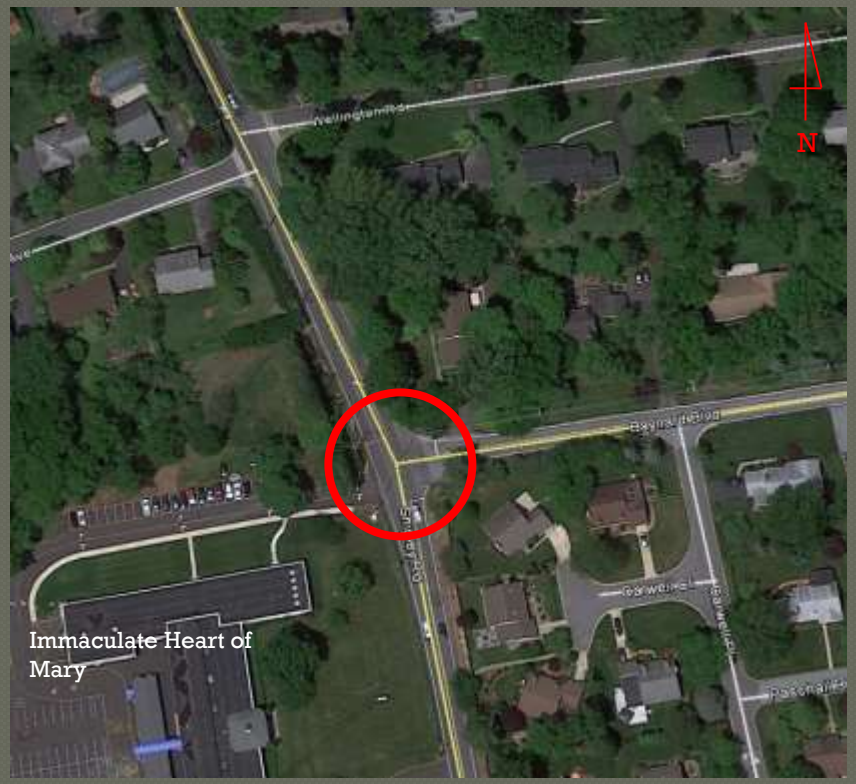
Baynard Boulevard at Shipley Road

Traffic Study

Baynard Boulevard at Shipley Road
Traffic Study – Facts

- Baynard Boulevard and Shipley Road are two lane major collector roadways
- Eastbound approach is egress only
- Eastbound/Westbound legs are stop controlled except during AM Peak Hour (operated by crossing guard)
- Intersection operates on flashing signal during off peak
- Total of 3 crashes (2014-2017)
  - 1 pedestrian fatality
  - 2 rear end crashes
- 1977 study installed existing signal
- 1987 study indicated intersection does not warrant a full time signal
- Capacity Analysis looked at two time frames:
  - AM Peak Hour (7:15-8:15 AM)
  - PM Peak Hour (5:00-6:00 PM)



Baynard Boulevard at Shipley Road

Traffic Study – Scenarios

- Scenario 0 : Existing Conditions
- Scenario 1: Install All Way Stop
- Scenario 2: Install Roundabout
- Scenario 3: Signalize Intersection

Baynard Boulevard at Shipley Road
Traffic Study – Scenario 0

Existing Conditions

Configuration
- Westbound stop controlled all movements serviced
- Eastbound stop controlled, egress only
- Southbound lefts onto Baynard Boulevard
- Traffic Signal operational during AM Peak Hour operated by crossing guard

Intersection Function
- Eastbound / Westbound suffer heavy delay, with moderate backups during PM Peak Hour
- Northbound / Southbound operate with minimal delays during AM and PM Peak Hours

Crashes
- Total of 1 crash per year with 1 crash susceptible to correction by the installation of an All Way Stop in three years

Pros:
- No cost
- Northbound/Southbound movements not impacted

Cons:
- No improvement for eastbound/westbound delays
- No improvement of existing crash patterns (no crosswalk provided)

Baynard Boulevard at Shipley Road
Traffic Study – Scenario 1

Convert to All Way Stop

Configuration
- Stop Signs on all four approaches
- Convert Two Way Stop with flashing signal to All Way Stop Condition
- Remove southbound left turn lane

Intersection Function
- Eastbound movements experience less delay than existing during AM and PM Peak hours
- Westbound movements experience less delay than existing during both peak hours
- Northbound movements experience heavy delay during AM and PM Peak hours
- Southbound movements experience heavy delay during AM and PM Peak hours

Pros:
- Improved delays for eastbound/westbound legs
- Potential pedestrian crosswalks can be provided for pedestrian friendly application
- Minimize crossing guard usage of traffic signal
- Improves crash patterns involving pedestrians
- Consistent with surrounding intersection controls (Weldin Rd at Shipley Rd and Weldin Rd at Talley Rd intersections)
- Requires all motorists accessing the intersection to stop
- Cost effective countermeasure
- Potential removal of traffic signal equipment if safety improves

Cons:
- Potential increase in rear end crashes due to northbound/southbound stop condition
- Reduction of Shipley Road operation due to stop condition
- Possible diversion of traffic from Shipley Road to adjacent congested intersections (i.e. Marsh Rd)

Baynard Boulevard at Shipley Road
Traffic Study – Scenario 2

Install Roundabout

Configuration
- All movements serviced by channelized yield controlled operation
- Southbound left turn lane and eastbound turn lanes removed and converted to single lane approach

Intersection Function
- Eastbound/Westbound movements operate with minimal delays during both peak hours
- Southbound movements experience slightly more delay during PM Peak hour compared to the existing condition
- Northbound delays remain minimal during both peak hours

Pros:
- Improved delays for eastbound/westbound legs
- Minimize crossing guard usage of traffic signal
- Improves crash patterns involving pedestrians
- Reduction in conflict points for vehicular traffic

Cons:
- Feasibility of roundabout fitting in the existing pavement geometry is unknown
- Cost of installation of a roundabout
- Cost to remove signal equipment

Baynard Boulevard at Shipley Road
Traffic Study – Scenario 3

Install Full Time Traffic Signal

Configuration

- All lane configurations remain unchanged
- Signalize all four legs of intersection
- Allows same turning movements as existing condition

Intersection Function

- Eastbound delays are slightly improved over existing condition during AM and PM Peak hours with excessive backups during the AM Peak Hour still occurring
- Westbound delays are improved during AM and PM Peak hours. However moderate backups still occur.
- Northbound delays increase over the existing condition during AM and PM Peak hours
- Southbound delays increase over the existing condition during AM and PM Peak hours

Pros:

- Eastbound/Westbound function is improved

Cons:

- Potential increase in rear end crashes due to signalization (increase to both Personal Injury Crashes as well as total crashes)
- Existing signal equipment (pole bases, signal heads, signal poles, signal cables, signal loops and conduit) is showing signs of wear and/or is not up to date with current standards. Therefore the light cannot simply be turned on. Signalization would require a full rebuild of the signal at this intersection
- Reduction of Shipley Road operation due to signalized condition
- Crossing guard still required to operate signal during AM Peak hour
- Pedestrians not accommodated as with All Way Stop Scenario (does not address pedestrian crash)
- Possible diversion of traffic from Shipley Road to adjacent congested intersections (i.e. Marsh Rd)

Baynard Boulevard at Shipley Road
Traffic Study – Traffic Operations

Scenario 0 - Two Way Stop LOS and Delay (s/veh) Baynard Boulevard at Shipley Road												
Peak Hour	HCS + Unsignalized Intersections											
	Eastbound			Westbound			Northbound			Southbound		
	Stop Controlled			Stop Controlled			Free			Free		
	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)
AM	F	158.5	261	F	60.9	106.3	A	8.0	0.25	A	8.3	7.5
PM	F	50.9	17	D	33.1	96.8	A	8.2	0	A	9.0	7.75

Scenario 1 - All Way Stop LOS and Delay (s/veh) Baynard Boulevard at Shipley Road														
Peak Hour	HCS + Unsignalized Intersections													
	Eastbound			Westbound			Northbound			Southbound			Intersection	
	Stop Controlled			Stop Controlled			Stop Controlled			Stop Controlled			AWSC	
	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)
AM	C	17.63	79	B	13.8	82	D	27.56	183	D	31.49	228	C	23.22
PM	B	11.78	4	B	14.66	45	F	71.33	856	F	52.99	588	F	51.62

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Traffic Study – Traffic Operations

Scenario 2 - Roundabout LOS and Delay (s/veh) Baynard Boulevard at Shipley Road														
Peak Hour	HCS 2010 Roundabouts													
	Eastbound			Westbound			Northbound			Southbound			Intersection	
	Yield Controlled			Yield Controlled			Yield Controlled			Yield Controlled			Roundabout	
	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)
AM	A	9.71	42.5	A	6.27	12.5	A	9.73	55	A	8.27	50	A	8.88
PM	A	5.84	2.5	A	9.39	30	A	8.97	70	B	11.69	90	B	10.10

Scenario 3 - Signalized LOS and Delay (s/veh) Baynard Boulevard at Shipley Road														
Peak Hour	HCS + Signalized Intersections													
	Eastbound			Westbound			Northbound			Southbound			Intersection	
	Signalized			Signalized			Signalized			Signalized			Signalized	
	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)	HCS 95th % Q (feet)	LOS	Delay (s/veh)
AM	D	50.4	362.5	D	51.2	220	C	32.3	532.5	C	24.0	477.5	D	36.5
PM	D	52.7	27.5	C	31.6	205	B	19.4	52.5	B	16.8	55	C	20.6

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Traffic Study – Conclusion

The Traffic Studies Section is recommending conversion of the intersection to an All Way Stop Condition based on intersection capacity and safety aspects.

Upon the completion of the public outreach, the proposed All Way Stop condition would be implemented at which time the intersection will be monitored for one year to understand operational and safety concerns. If the monitoring effort shows concerns, the location can be converted back to a two way stop condition and/or added to DelDOT's Design list for signalization.