

# MD 99 Corridor Investigation



**MD 99 / OLD FREDERICK ROAD / ROGERS AVENUE**

**SUMMARY OF TRAFFIC CONDITIONS  
AND PRELIMINARY RECOMMENDATIONS**



Howard County  
OFFICE OF TRANSPORTATION

**DECEMBER 11, 2018 7:00 PM- 8:30 PM  
MT. HEBRON HIGH SCHOOL**

# Agenda/Presentation Overview



1. Welcome
2. Background and purpose of meeting
3. Existing Conditions
4. Evaluation and findings
5. Potential Congestion and Multi Modal Strategies  
Background
6. Summary of Recommendations
7. Questions
8. Visit boards and talk to staff-balance of the evening

# Welcome and Introductions



## • Project Team



## • Study Purpose

To address community concerns about:

- Traffic congestion along the corridor, particularly around school bell times
- Traffic safety (crashes, speeding, sight distance)
- Traffic signal operations/ new traffic signal needs
- Cut-through traffic
- Lack of walking and biking infrastructure

### **MDOT State Highway Administration**

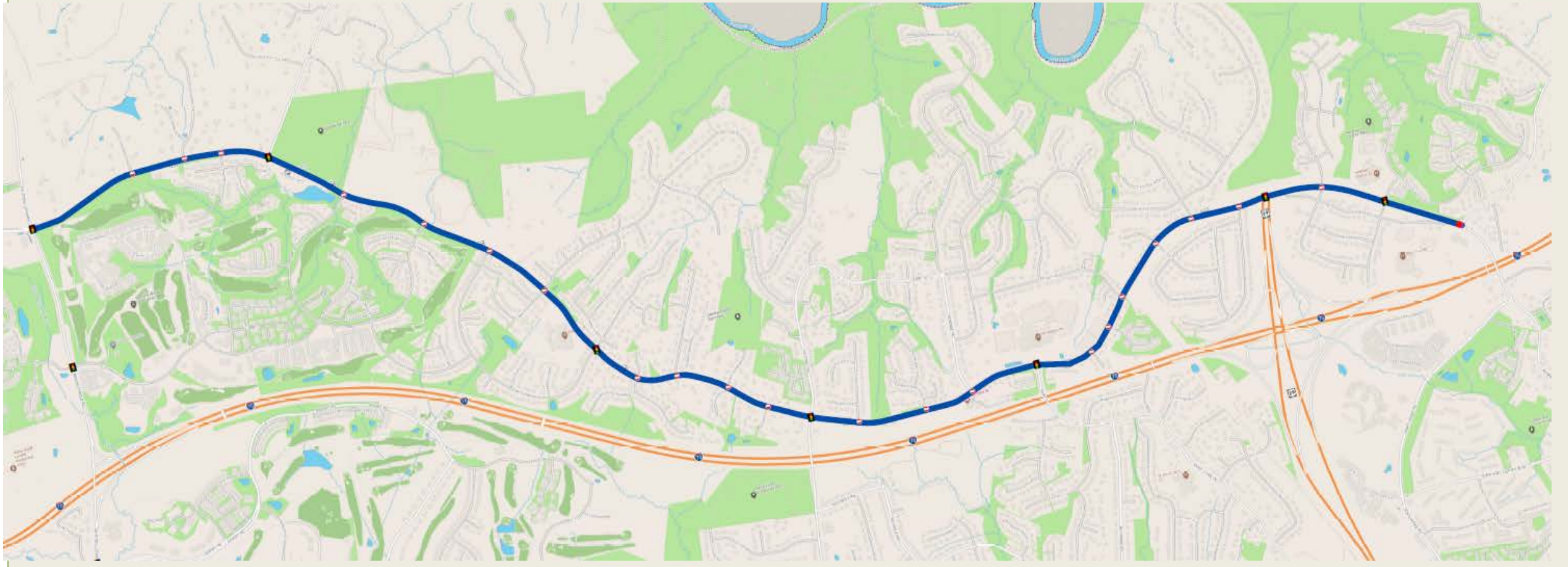
- -Recent and Current Related projects and role

# Project Genesis



- Long-standing concerns by some residents and public input into FY 2018 Priority Letter process
- County Executive decided to include in Priority Letter - MD 99 is a state road
- Howard County Office of Transportation initiated the project

# What area was studied?



# MD 99 List of Studies & Projects Completed by MDOT SHA

Year	Improvement Type	Location	Description
2009		Marriottsville Rd.	Modified signal phasing
2012		MD 99 Westbound near Alpha Ridge Park entrance	Installed additional signs
2012		Entrances of Mount Hebron High School	Widened lanes and provided right turn lane
2012		West side of St. Johns Lane	Upgraded pedestrian signals
2013		West of Marriottsville Road	Removed passing lane
2013		Eastbound of Old St. Johns Lane	Installed signs and pavement markings

# MD 99 List of Studies & Projects Completed by MDOT SHA

Year	Project	Location	Description
2013		Bethany Lane & Old Mill Rd.	Separate left turn lanes
2014		Butterfly Court	Installed signs
2015		Bethany Lane	Adjusted signal timing during even peak time
2016		St. Johns Lane	Adjusted signal phasing
2016		Melba Avenue	Modified pavement markings
2016		North Farm Rd., Weatherburn Rd., Waverly Woods Dr.	Installed signs

# Existing Conditions



- 2-lane roadway
  - Limited or no shoulders, sidewalks or bike lanes
- 5.5 mile segment from Marriottsville Road to Rogers Avenue/ Old Fredrick Road
- Average Daily Traffic volumes range from 6,500 east of Marriottsville Road to 16,500 near US 29
- Peak hour volumes
  - Up to 1,200 vehicles per hour eastbound AM and 1,200 westbound PM near US 29
  - Between 25 to 50 pedestrians per day @ Bethany Lane, St. Johns Lane, Wetherburn Road and Patapsco Valley Drive
- Four schools: Mt. Hebron High School, Waverly Elementary School, Hollifield Station Elementary School and Patapsco Middle School
- State maintained from Marriottsville Road to US 29, County maintained from US 29 to US 40



# Traffic Controls



## **Traffic Signals**

- › Marriottsville Road
- › Woodstock Lane
- › Wetherburn Road/ Maple Lane
- › Bethany Lane
- › St. John's Lane/ Mt. Hebron High School
- › US 29
- › Patapsco Valley Drive/ Orchard Avenue

Traffic signals operate independently (e.g. not coordinated) but do have detection to activate side streets and left-turn phases when vehicles are present on those lanes

## **Roundabouts**

- › Rogers Avenue/ Old Frederick Road

## **Stop Signs (Side Street)**

- › Maple Rock Drive
- › Melba Road
- › Mount Hebron Drive
- › Tiller Drive
- › McKenzie Road
- › Weatherstone Drive
- › Liter Drive
- › Taylor Farm Road
- › Green Clover Drive/ Waverly Woods Drive

# Traffic Operations - Signals



- **Signals with left-turn lanes**

- Marriottsville (all directions)
- Wetherburn/ Maplewood (EB and WB)
- Bethany (all directions)
- St. Johns (EB and WB)
- US 29 (WB)
- Patapsco Valley (EB and WB)

- **Signals with left-turn arrows**

- Marriottsville (all directions)
- Wetherburn / Maplewood (EB and WB)
- St. Johns (EB and WB)
- US 29 (WB)
- Patapsco Valley (EB and WB)

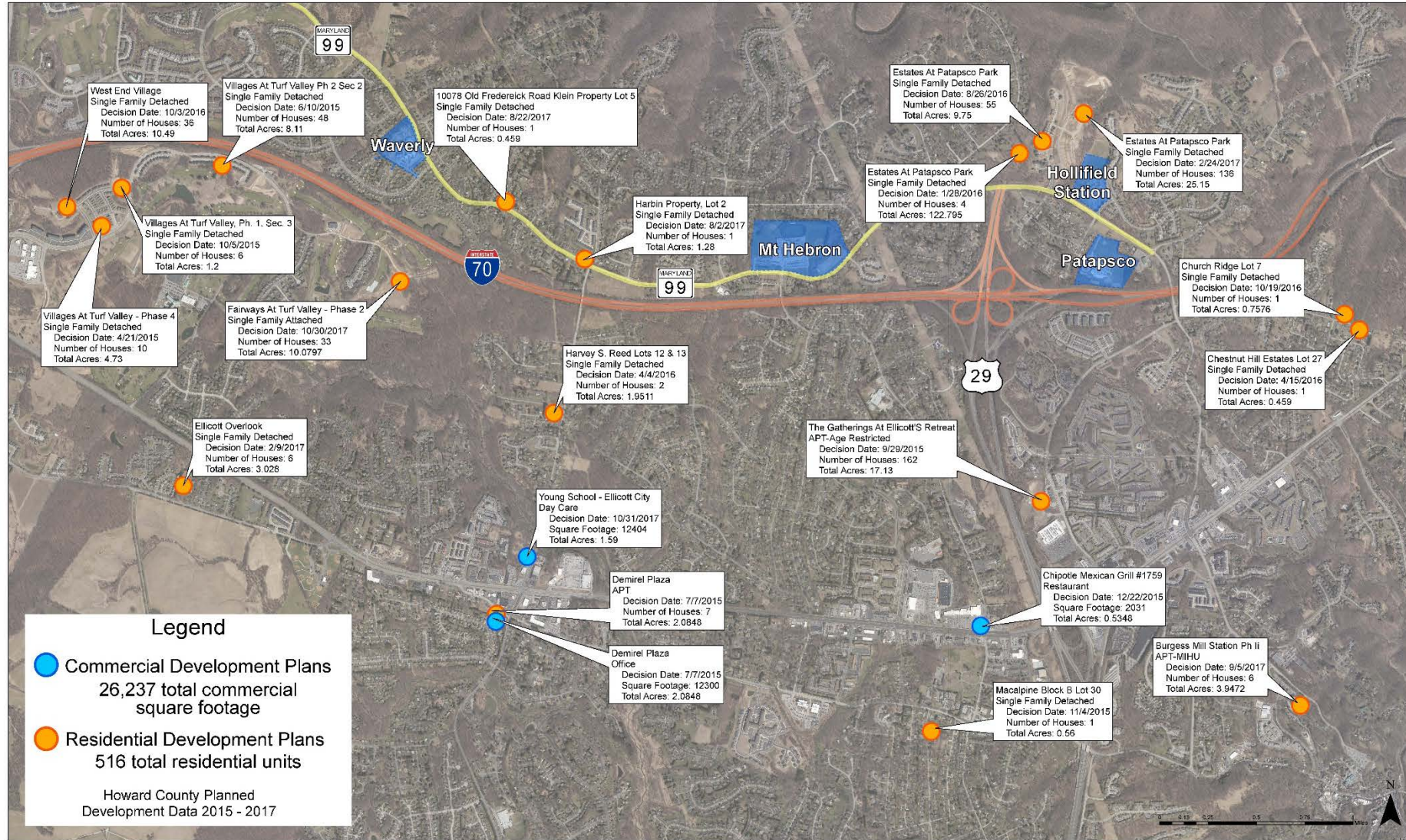


- **Residual Queuing (vehicles unable to clear the intersection in one traffic signal cycle)**

- SB MD 99 and EB and WB Marriottsville Rd, AM
- EB Wetherburn Through, AM\*
- SB Woodstock Lane, AM
- EB MD 99 at St. Johns Lane, AM and SB Hebron HS, AM\*
- NB US 29 @ MD 99, PM
- NB Bethany Lane LT PM
- EB Rogers at Patapsco Valley, PM\*
- EB Rogers @ Old Frederick, AM and PM\*

\* Bell time school congestion issue

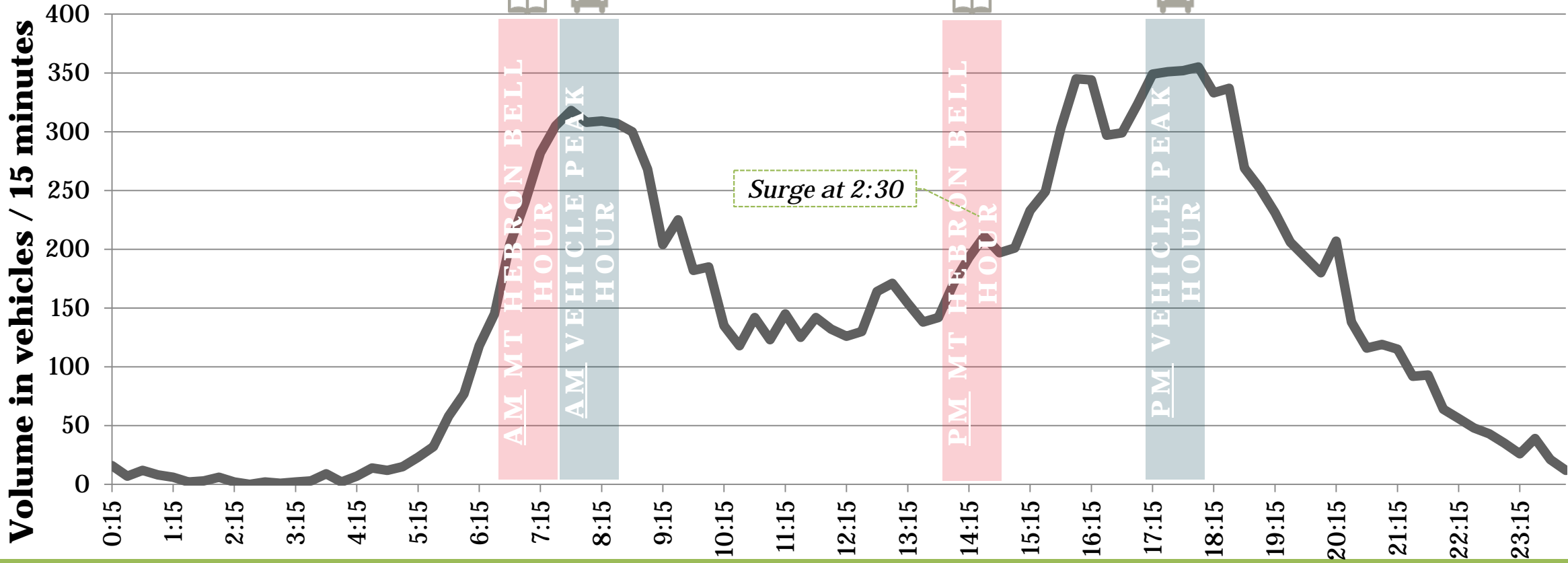
# Current Development



# Vehicle Traffic Volume Peak Times



## Hourly Volume Along MD 99 between Bethany Lane and St. John's Lane (Sum of EB and WB)

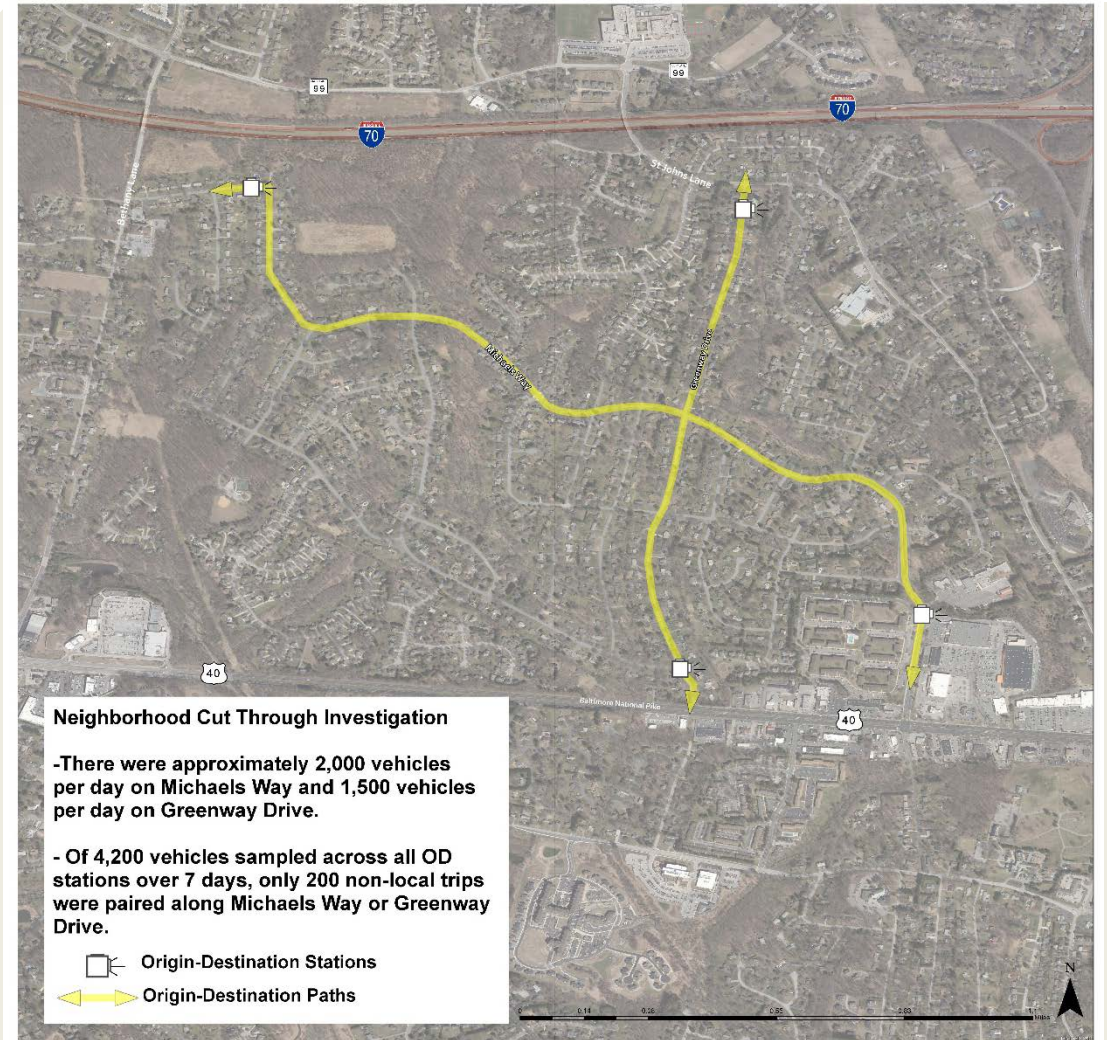


Time in 15 minute intervals between 12:15 AM and 11:45 PM

# Origin-Destination Study



- Identify potential non-local neighborhood cut-through traffic along Michaels Way and Greenway Drive avoiding MD 99
- Approximately 2,000 vehicles per day on Michaels Way and 1,500 on Greenleaf Drive
- 4,200 vehicles sampled across all O-D stations over 7 days, only 200 non-local trips paired along Michaels Way or Greenleaf Drive



# Corridor Field-Measured Travel Times



## MD 99 (Marriottsville to Rogers/ Old Frederick)

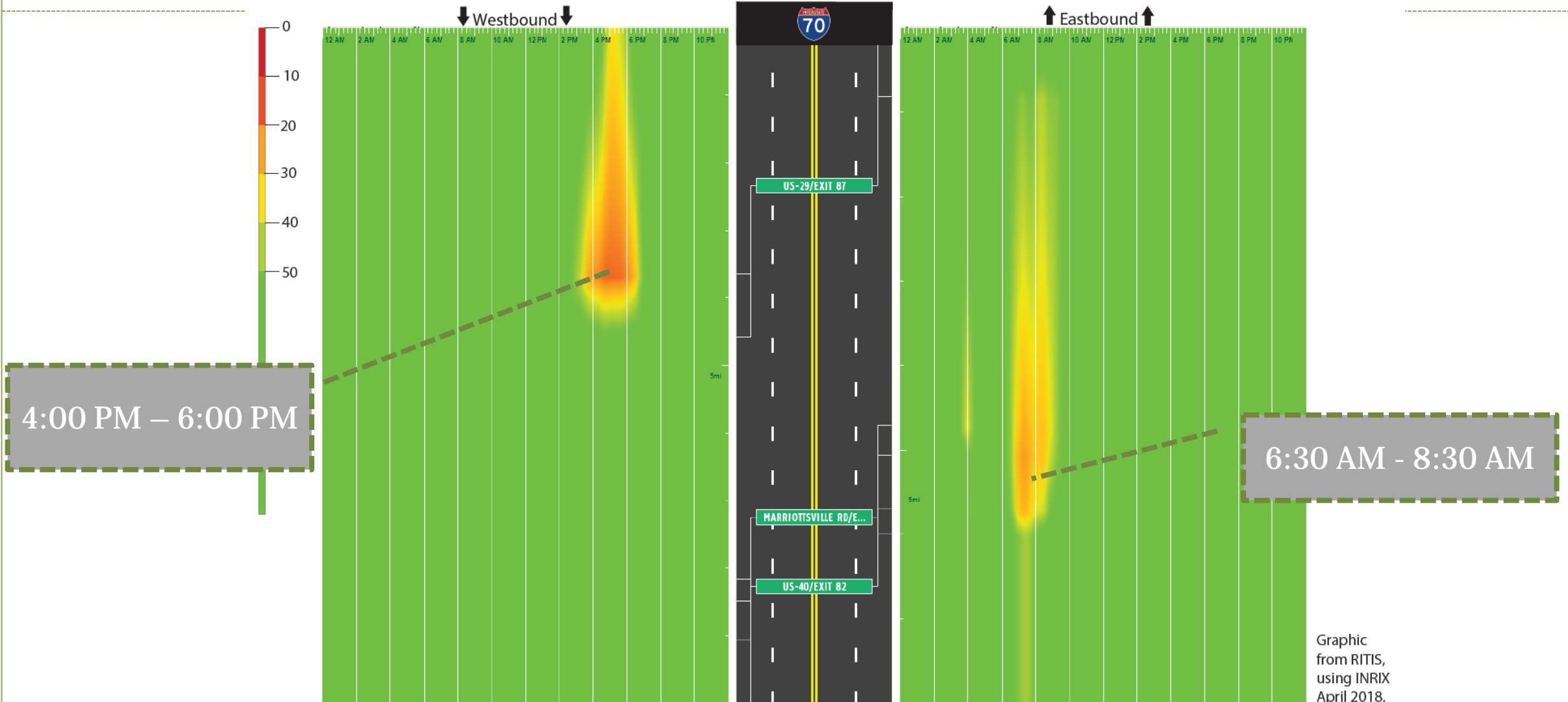
- AM Peak hour (7 to 8 AM)
  - Eastbound 10 to 13 minutes
  - Westbound 9 to 10 minutes
- PM Peak hour (5 to 6 PM)
  - Eastbound 9 to 10 minutes
  - Westbound 9 to 10 minutes

## I-70 (Marriottsville to US 29)

- AM Peak hour (7 to 8 AM)
  - Eastbound 6-10 minutes
  - Westbound 4-6 minutes
- PM Peak hour (5 to 6 PM)
  - Eastbound 4-6 minutes
  - Westbound 6-10 minutes

# I-70 Vehicle Speeds and Congestion

I-70 Speeds for April 2018 - Averaged by 15 minute intervals for every weekday



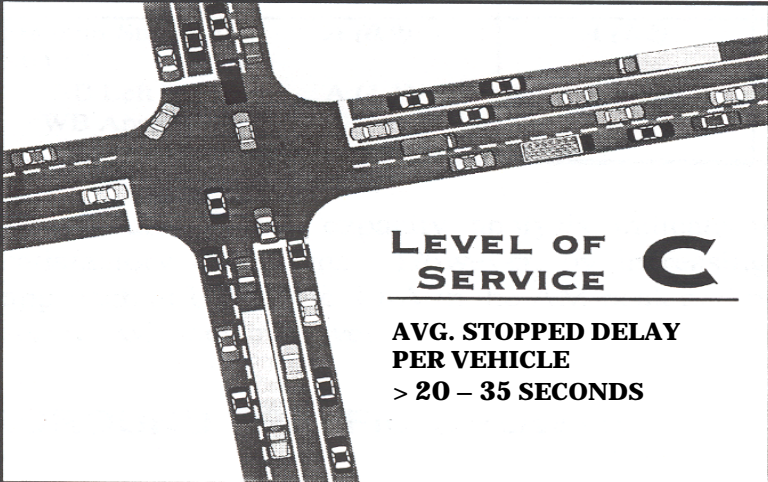
Graphic from RITIS, using INRIX April 2018.

# Signalized Intersection Level of Service Definitions

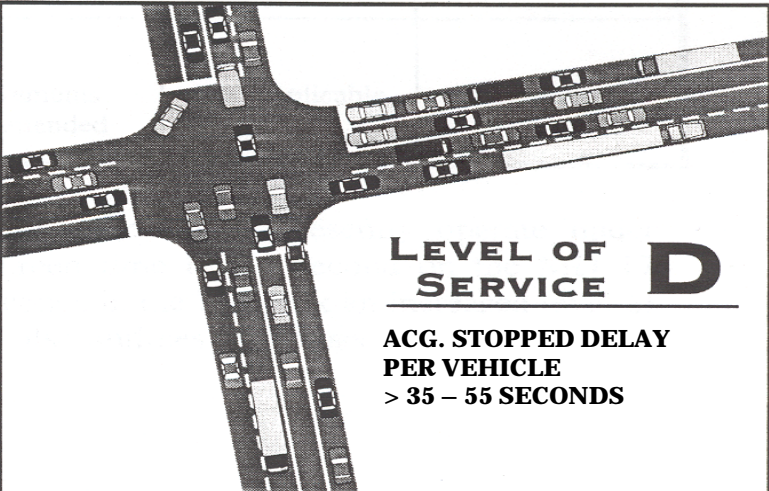


**AVG. STOPPED DELAY  
PER VEHICLE  
≤ 10 SECONDS**

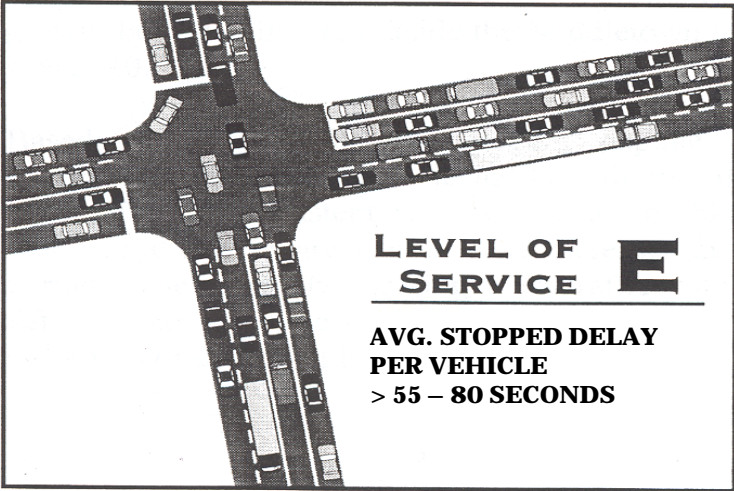
**AVG. STOPPED DELAY  
PER VEHICLE  
> 10 – 20 SECONDS**



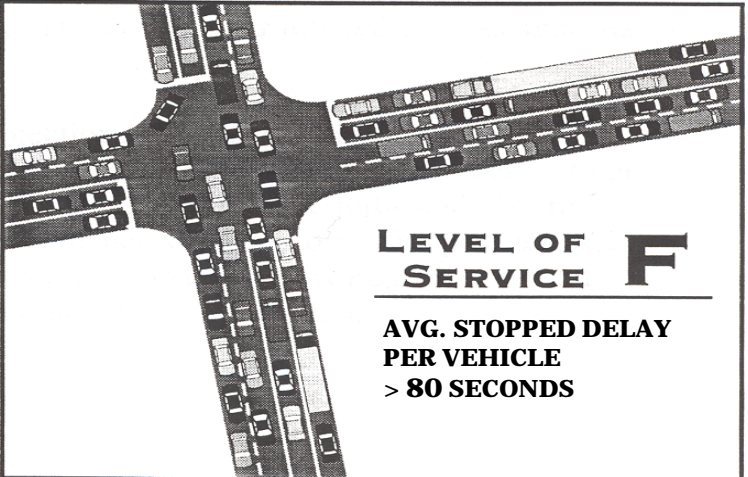
**LEVEL OF SERVICE C**  
**AVG. STOPPED DELAY PER VEHICLE > 20 – 35 SECONDS**



**LEVEL OF SERVICE D**  
**AVG. STOPPED DELAY PER VEHICLE > 35 – 55 SECONDS**



**LEVEL OF SERVICE E**  
**AVG. STOPPED DELAY PER VEHICLE > 55 – 80 SECONDS**



**LEVEL OF SERVICE F**  
**AVG. STOPPED DELAY PER VEHICLE > 80 SECONDS**



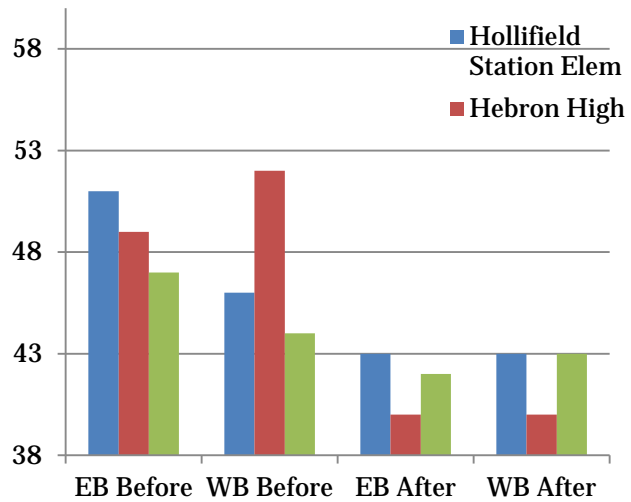
# Traffic Operations - Level of Service



<b>Intersection</b>	<b>Level of Service</b>	
	<b>AM</b>	<b>PM</b>
<b>Marriottsville Road</b>	<b>C</b>	<b>D</b>
<b>Woodstock Lane</b>	<b>D</b>	<b>C</b>
<b>Wetherburn Road/ Maple Lane</b>	<b>A</b>	<b>A</b>
<b>Bethany Lane</b>	<b>B</b>	<b>B</b>
<b>St. John's Lane/ Mt. Hebron High School</b>	<b>F</b>	<b>D</b>
<b>US 29</b>	<b>B</b>	<b>C</b>
<b>Patapsco Valley Drive/ Orchard Avenue</b>	<b>B</b>	<b>B</b>
<b>Rogers/ Old Frederick</b>	<b>F</b>	<b>F</b>

# Bell Time Speeds and Intersection Level of Service

## School Zone Speed Enforcement Before Vs. After



Benefits of reduced speeds include reduced crash risk and increased gaps for side street traffic to enter



# Vehicle Queues



**MD 99 Looking East @ St. Johns  
AM High School Bell Time**

**MD 99 Looking West @ Weatherstone  
AM High School Bell Time**



# Vehicle Queues



**Rogers Avenue  
Approaching Roundabout  
Eastbound PM**



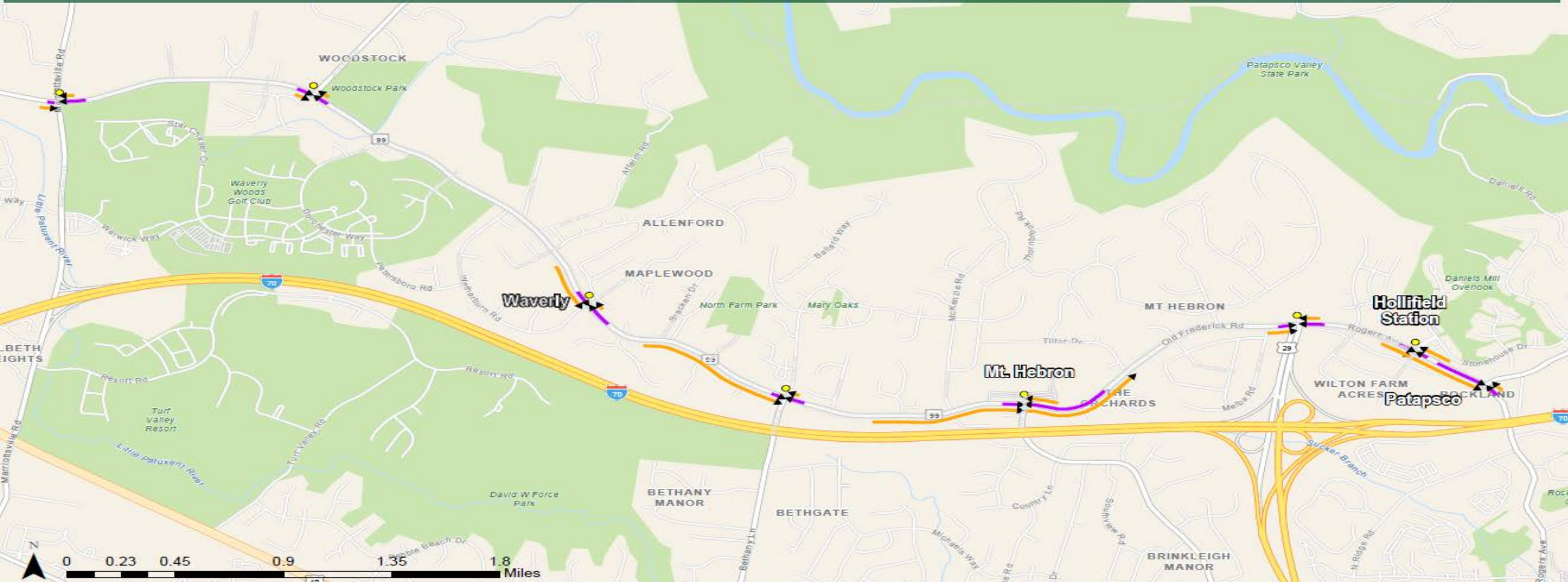
**Rogers Avenue  
Approaching Orchard Avenue  
Eastbound PM**



# Observed Vehicle Queues



## MD 99 Traffic Safety and Operations Investigation Maximum Observed Queues



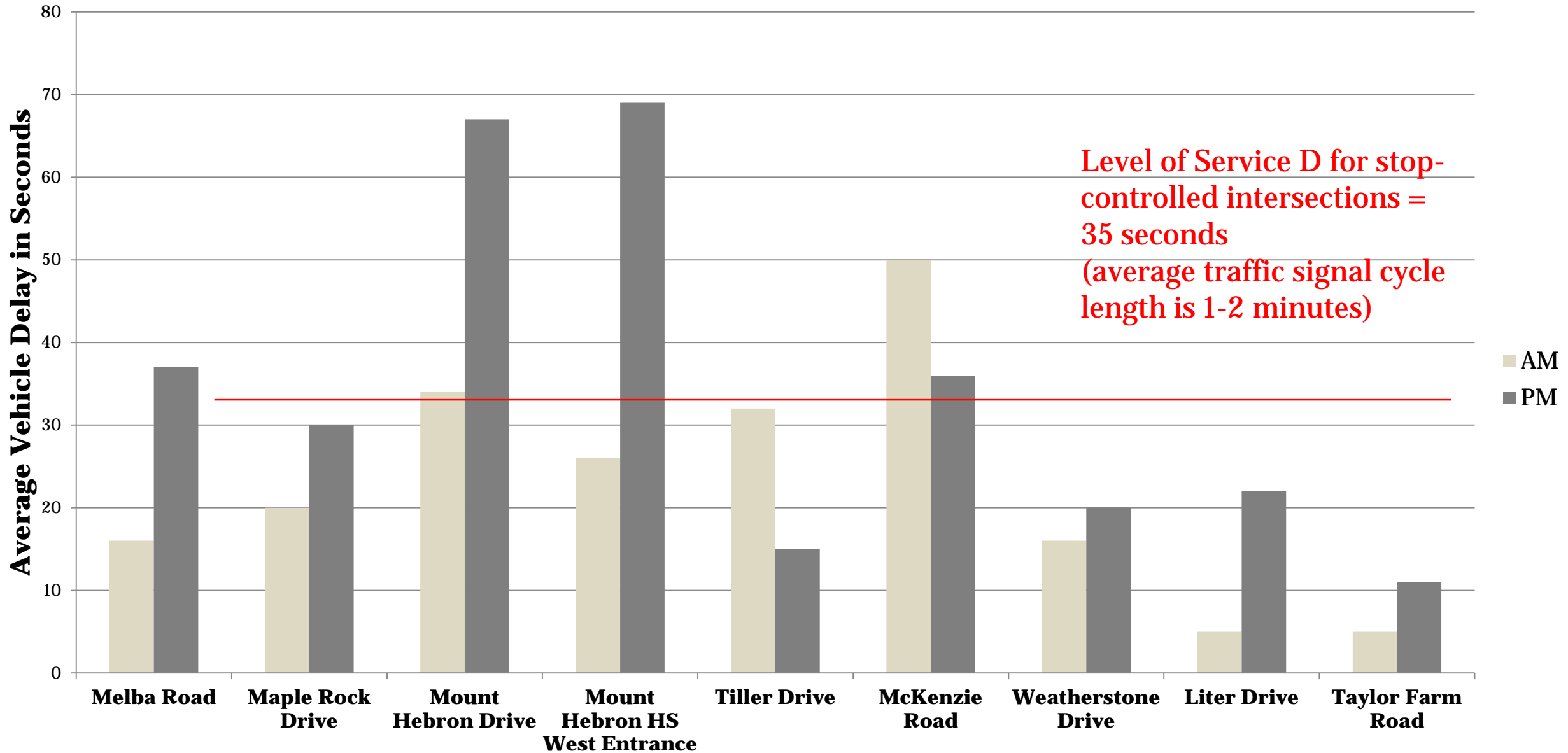
Map Features:

- Queues
  - AM (Orange line)
  - PM (Purple line)
- Signalized Intersection (Yellow dot)

Data Source:  
Max Observed Queues data was collected by Sabra & Associates through Field Observations in May 2018.



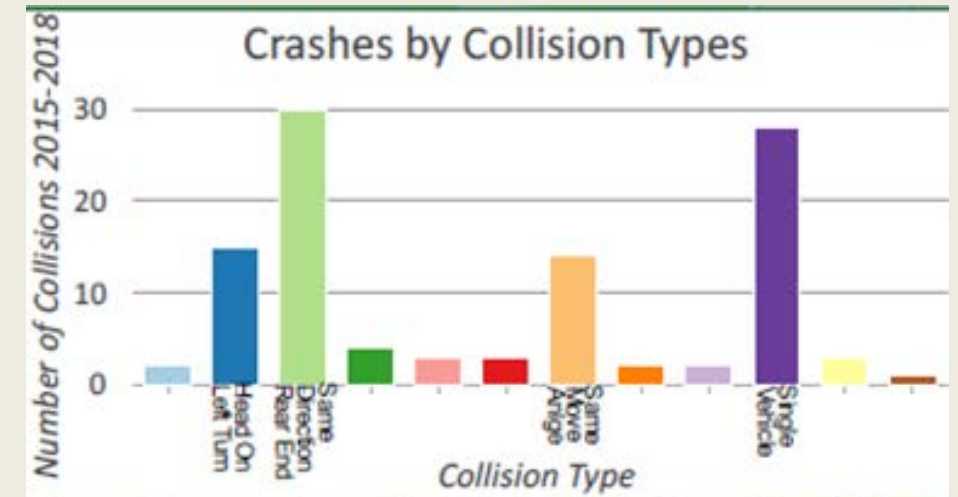
# Vehicle Delay – Stop Control Side Street



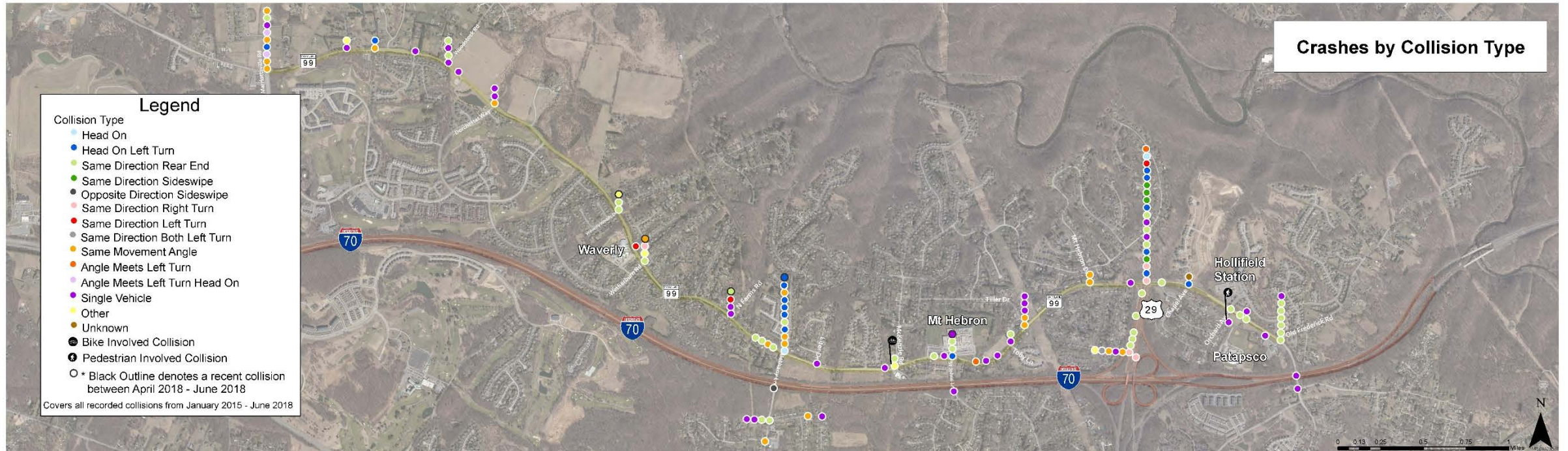
# Crash Experience



- January 2015 - June 2018
- Highest number of crashes occurred at
  - US 29 (19)
  - Marriottsville Road (9)
  - Bethany Lane (11)
- 34% of crashes occurred during school bell times
- 1 Pedestrian crash
- 1 Bicycle crash
- Most frequent crash types
  - Rear-end (30)
  - left-turn (22) – 6 at Marriottsville, 8 at Bethany, 7 at US 29
  - single vehicle/fixed-object (28)
  - angle (12)



# Crash Map – Location & Type

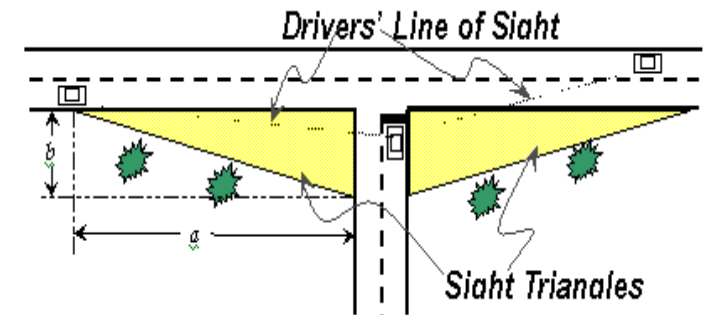






# Intersection Sight Distance (Stop Controlled)

Intersection	Stopping Sight Distance (for mainline traffic) Met?	Intersection Sight Distance (for entering vehicles) Met?	Issue	Potential Mitigation
Taylor Farm Rd	✓	✗	Vegetation	Trim/ remove
Liter Dr	✓	✓	None	n/a
Weatherstone Dr	✗	✗	Gateway Signage	relocate
McKenzie Rd	✗	✗	Vegetation	Trim/ remove
Mt Hebron HS West Ent	✓	✓	None	n/a
Tiller Dr	✓	✗	Roadway curvature	Advisory speed limit
Maple Rock Dr (SB)	✓	✗	Vegetation	Trim/ remove
Maple Rock Dr (NB)	✓	✗	Roadway curvature	Advisory speed limit
Mount Hebron Dr	✓	✗	Roadway curvature	Advisory speed limit
Melba Rd	✗	✗	Vegetation	Trim/ remove



# Intersection Sight Distance - Roadway Obstructions



**Melba Rd. – Looking west  
for a right turn**



**Maple Rock Dr. – Looking  
west for a right turn**



**Weatherstone Dr. – Looking  
west  
Signage**



*Photos Taken  
08/2018*

# Intersection Sight Distance - Roadway Curvature



**Tiller Dr. – Looking west  
for a left turn  
Crest Curve**



**Maple Rock Dr. –  
Looking east for a left  
from the south leg**

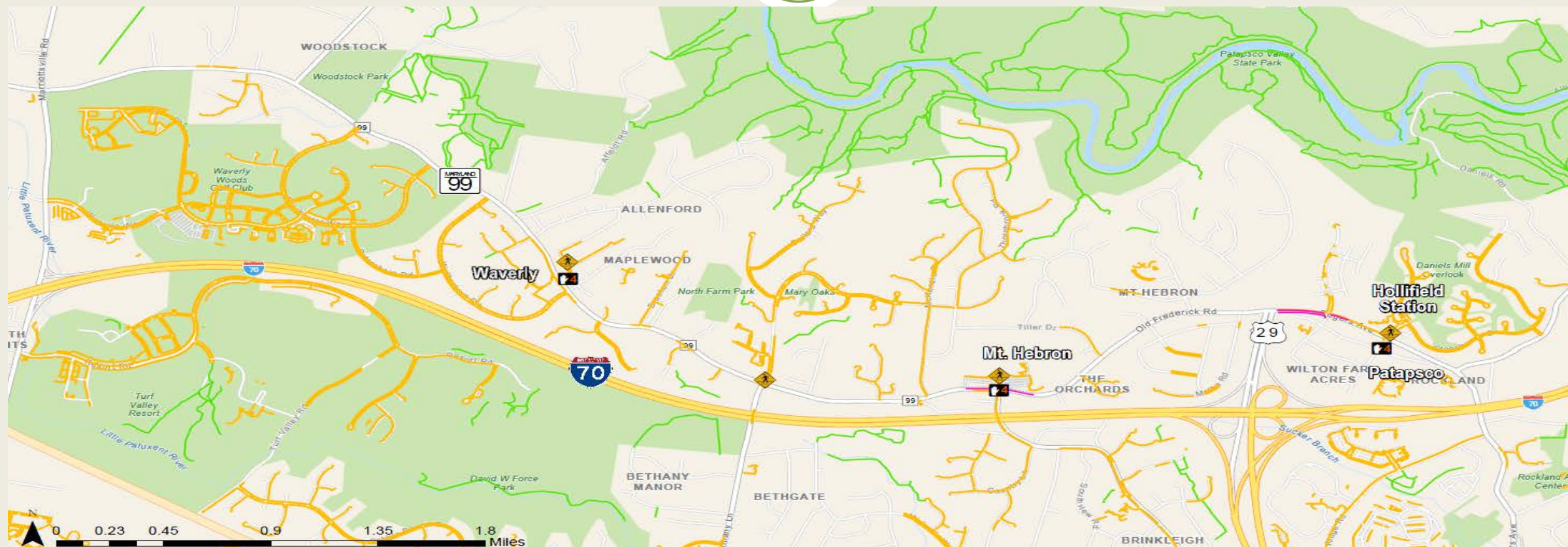


**Mount Hebron Dr. – Looking  
west for a left turn  
Curve**



*Photos Taken  
08/2018*

# Pedestrian and Bicycle Network



## Map Features:

- Crosswalks
- Painted Bike Lanes
- Sidewalks
- Pedestrian Signals
- Trails

## Data Source:

Trails and Sidewalks data from Howard County Open Data. Crosswalks, Bike Lane, and Ped Signal data created by Sabra & Associates.

\*No identified planned bike facilities for this corridor in Howard County Master Plan.



# Mitigation Strategy Menu



## Mode Shift / Demand Management



## Traffic Signal Operations And Management



## Geometric / Safety Improvements



# Potential Congestion Management and Multi-Modal Safety Strategies

## **Traffic Signal Operations**

- Timing-US 29 cycle length
- Detection-St. Johns Lane
- Phasing
  - ✦ St. Johns Lane
  - ✦ NB Bethany new left turn arrow
  - ✦ Woodstock Road left turn arrow
- Lane assignment-US 29

## ***Intersection improvements***

- MD 99 @ Woodstock Road (extend developer improvement)
- Access Modifications
  - ✦ Mt. Hebron High School

## **Traffic Control Modifications**

- No new traffic signals warranted

## **Pedestrian and Bicycle Network**

- Sidewalk retrofits to expand school walksheds

## **Transportation Demand Management**

- Incentives and programs to reduce bell time car traffic



# Questions and Next Steps

- **Open Questions**
- **Breakout Session – what to comment on:**
  - Comments on existing conditions
  - Comments on proposed recommendations
  - Priorities
- **Next Steps**
  - Final Analysis and Report incorporating public input
  - Engineering Design and Construction Cost Estimates
  - Funding and programming
  - Implementation of recommendations by (DPW, HCPS, MDOT SHA)



# Contact Information



<https://www.howardcountymd.gov/Departments/County-Administration/Transportation/Transportation-Projects/Maryland-Route-99-Investigation>

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