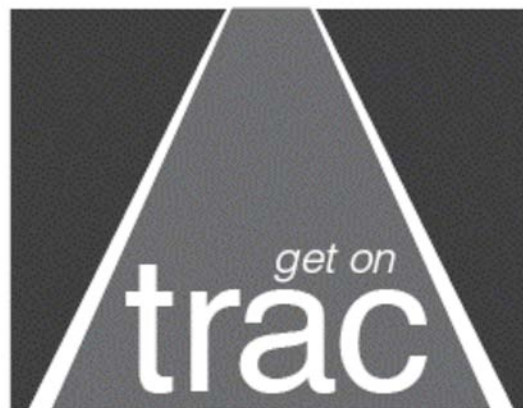


**A Comparison of the Number of Travelers Riding Baltimore's  
Metro Subway and Light Rail and Driving I-795 and I-83  
*between the Hours of 6 and 9 a.m.***

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## Summary

The Baltimore Metro Subway at Owings Mills attracts a significant fraction of the peak rush-hour traffic from I-795 and thus reduces highway congestion. The central Light Rail also attracts traffic from I-83, although its corridor share is significantly less than the subway share. This study highlights the significant fraction of corridor traffic the subway can attract and compares it to the lower corridor traffic share of the Central Light Rail. The hope is to improve rush-hour commutes into Baltimore.

A comparison of the people boarding the Baltimore Metro Subway at Owings Mills Station with the number passing the station on I-795 southbound between 6:00 and 9:00 a.m. reveals that 14% of the southbound corridor traffic is on the Metro Subway. Between the peak hour of 7:00 to 8:00 a.m., 17% of the inbound corridor traffic is on the Metro Subway. While not part of the intent of this study, approximately 2% to 3.5% of the outbound traffic was on the Metro Subway despite the fact that most outbound passengers must transfer to a bus, which is viewed as an inconvenience.

The 2003 “Report of the MTA Citizen’s Advisory Committee: Proposal and Discussion on Phase I of the Baltimore Transit Plan” by Edward Cohen, which was approved by the MTA’s Citizen Advisory Committee on 16 December 2003, found that 54% of the morning traffic into Baltimore’s Central Business District (CBD) from the northwest were on the Metro Subway.

The high quality of subway service is able to compete with the automobile and carry a significant fraction of the corridor traffic. This is true even though many people describe the Metro Subway line as one that “doesn’t go anywhere” or goes “from nowhere to nowhere by way of nowhere” or, as it is sometimes asked, “Baltimore has a subway?”

A similar comparison of the number of people on the Light Rail at Mt. Washington station with the number driving on I-83 across the Baltimore County/City Line shows that 3.0% of the southbound corridor traffic is on the train between 6:00 and 9:00 a.m. and 3.5% of the inbound corridor traffic is on the Light Rail during the peak between 7:00 to 8:00 a.m. At Northern Parkway, the light rail corridor share rises to 3.4% between 6:00 and 9:00 a.m. and to 4.0% during the peak 7:00 to 8:00 a.m. hour. While not the intent of this study, about 5% of the northbound corridor traffic was on the Light Rail.

The aforementioned 2003 “Report of the MTA Citizen’s Advisory Committee” found that 5.4% of the morning traffic into Baltimore’s Central Business District (CBD) from the north was on the Light Rail.

The Light Rail captures a far smaller fraction of the corridor traffic compared to the Metro Subway. While the low share in this study may be due to the Light Rail’s long closure and recent partial reopening only four weeks before this study, the similarity of this study’s results with the 2003 results suggest the lower corridor share is real. The lower share may be due to better competition from the highway (both I-83 and the Light Rail go downtown), to less desirable station locations and destinations, or to lower performance of the Light Rail as compared to the Metro Subway.

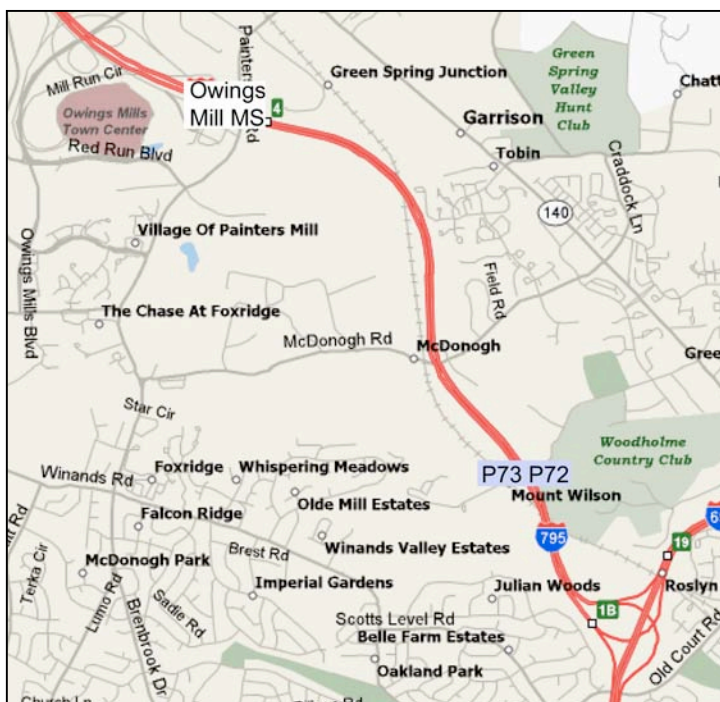
## Research Results

The author arrived in the Owings Mills Metro Subway station at 6:00 a.m. on Tuesday 24<sup>th</sup> January 2006. He stood just inside the turnstiles and counted people as they arrived through the gates. The counts were grouped by hours from 6:00 to 9:00 a.m. South of the station, between the I-795 interchanges with Owings Mills Blvd and I-695, there are automatic traffic counters (ATC) (P0072 northbound and P0073 – southbound). See Figure 1. Unfortunately these traffic counters provide only total, not classified, vehicle counts. Table 1 shows the southbound vehicle and Metro Subway passenger counts on 24<sup>th</sup> January. As in the MARC rail comparison with I-95 study by the same author, this study assumed 1.1 people per vehicle.

The corridor share is computed by dividing the Metro Subway people counts by the sum of the subway people counts and 1.1 times the vehicle counts.

The Metro Subway southbound corridor fraction averaged 14% between 6:00 and 9:00 a.m. It ranged from a low of 9.4% between 6:00 and 7:00 a.m. up to 17.4% between 7:00 and 8:00 a.m.

The Metro Subway is able to attract a significant fraction of the corridor traffic from interstate I-795. This may be because of the Metro Subway’s high operating speed and acceleration or because the Metro Subway provides a more direct route to downtown than the highway. It may be because the stations are all well located. The Owings Mills Station is very easy to reach from I-795; the Charles Center station is in the center of the central business district; and the Johns Hopkins Hospital is a large employer.



**Figure 1. Map of I-795 showing the interchanges with Owings Mills Blvd and I-695, the Owings Mills Metro Subway station, and the automatic vehicle counter locations.**

**Table 1. Number of southbound vehicles per hour on I-795 and Metro Subway passengers per hour boarding at Owings Mills Station on 24 January 2006.**

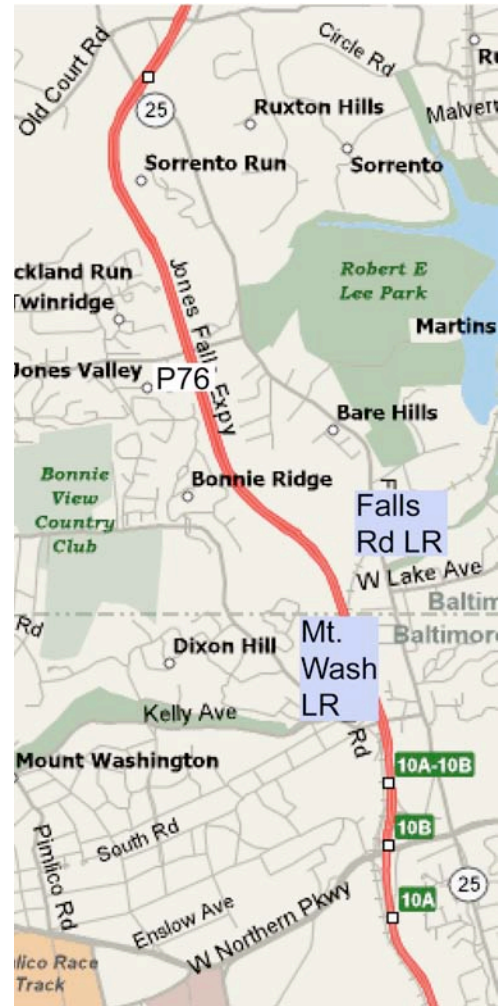
Time a.m.	Vehicles per hour	Metro Subway passengers per hour	Metro Subway Corridor Fraction
6:00-7:00	5,012	572	9.4%
7:00-8:00	5,039	1,168	17.4%
8:00-9:00	4,346	835	14.9%
<b>Total</b>	<b>14,397</b>	<b>2,575</b>	<b>14.0%</b>

For the Light Rail study, the author arrived at the Mt. Washington Light Rail station about 5:40 a.m., shortly before the first southbound train was due on Thursday 2<sup>nd</sup> February 2006. As each train arrived, he recorded the number of people waiting for the train, the number of heads observed through the window, and the number of people who detrained. For one person to count the people on the train is difficult and these counts are approximate.

There is an automatic vehicle counter (P0076) on I-83 a little north of the Mt. Washington Light Rail Station near Old Pimlico Road, between the Ruxton Rd. (Old Court) and Northern Parkway interchanges. See Figure 2. Between the interchanges, the number of vehicles is constant, so it is irrelevant where the automatic traffic counter is. The Light Rail and I-83 cross between the Falls Road and Mt. Washington Stations very close to the county/city line. The Light Rail corridor fraction can be calculated based on the number of Light Rail passengers leaving the Falls Road Station and crossing under I-83, or it can be made based on the number of people departing Mt. Washington and arriving at Northern Parkway. Table 2 shows both. The Light Rail's southbound corridor share crossing I-83 ranged from 2.0%, during the 5:00 to 6:00 a.m. hour when there was only one southbound train, to 3.5% between 7:00 and 8:00 a.m. The rush-hour average between 6:00 and 9:00 a.m. was 3.0%. Leaving Mt. Washington and arriving at Northern Parkway, the Light Rail corridor share averaged 3.4% from 6:00 to 9:00 a.m. and peaked at 4.0% between 7:00 and 8:00 a.m.

The Baltimore Metropolitan Council's 2003 Baltimore Central Business District Trip Characteristics (the BMC's 2003 CBD study) reported 1,159 passengers observed at the University of Baltimore / Mt. Royal Station. If we assume 1,000 people were on the Light Rail at Mt. Washington and use today's traffic count of 10,812 vehicles between 7:00 and 9:00 a.m., the Light Rail carried 8.4% of the southbound corridor traffic before closure.

The Light Rail study was conducted significantly south of its origin. North of the Mt. Washington Station are the Falls Road, Lutherville, Timonium Business Park, and Timonium stations.



**Figure 2. Map showing location of Falls Rd and Mt. Washington Light Rail stops and automatic traffic counter P76.**

**Table 2. Number of vehicles per hour southbound on I-83 and light rail passengers per hour arriving and departing Mt. Washington Station**

Time (a.m.)	Vehicles per hour	Light rail passenger arriving	Light rail passenger departing	Arriving Corridor Fraction	Departing Corridor Fraction
5:00-6:00	1,415	31	35	2.0%	2.2%
6:00-7:00	4,634	114	130	2.2%	2.5%
7:00-8:00	6,315	251	287	3.5%	4.0%
8:00-9:00	4,497	157	183	3.1%	3.6%
<b>Total 6:00-9:00</b>	<b>16,861</b>	<b>553</b>	<b>635</b>	<b>3.0%</b>	<b>3.4%</b>

As for the other comparisons, 1.1 passengers per vehicle on I-83 was used. This is based on the BMC’s 2003 CBD study, which found 4,454 people exiting from I-83 onto Maryland Ave., St. Paul St./Mt. Royal Ave., Guilford Ave., and Pleasant St. in 3,980 vehicles between 7:00 and 9:00 a.m. The average vehicle had 1.119 people per vehicle.

The Light Rail does not capture as large a fraction of the corridor traffic as the Metro Subway or MARC train. This might be because the Light Rail was closed for a year and partially reopened only four weeks before these data were collected. This is supported by comments from those waiting at Mt. Washington that before the double-tracking shutdown the “Parking lot was full by now” or “More people were on the train before the shutdown.” Also supporting this possibility is that the 470 people leaving Mt. Washington between 7:00 and 9:00 a.m. is very much smaller than the 1,159 passengers observed at the University of Baltimore / Mt. Royal Station in the BMC’s 2003 CBD study. The BMC later released more detailed data showing about 80 of the Mt. Royal passengers originated at Penn Station, leaving about 1,080 from North Avenue. Before the BMC released the Light Rail fraction from Penn Station, Edward Cohen, curious about the fraction from Penn Station, made his own observations and found about 100 passengers from Penn Station. Therefore between 1,000 and 1,100 Light Rail passengers arrived at Mt. Royal from North Avenue. As described above, even making the unlikely assumption that all of these passengers were on the Light Rail at Mt. Washington, the Light Rail corridor share rose only to 8.4% before closure. However, the MTA’s CAC, using BMC data, showed that only 5.4% of those entering CBD from the north were on the Light Rail.

The smaller corridor fraction might be due to lower acceptance of the Light Rail because of a lower average operating speed as compared to the Metro Subway and MARC or because the route selection of the Light Rail is less favorable. The average operating speed of the Baltimore Metro Subway is above 30 MPH while the average speed of the Light Rail is about 22 MPH. Also, as described above, the Metro Subway connects some very attractive locations. On the other hand, none of the operating Light Rail station parking lots are as easy to reach from an interstate highway; the Light Rail runs along the edge of the business district; and there are no employers comparable to Hopkins Hospital at a Light Rail station. (The University of Maryland Medical center is at least a few blocks walk from Howard Street.)

**Table 3. Number of vehicles per hour northbound on I-83 and light rail passengers per hour arriving and leaving Mt. Washington Station**

Time a.m.	Vehicles per hour	Light rail passengers arriving	Light rail passengers departing	Departing Corridor Fraction
5:00-6:00	858	63	67	6.6%
6:00-7:00	1,907	134	133	6.0%
7:00-8:00	3,784	227	221	5.0%
8:00-9:00	3,652	188	175	4.2%
<b>Total 6:00-9:00</b>	<b>10,201</b>	<b>612</b>	<b>529</b>	<b>4.9%</b>

Interestingly, through the Mt. Washington Station the Light Rail carries more passengers north out of Baltimore than south. Because there is less northbound morning highway traffic than southbound, the northbound corridor share is significantly higher than the southbound share. The northbound results are shown in Table 3.

The author thanks Secretary Flanagan for support and Holly Ellison of the MTA for assistance. The author appreciates significant editorial help from Christopher Wanjek. The author takes full responsibility for factual errors. The opinions expressed herein are those of the author alone.

## Assumptions

- 1) The data is correct, meaningful, and correctly entered.

The highway numbers are collected electronically. Although the counters are not ideal, they provide a general idea of the vehicle flow. The vehicle counts were unclassified.

The transit counts were conducted by the author. Counting at Owings Mills was relatively easy and the author has high confidence in those numbers. However, counting heads inside a Light Rail train from the outside is difficult, and those counts are likely to have errors.

- 2) Vehicle counts were converted to passengers by assuming 1.1 people per vehicle.

The 2000 U.S. Census gives a rush-hour vehicle occupancy rate of 1.08 per vehicle in the Baltimore Region. The BMC has conducted numerous studies of rush-hour vehicle occupancy. The BMC's 2003 CBD study found 1.18 people per passenger vehicle entering the Baltimore CBD over the entire rush hour and 1.118 people per vehicle exiting I-83 into the CBD. Their "2004 Employment/Activity Center Vehicle Occupancy and Classification Study" found vehicle occupancy of 1.25 in Bel Air, 1.21 at BWI, 1.12 in the White Marsh business region, and 1.05 in Woodlawn.

- 3) The studies assumed that the relevant roads are limited to I-795 and I-83.

One could argue that Reisterstown and Falls Roads should have been included in the corridor calculations. Morning rush-hour traffic on Reisterstown Road is significant, however it is not clear how much is destined for I-695. At the study time, Falls Road was closed for construction south of Roland Ave., which reduces its attractiveness as an alternative to I-83.