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**Division of Transportation**  
**Development Services Section**

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# MEMORANDUM

TO: Marymount Working Group

FROM: Robert A. Gibson

DATE: May 15, 2007

SUBJECT: Marymount University Expansion Traffic Impact Analysis Review

To expand on the County's review of the Traffic Impact Analysis (TIA) for the proposed Marymount University development and to address requests from community members, the County contracted with Sabra, Wang and Associates Inc, to perform a peer review of the TIA. Sabra, Wang and Associates Inc, is a local transportation engineering firm that primarily does work in the Maryland and DC area. Sabra, Wang and Associates Inc, performed a comprehensive review of the "Marymount University TIA" conducted by Wells and Associates, LLC, dated October 13, 2006.

The review concluded that the TIA performed for the site was done appropriately using valid assumptions and a sound methodology. The analysis also found that "based on future signalization of 26<sup>th</sup> Street and Old Dominion Drive, and 26<sup>th</sup> Street and Glebe Road, an additional signal would not be justified at 26<sup>th</sup> Street and Yorktown Road at this time."

In addition to the method used to forecast the future trip generation of the expansion of Marymount University, the review indicated an alternative method could also be used to project the future trips generated by the site. This alternative method uses formulas provided in the Institute of Transportation Engineers "Trip Generation" Manual, 7<sup>th</sup> Edition, for the University land use (550) to project University trip generation based on the number of students attending the University. As such, Sabra, Wang and Associates assumed that each of the new residential beds associated with the new dormitory would be considered as a new student and used to calculate trip generation for the site. The review found that the difference in the trip generation projection between these two methodologies was not so significant as to change the findings of the analysis.

A copy of the memorandum presenting Sabra, Wang and Associates review of the TIA is provided below.



# Sabra, Wang & Associates, Inc.

Engineers • Planners • Analysts

## MEMORANDUM

**To:** Terry L. Bellamy, Transportation Engineering and Operations Bureau Chief  
Arlington County, Virginia

**From:** Paul Silberman, P.E., PTOE, Sabra, Wang & Associates, Inc.

**Subject:** **Marymount University Traffic Impact Analysis Review**  
**Published October, 2006**

**Date:** April 20, 2007

The purpose of this memorandum is to provide comments on the subject report. The comments focus on the technical content and accuracy of the report, including adherence to ITE methodology and recommended guidelines, validity of assumptions, and quality of data.

The proposed development program proposes the replacement of a 169 space surface parking lot with a 378-space parking garage, 250 dormitory beds, 35,000 square feet of classroom and laboratory space, and 300-seat auditorium.

- *Does the study area include all likely affected intersection?*

The study evaluates nine intersections: 1) Glebe Road at North Parking Lot Entrance, 2) Glebe Road at South Parking Lot Entrance, 3) Glebe Road at Old Dominion Drive, 4) Glebe Road at 26<sup>th</sup> Street North, 5) Old Dominion Drive at 26<sup>th</sup> Street North, 6) Parking Lot Entrance at 26<sup>th</sup> Street North, 7) Yorktown Blvd at 26<sup>th</sup> Street North, 8) Library Drive at 26<sup>th</sup> Street North, and 9) Garage Entrance at Yorktown Blvd.

Traffic signals are currently located only at location 3, however traffic signals are proposed by the County at locations 4 and 5. All other intersections are controlled by stop signs on the minor street.

Proposed access to the site to the new parking garage will be via Yorktown Blvd, across from the existing parking garage entrance.

Based on the existing and future site access points, and existing traffic patterns, all of the likely affected intersections are included.

- *Is the existing roadway network accurately documented?*

All roadways and intersections are accurately documented with the correct lane configurations and traffic control.

- *Is the traffic count data valid?*

Traffic counts were collected at all locations on a Wednesday in October of 2005. Supplemental counts were performed at two intersections on Yorktown Blvd. on a Thursday in September of 2006. At the time of publication, all counts were one year old or less, which is acceptable. Traffic counts at the University access points were performed for 17 hours, from 7 AM to midnight. Traffic counts at all other intersections were collected during peak hours of 7 AM to 9 AM and 4 PM to 7 PM.

Historical traffic data was provided by the County at the intersections of Glebe Road and Old Dominion Drive, 26<sup>th</sup> Street at Old Dominion Drive, and 26<sup>th</sup> Street at Glebe Road. Traffic volumes collected for the Marymount study were found to be consistent with historical data.

Based on the summation of driveway counts, the report notes that the University's peak hours (8:45 AM to 9:45 AM and 5:45 PM to 6:45 PM) are slightly offset from the peak hours of the adjacent street network (8:00 AM to 9:00 AM and 5:15 PM to 6:15 PM). The slightly offset peak hour is not unusual for a university land use, referring to the Institute of Transportation Engineer's Trip Generation Handbook, trip rates for land use 550 (University College) are given for both the peak hour of adjacent street traffic and the peak hour of the generator. However, it should be noted that the differences cited in the ITE book are minimal; an average AM trip rate during the AM peak hour of adjacent street traffic is 0.20 vehicle trips per student and 0.21 vehicle trips per student during the AM peak hour of the generator.

Furthermore, a review of the traffic volumes indicates that the total percentage of minor street traffic at any of the University access points represents 5% of the total entering traffic volumes at the North Parking Lot Entrance, 1% at the South Parking Lot entrance, 8% at the Parking Lot Entrance on 26<sup>th</sup> Street, 6% at the Garage Entrance on Yorktown Blvd, and 10% at the Library Entrance on 26<sup>th</sup> Street. Although there are approximately 100 less total entering and exiting trips to the University occurring during the peak hours of adjacent street traffic, these trips are not concentrated at a single access point, but dispersed over the five existing access point. Based on this, and the high percentage of non-university traffic on the study roadway network, it is suggested to consider only the peak hour of adjacent street traffic for analysis and design purposes.

Lastly, a review of the 2006 traffic counts at Yorktown Blvd and 26<sup>th</sup> Street performed on Thursdays and found no significant difference beyond normal and tolerated variances in daily traffic volumes. Again, this is likely based on the high percentage of non-university traffic on the adjacent street network.

- *Is growth in existing traffic volumes accounted for, and if so is the growth rate reasonable? Are calculations accurate?*

A two-percent growth rate was applied to through volumes on Glebe Road, Old Dominion Drive, and 26<sup>th</sup> Street. This is a fair projection of growth in existing traffic volumes, and calculations were found to be accurate.

- *Are other future developments accounted for and documented? Are the trip generation and distributions for background developments documented?*

There are no other background developments planned, approved or under construction in the study area, and none are noted in the report.

- *Is the horizon study year reasonable?*

A 3-year build-out (2008) was assumed in the report, which is appropriate for a development of this size.

- *Are the proposed trip generation rates explained and documented? Are the ITE land use categories appropriate? Are any trip discounts applicable (i.e. transit, pedestrian, internal capture and by-pass)?*

Traditional trip generation analysis for the subject development was not performed. Based on current enrollment and housing data provided by the university, approximately 20% of the students currently live on or adjacent to campus that would walk or bike. Bicycle facilities are also provided on several roadways for improved bicycle access. Based on transit ridership data collected in the report, the transit share on WMATA and University buses is 13%. The existing total number of on-campus parking spaces is 690. The proposed development would increase the on-campus parking totals by 209 spaces, an increase of 30%.

The report estimates a net increase in vehicular trips 68 AM and 92 PM peak hour trips during adjacent roadway peak hours, and 107 AM and 128 PM peak hour trips during the peak hour of the generator.

As a parking garage is an ancillary use, an alternative trip generation analysis was performed using the ITE trip generation rates for land use code 550 (University) to challenge the assumptions in the report.

The analysis is based on the additional 250 dormitory beds. Although these students will reside on campus and likely walk or use transit, it is assumed that based on the current overflow of students living in nearby hotels, the 250 beds will allow for additional future increases in enrollment, particularly of commuter students. Furthermore, based on the increased classroom, lab, and auditorium space, no discounts for internally captured trips was assumed. The revised trip generation (for the peak hour of the generator) is presented in **Table 1**.

**Table 1. Summary of Revised Trip Generation for Marymount University**

Proposed Use	ITE Code	Average Vehicle Trip Ends versus:	Variable	AM New Vehicle Trip Ends	PM New Vehicle Trip Ends
University	550	Students	250	77	150
<b>TOTAL</b>				<b>77</b>	<b>150</b>

The revised trip generations are approximately 27% lower than the study reflected (107) in the AM peak hour, and 17% higher (128) in the PM peak hour.

- ***Does the trip distribution seem reasonable?***

The site-generated inbound and outbound vehicular trips were distributed and assigned to the roadway network as shown in Table 2.

**Table 2 – Summary of Trip Distribution for Marymount University**

Use	Distribution
University	30% to and from the south via Glebe Road, 30% to/ from the south via Old Dominion Drive, 5% to/ from the west via Yorktown Blvd, 5% to/ from the west via 26 <sup>th</sup> Street, 10% to/ from the east via 26 <sup>th</sup> Street, 13% to/ from the north via Glebe Road, and 7% to/ from the north via Old Dominion Drive.

Based on the surrounding land uses, roadway network, and access to public transportation facilities, these assumptions are reasonable.

- ***Are there any other proposed capacity-enhancing transportation improvements in the study area by others?***

New traffic signals are proposed to be installed at the intersections of Glebe Road and 26<sup>th</sup> Street, and Old Dominion Drive and 26<sup>th</sup> Street.

- ***Is the capacity analysis methodology correct? Are the calculations correct?***

Highway Capacity Manual analysis was used in the report to evaluate the existing and future conditions (adjacent peak hour traffic) at all of the study intersections. A review of the Synchro files developed by Wells and Associates for the existing and future conditions found that the inputs for lanes, volumes and signal timing and phasing was accurately coded.

- The existing signalized intersection of Glebe Road and Old Dominion Drive currently performs at a LOS C during the AM and PM peak hour.
- Several stop-controlled movements currently fail, including 26<sup>th</sup> Street at Old Dominion Drive (AM and PM) and 26<sup>th</sup> Street at Glebe Road (PM)
- The simulation shows that traffic on southbound 26<sup>th</sup> Street approaching Old Dominion Drive backs up past Yorktown Blvd during both the AM and PM peak hours.

For the future year 2008 conditions, the following was evaluated:

- 1) A 2% growth in the existing through traffic volumes on Glebe Road, Old Dominion Drive, and 26<sup>th</sup> Street
  - 2) Reassignment of existing traffic from the surface lot entrance to the proposed garage entrance
  - 3) Projected trips to the new garage/ classroom building
- Under future conditions, the intersection of Glebe Road and Old Dominion Drive is projected to perform at a LOS C during the AM and PM peak hour.

- Implementing signalized control at the intersection of Old Dominion Drive and 26<sup>th</sup> Street is projected to provide a LOS B in the AM and D in the PM peak hour.
- Implementing signalized control at the intersection of Glebe Road and 26<sup>th</sup> Street is projected to provide a LOS A in the AM and PM peak hours.
- The simulation shows excessive queuing on westbound Old Dominion Drive at 26<sup>th</sup> Street. According to Synchro, the 95<sup>th</sup>-percentile queues (maximum queues observed under 95<sup>th</sup>-percentile traffic volumes) are over 1000 feet, or 40 vehicles.
- The simulation did not show any excessive delays for motorists exiting Yorktown Blvd at 26<sup>th</sup> Street during either the AM or PM peak hour.

- *Do the recommended improvements mitigate the impact and achieve desirable level of service?*

The report recommends the following improvements:

- 1) No improvements are recommended to accommodate the proposed development

Our analysis concurs that based on future signalization of 26<sup>th</sup> Street and Old Dominion Drive, and 26<sup>th</sup> Street and Glebe Road, an additional signal would not be justified at 26<sup>th</sup> Street and Yorktown Road at this time.

However, based on the projected queues on Old Dominion Drive at 26<sup>th</sup> Street under signalized control, it is suggested to *consider additional capacity improvements*. The provision of a SB left-turn lane would improve the LOS from a D to a C in the PM peak and reduces 95<sup>th</sup>-percentile queues on WB Old Dominion Drive by 300 feet. The provision of a second westbound through lane would improve LOS from a D to a B in the PM peak hour and reduce 95<sup>th</sup>-percentile queues on WB Old Dominion Drive by 600 feet.