

# Memorandum

**To:** Matthew Mullenax, Hagerstown / Eastern Panhandle MPO  
Andrew Eshleman, Washington County

**From:** Dan Szekeres, Avinash Sinha, Michael Baker International

**Date:** 12/16/2015

**Re:** Travel Modeling Support for Professional Boulevard Study

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Under the Hagerstown / Eastern Panhandle MPO (HEPMPO) General Transportation Planning Services Contract, Michael Baker International (Michael Baker) was tasked to provide travel demand modeling support related to the Professional Boulevard traffic study being conducted by Washington County. The County requested additional modeling support to improve model forecasts within the project study area that includes sections of Eastern Boulevard, Robinwood Drive, Jefferson Boulevard (MD 64), and Dual Highway (US 40).

## **Data Collection and Site Visit**

Following the Notice to Proceed, Michael Baker conducted a one day field visit of the project study area to observe vehicle activity along key roadways and to identify traffic generators and access points within the study area. Some details of the field visit are provided in **Attachment A**. Other available information from the County's traffic study was also collected and reviewed including available traffic counts, anticipated development, and roadway characteristics.

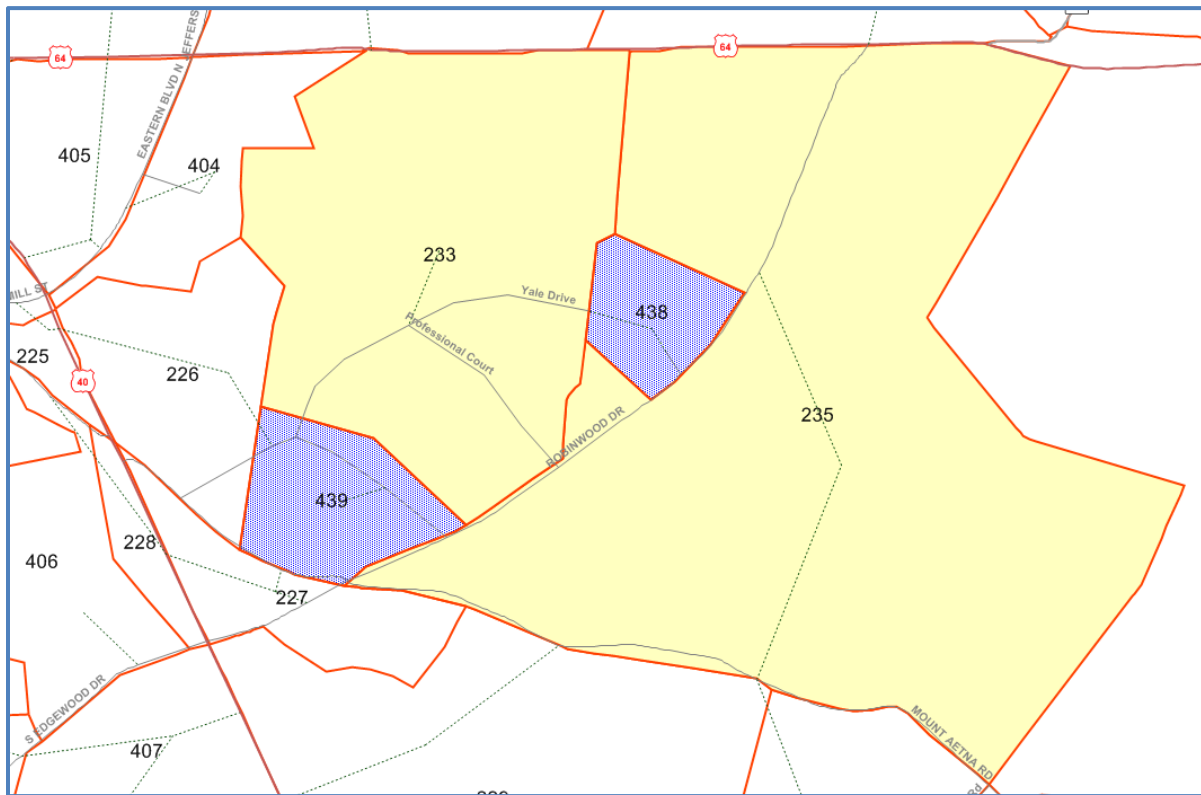
## **Traffic Model Structure Revisions and Adjustments**

In order to improve model forecasts, Baker enhanced the HEPMPPO regional model within the project study area. Enhancements to the model included:

- Disaggregation of the model Traffic Analysis Zone (TAZ) system to improve development loading onto the model's highway network.
- Factoring of existing zonal demographics to better match trip making to and from key developments within the study area.
- Other network modifications to improve traffic assignments including the update of highway attributes and trip table adjustments.

The TAZ disaggregation process was conducted by overlaying the existing TAZs with an aerial imagery layer that shows the existing development patterns in the study area. The model network was also imported as a GIS (.shp) file and overlaid with the TAZ layer to examine the existing loading points of zones. The study area includes Hagerstown Community College and Meritus Medical Center, both large trip attractors. The model demographic file and trip generation output was examined to determine the number of trips attracted to each TAZ. It was determined that the existing trip attractions were not fully representative of the number of community college students and the patients visiting the medical center. After discussion with the County, it was decided to split the existing TAZs (233 and 235) into two additional TAZs representing the community college (438) and medical center (439). The rest of TAZ 233 now contains the projected housing and new vision development. The demographic file was also updated to include the projected housing and vision development in the study area. **Figure 1** shows the existing and the split TAZs for the community college and medical center.

*Figure 1: TAZ Disaggregation (Highlighted TAZs are new)*

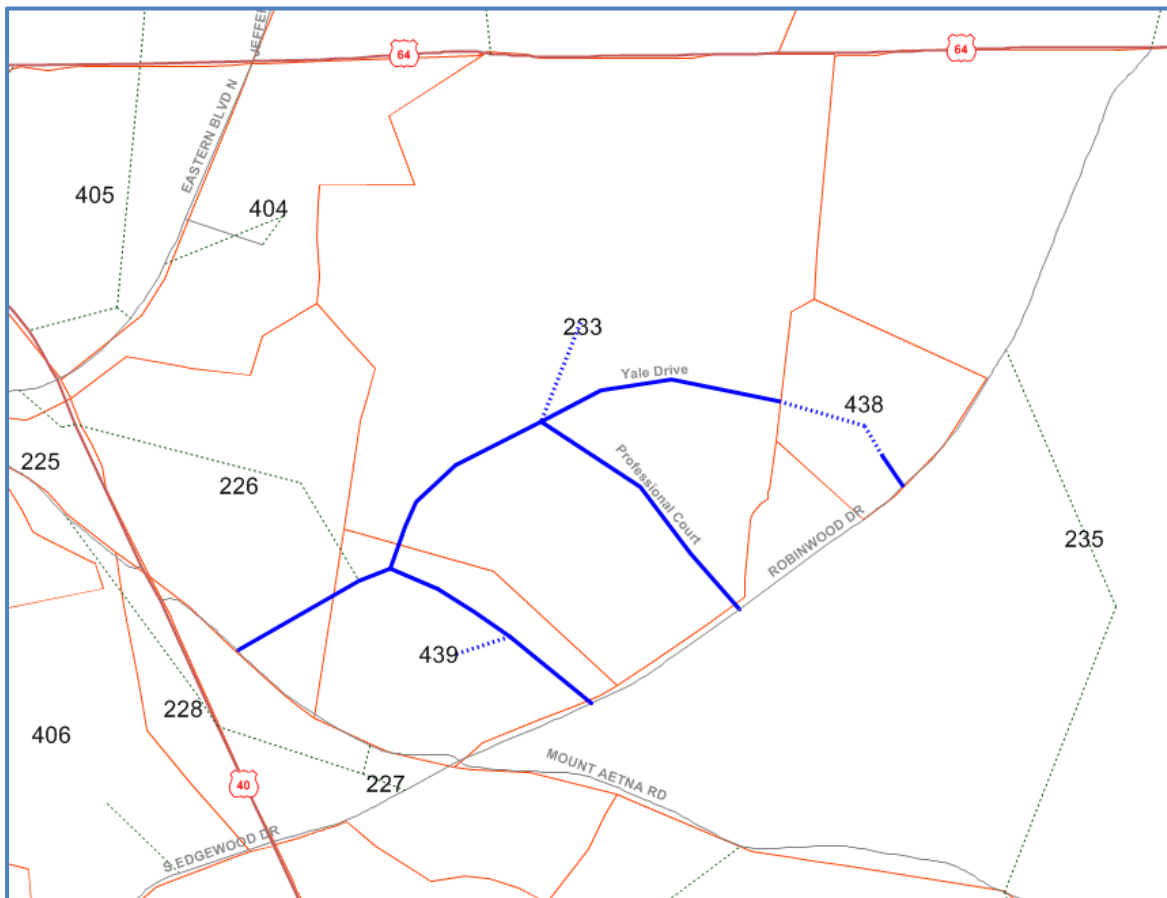


Special generators are introduced in travel demand models to represent certain types of facilities whose trip generation characteristics are not fully captured by the standard trip generation module. The medical center and community college are treated as special generators to fully capture the trip attractions to the split zones. The Institute of Transportation Engineers (ITE) Trip Generation Manual,

which determines the number of trips produced or attracted by different developments, was used to determine the number of trip attractions to the TAZs representing the medical center and community college. The model assigned trips were compared to the traffic counts on Medical Campus Road and Academic Boulevard to make sure that these two special generators are fully capturing trip attractions.

The zone splits also required some changes to the model network. Additional centroids and connectors were added to the no build and build scenario network to represent the split zones. In addition to Yale Drive, links representing the Academic Boulevard and Medical Campus Roads were also added to the model network. Loading points of some existing TAZs in the study area were also examined and modified. Distances between intersections were examined and updated to accurately reflect their location in the real world. In addition to the model network changes mentioned above, the turn penalty file was also updated to represent existing turn restrictions. Turning restrictions were added for the intersection of Mt. Aetna Road and US 40. **Figure 2** shows the model network updates for No-Build condition.

*Figure 2: Model Network Updates for No-Build Condition*



The model was executed for 2017 No-build scenario (includes Yale Drive connection) and the results were compared to traffic counts. Traffic count data was provided by the County. **Table 1** shows a comparison between traffic counts and assigned model volume for the streets in the study area. All locations around the study area fall below the goal of +/- 15%. Higher model volumes are expected as it represents 2017 conditions, whereas the traffic counts are for years before 2015.

*Table 1: Comparison of Traffic Counts with Model Volume*

| Location                           | Traffic Counts<br>(2008 - 2015) | Model Volume<br>(2017 NB) | Difference   | %<br>Difference |
|------------------------------------|---------------------------------|---------------------------|--------------|-----------------|
| Route 40 @ Eastern Blvd.           | 34,000                          | 37,800                    | 3,800        | 11%             |
| Eastern Blvd. @ Rt. 40             | <i>25,039</i>                   | 25,696                    | 657          | 3%              |
| Jefferson Blvd.                    | 6,421                           | 7,207                     | 786          | 12%             |
| Edgewood Dr. @ Rt. 40              | <i>14,500</i>                   | 15,981                    | 1,481        | 10%             |
| Robinwood Dr. @ Professional Blvd. | <i>15,181</i>                   | 16,826                    | 1,645        | 11%             |
| Robinwood Dr. @ Bluebird Ave.      | <i>14,895</i>                   | 15,632                    | 737          | 5%              |
| Mt. Aetna Rd.                      | <i>6,245</i>                    | 5,922                     | -323         | -5%             |
| Medical Campus Rd.                 | <i>4,522</i>                    | 4,671                     | 149          | 3%              |
| Academic Blvd.                     | <i>4,403</i>                    | 4,469                     | 66           | 1%              |
| <b>Total</b>                       | <b>125,206</b>                  | <b>134,204</b>            | <b>8,998</b> | <b>7%</b>       |

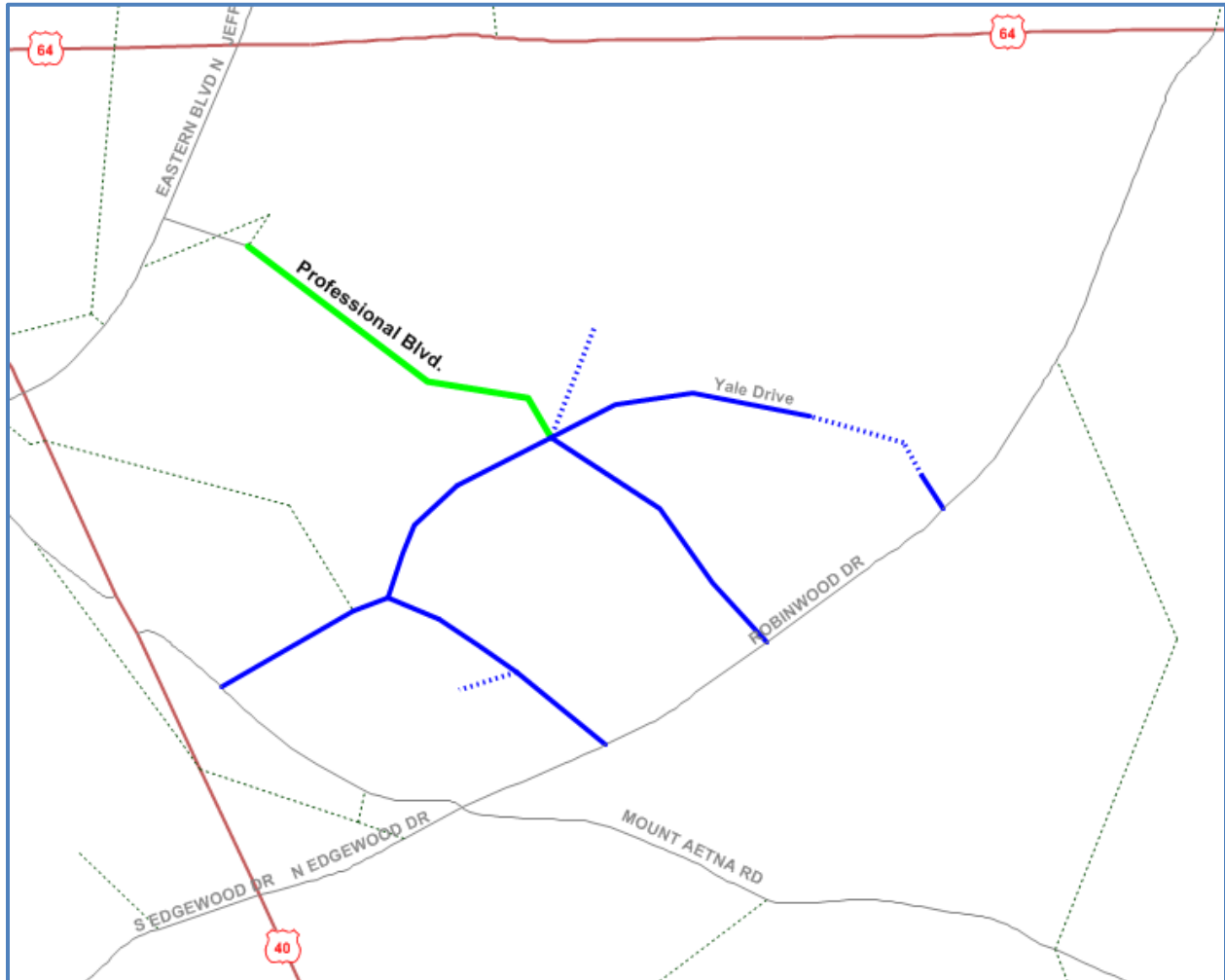
*Note: Italicized Traffic Counts are for 2011 - 2015.*

Based on the above comparisons, the traffic count validation result indicates that the updated HEPMPO model replicates daily traffic counts with sufficient accuracy to be used for Professional Boulevard Traffic Study.

### Traffic Model Analysis Runs

This task focused on application of the regional model for the traffic study. Initial efforts focused on ensuring that future year model demographic inputs are representative of the expected development in the study area per information from the County as shown in **Attachment B**. Additional household and employment was added in the zones comprising the study area (233, 235, 404, 405 and 406) to represent the expected development. In addition to the 2017 No-build condition, travel model runs were conducted for the 2017 Build condition and the forecast 2040 No-Build and Build conditions. Michael Baker worked with the County to determine the network changes reflected in the No-Build and Build scenarios. A four lane Professional Boulevard connection was added for year 2017 and 2040 Build conditions. **Figure 3** shows the model network updates for the Build condition.

Figure 3: Model Network Updates for Build Condition



The results of the model runs for Professional Boulevard and other key routes in the study area are shown in **Table 2**. Professional Boulevard near the intersection with Eastern Boulevard is estimated by the traffic model to carry about 11,550 daily vehicle when completed in 2017 and about 18,750 vehicles by year 2040. The completed Professional Boulevard helps in drawing traffic away from US-40 which is projected to carry about 49,600 vehicles without the completed Professional Boulevard. About 40,550 vehicles are projected to travel US-40 with the completed Professional Boulevard. Other routes in the study area show reasonably minor changes with or without Professional Boulevard.

Table 2: Assigned Model Volumes for No-Build and Build Scenarios

| Volumes (Two-way)                  | Time Period | 2017 No Build (with only Yale Dr. Completed) | 2017 Build (with both Yale Dr. & Professional Blvd. Completed) | 2040 No Build (with only Yale Dr. Completed) | 2040 Build (with both Yale Dr. & Professional Blvd. Completed) |
|------------------------------------|-------------|--|--|--|--|
| Professional Blvd. @ Eastern Blvd. | AM          | 418  | 1,019  | 482  | 1,705  |
|                                    | PM          | 362  | 945  | 440  | 1,596  |
|                                    | Daily       | 3,774  | 11,544   | 4,710  | 18,747   |
| Professional Blvd. @ Robinwood Dr. | AM          | 719  | 736  | 1,613  | 1,265  |
|                                    | PM          | 733  | 622  | 1,546  | 1,160  |
|                                    | Daily       | 7,020  | 6,487  | 14,615                                       | 11,958   |
| US-40                              | AM          | 3,407  | 2,942  | 4,397  | 3,533  |
|                                    | PM          | 3,453  | 2,993  | 4,403  | 3,524  |
|                                    | Daily       | 37,549                                       | 32,946   | 49,618                                       | 40,545   |
| Eastern Boulevard                  | AM          | 2,488  | 2,560  | 3,123  | 3,232  |
|                                    | PM          | 2,464  | 2,610  | 3,074  | 3,229  |
|                                    | Daily       | 25,696                                       | 27,717   | 32,232                                       | 34,831   |
| Jefferson Boulevard                | AM          | 1,074  | 1,024  | 1,258  | 1,173  |
|                                    | PM          | 1,046  | 995  | 1,270  | 1,163  |
|                                    | Daily       | 11,086                                       | 10,464   | 13,597                                       | 12,692   |
| Robinwood Drive                    | AM          | 1,473  | 1,519  | 1,839  | 1,863  |
|                                    | PM          | 1,491  | 1,535  | 1,840  | 1,944  |
|                                    | Daily       | 15,632                                       | 15,991   | 18,863                                       | 20,372   |

# ATTACHMENT A: Field Notes

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## Date:

- 11/13/2015 (8:00am – 11:30am) included follow-up meeting with Andrew Eshleman at Washington County

## Field Observations Conducted:

- Observe access driveways on all routes
- Key traffic generators
- Development type and location
- Traffic speeds and restrictions
- Spot traffic counts

## Spot Traffic Counts:

- Counts to observe activity at business park on Eastern Boulevard to evaluate if model producing enough traffic attractions
- 15 minute count (Eastern/Professional Court) 7:55am – 8:10am
- 15 minute count (Eastern/Opal Court) 8:25am – 8:40am



# ATTACHMENT B: County Information on Future Development in Study Area

Sheet 1 of 4



Locations



# DEPARTMENT OF PUBLIC WORKS

Job Professional Blvd Traffic  
 Sheet No. 2 of 4  
 Calculated By \_\_\_\_\_ Date 7/20/15  
 Checked By \_\_\_\_\_ Date \_\_\_\_\_  
 Scale \_\_\_\_\_

| ID | Development Name         | Development Program  | ITE Code                                   | Residential Units (2040) | Jobs (2040)  |
|----|--------------------------|--|--|--------------------------|--------------|
| 1  | Rosewood PUD             | Residential:<br>• Garden Apts : 48<br>• Towns : 133<br><br>Commercial & Offices:<br>• Office Bldgs: 113,550 sf<br>• Drive Thru Bank: 3,600 sf<br>• Convenience Store: 4800 sf w/ 16 Fuel Sta<br>• Drive Thru Bank: 3600 sf<br>Total 125,550 sf | 220<br>230<br><br>710<br>912<br>853<br>912 | 181                      | 377          |
| 2  | Mt. Aetna Farm<br>175 Ac | Commercial & Offices:<br>Bldgs : 1,413,000 sf  | 760  | -                        | 4,239        |
| 4a | Harrison Track<br>180 Ac | Commercial & Offices:<br>Buildings :   | 750 & 820                                  | -                        | 4,704        |
| 6  | Blackrock PUD            | Residential<br>Single Family: 213<br>Towns : 203   | 210<br>230                                 | 440                      |              |
| 7  | Duhbunza / Alter         | Commercial & Offices:<br>• Specialty Shops: 11,000 sf<br>• Offices : 11,000 sf<br>• Convenience Store: 3,000 sf<br>• Supermarket: 15,000 sf  | 826<br>710<br>853<br>850                   | -                        | 120          |
| 10 | Light Business Park      | Offices:<br>• Bldgs: 86,667 sf   | 710  | -                        | 260          |
| 12 | Greenwich Park           | Residential:<br>• Single Family: 62 units  | 210  | 62                       | -            |
| 18 | Hag. Community College   | Students since:<br>2010 @ 16,571 2015 @ 16,737<br>2040 @ 18,000  | 540  |                          | 855 students |
| 19 | MKS                      | Offices:<br>• Bldgs: 81,000 sf   | 710 & 720                                  | -                        | 243          |

# Washington County

## DIVISION OF ENGINEERING & CONSTRUCTION MANAGEMENT

Job Professional Blvd Traffic  
 Sheet No. 3 of 4  
 Calculated By \_\_\_\_\_ Date 7/20/15  
 Checked By \_\_\_\_\_ Date \_\_\_\_\_  
 Scale \_\_\_\_\_

| ID | Development Name  | Development Program   | ITE Code   | Residential Units (2040) | Jobs (2040) |
|----|---|---|------------|--------------------------|-------------|
| 20 | Triumph   | Commercial:<br>• Bank: 3,025 sf<br>• Retail: 36,481 sf<br>Total: 39,506 sf          | 912<br>826 | -                        | 118         |
| 21 | Parcel 1665<br>Doey House &<br>Hospital Day Care<br>19 Ac   | Commercial/Medical:<br>Hospice: 60,000 sf<br>Day Care: 10,000 sf<br>Total 70,000 sf | 620        | -                        | 210         |
| 22 | Diakon, Lutheran Services                                   | Assisted Living:<br>Residential: 100 units  | 254        | 100                      | -           |
| 23 | Parcel # 1718<br>Meritus Health<br>75.0 Ac. less 30 Ac. SWM | Medical Offices:<br>• Medical/Dental<br>196,000 sf                                  | 720        | -                        | 589         |
| 24 | Parcel # 1732<br>Meritus Health<br>11.12 Ac                 | Medical/Commercial:<br>Offices: 40,000 sf<br>Retail: 56,000 sf<br>Total: 96,000 sf  | 720<br>826 | -<br>-                   | 290         |
|    |   |   |            |                          |             |

# Washington County

## DIVISION OF ENGINEERING & CONSTRUCTION MANAGEMENT

Job Professional Blvd Traffic

Sheet No. 4 of 4

Calculated By \_\_\_\_\_ Date 7/20/15

Checked By \_\_\_\_\_ Date \_\_\_\_\_

Scale \_\_\_\_\_

| Highway        | Segment                                       | AM                             | PM                             | ADT      |
|----------------|---|--------------------------------|--------------------------------|----------|
| Robinwood Dr   | Mt. Aetna -<br>Medical Campus (9/17/13)       | NB 978<br>SB 535<br>Total 1513 | NB 861<br>SB 704<br>Total 1565 | 14,965   |
|                | Medical Campus to<br>Academic Dr (9/17/13)    | NB 622<br>SB 557<br>Total 1535 | NB 949<br>SB 645<br>Total 1594 | 15,181   |
|                | Academic Dr to<br>Jefferson Blvd (10/5/11)    | NB 196<br>SB 777<br>Total 973  | NB 689<br>SB 518<br>Total 1207 | ≈ 14,895 |
| Academic Dr.   | Robinwood Dr to Campus<br>(10/5/11)           | WB 729<br>EB 96<br>Total 825   | WB 399<br>EB 368<br>Total 767  | 4,408    |
| Medical Campus | Robinwood Dr to Hospital<br>(9/17/13)         | WB 483<br>EB 173<br>Total 656  | WB 231<br>EB 634<br>Total 865  | ≈ 4,522  |
| Mt Aetna Rd    | Robinwood Dr to Yale Dr<br>(10/5/11)          | WB 340<br>EB 213<br>Total 553  | WB 365<br>EB 322<br>Total 687  | 6,245    |
| Yale Dr        | Mt Aetna Rd to<br>Medical Campus<br>(9/18/12) | NB 269<br>SB 233<br>Total 502  | NB 246<br>SB 306<br>Total 652  | 5,363    |
| Edgewood Dr    | Dual Hwy to Mt. Aetna Rd<br>(9/17/13)         | NB 876<br>SB 484<br>Total 1354 | NB 821<br>SB 704<br>Total 1525 | ≈ 14,500 |