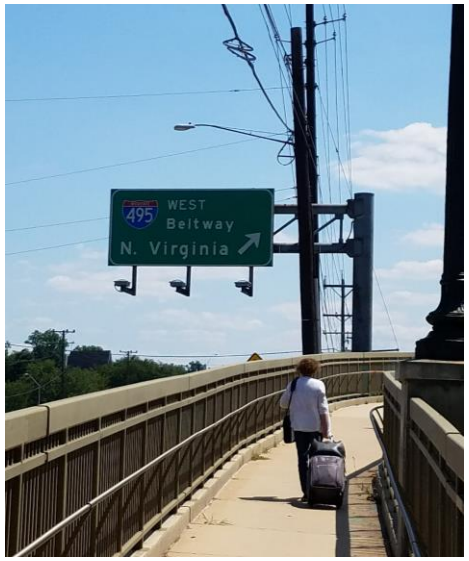
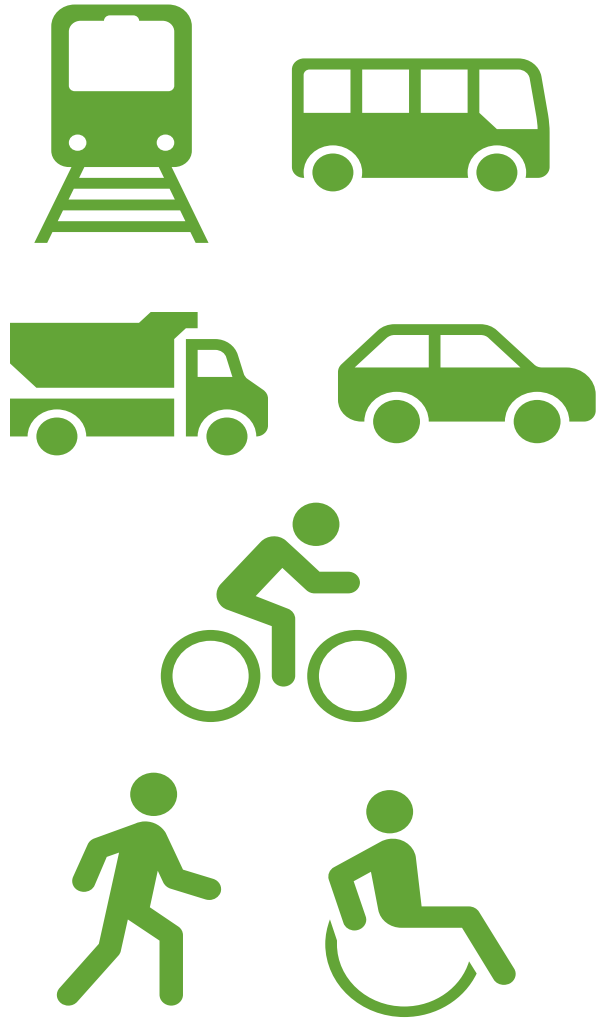


Preliminary Transportation Analysis

Goals of a Robust, Multimodal Transportation Network



- Safe
- Accessible/Connected
- Efficient
- Comfortable
- Context-Sensitive

Motor Vehicle:

- Continue to analyze the data to make recommendations for improving network **safety** and **efficiency**.

Pedestrian:

- Launch the pilot for the **Pedestrian Level of Comfort** analysis tool
- Work with MCDOT to coordinate potential **BiPPA concepts**, **assessments** and **recommendations**.

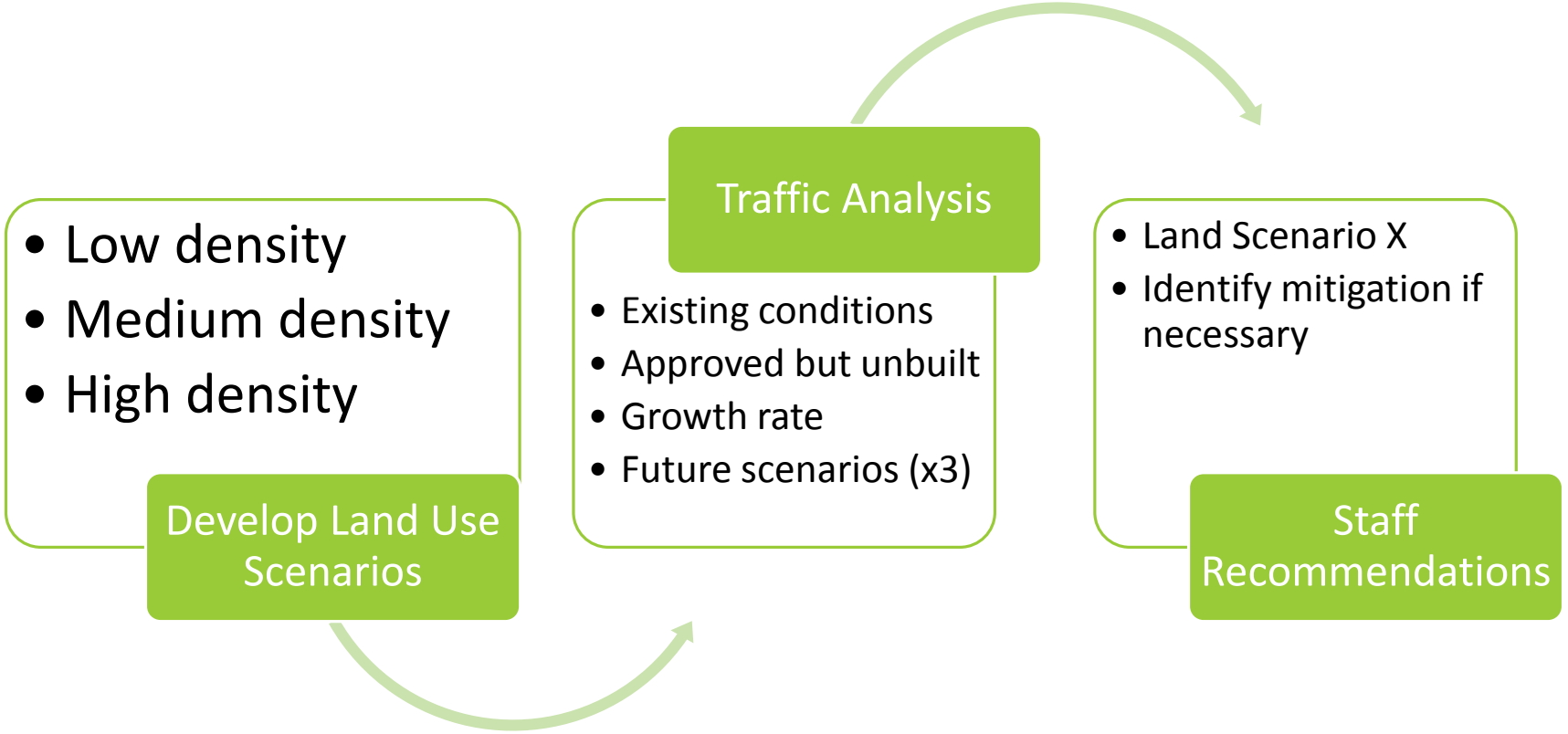
Bicycle:

- Build on analysis already completed for the **Bicycle Master Plan**
- Confirm and potentially suggest **additional recommendations** for improve bicycle safety and connectivity

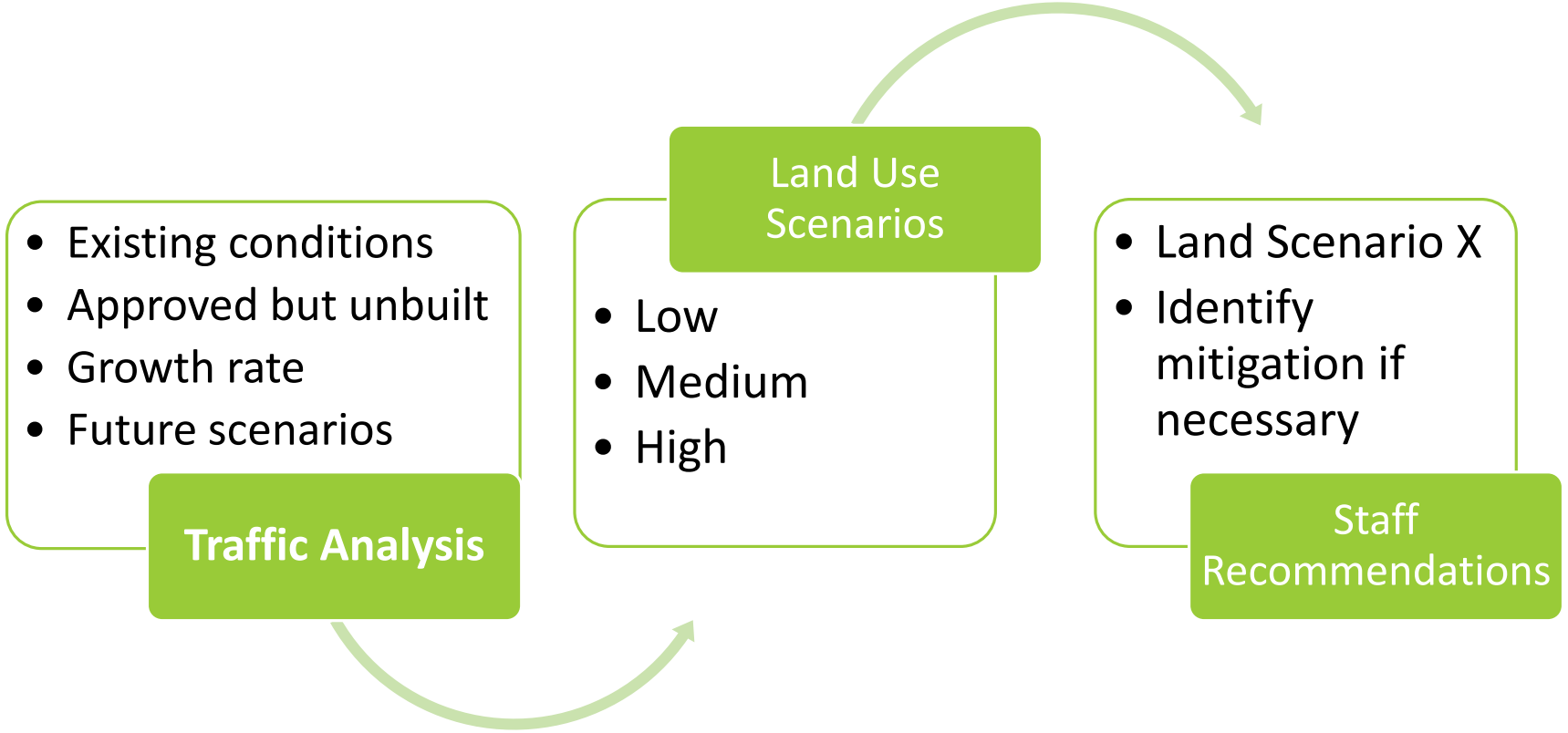
Transit:

- Analyze **access** to existing and planned stops and stations with the Pedestrian Level of Comfort Tool
- Review recommendations for **BRT stops and route alignment**
- Coordinate with WMATA and RideOn on known issues feedback from the public

Typical Process for Plan Development



Revised Process for Plan Development



Scenarios for Preliminary Traffic Analysis

1 Existing

- ❑ Traffic Counts

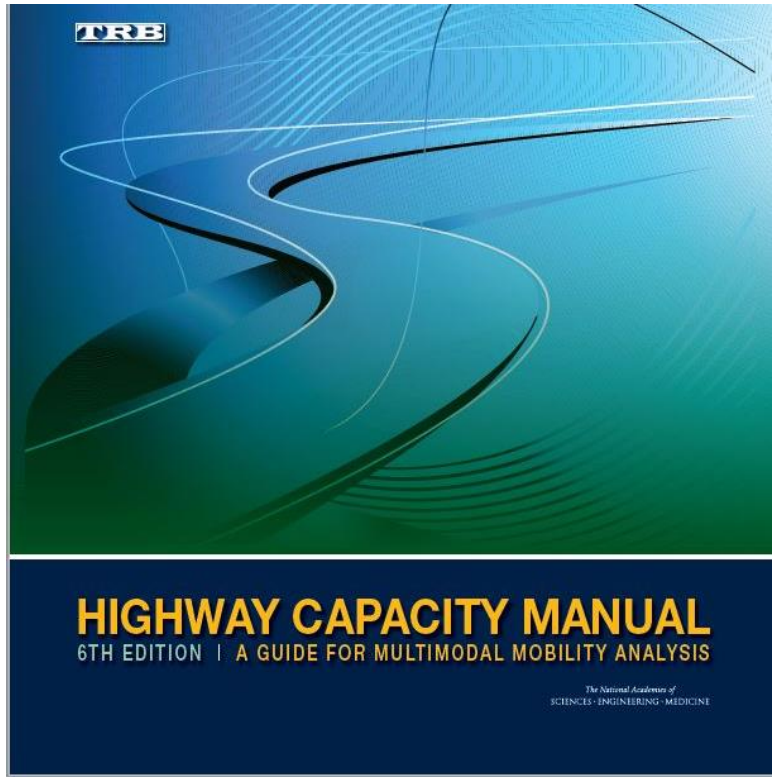
2 2040 "No-build"

- ❑ Applies growth rate for regional traffic
- ❑ Assumes **no changes** within Plan Area Boundary

3 2040 "Zoning Potential"

- ❑ Applies growth rate for regional traffic
- ❑ Assumes non-residential zones achieve **maximum density permitted by existing zoning**

Preliminary Results



HCM Signalized Intersection Capacity Analysis
1: Georgia Avenue & 16th Street

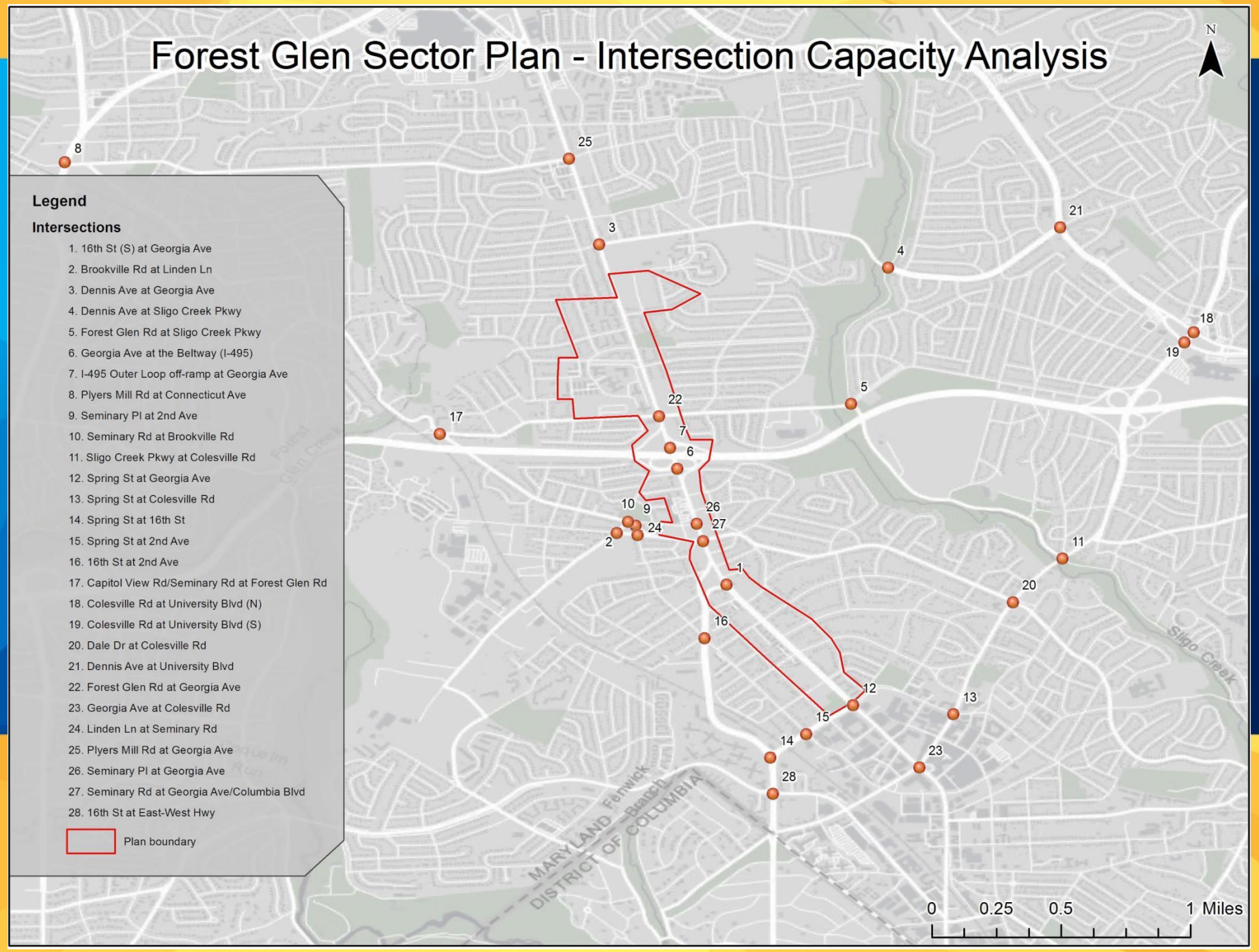
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	850	10	0	975	1540	0
Future Volume (vph)	850	10	0	975	1540	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12
Total Lost time (s)	4.0			4.5	4.5	
Lane Util. Factor	0.94			0.91	0.91	
Frt	1.00			1.00	1.00	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	4997			5085	5085	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	4997			5085	5085	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	924	11	0	1060	1674	0
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	934	0	0	1060	1674	0
Turn Type	Prot			NA	NA	
Protected Phases	4			2	6	
Permitted Phases						
Actuated Green, G (s)	44.6			124.9	124.9	
Effective Green, g (s)	45.6			125.9	125.9	
Actuated g/C Ratio	0.25			0.70	0.70	
Clearance Time (s)	5.0			5.5	5.5	
Vehicle Extension (s)	6.0			0.2	0.2	
Lane Grp Cap (vph)	1265			3556	3556	
v/s Ratio Prot	c0.19			0.21	c0.33	
v/s Ratio Perm						
v/c Ratio	0.74			0.30	0.47	
Uniform Delay, d1	61.7			10.3	12.1	
Progression Factor	1.00			1.00	0.10	
Incremental Delay, d2	3.2			0.2	0.1	

Forest Glen Sector Plan

(Draft Transportation Element)

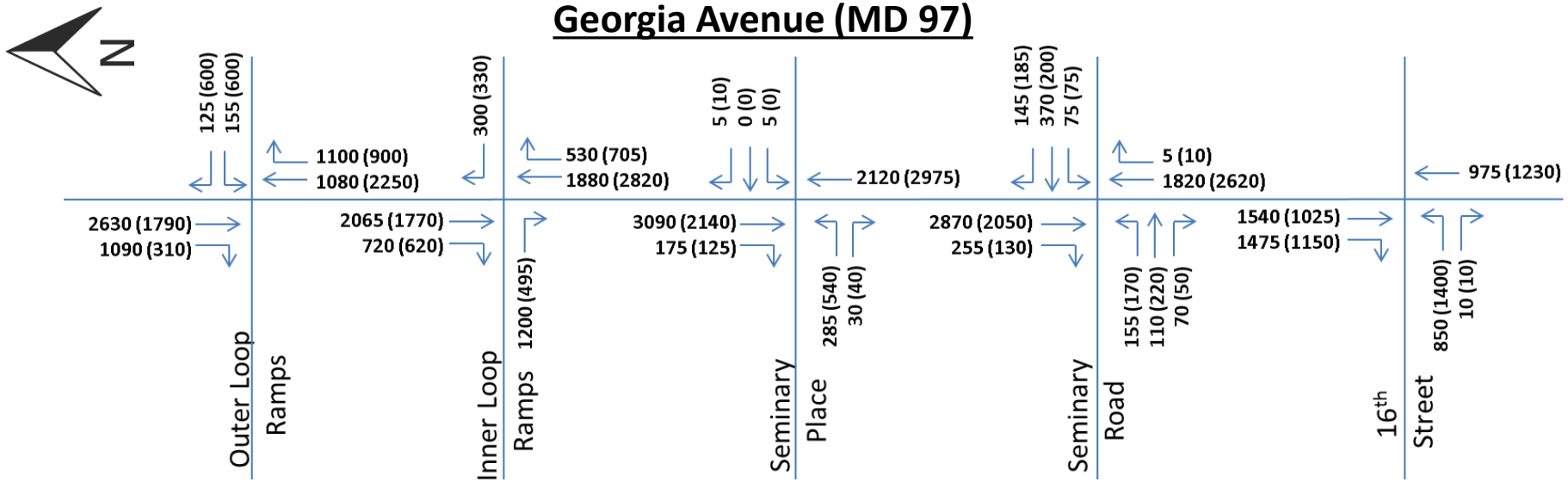
Planning Board Meeting 12/21/2017

Forest Glen Sector Plan - Intersection Capacity Analysis

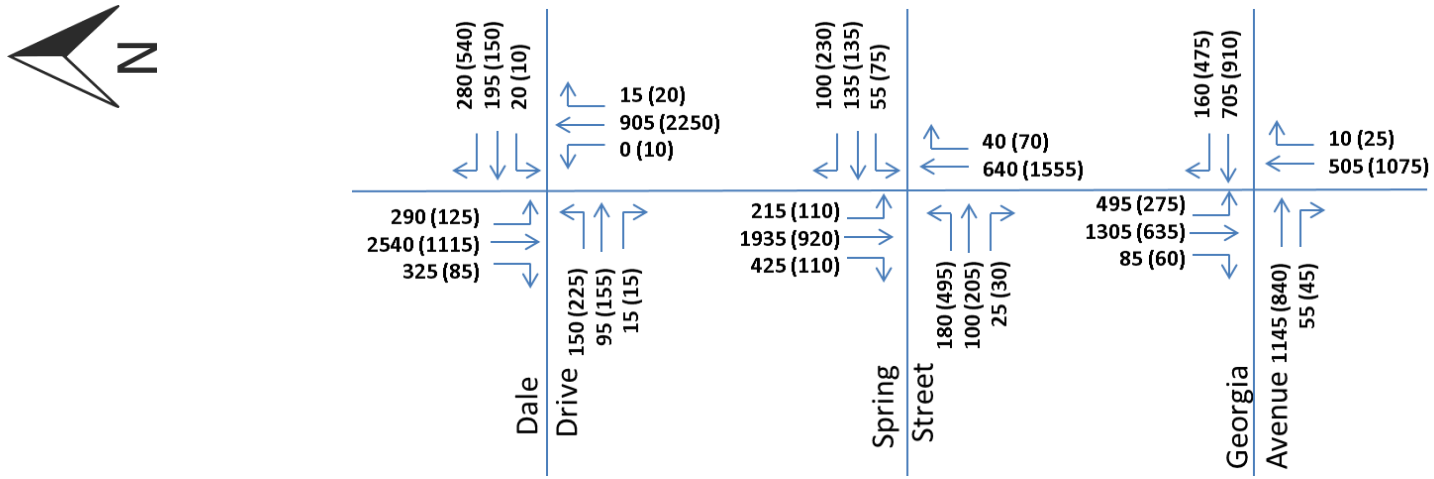


Current Traffic Volumes

Georgia Avenue (MD 97)

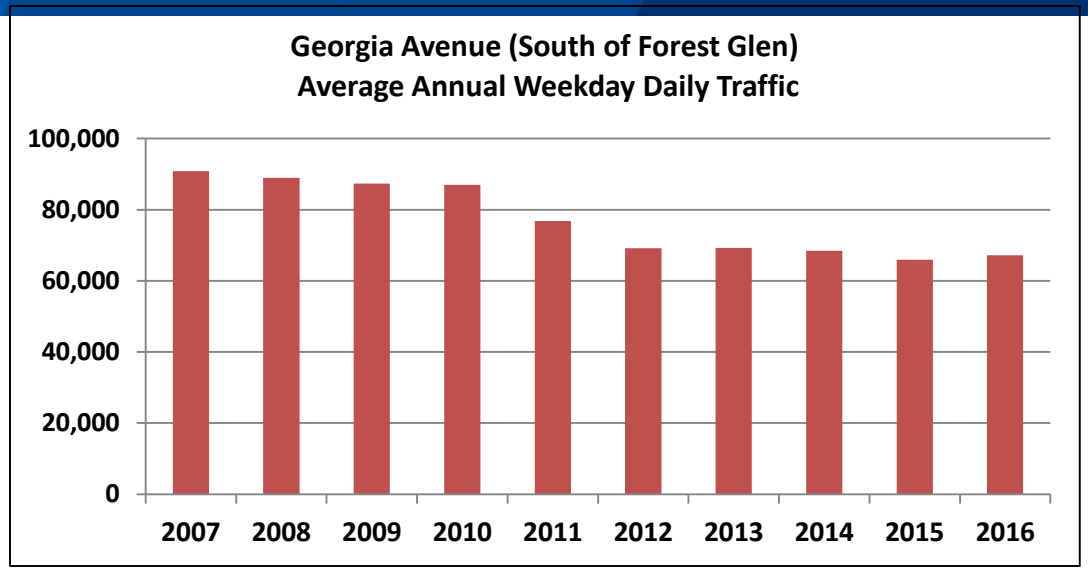


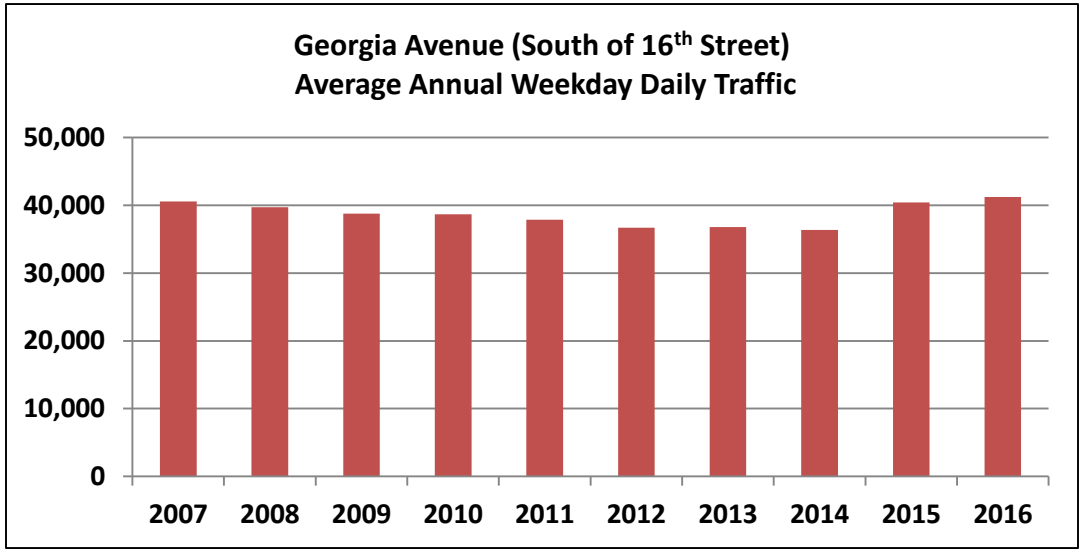
Colesville Road (US 29)



Historical Traffic Volumes

- A significant amount of regional through traffic travels through the MD 97 corridor to and from Silver Spring and Washington DC.

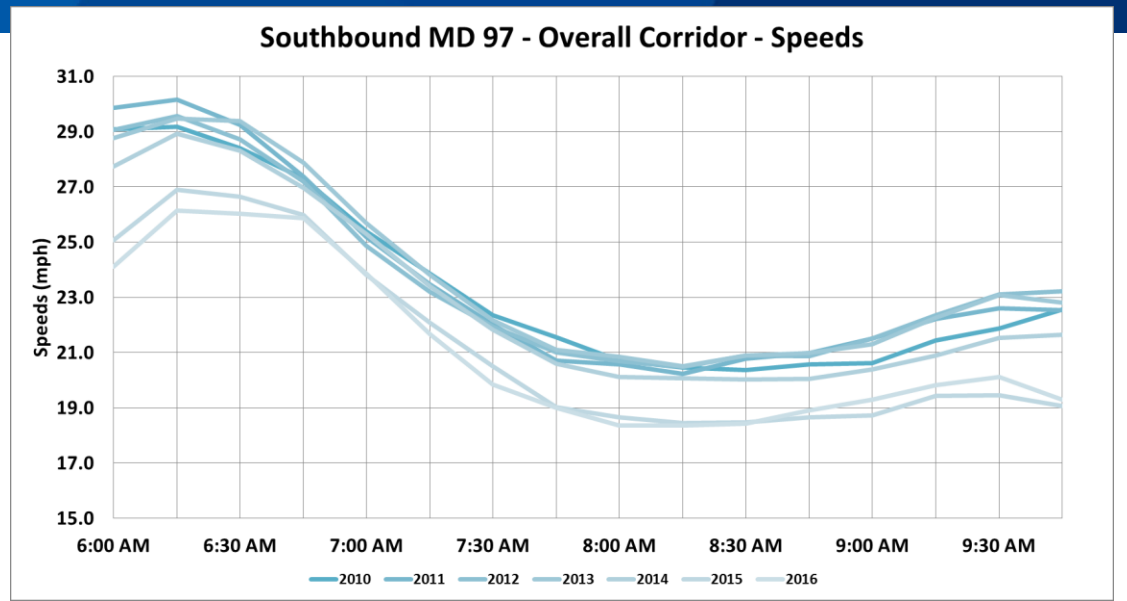


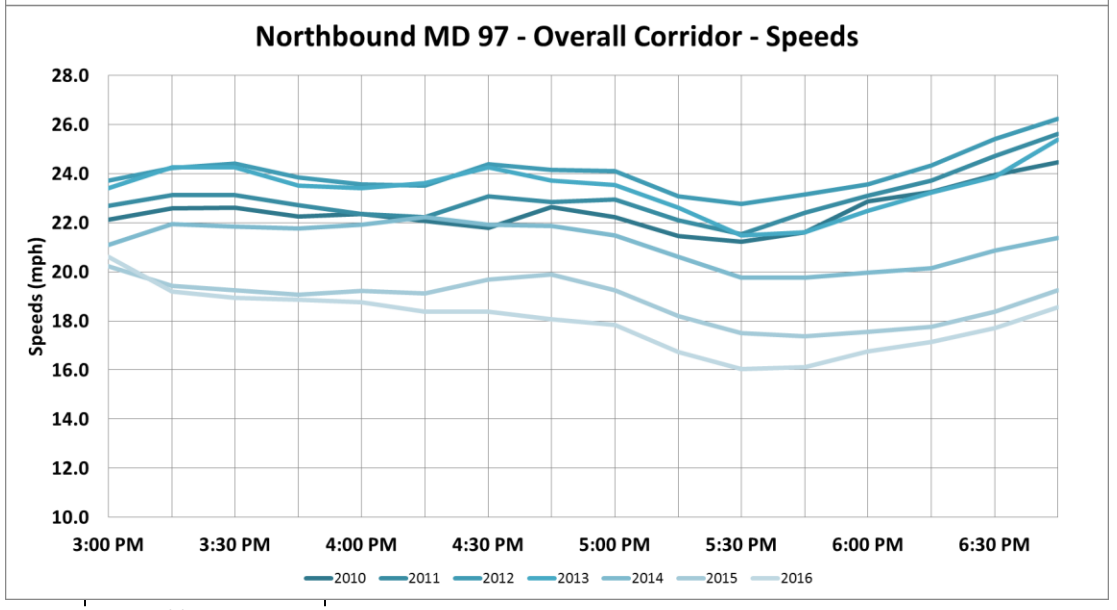


Source: State Highway Administration - Internet Traffic Monitoring System

Vehicle Speeds & Travel Times

- Peak direction automobile speeds have decreased in recent years along the MD 97 corridor.





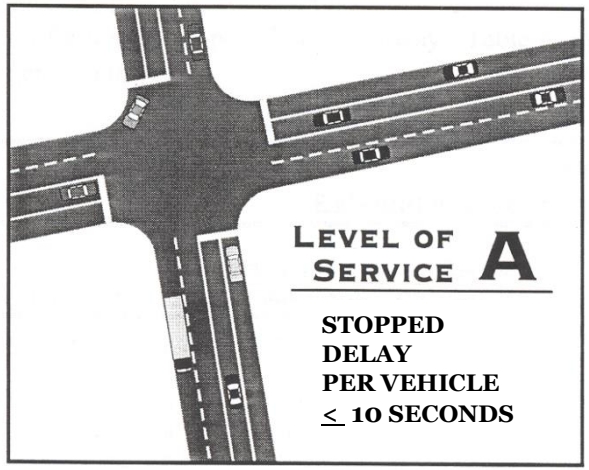
Reversible Lane Active

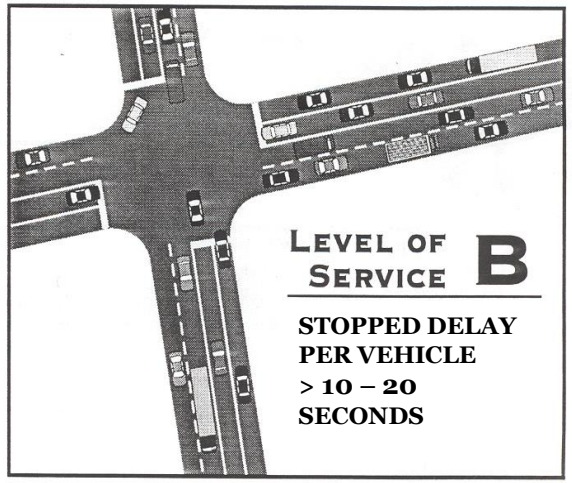
Source: INRIX

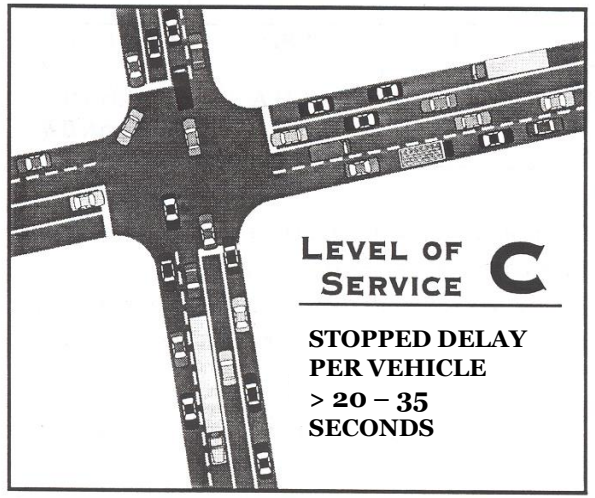
Existing Traffic Operations

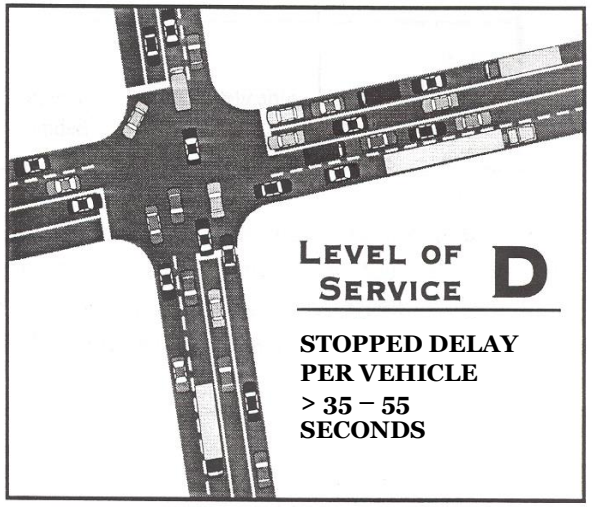
- The 28 study intersections were evaluated based on the average delay per vehicle for all intersection approaches during the morning and evening peak hours.
- Delay is the additional time experienced by a roadway user, typically motorists, as a result of constrained movements and deviation from ideal or free flow speed travel speeds.
- Average vehicle delay was calculated using Highway Capacity Methodologies which accounts for traffic volumes, number of lanes, and signal timing/phasing and represents a weighted average for all approaches.
- Current Policy Area Standards
  - The Silver Spring Central Business District (CBD), generally bounded by Spring Street to the north, has a delay standard of 120 seconds per vehicle.
  - All remaining study intersections have an 80 seconds per vehicle delay standard.

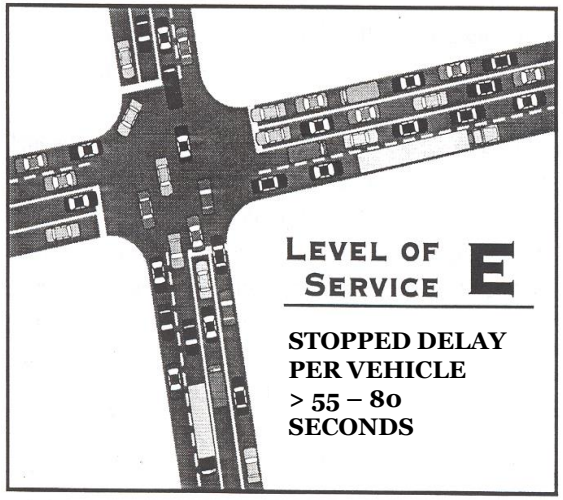
Existing Traffic Operations

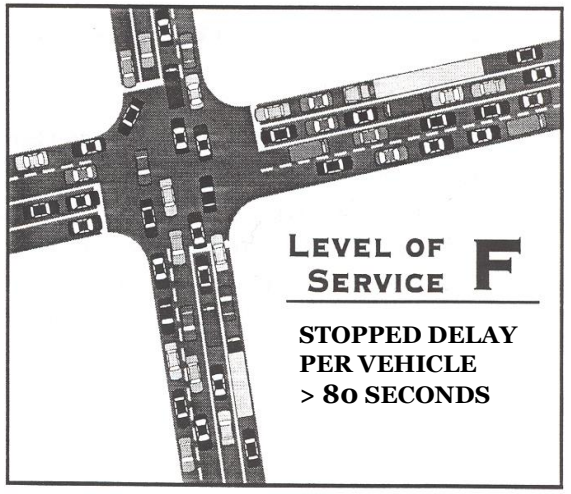








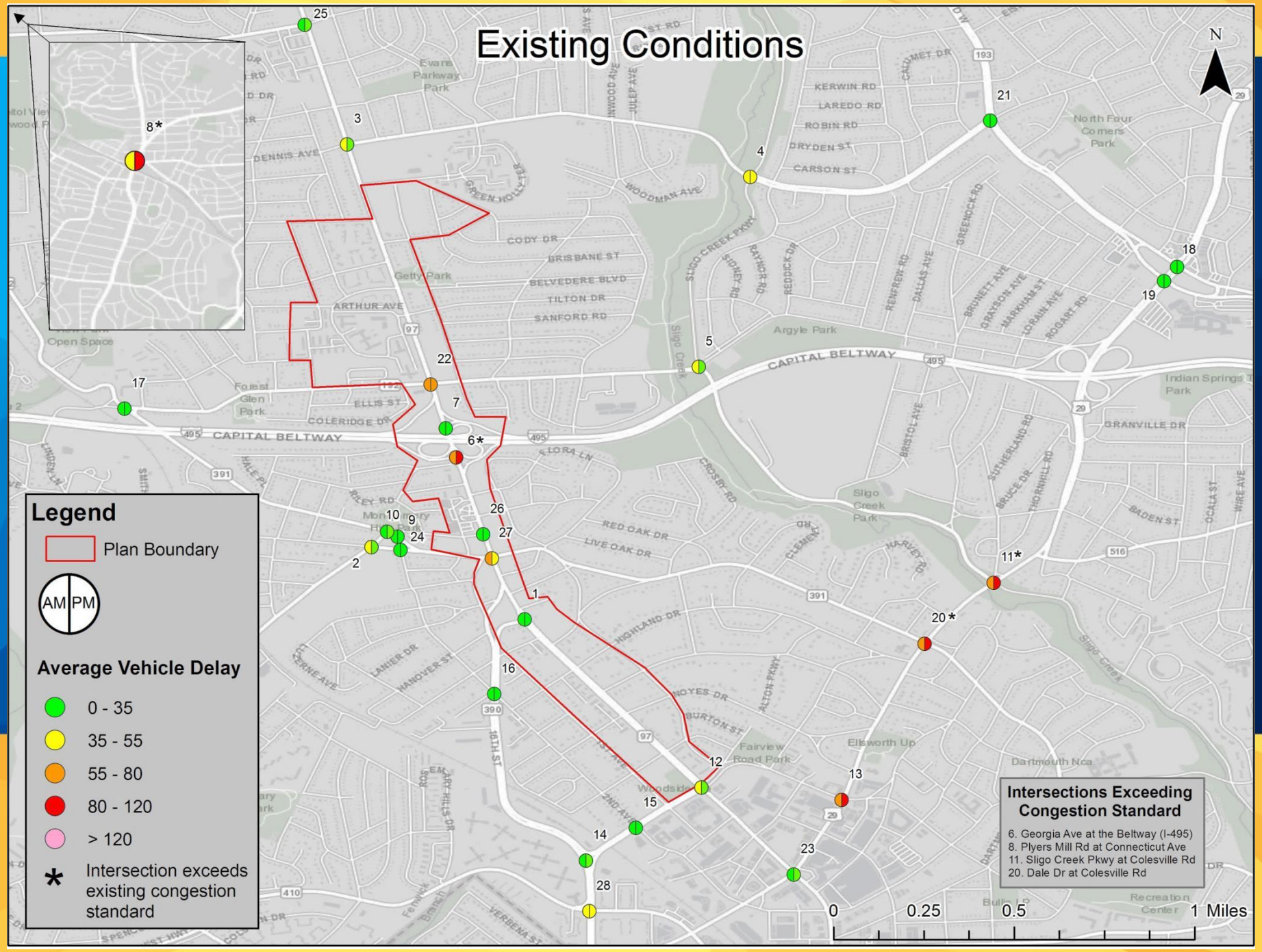




Existing Traffic Operations

- What other factors impact traffic congestion?
  - Latent Demand
    - Intersection traffic counts only count vehicles which are processed through the intersection. This means that the delays attributed to vehicles who do not get processed through the intersection may not be fully accounted for.
  - Lane Utilization
    - An unequal distribution of vehicles among travel lanes.

  - Access Points
    - Business driveways and minor streets cause reductions in travel speeds due to turning vehicles.
  - Bus Stops
    - Bus blockages temporarily impede traffic flow in a travel lane during the boarding and alighting process.
  - Vehicle Composition and Driver Characteristics
    - A higher composition of heavy vehicles, such as buses and trucks, typically results in a reduction in capacity due to reduced acceleration and deceleration rates, as well as generally slower travel speeds.
    - Similarly, driver aggressiveness in an area can impact capacity through increased acceleration and deceleration rates.

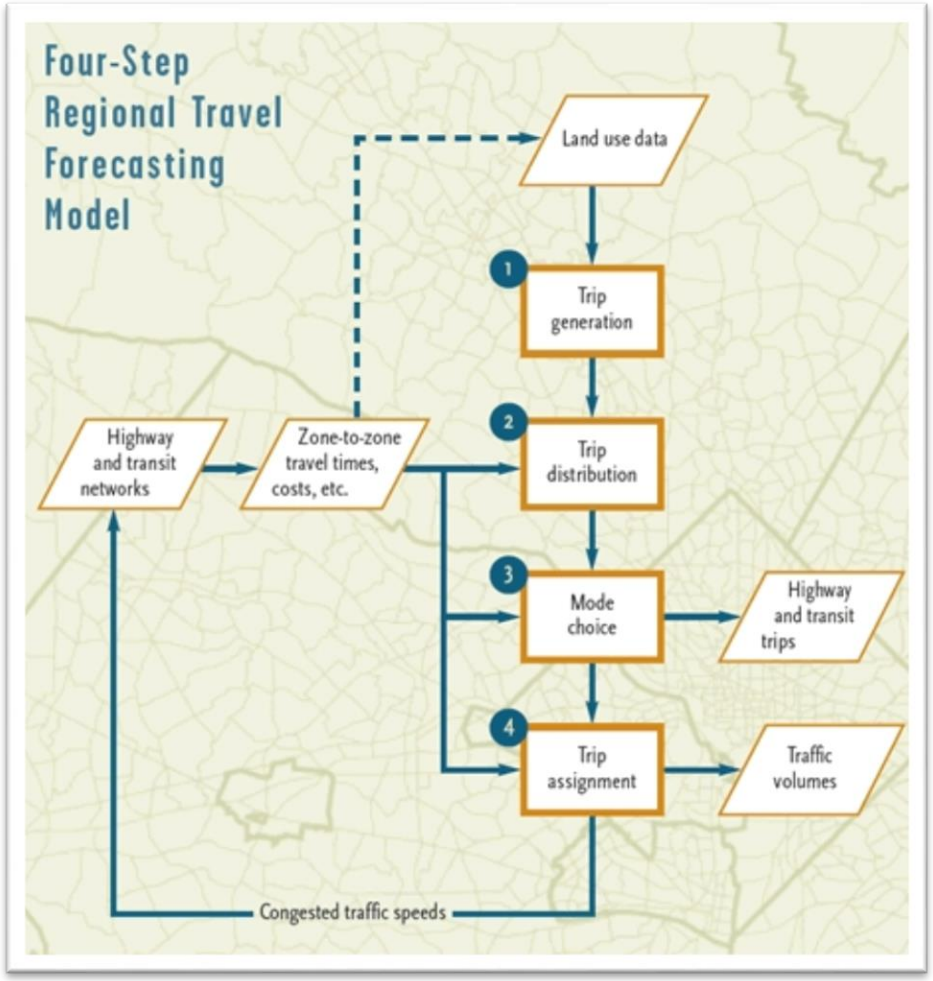

Existing Conditions
N
Legend
Plan Boundary
AM PM
Average Vehicle Delay
0 - 35
35 - 55
55 - 80
80 - 120
> 120
* Intersection exceeds existing congestion standard
Intersections Exceeding Congestion Standard
6. Georgia Ave at the Beltway (I-495)
8. Plyers Mill Rd at Connecticut Ave
11. Sligo Creek Pkwy at Colesville Rd
20. Dale Dr at Colesville Rd
0 0.25 0.5 1 Miles
CAPITAL BELTWAY
Evans Parkway Park
Getty Park
Forest Glen Park
Argyle Park
Sligo Creek Park
North Four Corners Park
Indian Springs Park
Fairview Road Park
Woodside
Ellsworth Up
Dartmouth Nca
Recreation Center
Open Space

Traffic Forecasts

2040 Land Use Scenarios

- No-Build Scenario
  - The No-Build Scenario assumes that no new developments occur within the Plan Area Boundary between 2017 and 2040.
- Zoning Potential Scenario
  - The Zoning Potential Scenario assigns parcels the maximum permitted density under the existing zone.

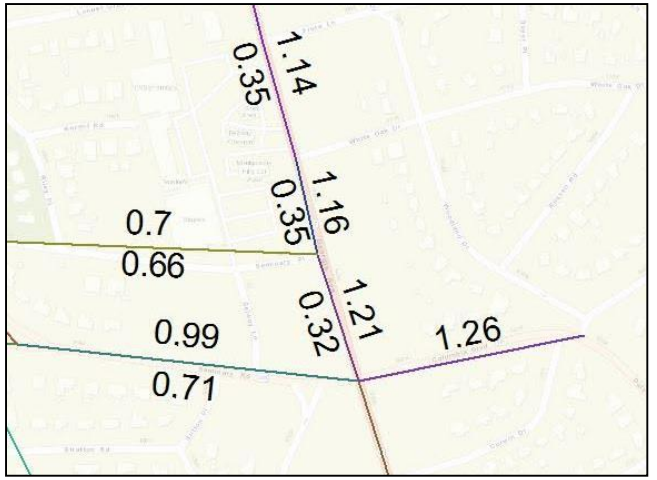
Traffic Model Inputs



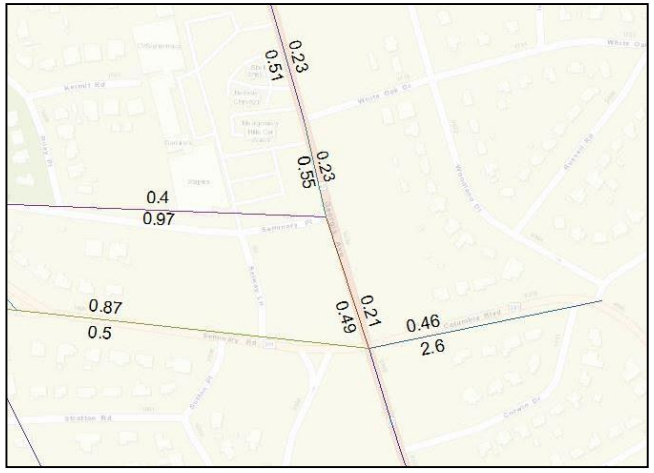
How we Determined Growth Rates

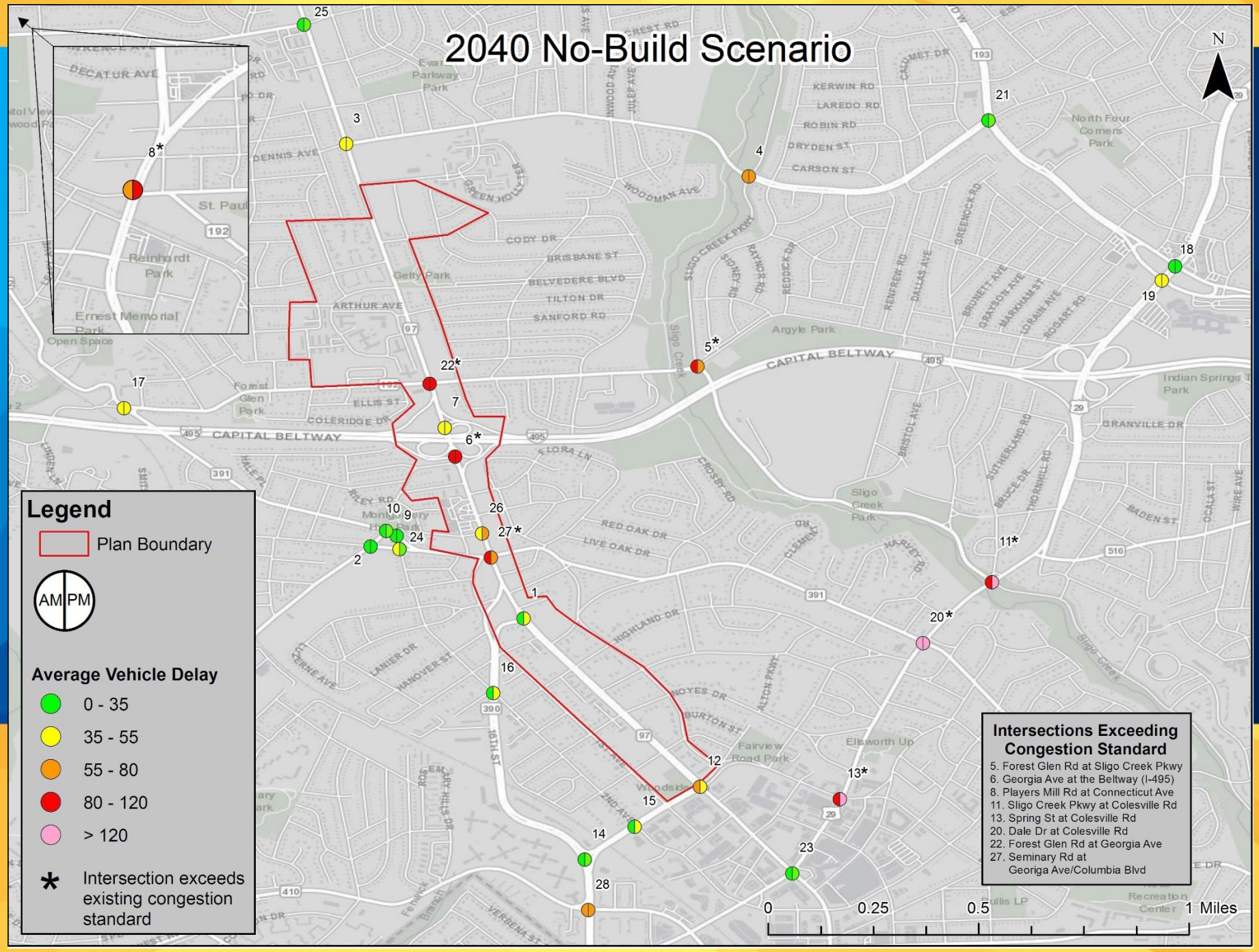
- Annual Growth Rates (AGR) for each roadway link were taken from the traffic forecast model outputs and applied to existing traffic volumes.
- The average growth rates between the origin and destination links were applied to individual turning movements at each intersection then balanced.
- Annual growth rates ranged from 0.25% to 2.00%.

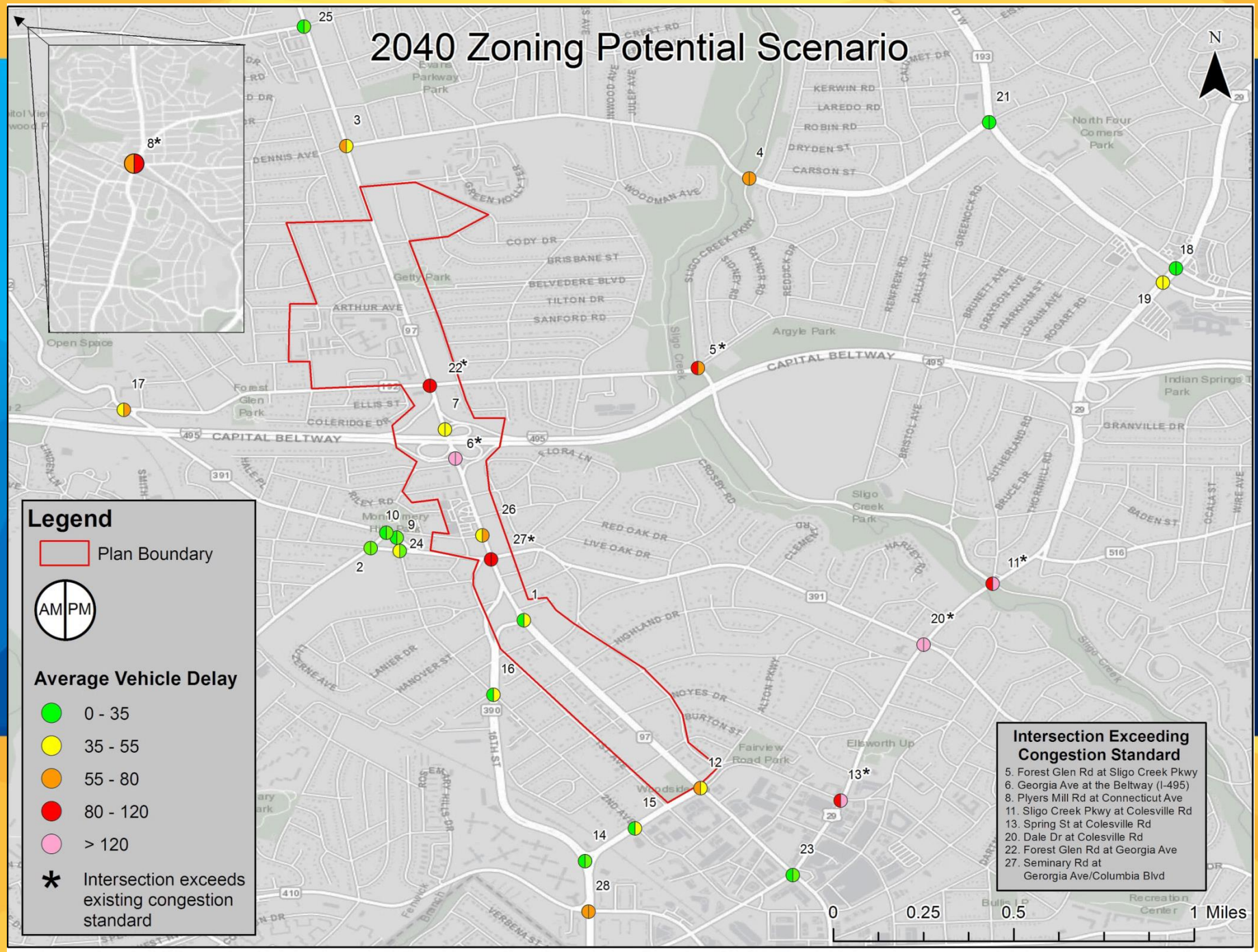
2040 No Build AM



2040 No Build PM




2040 No-Build Scenario
N
Legend
Plan Boundary
AM PM
Average Vehicle Delay
0 - 35
35 - 55
55 - 80
80 - 120
> 120
* Intersection exceeds existing congestion standard
Intersections Exceeding Congestion Standard
5. Forest Glen Rd at Sligo Creek Pkwy
6. Georgia Ave at the Beltway (I-495)
8. Players Mill Rd at Connecticut Ave
11. Sligo Creek Pkwy at Colesville Rd
13. Spring St at Colesville Rd
20. Dale Dr at Colesville Rd
22. Forest Glen Rd at Georgia Ave
27. Seminary Rd at Georiga Ave/Columbia Blvd
0 0.25 0.5 1 Miles
CAPITAL BELTWAY
Sligo Creek Park
Argyle Park
Indian Springs Park
North Four Corners Park
Fairview Road Park
Forest Glen Park
Reinhardt Park
Ernest Memorial Park Open Space
Getty Park
Evans Parkway Park
Montgomery Hills Park
Recreation Center

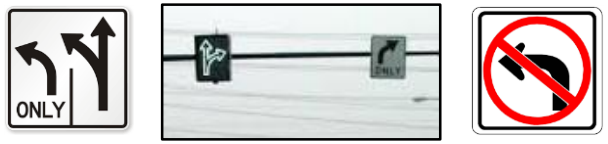

2040 Zoning Potential Scenario
N
Legend
Plan Boundary
AM PM
Average Vehicle Delay
0 - 35
35 - 55
55 - 80
80 - 120
> 120
* Intersection exceeds existing congestion standard
Intersection Exceeding Congestion Standard
5. Forest Glen Rd at Sligo Creek Pkwy
6. Georgia Ave at the Beltway (I-495)
8. Plyers Mill Rd at Connecticut Ave
11. Sligo Creek Pkwy at Colesville Rd
13. Spring St at Colesville Rd
20. Dale Dr at Colesville Rd
22. Forest Glen Rd at Georgia Ave
27. Seminary Rd at Gerorgia Ave/Columbia Blvd
0 0.25 0.5 1 Miles
CAPITAL BELTWAY
Open Space
Forest Glen Park
Getty Park
Argyle Park
Sligo Creek Park
Fairview Road Park
North Four Corners Park
Indian Springs Park
Recreation Center
Ellsworth Up
Woodside
Evans Parkway Park

Traffic Management & Mitigation Tools

- Mode Shift
  - Incentivizing non-auto modes of transportation can reduce traffic volumes on a roadway reducing congestion.
  - May also include increasing the congestion standard.

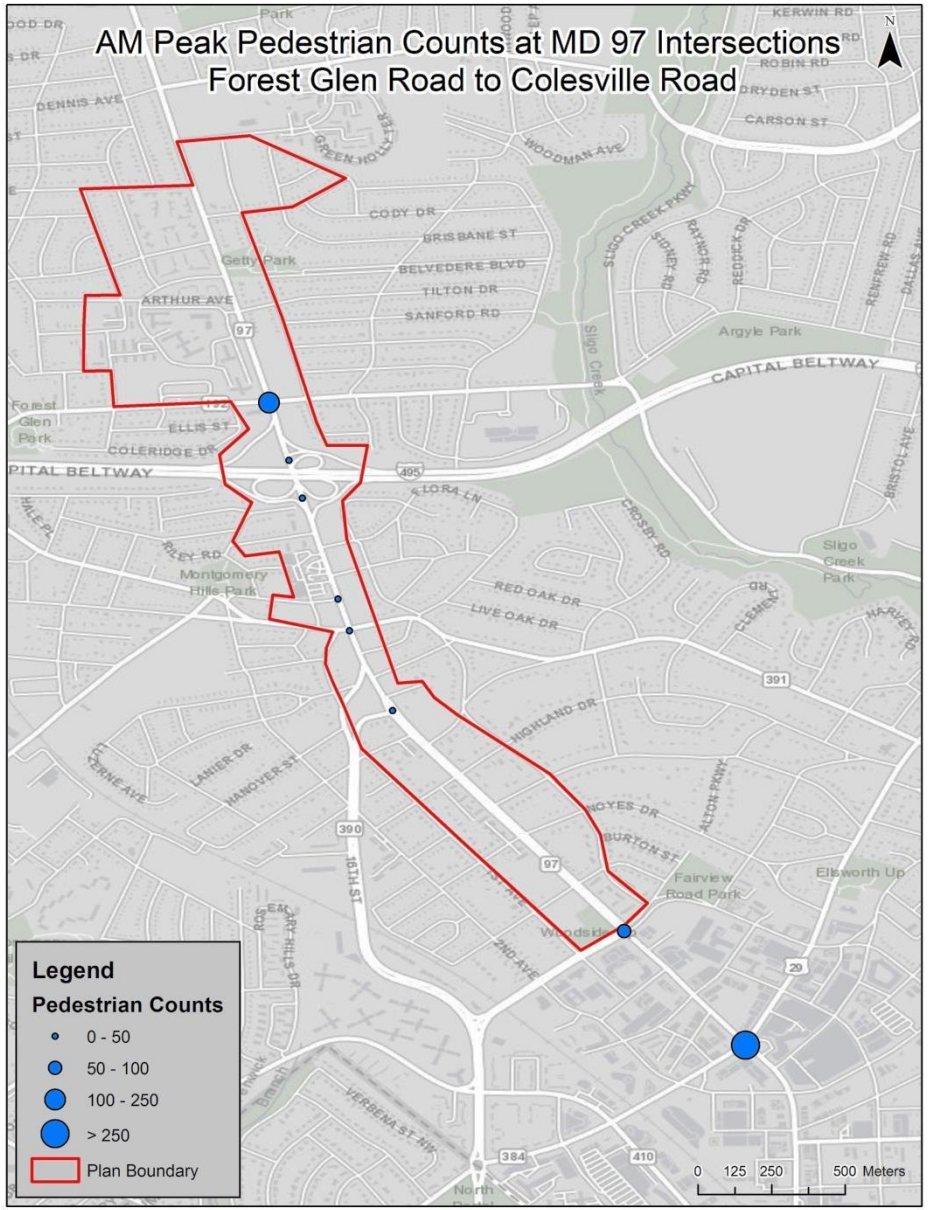
- Traffic Redistribution
  - Redistributing traffic from roadways operating over capacity to roadways operating under capacity can reflect real world adjustments drivers make to their typical routes as they find the quickest path to their destination.

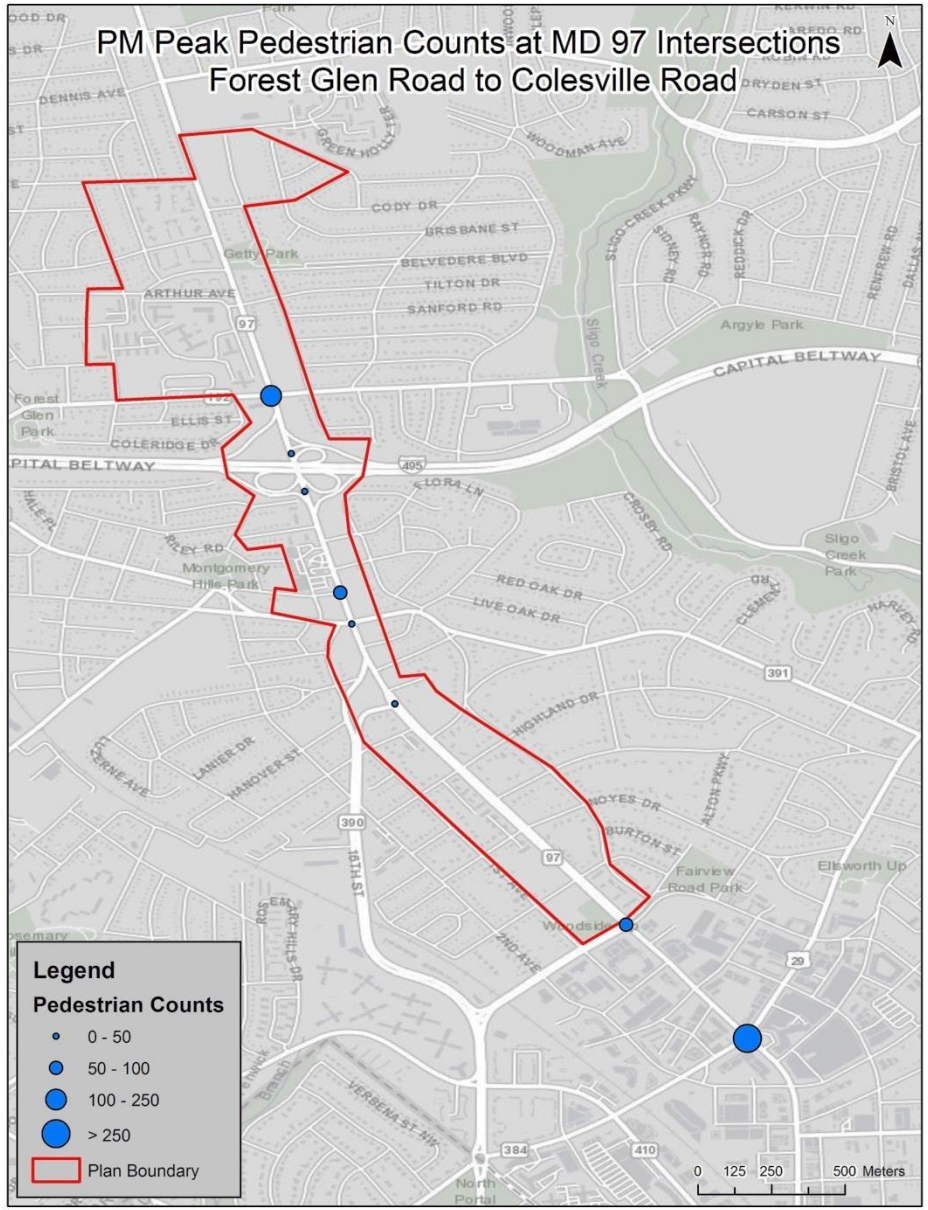
- Traffic Management
  - Traffic management such as turn restrictions can eliminate signal phases increasing green time for other movements.



- Geometric Improvements
  - The addition of travel lanes increase capacity at an intersection.

Multi-Modal Considerations



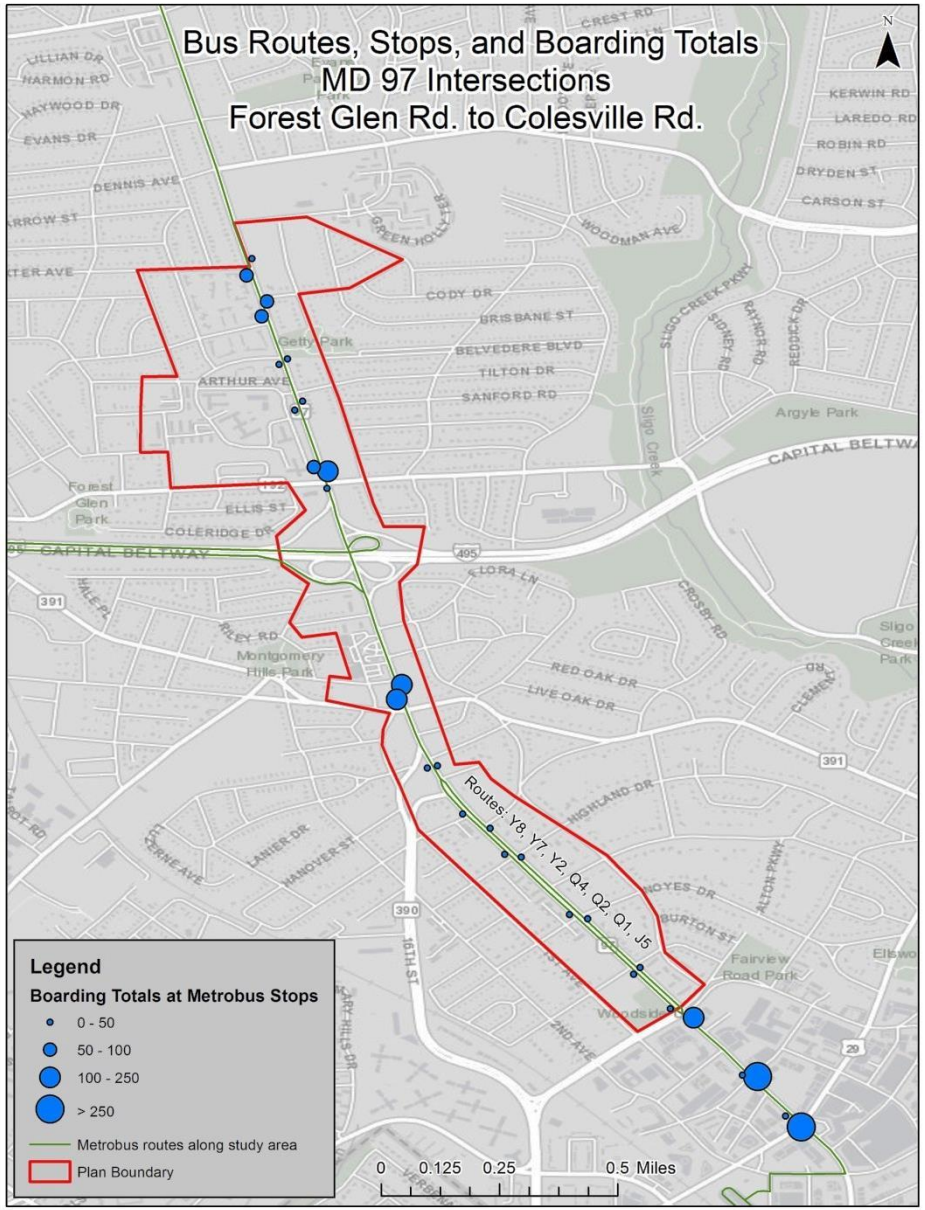


Multi-Modal Considerations

Example Enhanced Bicycle Facilities

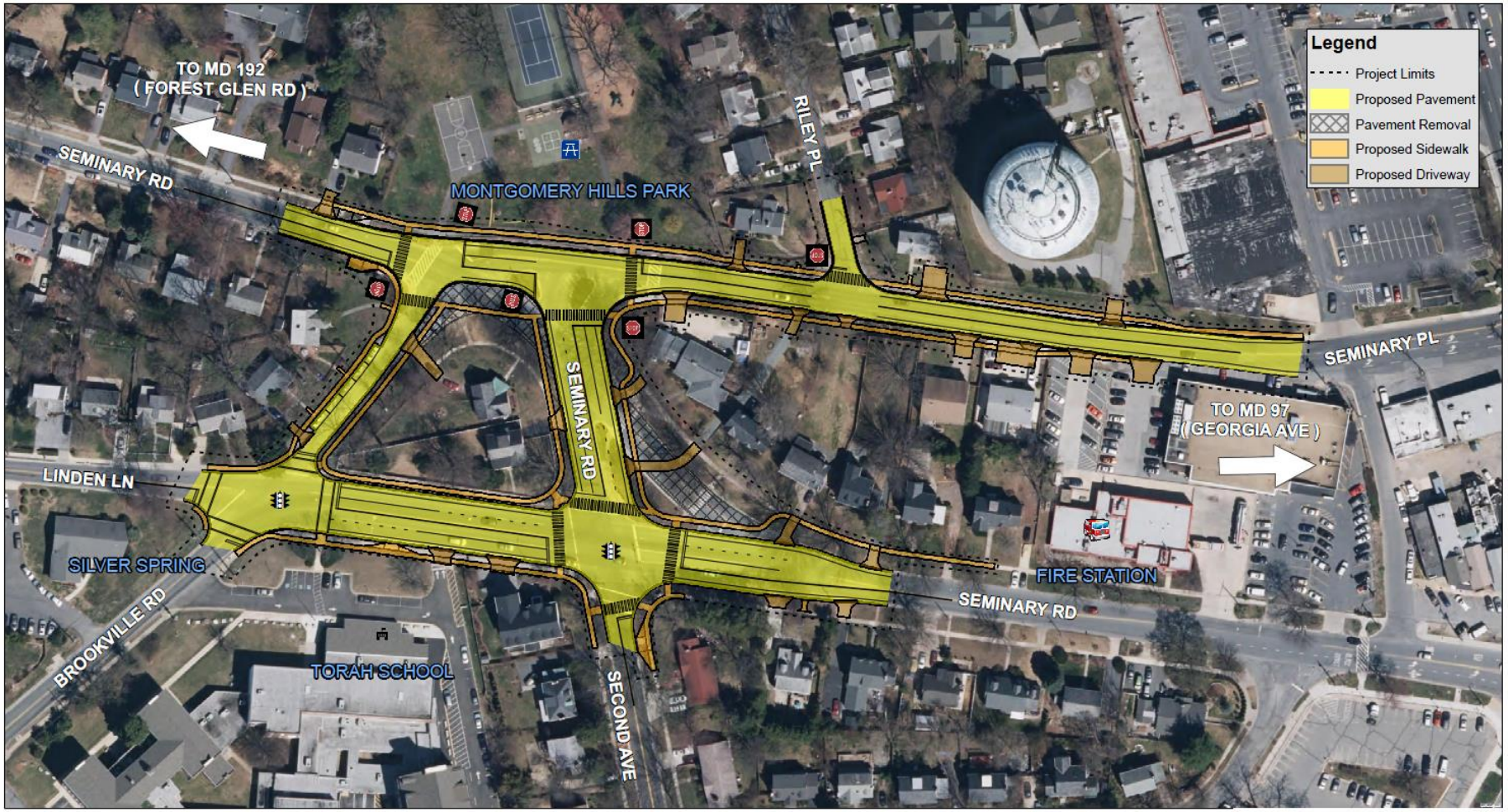
Forest Glen will be a bike/ped priority area

Multi-Modal Considerations



Background Roadway Improvements

Seminary Road, Seminary Lane, Second Avenue, Linden Lane, and Brookville Road



Seminary Road Intersection Improvements
Public Hearing
May 11, 2017

0 25 50 100 150 200 Feet
1 in = 25 ft

N

Potential Mitigation Considerations

Connecticut Avenue at Plyers Mill Road

<u>Signal Phasing Improvements:</u>

Installation of a westbound right overlap phase.

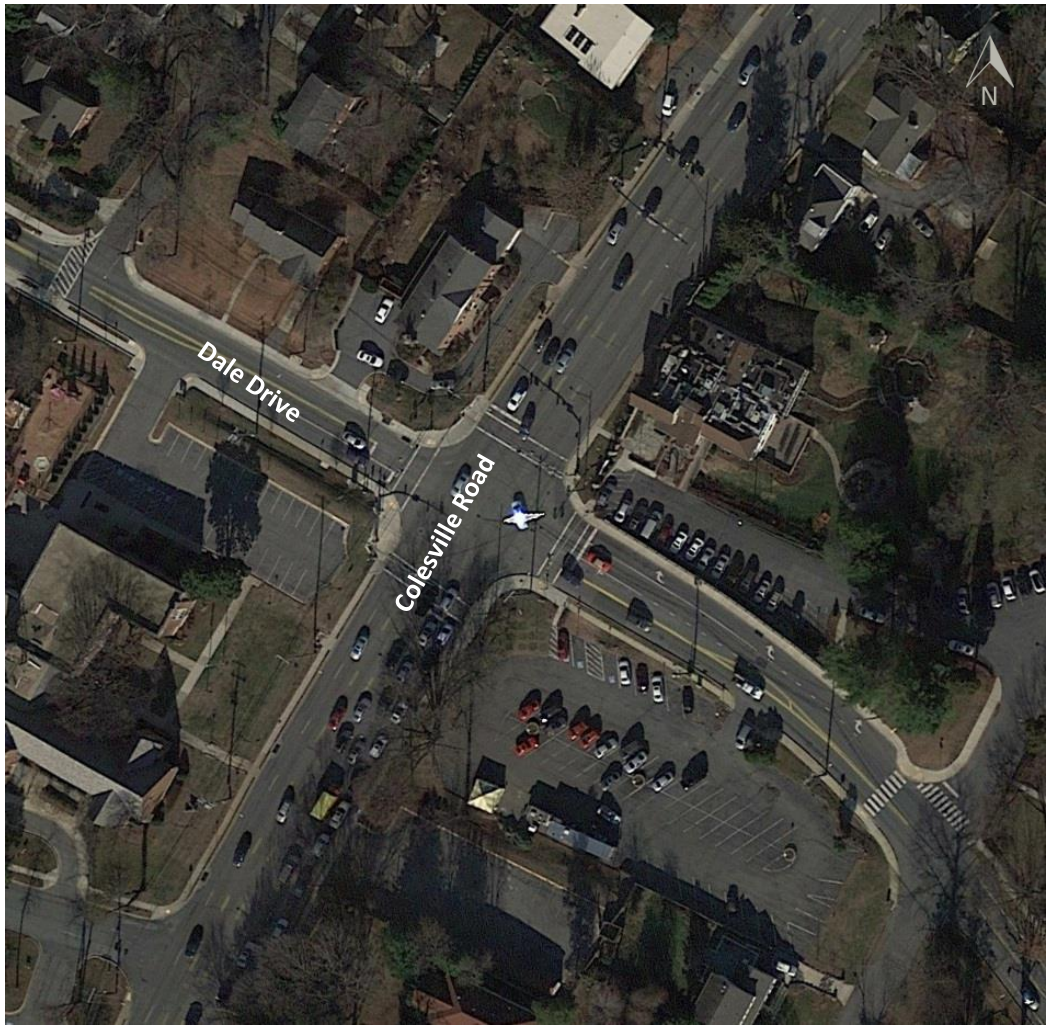
- Provides a right turn arrow for the westbound right turn movement which operates concurrently with the protected southbound left turn phase.

<u>Geometric Improvements:</u>

Addition of a northbound right turn lane to reduce the amount of vehicles in the three existing northbound through lanes.

Potential Mitigation Considerations

Colesville Road at Dale Drive



Traffic Management:

- Southbound left turn restriction during PM peak period.
- Diversions were assumed to take southbound left turns at Sligo Creek Parkway and Dale Drive.

Signal Timing Improvements:

Signal timing splits optimized.

Potential Mitigation Considerations

Colesville Road at Sligo Creek Parkway

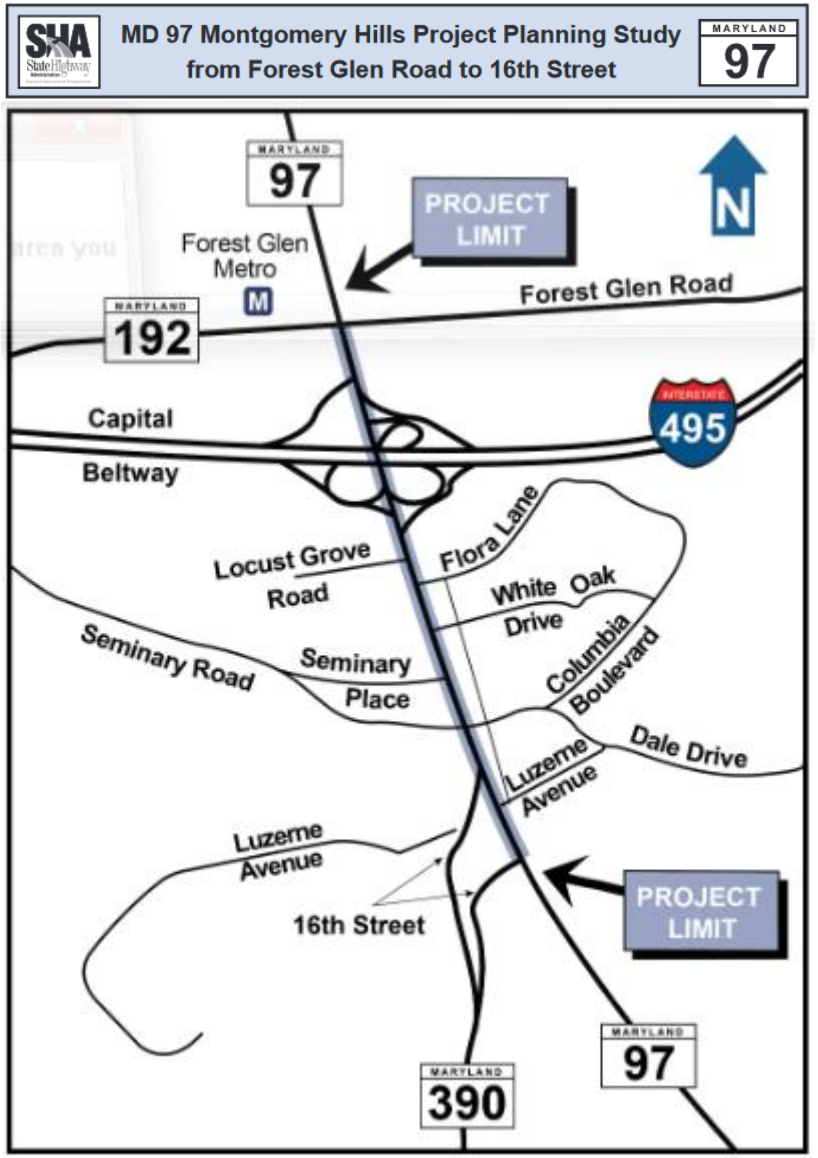
Traffic Management:

- Morning and evening phase shut down for St. Andrew's Way approach
- Traffic diversions were assumed to be via Lorain Avenue and Brunett Avenue

Signal Timing Improvements:

Signal timing splits optimized.

SHA Montgomery Hills Project Update



Forest Glen Metro Station

Washington Metropolitan Area Transit Authority

Office of Real Estate and Parking

December 18, 2017

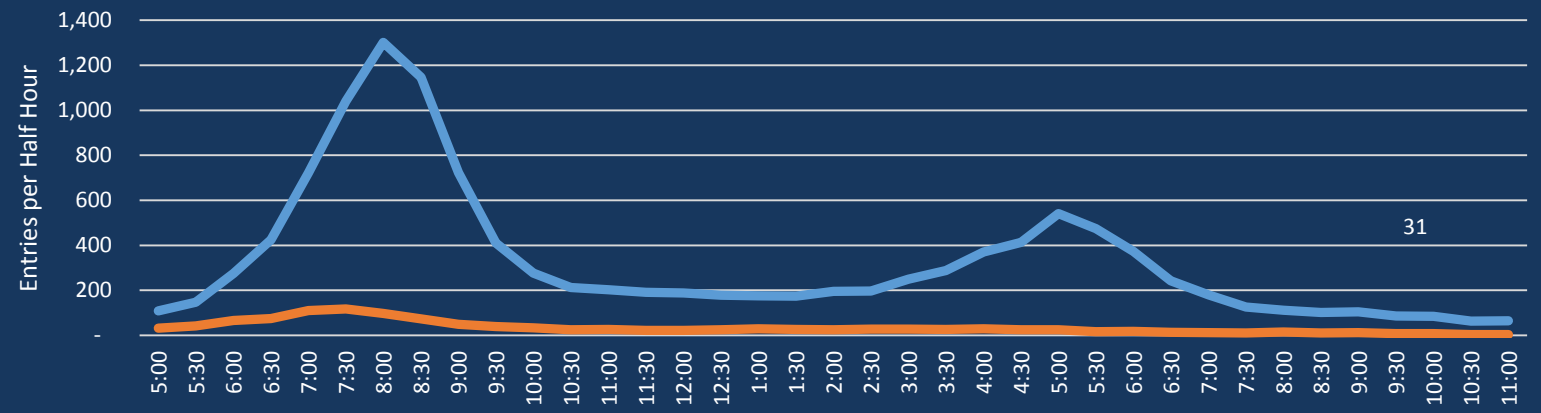
Why Land Use Matters

Silver Spring

Weekday Passenger Entries: 12,000
Weekday Average Revenue: $39,500

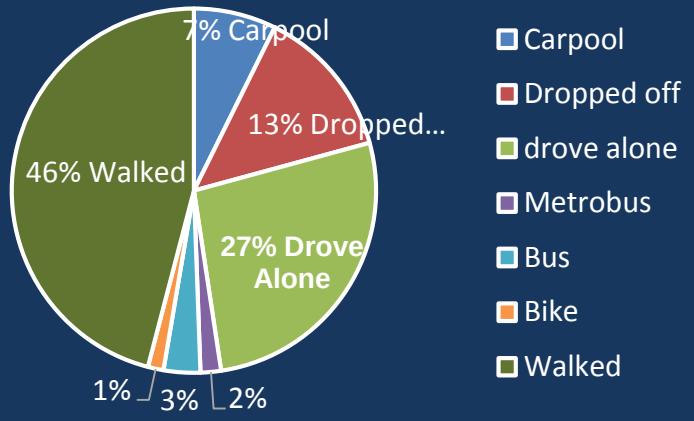
Deanwood

Weekday Passenger Entries: 1,300
Weekday Average Revenue: $3,300



Metro-Owned Property

Forest Glen Metro Station



- 8-acre site
- Zoned R-60
- 596 all-day spaces
  - 80% average utilization
- 45 short-term spaces
- 2,181 daily ridership
  - One of least used stations in system
- No Metrobus service

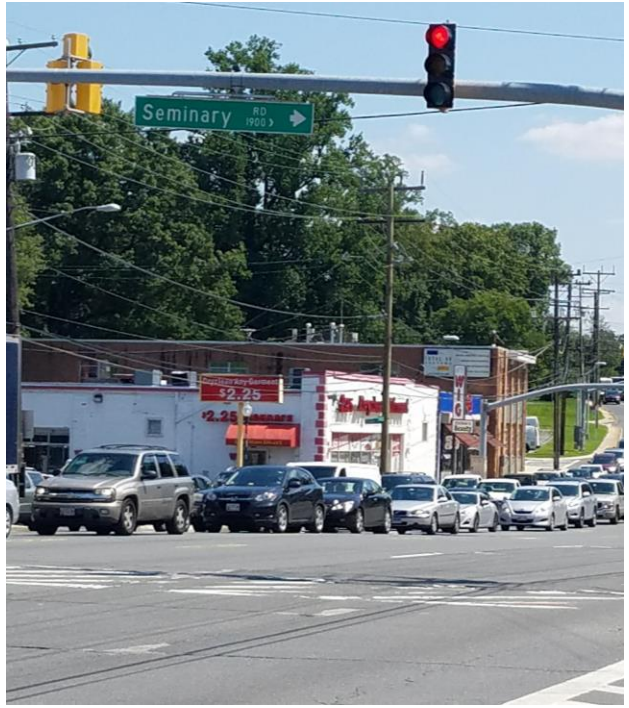
Background

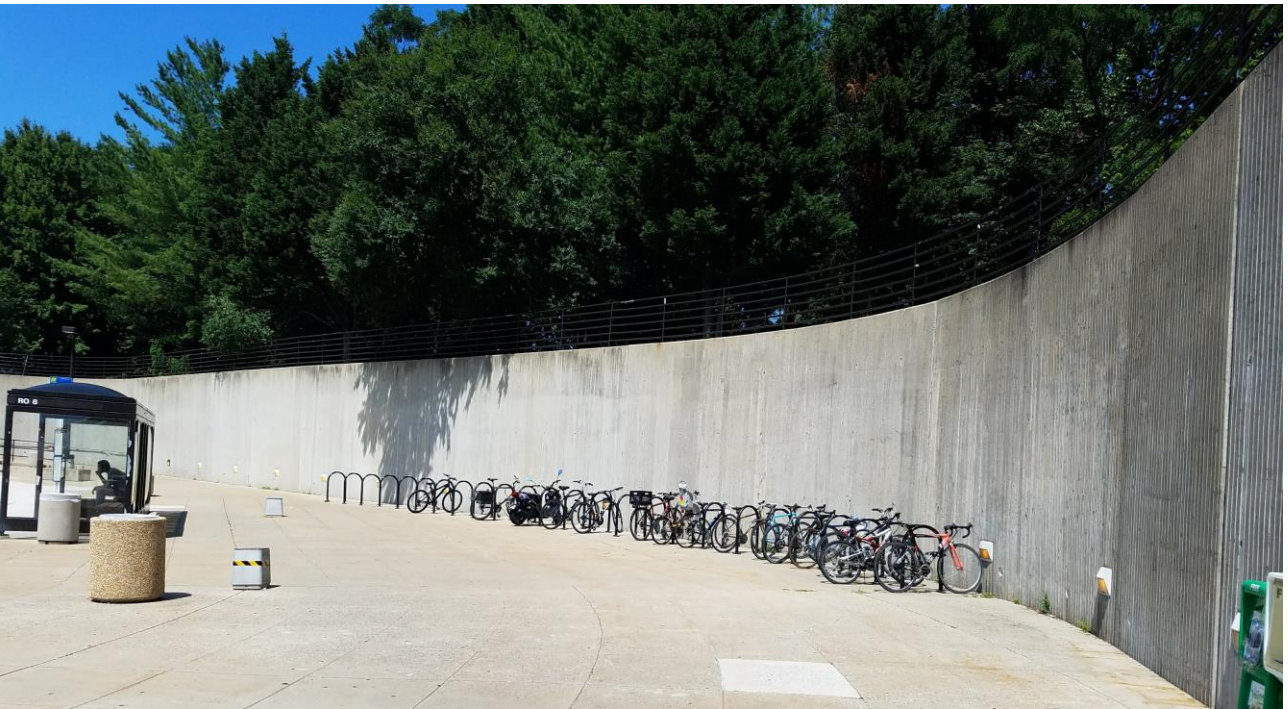
March 2014	Metro adopted 2014 joint development work program, to issued a RFP for developable parcels at Forest Glen
June 2015	Metro started community engagement for station redevelopment
2015	Development studies completed; test fits included
Present	Joint development financial feasibility study underway

2015 Development Study Test Fits

Scope of Financial Feasibility Study

- Develop site specific goals and criteria
  - Maximize ridership potential
  - Explore potential for higher density, mix of uses
  - Recommend investments to maximize pedestrian connections to the Metro station
- Complete market analysis and implementation plan
- Incorporate information and/or analysis resulting from Montgomery County's planning study
- Reach an informed "Go/No Go" decision for joint development





Questions?

Corrections and Clarifications

Existing Conditions:
Outside the plan area, ~~five~~ three intersections exceed the standard and they include:

- Sligo Creek Parkway and Colesville Road (evening peak hour)
- Dale Drive and Colesville Road (evening peak hour)
- ~~Spring Street and Colesville Road (evening peak hour)~~
- Plyers Mill Road and Connecticut Avenue (evening peak hour)
- ~~Dennis Avenue and Sligo Creek Parkway (morning and evening peak hours, stop-controlled intersection)~~

Two intersections experience a level of service F, but do not exceed the standard set by the SSP

- Spring Street and Colesville Road (evening peak hour)
- Dennis Avenue and Sligo Creek Parkway (morning and evening peak hours, stop-controlled intersection.

Corrections and Clarifications

2040 No Build:
Within the Plan Area Boundary, ~~four~~ three intersections are forecasted to exceed the standard

- Georgia Avenue and Forest Glen Road (both morning and evening peak hours)
- Georgia Avenue and the Inner Beltway off-ramp (both morning and evening peak hours)
- ~~Georgia Avenue and Seminary Place (evening peak hour)~~
- Georgia Avenue and Seminary Road/Columbia Boulevard (morning peak hour)

While Georgia Avenue and Seminary ~~Place~~ Road is forecasted to approach the standard in the morning peak hour, there is a very small margin before it exceeds the standard in the evening peak hour.

Two intersections are forecasted to have a level of service F, but do not exceed the standard for the SSP

- Spring Street and Colesville Road (morning peak hour)
- Dennis Avenue and Sligo Creek Parkway (morning and evening peak hours, stop-controlled intersection.