

PREPARED BY



Analysis Results Memo

# Bethesda Two-Way Conversion Study

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## INTRODUCTION & PURPOSE

Bethesda is a growing community that has been guided by a series of County Master and Sector Plans. A primary goal of these planning efforts is to support sustainability, accessibility, equity and innovation. Accessible transportation choices are a key part of this vision, and a primary goal is to develop a well-connected network of walkable and bikeable streets, trails, and open spaces accessible to all users in downtown Bethesda. This can help to make downtown Bethesda safer and more connected for all people regardless of which mode they are traveling, and to increase visibility and access to local businesses.

Recommendations from the County's 2020 Bike Master to implement a separated bike network throughout downtown are already underway. The 2017 Downtown Bethesda Sector Plan also recommends a Complete Street retrofit converting Montgomery Lane, Montgomery Avenue, and East-West Highway to multimodal corridors with two-way operations. With multiple bus routes serving the local vicinity, dedicated bus lanes have also been considered. As stated in the Downtown Bethesda Sector Plan, the goals of street reconfiguration would be to:

- ✓ Slow vehicular traffic
- ✓ Improve bicycle accommodation (by virtue of slower vehicular traffic and dedicated, separated bike facilities)
- ✓ Enliven the street for pedestrians.
- ✓ Increase visibility to commercial establishments
- ✓ New opportunities for placemaking
- ✓ Make car travel less confusing

The objective of this study is to:

1. Identify opportunities to modify roadway operations to support Complete Streets
2. Evaluate the impacts, advantages, and disadvantages for potential roadway reconfigurations

The attached PowerPoint slides and HCM Analysis Excel table detail further information for this study. Supporting maps, graphics, and information regarding analysis methodology and results can be found in these attachments.

## STUDY AREA

Downtown Bethesda is a densely developed, mixed-use, urban environment where several State highway arterial roadways converge. The area also has transit with a metro station and multiple bus routes. The study area streets include (See attached slides for a map):

- East West Highway (MD 410 westbound)
- Montgomery Avenue (MD 410 eastbound)
- Wisconsin Avenue (MD 355)
- Old Georgetown Road (MD 187)
- Montgomery Lane
- Woodmont Avenue
- Edgemoor Lane
- Waverly Street
- Pearl Street
- Chelton Road

## ALTERNATIVES STUDIED

Multiple alternatives have been studied to reconfigure the roadway space in Downtown Bethesda for more complete streets. The alternatives studied all include the 2020 Bike Master Plan recommendations for a road diet a new separated bike lane network. The five alternatives studied include (See attached slides for plans, typical sections, and traffic analysis results):

### Alternative 1: Two-Way Road Diet with Separated Bike Lanes

This alternative advances the 2017 Downtown Bethesda Master Plan recommendations to convert East-West Highway/ Old Georgetown Road, Montgomery Avenue/Montgomery Lane and Woodmont Avenue from a one-way pair to both being two-way. While this alternative can help increase visibility for local businesses, it would significantly increase traffic congestion in Downtown Bethesda. This would also require more capital investment to design and construct intersection modifications for two-way movements.

### Alternative 2: Partial Two-Way Road Diet with Separated Bike Lanes

This alternative is a modification from the 2017 Downtown Bethesda Master Plan recommendations and converts East-West Highway, Montgomery Avenue/Montgomery Lane, and Old Georgetown Road from a one-way pair to being two-way. Woodmont Avenue Lane remains one-way. This alternative has some operational improvements from Alternative 1, but also would cause heavier congestion in Downtown Bethesda. This would also require more capital investment to design and construct intersection modifications for two-way movements.

### Alternative 3: One-way Couplet Road Diet with Dedicated Bus Lanes with Separated Bike Lanes

This alternative maintains existing one-way traffic operations on East-West Highway and Montgomery Avenue/Montgomery Lane. Dedicated Bus Lanes are added to further reduce the number of through lanes and optimize transit efficiency. The separated bike lanes on Montgomery Lane/Avenue will repurpose existing travel lanes. The separated bike lanes on East-West Highway are assumed to be constructed with some widening or shoulder repurposing. However, the volume of buses is less than 10 per hour, which does not fully warrant a dedicated lane while also decreasing roadway capacity. This alternative would cause heavier congestion in Downtown Bethesda.

### Alternative 3a: One-way Couplet Partial Road Diet with Separated Bike Lanes

This alternative maintains existing one-way traffic operations on East-West Highway and Montgomery Avenue/Montgomery Lane. The separated bike lanes on Montgomery Lane/ Avenue will repurpose existing travel lanes. The separated bike lanes on East-West Highway are assumed to be constructed with some widening or shoulder repurposing. This is the best-performing alternative for traffic operations and incorporates road diet and complete street elements to improve safety, access, and comfort for pedestrians, bicyclists, and transit riders.

## METHODOLOGY

A capacity analysis was performed using “Synchro 11” traffic analysis software, which incorporates the methodology of the 6<sup>th</sup> edition of the *Highway Capacity Manual (HCM2000)* for the study intersections. Models for this analysis were developed from existing 2019 Mead & Hunt Synchro signal timing models for Downtown Bethesda; the signal timings in this model were used as the existing signal timings. Traffic volumes were collected during May of 2022 and compared to pre-covid 2019 counts. The 2022 mainline volumes were between 15 to 50% lower than the 2019 counts, indicating that the downtown Bethesda area has not recovered to pre-pandemic volumes. 2022 volumes were used as the baseline existing volumes in this analysis, with a sensitivity analysis performed on the alternatives with the 2019 volumes representing a future year/ pandemic recovery scenario.

Three initial alternatives were included in the Synchro analysis: full two-way conversion, partial two-way conversion (two-way operations on Old Georgetown Rd/ East-West Hwy, one-way operations on Montgomery Ln/ Ave), and a one-way road diet (one-way configuration with dedicated bus lanes in the study area). The two-way analysis was performed first, which resulted in most intersections over capacity and experiencing a failing level of service. Opposing left turns and advancing right turns were changed to

protective phasing to reduce conflicts with the proposed separated bike lanes. Where only a single travel lane in each direction was provided, left turns were restricted to alleviate congestion, but a majority of the intersections in the model still experienced a failing level of service. The partial two-way concept resulted in better operations on Montgomery Ln/ Ave, but resulted in congestion and failing level of service on East-West Hwy/ Old Georgetown Rd. In both two-way scenarios, the signal phasing was updated to reflect the necessary phasing for a two-way lane configuration, but the cycle length was maintained. The one-way road diet performed the best with the baseline volumes, with no intersections experiencing a failing level of service. Existing cycle lengths and phasing were maintained in this scenario, with optimized splits.

To simulate a future scenario with full pandemic-recovery traffic volumes, 2019 volumes were input in the two-way partial and one-way road diet scenarios. The 2019 volumes caused the partial two-way network to be severely over capacity on East-West Hwy and Old Georgetown Rd, with intersections experiencing between 250 – 300 seconds of delay. The one-way road diet also failed and was over capacity on Montgomery Ave, as eastbound traffic is channeled into one lane. Mitigation was performed on the one-way road diet with 2019 volumes. The delay at intersections on East-West Hwy was able to be mitigated with signal timing, but the intersections on Montgomery Ave are failing due to high volumes in one lane. Removing the dedicated bus lanes, which after closer examination are not fully warranted based on bus frequency and bus circulation patterns around the Metro station, did result in sufficient capacity for vehicle traffic.

In addition due to the master planned separated bike lanes, multimodal treatments are necessary at signals in the study area. Proposed multimodal treatments include implementing no right-turn on red at all study intersections, with a leading pedestrian interval integrated into the signal timing. Further considerations regarding protected vehicle or bicycle signal phasing should be considered at high-conflict intersections where the peak hour right turn volume is greater than 150 vehicles. Transit signal priority and/ or queue jumps should also be considered where feasible once a preferred alternative is selected.

## CONCLUSIONS

The Alternative that best meets the project goals and objectives is Alternative 3a – One-Way Couplet with Separated Bike Lanes. The alternative includes road diet and complete street elements by reducing through lanes and adding protected bike lanes on Old Georgetown Road, East-West Highway, Montgomery Road, and Montgomery Lane. This will provide a connected network with safer and more comfortable access for bicyclists, pedestrians, scooters, and transit riders to destinations in the local vicinity. The traffic impacts of a through lane reduction can be mitigated with signal timing optimization that also accommodates phasing for all modes. The traffic modeling shows this alternative performs best when compared to other alternatives. This alternative also supports the 2020 Montgomery County Bike Master Plan recommendations to implement a protected Bike Lane network throughout Downtown Bethesda, with some implementation already underway for segments throughout this study area.