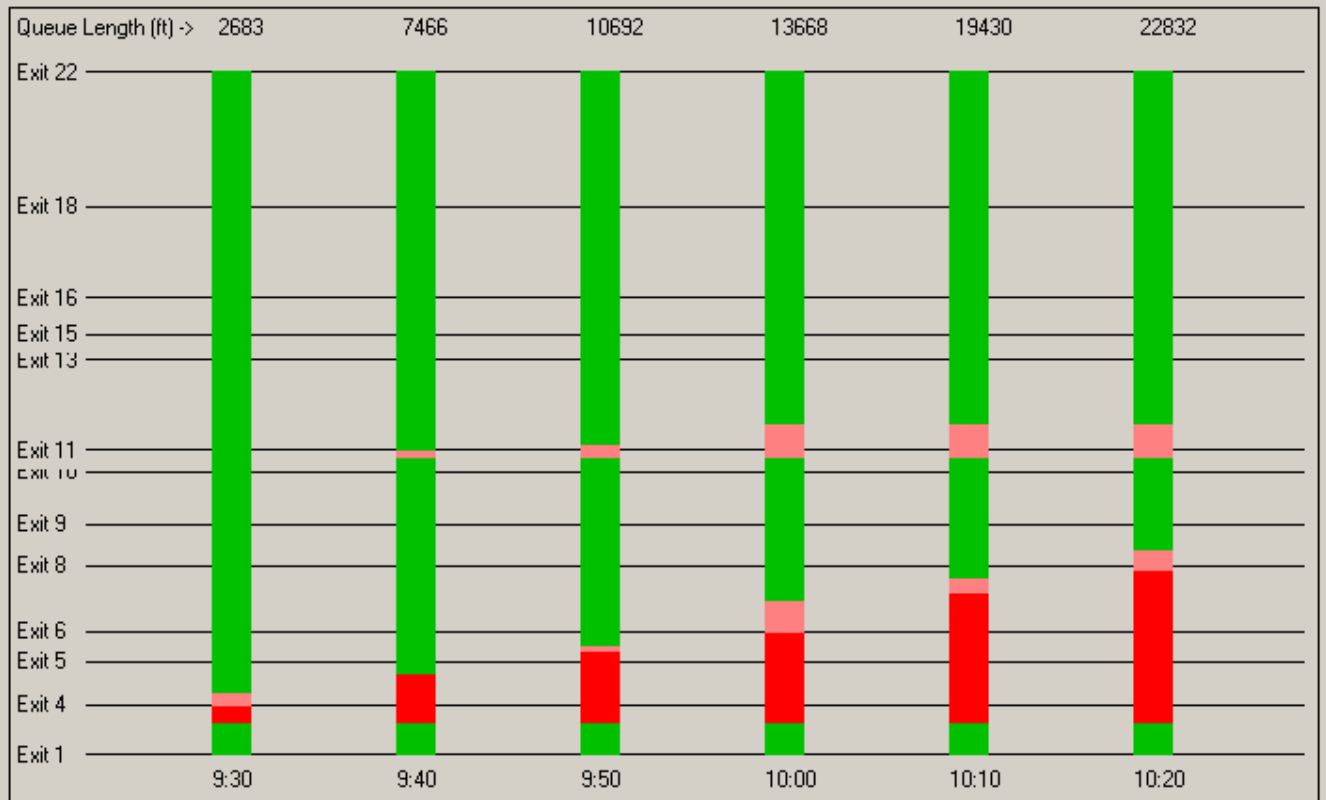
↓ Traffic Direction

Time Period

From : To :

Queue Legend

< 25 mph
 > 45 mph
 between 25 and 45 mph



Output Selection

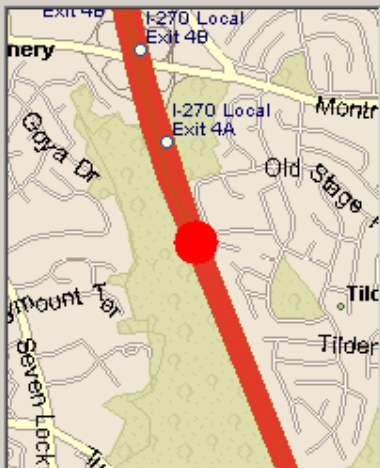


Or



I-270 MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Queue Length

Travel Time

Road Segments



Exit 9 (I-370)



Traffic Direction

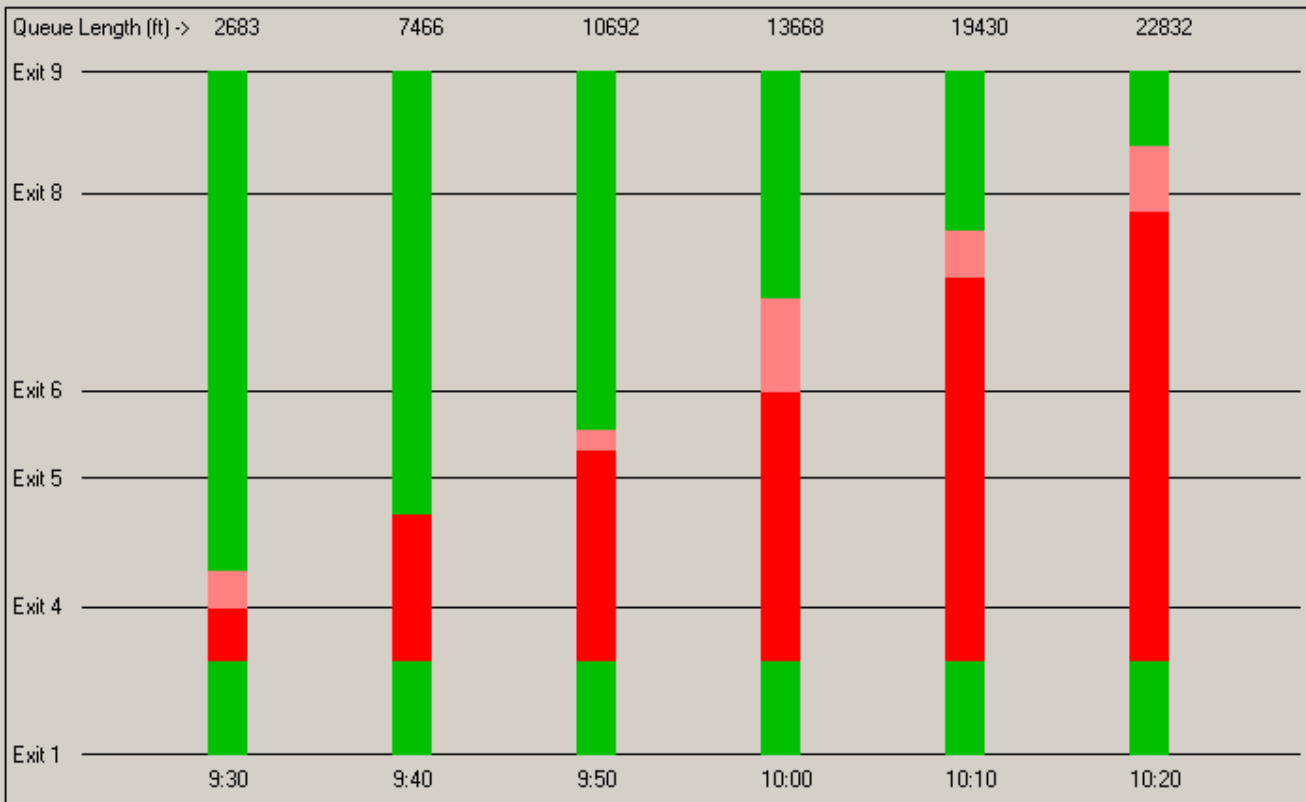
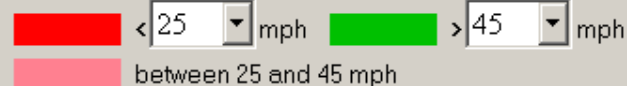


Exit 1 (I-495)

Display the output of the travel time

Time Period

Queue Legend



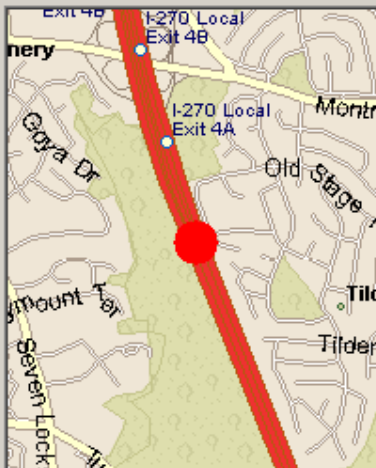
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Average Speed

Display the map-based output

Road Segments



Exit 9 (I-370)



Traffic Direction



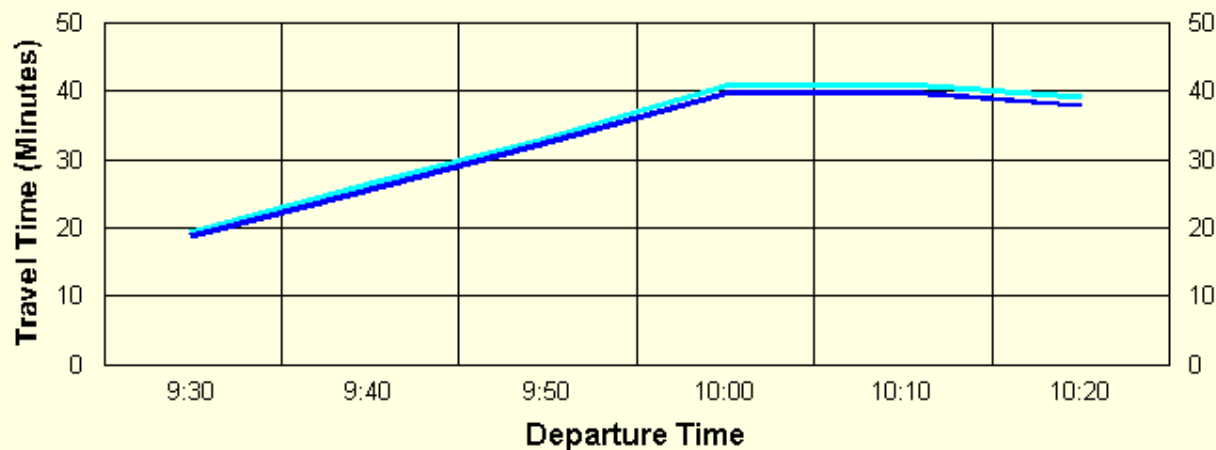
Exit 1 (I-495)

Time Period

From : 09:20

To : 10:20

Travel Time vs. Departure Time



— No detour operation:

Travel Time on I-270 from Ex9 to Ex1

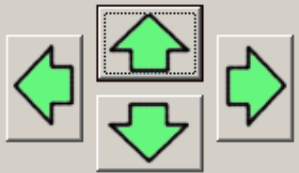
— No detour operation:

Travel Time on I-270 using the detour route from Ex9 to Ex1

Time Period: 09:20 to 10:50

Time: 9:20 To 9:30AM

Display Information



Queue Speed

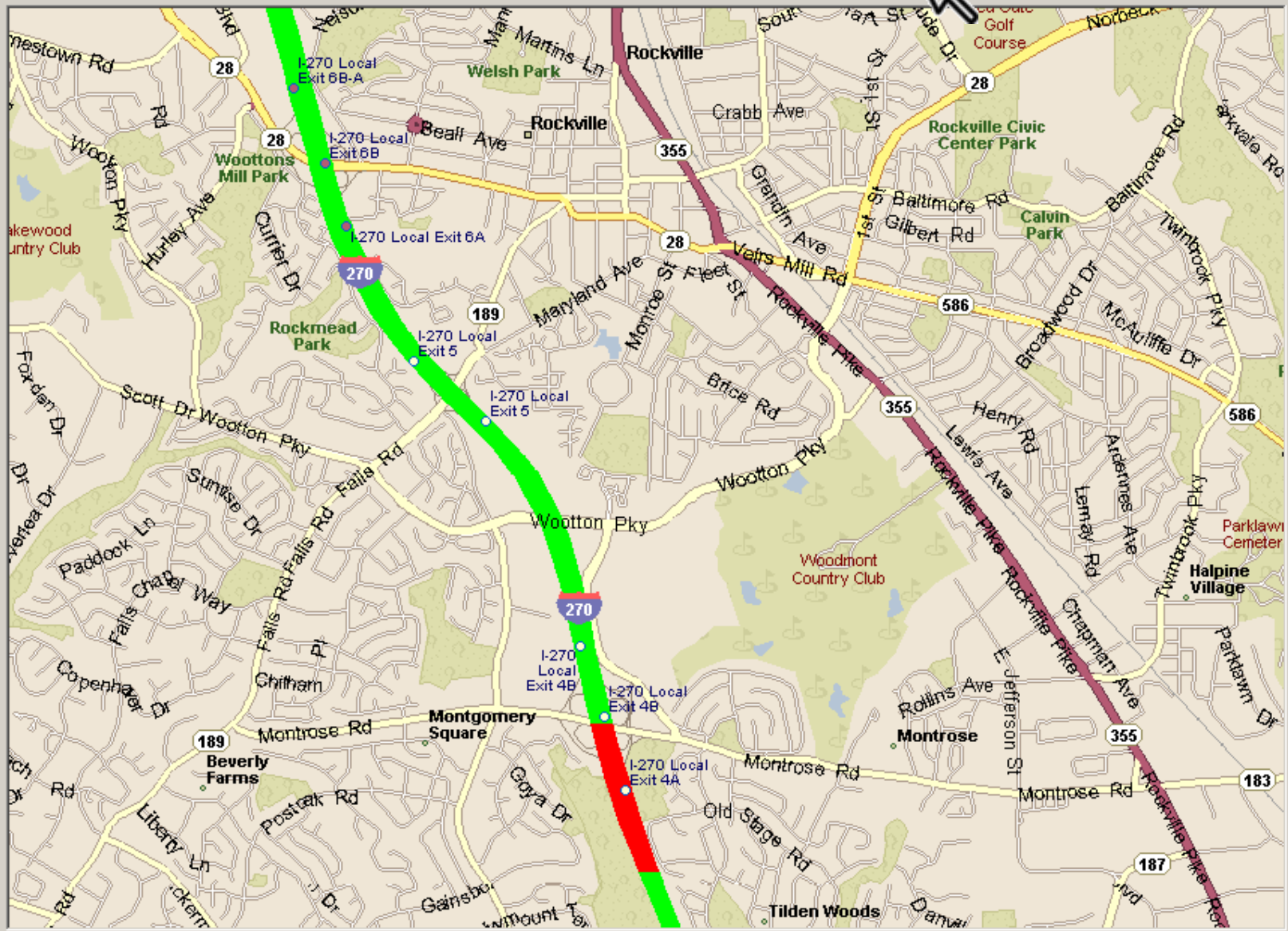
< Pause Play >

- I-270
- MD 355

Queue

Queue

< 15 mph



Traffic Direction

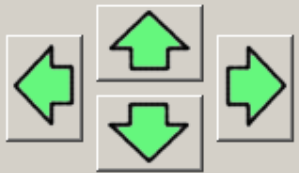
Chart-based Output

View Animation

Time Period: 09:20 to 10:50

Time: 9:30 To 9:40AM

Display Information




Queue Speed

< Pause Play >

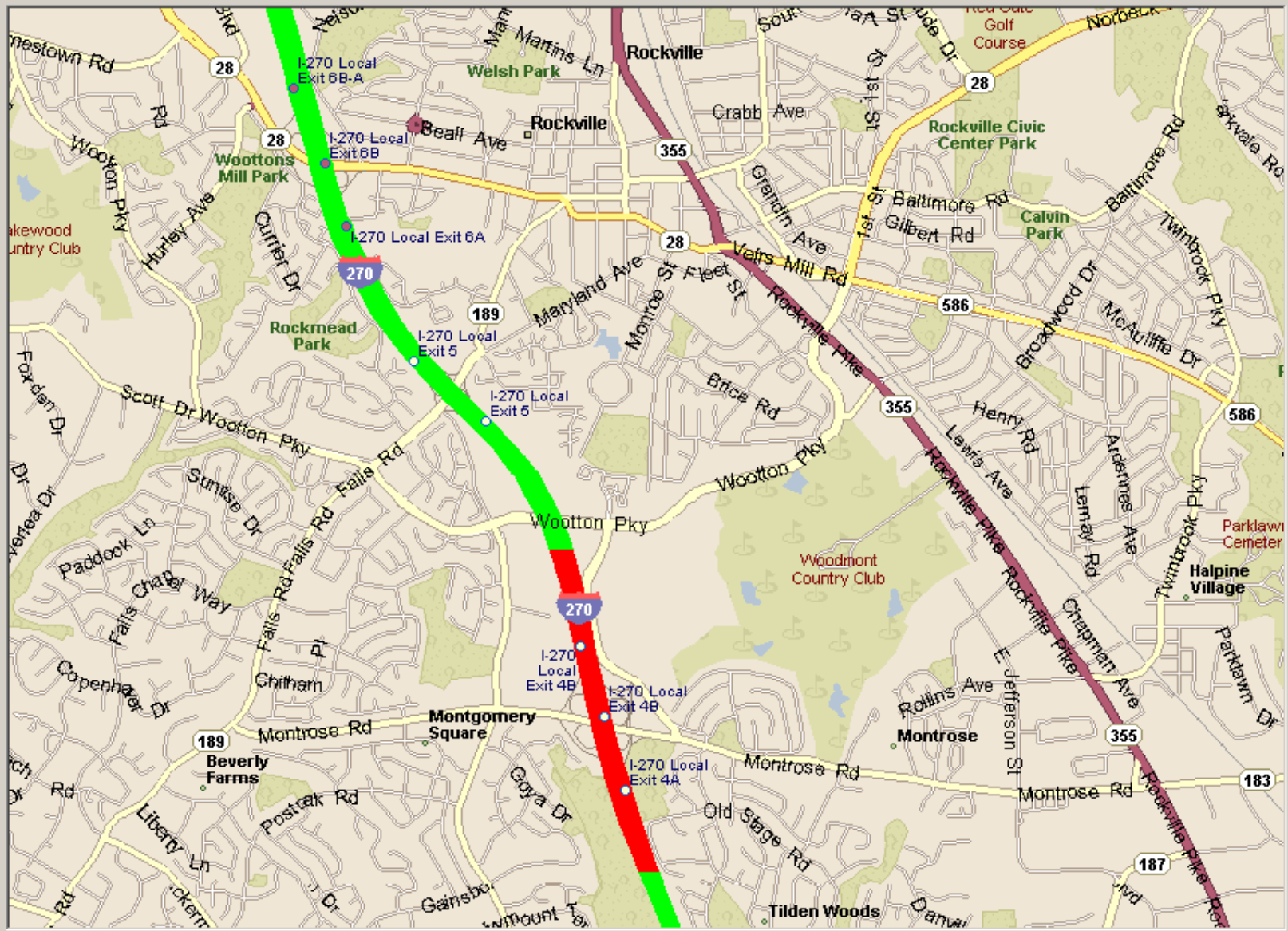
- I-270
- MD 355

Queue



Queue

< 15 mph



- Traffic Direction
- Chart-based Output
- View Animation

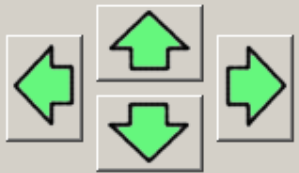
Time Period: 09:20 to 10:50

Time: 9:40 To 9:50AM

Display Information


Queue **Speed**

Show speed information



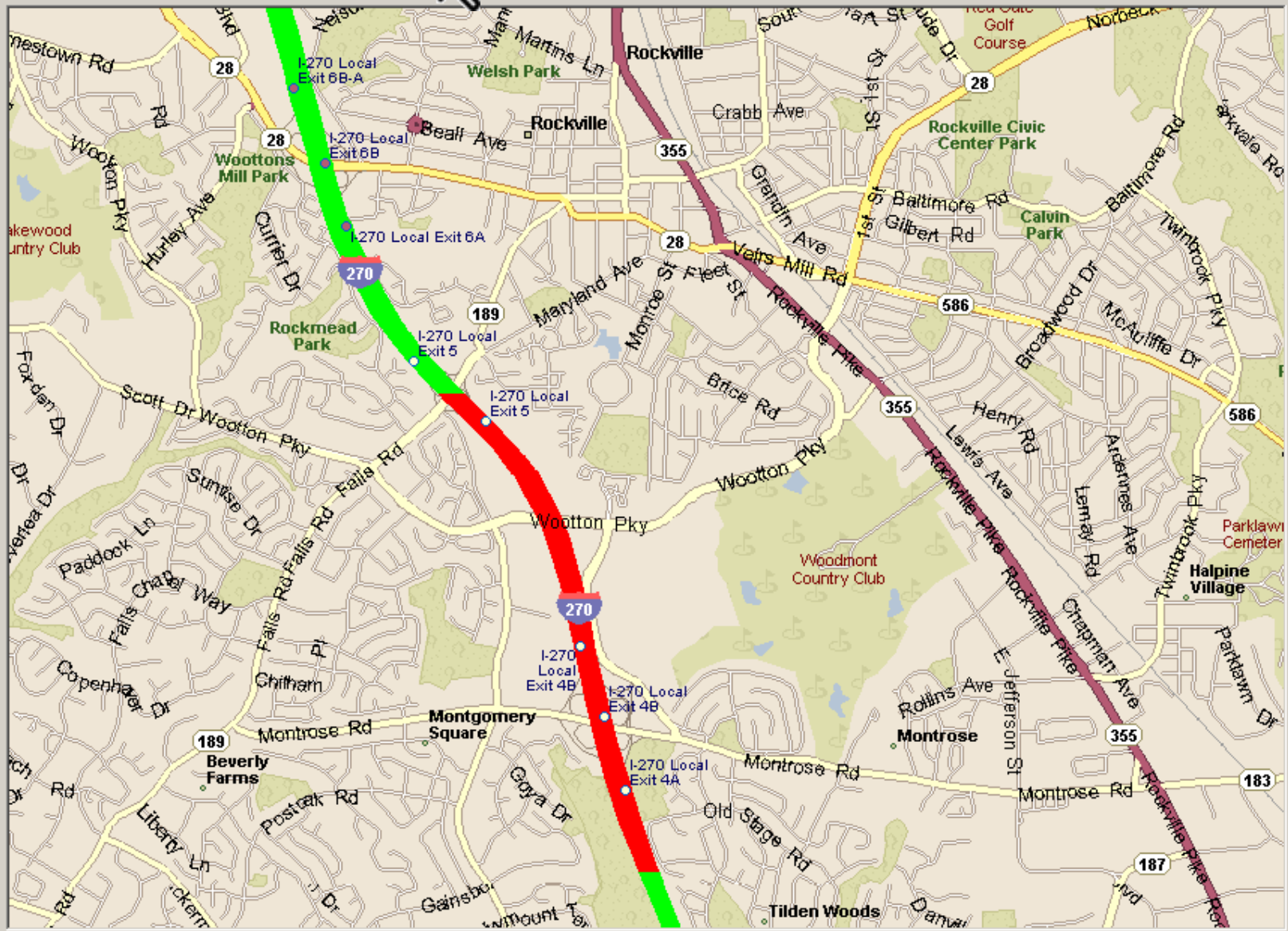
- I-270
- MD 355

Queue



Queue

< 15 mph

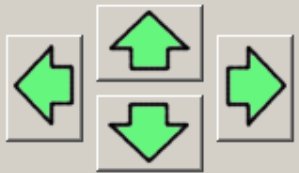


- Traffic Direction
- Chart-based Output
- View Animation

Time Period: 09:20 to 10:50

Time: 9:40 To 9:50AM

Display Information



Queue

Speed




Pause

Play



- I-270
- MD 355


Speed




< 25 mph

Between

25 mph and 45 mph



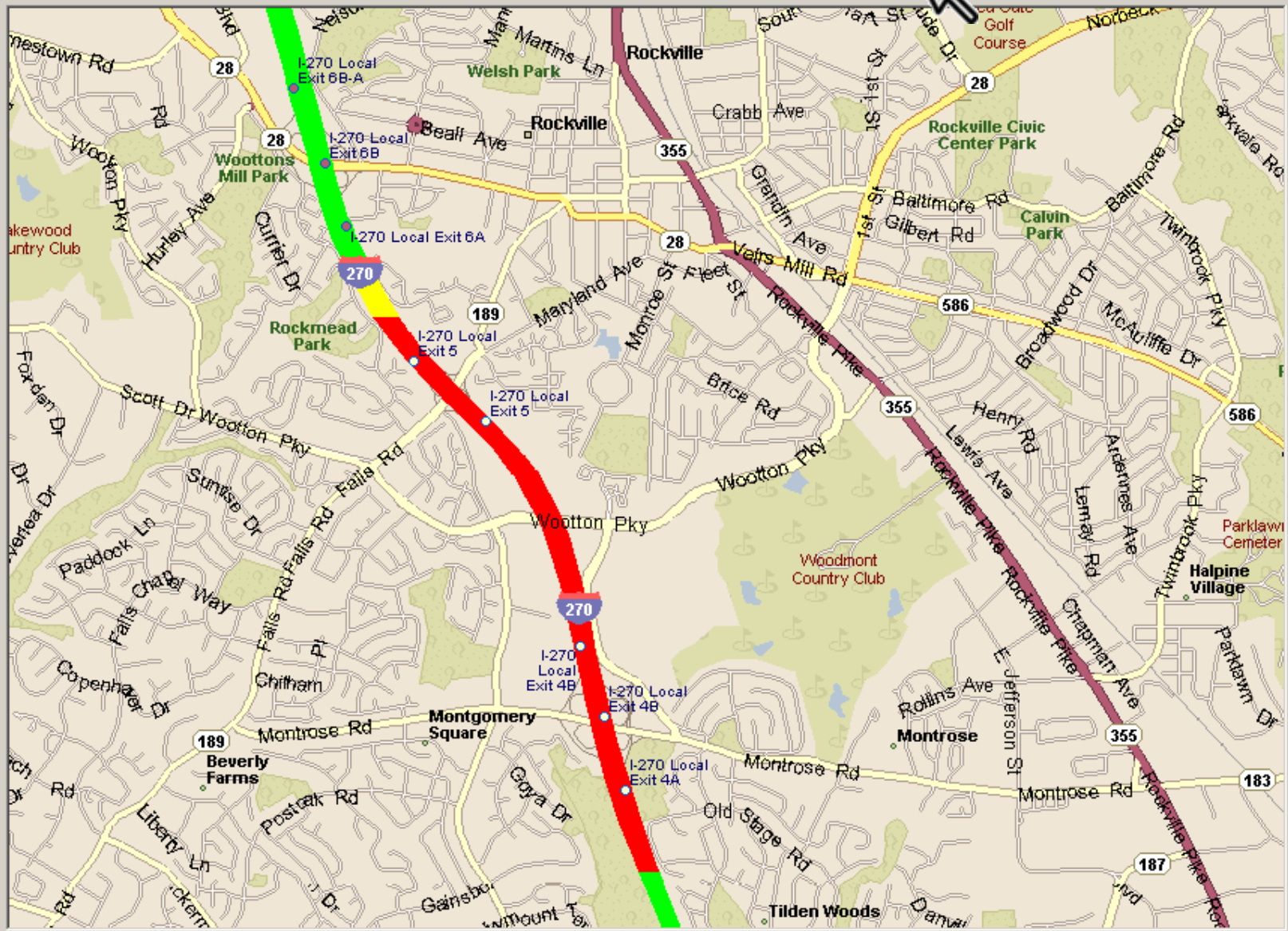
> 45 mph



Traffic Direction

Chart-based Output

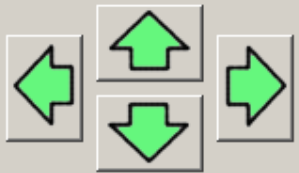
View Animation



Time Period: 09:20 to 10:50

Time: 9:50 To 10:00AM

Display Information




Queue Speed


< Pause Play >

- I-270
- MD 355


Speed




< 25 mph



Between 25 mph and 45 mph



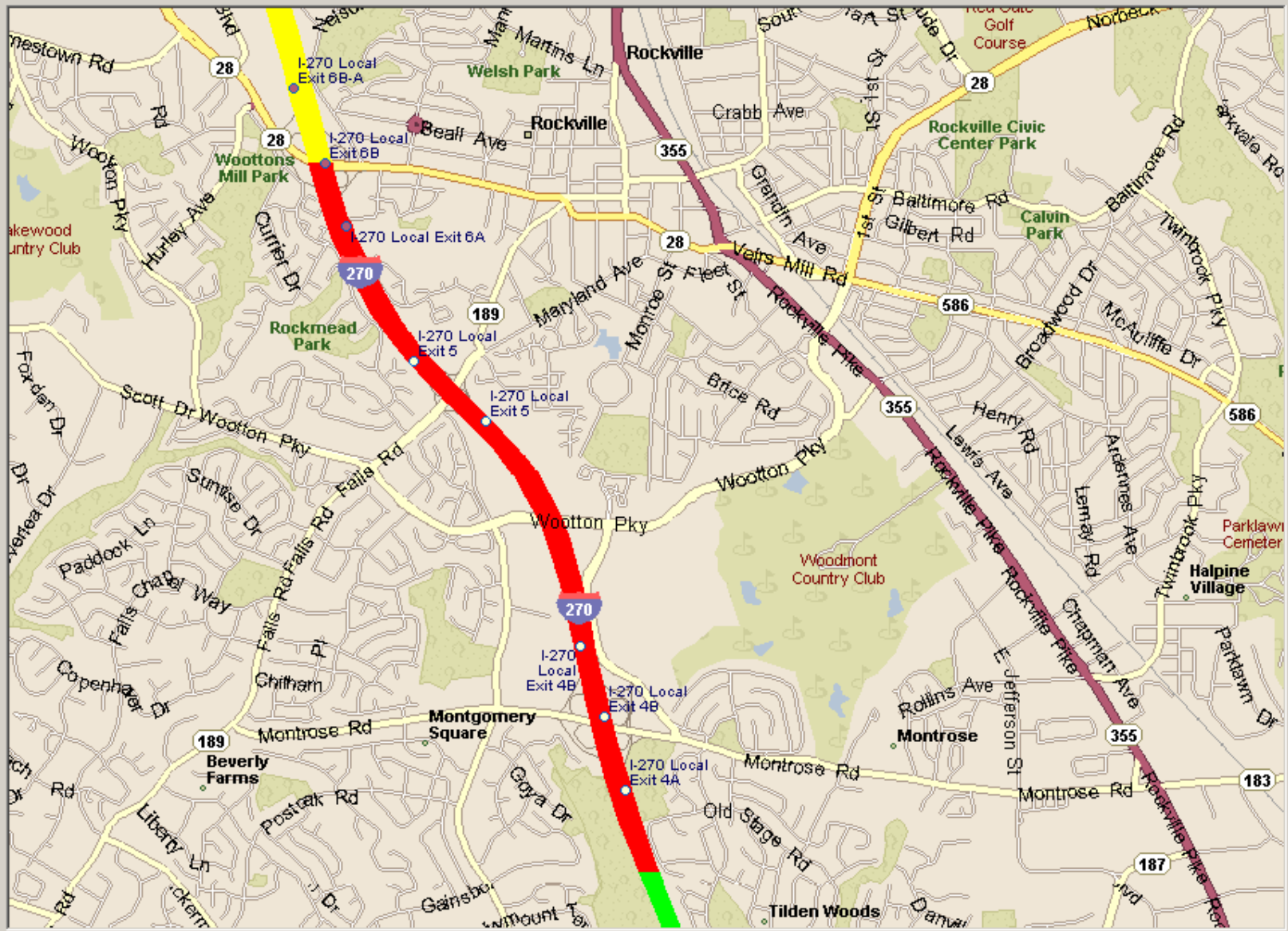
> 45 mph



Traffic Direction

Chart-based Output

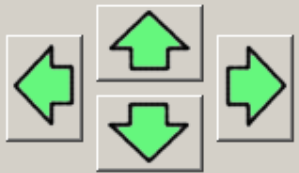
View Animation



Time Period: 09:20 to 10:50

Time: 10:00 To 10:10AM

Display Information



- I-270
- MD 355

Speed



< 25 mph



Between

25 mph

and 45 mph

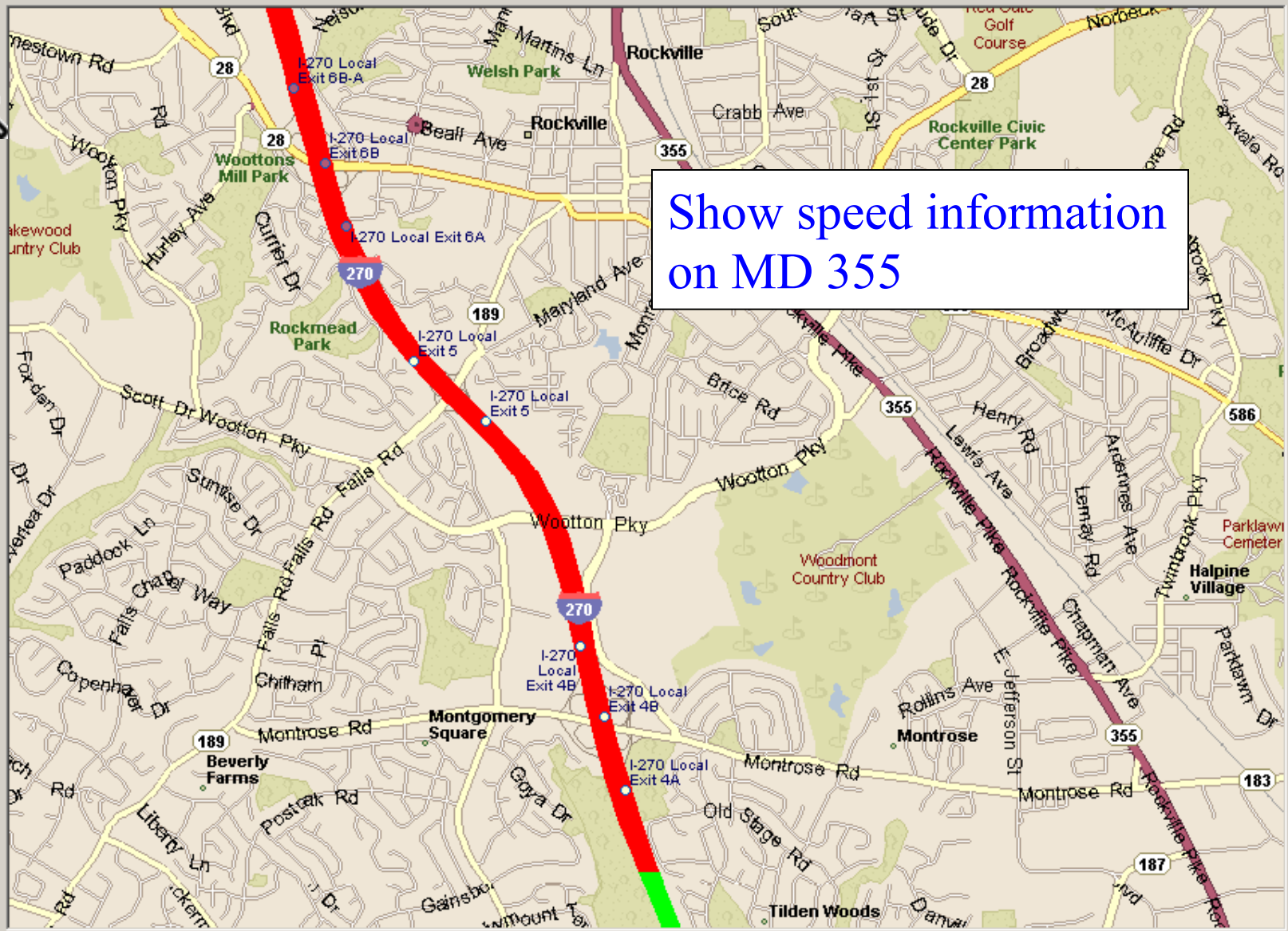


> 45 mph



Traffic Direction

Show speed information
on MD 355



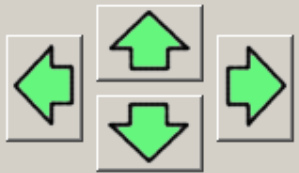
Time Period: 09:20 to 10:50

Time: 10:00 To 10:10AM

Display Information

Queue Speed

< Pause Play >



- I-270
- MD 355

Speed

< 25 mph

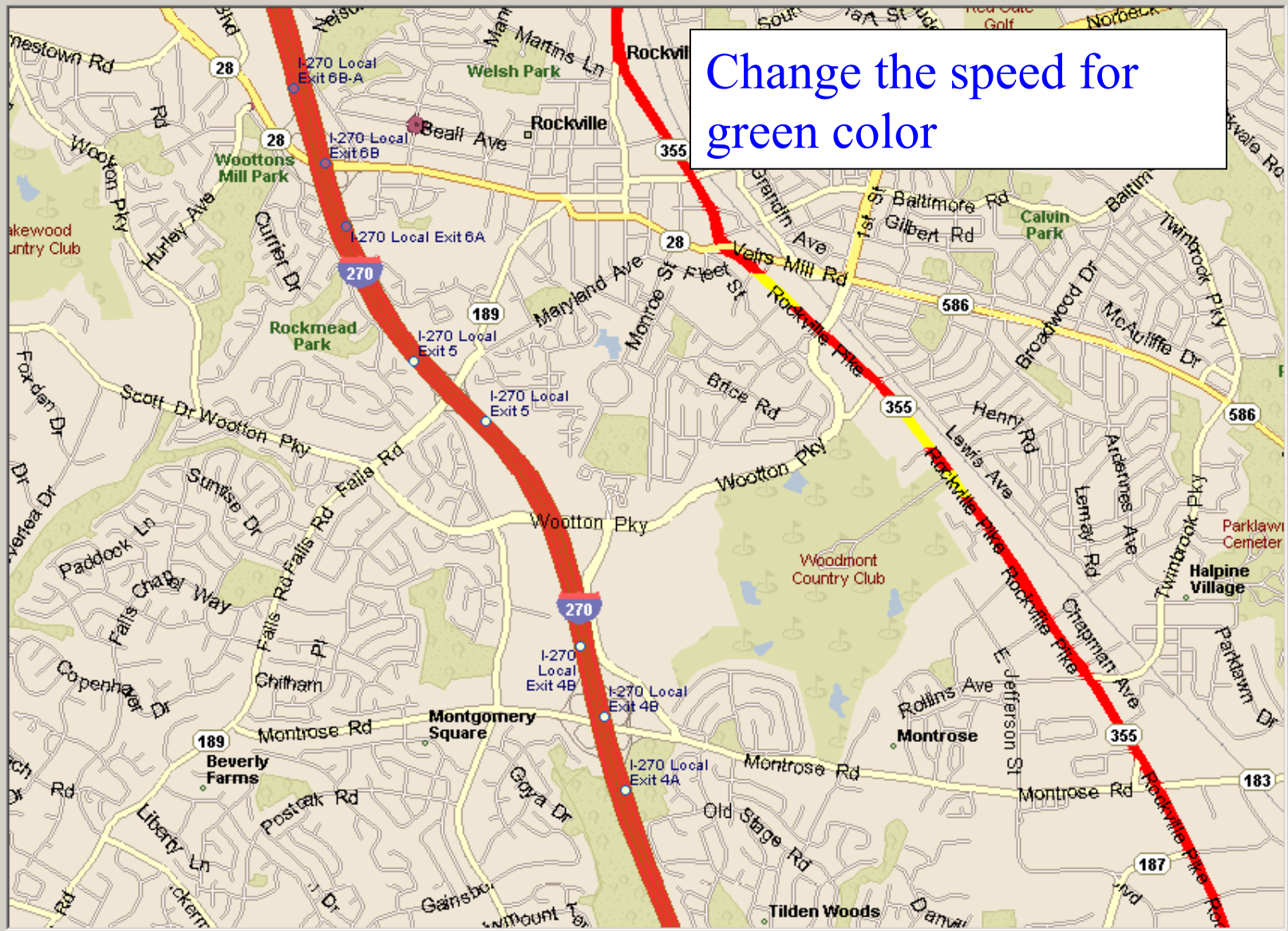
Between 25 mph and 45 mph

> 45 mph



- Traffic Direction
- Chart-based Output
- View Animation

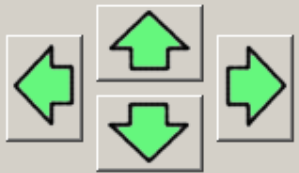
Change the speed for green color



Time Period: 09:20 to 10:50

Time: 10:00 To 10:10AM

Display Information



Queue Speed

< Pause Play >

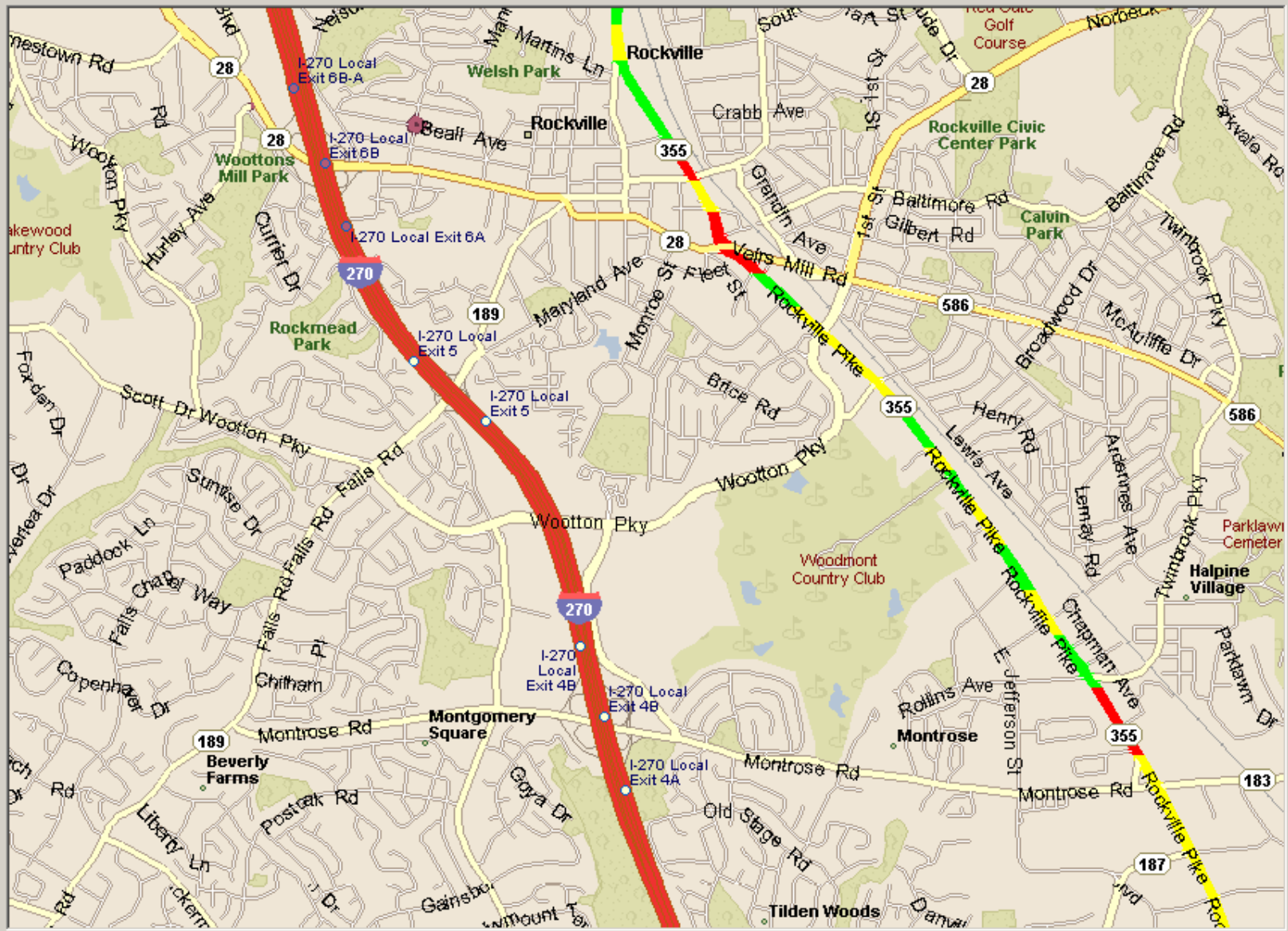
- I-270
- MD 355

Speed

< 15 mph

Between 15 mph and 20 mph

> 20 mph



- Traffic Direction
- Chart-based Output
- View Animation

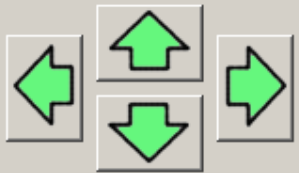
Time Period: 09:20 to 10:50

Time: 10:10 To 10:20AM

Display Information

Queue Speed

< Pause Play >



View the animation of the simulation

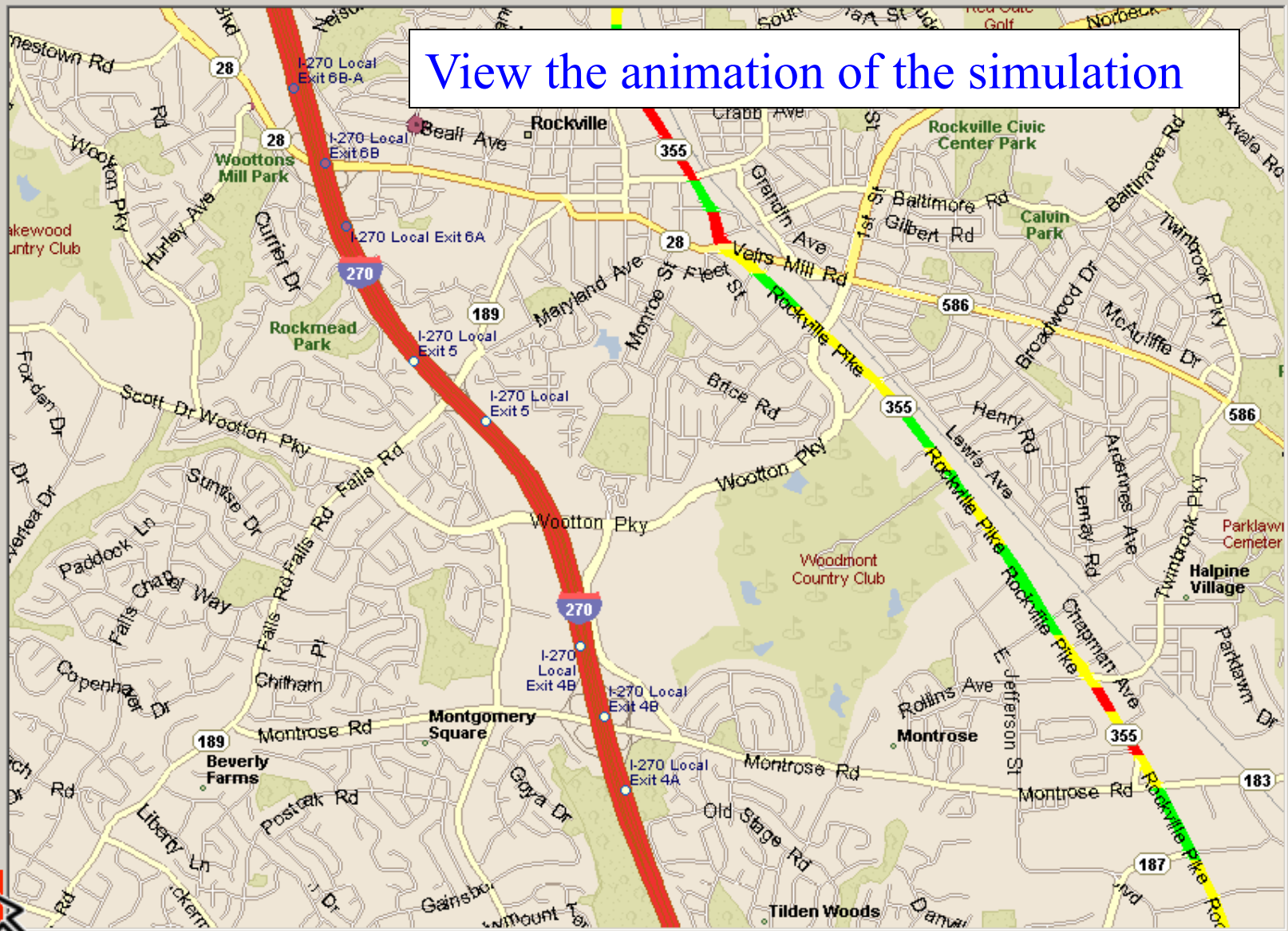
- I-270
- MD 355

Speed

< 15 mph

Between 15 mph and 20 mph

> 20 mph



- Traffic Direction
- Chart-based Output
- View Animation**



- LEGEND
- VEHICLE COLORS
- Left ■
 - Right ■
 - Lt Diag ■
 - Rt Diag ■
 - Through ■
- INCIDENTS
- Blocked ■
 - Restricted ■
- SIGNALS
- Actuated ●
 - Fixed ■
 - Ramp Mtr ◆

APC

Frame Delay (Seconds)

0.000 0.000 2.000

Frames/Time Step

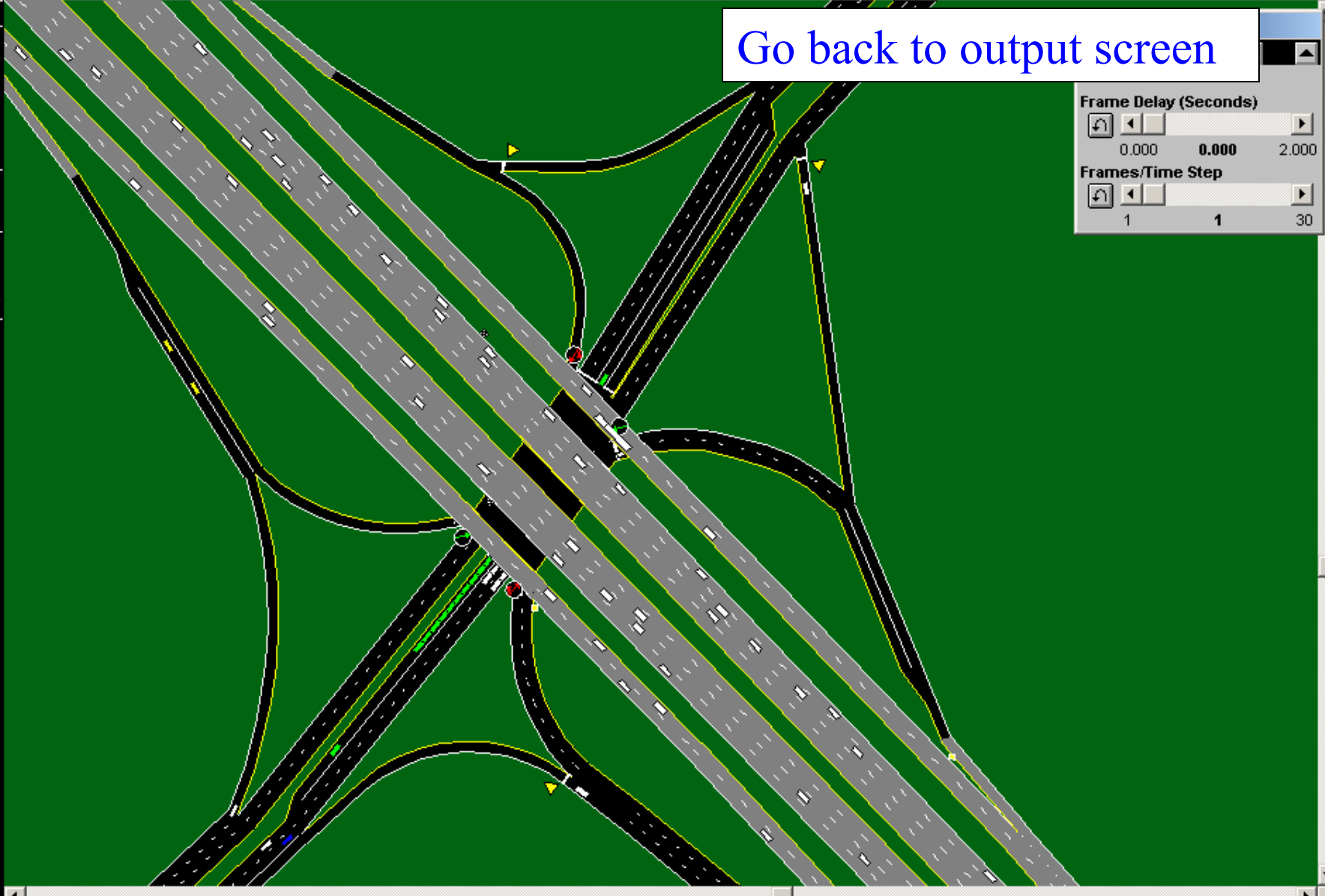
1 1 30

Incident Location





- LEGEND**
- VEHICLE COLORS**
- Left ■
 - Right ■
 - Lt Diag ■
 - Rt Diag ■
 - Through ■
- INCIDENTS**
- Blocked ■
 - Restricted ■
- SIGNALS**
- Actuated ●
 - Fixed ■
 - Ramp Mtr ◆



Go back to output screen

Frame Delay (Seconds)

0.000 **0.000** 2.000

Frames/Time Step

1 1 30

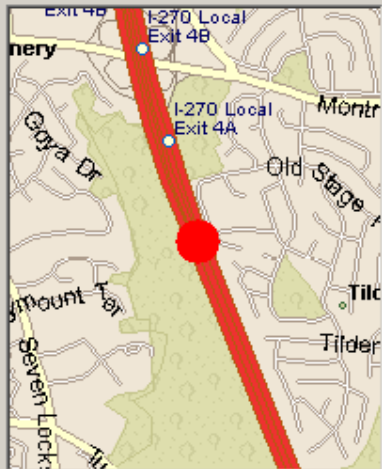
Output Selection



Or


 I-270
 MD 355

Study Area



Status

Result updated by
Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Apply incident management strategies

Road Segments



Exit 9 (I-370)



Traffic Direction



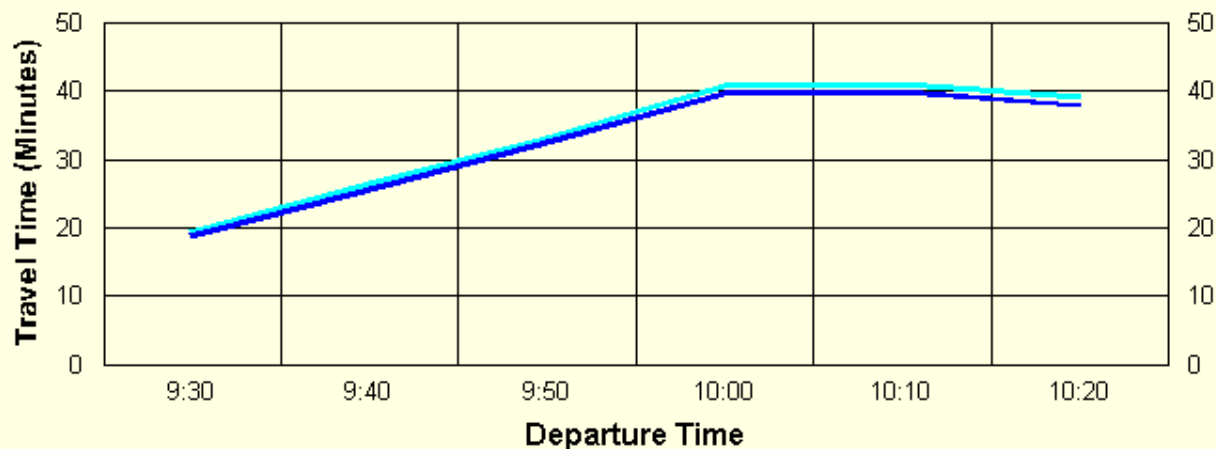
Exit 1 (I-495)

Time Period

From : 09:20

To : 10:20

Travel Time vs. Departure Time



— No detour operation: Travel Time on I-270 from Ex9 to Ex1

— No detour operation: Travel Time on I-270 using the detour route from Ex9 to Ex1

Set the detour plan for the current incident

 Interstate 270

Between

Exit 4 (Montrose Rd)

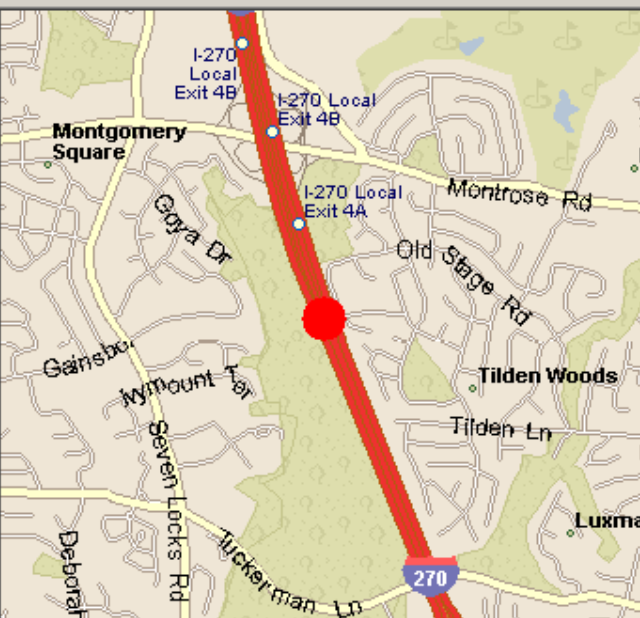
And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!



Summary of Accident Related Information:

Here is the summary for the detailed information of the accident

1. The accident is located on I-270 **SOUTH BOUND**.
2. The accident location is **4996 feet from downstream Exit 4 (Montrose Rd)**.
3. The blocked lane(s) are:  Traffic Direction

4. Approximated starting time of the accident: **9:25**

5. Estimated incident duration: **50 minutes**

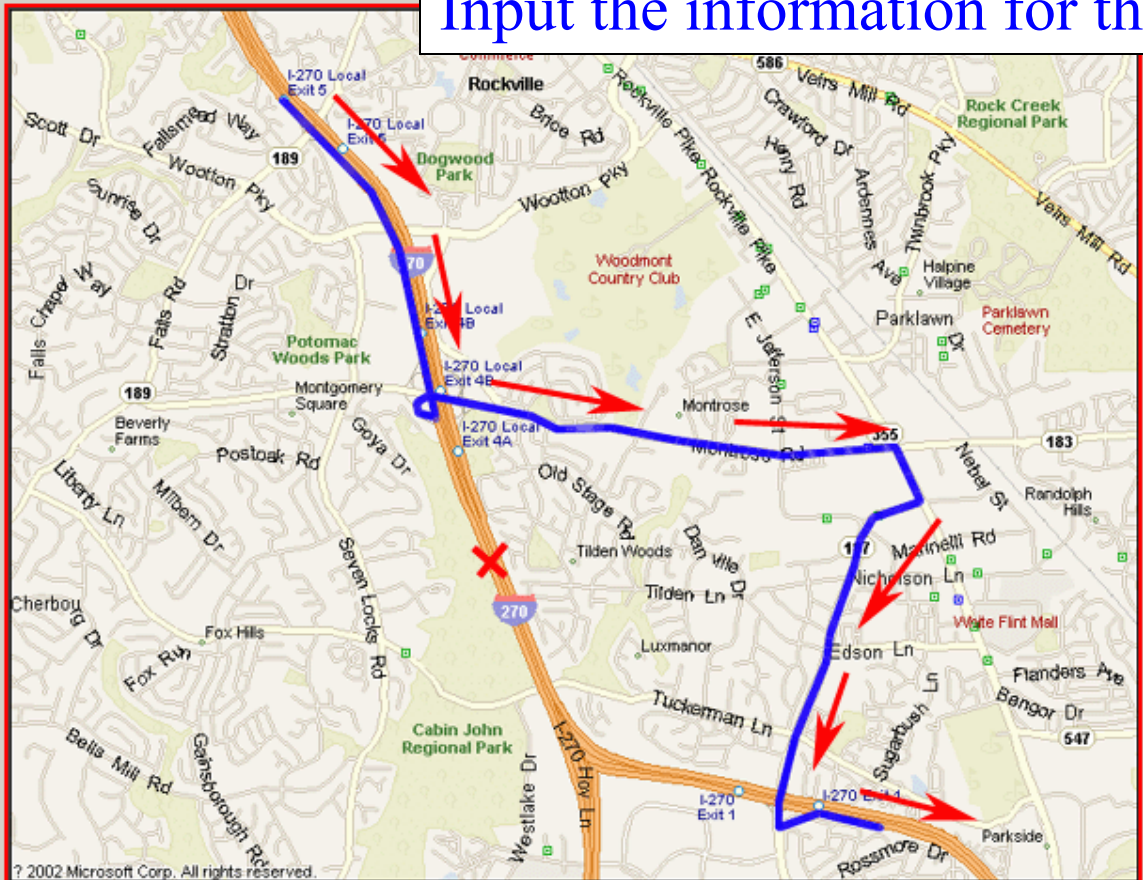
If some changes are needed =>

Or, all above are correct => execute the simulation and then show estimated results.

Ready to set detour operation? Click below:

Ready to reset signals? Click below:

Input the information for the detour plan



Summary of Acc

Here is the sum

- 1. The accident is loc
- 2. The accident locati
- 3. The blocked lane(s)

- 4. Approximated start
- 5. Estimated incident

If some change

Or, all above are

Northbound Southbound

Start at minutes after the time of the incident

Duration : minutes

Percentage of Detour Volume : %

OK

Cancel

Choose another detour



on? Click below:

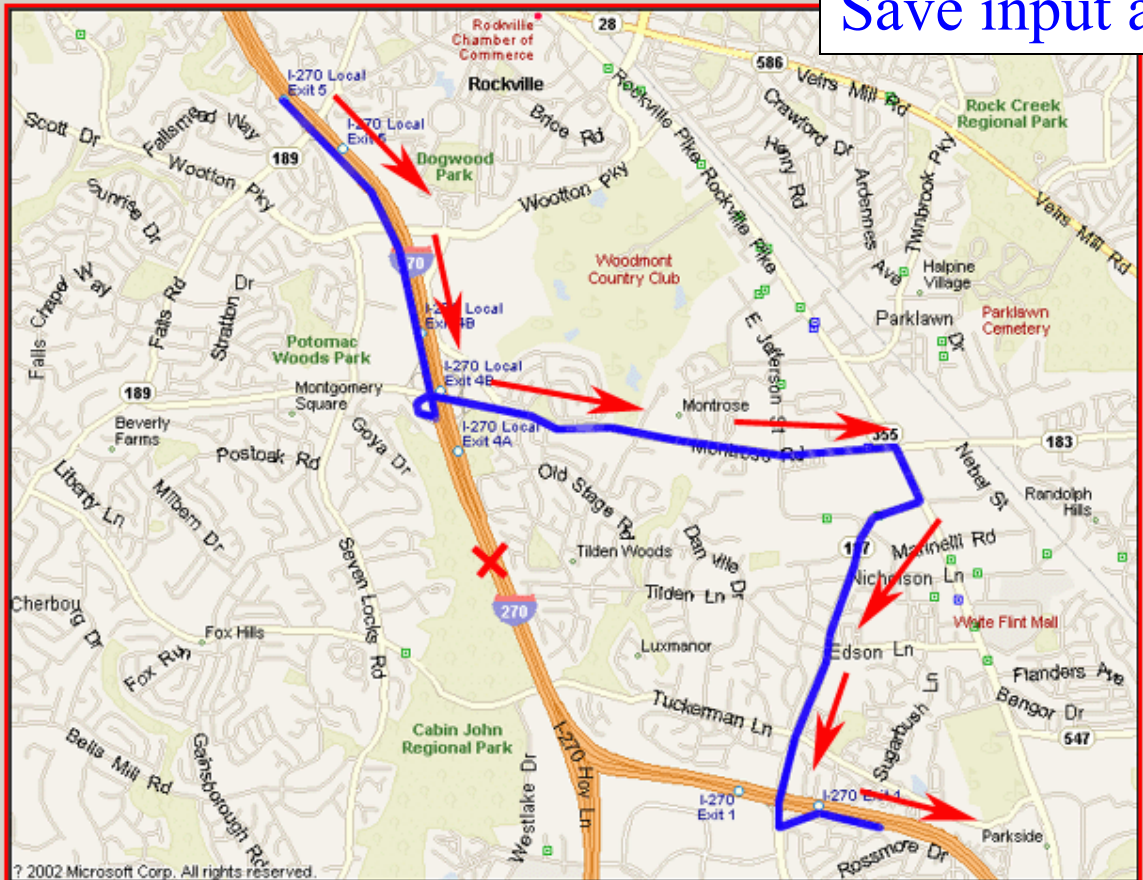
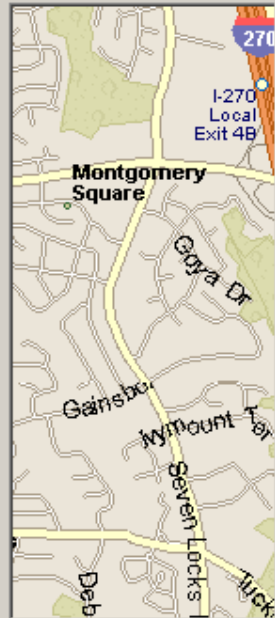
our

c below:

als

ation ⇨

Save input and continue



Summary of Acc

Here is the sum

- 1. The accident is loc
 - 2. The accident locati
 - 3. The blocked lane(s
 - 4. Approximated start
 - 5. Estimated incident
- If some change
- Or, all above are

Northbound Southbound

Start at minutes after the time of the incident

Duration : minutes

Percentage of Detour Volume : %

Choose another detour

OK
Cancel



on? Click below:

our

c below:

als

ation ⇨

Change signal timings

Selected Information

You have just indicated the accident location

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

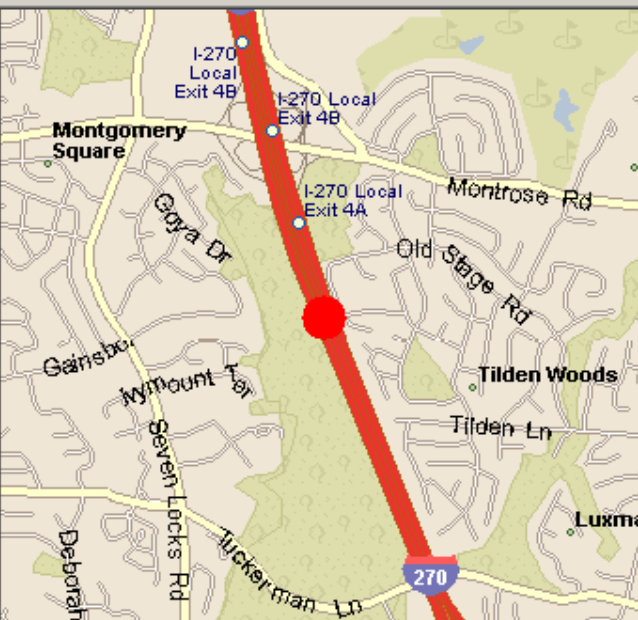
And

Exit 1 (I-495)

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!



Summary of Accident Related Information:

Here is the summary for the detailed information of the accident

1. The accident is located on I-270 **SOUTH BOUND**.
2. The accident location is **4996 feet from downstream Exit 4 (Montrose Rd)**.

3. The blocked lane(s) are:  Traffic Direction

4. Approximated starting time of the accident: **9:25**

5. Estimated incident duration: **50 minutes**

If some changes are needed =>

Or, all above are correct => execute the simulation and then show estimated results.

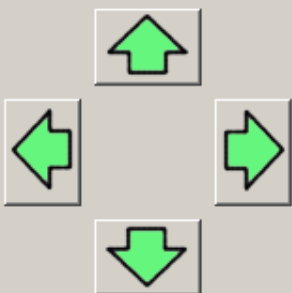
Ready to set detour operation? Click below:

Ready to reset signals? Click below:

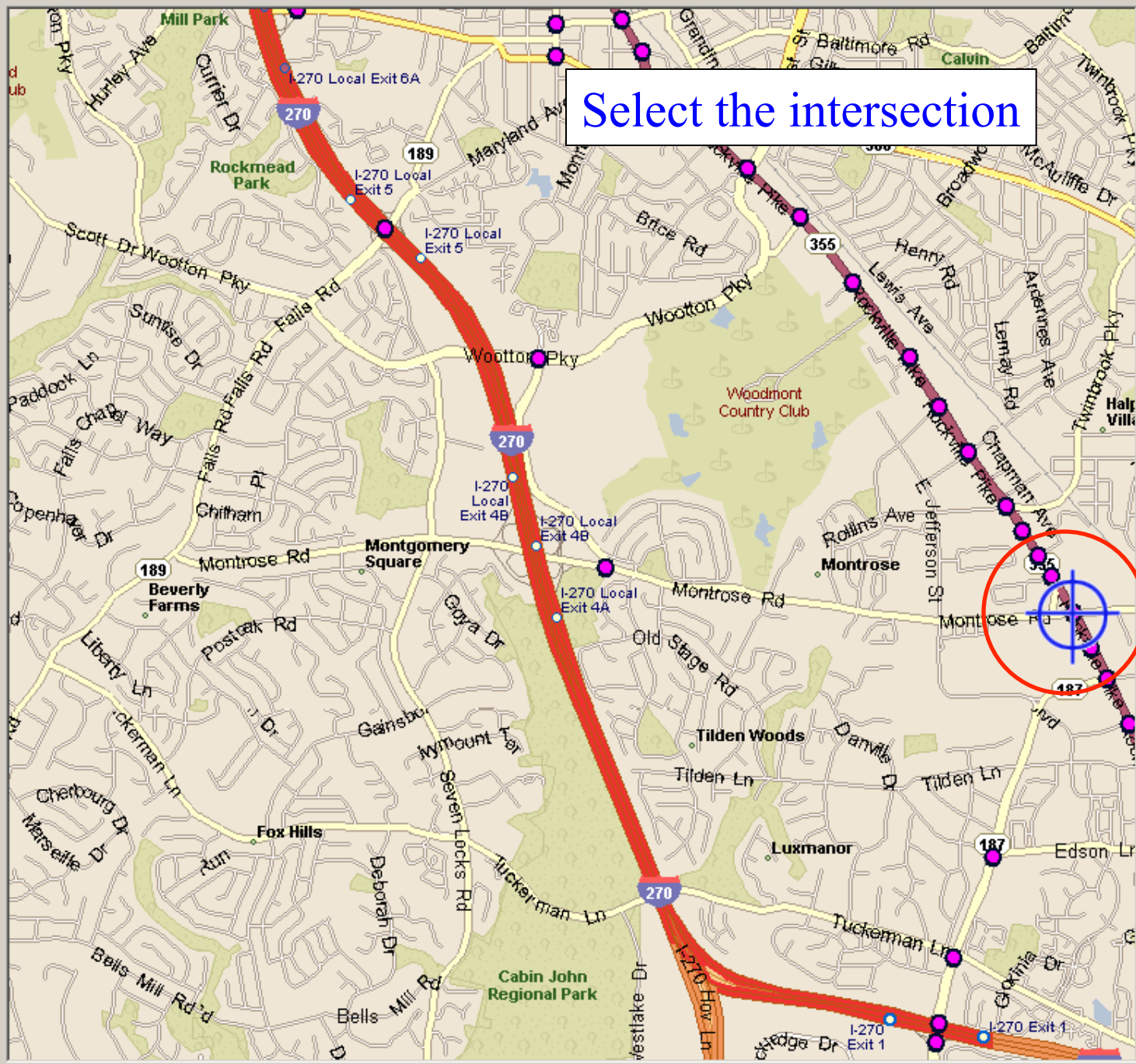
Select Signal

Click on the pink circles to change the signal timings

Map Navigation



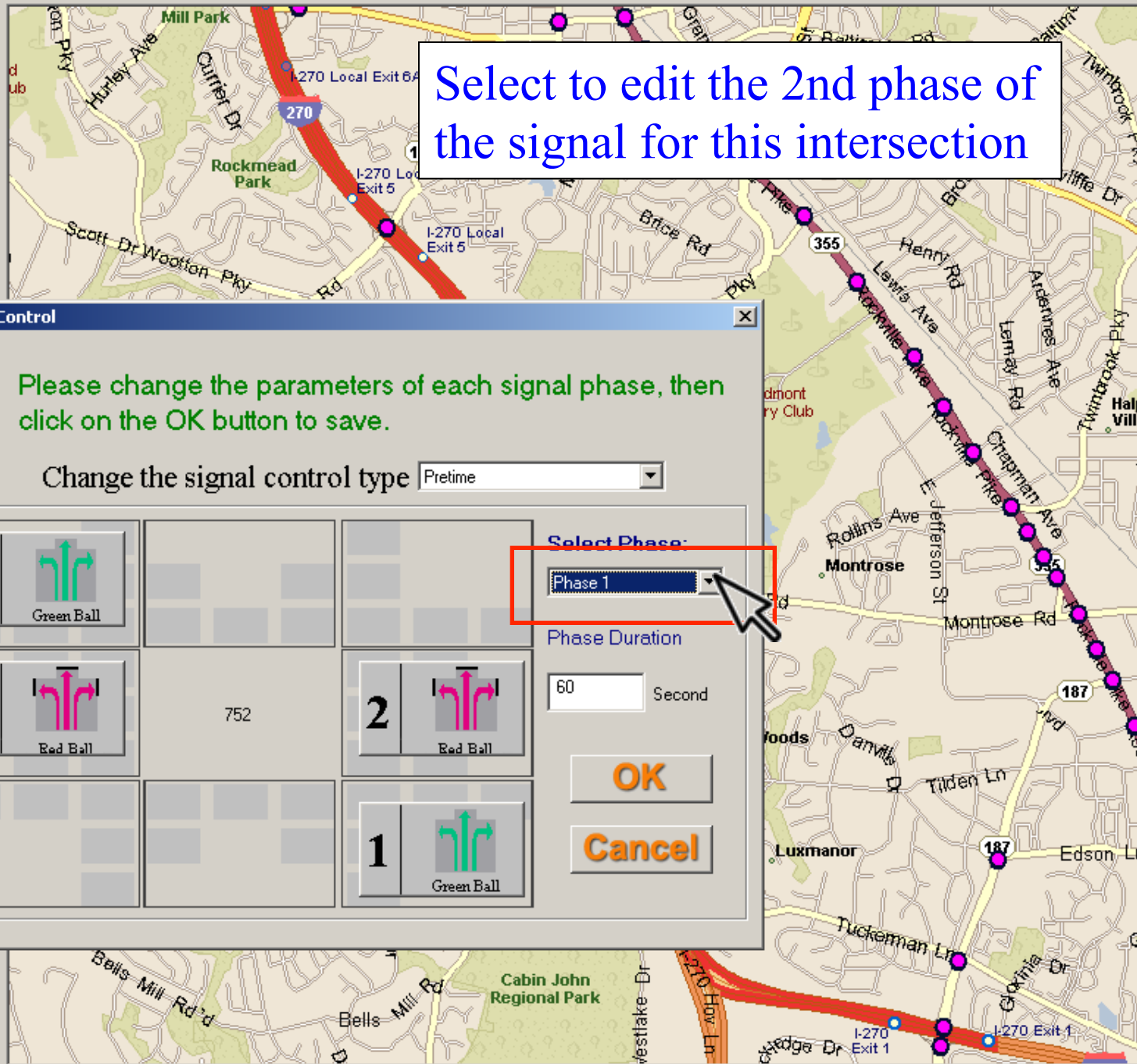
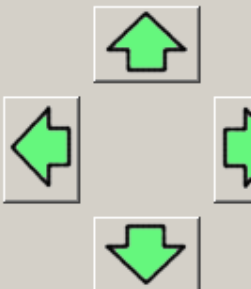
Exit



Select Signal

Click on the pink circles to change the signal timings

Map Navigation







Select to edit the 2nd phase of the signal for this intersection

Signal Control

Please change the parameters of each signal phase, then click on the OK button to save.

Change the signal control type

1				
2		752	2	
			1	

Select Phase:

Phase Duration Second

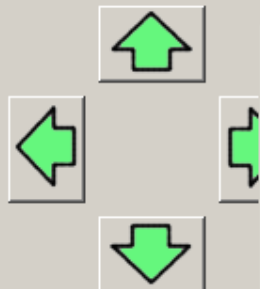
OK

Cancel

Select Signal

Click on the pink circles to change the signal timings

Map Navigation



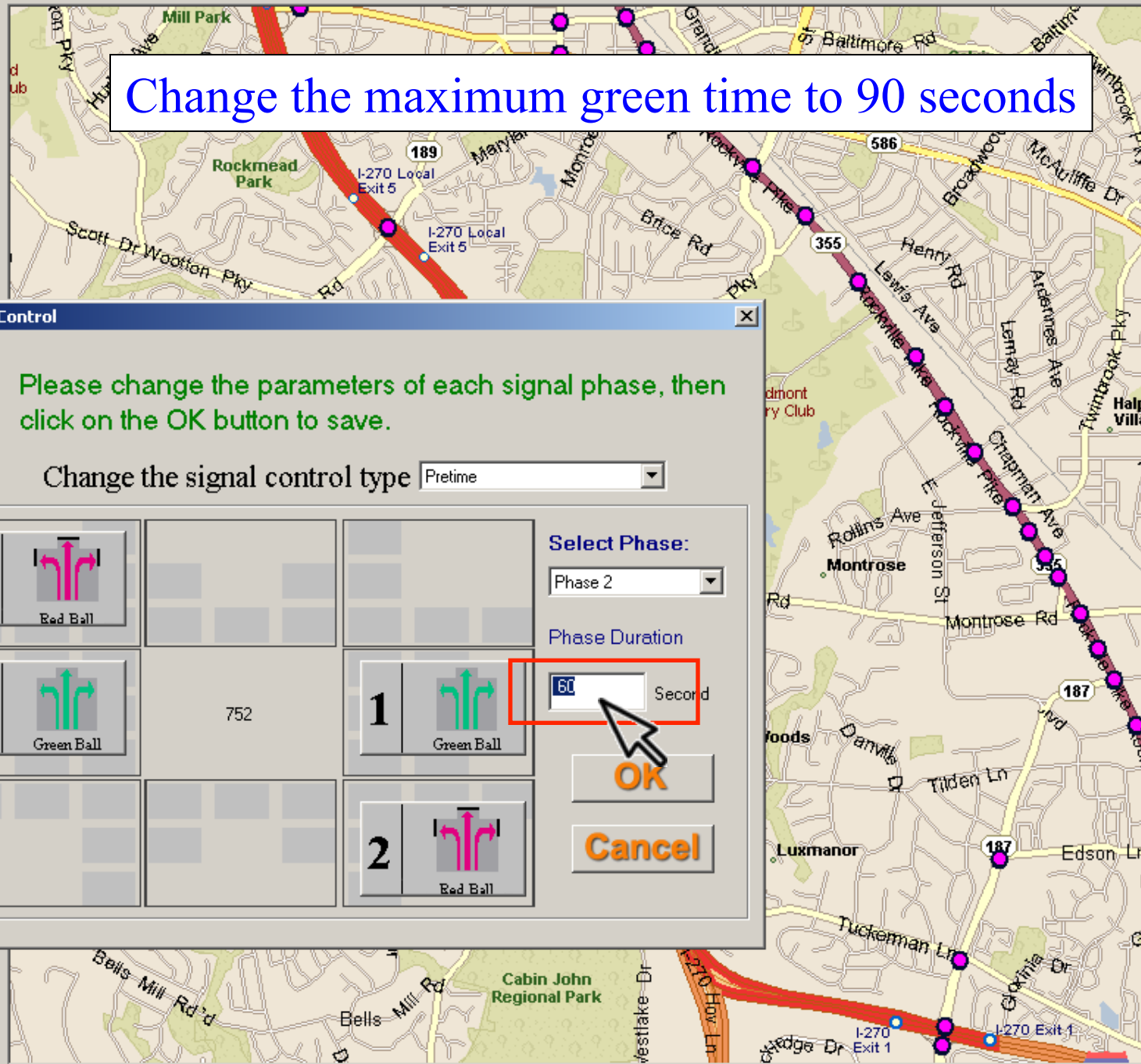
Change the maximum green time to 90 seconds

Signal Control

Please change the parameters of each signal phase, then click on the OK button to save.

Change the signal control type

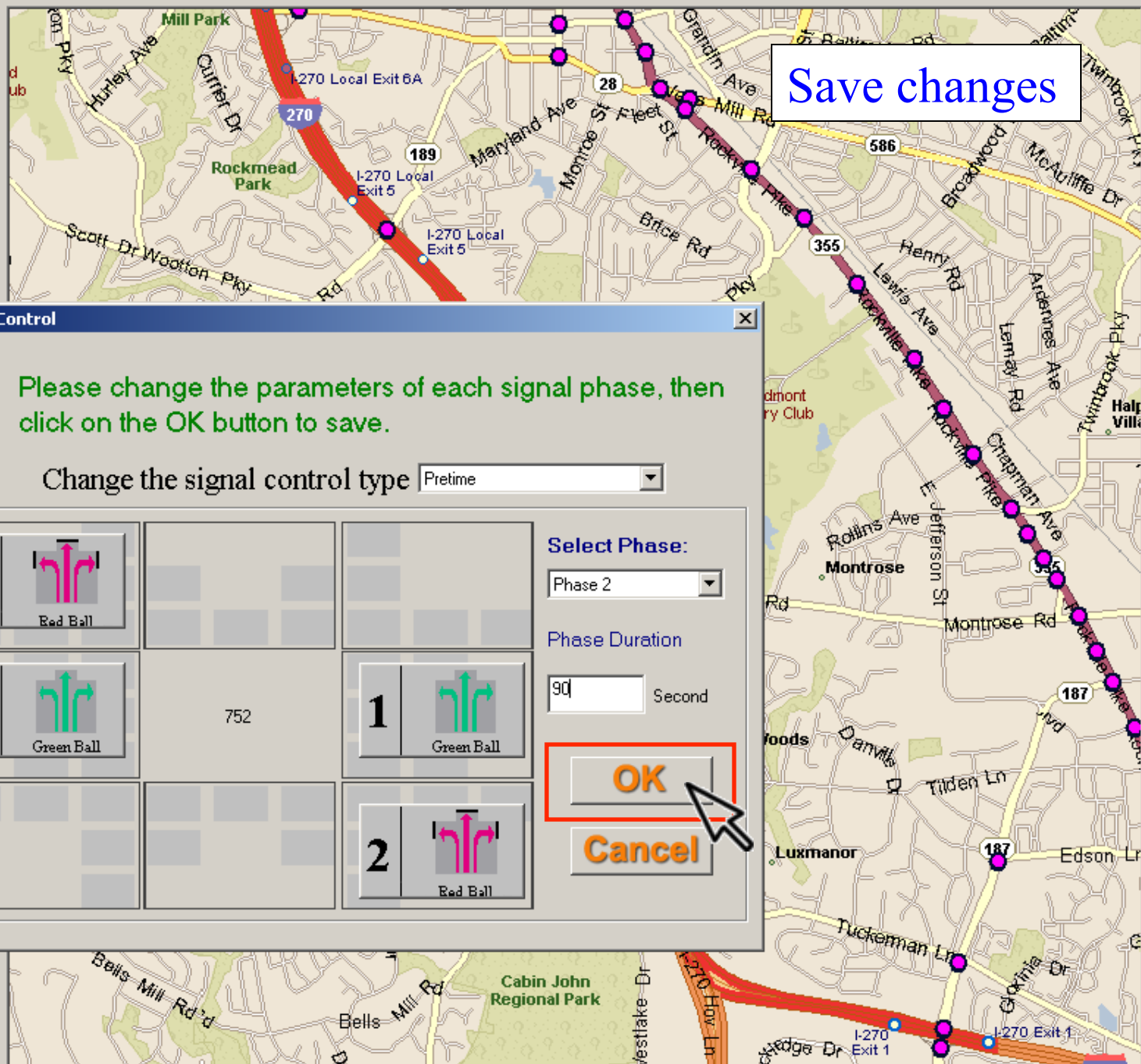
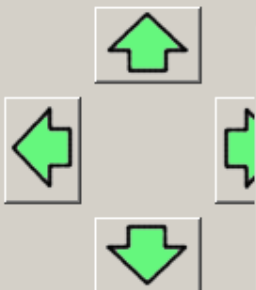
2 Red Ball			Select Phase: <input type="text" value="Phase 2"/>
1 Green Ball	752	1 Green Ball	Phase Duration <input type="text" value="60"/> Second
		2 Red Ball	<input type="button" value="OK"/> <input type="button" value="Cancel"/>



Select Signal

Click on the pink circles to change the signal timings

Map Navigation







Save changes

Signal Control

Please change the parameters of each signal phase, then click on the OK button to save.

Change the signal control type

2					
1		752	1		
			2		

Select Phase:

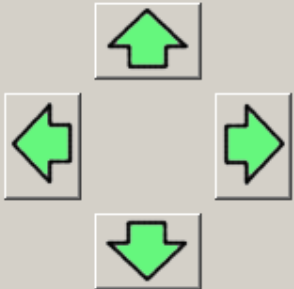
Phase Duration: Second

OK **Cancel**

Select Signal

Click on the pink circles to change the signal timings

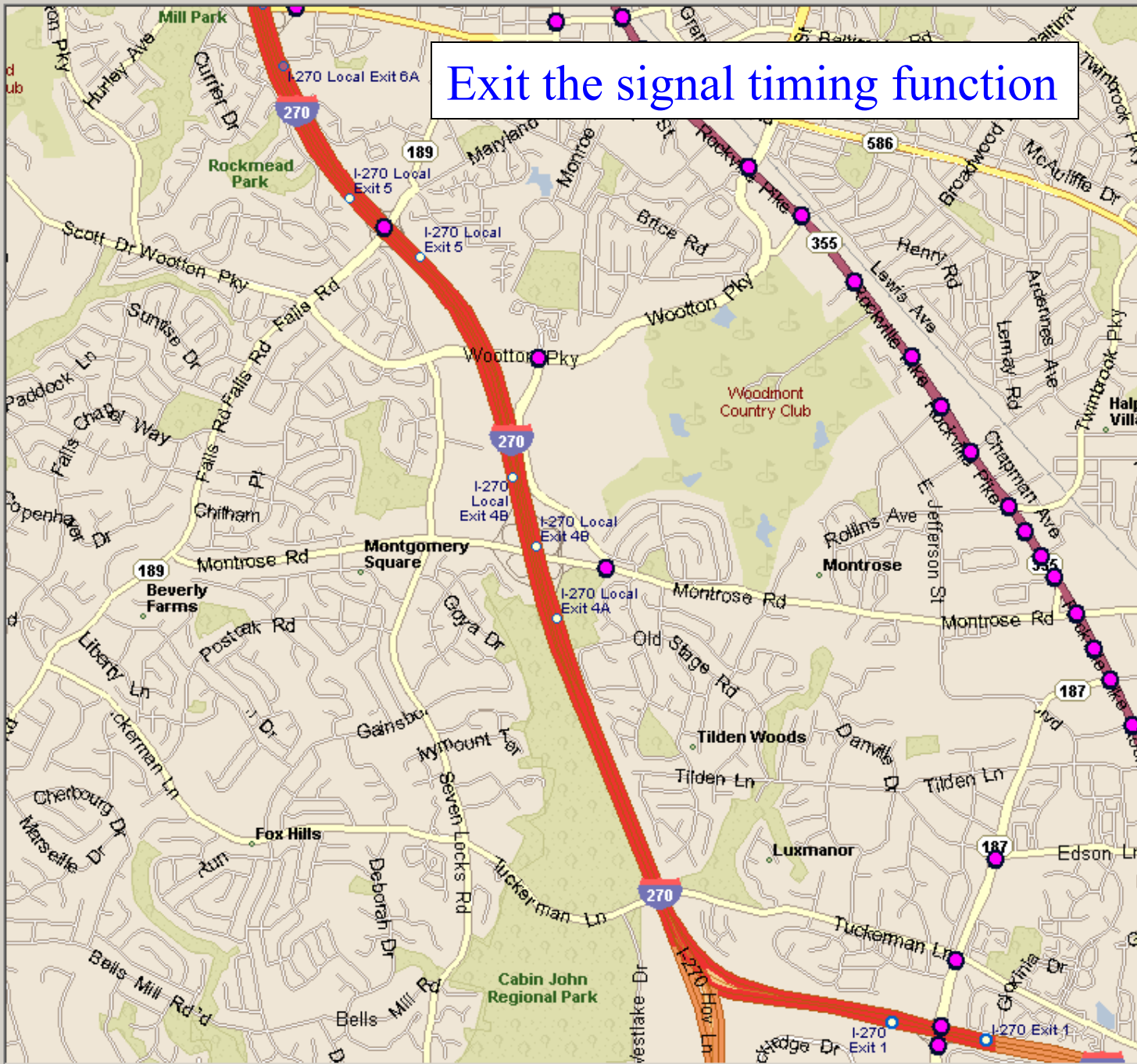
Map Navigation

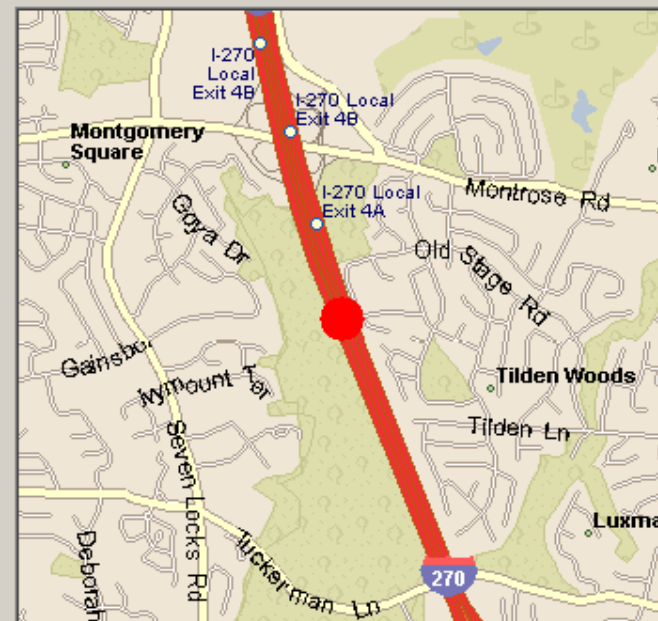


Exit



Exit the signal timing function





Selected Information

You have just indicated the accident

 **Interstate 270**

Between

Exit 4 (Montrose Rd)

And

Exit 1 (I-495)

Execute the simulation

Is this the accident location?

No! → Click to location

Yes! → Please complete the following information!

Summary of Accident Related Information:

Here is the summary for the detailed information of the accident

1. The accident is located on I-270 **SOUTH BOUND**.
2. The accident location is **4996 feet from downstream Exit 4 (Montrose Rd)**.
3. The blocked lane(s) are:  Traffic Direction

4. Approximated starting time of the accident: **9:25**

5. Estimated incident duration: **50 minutes**

If some changes are needed =>

Or, all above are correct => execute the simulation and then show estimated results

Ready to set detour operation? Click below:

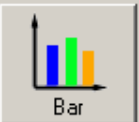
Ready to reset signals? Click below:

→

Output Selection

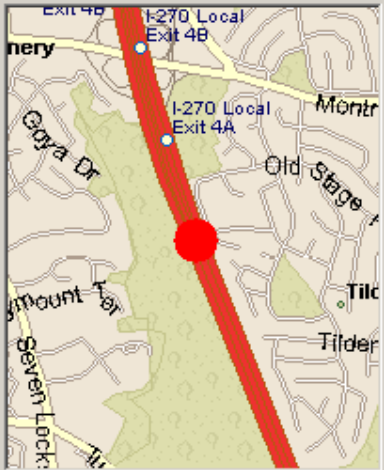


Or



I-270 MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

Delay

Road Segment



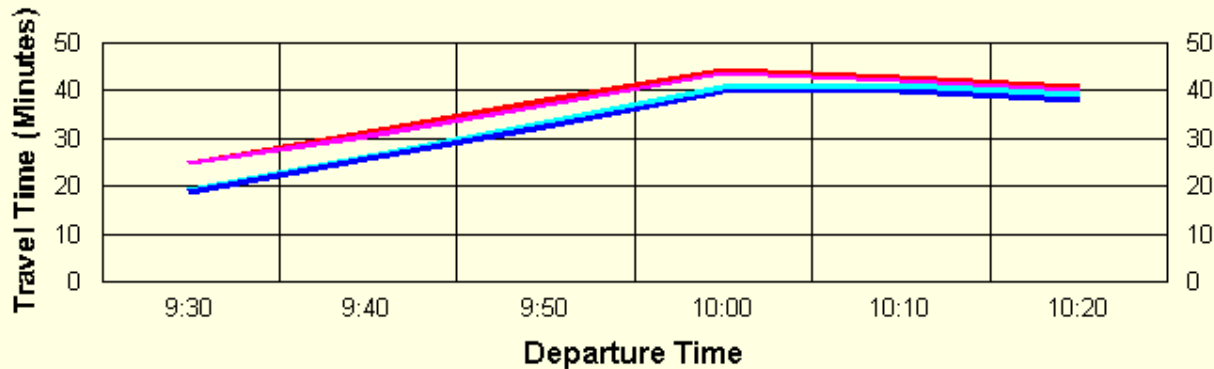
Traffic Direction



Exit 1 (I-495)

Comparison of the travel time with and without the detour operation on I-270

Travel Time vs. Departure Time



- No detour operation: Travel Time on I-270 from Ex16 to Ex1
- No detour operation: Travel Time on I-270 using the detour route from Ex16 to Ex1
- With detour operation: Travel Time on I-270 from Ex16 to Ex1
- With detour operation: Travel Time on I-270 using the detour route from Ex16 to Ex1

Comparison of the Travel Time with and without Detour Operation on:

I-270 Only

+ Detour

Or

Comparison of the Travel Time Between I-270 and the Detour Route After the Detour Operation

vs. + Detour

Output Selection

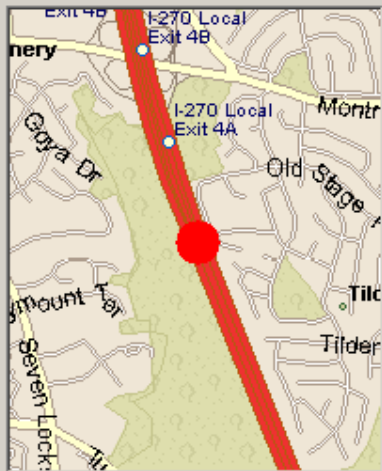


Or



I-270 MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

D

Road



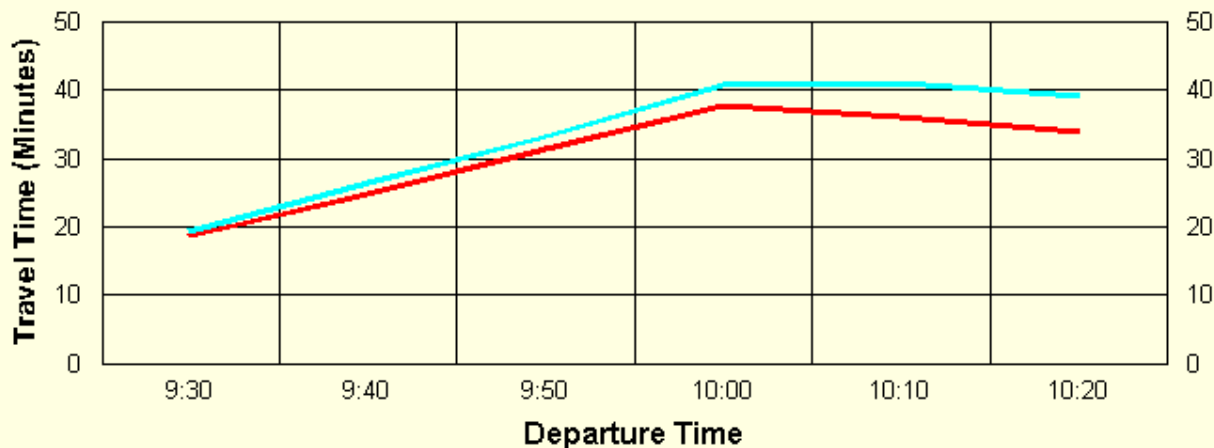
Comparison of the travel time on I-270 using detour before and after the detour operation

Traffic Direction



Exit 1 (I-495)

Travel Time vs. Departure Time



- No Detour Operation: Travel Time by Using Recommended Detour Route
- With Detour Operation: Travel Time by Using Recommended Detour Route

Comparison of the Travel Time with and without Detour Operation on:

I-270 Only Detour

Comparison of the Travel Time Between I-270 and the Detour Route After the Detour Operation

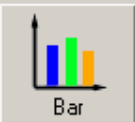
Or

VS. Detour

Output Selection

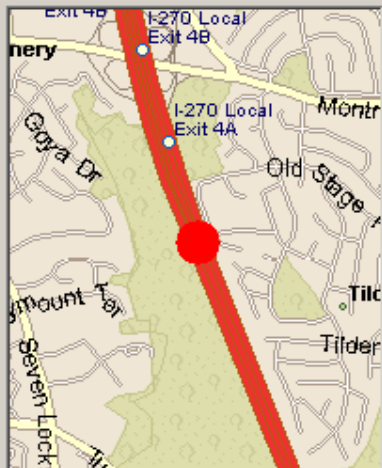


Or



I-270 MD 355

Study Area



Status

Result updated by Simulation!

Simulation Finished!

Map-based Output

View Animation

Detour / Signals

Back to Main Menu

D

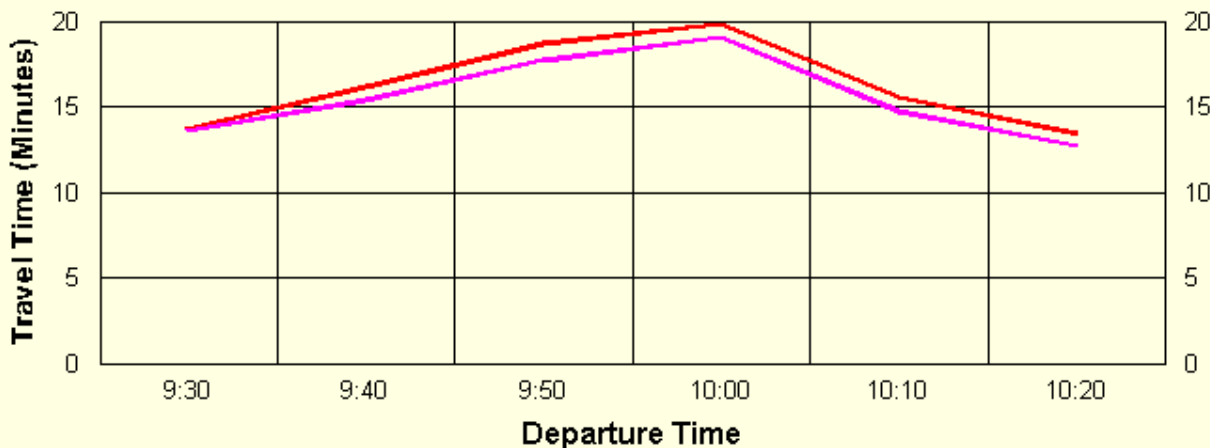
Road



Comparison of the travel time on I-270 between not choosing detour and choosing detour when the detour operation is applied

Exit 1 (I-495)

Travel Time vs. Departure Time



- With Detour Operation: Travel Time on I-270
- With Detour Operation: Travel Time by Using the Detour Route

Comparison of the Travel Time with and without Detour Operation on:

I-270 Only I-270 + 355 Detour

Or

Comparison of the Travel Time Between I-270 and the Detour Route After the Detour Operation

VS. I-270 + 355 Detour



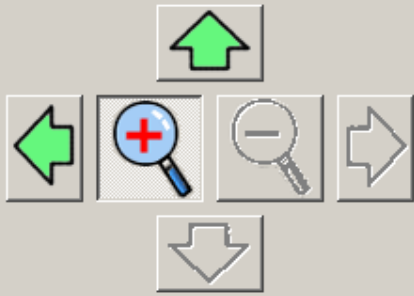
Additional Functions

- Update volumes
- Check the network balance
- Close ramps
- Change the length of auxiliary lane

Identify accident location

- > Directly click the Map, or
- > Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In

- Zoom In
- Zoom Out
- Identify Location

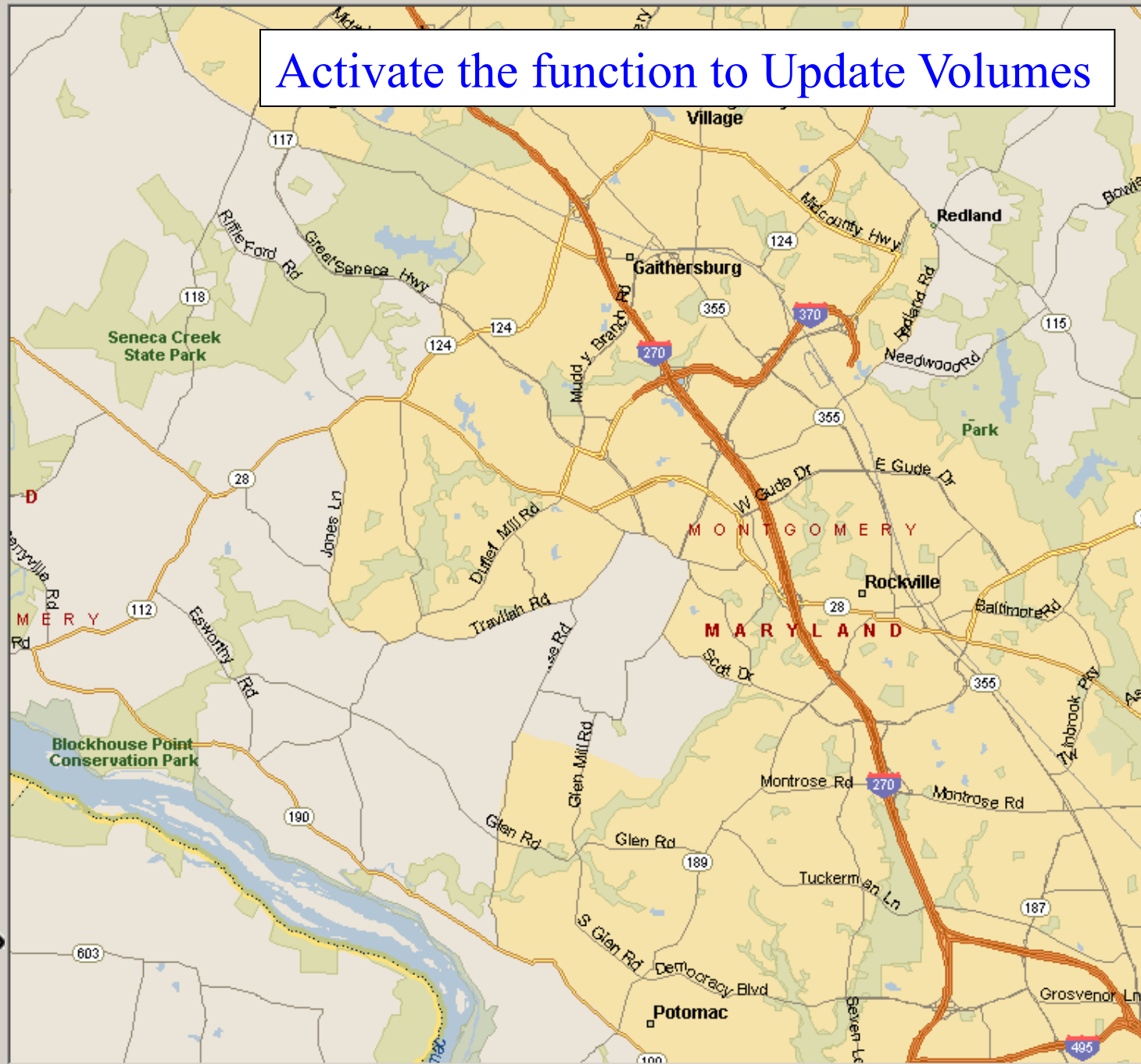
Update Volumes

Reset Signals

Management Functions

Exit

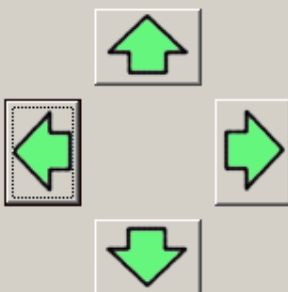
Activate the function to Update Volumes



Select Intersection

Click on the pink circles to change the volume data

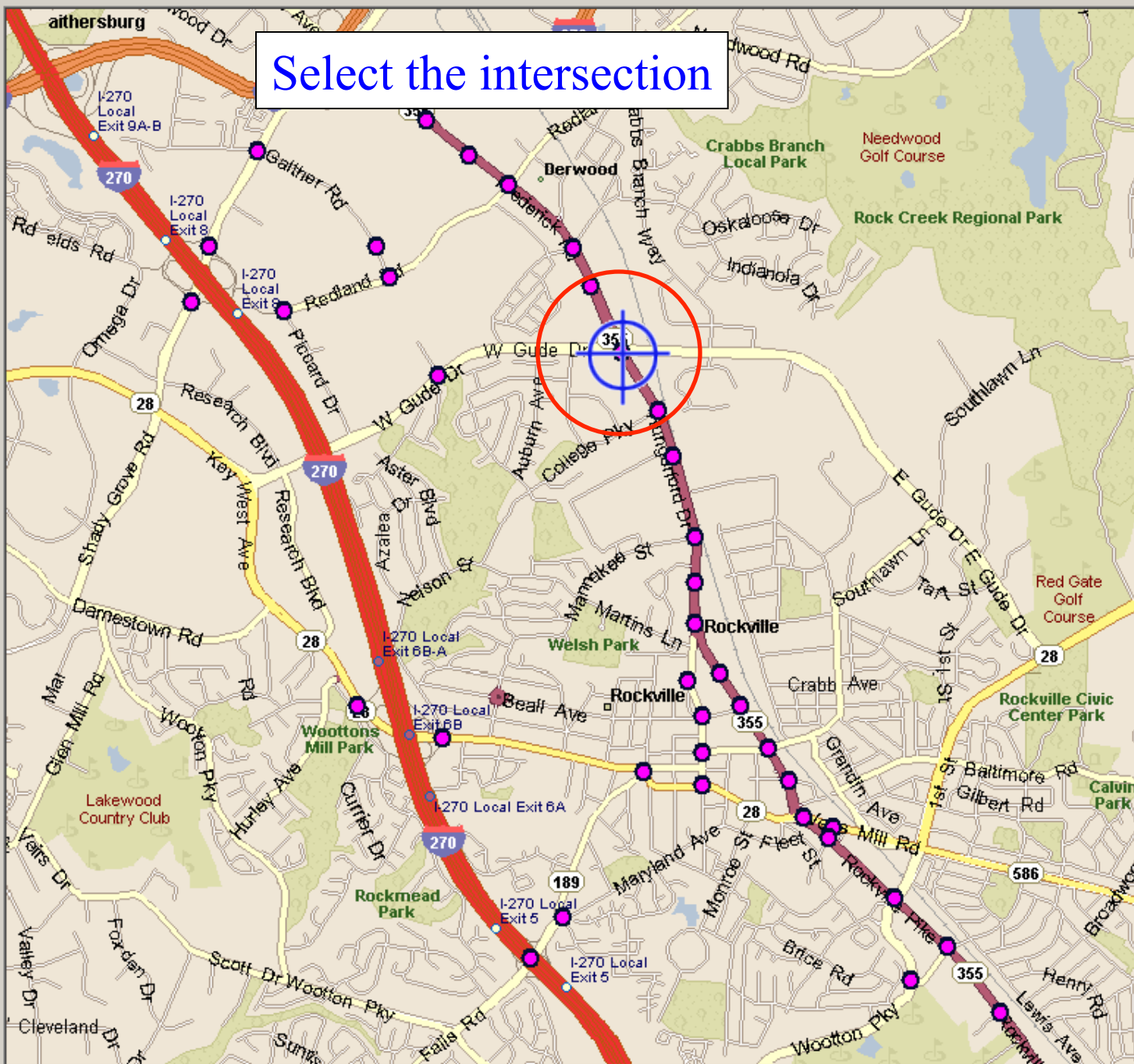
Map Navigation






Check

Exit

Select the intersection






879




SouthBound			
Volume (vph)	<input type="text" value="34"/>	<input type="text" value="33"/>	<input type="text" value="33"/>

Change the volumes

832




EastBound			
Volume (vph)	<input type="text" value="34"/>	<input type="text" value="33"/>	<input type="text" value="33"/>

833

WestBound			
Volume (vph)	<input type="text" value="34"/>	<input type="text" value="33"/>	<input type="text" value="33"/>

777

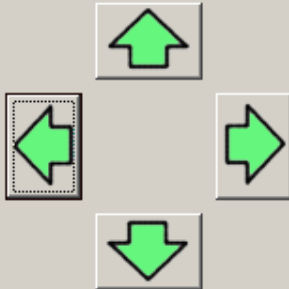
778

NorthBound			
Volume (vph)	<input type="text" value="34"/>	<input type="text" value="33"/>	<input type="text" value="33"/>

Select Intersection

Click on the pink circles to change the volume data

Map Navigation

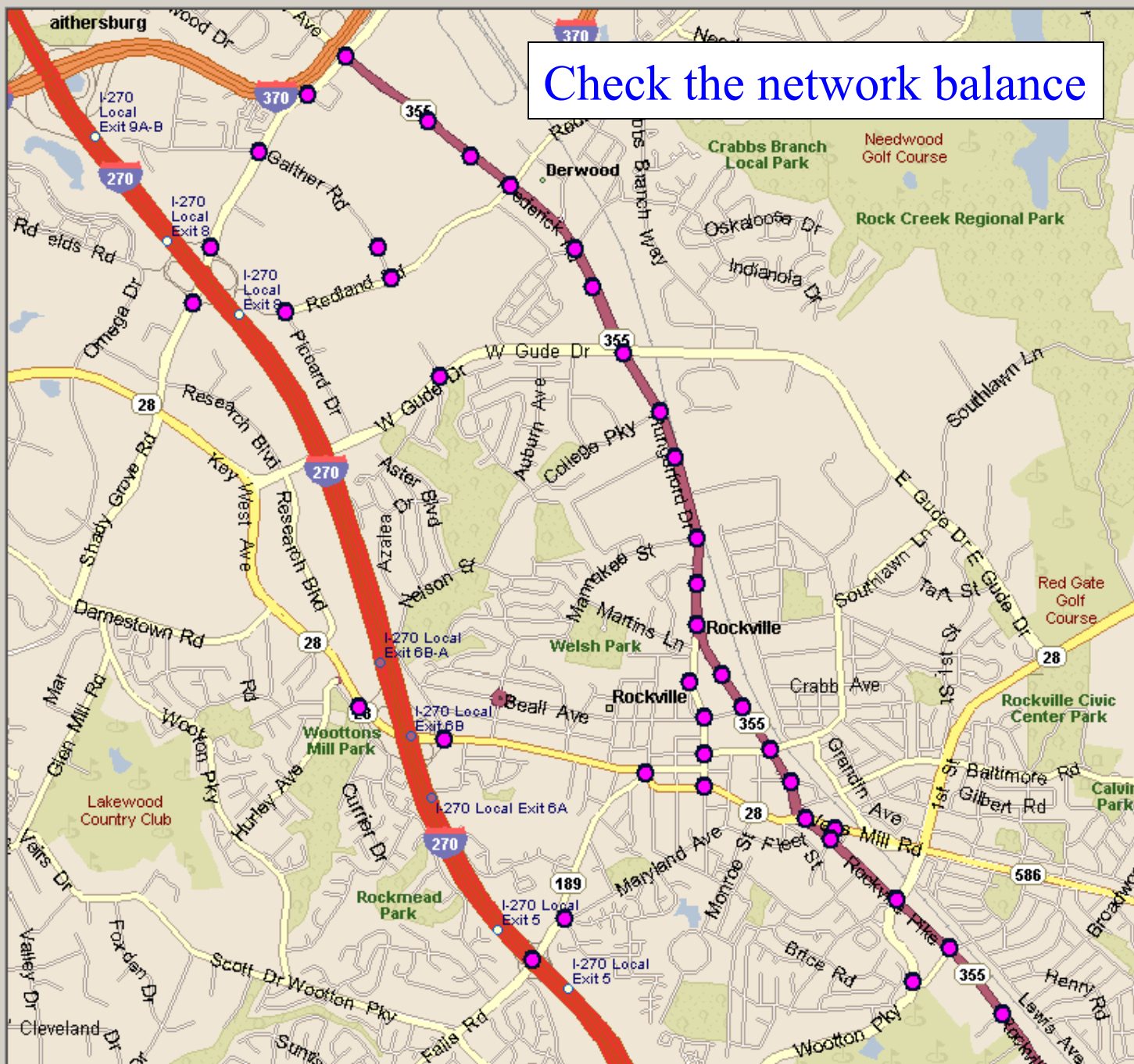


Check

Exit



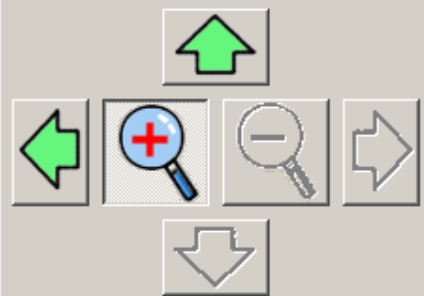
Check the network balance



Identify accident location

- > Directly click the Map, or
- > Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In

- Zoom In
- Zoom Out
- Identify Location

Update Volumes

Reset Signals

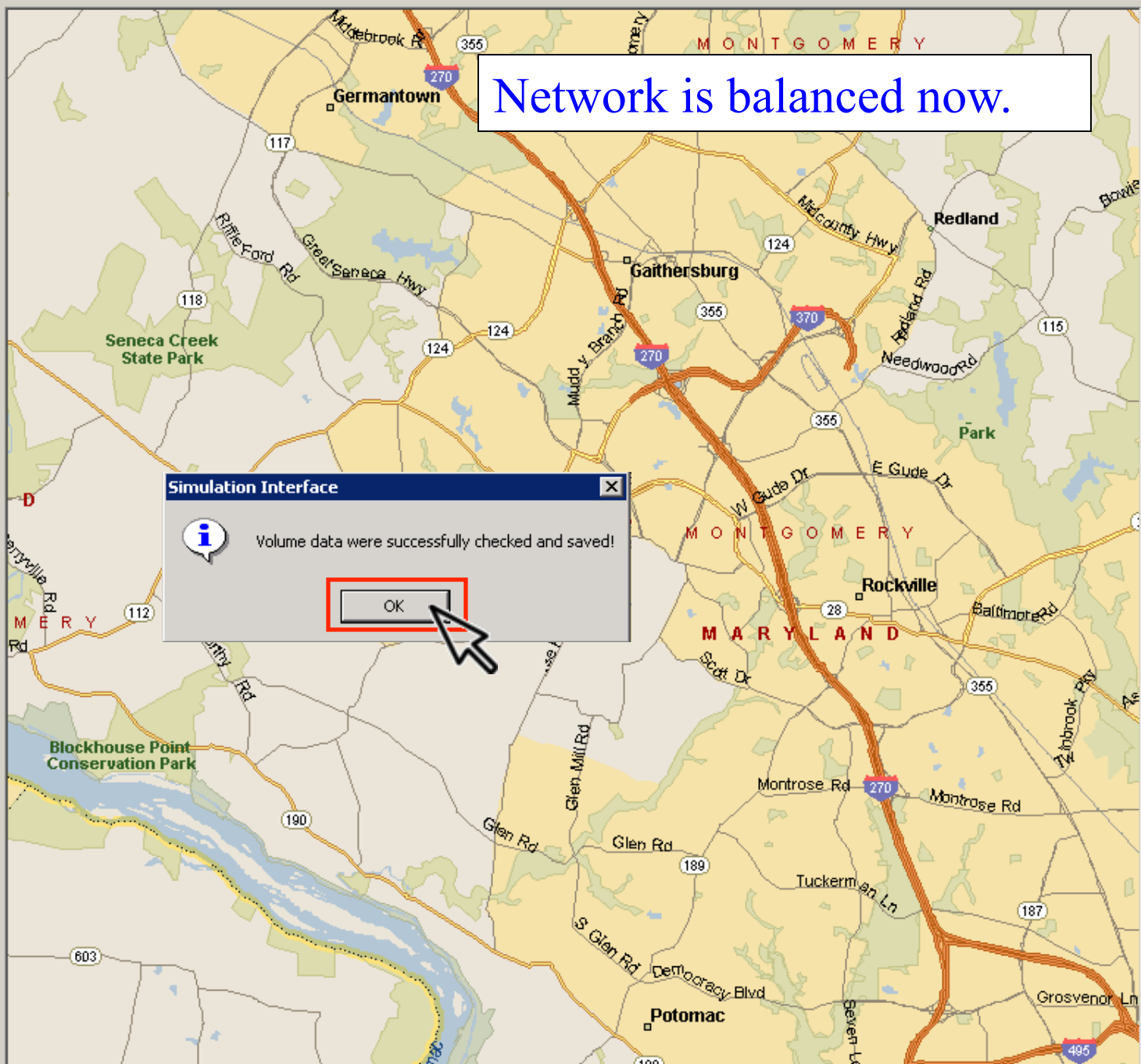
Management Functions

Exit

Network is balanced now.

Simulation Interface

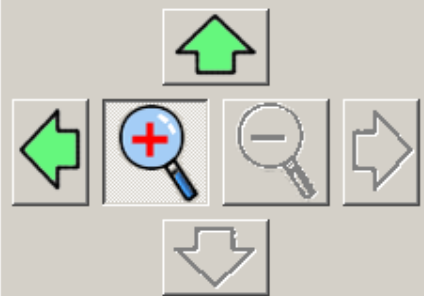
Volume data were successfully checked and saved!



Identify accident location

- > Directly click the Map, or
- > Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In

- Zoom In
- Zoom Out
- Identify Location

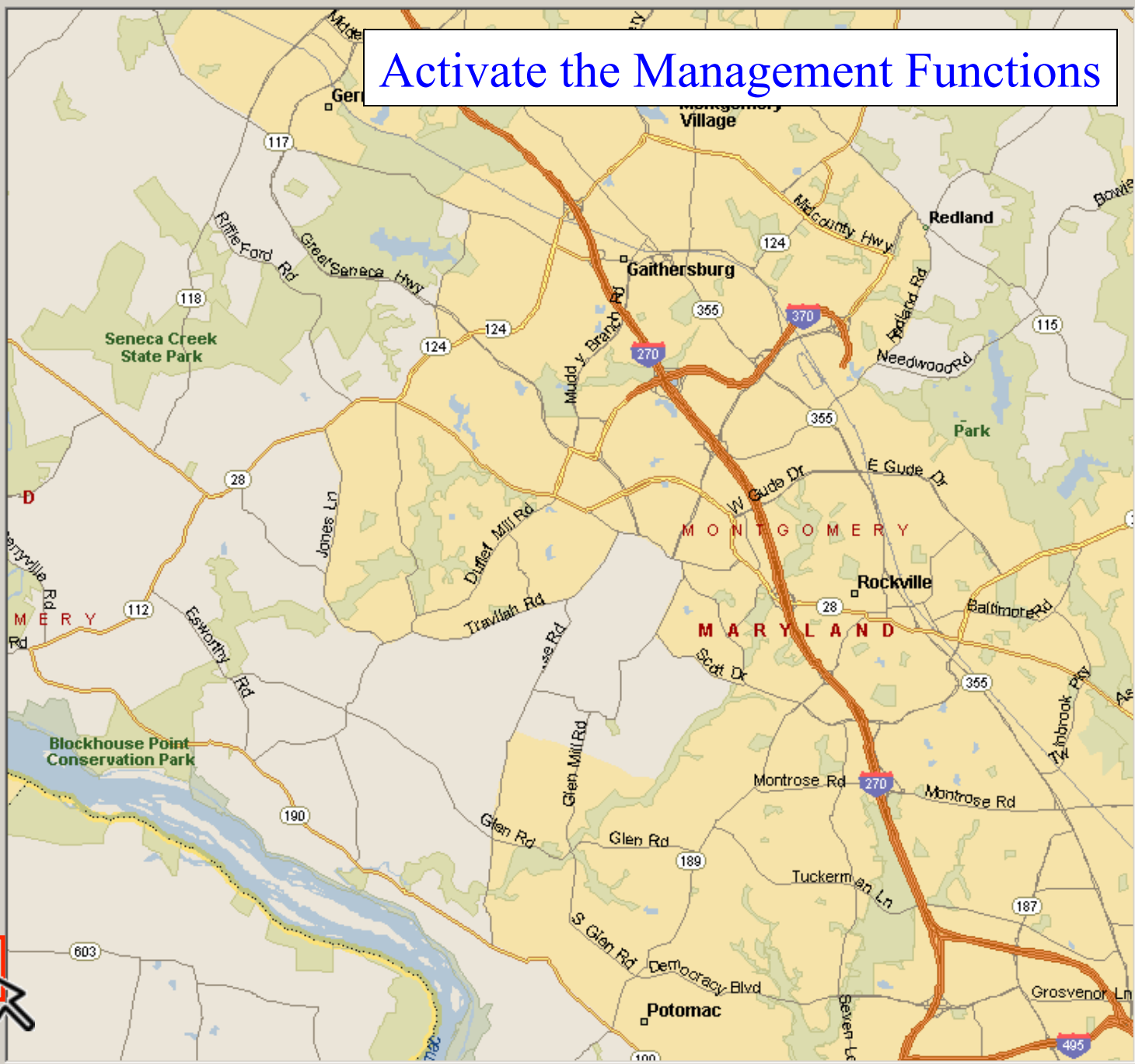
Update Volumes

Reset Signals

Management Functions

Exit

Activate the Management Functions

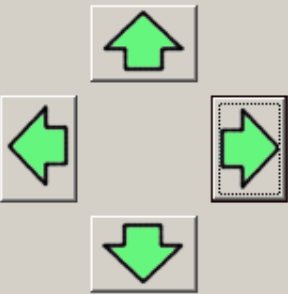


Select Ramp

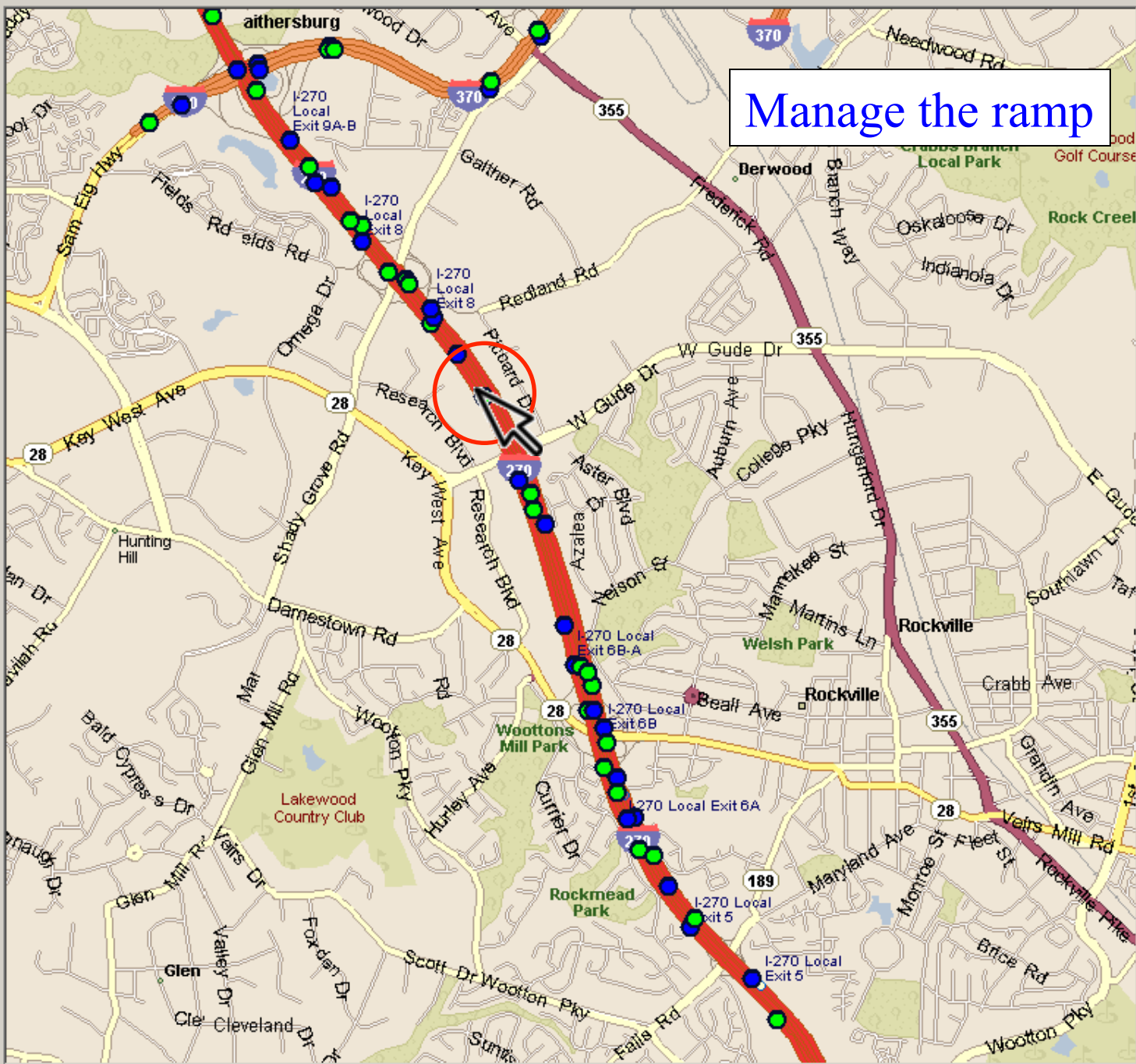
Click on the circles to manage the ramp

- On Ramp
- Off Ramp
- Closed Ramp

Map Navigation



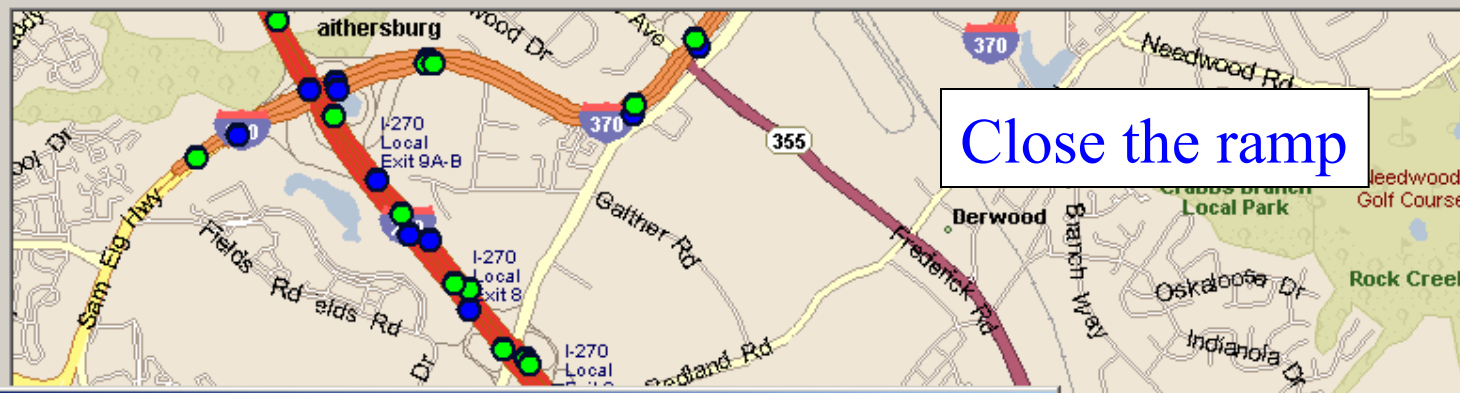
Exit



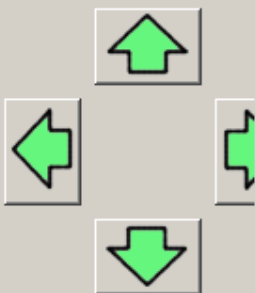
Select Ramp

Click on the circles to manage the ramp

-  On Ramp
-  Off Ramp
-  Closed Ramp



Map Navigation



Ramp Management

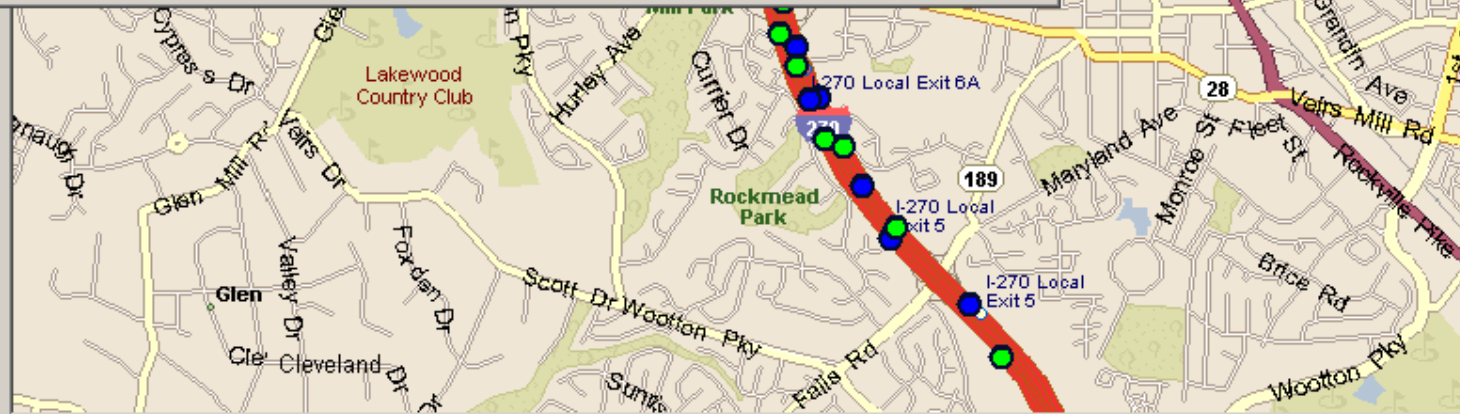
On Ramp at Exit 8

Close this ramp

Accessory Lanes

First accelerate lane Length ft

OK **Cancel**



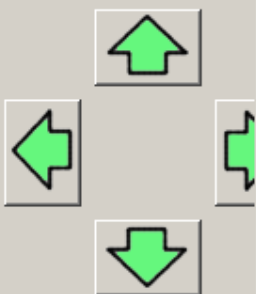
Select Ramp

Click on the circles to manage the ramp

- On Ramp
- Off Ramp
- Closed Ramp



Map Navigation



Exit

Ramp Management

On Ramp at Exit 8

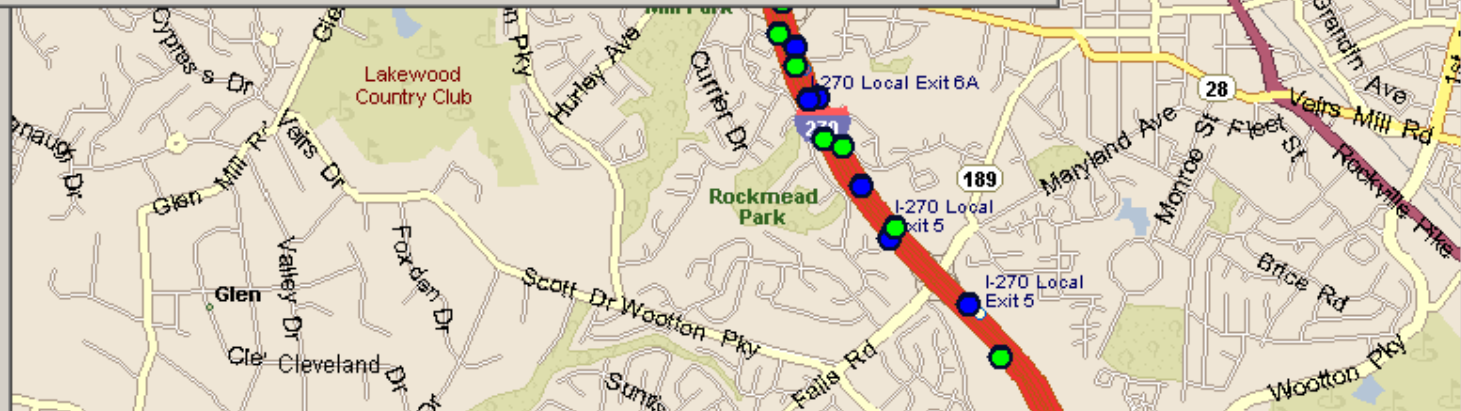
Close this ramp

Auxiliary Lanes

First accelerate lane

Length ft

OK Cancel

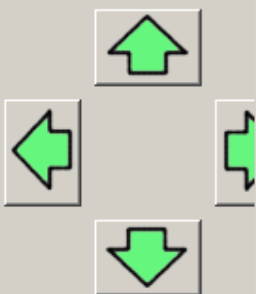


Select Ramp

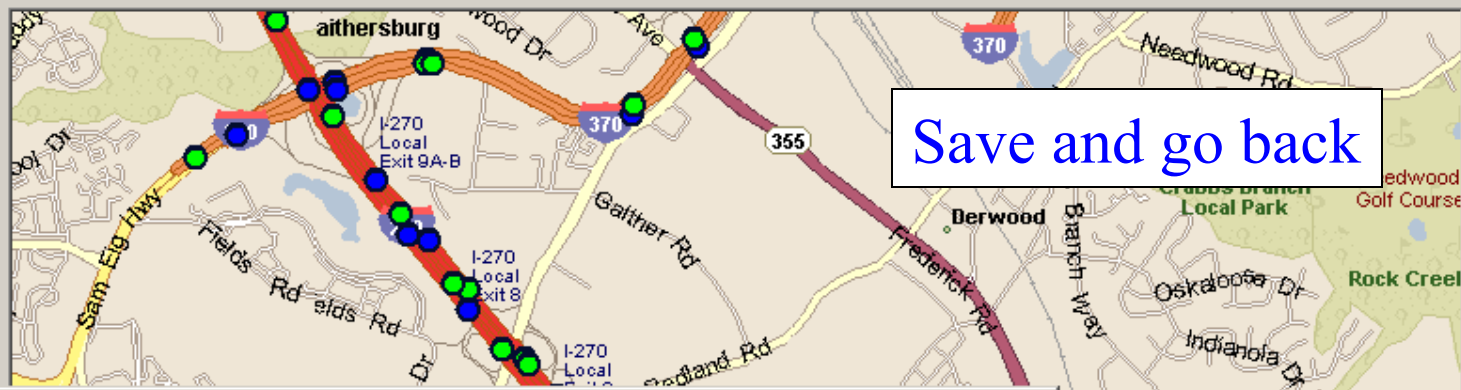
Click on the circles to manage the ramp

-  On Ramp
-  Off Ramp
-  Closed Ramp

Map Navigation



Exit



Ramp Management

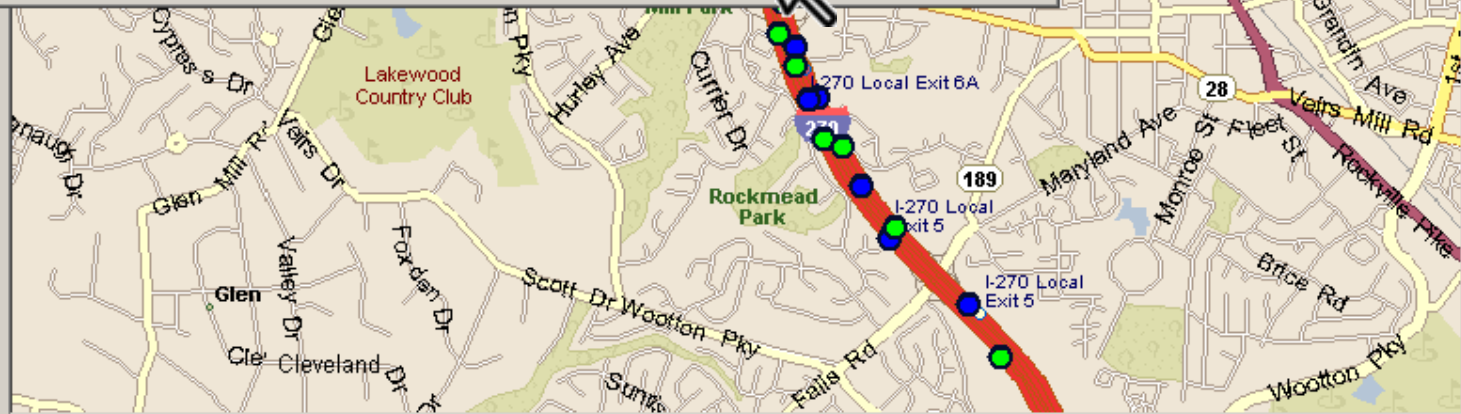
On Ramp at Exit 8

Close this ramp

Auxiliary Lanes

First accelerate lane Length ft

OK **Cancel**

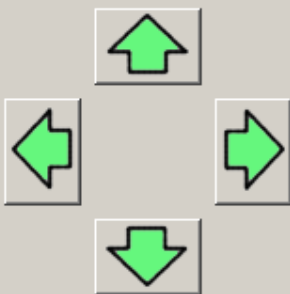


Select Ramp

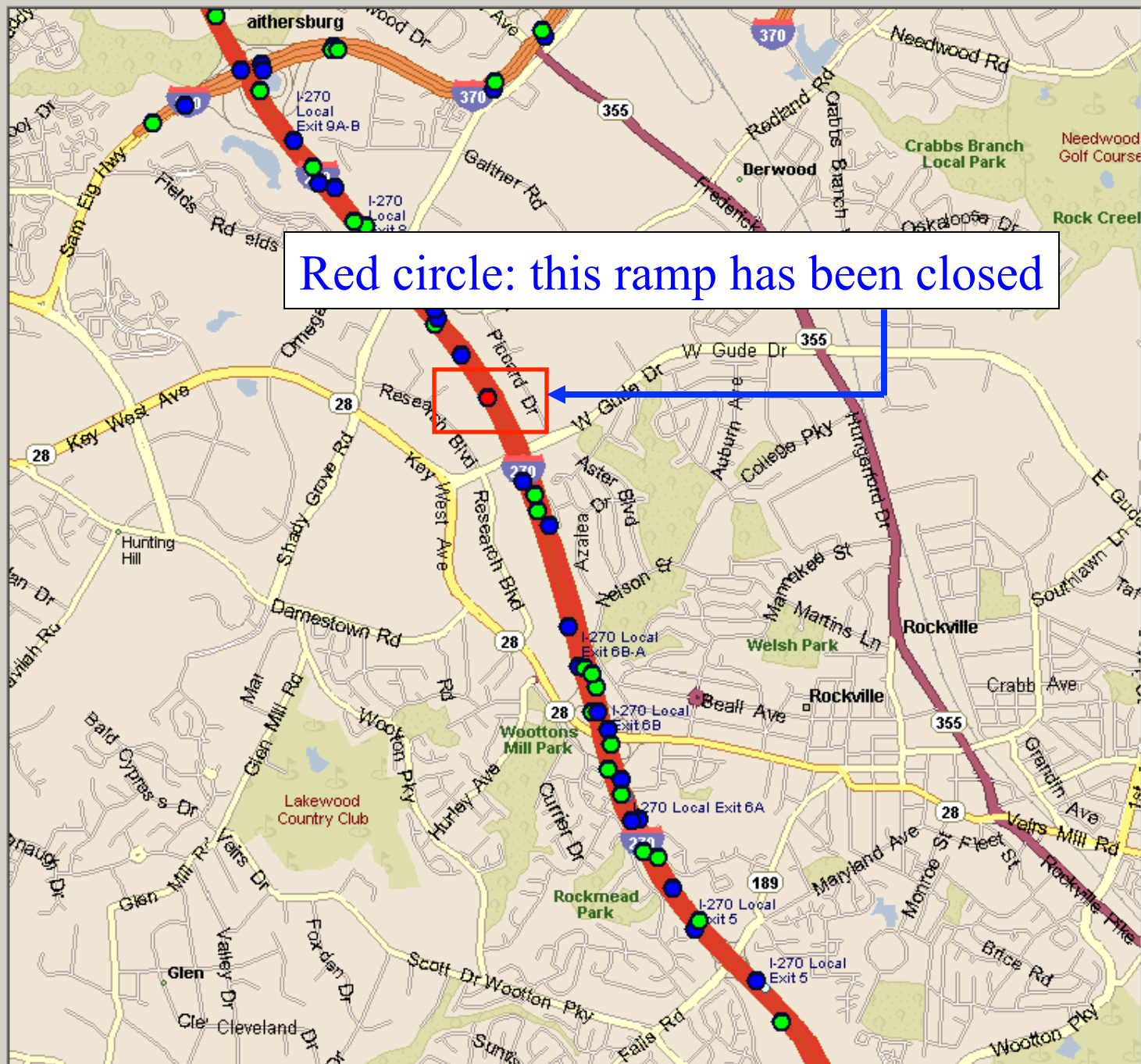
Click on the circles to manage the ramp

- On Ramp
- Off Ramp
- Closed Ramp

Map Navigation



Exit

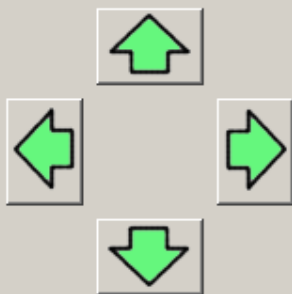


Select Ramp

Click on the circles to manage the ramp

- On Ramp
- Off Ramp
- Closed Ramp

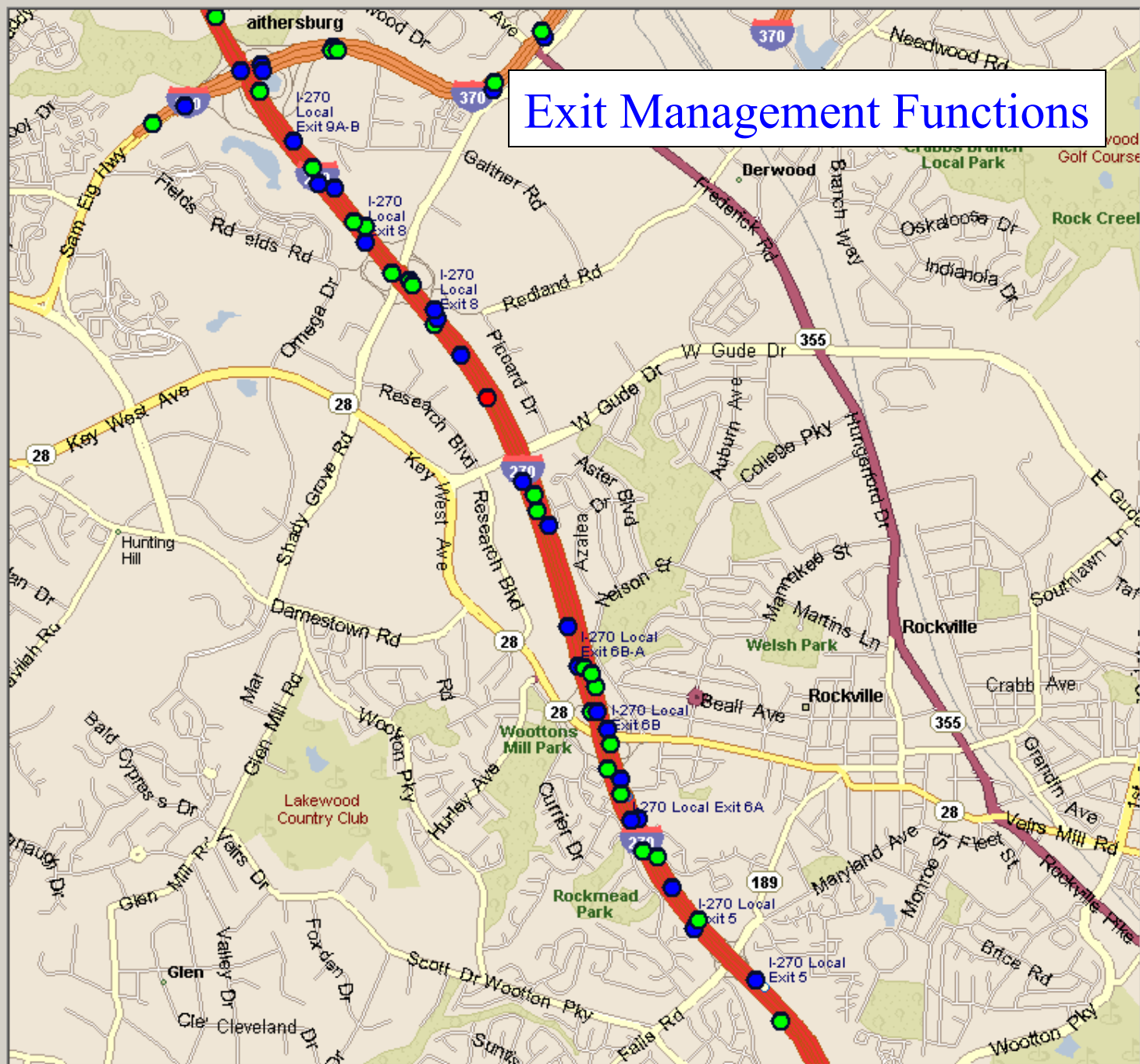
Map Navigation



Exit



Exit Management Functions





Future Research Areas

- Integrate the system with an optimization module that can assist engineers in selecting the most effective control plan
- Support more than one simulation server so as to save execution time
- Develop the web-based interface



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- Support more than one simulation server so as to save execution time
- **Develop the web-based interface**

Identify accident location

Directly click the Map, or

Use the Map Navigation module

Map Navigation



Click on the Map to:

Zoom In

-  - Zoom In
-  - Zoom Out
-  - Identify Location

Update Volumes

Reset Signals

Management Functions

Exit

End of Presentation
Thank you!

