

MD 355 Bus Rapid Transit (BRT) Interjurisdictional Meeting

Montgomery County
RAPID TRANSIT

MD 355

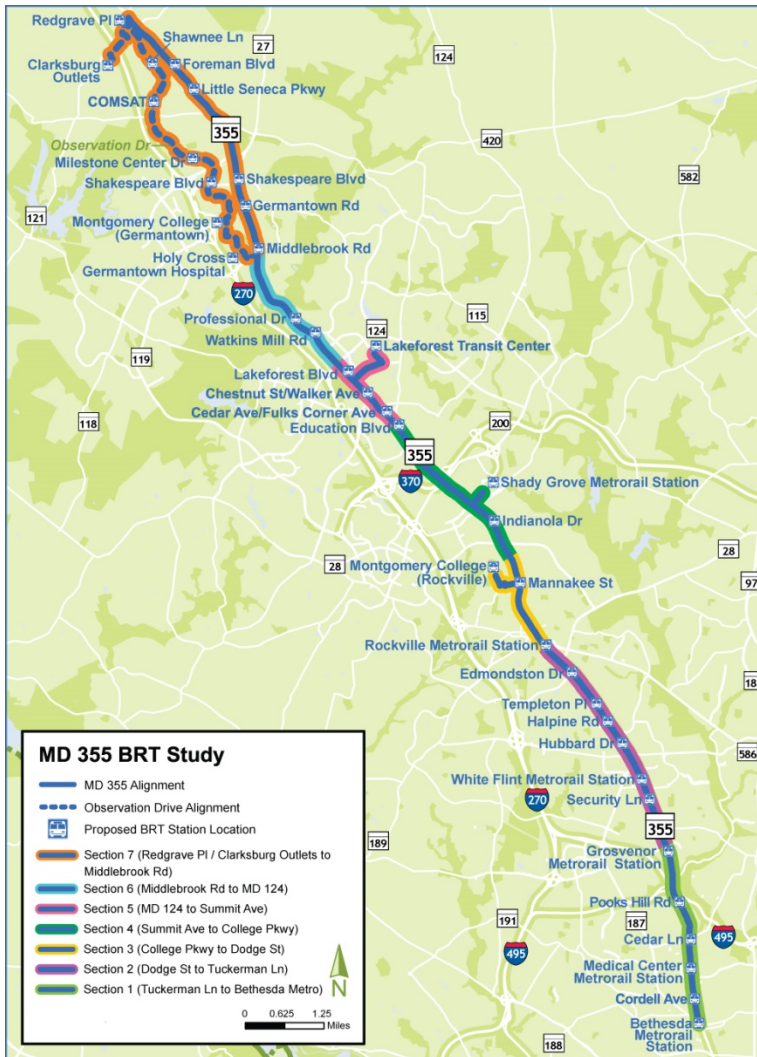
Rockville, Maryland
March 9, 2017
6:30 pm to 9:00 pm



Maryland Department
of Transportation

MC DOT
Montgomery County
Department of Transportation

MD 355 Corridor



Section	Section Limits
Section 7 – Clarksburg / Germantown	Redgrave Place / Clarksburg Outlets to Middlebrook Road ~4.7 miles
Section 6 –Germantown / Montgomery Village	Middlebrook Road to MD 124 ~3.2 miles
Section 5 – Gaithersburg	MD 124 to Summit Avenue ~1.4 miles
Section 4 – Shady Grove / Rockville	Summit Avenue to College Parkway ~3.2 miles
Section 3 – Rockville Town Center	College Parkway to Dodge Street ~1.8 miles
Section 2 – Rockville / White Flint	Dodge Street to Tuckerman Lane ~4.1 miles
Section 1 – Bethesda	Tuckerman Lane to Bethesda Metro ~3.2 miles

Elements of a BRT Alternative


- **Running way** – A designated facility such as a striped/signed lane or exclusive busway in which the vehicle would travel between stations
- **Station locations** - Specific locations where passengers can access the service and the service can support the local land uses (residential, commercial, etc.)
- **Service plan** - The way in which BRT operates including service frequency, hours of service, routing and connecting services



Conceptual Alternatives – Running Way Alternatives Under Consideration

- Alternative 1 No-Build
- Alternative 2 – Transportation

System Management (TSM)



Moving forward to
next phase of study

BRT Alternatives

- Alternative 3A (Mostly median, service from Clarksburg Outlets to the Grosvenor Metrorail)
- Alternative 3B (Mostly median, service from Redgrave Place in Clarksburg to the Bethesda Metrorail Station)
- Alternative 4A (Mostly curb, service from Clarksburg to the Grosvenor Metrorail Station)
- Alternative 4B (Mostly curb, service from Redgrave Place in Clarksburg to Bethesda Metrorail Station)

Conceptual Alternatives – Running Way

Alternative 3s

- Mostly median running way

Alternative 4s

- Mostly curb running way

A Alternatives

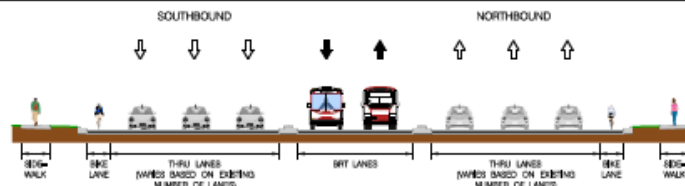
- Service from Clarksburg to Grosvenor Metrorail Station
- 3A – Terminates at Clarksburg Outlets along Observation Drive
- 4A – Terminates at Redgrave Place along MD 355

B Alternatives

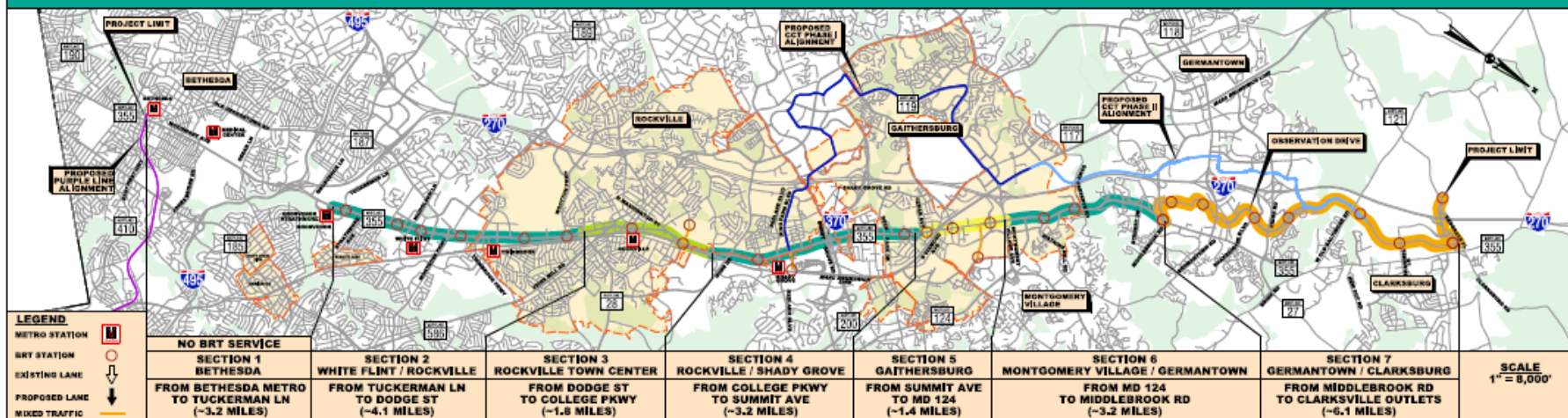
- Service from Redgrave Place to Bethesda Metrorail Station along MD 355

ALTERNATIVE 3A

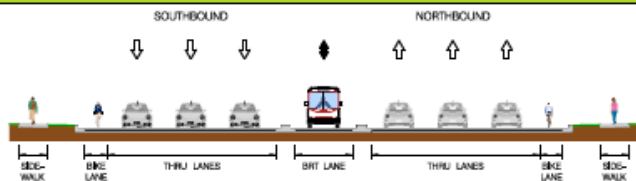
SECTION 2, 4 & 6



TWO DEDICATED MEDIAN BRT LANES WHERE FEASIBLE

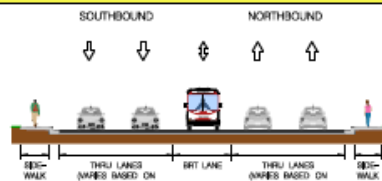


SECTION 3



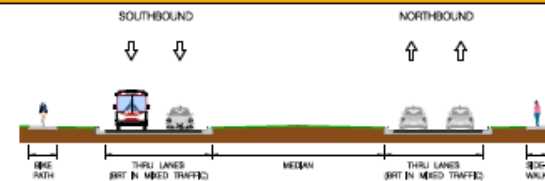
ONE DEDICATED MEDIAN BI-DIRECTIONAL BRT LANE

SECTION 5



LANE REPURPOSING - ONE DEDICATED MEDIAN BI-DIRECTIONAL BRT LANE

SECTION 7

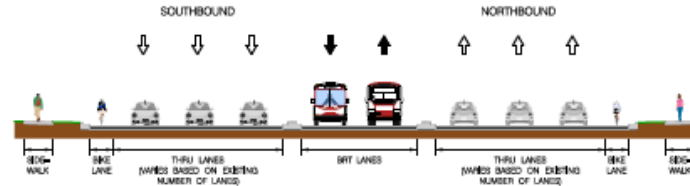


MIXED TRAFFIC

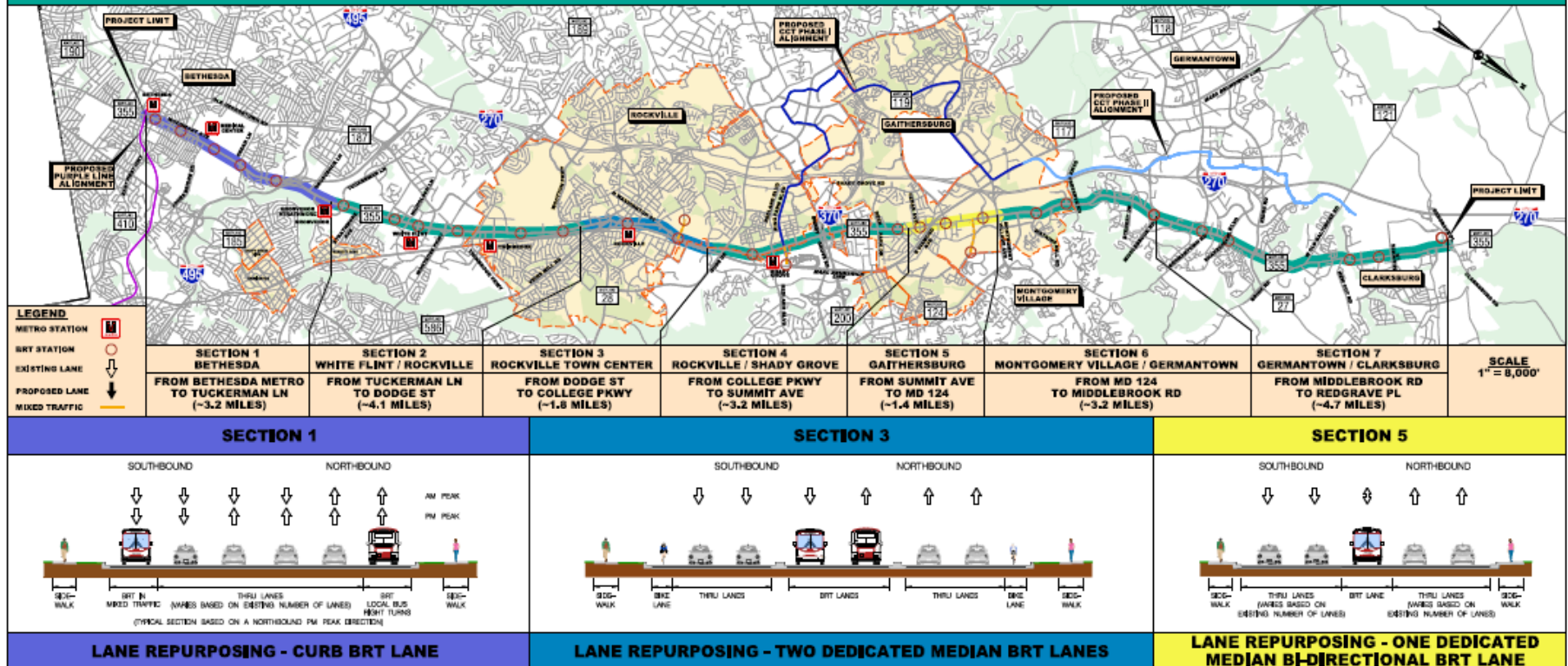
ALTERNATIVE 3 - ENDSIDE 4

ALTERNATIVE 3B

SECTION 2, 4, 6 & 7



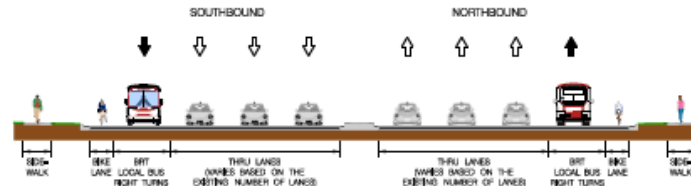
TWO DEDICATED MEDIAN BRT LANES WHERE FEASIBLE



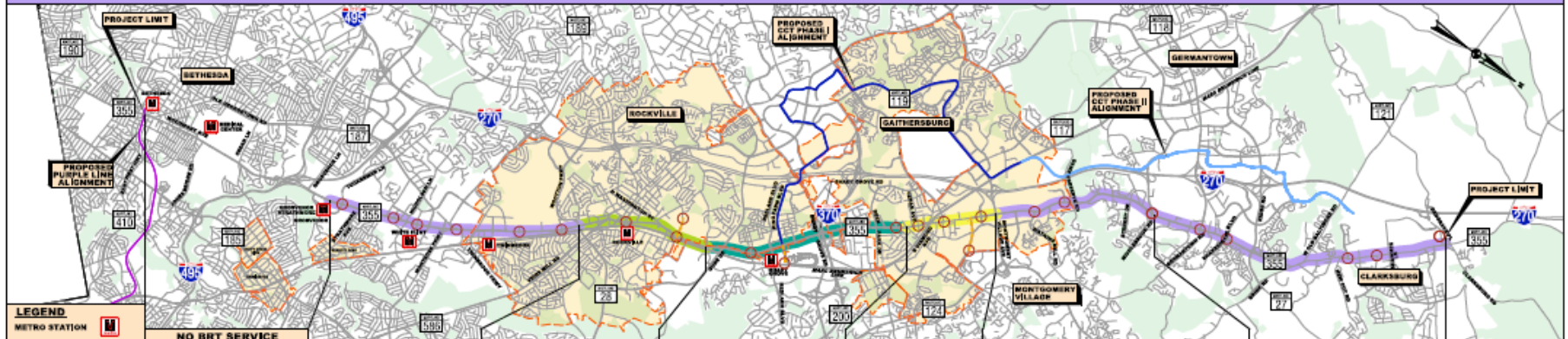
APPENDIX B - FIGURE 2

ALTERNATIVE 4A

SECTIONS 2, 6 & 7



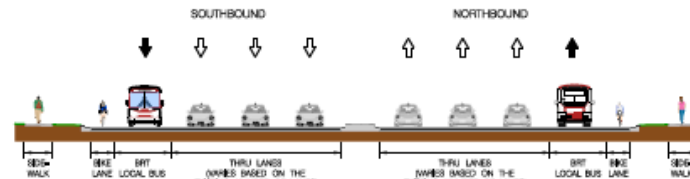
TWO DEDICATED CURB BRT LANES WHERE FEASIBLE



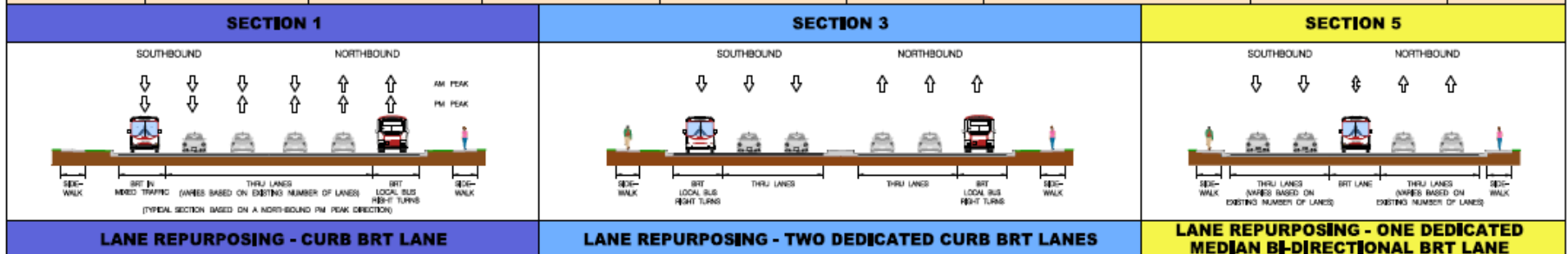
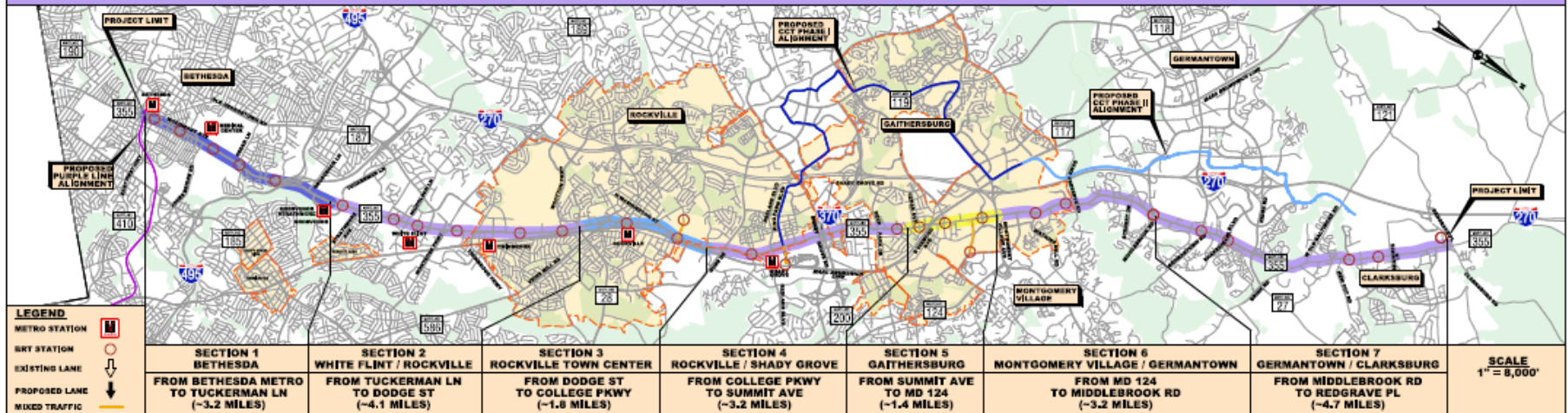
SECTION 3		SECTION 4		SECTION 5	
<p>SECTION 3</p> <p>FROM TUCKERMAN LN TO TUCKERMAN LN (~3.2 MILES)</p> <p>NO BRT SERVICE</p>		<p>SECTION 4</p> <p>FROM COLLEGE PKWY TO SUMMIT AVE (~3.2 MILES)</p> <p>TWO DEDICATED MEDIAN BRT LANES WHERE FEASIBLE</p>		<p>SECTION 5</p> <p>FROM MIDDLEBROOK RD TO REDGRAVE PL (~4.7 MILES)</p> <p>LANE REPURPOSING - ONE DEDICATED MEDIAN BI-DIRECTIONAL BRT LANE</p>	
<p>SECTION 3</p> <p>SOUTHBOUND</p> <p>↓ ↓ ↓ ↓</p> <p>THRU LANES</p> <p>BRT LANE</p> <p>THRU LANES</p> <p>BKE LANE</p> <p>SEC-WALK</p>		<p>SECTION 4</p> <p>SOUTHBOUND</p> <p>↓ ↓ ↓ ↓</p> <p>THRU LANES</p> <p>BRT LANES</p> <p>THRU LANES</p> <p>BKE LANE</p> <p>SEC-WALK</p>		<p>SECTION 5</p> <p>SOUTHBOUND</p> <p>↓ ↓ ↓ ↓</p> <p>THRU LANES (WIDTHS BASED ON EXISTING NUMBER OF LANES)</p> <p>BRT LANE</p> <p>THRU LANES (WIDTHS BASED ON EXISTING NUMBER OF LANES)</p> <p>SEC-WALK</p>	

ALTERNATIVE 4B

SECTIONS 2, 4, 6 & 7



TWO DEDICATED CURB BRT LANES WHERE FEASIBLE

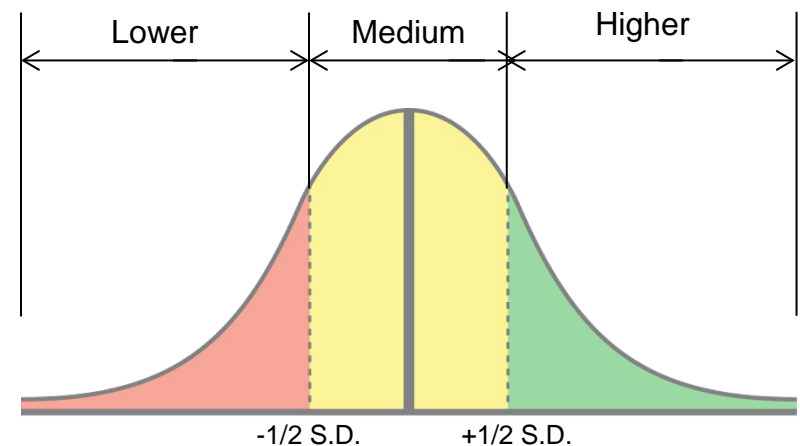


APPENDIX B - FIGURE 4

Screening Criteria Results Qualitative Methodology

- Results of the analysis are being compared using a Higher-Medium-Lower rating scale
- The standard deviation (S.D.) of the results are computed for each screening criteria
 - If an alternative performed better than the others (more than half a standard deviation higher than the mean), it is presented in **green***
 - If an alternative performed worse than the others (more than half a standard deviation lower than the mean), it is presented in **red***
 - If an alternative ranked in the middle (within half a standard deviation of the mean), it is presented in **yellow**

* For screening criteria related to travel times, impacts, and cost, if an alternative performed better than the others (lower travel times, impacts, and cost), it is presented in **green**; if an alternative performed worse than the others (higher impacts and costs), it is presented in **red**



Corridor Wide - Screening Criteria Results

	Alt 3A	Alt 3B	Alt 4A	Alt 4B
Increase in total daily transit ridership	Medium	Higher	Lower	Higher
Increase in total daily bus ridership	Medium	Higher	Lower	Higher
Total daily BRT ridership	Medium	Higher	Lower	Higher
Boardings by station – North Section (Section 7)	Higher	Medium	Medium	Lower
Boardings by station – Central Section (Section 6 through Section 2)	Lower	Higher	Lower	Higher
Boardings by station – South Section (Section 1)	Same for Alternative 3B and Alternative 4B			
Increase in jobs within 45 minutes along the corridor	Medium	Higher	Lower	Lower
Increase in jobs within 60 minutes along the corridor	Medium	Higher	Lower	Medium
Increase in households within 45 and 60 minutes of activity centers	Lower	Higher	Lower	Higher
Property impacts	Medium	Higher	Medium	Lower
Total operating costs	Higher	Medium	Lower	Medium
Construction costs	Medium	Higher	Medium	Lower

Preliminary Analysis of Conceptual Alternatives

Differences in ridership for new BRT service between the Alternatives

Comparison of the two northern alignments alternatives in Section 7 - MD 355 and Observation Drive

Comparison of the two southern limits in Section 1 Grosvenor Metrorail Station and Bethesda Metrorail Station

Effects of lane repurposing in Sections 1 and 3 (Alt 3B and 4B)

Operational characteristics for the bi-directional running way in Section 3

Median vs Curb Running Way Comparison

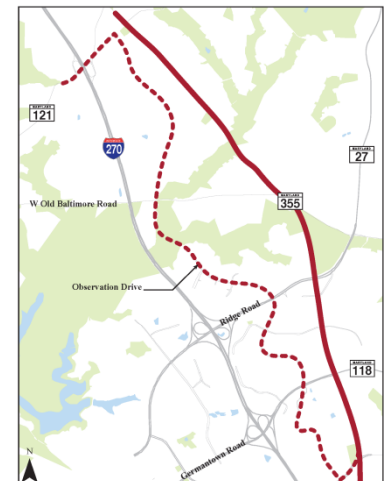
BRT service features affecting property impacts and construction costs

BRT service features that are affecting operational costs



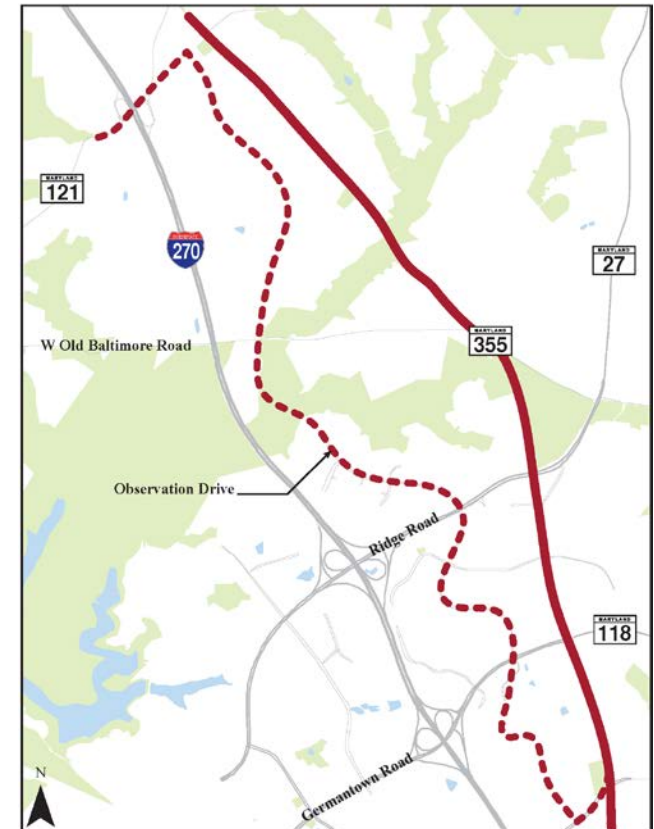
Differences in ridership for new BRT service between the Alternatives

- Providing service along Observation Drive increases ridership due to higher number of large trip generators
- Extending service to Bethesda increases ridership by expanding BRT market and providing improved transit access to additional activity centers without having to transfer to Metrorail
- In general the median running way sections have up to 20% shorter BRT travel times generating higher ridership within those sections



Comparison of the two northern alignments alternatives in Section 7 - MD 355 (Alt 3B, 4A, 4B) and Observation Drive (Alt 3A)

- Over 50% higher ridership identified along Observation Drive compared to MD 355
- It takes twice as long (or more) for the BRT to travel along Observation Drive compared to MD 355 due to longer distance and mixed traffic operations
- Observation Drive has higher ridership despite longer BRT travel times due to higher number of large trip generators
- The mixed traffic running way along Observation Drive results in lower property impacts and lower construction costs than alternatives along MD 355
- Observation Drive has operational costs that are over 40% higher than the other alternatives due to higher ridership and longer travel times



Comparison of the two southern limits in Section 1 Grosvenor Metrorail Station (Alt 3A and 4A) and Bethesda Metrorail Station (Alt 3B and 4B)

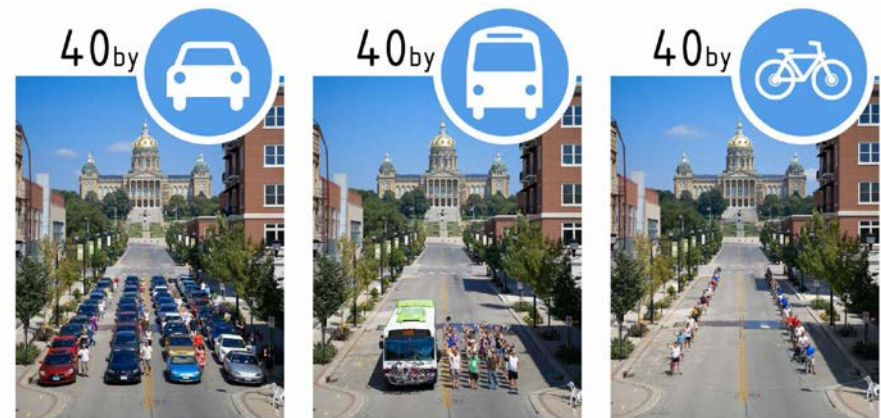
- **Grosvenor**
 - Terminating service at **Grosvenor** would result in lower property impacts, operational and construction costs
- **Bethesda**
 - Approximately **15%** of ridership is generated at stations south of Grosvenor Metrorail Station
 - Extending service to the **Bethesda** Metrorail:
 - Increases the ridership along MD 355 between Middlebrook Road and Grosvenor Metrorail Station by more than **10%**
 - Increases accessibility to households from activity centers by approximately **40 to 75%**
 - Provides access to key activity centers including Medical Center and downtown Bethesda without having to transfer to Metrorail



Effects of lane repurposing in Sections 1 and 3 (Alt 3B and 4B)

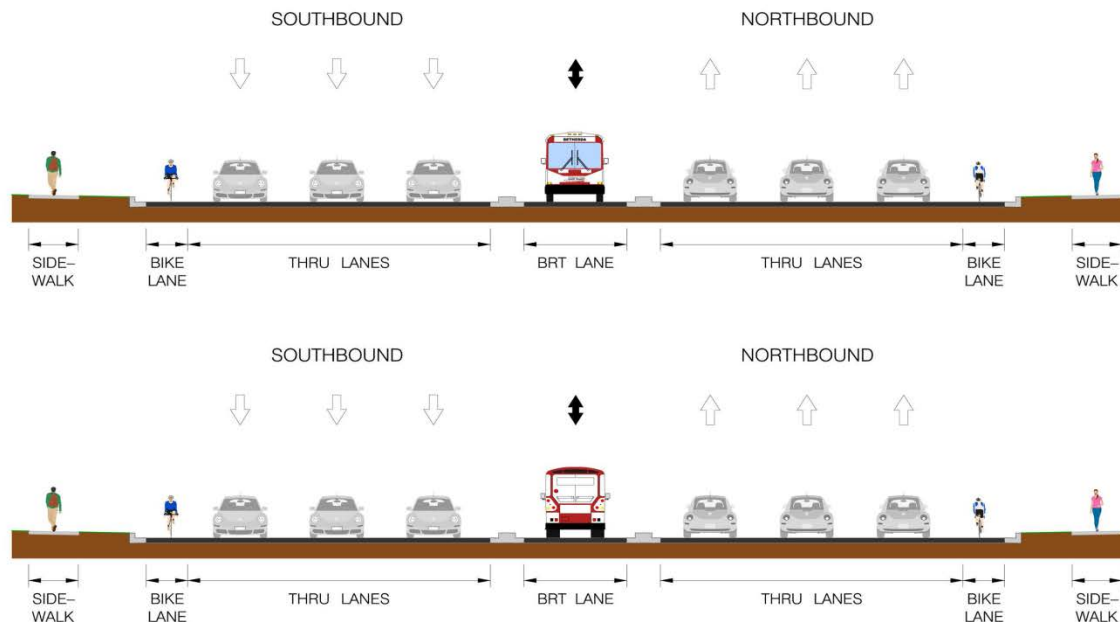
- The running ways where lane repurposing is being proposed result in lower impacts and lower costs
- Transit person throughput increases between **80% and 130%** within the different sections with repurposed lanes compared to the No-Build Alternative
- Total person throughput decreases by up to **15%** in sections where lane repurposing is being proposed due to a decrease in auto throughput outweighing increase in transit throughput

How much space does it take?



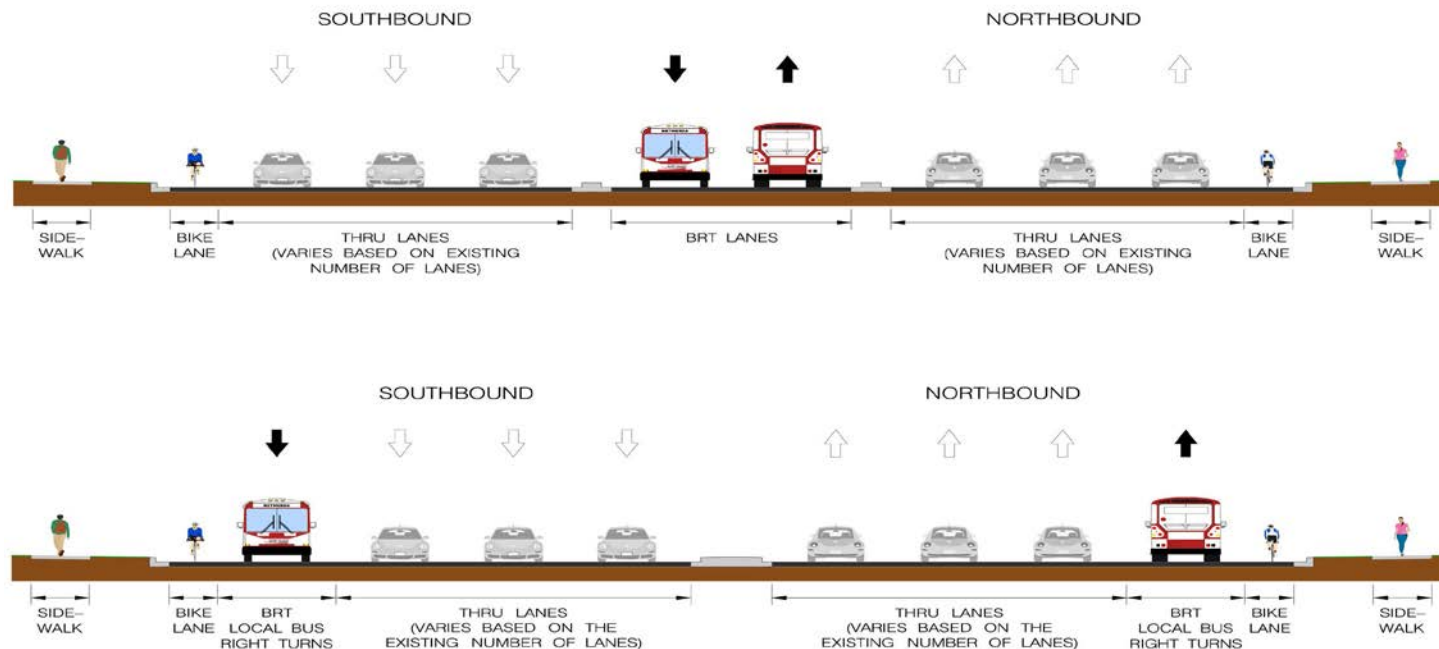
Operational Characteristics for the bi-directional running way in Section 3 (Alts. 3A and 4A)

- BRT travel times are up to **25%** longer
- BRT ridership is up to **25%** lower
- Average delay per BRT trip ranges from a low of **1 minute 30 seconds** to more than 3 minutes
- Wider footprint results in construction costs more than **13%** higher compared to lane repurposing option



Median vs Curb Running Way Comparison

- In general, the median running way sections have up to **20%** shorter travel times generating higher ridership within those sections
- Median running way has a wider footprint and results in more than **25%** higher property impacts and **60%** higher construction costs compared to the curb running way



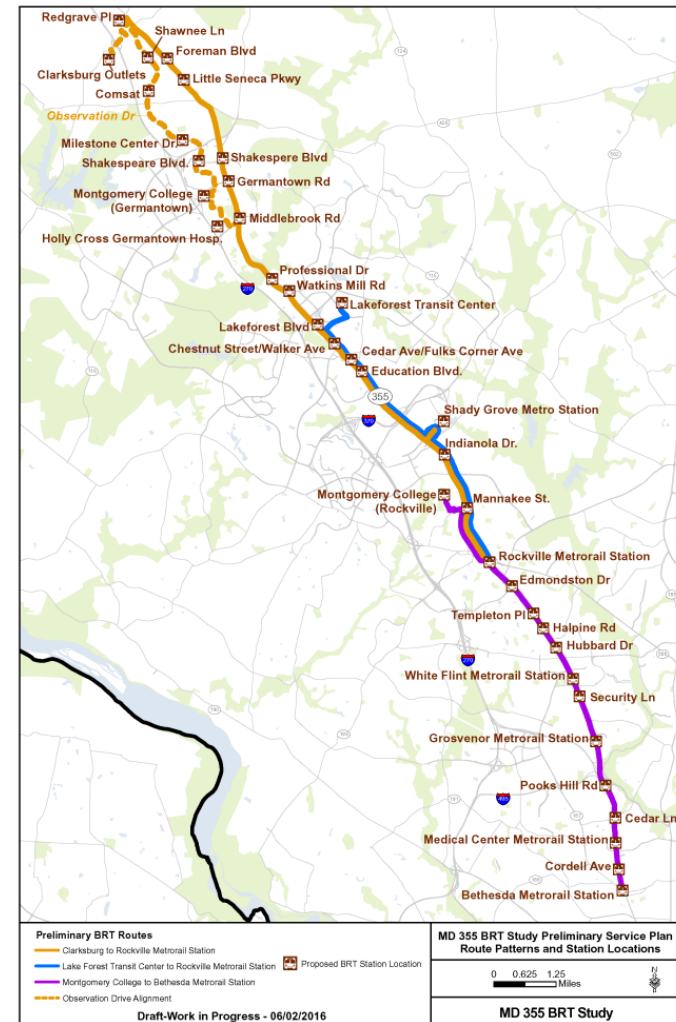
BRT Service features affecting property impacts and construction costs

- Median running way has a wider footprint and results in over **25%** higher property impacts and **60%** higher construction costs compared to the curb running way
- Mixed traffic running way along Observation Drive is reducing the overall property impacts on Alternative 3A
- Extending service to Bethesda results in additional property impacts for stations



BRT service features affecting operational costs

- Orange BRT Route (Clarksburg to Rockville) is more than double the cost to operate than the other BRT Routes in the service plan
- Higher ridership would require more frequent service and result in slower travel times and more buses in service, resulting in higher operational costs



Next Steps

- Collect Comments from Public Open House
- Refinement of Alternatives
- Conceptual Alternatives Report – May 2017

Questions?