BEFORE THE OFFICE OF ZONING AND ADMINISTRATIVE HEARINGS FOR MONTGOMERY COUNTY, MARYLAND

IN THE MATTER OF THE APPLICATION OF HOLTON ARMS SCHOOL, INC. FOR A MAJOR MODIFICATION OF SPECIAL EXCEPTION FOR A PRIVATE EDUCATIONAL INSTITUTION	: : : : :	**Conditional Use Application Nos. CBA-1174-E, S-2467-A S-2503-B, S-516, & S-729**

PRE-HEARING SUBMISSION OF VIVIAN RIEFBERG AND BRADLEY BOULEVARD CITIZENS ASSOCIATION

EXHIBIT C(a)

Exhibit No. 121 Letter dated December 13, 2007,
from People's Counsel (with attached documents)

Exhibit 41(c)(i)
OZAH Case No: CBA-1174-E

MONTGOMERY COUNTY, MARYLAND

December 13, 2007

Allison Ishihara Fultz, Chair
And Members of the Board
Board of Appeals of Montgomery County
Stella B. Werner Council Office Building
100 Maryland Avenue, Suite 217
Rockville, Maryland 20850

Re: Condition No. 5 in January 5, 2007
Resolution in CBA-1174-D, S-2467
and S-2503-A (Holton-Arms School)

Dear Ms. Fultz and Members of the Board:

The Board in its Resolution, effective January 5, 2007 established the following set-out condition in the above cases; and a submission date for the additional traffic study that was different from that recommended by the Hearing Examiner:

"5. Petitioner shall conduct a traffic study, as follows:

No later than February 28, 2007, the Petitioner will submit a traffic study to the Board of Appeals and the Transportation Planning staff of the Maryland-National Capital Park & Planning Commission, after consultation with the Bradley Boulevard Citizens Association (BBCA), the Burning Tree Civic Association (BTCA), the Office of the People's Counsel (OPC) and Transportation Planning staff as to the parameters of the traffic study. Copies of the study shall be provided to the BBCA, BTCA, and the OPC. In accordance with Section 59-G-2.19(b), the traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton generated traffic at all affected intersections and roadways. Upon receipt of the analysis and comments of the Transportation Planning staff and other interested parties, the Board of Appeals may conduct a public hearing to discuss the study and the analysis and comments of the Transportation Planning staff. Should the Board of Appeals determine that there has been an adverse traffic impact due to the modified uses, then the Board may, after a public hearing, amend the conditions of approval for the modified uses approved in its March 23, 2004 Opinion and Resolution; however, every effort will be made to avoid any reduction in enrollment from the approved level of 665.

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* * *

The Board of Appeals considered the Hearing Examiner's Report and Recommendation at its Worksession on November 29, 2006. The Board also had before it a request from Elsie L. Reid, Esquire and Megan Wallace, Esquire, on behalf of Holton Arms, to present oral argument on the Hearing Examiner's Report and Recommendation. The Board finds the Report and Recommendation thorough and persuasive as to the need for an additional traffic study with revised parameters. However, the Board amends the recommended condition to require submission of the study by no later than **June 1, 2007**. Therefore, on a motion by Catherine G. Titus, seconded by Wendell M. Holloway, with Caryn L. Hines and Donna L. Barron, Vice-Chair in agreement, and Allison Ishihara Fultz, Chair necessarily absent:"

The Holton-Arms School Community Liaison Council discussed and considered how to process such issues as the parameters of the traffic study, the traffic analysis study and findings, the analyses and comments on the study by the Transportation Planning Division of the Maryland-National Capital Park and Planning Commission and the analyses and comments by the Holton-Arms School, the Bradley Boulevard Citizens Association, the Burning Tree Civic Association and this Office.

It was decided that all of the analyses and comments based on Condition 5 would be forwarded to this Office, and that to ensure clarity, fairness and efficiency this Office would forward all the documents to the Board in one submittal. Such is the purpose of this letter.

Please note that all of the documents are listed and attached in chronological order for the convenience of the Board. Accordingly, listed below are all of the analyses and comments pursuant to Condition No. 5:

1. Traffic Study Timeline agreed to on January 23, 2007 by the Community Liaison Council.
   (Attachment 1)

2. Elsie Reid's memorandum of February 13, 2007 transmitting revised Gorove/Slade's Holton-Arms Traffic Study approach of February 13, 2007.
   (Attachment 2)

3. Elsie Reid's e-mail of March 14, 2007 attaching Gorove/Slade Associates' Holton-Arms Traffic Study approach of March 9, 2007.
   (Attachment 3)

4. Board of Appeals Worksession Minutes for Wednesday, May 16, 2007 – item 7 at page 2, "[l]etter from Elsie Reid, Esquire, regarding additional time to submit traffic study."
   (Attachment 4)

5. Board of Appeals resolution, effective June 14, 2007 granting extension of time for submission of traffic report until September 15, 2007.
   (Attachment 5)

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6. Gorove/Slade Traffic Impact Study of July 2, 2007.
(Attachment 6)

7. Gorove/Slade Traffic Impact Study Appendix.
(Attachment 7)

8. Gorove/Slade Supplement to Traffic Impact Study addressing "comments made by representatives of the community at the July 24, 2007 meeting of the Neighborhood Liaison Committee."
(Attachment 8)

9. Burning Tree Civic Association's letter of August 15, 2007 commenting on the Traffic Impact Study.
(Attachment 9)

10. Bradley Boulevard Citizens Association's letter of August 20, 2007 commenting on the Traffic Impact Study.
(Attachment 10)

11. Office of the People's Counsel's letter of August 21, 2007 to the Transportation Planning Division requesting the analysis of the Gorove/Slade Traffic Impact Study. This letter additionally transmitted the comments about the Study from the Burning Tree Civic Association (Attachment 8) and the Bradley Boulevard Citizens Association (Attachment 9) as well as the Board's resolution effective January 5, 2007.
(Attachment 11)

12. Mr. Shahriar Etemadi's letter of August 27, 2007 about when he expected to submit his review and recommendations on the study.
(Attachment 12)

13. Ms. Reid's letter of August 30, 2007, transmitting Study to Board of Appeals before September 15, 2007 deadline, but asking for Board to defer consideration pending receipt of comments from the parties.
(Attachment 13)

14. Mr. Etemadi's review of and comment on the Study dated October 30, 2007.
(Attachment 14)

15. Office of the People's Counsel's letter of November 6, 2007 transmitting Mr. Etemadi's evaluation and comments to the parties and establishing November 30, 2007 as the deadline for submitting comments on Mr. Etemadi's analysis and final comment on the Study.
(Attachment 15)

16. Mr. George Springston's e-mail of November 28, 2007 requesting an additional week (until December 7, 2007) to submit his comments.
(Attachment 16)

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17. Ms. Reid's letter of November 30, 2007 submitting Holton-Arms' comments on Mr. Etemadi's analysis and final comments on the Study. (Attachment 17)

18. Bradley Boulevard Citizens Association's letter of November 30, 2007 commenting on Mr. Etemadi's analysis and submitting final comment on the Study.

    Please note that for the sake of brevity, the People's Counsel has not transmitted Attachment B of this letter. This attachment is the August 20, 2007 letter from the Bradley Boulevard Citizens Association on the Study, which is Attachment 9 above. (Attachment 18)

19. Burning Tree Civic Association's letter of December 7, 2007 commenting on Mr. Etemadi's analysis and submitting final comment on the Study. (Attachment 19)

Should you have any questions in this matter, I would be more than happy to assist you in their resolution.

Respectfully submitted,

Martin Klauber
People's Counsel

Attachments (19)

cc: Linda Kauskay, Esquire (w/o attachments)
Norman Knopf, Esquire (w/o attachments)
Elsie Reid, Esquire (w/o attachments)
George Springston (w/o attachments)
Suzanne Jones (w/o attachments)
Shahriar Etemadi (w/o attachments)

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ATTACHMENT 1

THE HOLTON-ARMS SCHOOL, INC.

Traffic Study Timeline

1. Neighborhood Liaison Committee ("NLC") approves Study scope.
2. Zoning Hearing Examiner ("ZHE") approves Study scope.
3. Gorove/Slade ("G/S") reviews survey design with Joe Cutro.
4. Collect data at 3 intersections.
5. G/S perform trip comparison analysis of traffic counts and trip generation rates.
6. G/S create master simulation.
7. G/S and Joe Cutro go over calibration simulation.
8. NLC review of calibration of simulation - including Norman Knopf.
9. G/S prepares retrospective simulations and performs intersection capacity analysis including queing and safety.
10. Complete draft report and submit to NLC for approval.
11. Finalize study to submit to Maryland-National Capital Park & Planning Commission and ZHE.

The above Traffic Study Timeline was agreed to by the members of the NLC at a meeting held on January 23, 2007.

ATTACHMENT 2

LAW OFFICES

FUREY, DOOLAN & ABELL, LLP
SUITE 1100
8401 CONNECTICUT AVENUE
CHEVY CHASE, MARYLAND 20815-5803
(301) 652-6880
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MICHAEL A. DYMERSKY
JAMES G. NOLAN
ROBERT L. BROWNELL
PATRICK F. GREANEY
LILLIAM L. MACHADO

ROBERT E. GRANT
TANYA CALVELLI BERNSTEIN
MEGAN M. WALLACE
CHARLES S. ABELL
JEANNETTE OWEN ROEGGE
REBECCA L. BIXLER
BRENDAN D. DELANY
L. LAUREL LEA

EGBERT R. FERGUSON, JR.
SUSAN C. BROWN
SAMUEL S.D. MARSH
HAL WITT
OF COUNSEL

February 13, 2007

MEMORANDUM

TO: Neighborhood Liaison Committee

FROM: Elsie L. Reid, Esq., Megan M. Wallace, Esq.

RE: Technical Memorandum of Gorove/Slade

Attached is the revised Technical Memorandum of the The Holton-Arms School's traffic engineers, Gorove/Slade Associates, Inc. ("Gorove/Slade"), describing the parameters of the traffic study commissioned by the School in response to the Board of Appeals' decision adopting the Hearing Examiner's Report. Gorove/Slade drafted the original proposal after consultation with the parties and their traffic engineers (Gorove/Slade representatives: Louis Slade and Rob Schiessel; Joe Cutro for the Bradley Boulevard Citizen's Association ("BBCA"); and Shahriar Etemadi of the Transportation Planning Division of the Planning Department (MNCPPC)) at a meeting on January 3, 2007. The proposal was then reviewed extensively at the Neighborhood Liaison Committee meeting on January 23, 2007 that included representatives of the BBCA, representatives of the Burning Tree Civic Association ("BTCA"), representatives of the School, and Martin Klauber, the People's Counsel. Subsequent to the NLC meeting, additional wording changes, not considered at the NLC meeting, were offered by Linda Kauskay of the BBCA (three submissions).

The School discussed Ms. Kauskay's proposed changes with its traffic engineers and Gorove/Slade has incorporated a number of her suggestions. Not all of Ms. Kauskay's recommended changes nor all those discussed at the January 23 meeting have been incorporated by Gorove/Slade because of its concerns that the integrity of its professional analysis and reporting is, or may be, compromised by some of the changes proffered, or simply because some suggestions were already included.

The School is concerned that, in a laudable desire to achieve consensus on the parameters of the traffic study, all participants, including representatives of the School, are trying to specify in lay language what is ultimately a technical proposal, and that no matter how well intended it is better to rely on the expert's lexicon and expertise. The elements called for by the Hearing Examiner, and belabored by all members of the NLC, are addressed in this technical proposal made by the School's expert for the School to submit at the School's considerable expense.

Gorove/Slade will present its final report to the NLC explaining its analysis and methods as well as its conclusions. This presentation will occur before the report is submitted to MNCPPC and the BOA, as the NLC contemplated. The Gorove/Slade final report cannot become a "report by committee"; if it were, its integrity as an expert report would be undermined. The authorship of the report and the professional role of Gorove/Slade in signing the report must be respected.

We have reserved Tuesday, Feb. 20 from 4:00 p.m. until 6:00 p.m. to meet with the NLC if representatives of the NLC reasonably believe there are misunderstandings about the parameters which still need to be resolved. Please let Megan Wallace know by e-mail (mmw@fdalaw.com) or phone (301) 652-6880 by 10:00 a.m., Thursday morning, Feb. 15, if a meeting is desirable so that the School can attempt to notify all members of the NLC. Following such meeting, or if the February 20 meeting is not required, the School plans to proceed to engage Gorove/Slade to conduct the study so that the data collection can be accomplished in a timely manner. Per Ms. Kauskay, the BBCA has agreed to the completion of the study before the traffic light is installed at Burdette Road.

GOROVE/SLADE ASSOCIATES, INC.
1140 Connecticut Ave / Suite 700 / Washington, DC 20036

TECHNICAL MEMORANDUM

TO: Elsie Reid

FROM: Jeff Price, Louis Slade, Robert Schiesel

DATE: February 13, 2007

SUBJECT: Holton-Arms traffic study approach

PURPOSE OF STUDY

The goal of this traffic study is to determine whether Holton generated traffic has changed as a result of the modifications to enrollment and programs (including after-hours programs) so as to adversely impact the community. The traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton generated traffic at all affected intersections and roadways. See pp. 47-48 of Hearing Examiner's Report dated November 9, 2006 re: CBA-1174-D.

SUMMARY OF STUDY

This study scope reflects our efforts to date in participating in meetings with representatives of the community on January 3rd and January 23rd, reviewing background information and developing the study parameters.

The Holton-Arms traffic study products will include the following:

1. Data collection at and between the intersections of River and Beech Tree/Nevis Roads, River Road and Royal Dominion Drive and River and Burdette Roads ("Study Intersections").
2. A comparison of the hour-by-hour traffic counts and trip generation rates for vehicles arriving at and leaving the Holton-Arms campus before and after the approval of the modifications, based on studies performed in 2003, 2005 and 2007.
3. Intersection capacity analyses for the Study Intersections.
4. A description of non-school related activities.
5. Simulation study that augments field observations of pre-modification traffic conditions and permits analysis of travel time and queuing before and after implementation of the modifications at and approaching the Study Intersections.
6. A safety analysis for the Study Intersections including comparisons with similar data along the River Road corridor from Burdette Road to Springfield Road.
7. Assessment of measured intersection delay at the River and Holton-Arms/Royal Dominion intersection.

STUDY TIMELINE

The Holton-Arms traffic study timeline will be as follows:

1. Neighborhood Liaison Committee ("NLC") approves study scope.
2. Gorove/Slade ("G/S") discusses data collection design with Joe Cutro.
3. Collect data at Study Intersections.
4. G/S performs trip comparison analysis of traffic counts and trip generation rates.
5. G/S creates master simulation based on traffic counts, travel time/measured delay and queues.
6. G/S and Joe Cutro go over calibration of simulation to review relevant technical information.
7. G/S prepares retrospective simulations and performs intersection capacity analysis including travel time/delay, queuing and safety analyses.
8. Complete report and present to NLC.
9. Submit report to Maryland-National Capital Park & Planning Commission and Board of Appeals.

The detailed scope of the Holton-Arms traffic study is summarized below:

DATA COLLECTION

Traffic Counts

We will conduct turning movement counts, including counts of both vehicles and pedestrians for a period of 16 hours, from 5 a.m. to 9 p.m., on a typical school day that includes regular after school programs at the intersection of River Road and the Holton-Arms entrance. The turning movement counts will be conducted according to industry standards and in general accordance with the Institute of Traffic Engineers, Traffic Engineering Handbook's chapter on Traffic Studies. We will conduct turning movement counts in 15 minute intervals, including counts of both vehicles and pedestrians from 6:30-9 a.m. and 2:30-7 p.m. on a typical school day that includes regular after school programs at the intersections of River Road and Beachtree Rd/Nevis Rd and River Road and Burdette Rd.

Observations

During the turning movement counts, we will videotape the intersection of River Road and Holton-Arms, focusing on queuing on River Road. Average queue lengths will be observed along Study Intersections. During peak periods of queuing, the number of cars stacking in turning lanes into Holton-Arms will be counted. In addition, turning movements of vehicles and pedestrian crossings into and out of the school will be observed, noting any concerns or problems, including those related to pedestrian and vehicular safety. Travel time/delay studies will also be conducted during the peak periods to determine a baseline travel-time along Study Intersections.

ANALYSIS

Compare Trip Generation

We will prepare a comparison study ("Study") that looks at actual numbers of trips and trip generation rates. The Study will compare the hour-by-hour traffic counts and trip generation rates arriving and leaving the campus, for the Holton-Arms School before the modifications in October 2003 and after the modifications in May 2005 based on hours that have significant differences. The purpose of this Study is to determine where to focus further analysis if warranted. This approach will count all trips to the site whether school related or "nonschool" and "after school" activities.

Prepare Description of Non-School Related Activities

In addition there will be a description of the non-school and after school activities at the site. The trip generation will be examined and an attempt will be made to distinguish between on-going activities and those that are not, recognizing that activities at the site overlap.

Prepare Simulations for Travel Time and Queuing Analysis

We will be using the industry standard Synchro Traffic Signal Coordination Software, a commonly used traffic engineering tool, to prepare simulations for the Study Intersections. These multiple Synchro simulations take into account variations that occur randomly in normal traffic conditions, including speed, response times, u-turns, aggressive driving, etc. Initial simulations of current conditions will be run, and the calibrations of the program will then be adjusted with field observations to ensure that the simulations accurately mimic current traffic conditions of the locations under study.

The current traffic counts inputs will then be replaced by traffic counts taken before the modifications were implemented. Operating on the assumption that driving patterns have remained roughly the same, the program will then generate simulations of traffic conditions prior to the modification, including travel times and queuing. These simulations will provide comparative data that was not collected in the pre-modification traffic studies. The program is capable of running hundreds of simulations using random variables and generating an "average" picture of the conditions that would have existed.

The proposal is to run these simulations for those time periods in which the comparison study indicates there have been "significant" changes, since the implementation of the modifications, in either traffic counts or trip generation rates, or, in the event there is no consensus on these time periods, for the peak hours for both the Holton-Arms site and Total Traffic for a total of 4 hours. Based on the previous traffic study, the Holton-Arms traffic AM Peak Hour is expected to be 7:15 - 8:15 AM and the PM Peak Hour is expected to be 3:00 - 4:00 PM. The Total Traffic AM Peak Hour is expected to be 7:30 - 8:30 AM and the PM Peak Hours is expected to be 5:15 - 6:15 PM.

Intersection Capacity Analysis

Intersection Capacity Analysis will be prepared to standard Montgomery County Critical Lane Volume analysis as well as Highway Capacity Manual analysis for the Study Intersections before and after the modifications.

Prepare Safety Analysis

A safety analysis will be prepared for Study Intersections, with specific incidents and details to be listed for both pedestrian and vehicular usages as available. Crash data will be collected from Maryland State Highway Administration for years 2003, 2004 and 2005 and will be compared to similar data along the River Road corridor from Burdette Road to Springfield Road.

DOCUMENTATION

A technical memorandum will summarize our data collection efforts and analyses.

MEETINGS

Attendance at work sessions, conference calls, and/or public meetings will occur as needed.

ATTACHMENT 3

Klauber, Martin

From: Elsie Reid [elr@fdalaw.com]

Sent: Wednesday, March 14, 2007 8:02 AM

To: ljslade@gsatrans.com; mala.kaus@verizon.net; Klauber, Martin; jdsmolen@smolenplevy.com; gspring@olg.com; shariar.etemadi@mncppc-mc.org; jcutro@worldnet.att.net; knopf@knopf-brown.com; dcaterini@aol.com; Diana Coulton Beebe; Elsie Reid; Janice Demare; John Wintrol; Kim Samperton; Megan M. Wallace; Rich Esposito (Rich Esposito)

Cc: rbs@goroveslade.com; jeff.price@goroveslade.com; Megan Wallace

Subject: Gorove/Slade Technical Proposal for Traffic Study/Condition # 5 of BOA Opinion

Dear All:

I am attaching to this message, a "PDF" of the Gorove/Slade final proposal to perform a traffic study responsive to the Board of Appeals recent decision which was based upon the Zoning Hearing Examiner's Report concerning Condition # 5 of the March 2004 modifications to Holton-Arms special exception.

As you will see, this proposal incorporates the matters discussed at three meetings with representatives of the Neighborhood Liaison Committee in which the traffic engineer for BBCA, Joe Cutro, also participated. Norman Knopf, counsel to BBCA, also participated in person at the first meeting and then in consultation with Linda Kauskay at the next two sessions. George Springston attended the last two of the three meetings, and in one meeting he was joined by Dino Caterini, for BTCA. Mr. Klauber attended all three meetings. Shahriar Etemadi of the Planning Board Transportation Planning Division attended the first two meetings and received, as did other members of the NLC, the draft proposals as they were circulated for group comment. Representatives of the school, its traffic engineers, Gorove/Slade, and its counsel, hosted all three meetings.

As a result the scope of the study as initially conceived by the school's traffic engineers has been revised, refined, and supplemented per the discussions of the group so as to evolve into this final version. Of particular importance is that, following the last meeting of the NLC, the school agreed to include, at the specific request of BBCA and its expert Mr. Cutro, an "intersection delay analysis" per the general description provided by Mr. Cutro even though it is not, in the school's engineers' view, necessary, in light of the other analytical tools being employed, to address the traffic impact issues pertinent to the modifications.

Given the agreement reached at our last group meeting, the school now will proceed with the study. It is Holton's express assumption that all the members of the NLC, and in particular, the BBCA and BTCA have, as stated at the meeting, approved of the traffic study parameters, especially now that the school has agreed to include the additional delay study. Gorove/Slade is mobilizing for the data collection phase of the study.

Thanks to everyone for participating in this consultative phase.

With regards,

Elsie Reid

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GOROVE/SLADE ASSOCIATES, INC.
1140 Connecticut Ave / Suite 700 / Washington, DC 20036
Toll Free: 888.212.4242
Phone: 202.296.8625
Fax: 202.785.1276

MEMORANDUM

DATE: March 9, 2007

TO: Kim Samperton
Richard Esposito
Diana Coulton Beebe

CC: Elise Reid
Megan Wallace

FROM: Louis Slade
Robert Schiesel
Jeff Price

SUBJECT: Holton-Arms traffic study approach

PURPOSE OF STUDY

The goal of this traffic study is to determine whether Holton generated traffic has changed as a result of the modifications to enrollment and programs (including after-hours programs) so as to adversely impact the community. The traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton generated traffic at all affected intersections and roadways. See pp. 47-48 of Hearing Examiner's Report dated November 9, 2006 re: CBA-1174-D.

SUMMARY OF STUDY

This study scope reflects our efforts to date in participating in meetings with representatives of the community on January 3rd, January 23rd and February 20th, reviewing background information and developing the study parameters.

The Holton-Arms traffic study products will include the following:

1. Data collection at and between the intersections of River and Beech Tree/Nevis Roads, River Road and Royal Dominion Drive and River and Burdette Roads ("Study Intersections").
2. A comparison of the hour-by-hour traffic counts and trip generation rates for vehicles arriving at and leaving the Holton-Arms campus before and after the approval of the modifications, based on studies performed in 2003, 2005 and 2007.

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3. Intersection capacity analyses for the Study Intersections.
4. A description of non-school related activities.
5. Simulation study that augments field observations of pre-modification traffic conditions and permits analysis of travel time and queuing before and after implementation of the modifications at and approaching the Study Intersections.
6. A safety analysis for the Study Intersections including comparisons with similar data along the River Road corridor from Burdette Road to Springfield Road.
7. Assessment of measured intersection delay at the River and Holton-Arms/Royal Dominion intersection.

STUDY TIMELINE

The Holton-Arms traffic study timeline will be as follows:

1. Neighborhood Liaison Committee ("NLC") approves study scope.
2. Gorove/Slade ("G/S") discusses data collection design with Joe Cutro.
3. Collect data at Study Intersections.
4. G/S performs trip comparison analysis of traffic counts and trip generation rates.
5. G/S creates master simulation based on traffic counts, travel time/measured delay and queues.
6. G/S and Joe Cutro go over calibration of simulation to review relevant technical information.
7. G/S prepares retrospective simulations and performs intersection capacity analysis including travel time/delay, queuing and safety analyses.
8. Complete report and present to NLC.
9. Submit report to Maryland-National Capital Park & Planning Commission and Board of Appeals.

The detailed scope of the Holton-Arms traffic study is summarized below:

DATA COLLECTION

Traffic Counts

We will conduct turning movement counts in fifteen minute intervals, including counts of both vehicles and pedestrians, at the intersection of River Road and the Holton-Arms entrance, from 5 a.m. to 9 p.m., on a typical school day that includes regular after school programs. The turning movement counts will be conducted according to industry standards and in general accordance with the Institute of Traffic Engineers, Traffic Engineering Handbook's chapter on Traffic Studies. We will conduct turning movement counts in 15 minute intervals, including counts of both vehicles and pedestrians, at the intersections of River and Beech Tree/Nevis Roads and River and Burdette Roads, from 6:30 a.m. to 9 a.m. and 2:30 p.m. to 7 p.m. on a typical school day that includes regular after school programs.

Observations

During the turning movement counts, we will videotape the intersection of River Road and Holton-Arms, focusing on River Road queues to ensure that eastbound and westbound queue lengths are captured during recording. During peak periods of queuing, the number of cars stacking in both turning lanes into Holton-Arms will be counted. If the number of cars exceeds the capacity of the turning lanes, the frequency and duration of such

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occurrences will be recorded and noted in the traffic study analysis. In addition, turning movements of vehicles and pedestrian crossings into and out of the school will be observed, noting any concerns or problems, including those related to pedestrian and vehicular safety. Vehicle queue lengths from the Burdette Road approach will be recorded for each signal cycle at the intersection of River Road and Burdette Road between 7:15 and 8:30 a.m. and between 3:00 and 4:00 p.m. Vehicle queue lengths from the eastbound River Road left-turn movement and the southbound Beechtree Road movement will be recorded for each signal cycle at the intersection of River Road and Beechtree Road between 7:15 and 8:30 a.m. and between 3:00 and 4:00 p.m. Finally, a study of travel time and delay will be conducted during peak periods to determine eastbound and westbound travel times along River Road through the Study Intersections.

ANALYSIS

Compare Trip Generation

We will prepare a comparison study ("Study") that looks at actual numbers of trips and trip generation rates. The Study will compare the hour-by-hour traffic counts and trip generation rates arriving and leaving the campus, for the Holton-Arms School before the modifications in October 2003 and after the modifications in May 2005 based on hours that have significant differences. The purpose of this Study is to determine where to focus further analysis if warranted. This approach will count all trips to the site whether school related or "nonschool" and "after school" activities.

Intersection Delay Study

Videotaped data and queue measurements from the River Road/Holton-Arms intersection will be used to measure stopped delay between 7:15 and 8:30 a.m. and between 3:00 and 4:00 p.m. in general accordance with procedures outlined in the Institute of Traffic Engineers' Manual of Transportation Engineering Studies (1994 ed.) and an email from Joe Cutro to Jeff Price dated February 23, 2007 (2:16 p.m.).

Prepare Description of Non-School Related Activities

In addition there will be a description of the non-school and after-school activities at the site. The trip generation will be examined and an attempt will be made to distinguish between on-going activities and those that are not, recognizing that activities at the site overlap.

Prepare Simulations for Travel Time and Queuing Analysis

We will be using the industry standard Synchro Traffic Signal Coordination Software, a commonly used traffic engineering tool, to prepare simulations for the Study Intersections. These multiple Synchro simulations take into account variations that occur randomly in normal traffic conditions, including speed, response times, u-turns, aggressive driving, etc. Initial simulations of current conditions will be run, and the calibrations of the program will then be adjusted with field observations to ensure that the simulations accurately mimic current traffic conditions of the locations under study.

The current traffic counts inputs will then be replaced by traffic counts taken before the modifications were implemented. Operating on the assumption that driving patterns have remained roughly the same, the program will then generate simulations of traffic conditions prior to the modification, including travel times and queuing. These simulations will provide comparative data that was not collected in the pre-modification traffic studies. The program is capable of running hundreds of simulations using random variables and generating an "average" picture of the conditions that would have existed.

The proposal is to run these simulations for those time periods in which the comparison study indicates there have been "significant" changes, since the implementation of the modifications, in either traffic counts or trip generation rates, or, in the event there is no consensus on these time periods, for the peak hours for both the Holton-Arms site and Total Traffic for a total of 4 hours. Based on the previous traffic study, the Holton-Arms traffic AM Peak Hour is expected to be 7:15 - 8:15 AM and the PM Peak Hour is expected to be 3:00 - 4:00 PM. The Total Traffic AM Peak Hour is expected to be 7:30 - 8:30 AM and the PM Peak Hours is expected to be 5:15 - 6:15 PM.

Intersection Capacity Analysis

Intersection Capacity Analysis will be prepared to standard Montgomery County Critical Lane Volume analysis as well as Highway Capacity Manual analysis for the Study Intersections before and after the modifications. Use of data from the simulations will be noted.

Prepare Safety Analysis

A safety analysis will be prepared for Study Intersections, with specific incidents and details to be listed for both pedestrian and vehicular usages as available. Crash data will be collected from Maryland State Highway Administration for years 2003, 2004 and 2005 and will be compared to similar data along the River Road corridor from Burdette Road to Springfield Road.

DOCUMENTATION

A technical memorandum will summarize our data collection efforts and analyses.

MEETINGS

Attendance at work sessions, conference calls, and/or public meetings will occur as needed.

Sincerely,

Jeff A. Price
Project Manager

Louis J. Slade, P.E.
Principal

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ATTACHMENT 4

BOARD OF APPEALS
for
MONTGOMERY COUNTY

Stella B. Werner Council Office Building
100 Maryland Avenue
Rockville, Maryland 20850
(240) 777-6600

WORKSESSION MINUTES

Second Floor Davidson Memorial Hearing Room

Wednesday, May 16, 2007, 9:30 a.m.

ACTION ITEMS:

1. **Minutes**, May 2, and May 9, 2007 Worksessions.

   Action: Approved, (CLH/WMH, 4-0).

2. **A-6114, Appeal of Newland Communities LLC and NNP Clarksburg LLC** (administrative appeal). Letter from Todd D. Brown, Esquire, giving status report concerning Clarksburg Town Center.

   Action: (1) Re-opened the record to include the letter from Mr. Brown; (2) next status report due 10/1/07, (CGT/CLH, 4-0).

3. **A-6117, Petition of Mary Hemingway and Edward Purich for Cloverly Civic Association** (administrative appeal). Order from Montgomery County Circuit Court.

   Action: (1) Board will execute the Order from the Circuit Court; (2) remand the appeal to the Department of Permitting Services (DPS) to consider the evidence regarding the age, condition and flooring of the structure, (CGT/CLH, 4-0).

4. **A-6196, Petition of Joy M. Leong** (administrative appeal Building Permit #429156). Letter to the Board from Joy Leong withdrawing the appeal.

   Action: Dismissed the administrative appeal as withdrawn, (CLH/DLB, 4-0).

5. **A-6209, Petition of Laura S. Gajardo** (administrative appeal). Letter from Laura S. Gajardo withdrawing the appeal and requesting a refund of the filing fee.

   Action: (1) Dismissed the administrative appeal as withdrawn; (2) refund 100% ($200.00) of the filing fee, (DLB/CGT, 4-0).

6. **CBA-748 [S-612, S-612-A, S-749, S-2238], Petition of Stephen Benedek** (commercial riding stable and summer day camp). Letter to the Board from

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Stanley Abrams, Esquire, submitting revised site plan in support of administrative modification request. (Large Exhibit: Site Plan). [W/S 4/4/07]

Action: (1) Re-opened the record to include the letter from Mr. Abrams; (2) adopted the revised special exception site plan; (3) granted the administrative modification, (CLH/CGT, 4-0).

7. **CBA-1174-D, [S-2503-A, S-2467-A], Petition of Holton Arms School** (special exception modification to allow extension of hours of operation). Letter from Elsie Reid, Esquire, requesting additional time to submit traffic study.

   Action: Granted the extension of time for submission of the traffic study until 9/15/07, (CGT/CLH, 4-0).

8. **S-274-C, Petition of Suburban Hospital, Inc,** (hospital). Letters to the Board from Barbara Sears, Esquire, and Erin Girard, Esquire, requesting administrative modification. (Large Exhibits: Elevation, Floor Plan, Roof Plan).

   Action: Re-opened the record to include the letter from Ms. Sears and Ms. Girard. Item deferred for future Worksession, consensus.

9. **S-525, Petition of Allegheny Power** (public utility structure). Letter from Mathew Szekely, Project Engineer, requesting an administrative modification. (Large Exhibit: Proposed Substation Drawing).

   Action: (1) Re-opened the record to include the letter from Mr. Szekely; (2) adopted the substation drawing; (3) granted the administrative modification, (CLH/DLB, 4-0).

10. **S-700, Petition of Fyock** (home occupation – dog grooming). Memorandum to the Board from Heather Gottke, Zoning Inspector, requesting a Show Cause Hearing for abandonment.

    Action: Schedule Show Cause Hearing, (DLB/CGT, 4-0).

11. **S-2184, Petition of Charles R. Gilbert** (indoor shooting range). Board has received additional information from Mr. Gilbert regarding co-holders of the special exception.

    Action: (1) Re-opened the record to include the letter from Mr. Gilbert; (2) granted the transfer of the special exception; (3) sales at special exception site are limited to members only; (4) no internet sales are permitted, (WMH/CLH, 4-0).

12. **S-2480, Petition of Connie Lucas** (construction and operation of group home). Letter from Connie Lucas requesting an extension of time to implement special exception.

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Action: Granted extension of time until 4/18/08, (CGT/CLH, 4-0).

13. **S-2668, Petition of Taiwan Culture Center** (service organization). Letter from Tai L. Huang, President, with information on membership of the Community Liaison Council.

    Action: Re-opened the record to include the letter from Mr. Huang with attachments (DLB/WMH, 4-0).

DECISION ITEMS:

14. **A-6203, Petition of Albert Pearce** (variance - one-story addition). Board has received additional information from Department of Permitting Services (DPS).

    Action: (1) Opened record to include the information from DPS; (2) granted the variance request, (CGT/WMH, 4-0).

15. **S-2690, Petition of Katco Investments RLLLP** (non-residential professional office). Hearing Examiner's Report and Recommendation.

    Action: (1) Adopted the Hearing Examiner's Report and Recommendation; (2) granted the special exception with all conditions as recommended by the Hearing Examiner, (DLB/WMH, 4-0).

PENDING ITEMS:

16. **A-6114, Appeal of Newland Communities LLC and NNP II – Clarksburg LLC** (Department of Fire and Rescue Services – Notice of Violation dated September 20, 2005). Second Status Report from Todd Brown, Esquire. (1) Re-opened the record to include the Second Status Report from Todd Brown; (2) the Board will receive Status Reports on 1/15/07 and 4/1/07. [W/S 10/25/06]. (1) Re-opened the record to include the status report from Mr. Brown; (2) Mr. Brown to provide a status/progress report to BOA at its 5/2/07 Worksession. [2/28/07].

17. **A-6190, Appeal of Amanda Enterprises, LLC** (Department of Permitting Services – Notice of Violation dated November 13, 2006 and Use and Occupancy Certificate No. 250849). BOA to receive a status report from the appellant by 6/15/07. [Pre-hearing Conference on 3/14/07].

18. **A-6193, Petition of Roy Glixon** (accessory structure/swimming pool). Record will be open for 30 days to provide a corrected notice. Hearing held 4/27/07.

PENDING ITEMS (continued):

19. **A-6203, Petition of Albert J. Pearce** (one-story addition). Record closed at the public hearing. Decision at Worksession. Hearing held. 4/27/07.

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20. **CBA-470-A, Petition of Kensington Nursery School** (private educational institution). Item deferred for the site plan required in Condition No. 3 of the Hearing Examiner's Report and Recommendation. [W/S 5-31-06]. (1) Re-opened the record to include Mr. Smith's letter; (2) record will remain open until 5/15/07 to receive the required site plan; (3) administrative modification will be dismissed upon non-receipt of the required site plan after 5/17/07. [W/S 4/18/07].

21. **CBA-748 [S-612, S-612-A, S-749, S-2238], Petition of Stephen Benedek** (commercial riding stable and summer day camp). Letter to the Board from Stanley Abrams, Esquire, requesting an administrative modification. (Large exhibits: partial zoning vicinity map, site plan, survey plat). Item deferred for a revised site plan. [W/S 4/4/07].

22. **S-232, Petition of R. P. Patton & Sons, Inc.** (horticultural nursery and commercial greenhouse). Letter to the Board from Melvin Laney requesting an inspection of the special exception and a public hearing. (1) Re-opened the record to include the letter from Mr. Laney; (2) Board to request DPS to inspect the special exception and provide the Board with an inspection report. [W/S 4/18/07].

23. **S-390, Petition of Twin Farms Club, Inc.** (community swimming pool). Letter to the Board from Teresa A. McKenna, President, requesting an administrative modification. (Large exhibit: site and grading plan). (1) Item deferred for receipt of a site plan with the existing conditions; (2) item referred to M-NCPPC Technical Staff for review of administrative modification request. [W/S 2/18/04].

24. **S-671, Petition of Randolph Associates** (off-street parking). Letter from Ronald Bolt, Esquire, notifying the Board of the change in zoning for the special exception and requesting a transfer of the special exception. (1) Granted the transfer of the special exception; (2) Board to be notified by the petitioner by 6/10/07 that all violations have been abated; (3) DPS to inspect to determine if a Show Cause Hearing will be required. [W/S 4/18/07].

25. **S-2328, Petition of Judith Hiramalfarb** (accessory apartment). Letter to the Board from Ariel De notifying the Board that the special exception has been abandoned and requesting that it be revoked. Item deferred until confirmation that the accessory apartment's kitchen has been removed. [W/S 7/26/06].

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Board Members

Allison Ishihara Fultz, Chair - ABSENT
Donna L. Barron, Vice Chair
Wendell M. Holloway
Caryn L. Hines
Catherine G. Titus

Staff

Barbara Jay, Associate County Attorney
Katherine Freeman, Executive Director
Hermene Jones, Administrative Specialist

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ATTACHMENT 5

BOARD OF APPEALS
for
MONTGOMERY COUNTY

Stella B. Werner Council Office Building
100 Maryland Avenue
Rockville, Maryland 20850
(240) 777-6600
www.montgomerycountymd.gov/content/council/boa/board.asp

Case No. CBA-1174-D

PETITION OF HOLTON ARMS SCHOOL

RESOLUTION TO RE-OPEN THE RECORD
(Resolution Adopted May 16, 2007)
(Effective Date of Resolution: June 14, 2007)

The Board of Appeals has received a letter, dated May 1, 2007, from Elsie L. Reid, Esquire, on behalf of the Holton Arms School. Ms. Reid requests an extension of time to submit the new traffic report pertaining to modifications approved in the Board's March, 2004 opinion, which the Board required in a Resolution effective January 5, 2007. Ms. Reid requests that the deadline for delivery of the report be extended from June 1, 2007 to September 15, 2007. Ms. Reid informs the Board that the study is well underway, but that additional time is needed to complete the report. She advises that she has contacted representatives of Bradley Boulevard Citizens Association, Burning Tree Civic Association, and the Neighborhood Liaison Council, and had received a telephone message from the Bradley Boulevard Citizens Association representative that that association does not object to an extension of time. Megan Wallace, Esquire appeared at the Worksession on behalf of Holton Arms, and further informed the Board that the traffic study was concluded in March, and that what remains to be accomplished, including coordination with the Community Liaison Council and the Peoples' Counsel, is finalization of the report.

The subject property is Lot N-624, Parcel 2, and Part of Lots 6 and 7, Outlot A, Block B, Burning Tree Valley Subdivision, located at 7303 River Road, Bethesda, Maryland, in the R-90 and R-200 Zones.

The Board of Appeals considered Ms. Reid's letter at its Worksession on May 16, 2007. The Board finds that the request for additional time to complete the traffic report is reasonable. Therefore, on a motion by Catherine G. Titus, seconded by Caryn L. Hines, with Wendell M. Holloway and Donna L. Barron, Vice-Chair in agreement and Allison Ishihara Fultz, Chair, necessarily absent:

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ATTACHMENT 6

Traffic Impact Study

FINAL

Holton-Arms School

7303 River Road, Bethesda, Maryland

July 2, 2007

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Prepared For:
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EXECUTIVE SUMMARY

The Holton-Arms School commissioned this study to satisfy a condition imposed by the Board of Appeals for an additional traffic study to be made in connection with certain modifications to three special exceptions held by the school, modifications approved by the Board in March of 2004. It is intended to comply with such traffic condition, which incorporates the requirements of Section 59-G-2.19(b) of the Zoning Ordinance relative to private educational institutions. As a result, this study for the Holton-Arms School is unusually comprehensive and detailed. It is much more extensive in scope than the standard adequate public facilities local area review that is customarily required in Montgomery County. The Holton-Arms School and its consultants engaged in seven hours of discussions with the Neighborhood Liaison Committee (NLC) and their consultant to develop the detailed scope of work for this study.

The study includes data collection which involves:

- Sixteen (16) hours of traffic counting at the intersection of River Road at Holton-Arms School;
- Videotaping, queue length recording, and other observations at the intersection of River Road at Holton-Arms School;
- Similar surveys of traffic counts and observations covering the commuter peak time periods at:
  - River Road at Burdette Road (the next major intersection to the west);
  - Beach Tree and Nevis Road intersection with River Road (to the east); and
- At the specific request of the neighborhood, travel time surveys were conducted by driving both directions of the 0.6 mile section of River Road through the above three intersections and measuring the duration of a sample of trips.

Detailed studies include:

- Analyses of all of the collected traffic and queuing data;
- Holton-Arms trip generation;
- Special estimates of delay for stopped vehicles;
- Safety analysis of accident data; and,
- Computer simulations of traffic flows were created to overcome lack of data for pre-modification conditions. Pre-modification reflects the traffic condition from 2003, Post-modification reflects 2007 traffic conditions.

Study Results:
The results are summarized below and, for the reader's convenience, in Table 1. The findings of these studies provide an excellent set of data to answer the questions outlined in the hearing examiner's findings. Detailed comparisons of the data collected in 2007 were made with data collected during other surveys in 2003 and 2005. These comparisons show:

- The Holton-Arms School has generated an almost identical volume of traffic in 2003, 2005 and 2007 on a total daily basis (for 16 hours), on a peak period basis (2 ½ hours in the morning and 2 hours in the afternoon), and on a morning peak hourly basis.

- Only during the afternoon school peak hour was there identified a significant difference in the number of vehicle trips. This difference is not a result of traffic increases, but is due to a programmatic administrative change

made at the school in 2006 to improve the learning curriculum for students. The consolidation of certain activities at the school resulted in setting uniform starting and ending times for the entire school. Thus, while the school generates no significant additional traffic on a daily basis or on a peak period basis, there is an increased concentration in traffic that causes higher traffic levels for a brief period within the peak hour. This was measurable by our surveys and we were able to estimate the impact of it using intersection capacity analysis.

- This programmed concentration of afternoon departures results in negligible impacts on River Road through traffic because the timing of the Holton-Arms traffic signal is set by the State Highway Administration to favor that traffic movement. The Highway Capacity Manual (HCM) analysis provides delay estimates for each of the movements at a signalized intersection. Our HCM analysis shows that during the peak hours, traffic conditions on River Road and on Royal Dominion Drive are unchanged in 2007 as compared with the pre-modification data in the years for which data are available. The traffic signal timing at River Road intersections favors the through movements on River Road at the expense of greater delays on the cross streets and the Holton-Arms campus entrance. Thus, the increase in the afternoon peak Holton-Arms traffic only impacts delays to Holton-Arms motorists who are delayed at their departure onto River Road. The modifications have no measurable impact on the River Road through traffic.

Conclusions:

- The findings of this study show that the Holton-Arms traffic operates fully within reasonable limits and that there have been no significant increases in traffic generation.
- Holton-Arms traffic queuing on River Road and on the Holton-Arms campus is well contained within the roadway turn lanes. The Holton-Arms traffic queue turning left into the campus from River Road neared the capacity of the left turn lane during a fifteen minute period in the Holton AM Peak Hour.
- The results of all the analysis are consistent with logic and intuition with a couple of exceptions. We believe that those inconsistent results are simply a matter of the randomness of traffic conditions that are simulated with the software we used for the analysis.

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Executive Summary Table

River/Holton Intersection

Metric	Conclusion	Notes	Table #
Holton Trip Generation - Peak Hour	No significant impact. Only measured impact on Holton PM traffic	0.9% incr AM peak. 13.5% incr PM peak due to change in school schedule to create consistent starting/ending time for all grades	4
Holton Trip Generation - Daily & Peak Periods	No significant impact	Daily - Total 16-Hour Counts are only 0.3% incr. Peak Periods - 5.9% incr AM, (4.4)% decr PM	5
Holton % of Traffic During Holton Peak Hours	No significant impact	1% point incr peak AM, 2% point incr peak PM	6A
Holton % of Traffic During Total Traffic Peak Hours	No significant impact	1% point incr peak AM, no base 2003 data for peak PM, overall 8% of PM traffic	6B
Safety	No significant impact	Decrease in accidents from 2003 to 2005	Page 16
Simulation Stopped Delay (overall)			
- Holton Traffic Peak Hour	No significant impact	1.2 second incr in AM peak and 0.8 second incr in PM peak	11
- Total Traffic Peak Hour	Varied impact	14.8 second incr in AM peak and 3.3 second incr in PM peak	12
Simulation Max Queues			
- Holton Traffic Peak Hour	Varied impact	AM peak: 3 of 4 approaches had only 1 car incr or decr. WB approach incr by 18 cars due to school schedule change PM peak: 3 of 4 approaches had range of 1 car incr to 7 car decr. WB approach incr by 34 cars due to school schedule change	11
- Total Traffic Peak Hour	Varied impact	AM peak: 3 of 4 approaches had range of 1 to 2 car incr/decr. WB approach incr by 39 cars PM peak: 3 of 4 approaches had range of 1 to 2 car incr/decr. WB approach incr by 48 cars	12
Simulation CLV			
- Holton Traffic Peak Hour	No significant impact	AM and PM peak slight increases (1.0%- 4.8%). Both still under present CLV standard of 1600	13
- Total Traffic Peak Hour	Varied impact	AM peak: slight increase (1.5%). Pre- and Post-mod still slightly above present CLV standard of 1600 (Note: Pre- and Post mod would be below prior '04 CLV standard of 1650) PM peak: increase of 10%. Still under present 1600 CLV standard	14
Simulation HCM- Delay and LOS (overall)			
- Holton Traffic Peak Hour	No significant impact. No significant impact. Only measured impact on Holton PM traffic	AM peak: 0.2 second incr, LOS no change PM peak: 3 of 4 approaches range from 5 sec incr to (4) sec decr. SB Holton on campus incr by 187 sec due to school schedule change. LOS B to C	15
- Total Traffic Peak Hour	No significant impact	AM peak: 1.8 second incr, LOS no change, PM peak: 2.9 second incr, LOS no change	16

River/Burdette Intersection

Metric	Conclusion	Notes	Table #
Safety	No significant impact	Decrease in accidents from 2003 to 2005.	Page 16
Simulation Stopped Delay	No significant impact	Holton peak (overall): (13) sec decr in PM; Total traffic peak (overall): 3.8 sec incr in PM	11, 12
Simulation Max Queues	No significant impact	Holton peak: (1) car decr in PM; Total traffic peak: SB Burdette incr in PM	11, 12
Simulation CLV	No significant impact	Holton and Total traffic peak: Both slight increase in CLV. Both still under present 1600 CLV standard	13, 14
Simulation HCM (Delay and LOS)	No significant impact	No change Holton peak LOS. Slight change Total traffic PM	15, 16

River/Beech Tree Intersection

Metric	Conclusion	Notes	Table #
Safety	No significant impact	Decrease in accidents from 2003 to 2005.	Page 16
Simulation Stopped Delay	No significant impact	Holton and Total traffic peaks (overall): slight incr/decr	11, 12
Simulation Max Queues	No significant impact	Holton and Total traffic peaks (overall): minor incr/decr	11, 12
Simulation CLV	No significant impact	Holton and Total traffic peak: Both slight increase in CLV. Both still under present 1600 CLV standard	13, 14
Simulation HCM (Delay and LOS)	No significant impact	Holton and Total traffic peak: Both slight incr/decr. No change in LOS	15, 16

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Key Findings From Data Collection

- There has been no significant change in Holton-Arms traffic resulting from modifications. The Holton-Arms School generates a small fraction of the total traffic on all approaches entering its intersection with River Road, and this trend has remained consistent from 2003 to 2007.

- Holton-Arms traffic peaks occur before the River Road commuter traffic peaks. The morning Holton-Arms peak precedes commuter peak by ½ hour. In the afternoon, the Holton-Arms peak precedes the commuter peak by 1 hour 45 minutes.

- There is a negligible amount of pedestrian traffic passing through the intersection of the Holton-Arms entrance with River Road. Nonetheless, pedestrian safety remains an important objective for the school.

- Holton-Arms vehicle traffic queues were fully contained in the turn lanes provided for Holton-Arms traffic at the River Road intersection. The Holton-Arms traffic queue turning left into the campus from River Road neared the capacity of the left turn lane during a fifteen minute period in the Holton AM Peak Hour.

- The average speeds during the travel time surveys along River Road between the Burdette intersection and the Beech Tree intersection averaged 23 mph in the westbound direction and 28 mph in the eastbound direction during the morning peak period. During the evening peak period the average period eastbound speed was 44 mph and the westbound speed was 15 mph. This reflects the heavy commuter congestion westbound on River Road during the evening peak period.

- We obtained safety data for 2003 through 2005 from the Maryland State Highway Administration. None of the individual accident categories met the criteria for being significant during the overall study period as defined by the State Highway Administration analysis. Studies of accident rates were shown to be consistently lower than statewide rates.

Key Findings from Trip Generation Study

- The trip generation study focuses on the traffic entering and departing from Holton-Arms throughout the 16-hour period. These data are presented in detail in the Appendix to this report. A major finding is that between 2005 and 2007 the school generated almost identical levels of traffic over the full 16 hours surveyed.

- There were relatively small differences in Holton-Arms traffic from year to year during the morning 2 ½ hour peak period and the afternoon 2 hour peak period. These differences are probably due to random variance each day given the first finding that the total traffic throughout the day is relatively unchanged.

- During the single highest morning peak hour Holton traffic was slightly less in 2007 than in 2003. However during the single highest afternoon peak hour, Holton traffic was thirteen and one-half percent (13.5%) higher. This occurred for the reason cited earlier in this summary that the school altered its programmatic

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scheduling and that has affected the concentration of Holton traffic in the afternoon. As noted above, the afternoon Holton traffic during the entire 2 hour period is actually slightly less.

Key Findings from Computer Simulation of Pre Modification and Post Modification Traffic Conditions

- This portion of the study was designed to isolate the impact of the changes in the Holton-Arms traffic generation that occurred as a result of the approved modifications. Gorove/Slade suggested to the NLC that we use traffic simulation to retrospectively create a pre-modification condition that represented traffic conditions prior to the modification in 2003. This was necessary because data collected in surveys in prior years would represent a picture with many other variables including differing levels of through traffic on River Road, differing levels on the minor cross streets, and unknown ambient condition such as weather, accidents, construction, Beltway congestion, etc.

  We presented the idea of using the simulation to the NLC and their consultant and discussed it at length. It was agreed that the simulation would isolate the effects of the Holton generated traffic.

  The post-modification simulation was created using the data collected in 2007 as input to the computer simulation, and by calibrating the simulation to replicate 2007 peak period conditions as accurately as possible. The details of the calibration are summarized in the body of the report.

  As noted in the prior sections of this summary, Holton-Arms traffic changed significantly only during the afternoon Holton-Arms peak hour. Otherwise, changes in Holton-Arms traffic was relatively insignificant from pre-modification to post-modification conditions. This is apparent in the summary of the results presented below.

  The four-quantitative measures of pre and post modification traffic conditions:
  - Stopped delay (as requested by NLC);
  - Maximum queue length measured in number of vehicles;
  - Critical lane volume (CLV); and
  - Total delay and level of service (HCM Analysis).

  The difference between stopped delay and total delay is defined as follows:
  - Stopped delay is a measurement of the average time waiting or standing for all vehicles that stop as a result of a red light at a traffic signal or a stop sign. This is measured in the field during actual traffic operations using a stopwatch. Alternatively, it is estimated using a calculation that is presented in "Manual of Transportation Engineering Studies" by the Institute of Transportation Engineers.

  - Total delay is an estimate of delay including deceleration and acceleration to all vehicles that occurs as a result of a traffic control device such as a traffic signal or a stop sign. Specifically, total delay is the difference between the time it takes a vehicle to pass through an intersection area if there were no traffic signal versus the time required to make that same trip with the traffic signal in place. Therefore, total delay is somewhat hypothetical, but it can be surveyed in the field, and it can be easily estimated using a computer simulation.

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- Stopped delay findings were fairly consistent between pre- and post-modification conditions at all intersection approaches.

- The results of the queuing comparisons between pre- and post-modification conditions identified several intersection approaches where queue lengths became significantly longer in the post modification condition. However, as noted in the stop delay and total delay section of this summary the delays remain fairly consistent. At first, we felt these were faulty results because longer queues seemingly would result in longer delays. However, upon more detailed review we determined that this is not the case. Longer queues merely reflect the fact that there was an increase in overall traffic. These increases in traffic means the queues on River Road were greater. However, when the traffic signal turned green, these queues would clear. The overall average delay per vehicle pre-modification versus post-modification was about the same even though there were more vehicles queued in the post-modification situation.

- We utilized the simulation results to measure critical lane volume (CLV) and they were very consistent pre-modification versus post-modification at each of the intersections. This is because the way CLV is calculated diminishes the relatively small impacts of increased Holton-Arms traffic in the post modification condition because the traffic is spread over several lanes. An increase in PM Peak CLV was observed due to an increase in peak Holton volumes as discussed earlier.

- Finally, we computed total delay using the Highway Capacity Manual (HCM) method where total average delay is calculated and then converted into a letter level of service grade. The results of the HCM analysis of simulations results showed that delays and level of service on River Road are relatively unchanged from the pre- to post-modification scenarios because the signal timing on River Road provides greater capacity to the River Road through traffic flow than it does to the Holton-Arms exiting traffic flow. The significant changes in delay measured in this analysis of pre- and post-modification simulation conditions were on the Holton-Arms approach to the Holton-Arms entrance intersection with River Road. This is because the traffic signal timing favors River Road over traffic exiting the Holton-Arms campus.

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INTRODUCTION

This study executes the elements of the March 9th, 2007 Holton-Arms Traffic Study Approach to analyze the traffic generated by the increased enrollment and non-school activities. Figure 1 shows an aerial photograph of the Burning Tree Valley neighborhood including the Holton-Arms School at the top of the figure. The figure shows River Road (MD190) in yellow from Burdette Road on the left side to Beech Tree Road on the right side of the figure.

Figure 1: Study Area

BACKGROUND

The Holton-Arms School moved to its current River Road location in Montgomery County over 40 years ago. Over the ensuing years, the school's enrollment gradually increased to the point in the late 1990's at which the size of its student body had stabilized between 660 and 665 students. Because Holton's enrollment as then approved by the Board of Appeals (BOA) was 650 students, a modification to its special exception to achieve the desired enrollment became necessary. In 2004, the BOA approved the following modifications (the "modifications") to three special exceptions held by the school: an increase in pupil enrollment of 15 for a cap of 665 for the school; an identical increase of 15 for a total of 665 allowed in the summer camp; and an increase of 5, for a cap of 20, in the faculty/staff onsite daycare facility. In addition the Board formally approved a circumscribed set of before and after-school and non-school activities--activities which had been previously grandfathered on the school premises for a two year period but which needed to be approved prospectively. The modifications were relatively modest in

nature and, except for the limited enrollment increases represented a reduction in the intensity of the "ancillary" uses from the conditions that had evolved in the late 1990's.

The location of the Holton-Arms School on River Road in Bethesda, MD is just one-half mile inside the Washington Beltway. River Road is a major commuter route and state highway. Per an agreement reached with its neighbors in 2002, all access to the school is from a single, signalized entrance at River Road and Royal Dominion Drive, so as to avoid burdening local neighborhood streets with school traffic. (There is an unpaved emergency route providing access to and from the school to Burdette Road.) Accordingly, all traffic to and from the school necessarily uses a single entrance on a heavily traveled major commuter highway of which the school's traffic is only a small part. Even at the peak of the school trip activity (between 7:15 - 8:15 am weekdays), Holton accounts for just 17% of the total traffic at the River Road/Holton intersection (Table 6A). Most of the day, the school accounts for much less traffic along River Road. During the afternoon between 5:15-6:15 pm (the Total Traffic Peak Hour) Holton traffic accounts for only 8% of the traffic at the River Road/Holton intersection (Table 6B).

As part of the agreement with the neighbors as approved by the BOA in 2002, the school made substantial changes to its circulation driveway and the lane configuration and traffic signal at Royal Dominion and River Road to ensure school traffic queues were captured on school property and that the movements through the intersection were made safer. Following the Board's approval of the Modifications in 2004, the school obtained approval from the State Highway Administration to extend the eastbound left turn lane on River Road providing entry into the school. The lane was extended approximately 275 feet, for a total length of 491 feet, and accommodates approximately 22 vehicles, a number that is generally sufficient to accommodate cars waiting to turn into the school.

PURPOSE OF STUDY

The goal of this traffic analysis is to determine whether the Holton-Arms School generated traffic has changed as a result of the modifications to enrollment and programs (including after-hours programs) so as to adversely impact the community. This study evaluates the traffic generated by the increased enrollment and by the after-hours/non-school activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton-Arms generated traffic at all affected intersections and roadways. See pp. 47-48 of Hearing Examiner's Report dated November 9, 2006 re: CBA-1174-D.

SUMMARY OF STUDY

This study scope follows the elements of the March 9th, 2007 Holton-Arms Traffic Study Approach that reflects efforts participating in meetings with representatives of the community on January 3, January 23 and February 20, 2007 and also includes reviewing background information and developing the study parameters.

This traffic study includes the following elements:

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1. Data collection at and between the intersections of River and Beech Tree/Nevis Roads, River Road and Holton-Arms Driveway/Royal Dominion Drive and River and Burdette Roads ("Study Intersections").
2. A comparison of the hour-by-hour traffic counts and trip generation rates for vehicles arriving at and leaving the Holton-Arms campus before and after the approval of the modifications, based on studies performed in 2003, 2005 and 2007.
3. Intersection capacity analyses for the Study Intersections.
4. A description of non-school related activities.
5. Simulation study that augments field observations of pre-modification traffic conditions and permits analysis of travel time and queuing before and after implementation of the modifications at and approaching the Study Intersections.
6. A safety analysis for the Study Intersections including comparisons with similar data along the River Road corridor from Burdette Road to Springfield Road.
7. An assessment of measured intersection delay at the River Road and Holton-Arms/Royal Dominion Drive intersection.

Figure 2 describes the study intersections, including the number of lanes and the location of traffic signals. For the purposes of consistency, the intersection approaches have been described as follows:

- Vehicles traveling along River Road coming from the capital beltway and heading toward downtown Washington, DC are described as eastbound traffic, on an eastbound approach;

- Vehicles traveling along River Road coming from downtown Washington, DC heading toward the capital beltway are described as westbound traffic, on a westbound approach;

- Other vehicle travel at the study intersection are described as either northbound or southbound, for example, vehicles traveling along the Holton-Arms Driveway from the Holton-Arms School toward the River Road intersection are described as southbound traffic, on a southbound approach. Royal Dominion Drive vehicles approaching the River Road intersection are described as northbound traffic, on a northbound approach.

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STUDY INTERSECTIONS

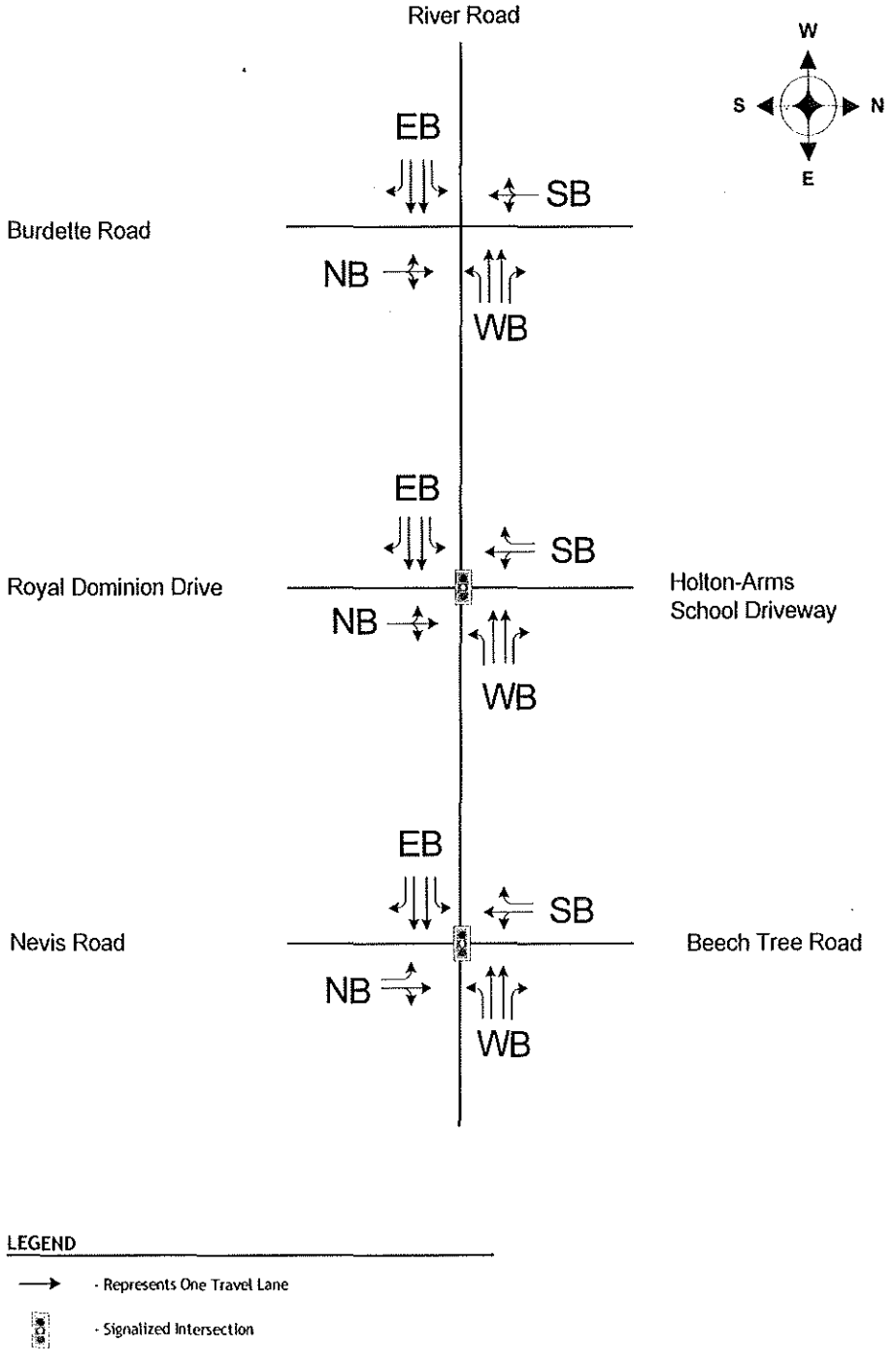

Figure 2: Study Intersections

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DATA COLLECTION

Traffic Counts

Turning movement counts were conducted on Tuesday, March 20, 2007, including counts of both vehicles and pedestrians, at the intersection of River Road and the Holton-Arms entrance, from 5 a.m. to 9 p.m., on a typical school day that included regular after school programs. Turning movement counts were conducted on Tuesday, March 20, 2007 including counts of both vehicles and pedestrians, at the intersections of River and Beech Tree/Nevis Roads and River and Burdette Roads, from 6:30 a.m. to 9 a.m. and 2:30 p.m. to 7 p.m. on a typical school day that included regular after school programs. The traffic count data is attached to this memorandum in Appendix A-C.

A traffic signal is planned for the intersection of River Road and Burdette Road, but at the time of the traffic counts the signal was not installed and there was no signal construction activity. A signal at the intersection of River Road and Burdette Road might reduce the large number of U-turns movement that occur on the eastbound left turn movement at the intersection of River Road and Holton-Arms.

Based on these counts, the morning and afternoon peak hours, for the Holton-Arms school traffic were found to be from 7:15 a.m. to 8:15 a.m. and 3:30 p.m. to 4:30 p.m. The non-school traffic, or the traffic not coming or going to the school, had morning and afternoon peak hour that occurred later in the day from 7:45 a.m. to 8:45 a.m. and 5:15 p.m. to 6:15 p.m. The Total Traffic peak hours were found to be from 7:30 a.m. to 8:30 a.m. and 5:15 p.m. to 6:15 p.m. Table 1 contains a summary of Holton-Arms School peak hours compared to the overall Total Traffic peak hour. Figure 1 shows a chart of these traffic flows on the day counted, highlighting the peak hours of school related traffic.

Table 1: Comparison of River Road/Holton-Arms Intersection Peak Hours

Traffic	AM Peak		PM Peak	
	Hour	*No. of Vehicles*	*Hour*	*No. of Vehicles*
Holton-Arms Traffic	7:15 – 8:15 AM	872	3:30 – 4:30 PM	557
Non-Holton-Arms Traffic	7:45 – 8:45 AM	4,334	5:30 – 6:30 PM	4,067
Total Traffic	7:30 – 8:30 AM	5,056	5:15 – 6:15 PM	4,397

As Table 1 shows, the peak hours of school-related traffic and commuter-related traffic overlap in the morning and in the evening. For the remainder of this report, the AM and PM peak hours for the Holton-Arms School related traffic will be described as Holton peak hours, and the AM and PM peak hours for the Total Traffic peak hours will be described as Total Traffic peak hours.

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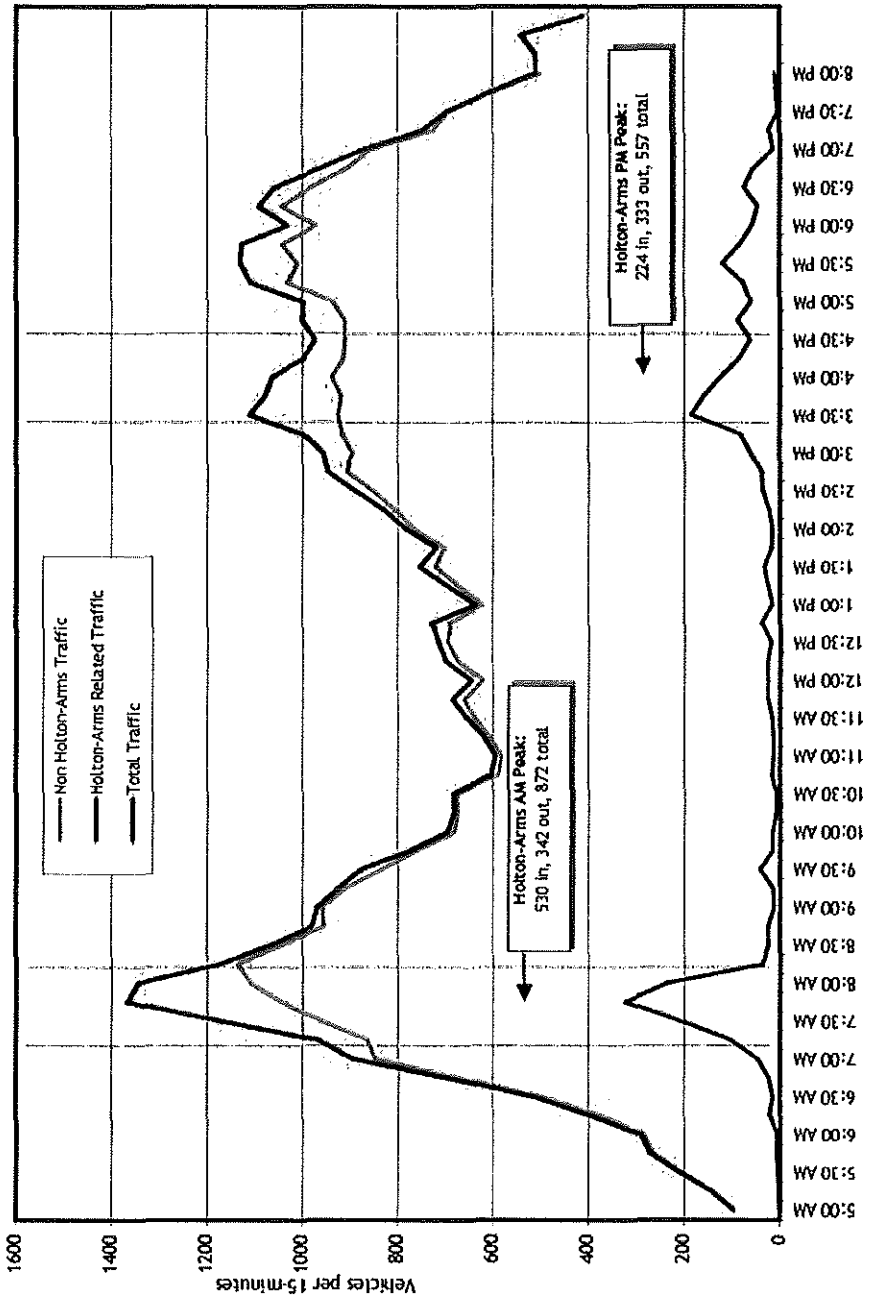

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Figure 3: Daily Traffic by Type at Intersection of River Rd/Holton Arms on March 20, 2007

Pedestrian Observations

During the collection of traffic data, pedestrian activity was also recorded at the intersection of River Road and the School driveway on Tuesday, March 20, 2007. Table 2 summarizes the pedestrian counts during the Holton peak hours, summarized by the number of pedestrians crossing each approach. Also included is a comparison of these crossings to the number of school students; at most, only a small number of students use this intersection. Although the high volumes and speeds of through traffic on River Road made crossings more difficult compared to intersections with lower volumes and speeds, while observing intersection operations no dangerous pedestrian activity was recorded.

Table 2 – Holton Peak Hour Pedestrian Counts

Approach	Holton AM Peak	Holton PM Peak
	No. of Pedestrians	*No. of Pedestrians*
NB Royal Dominion Drive	0	1
EB River Road	0	3
SB Holton-Arms Driveway	4	0
WB River Road	0	0
Total Pedestrians	4	4
Student to Total Pedestrian Ratio	**0.6%**	**0.6%**

Vehicle Queue Length Observations

The vehicle queue length observations were conducted at the study intersections during peak periods of queuing, as agreed in the study scope, between 7:15 and 8:30 a.m. and between 3:00 and 4:00 p.m. Saturated conditions, when cars exceed the capacity of the turning lanes, did not occur. At the intersection of River Road/Holton-Arms the following maximum queue observations were reported:

- The peak demand for the eastbound River Road in the left-turn lane occurred at one fifteen (15) minute period during the queue observations. The queue lengths during this period between 7:45 and 8:00 a.m. approached capacity for four out of five signal cycles for eastbound River Road in the left-turn lane. The left-turn lane capacity is 22 vehicles, but the vehicles queues only reached 19 vehicles in the left turn lane. The vehicles were contained in the turning lanes at all times.
- The maximum eastbound River Road through movement queue lengths occurred between 8:15 – 8:30 a.m. During the five signal cycles, the queue lengths ranged from 52 – 63 vehicles. These queues do not include the left turn movements.
- The maximum westbound River Road through movement queue lengths occurred between 3:45 – 4:00 p.m. During the five signal cycles, the queue lengths ranged from 44 – 64 vehicles. No queues were observed either in the AM of PM for westbound River Road right-turn movement. Only one instance of vehicle delay was observed for the westbound right turn lane when two right turning vehicles were delayed 5 seconds because they were behind a Metrobus stopped in the right turn lane at the bus stop.
- The maximum southbound Holton-Arms Driveway movement queue lengths occurred between 3:45 – 4:00 p.m. During the six signal cycles, the queue lengths ranged from 14 – 22 vehicles on the Holton campus driveway. Currently the 1,200 foot driveway has capacity for over 92 vehicles to queue.
- Detailed queue count data is attached in Appendix D - K.

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Travel Time Study

Table 3 summarizes the time and delay study that was conducted during peak periods to determine eastbound and westbound travel times and average speed along River Road through the Study Intersections. For example, the average travel time for AM Peak Period eastbound travel along River Road was 78 seconds, this was the average of nine runs where travel was measured from the time the vehicle enters the Burdette Road intersection until it enters the Beech Tree Road intersection which is 0.60 miles. The average speed for this observation is 28 mph. The travel time observations are attached in Appendix L.

Table 3: Summary of Travel Time Study During Peak Periods

	AM Peak Period (6:30 - 9:00 am)			PM Peak (3:00 - 5:00 pm)		
Date of Observation	*# Runs*	*Average Travel Time (seconds)*	*Average Speed (mph)*	*# Runs*	*Average Travel Time (seconds)*	*Average Speed (mph)*
03/20/07						
Eastbound Travel	9	78	28	6	49	44
Westbound Travel	9	96	23	6	145	15

Safety Analysis

A safety analysis was prepared for study intersections, with specific incidents and details listed for both pedestrian and vehicle usages. The crash data was collected from the Maryland State Highway Administration (SHA) for 2003, 2004, and 2005. The data results show that there were 156 total police-reported accidents within the study area, of which rear end collisions (79) were most predominant. None of the individual accident categories met the criteria for being significantly high during the overall study period as defined by the SHA analysis. Study area accident rates were shown to be consistently lower than statewide rates. The SHA data is attached to this memorandum in Appendix M.

There were a total of 20 accidents recorded at or near the River Road and Holton-Arms/Royal Dominion Drive intersection between 2003-2005; none of these accidents involved pedestrians. In 2003, 11 accidents were recorded near the River Road/Holton-Arms intersection: 8 of the accidents occurred in the intersection. Ten (10) of the 11 accidents near the intersection were rear-end collisions. In 2004, 4 accidents were near the River Road/Holton-Arms intersection while 2 accidents occurred in the intersection. Three (3) of the 4 accidents near the intersection were rear-end collisions. In 2005, 5 accidents were near the River Road/Holton-Arms intersection while 5 accidents occurred in the intersection. Four (4) of the 5 accidents near the intersection were rear-end collisions.

There were a total of 23 accidents recorded at or near the River Road/Beech Tree Road intersection between 2003-2005; none of these accidents involved pedestrians. Eleven (11) accidents were recorded in 2003, eight (8) accidents were recorded in 2004, and six (6) accidents were recorded in 2005. There were a total of 12 accidents recorded at or near the River Road/Burdette Road intersection between 2003-2005; none of these accidents involved pedestrians. Nine (9) accidents in 2003, and four (4) accidents in 2004, and six (6) accidents were recorded in 2005.

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TRIP GENERATION ANALYSIS

Trip generation for the Holton-Arms School is determined using the ratio of traffic generated by the school to the total number of students enrolled plus the number of children in the daycare facility. In March 2007, there were 652 students enrolled at the school, and 15 children in daycare. In May 2005, there were 656 students enrolled at the school, and 16 children in daycare. In October 2003, there were 642 students enrolled at the school, and 11 children in daycare. Table 4 presents the results of the existing trip generation calculations, and those calculated from data presented in the June 29, 2005 Holton-Arms Traffic Analysis. The results in Table 4 indicate that the trip rate per student, and overall traffic generated has remained relatively constant since the fall of 2003 despite increased enrollment. The notable difference is that the PM Peak Hour is now occurring from 3:30-4:30 pm, and that hour shows a thirteen and a half percent (13.5%) increase in trips and a twelve percent (11.9%) increase trip generation from 2003. The 2005 and 2003 traffic count data is attached to this memorandum in Appendix N and O, and the 16-hour trip generation rates are attached in Appendix P.

Table 4: Holton Arms Trip Generation Calculations and Comparison

Date of Count	Total School + Day Care Enrollment	Holton AM Peak			Holton PM Peak		
		In	*Out*	*Total*	*In*	*Out*	*Total*
March 2007							
School Generated Traffic 7:15-8:15am, 3:30-4:30pm	---	530	342	872	224	333	557
Trip Rate	667	0.79	0.51	1.31	0.34	0.5	0.84
May 2005							
School Generated Traffic	---	476	304	780	202	267	469
Trip Rate	672	0.71	0.45	1.16	0.3	0.4	0.7
October 2003							
School Generated Traffic	---	526	338	864	209	273	482
Trip Rate	653	0.81	0.52	1.32	0.32	0.42	0.74
Percent Difference 2003-2007							
School Generated Traffic		**0.8%**	**1.2%**	**0.9%**	**7.0%**	**18.0%**	**13.5%**
Trip Rate	**2.1%**	**-2.5%**	**-2.0%**	**-0.8%**	**5.9%**	**16.0%**	**11.9%**

Table 5 presents a comparison of the total trips generated by the site, including data presented in the June 29th, 2005 Holton-Arms Traffic Analysis. The results in Table 5 indicate that the overall daily trips or traffic generated have remained relatively constant since the fall of 2003 despite increased enrollment.

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Table 5: Total Trips to Holton-Arms Comparison

Date of Count	Total School + Day Care Enrollment	AM Peak Period 7-9:30 AM			PM Peak 2:30-4:30 PM			TOTAL 16-Hour Counts (6:00 AM -9:00 PM)		
		In	*Out*	*Total*	*In*	*Out*	*Total*	*In*	*Out*	*Total*
March 2007										
School Generated Traffic	667	655	417	1072	389	389	778	1,600	1,498	3,098
Trip Rate				1.61			1.17			4.64
May 2005										
School Generated Traffic	672	571	369	940	378	403	781	1,624	1,466	3,090
Trip Rate				1.40			1.16			4.60
October 2003										
School Generated Traffic	653	628	384	1,012	405	409	814	n/a	n/a	n/a
Trip Rate				1.55			1.25			
Percent Difference 2005-2007	**-0.7%**	**14.7%**	**13.0%**	**14.0%**	**2.9%**	**-3.5%**	**-0.4%**	**-1.5%**	**2.2%**	**0.3%**
Percent Difference 2003-2007	**2.1%**	**4.3%**	**8.6%**	**5.9%**	**-4.0%**	**-4.9%**	**-4.4%**			

Table 6A shows the percent of Holton and non-Holton related traffic at the intersection of River Road and Holton Arms during the AM and PM school peak hours. The findings show that the percent of school related traffic has remained consistent with slight increases from 2003 to 2007.

Table 6A: Percent of Traffic During Holton Peak Hours

Count Year	Period	Holton Peak Hours	Holton (vehs)	Holton (%)	Non-Holton (vehs)	Non-Holton (%)
2003	AM Peak	7:15-8:15am	864	17%	4085	83%
	PM Peak	3:30-4:30pm	473	11%	3838	89%
2005	AM Peak	7:15-8:15am	780	17%	3841	83%
	PM Peak	3:30-4:30pm	402	10%	3764	90%
2007	AM Peak	7:15-8:15am	872	18%	3979	82%
	PM Peak	3:30-4:30pm	557	13%	3695	87%

Table 6B shows the percent of Holton and non-Holton related traffic at the intersection of River Road and Holton Arms during the total traffic AM and PM peak hours. The findings show that the percent of school related traffic is reduced during the AM and PM total traffic peak hours. Also the percent of Holton related traffic has remained consistent with slight increases from 2003 to 2007.

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Table 6B: Percent of Traffic During Total Traffic Peak Hours

Count Year	Period	Total Traffic Peak Hours	Holton (vehs)	Holton (%)	Non-Holton (vehs)	Non- Holton (%)
2003	AM Peak	7:30-8:30 am	769	15%	4277	85%
	PM Peak	5:15-6:15 pm	n/a	n/a	n/a	n/a
2005	AM Peak	7:30-8:30am	739	15%	4052	85%
	PM Peak	5:15-6:15 pm	290	7%	3944	93%
2007	AM Peak	7:30-8:30am	805	16%	4251	84%
	PM Peak	5:15-6:15 pm	342	8%	4055	92%

River Road is a major state highway through southern Montgomery County, Maryland. Its western terminus is at Maryland Route 112, and its eastern terminus is just inside the Washington, D.C. border at Wisconsin Avenue. The route is named River Road because it parallels the Potomac River for most of its course. River Road intersects with the Capital Beltway (I-495) at exit 39. River Road acts as a radial commuter corridor as major traffic from Potomac, Maryland, the Beltway and Interstate 270 use this route to get to Washington. The dominant land-use adjacent to River Road is low-density residential. River Road is a six-lane, divided arterial with a speed limit of forty-five miles per hour. There are several major arterial roads in Montgomery County that have similar physical characteristics and vehicle volumes to River Road; they include Wisconsin Ave (MD 355), Georgia Ave (MD 97), New Hampshire Ave (MD 187), Colesville Road (US 29).

Figure 4 shows the River Road through volumes at the intersection of River Road/Holton Arms during the Holton AM Peak Period (7-9:30 am) for the 2003, 2005 and 2007 count years. Figure 5 shows the River Road through volumes at the intersection of River Road/Holton Arms during the school PM Peak Period (2:30 - 4:30 pm) for the 2003, 2005 and 2007 count years. The findings show that the River Road through movement volumes have remained consistent from 2003 to 2007.

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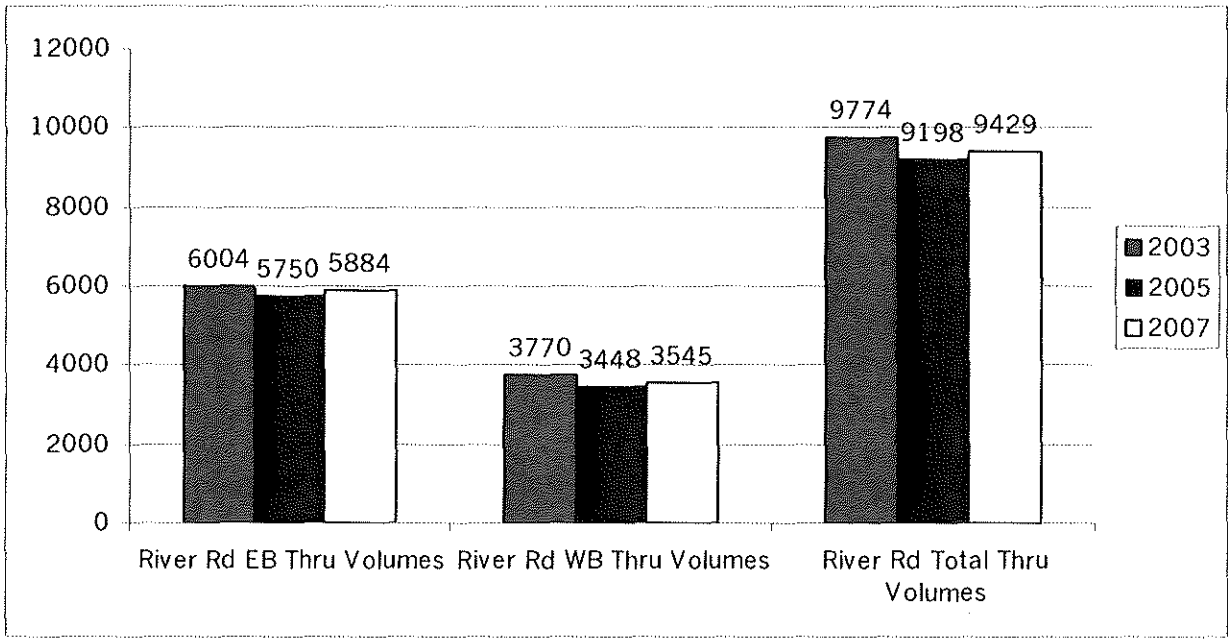

Figure 4: AM Peak Period (7-9:30 am) through volumes along River Road at Holton Arms

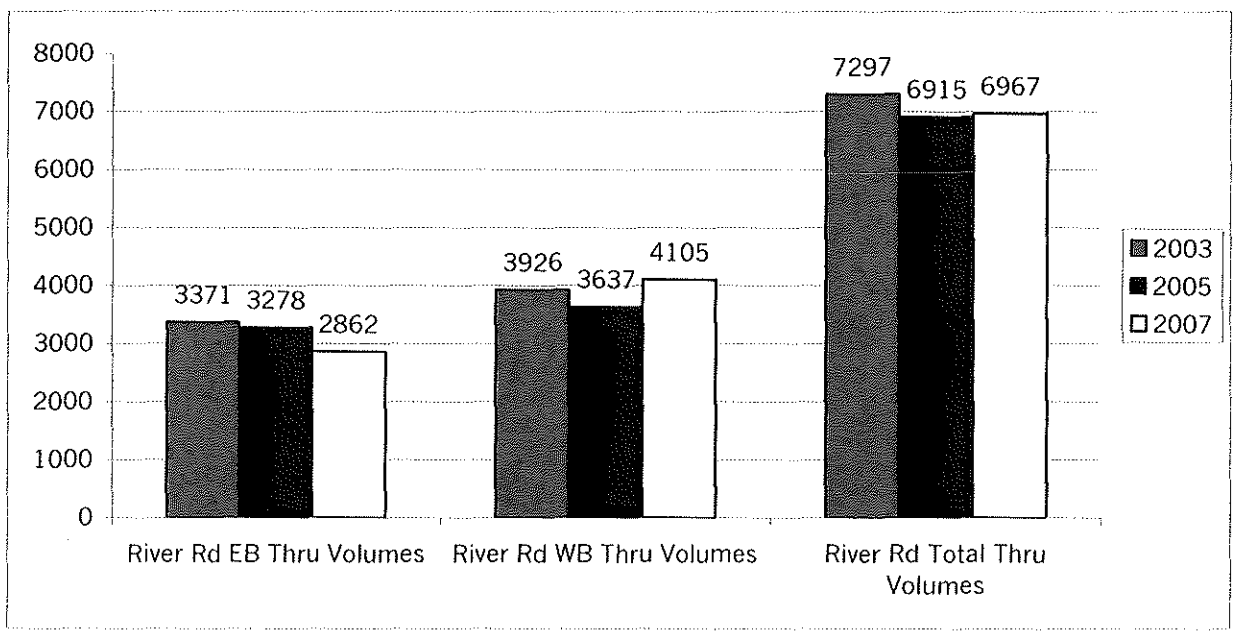

Figure 5: PM Peak Period (2:30-4:30 pm) through volumes along River Road at Holton Arms

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MEASURED INTERSECTION DELAY

Stopped delay counts were conducted at the request of the community representatives. The stopped delay counts were recorded and calculated from the videotape captured on Tuesday, March 20, 2007 at the intersection of River Road/Holton-Arms from 7:15 a.m. to 8:30 a.m. and 3:00 p.m. to 4:00 p.m. Stopped delay is a measurement of the average time waiting or standing for all vehicles that stop as a result of a red light at a traffic signal or a stop sign. This is measured in the field during actual traffic operations using a stopwatch. Alternatively, it is estimated using a calculation that is presented in "Manual of Transportation Engineering Studies" by the Institute of Transportation Engineers. This analysis results in the calculation of delay and Level of Service (LOS) for the eastbound and westbound River Road intersection approaches. The delay is a calculation of the average seconds lost for each driver passing through the intersection, as compared to the driver's travel time if the intersection did not exist. LOS is a qualitative measure of intersection quality based on the delay, and uses letter grades (F being the worst, and A best). The LOS calculation is based on level of service criteria for signalized intersections, HCM, 1985.

The results of this analysis are shown for the full Holton peak hour, and for 15-minute intervals within the hour in Table 7. The results show LOS calculations that ranged between A – C for all measures but one period which was Westbound River Road from 3:45 – 4:00pm LOS D. The stopped delay does not include travel time lost to braking, or accelerating, therefore this measure will report lower delays than the total control delay measure which is what the most recent HCM and Synchro simulation software analysis results report. Therefore the results are not comparable to the delays calculated below in Tables 15 and 16.

Table 7 – Summary of Stopped Delay Results for Intersection of River Road/Holton Arms

Intersection & Approach	AM Period	*Delay (sec./veh.)*	*Level of Service**	PM Period	*Delay (sec./veh.)*	*Level of Service*
River Road/Holton-Arms						
Eastbound River Road	7:15 – 8:15 am	21.8	C	3:00 – 4:00 pm	9.6	A
Eastbound River Road	7:30 – 8:30 am	21.3	C	3:00 – 3:15 pm	9.5	A
Eastbound River Road	7:15 – 8:30 am	17.5	B	3:15 – 3:30 pm	8.4	A
Eastbound River Road	7:15 – 7:30 am	4.0	A	3:30 – 3:45 pm	10.3	B
Eastbound River Road	7:30 – 7:45 am	10.4	B	3:45 – 4:00 pm	10.1	B
Eastbound River Road	7:45 – 8:00 am	25.1	C			
Eastbound River Road	8:00 – 8:15 am	20.6	C			
Eastbound River Road	8:15 – 8:30 am	22.5	C			
Westbound River Road	7:30 – 8:30 am	13.9	B	3:15 – 4:00 pm	27.9	C
Westbound River Road	7:30 – 7:45 am	13.6	B	3:15 – 3:30 pm	22.7	C
Westbound River Road	7:45 – 8:00 am	12.2	B	3:30 – 3:45 pm	24.6	C
Westbound River Road	8:00 – 8:15 am	14.4	B	**3:45 – 4:00 pm**	**36.6**	**D**
Westbound River Road	8:15 – 8:30 am	15.7	B			

*The LOS calculation is based on level of service criteria for signalized intersections, HCM, 1985.

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DESCRIPTION OF NON-SCHOOL RELATED ACTIVITIES

Table 8 is a description of the Holton-Arms School activities on March 20th, 2007. School officials confirmed that March 20th, 2007 was a typical school day. The activities listed in Table 8 indicate that many activities occurred on the day of the traffic counts including many pre- and post- class school events such as the Lacrosse games. There was also a Board meeting and track team dinner, two activities that are not occurring on a weekly basis. School officials report that the lower, middle and upper school schedules were changed in 2006 to release students at the same time, which facilitates transportation coordination for parents with multiple students attending the school. Prior to this change, the school day ending times were staggered. This change accounts for no increase in overall trips to the school, but may account for a higher demand in the Holton peak hours.

Table 8: Description of School Activities

School Activity	Description	Hours of Duration	Number of Participants
Holton Arms School	Regular class schedule Lower, middle and high school	8:10 am – 3:30 pm	652 students, 182 teachers & staff
Prospective Students	Visits by potential students	9 am – 3 pm	4 students
Truck loading	Cafeteria food deliveries	6 am – 11 am	4 truck deliveries from 6-11 am
Pool Lounge	Track team parent/athlete dinner	5:30 pm – 6:30 pm	26 students (26 Holton), 6 parents, 5 coaches
Consortium	Morning classes	7 – 8 am	15 students (7 Holton), 1 teacher
Chamber Orchestra	Rehearsal	7:20 – 8:10 am	23 students (15 Holton), 1 teachers
Small Instrument Class	Rehearsal	7:20 – 8:10 am	13 students (13 Holton), 2 teachers
Small Instrument Class	Rehearsal	3 pm – 4 pm	16 students (16 Holton), 2 teachers
Middle School Play	Auditions	3:30 pm – 5:30 pm	18 students (18 Holton), 2 teachers
V Lacrosse home game	v. Severn at Lacrosse Field	3:30 pm – 5 pm	30 students (15 Holton), 2 teachers
JV Lacrosse home game	v. Severn at Lacrosse Field	5 pm – 6:30 pm	30 students (15 Holton), 2 teachers
Faculty Child Care	On-school daycare	7:30 am – 5 pm	15 children (15 Holton Parents), 4 staff
School Board Meeting	Monthly board meeting	5 pm – 8 pm	12 teachers, staff, and parents

Table 9 is a description of the Holton-Arms Non-School activities on March 20th, 2007.

Table 9: Description of Non-School Activities

Non-School Activity	Description	Hours of Duration	Number of Participants
AM Swimming Pool	Sea Devils	5 am – 6:30 am	4 students, 2 coaches
PM Swimming Pool	Curl Burke	5 pm – 7 pm	40 students (15 Holton), 4 coaches
Music lessons	Center for the Arts	1 pm – 3 pm	20 students (15 Holton), 5 teachers
Tae Kwon Do	Center for the Arts	5 pm – 7 pm	10 students (8 Holton), 3 teachers

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SIMULATION STUDY

The industry standard Synchro Traffic Signal Coordination Software, a commonly used traffic engineering tool, was used to prepare simulations for the study intersections. Simulations were prepared for the study intersections to generate traffic conditions prior to the modification, including travel times and queuing.

The current conditions, from current 2007 traffic counts, were calibrated, and this analysis is described below. The current conditions are described as post-modification. The current traffic counts inputs were then replaced by traffic counts taken before the modifications were implemented, from 2003 traffic counts, to generate simulations of traffic conditions prior to the modification. These prior conditions are described as pre-modification and define a base for a comparative analysis between past and present conditions operating on the assumption that driving patterns have remained the same. Both the representatives of the Holton-Arms school and the representatives of the community accepted this approach. The traffic engineer representing the community agreed that this approach is the best way to determine the details of the pre-modification condition.

The simulations were created for the following alternatives in accordance with the study scope:

(1) The pre- and post- modification simulations for the Holton Peak Hours observed between 7:15 - 8:15 a.m. and 3:30 - 4:30 p.m.

(2) The pre- and post- modification simulations for the Total Traffic Peak Hours observed between 7:30 - 8:30 a.m. and 5:30 - 6:30 p.m. Due to a lack of intersection traffic count data past 6:00 pm from 2003, the PM Peak alternative was simulated from 5:00 p.m. to 6:00 p.m.

The study intersection turning movement volumes for the simulation alternatives are provided in Appendix Q.

For each alternative described above six simulations were run and the average results reported in the following four quantitative measures of pre and post modification traffic conditions:

- Stopped delay;
- Max queue length measured in number of vehicles;
- Critical lane volume (CLV); and
- Total delay and level of service (HCM Analysis).

Calibration Analysis

Initial simulations of current conditions, from 2007 traffic counts, were run for Holton Peak Hours of 7:15- 8:15 a.m. and 3:30-4:30 p.m. The simulation inputs were calibrated and adjusted so that simulations reflect current traffic conditions of the study locations. The basic simulation inputs include the physical characteristics of the study intersections, including the number of traffic lanes, traffic volumes, and signal timings. The simulation is then run several times in an iterative process where simulation results are compared to observed results and adjustments are made to the secondary inputs, such as driver aggressiveness, until the simulation is calibrated to reflect observed conditions.

A calibrated simulation model will provide results that are similar to observed conditions, but it will not replicate exact observed conditions due to limitations of software programming, difficulty in replicating human behavior, and

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random and systematic error in measurements. The results are consistent with logic and intuition with a few exceptions which are attributed to the randomness of traffic conditions that are simulated with the software we used for the analysis.

Table 10 provides a comparison of the field observations from March 20, 2007 (observed) and the simulation results (calculated) existing conditions. This comparison includes stopped delay, travel times and queue lengths measure results after the simulation has been calibrated for the post-modification AM and PM peak hours. Table 10 shows that the simulation has been calibrated to field observations. Priority was given to matching the measured and calculated maximum (max) queues for the main through movements of River Road. Stopped delay and travel time were also used to calibrate the model. Overall, the finished calibration shows nine of the seventeen (9/17) calibration measures compare favorably as the calculated and observed values are within fifteen percent.

Table 10: Comparison of the Observed and Calculated Existing Conditions (2007 traffic counts) at the Intersection of River Road/Holton Arms during Holton Peak Hours (7:15- 8:15 a.m. & 3:30-4:30 p.m.)

Intersection & Approach	**AM Peak Hour** 7:15- 8:15 a.m.					
	Measured Max Queues (# of vehs)	*Calculated Max Queues (# of vehs)*	*Measured Travel Time (sec)*	*Calculated Travel Time (sec)*	*Measured Stopped Delay (sec./veh.)*	*Calculated Stopped Delay (sec./veh.)*
River Road & Holton-Arms Driveway			Average(Range)		Average(Range)	
Eastbound (River Road)	Thru 60 Left 22	Thru 52 Left 21	78 (44-110)	93.5	21.8 (4.0-25.1)	21.2
Westbound (River Road)	56	57	96 (46-154)	98.7	13.4 (12.2-4.4)	21.3
Northbound (Royal Dominion Drive)						
Southbound (Holton-Arms Driveway)	15	7				

Intersection & Approach	**PM Peak Hour** 3:30-4:30 p.m.					
	Measured Max Queues (# of vehs)	*Calculated Max Queues (# of vehs)*	*Measured Travel Time (sec)*	*Calculated Travel Time (sec)*	*Measured Stopped Delay (sec./veh.)*	*Calculated Stopped Delay (sec./veh.)*
River Road & Holton-Arms Driveway			Average(Range)		(Range)	
Eastbound (River Road)	Thru 24, Left 12	Thru 13, Left 13	49 (40-58)	51.3	(10.1-10.3)	12.4
Westbound (River Road)	63	70	145 (84-181)	84.7	(24.6-36.6)	8.8
Northbound (Royal Dominion Drive)						
Southbound (Holton-Arms Driveway)	12	7				

For the AM Peak hour, the maximum measured and calculated queues were observed to have similar values except that the calculated southbound queues were less than measured values. The stopped delay results were similar for the eastbound movement, but for the westbound movement the measured delay was lower than the calculated value. Conversely, the measured travel time values were similar for the westbound movement, but for the eastbound movement the measured travel time was lower than the calculated value.

For the PM Peak hour, measured queues values were found to be generally similar to the observed queues. The stopped delay results were similar for the eastbound movement, but for the westbound movement the measured delay was higher than the calculated value. The measured travel time values were similar for the eastbound movement, but for the westbound movement the measured travel time was much higher than the calculated value.

Stopped Delay and Queuing Analysis

Stopped Delay and queuing analysis are two measures required by the study scope to provide comparative data from which to measure the pre-modification and post-modification traffic conditions. For the study intersections the travel time and queuing analysis are calculated and summarized in Table 11 and Table 12. In Table 11 and Table 12, SAT represents a 'saturated' traffic condition, when the number of cars exceeds the capacity of the lanes. For the minor movement at these intersections, the software is unable to represent a value for the real world conditions but comparative analysis is possible. The comparative analysis between past and present conditions shows a difference between the westbound River Road movement in the AM and PM Peak Hour at the River Road/Holton-Arms intersection.

Table 11: Stopped Delay and Queuing Analysis from Simulation for Study Intersections for Holton Peak Hours (7:15- 8:15 a.m. and 3:30-4:30 p.m.)

Intersection & Approach	AM Peak Hour 7:15- 8:15 am				PM Peak Hour 3:30-4:30 pm			
	Pre-Modification		Post-Modification		Pre-Modification		Post-Modification	
	Stopped Delay (sec)	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*
River Road/Holton-Arms Driveway								
Overall	**21.1**		**22.3**		**11.1**		**11.9**	
Eastbound River Road	20.8	51	21.2	52	11.5	20	12.4	13
Westbound River Road	17.7	60	21.3	78	6.5	36	8.8	70
Northbound Royal Dominion Drive	51.7	6	57.2	7	77.4	6	41.3	5
Southbound Holton-Arms Driveway	34.2	8	30.0	7	32.8	6	25.6	7
River Road/Burdette Road								
Overall								
Northbound Burdette Road	28.3	3	32.0	3	430.8	5	112.8	4
Southbound Burdette Road	SAT	38	SAT	38	SAT	38	SAT	37
Eastbound River Road	9.0		9.5		8.4		5.9	
Westbound River Road	0.0		0.0		0.1		0.1	
River Road/Beech Tree Road								
Overall	**9.0**		**9.3**		**5.6**		**5.2**	
Eastbound River Road	6.2	31	5.0	50	4.0	15	3.5	12
Westbound River Road	5.6	25	5.9	28	3.5	28	3.6	34
Northbound Nevis Road	61.2	9	61.1	9	42.8	7	41.6	7
Southbound Beech Tree Road	43.7	11	58.2	13	32.6	6	31.6	6

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Table 12: Stopped Delay and Queuing Analysis from Simulation for Study Intersections for Total Traffic Peak Hours (7:30-8:30 a.m. and 5:00-6:00 p.m.)

Intersection & Approach	AM Peak Hour 7:30-8:30 am				PM Peak Hour 5:00-6:00 pm			
	Pre-Modification		Post-Modification		Pre-Modification		Post-Modification	
	Stopped Delay (sec)	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*	*Stopped Delay (sec)*	*Calculated Max Queues (# of vehs)*
River Road/Holton-Arms Driveway								
Overall	**27.2**		**42.0**		**5.3**		**8.6**	
Eastbound River Road	32.5	51	56.7	52	2.4	14	5.4	15
Westbound River Road	17.8	59	22.4	98	5.2	25	7.5	73
Northbound Royal Dominion Drive	57.9	15	51.9	13	67.0	8	125.0	10
Southbound Holton-Arms Driveway	30.6	7	35.0	9	35.6	4	23.8	5
River Road/Burdette Road								
Overall								
Northbound Burdette Road	SAT	5	SAT	19	2.5	2	11.6	2
Southbound Burdette Road	SAT	38	SAT	37	56.4	16	305.6	36
Eastbound River Road	18.3		48.2		4.9		5.7	
Westbound River Road	0		0		0		0.1	
River Road/Beech Tree Road								
Overall	**9.7**		**10.9**		**5.6**		**6.4**	
Eastbound River Road	5.4	36	7.3	37	3.6	17	4.1	13
Westbound River Road	6.2	27	5.8	27	3.7	27	3.6	27
Northbound Nevis Road	67.3	6	64.2	10	49.6	8	52.3	7
Southbound Beech Tree Road	44.7	12	61.0	14	50.0	7	61.8	7

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Intersection Capacity Analysis - Critical Lane Volume

Critical Lane Volume (CLV) is the standard intersection capacity analysis methodology for Montgomery County under the Local Area Transportation Review Guidelines (LATR) of the Montgomery County Planning Board. The analysis calculates a total CLV figure for the intersection based on peak hour traffic volumes and intersection geometry. The peak hour CLV is compared to the CLV standard set by the County, which varies for different planning policy areas throughout the County.

The CLV calculations are summarized in Table 13 and Table 14. The comparative analysis between past and present conditions shows slight increases in CLV results for the PM calculation due to the increases in Holton volumes. The most significant increase in CLV calculation is the increase CLV at the River Road/Holton-Arms intersection for the Total Traffic PM Peak Hour. However, as shown in the Highway Capacity Manual Analysis below, the delays at this intersection are due to a short amount of green time for the southbound movement, which causes delays that are borne by the traffic coming out of the Holton-Arms Driveway.

Table 13: Comparison of CLV Calculations from Simulation for the Study Intersections for Holton Peak Hours (7:15- 8:15 a.m. and 3:30-4:30 p.m.)

Intersection & Approach	AM Peak Hour 7:15- 8:15 am		PM Peak Hour 3:30-4:30 pm	
	Pre-Mod.	Post-Mod.	Pre-Mod.	Post-Mod.
	CLV	*CLV*	*CLV*	*CLV*
River/Holton	1,520	1,534	1,437	1,506
River/Burdette	1,483	1,515	1,343	1,380
River/Beech Tree	1,507	1,496	1,282	1,288

Table 14: Comparison of CLV Calculations from Simulation for the Study Intersections for Total Traffic Peak Hours (7:30- 8:30 a.m. and 5:00-6:00 p.m.)

Intersection & Approach	AM Peak Hour 7:30- 8:30 am		PM Peak Hour 5:00-6:00 pm	
	Pre-Mod.	Post-Mod.	Pre-Mod.	Post-Mod.
	CLV	*CLV*	*CLV*	*CLV*
River/Holton	1,615	1,640	1,322	1,458
River/Burdette	1,489	1,521	1,330	1,367
River/Beech Tree	1,545	1,544	1,331	1,337

Intersection Capacity Analysis - Highway Capacity Manual Methodology

The intersection traffic capacity was also analyzed using the Highway Capacity Manual (HCM) method. This analysis results in the calculation of delay and Level of Service (LOS) for each intersection approach. The delay is a calculation of the average seconds lost for each driver passing through the intersection, as compared to the driver's travel time if the intersection did not exist. LOS is a qualitative measure of intersection quality based on the delay, and uses letter grades (F being the worst, and A best).

Table 15 and Table 16 show the HCM results as the calculation of delay and Level of Service (LOS) for the study intersections. The comparative analysis between past and present conditions in general shows little difference

between the intersections level-of-service, in some cases the intersection delay actually decreases. The differences between the two conditions on the intersections are within the fluctuations of daily traffic. This analysis shows clearly that the impact of the Holton-Arms modifications has no adverse impact on traffic traveling along River Road at the three study intersections.

One significant increase is the delay at the southbound Holton-Arms Driveway movement at the River Road/Holton-Arms intersection for the Holton PM Peak Hour and Total Traffic PM Peak Hour. The increased delay at this movement impacts the calculated delay of the entire intersection, but does not increase the delay experienced by motorists traveling along River Road or out of Royal Dominion Drive.

Table 15: Summary of HCM Results from Simulation for the Study Intersections for Holton Peak Hours (7:15- 8:15 a.m. and 3:30-4:30 p.m.)

Intersection & Approach	AM Peak Hour 7:15- 8:15 a.m.				PM Peak Hour 3:30-4:30 p.m.			
	Pre-Modification		Pre-Modification		Pre-Modification		Post-Modification	
	Delay (sec./veh.)	*Level of Service*	*Delay (sec./veh.)*	*Level of Service)*	*Delay (sec./veh.)*	*Level of Service*	*Delay (sec./veh.)*	*Level of Service*
River Road/Holton-Arms Driveway								
Overall	**40.8**	**D**	**41.0**	**D**	**18.5**	**B**	**34.5**	**C**
Eastbound River Road	45.1	D	42.0	D	12.5	B	17.9	B
Westbound River Road	26.3	C	30.6	C	13.5	B	9.7	A
Northbound Royal Dominion Drive	82.5	F	82.6	F	71.0	E	71.0	E
Southbound Holton-Arms Driveway	78.1	E	79.0	E	91.2	F	278.8	F
River Road/Burdette Road								
Overall								
Northbound Burdette Road	38.8	E	41.0	E	SAT	F	SAT	F
Southbound Burdette Road	52.9	F	57.3	F	SAT	F	SAT	F
River Road/Beech Tree Road								
Overall	**17.7**	**B**	**16.6**	**B**	**11.6**	**B**	**11.6**	**B**
Eastbound River Road	15.1	B	13.6	B	5.6	A	5.7	A
Westbound River Road	10.1	B	9.5	A	10.6	B	10.8	B
Northbound Nevis Road	78.8	E	78.7	E	65.6	E	65.9	E
Southbound Beech Tree Road	77.5	E	77.8	E	65.6	E	65.6	E

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Table 16: Summary of HCM Results from Simulation for the Study Intersections for Total Traffic Peak Hours (7:30-8:30 a.m. and 5:00-6:00 p.m.)

Intersection & Approach	AM Peak Hour 7:30-8:30 am				PM Peak Hour 5:00-6:00 pm			
	Pre-Modification		Pre-Modification		Pre-Modification		Post-Modification	
	Delay (sec./veh.)	*Level of Service*	*Delay (sec./veh.)*	*Level of Service)*	*Delay (sec./veh.)*	*Level of Service*	*Delay (sec./veh.)*	*Level of Service*
River Road/Holton-Arms Driveway								
Overall	**58.1**	**E**	**59.9**	**E**	**11.4**	**B**	**14.3**	**B**
Eastbound River Road	74.1	E	70.6	E	6.3	A	9.1	A
Westbound River Road	29.9	C	37.5	D	11.8	B	12.1	B
Northbound Royal Dominion Drive	83.5	F	83.4	F	69.9	E	71.6	E
Southbound Holton-Arms Driveway	81.2	F	81.2	F	68.6	E	72.7	E
River Road/Burdette Road								
Overall								
Northbound Burdette Road	39.3	E	42.3	E	SAT	E	SAT	F
Southbound Burdette Road	105.5	F	120.1	F	SAT	F	SAT	F
River Road/Beech Tree Road								
Overall	**20.0**	**B**	**19.8**	**B**	**12.6**	**B**	**12.7**	**B**
Eastbound River Road	18.2	B	18.1	B	6.1	A	6.1	A
Westbound River Road	10.8	B	10.4	B	13.6	B	13.9	B
Northbound Nevis Road	80.9	F	80.7	F	64.4	E	64.4	E
Southbound Beech Tree Road	77.5	E	77.5	E	65.6	E	65.6	E

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CONCLUSIONS

The conclusion of the Holton-Arms School traffic characteristics based on the new traffic counts, new data observations and analyses are as follows:

- The trip generation analysis did not reveal any other significant changes. The trip rate per student remains unchanged in the AM Peak, and the number of trips are up 13.5% in the PM Peak due to a programmatic administrative change, one which permits parents and school officials to better coordinate transportation for their children attending Holton-Arms. This does not result in a traffic increase;
- The overall traffic generated by the Holton-Arms School has remained virtually unchanged since 2003;
- The percent of school related traffic as compared to the total intersection traffic has remained consistent, increasing slightly from 2003 to 2007 for both school and total traffic peak hours; and
- Using the County LATR Guidelines and HCM methodologies, intersection capacity analyses show that the intersection of River Road and the Holton-Arms driveway operates at acceptable conditions along the River Road eastbound and westbound movements. The northbound and southbound movements operate with high delays during both the AM and PM Peak hours.

The simulation study results that compared the pre- and post-modification impact of traffic concluded the following:

- There were no other significant changes in travel times and queue lengths for the study intersections. Also, there were no significant changes in intersection capacity for the study intersections. Therefore, traffic conditions pre- and post- modifications are similar, or within the fluctuations of daily traffic, and no adverse impact on traffic trips, turning movements, delay, or safety have resulted from the approval of modifications at the study intersections; and
- The PM Peak hour southbound movement at the intersection of River Road/Holton-Arms has decreased the intersection level of service. This increase delay impacts the southbound movement only, (or the wait time for the vehicles leaving the school) and does not impact the other movements at the intersection. The cause of this delay could be due to the change in school schedule. The right-turn southbound movement volume has increased from 148 to 220 vehicles in the Holton PM Peak Hour.

Additional findings based on the new traffic count, new data observations and analyses are as follows:

- The nature of River Road as a major commuting route leads to operations of the traffic signal that creates a long left turning queue into the school in the morning;
- Safety records show that there are no significantly high accident rates for the study intersections and that the study area accident rates were shown to be consistently lower than statewide rates between 2003 and 2005; and
- Pedestrian volumes were found to be very low, but these levels are consistent with counts from 2005.

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ATTACHMENT 7

Traffic Impact Study APPENDIX

FINAL

Holton-Arms School

7303 River Road, Bethesda, Maryland

July 2, 2007

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Appendix A: 2007 Turning Movement Counts

Time	NB Royal Dominion Drive				EB River Road				SB Holton-Arms Driveway				Westbound River Road			
	Right	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*	*Right*	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*
5:00 AM	0	0	0	0	0	65	1	0	0	0	0	0	0	30	1	0
5:15 AM	0	0	0	0	1	107	1	0	0	0	0	0	1	32	1	0
5:30 AM	0	0	0	0	0	171	3	0	0	0	0	0	1	36	0	0
5:45 AM	1	0	0	0	0	193	4	0	2	0	0	0	1	71	0	0
6:00 AM	2	0	1	0	0	198	2	0	1	0	3	0	0	85	0	0
6:15 AM	2	0	1	0	0	282	7	0	5	0	4	0	6	89	0	0
6:30 AM	3	0	1	0	1	347	10	0	0	0	2	0	2	147	0	0
6:45 AM	4	1	1	0	2	507	14	0	1	0	0	0	8	158	0	0
7:00 AM	9	0	3	0	0	621	21	0	9	0	5	0	12	213	1	0
7:15 AM	4	0	4	0	0	543	57	0	20	0	8	0	19	307	7	0
7:30 AM	14	2	1	0	4	608	82	0	52	0	21	0	51	330	4	0
7:45 AM	7	1	12	0	5	584	129	0	78	2	44	2	70	430	4	0
8:00 AM	9	1	10	0	23	575	62	0	56	3	58	2	56	466	24	0
8:15 AM	32	0	38	0	21	630	16	1	8	0	5	1	8	397	17	0
8:30 AM	23	0	24	1	12	574	11	0	6	0	4	1	3	401	8	0
8:45 AM	11	1	15	0	4	556	5	1	10	0	5	0	4	366	3	0
9:00 AM	12	0	6	0	2	598	1	1	1	0	7	0	2	335	5	0
9:15 AM	4	0	7	0	1	595	3	0	4	1	2	0	4	300	4	0
9:30 AM	5	26	2	0	4	501	6	0	6	0	2	0	2	322	1	0
9:45 AM	5	0	12	0	1	447	5	0	4	0	2	0	4	297	0	0
10:00 AM	2	0	6	0	0	396	5	0	4	0	0	0	6	278	0	0
10:15 AM	2	0	9	0	2	379	1	0	4	0	0	0	3	283	1	0
10:30 AM	5	0	11	0	8	371	1	0	5	0	0	1	1	282	0	0
10:45 AM	2	0	5	0	2	337	8	0	2	0	4	0	2	241	1	0
11:00 AM	1	1	4	0	3	334	2	0	3	0	4	2	3	236	2	0
11:15 AM	6	0	2	0	1	352	3	0	1	2	2	2	5	243	0	0
11:30 AM	0	0	2	0	0	347	4	0	4	0	3	3	5	286	0	0
11:45 AM	1	0	2	0	2	336	6	0	5	0	4	0	10	320	0	0
12:00 PM	5	0	5	0	1	314	5	0	5	2	5	3	8	293	0	0
12:15 PM	8	0	9	0	6	331	5	0	13	0	5	1	3	319	0	0
12:30 PM	6	1	5	0	11	340	2	0	5	1	1	0	9	335	0	0
12:45 PM	10	1	21	0	7	322	3	0	28	0	5	0	1	330	1	0
1:00 PM	2	0	5	0	3	277	4	0	7	0	1	0	3	333	0	1
1:15 PM	1	1	8	0	1	314	8	0	9	0	1	0	5	349	0	0
1:30 PM	0	0	4	0	1	332	9	0	11	1	8	0	4	377	8	0
1:45 PM	6	0	3	1	4	311	6	0	6	0	3	0	2	377	1	0
2:00 PM	2	0	3	0	3	328	7	0	5	1	1	0	2	432	1	0
2:15 PM	2	7	4	0	8	320	7	0	3	0	3	0	3	464	8	0
2:30 PM	5	0	4	2	16	348	9	0	16	0	6	0	6	467	11	0
2:45 PM	23	4	36	0	20	339	22	0	6	0	1	0	6	477	14	0
3:00 PM	22	1	19	1	6	331	35	1	6	1	6	3	13	503	8	1
3:15 PM	8	3	9	0	0	329	45	0	7	0	7	2	21	561	7	0
3:30 PM	3	0	10	0	2	392	54	0	66	0	41	0	25	511	7	0
3:45 PM	4	0	4	0	4	363	41	2	67	0	33	0	19	535	6	0
4:00 PM	6	0	6	1	1	373	23	1	48	1	28	0	25	548	3	0
4:15 PM	3	0	6	0	4	387	15	0	39	1	9	0	22	503	10	0
4:30 PM	6	0	3	0	2	401	13	0	31	0	9	0	10	497	3	0
4:45 PM	4	2	6	1	1	387	14	1	27	0	19	0	28	511	0	1
5:00 PM	4	6	5	0	4	390	18	1	13	0	11	0	14	525	9	0
5:15 PM	6	0	7	0	3	449	19	0	24	2	18	0	14	559	7	0
5:30 PM	4	0	3	0	1	405	31	0	58	0	21	0	11	590	6	0
5:45 PM	6	3	4	0	2	447	25	0	28	0	22	0	7	578	6	0
6:00 PM	3	0	4	0	2	444	10	1	19	1	17	0	12	511	7	0
6:15 PM	5	0	5	0	1	432	9	0	24	0	11	0	4	589	10	1
6:30 PM	9	0	2	0	0	406	11	0	32	0	24	0	9	558	8	0
6:45 PM	7	0	4	0	1	406	14	0	24	0	11	1	8	482	6	0
7:00 PM	3	0	2	1	2	375	5	0	4	0	3	0	2	467	7	0
7:15 PM	7	0	4	0	2	322	4	0	14	1	2	0	2	387	3	0
7:30 PM	3	1	2	0	2	276	0	0	1	0	1	0	0	405	6	0
7:45 PM	0	0	1	0	0	241	3	0	2	0	2	0	0	356	2	0
8:00 PM	2	0	0	0	1	173	1	0	4	0	4	0	1	321	3	0
8:15 PM	0	0	0	0	1	209	2	0	4	0	0	0	0	288	6	0
8:30 PM	2	0	2	0	1	183	0	0	1	0	1	0	0	347	5	0
8:45 PM	1	0	1	0	1	156	0	0	1	0	0	0	0	250	1	0

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Appendix B: 2007 Turning Movement Counts

Time	SB Beech Tree Rd				WB River Road				NB Beech Tree Rd				EB River Road			
	Right	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*	*Right*	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*
5:00 AM																
5:15 AM																
5:30 AM																
5:45 AM																
6:00 AM																
6:15 AM																
6:30 AM	10	0	3	0	2	120	1	0	1	0	3	0	6	328	6	0
6:45 AM	7	2	9	0	6	161	6	1	4	0	4	0	12	487	6	0
7:00 AM	5	3	11	0	3	210	8	1	9	0	6	0	8	598	8	1
7:15 AM	10	3	12	0	10	328	9	1	8	1	5	0	12	543	5	0
7:30 AM	24	4	19	0	3	343	3	0	4	6	9	0	19	628	13	0
7:45 AM	22	5	13	1	14	475	17	1	13	3	42	0	30	604	6	0
8:00 AM	30	7	25	0	19	441	13	0	10	4	36	0	15	596	17	0
8:15 AM	20	5	23	0	14	368	4	1	4	1	16	0	20	600	27	0
8:30 AM	27	5	22	0	11	352	8	1	4	3	7	0	6	611	8	0
8:45 AM	14	2	23	0	14	337	5	0								
9:00 AM																
9:15 AM																
9:30 AM																
9:45 AM																
10:00 AM																
10:15 AM																
10:30 AM																
10:45 AM																
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12:45 PM																
1:00 PM																
1:15 PM																
1:30 PM																
1:45 PM																
2:00 PM																
2:15 PM																
2:30 PM	15	1	16	0	5	456	9	0	6	2	10	0	15	337	12	0
2:45 PM	15	5	5	0	13	478	11	0	9	3	8	1	25	330	11	1
3:00 PM	11	6	10	0	12	523	9	0	5	5	36	0	27	350	15	1
3:15 PM	7	8	6	0	11	557	12	4	5	8	17	0	19	321	25	1
3:30 PM	30	9	24	0	14	517	3	0	9	1	11	0	10	398	18	0
3:45 PM	8	2	7	1	15	537	14	1	11	3	12	0	14	390	9	0
4:00 PM	12	2	10	0	24	548	9	1	5	1	13	0	12	370	16	0
4:15 PM	9	1	12	0	12	503	9	0	8	7	6	0	9	351	14	0
4:30 PM	8	11	17	1	16	497	10	1	5	4	9	0	12	377	13	0
4:45 PM	8	2	10	0	12	511	14	2	13	4	9	0	6	401	10	1
5:00 PM	8	1	20	0	15	540	7	0	4	8	15	0	10	390	10	0
5:15 PM	8	2	17	0	19	538	2	0	7	3	9	0	13	426	21	0
5:30 PM	9	1	10	0	19	580	6	0	3	1	11	0	7	432	16	0
5:45 PM	7	2	9	0	14	558	8	2	8	8	8	1	9	457	18	0
6:00 PM	11	6	11	0	19	526	6	0	7	3	8	1	6	447	17	0
6:15 PM	6	5	12	0	11	593	10	1	5	2	8	0	6	429	17	0
6:30 PM	12	0	5	0	12	561	6	0	4	2	6	0	8	416	6	0
6:45 PM	12	1	10	0	12	446	8	0	2	5	3	0	11	403	14	0
7:00 PM																
7:15 PM																
7:30 PM																
7:45 PM																
8:00 PM																
8:15 PM																
8:30 PM																
8:45 PM																

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Appendix C: 2007 Turning Movement Counts

Time	SB Burdette Rd				WB River Road				NB Burdette Rd				EB River Road			
	Right	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*	*Right*	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*
5:00 AM																
5:15 AM																
5:30 AM																
5:45 AM																
6:00 AM																
6:15 AM																
6:30 AM	13	0	5	0	9	120	0	0	0	0	0	0	1	339	6	0
6:45 AM	13	0	2	0	6	158	0	0	0	0	1	0	0	435	18	0
7:00 AM	20	0	3	0	1	209	0	0	4	0	1	0	1	639	18	0
7:15 AM	29	0	1	0	2	329	0	0	3	0	0	0	3	621	20	0
7:30 AM	27	0	7	0	14	350	0	0	3	0	0	0	4	676	19	0
7:45 AM	22	0	4	0	16	475	0	0	4	0	0	0	1	669	26	0
8:00 AM	33	0	6	0	12	502	0	0	2	0	0	0	4	650	16	0
8:15 AM	29	0	6	0	9	436	1	0	6	0	0	0	3	621	20	0
8:30 AM	28	0	5	0	24	379	0	0	0	0	0	0	3	559	16	0
8:45 AM	24	1	6	0	5	359	0	0	2	0	1	0	4	598	26	0
9:00 AM																
9:15 AM																
9:30 AM																
9:45 AM																
10:00 AM																
10:15 AM																
10:30 AM																
10:45 AM																
11:00 AM																
11:15 AM																
11:30 AM																
11:45 AM																
12:00 PM																
12:15 PM																
12:30 PM																
12:45 PM																
1:00 PM																
1:15 PM																
1:30 PM																
1:45 PM																
2:00 PM																
2:15 PM																
2:30 PM	31	0	4	0	20	451	0	0	1	0	1	0	5	231	14	0
2:45 PM	32	0	6	0	9	487	0	0	2	0	0	0	9	260	24	0
3:00 PM	42	0	12	0	11	528	1	0	2	0	1	0	4	234	19	0
3:15 PM	37	0	7	0	9	567	0	0	2	0	0	0	5	314	25	0
3:30 PM	33	0	14	0	18	547	0	0	0	0	1	0	3	290	18	0
3:45 PM	20	0	3	0	9	583	0	0	1	0	2	0	0	328	32	0
4:00 PM	24	0	4	0	19	557	1	0	3	0	0	0	1	275	33	0
4:15 PM	20	0	4	0	17	542	4	0	2	0	0	0	2	366	55	0
4:30 PM	24	0	9	0	13	503	0	0	1	0	0	0	2	245	23	0
4:45 PM	28	0	4	0	24	490	0	0	1	0	1	0	5	288	25	0
5:00 PM	12	0	3	0	14	519	1	0	1	0	1	0	4	302	23	0
5:15 PM	22	0	5	0	16	502	1	0	0	0	0	0	1	296	32	0
5:30 PM	12	0	0	0	46	605	0	0	2	0	0	0	4	409	50	0
5:45 PM	19	0	7	0	25	586	0	0	1	0	1	0	1	446	16	0
6:00 PM	30	0	1	0	11	542	0	0	2	1	1	0	3	442	25	0
6:15 PM	18	0	3	0	15	612	1	0	4	0	0	0	13	432	46	0
6:30 PM	40	0	2	0	17	559	0	0	1	0	0	0	3	406	39	0
6:45 PM	19	0	1	0	12	504	0	0	1	0	3	0	5	343	30	0
7:00 PM																
7:15 PM																
7:30 PM																
7:45 PM																
8:00 PM																
8:15 PM																
8:30 PM																
8:45 PM																

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Appendix D: 2007 Holton Arms School Movement Vehicle Queue Counts

AM			PM		
Time:	Through & Left Lanes	Right Lanes	Time:	Through & Left Lanes	Right Lanes
7:15	2	0	3:00	0	0
	0	0		0	0
	0	0		1	2
	0	0		0	2
	0	0		0	0
	2	0		0	0
7:30	3	2		0	0
	3	1	3:15	0	0
	4	2		0	0
	0	0		0	0
	0	0		1	2
	6	4		0	0
	1	1		4	1
7:45	0	0		0	2
	3	0	3:30	4	1
	4	1		0	0
	11	5		0	0
	11	0		12	7
	12	7		7	4
	11	8		5	9
8:00	15	0		5	11
	11	3	3:45	10	12
	10	2		4	3
	13	5		5	11
	0	0		4	6
	0	0		8	9
	0	0		5	9
8:15	0	0			
	0	0			
	0	0			
	0	1			
	0	0			
8:15	0	0			
	0	0			
	0	0			
	0	0			
	0	0			
	0	0			
	0	0			

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Appendix E: 2007 Burdette Road Movement Vehicle Queue Counts

AM		AM		AM		PM	
Time:	Queue:	Time:	Queue:	Time:	Queue:	Time:	Queue:
6:30	0	7:30	0	8:30	0	3:00	6
	0		0		0		5
	0		0		2		2
	0		0		0		0
	0		3		0		4
	0		2		0		0
	0		0		3		0
	0		2		0		0
6:45	0	7:45	0			3:15	3
	0		0				5
	0		0				2
	0		0				0
	0		0				0
	0		0				0
	0		0				0
	0		0				0
7:00	0	8:00	0			3:30	0
	0		4				0
	0		3				0
	0		2				3
	0		0				0
	0		0				0
	0		0				6
	0		0				5
7:15	0	8:15	0			3:45	0
	2		2				0
	0		0				0
	0		0				0
	0		0				0
	0		0				3
	0		0				0
	0		0				0

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Appendix F: 2007 Beech Tree Road Movement Vehicle Queue Counts

AM		AM		PM		PM	
Time:	Queue:	Time:	Queue:	Time:	Queue:	Time:	Queue:
6:30	0	7:30	6	3:00	2	3:45	2
	0		4		3		3
	0		4		5		2
	0		5		2		3
	1		3		3		3
	0		2		2		1
	0		0		0		0
	1		1		0		0
6:45	2	7:45	4	3:15	1	4:00	7
	2		2		2		2
	2		1		1		6
	1		2		4		3
	1		3		2		3
	1		5		1		4
	2		6		0	4:15	6
	4	8:00	5		0		5
7:00	0		8	3:30	9		2
	0		4		10		4
	2		3		14		0
	2	8:15	9		5		1
	0		5		7		
	0		8		6		
	2		2		0		
	2		8		0		
7:15	0						
	2						
	0						
	2						
	5						
	1						
	1						
	0						

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Appendix G: 2007 Eastbound River Road Left Turn Movement Vehicle Queue Counts at Beech Tree

AM		AM		PM		PM	
Time:	Queue:	Time:	Queue:	Time:	Queue:	Time:	Queue:
6:30	0	7:30	0	3:00	0	4:00	2
	0		0		1		0
	0		2		0		0
	0		0		1		1
	0		1		1		1
	0		2		1		0
	0		1		0		0
	0		1		0		0
6:45	0	7:45	1	3:15	1	4:15	0
	0		3		0		0
	0		4		0		2
	0		5		1		0
	1		3		3		0
	1		2		0		0
	1		1		0		0
	4		0		0		0
7:00	2	8:00	3	3:30	0		
	0		4		2		
	0		2		0		
	2		1		0		
	2		0		2		
	0		0		0		
	0		0		0		
	1		0		0		
7:15	1	8:15	1	3:45	0		
	0		1		1		
	1		1		2		
	2		0		1		
	1		0		3		
	1		0		1		
	1		0		0		
	0		0		0		

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Appendix H: 2007 AM Eastbound River Road Vehicle Queue Counts at Holton Arms Driveway

Eastbound Through		Eastbound Left	
Time:	Queue:	Time:	Queue:
7:15	26	7:15	3
	28		1
	52		5
	35		7
7:30	40	7:30	3
	40		13
	45		10
	47		18
	50		15
7:45	49	7:45	18
	45		18
	30		19
	55		18
	40		15
8:00	60	8:00	19
	58		7
	40		9
	64		2
	44		4
8:15	55	8:15	2
	52		1
	63		0
	61		2
	56		1

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Appendix I: 2007 PM Eastbound River Road Vehicle Queue Counts at Holton Arms Driveway

Eastbound Through		Eastbound Left	
Time:	Queue:	Time:	Queue:
3:00 PM	6	3:00 PM	3
	15		2
	5		5
	7		5
	12		4
	9		8
	3		5
3:15 PM	3	3:15 PM	4
	4		3
	18		3
	18		2
	7		5
	13		6
	6		6
3:30 PM	15	3:30 PM	7
	6		3
	14		9
	16		4
	11		8
	10		4
	9	3:45 PM	7
3:45 PM	24		3
	5		3
	21		12
	5		2
	13		4
	21		

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Appendix J: 2007 AM Westbound River Road Vehicle Queue Counts at Holton Arms Driveway

Westbound Through		Westbound Left	
Time:	Queue:	Time:	Queue:
7:15	20	7:15	0
	13		0
	29		0
	28		0
7:30	42	7:30	1
	27		0
	34		0
	34		0
	33	7:45	0
7:45	36		0
	38		0
	43		0
	50	8:00	0
	53		0
8:00	56		0
	46		4
	49	8:15	0
	47		0
	37		0
8:15	46		0
	28		0
	41		
	32		
	31		

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Appendix K: 2007 PM Westbound River Road Vehicle Queue Counts at Holton Arms Driveway

Westbound Through		Westbound Left	
Time:	Queue:	Time:	Queue:
3:00 PM	19	3:00 PM	1
	21		0
	36		1
	43		1
	52		2
	64		0
3:15 PM	65	3:15 PM	0
	42		1
	40		0
	33		0
	24		0
	29		1
	43	3:30 PM	2
3:30 PM	51		1
	42		2
	56		1
	52		0
	61		1
	51	3:45 PM	3
3:45 PM	64		0
	44		0
	55		1
	52		0
	63		
	61		
	56		

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Appendix L1: 2007 AM Travel Time Runs Along River Road from March 20, 2007

Travel Time Runs	EASTBOUND									
AM	6:30-7	6:30-7	7:30-8	7:30-8	7:30-8	7-8	8-9	8-9	8-9	AVG
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 9	Run 10	
Captial Beltway West	0	0	0	0	0	0	0	0	0	
Captial Beltway East	18	16	16	16	18	16	16	15	16	
Burdettle	33	30	35	32	35	31	51	42	32	
Holton/Royal Dom	48	60	98	99	78	48	93	63	81	
BeechTree	77	96	135	142	136	91	130	101	115	
Wilson Ln	101	154	167	176	174	127	166	143	157	
Segment Travel Time (seconds)	44	66	100	110	101	60	79	59	83	78

Travel Time Runs	WESTBOUND									
AM	6:30-7	6:30-7	7:30-8	7:30-8	7:30-8	7-8	8-9	8-9	8-9	AVG
	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 9	Run 10	
Wilson Ln	0	0	0	0	0	0	0	0	0	
BeechTree	34	49	48	48	34	33	11	31	31	
Holton/Royal Dom	67	80		182	160	157	91	64	81	
Burdettle	97	95		202	179	176	110	81	102	
Captial Beltway East	111	109		229	199		124	94	116	
Captial Beltway West	125	129								
Segment Travel Time (seconds)	63	46		154	145	143	99	50	71	96

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Appendix L2: 2007 PM Travel Time Runs Along River Road from March 20, 2007

Travel Time Runs	EASTBOUND						
PM part 1	3-4	3-4	3-4	3-4	4-5	4-5	AVG
	Run 11	Run 12	Run 13	Run 14	Run 15	Run 16	
Captial Beltway West	0	0	0	0	0	0	
Captial Beltway East	16	16	14	16	15	17	
Burdettle	31	31	26	32	31	32	
Holton/Royal Dom	49	48	39	47	50	51	
BeechTree	79	89	66	77	81	85	
Wilson Ln	166	170	137	130	167	116	
Segment Travel Time (seconds)	48	58	40	45	50	53	*49*

Travel Time Runs	WESTBOUND						
PM part 1	3-4	3-4	3-4	3-4	4-5	4-5	AVG
	Run 11	Run 12	Run 13	Run 14	Run 15	Run 16	
Wilson Ln	0	0	0	0	0	0	
BeechTree	114	32	34	44	36	112	
Holton/Royal Dom	245	98	139	186	198	260	
Burdettle	265	116	157	210	217	278	
Captial Beltway East	280	131	172	227	233	292	
Captial Beltway West		196	208	262	253	330	
Segment Travel Time (seconds)	151	84	123	166	181	166	*145*

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Martin O'Malley, *Governor*
Anthony G. Brown, *Lt. Governor*

SHA State Highway Administration

John D. Porcari, *Secretary*
Neil J. Pedersen, *Administrator*

Maryland Department of Transportation

April 25, 2007

Mr. Jeff Price
Gorove/Slade Associates, Inc.
1140 Connecticut Avenue, NW
Suite 700
Washington, D.C. 20036

RE: Accident Data
MD 190 from Burdette Road to Springfield Drive
Montgomery County

Dear Mr. Price:

Thank you for your recent e-mail requesting accident information for the above-cited location. Enclosed are a study worksheet, accident summary, accident history and line diagram for the three-year study period, 2003 through 2005. These forms portray the accident experience by year, severity, collision type, probable cause, location, accident rate per 100 million vehicle miles of travel (acc/100mvm) and comparable weighted statewide average accident rate for all similarly designed highways under state maintenance.

There were 156 total police-reported accidents within the study area, of which rear end collisions (79) were most predominant by far. None of the individual accident categories met the criteria for being *significantly high* during the overall study period. Should you have any questions regarding this information, please contact me at (410) 787-5834, or via e-mail at: dmcmullen1@sha.state.md.us .

Sincerely,

Dennis McMullen
Traffic Development & Support Division

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Enclosures

cc: Mr. Ken Harn Mr. Darrell B. Mobley Mr. Jeffrey Wentz

My telephone number/toll-free number is _____
Fax: __ 410-787-4082, __ 410-553-6399, __ 410-582- 9469, __ 410-787-5823 __ 410-787-2863, __ 410-787-3798
Maryland Relay Service for Impaired Hearing or Speech: 1.800.735.2258 Statewide Toll Free

Street Address: 7491 Connelley Drive · Hanover, Maryland 21076 · Phone: 410.787.5800 · www.marylandroads.com

Maryland State Highway Administration
Office of Traffic and Safety - Traffic Development and Support Division
SH .1 ADC Study Worksheet Output rev. 06/2006-1

Name: Dennis McMullen
Date: 04/25/2007

Location: MD 190 FROM BURDETTE ROAD TO SPRINGFIELD DRIVE
Logmile: From 011.78 To 014.42 Length: 2.64
County: Montgomery Period: January 1, 2003 To December 31, 2005 Note(s):
Type Controls: 3U-100%
* Significantly Higher than Statewide

YEAR ▸	2003	2004	2005	TOTAL	STUDYRATE	STWDRATE
FATAL					0.0	1.5
No. KILLED						
INJURY	21	23	23	67	47.4	64.8
No. INJURED	31	29	36	96		
PROP DAMAGE	37	22	30	89	62.9	77.6
TOTAL ACC	58	45	53	156	110.3	143.8
RATE	110.2	100.2	120.6			
WAADT	54600	46500	45600			
VMT(millions)	52.6	44.9	43.9	141.4		
OPPOSITE DIR		1	1	2	1.4	2.4
REAR END	31	21	27	79	55.9	61.1
SIDESWIPE	2	1		3	2.1	10.5
LEFT TURN	8	3	2	13	9.2	12.1
ANGLE	6	10	11	27	19.1	20.1
PEDESTRIAN	1	1		2	1.4	2.5
PARKED VEH					0.0	2.1
FD OBJECT	7	3	7	17	12.0	17.0
OTHER	3	5	5	13	9.2	10.7
U-TURN		2		2		
BACKING		1	1	2		
ANIMAL	1		1	2		
RAILROAD						
EXPL./FIRE						
OVERTURN		1	1	2		
OTHER/UNK	2	1	2	5		
TRCK REL ACC	4	4	2	10	7.1	9.8
NIGHTTIME	14	9	12	35	22 %	32 %
WET SURFACE	15	17	8	40	25 %	28 %
ALCOHOL REL	1	2	5	8	5 %	8 %
INTERSEC REL	39	33	30	102		
TOTAL VEH	119	94	103	316		
TOTAL TRUCKS	4	4	2	10		
PERCENT TRKS	3.4	4.3	1.9	3.2		

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Comments:

Appendix M3: SHA Accident Data Page 16

Maryland State Highway Administration
Office of Traffic and Safety - Traffic Development and Support Division
SHA 52.1 ADC Combined Summary Output rev. 06/2006-1

Name: Dennis McMullen
Date: 04/25/2007

Location: MD 190 FROM BURDETTE ROAD TO SPRINGFIELD DRIVE
Logmile: From 011.78 To 014.42 Length: 2.64
County: Montgomery Period: January 1, 2003 To December 31, 2005 Note(s):

SEVERITY	Fatal	Injury	P-Damage	Total
Accidents		67	89	156
Veh Occ		94		
Pedestrian		2		

DAY OF THE WEEK	SUN	MON	TUE	WED	THU	FRI	SAT	UNK
	13	23	22	27	23	25	23	

MONTH OF THE YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK
	16	10	12	12	14	12	5	11	11	16	19	18	

CONDITION:	DRIVER	PED
Normal:	141	2
ALCOHOL:	8	
Other:	7	

TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK
AM:	2		1	2	4	2	4	13	6	17	10	13	
PM:	6	8	13	6	12	8	14	3	3	3	3	3	

VEHICLES INVOLVED PER ACCIDENT	1	2	3	4	5	6+	UNK	TOTAL
	24	107	22	3				316

VEHICLE TYPE			
1	M_Cycle/Moped	2	Trk_Trailer
185	Passenger Veh	1	Passenger Bus
30	Light Truck	3	School Bus
8	Heavy Truck	2	Emergency Veh
84	Other Types		

SURFACE	
40	WET
108	DRY
8	SNO/ICE
	MUD
	OTHER

MOVEMENTS	NORTH			SOUTH			EAST			WEST		
	LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT
	8	11		5	27	1	6	85	3	6	127	

OTHER MOVEMENTS 37

PROBABLE CAUSES			
2	Inf. of Drugs		Improper Parking
5	Inf. of Alcohol		Passenger Interfere/Obstr.
	Inf. of Medication		Illegally in Roadway
	Inf. of Combined Substance		Bicycle Violation
	Physical/Mental Difficulty		Clothing not Visible
2	Fell Asleep/Fainted etc.		Smog, Smoke
85	Fail to give full attent.	1	Sleet, Hail, Frz. Rain
	Lic. Restr. Non-comply		Blowing Sand, Soil, Dirt
17	Fail to Yield Rightofway		Severe Crosswinds
	Fail to Obey Stop Sign	2	Rain, Snow
3	Fail to Obey Traffic Sig	1	Animal
2	Fail to Obey Other Contr.	1	Vision Obstruction
1	Fail to Keep Right of Ctr	1	Vehicle Defect
	Fail to Stop for Sch. Bus		Wet
	Wrong Way on One Way		Icy or Snow Covered
1	Exceeded Speed Limit		Debris or Obstruction
8	Too Fast for Conditions		Ruts, Holes, Bumps
8	Followed too Closely		Road Under Construction
2	Improper Turn		Traffic Cntrl Device Inop.
3	Improper Lane Change		Shoulders Low, Soft, High
	Improper Backing		
	Improper Passing	11	Other or Unknown
	Improper Signal		

COLLISION TYPES		FAT	INJ	PROP	TOTAL
OPPOSITE DIR	RELATED:		2		2
	UNRELATED:				
REAR END	RELATED:		21	22	43
	UNRELATED:		14	22	36
SIDESWIPE	RELATED:			2	2
	UNRELATED:		1		1
LEFT TURN	RELATED:		8	5	13
	UNRELATED:				
ANGLE	RELATED:		13	14	27
	UNRELATED:				
PEDESTRIAN	RELATED:		1		1
	UNRELATED:		1		1
PARKED VEH.	RELATED:				
	UNRELATED:				
OTHER CT	RELATED:		2	5	7
	UNRELATED:			6	6

F	BRIDGE	01			
I	BUILDING	02			
X	CULVERT/DITCH	03			
E	CURB	04	2	6	8
D	GUARDRAIL/BARRIER	05		2	2
	EMBANKMENT	06		1	1
O	FENCE	07			
B	LIGHT POLE	08	2	1	3
J	SIGN POST	09		1	1
E	OTHER POLE	10		2	2
C	TREE/SHRUBBERY	11			
T	CONSTR. BARRIER	12			
S	CRASH ATTENUATOR	13			
	OTHER FIXED OBJECT				

WEATHER		ILLUMINATION		TOTALS	
16	CLEAR/CLDY	115	DAY		
	FOGGY	6	DAWN/DUSK		
34	RAINING	33	DARK - LIGHTS ON	2003	58
5	SNOW/SLEET	2	DARK - NO LIGHTS	2004	45
1	OTHER		OTHER	2005	53

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Maryland State Highway Administration
Office of Traffic and Safety - Traffic Development and Support Division
SHA 52.1 ADC Combined Logmile History Output rev. 06/2006-1

Name: Dennis McMullen
Date: 04/25/2007

Location: MD 190 FROM BURDETTE ROAD TO SPRINGFIELD DRIVE
County: Montgomery Period: January 1, 2003 To December 31, 2005

Logmile: From 011.78 To 014.42 Length: 2.64
Note(s):

LOGMILE	IR	DATE	SEVERITY	TIME	LIGHT	SUR FACE	ALC	FX OB	CLSN TYPE	MOVE V1	MOVE V2	PROBABLE CAUSE
MD0190												
11.78	✓	020803	PROPERTY	9P	NIGHT	WET			SDSWP	WS	WS	IMPROPER LANE CHANGE
11.78	✓	030503	PROPERTY	6A	DAY	WET			ANGLE	NL	ES	FAIL TO GIVE FULL TIME/ATTENT
11.78	✓	101503	PROPERTY	4P	DAY	DRY			ANGLE	SS	WS	FAIL TO YIELD RIGHT OF WAY
11.78	✓	112204	1 Inj.	7A	DAY	WET			OTHER	NU	WS	FAIL TO YIELD RIGHT OF WAY
11.78	✓	100704	4 Inj.	6P	DAY	DRY			ANGLE	SL	WS	FAIL TO GIVE FULL TIME/ATTENT
11.78	✓	042804	1 Inj.	4P	DAY	DRY			ANGLE	SL	WS	FAIL TO GIVE FULL TIME/ATTENT
11.78	✓	120704	PROPERTY	8P	NIGHT	WET			ANGLE	SS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.78		060405	PROPERTY	11A	DAY	DRY			RREND	ES	ES	IMPROPER LANE CHANGE
11.79		013105	PROPERTY	10A	DAY	DRY			RREND	SS	SS	FAIL TO GIVE FULL TIME/ATTENT
11.79	✓	051705	PROPERTY	4P	DAY	DRY		04	FXOBJ	ES	na	UNKNOWN OR OTHER CAUSE
11.81		012205	PROPERTY	4P	DAY	SNOW			OTHER	ES	na	TOO FAST FOR CONDITIONS
11.86		061305	PROPERTY	6P	DAY	DRY			RREND	WS	WS	FOLLOWED TOO CLOSELY
11.88	✓	052005	PROPERTY	6P	DAY	WET			ANGLE	SL	ES	FAIL TO YIELD RIGHT OF WAY
11.94		101303	PROPERTY	2P	DAY	DRY			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT
11.95		070204	PROPERTY	10A	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	012203	PROPERTY	9A	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	090503	3 Inj.	8A	DAY	DRY			LFTRN	EL	WS	FAIL TO YIELD RIGHT OF WAY
11.96	✓	050503	PROPERTY	5P	DAY	WET			RREND	WS	WS	FOLLOWED TOO CLOSELY
11.96	✓	042203	PROPERTY	9A	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	041603	1 Inj.	7A	DAY	DRY			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	030203	2 Inj.	11A	DAY	WET			RREND	WS	WS	TOO FAST FOR CONDITIONS
11.96		092203	PROPERTY	7P	NIGHT	WET			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	020904	PROPERTY	7A	DAY	DRY			LFTRN	EL	WS	FAIL TO YIELD RIGHT OF WAY
11.96	✓	120104	1 Inj.	10A	DAY	WET			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	111705	PROPERTY	11A	DAY	DRY			RREND	WS	WS	VEHICLE DEFECT
11.96		111705	PROPERTY	5A	NIGHT	DRY			OTHER	WS	na	ANIMAL
11.96	✓	070605	1 Inj.	5P	DAY	DRY			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	052005	PROPERTY	4P	DAY	WET			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.96	✓	120905	PROPERTY	9A	DAY	SNOW			RREND	WS	WS	TOO FAST FOR CONDITIONS
11.97	✓	110703	1 Inj.	9A	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.97		083004	1 Inj.	4P	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
11.98	✓	111703	1 Inj.	5P	NIGHT	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
12.02		011103	PROPERTY	10P	NIGHT	DRY		08	FXOBJ	WS	na	FAIL TO GIVE FULL TIME/ATTENT
12.25		041105	1 Inj.	4P	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
12.26		101504	1 Inj.	2P	DAY	WET			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
12.26	✓	092604	PROPERTY	7A	DAY	DRY	✓		RREND	WS	WS	UNDER INFLUENCE OF ALCOHOL
12.29		091804	PROPERTY	12P	DAY	WET			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
12.31		120904	PROPERTY	7A	DAY	DRY			RREND	ES	ES	VISION OBSTRUCTION
12.33	✓	012403	PROPERTY	2P	DAY	DRY			RREND	WS	WS	FAIL TO GIVE FULL TIME/ATTENT
12.33	✓	101904	1 Inj.	9A	DAY	WET			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT
12.33		120605	1 Inj.	6P	NIGHT	DRY	✓		RREND	WS	WS	TOO FAST FOR CONDITIONS
12.34	✓	122903	PROPERTY	8A	DAY	DRY			RREND	ES	ES	FAIL TO GIVE FULL TIME/ATTENT

(01)=Bridge (02)=Building (03)=Culver/Ditch (04)=Curb (05)=Guardrail/Barrier (06)=Embankment (07)=Fence
(08)=Light Pole (09)=Sign Post (10)=Other Pole (11)=Tree/Shrubbery (12)=Construc. Barrier (13)=Crash Attenuator

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ADC Combined Logmile History Output Continued...

LOGMILE	IR	DATE	SEVERITY	TIME	LIGHT	SUR FACE	ALC	FX OB	CLSN TYPE	MOVE V1 V2	PROBABLE CAUSE
12.34	✓	102203	1 Inj.	4P	DAY	WET			RREND	WS WS	RAIN, SNOW
12.35		110503	PROPERTY	8A	DAY	ICE			RREND	WS WS	UNDER INFLUENCE OF DRUGS
12.35	✓	102603	1 Inj.	11A	DAY	DRY			ANGLE	ER SS	FAIL TO YIELD RIGHT OF WAY
12.35		111403	PROPERTY	10A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
12.35	✓	111303	PROPERTY	6P	NIGHT	DRY			LFTRN	WL ES	FAIL TO YIELD RIGHT OF WAY
12.35	✓	062004	1 Inj.	10A	DAY	DRY			LFTRN	WL ES	FAIL TO GIVE FULL TIME/ATTENT
12.35	✓	050704	2 Inj.	9A	DAY	DRY			OPDIR	ES WS	FAIL TO YIELD RIGHT OF WAY
12.35	✓	120904	1 Inj.	8P	NIGHT	WET			OTHER	WS EU	FAIL TO GIVE FULL TIME/ATTENT
12.35	✓	011805	PROPERTY	7A	DAY	DRY			ANGLE	SS ES	FAIL TO GIVE FULL TIME/ATTENT
12.35	✓	091905	PROPERTY	3P	DAY	DRY			RREND	WS WS	FOLLOWED TOO CLOSELY
12.36	✓	090303	PROPERTY	9A	DAY	DRY			OTHER	UU WS	FAIL TO GIVE FULL TIME/ATTENT
12.37		070703	PROPERTY	1P	DAY	DRY		06	FXOBJ	ES na	FAIL TO GIVE FULL TIME/ATTENT
12.45		092705	PROPERTY	3P	DAY	DRY			RREND	SS SS	FOLLOWED TOO CLOSELY
12.46		060905	PROPERTY	4P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.69		022605	1 Inj.	10A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
12.70	✓	050103	2 Inj.	9A	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.70		020705	3 Inj.	6P	NIGHT	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.70	✓	110905	1 Inj.	10P	NIGHT	DRY			OPDIR	WS ES	FAIL TO KEEP RIGHT OF CENTER
12.71		032003	2 Inj.	7A	DAY	WET			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.71		122503	PROPERTY	8P	NIGHT	DRY	✓		RREND	NS NS	UNDER INFLUENCE OF ALCOHOL
12.71	✓	032904	1 Inj.	4P	DAY	DRY			RREND	NS NS	FAIL TO GIVE FULL TIME/ATTENT
12.71	✓	121104	PROPERTY	10A	DAY	WET			ANGLE	ES NS	FAIL TO OBEY OTHER CTRL DEVICE
12.71	✓	110404	1 Inj.	4P	DAY	WET			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.71	✓	020604	PROPERTY	6A	NIGHT	ICE			ANGLE	WS NS	FAIL TO GIVE FULL TIME/ATTENT
12.71	✓	022604	PROPERTY	8A	DAY	DRY			ANGLE	NL WS	FAIL TO OBEY OTHER CTRL DEVICE
12.71		110204	1 Inj.	9A	DAY	DRY			RREND	SS SS	FAIL TO GIVE FULL TIME/ATTENT
12.71		081204	2 Inj.	11P	NIGHT	WET			RREND	WS WS	RAIN, SNOW
12.71	✓	012904	2 Inj.	6A	NIGHT	DRY			LFTRN	NL SS	FAIL TO GIVE FULL TIME/ATTENT
12.71	✓	052905	2 Inj.	2P	DAY	DRY			RREND	WS WS	TOO FAST FOR CONDITIONS
12.71	✓	080405	4 Inj.	9A	DAY	DRY			ANGLE	WS SS	FAIL TO OBEY TAFFIC SIGNAL
12.71	✓	100905	PROPERTY	4A	NIGHT	WET	✓	10	FXOBJ	NS na	UNDER INFLUENCE OF ALCOHOL
12.71	✓	082005	1 Inj.	3P	DAY	DRY			ANGLE	SS ES	FAIL TO GIVE FULL TIME/ATTENT
12.71		060105	PROPERTY	9A	DAY	DRY		04	FXOBJ	WS na	UNKNOWN OR OTHER CAUSE
12.71	✓	031305	2 Inj.	11A	DAY	DRY			ANGLE	SS EL	FAIL TO OBEY TAFFIC SIGNAL
12.72		061103	PROPERTY	5P	DAY	DRY			RREND	WS WS	FOLLOWED TOO CLOSELY
12.72	✓	081804	1 Inj.	5P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.73		041405	PROPERTY	8A	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.74		052603	PROPERTY	6P	DAY	DRY		04	FXOBJ	WS na	FELL ASLEEP, FAINTED, ETC.
12.76	✓	051904	1 Inj.	3P	DAY	DRY			RREND	WS WS	TOO FAST FOR CONDITIONS
12.76	✓	021905	PROPERTY	2P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.78		041303	PROPERTY	4A	NIGHT	DRY			OTHER	ES na	FAIL TO GIVE FULL TIME/ATTENT
12.78		051003	PROPERTY	4A	NIGHT	DRY		05	FXOBJ	ES na	FAIL TO GIVE FULL TIME/ATTENT
12.81	✓	010603	1 Inj.	2P	DAY	WET			ANGLE	ES NS	FAIL TO OBEY TAFFIC SIGNAL
12.81	✓	012404	PROPERTY	11A	DAY	SNOW			OTHER	ES UU	UNKNOWN OR OTHER CAUSE
12.84	✓	103005	1 Inj.	4A	NIGHT	DRY	✓	08	FXOBJ	WS na	FAIL TO GIVE FULL TIME/ATTENT
12.86		042303	1 Inj.	2P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
12.93	✓	100705	4 Inj.	6P	DAY	WET			ANGLE	NS ES	FAIL TO YIELD RIGHT OF WAY
13.03	✓	110803	2 Inj.	10A	DAY	DRY			LFTRN	WL ES	FAIL TO GIVE FULL TIME/ATTENT
13.03	✓	111603	1 Inj.	6P	NIGHT	WET			LFTRN	WL ES	FAIL TO YIELD RIGHT OF WAY

(01)=Bridge (02)=Building (03)=Culver/Ditch (04)=Curb (05)=Guardrail/Barrier (06)=Embankment (07)=Fence
(08)=Light Pole (09)=Sign Post (10)=Other Pole (11)=Tree/Shrubbery (12)=Construc. Barrier (13)=Crash Attenuator

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ADC Combined Logmile History Output Continued...

LOGMILE	IR	DATE	SEVERITY	TIME	LIGHT	SUR FACE	ALC	FX OB	CLSN TYPE	MOVE V1 V2	PROBABLE CAUSE
13.03	✓	081203	1 Inj.	2P	DAY	DRY			ANGLE	NS ES	FAIL TO GIVE FULL TIME/ATTENT
13.03	✓	120204	PROPERTY	3P	DAY	DRY			RREND	WS WS	TOO FAST FOR CONDITIONS
13.03		040804	PROPERTY	2A	NIGHT	DRY			OTHER	EU na	FAIL TO GIVE FULL TIME/ATTENT
13.03	✓	061705	PROPERTY	1P	DAY	DRY			RREND	ES ES	FOLLOWED TOO CLOSELY
13.03	✓	010505	PROPERTY	7A	DAY	WET			ANGLE	EL SS	FAIL TO GIVE FULL TIME/ATTENT
13.03	✓	031205	1 Inj.	9P	NIGHT	DRY			ANGLE	SL WS	FAIL TO YIELD RIGHT OF WAY
13.03	✓	010505	1 Inj.	7A	DAY	WET			RREND	SS SS	FAIL TO GIVE FULL TIME/ATTENT
13.03	✓	092805	PROPERTY	11A	DAY	DRY			ANGLE	SS WS	FAIL TO GIVE FULL TIME/ATTENT
13.04		012205	PROPERTY	2P	DAY	SNOW		10	FXOBJ	ES na	UNKNOWN OR OTHER CAUSE
13.33	✓	100705	1 Inj.	11P	NIGHT	WET			LFTRN	NL SS	FAIL TO YIELD RIGHT OF WAY
13.50		032503	PROPERTY	12A	NIGHT	DRY		04	FXOBJ	UU na	FAIL TO GIVE FULL TIME/ATTENT
13.54	✓	071304	1 Inj.	9P	NIGHT	DRY	✓		RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.55	✓	082803	PROPERTY	9A	DAY	DRY			LFTRN	EL WS	FAIL TO YIELD RIGHT OF WAY
13.55		030203	PROPERTY	6A	DAY	WET		09	FXOBJ	ES na	TOO FAST FOR CONDITIONS
13.55	✓	051103	PROPERTY	7P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.55	✓	042203	PROPERTY	9A	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.55	✓	120404	1 Inj.	12P	DAY	DRY			RREND	WS WS	FOLLOWED TOO CLOSELY
13.55	✓	111204	1 Inj.	6P	NIGHT	WET			PED	SR na	FAIL TO GIVE FULL TIME/ATTENT
13.55	✓	052604	PROPERTY	2P	DAY	DRY			ANGLE	ES SL	FAIL TO GIVE FULL TIME/ATTENT
13.55	✓	042205	PROPERTY	7A	DAY	WET	✓		OTHER	EU ES	UNDER INFLUENCE OF ALCOHOL
13.73	✓	010105	2 Inj.	3A	NIGHT	DRY			ANGLE	NS WS	FAIL TO YIELD RIGHT OF WAY
13.80	✓	102503	PROPERTY	12P	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.81		012004	1 Inj.	10A	DAY	DRY		04	FXOBJ	ES na	FAIL TO GIVE FULL TIME/ATTENT
13.81		051905	PROPERTY	7A	DAY	DRY			RREND	WS WS	FOLLOWED TOO CLOSELY
13.82		041404	PROPERTY	9A	DAY	WET			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.82		121705	PROPERTY	3A	NIGHT	ICE	✓		OTHER	ES na	UNDER INFLUENCE OF ALCOHOL
13.83	✓	082103	PROPERTY	5P	DAY	DRY			SDSWP	ER ES	IMPROPER TURN
13.83	✓	050503	PROPERTY	10P	NIGHT	WET			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	012803	2 Inj.	9A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	022603	PROPERTY	7P	NIGHT	WET			LFTRN	NL SS	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	082203	3 Inj.	11P	NIGHT	DRY		04	FXOBJ	UU na	UNKNOWN OR OTHER CAUSE
13.83	✓	121803	PROPERTY	5P	NIGHT	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	062003	1 Inj.	1P	DAY	WET			LFTRN	WL ES	FAIL TO YIELD RIGHT OF WAY
13.83	✓	100903	PROPERTY	11A	DAY	DRY			LFTRN	WL ES	IMPROPER TURN
13.83	✓	033104	PROPERTY	5A	DAY	WET		04	FXOBJ	ES na	UNKNOWN OR OTHER CAUSE
13.83	✓	112304	PROPERTY	6P	NIGHT	WET		04	FXOBJ	ER na	SLEET, HAIL, FREEZING RAIN
13.83	✓	071204	1 Inj.	3P	DAY	DRY			ANGLE	WS NL	FAIL TO YIELD RIGHT OF WAY
13.83	✓	021505	1 Inj.	2P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	060505	1 Inj.	12A	NIGHT	DRY			ANGLE	ES SS	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	122005	2 Inj.	5P	NIGHT	DRY			LFTRN	EL WS	FAIL TO GIVE FULL TIME/ATTENT
13.83		111605	PROPERTY	12P	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.83		101705	PROPERTY	12P	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
13.83	✓	083005	1 Inj.	9A	DAY	DRY		08	FXOBJ	ES na	UNKNOWN OR OTHER CAUSE
13.84	✓	102803	PROPERTY	9A	DAY	DRY			OTHER	WS WS	IMPROPER LANE CHANGE
13.84		092004	1 Inj.	6P	DAY	DRY			SDSWP	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.84	✓	031304	PROPERTY	11A	DAY	DRY			RREND	WS WS	UNKNOWN OR OTHER CAUSE
13.85	✓	043003	PROPERTY	1P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
13.86	✓	031905	1 Inj.	1P	DAY	DRY			RREND	WS WS	UNKNOWN OR OTHER CAUSE
13.86		120905	1 Inj.	12P	DAY	ICE			RREND	SS SS	UNDER INFLUENCE OF DRUGS

OB(01)=Bridge (02)=Building (03)=Culver/Ditch (04)=Curb (05)=Guardrail/Barrier (06)=Embankment (07)=Fence
(08)=Light Pole (09)=Sign Post (10)=Other Pole (11)=Tree/Shrubbery (12)=Construc. Barrier (13)=Crash Attenuator

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ADC Combined Logmile History Output Continued...

LOGMILE	IR	DATE	SEVERITY	TIME	LIGHT	SURFACE	ALC	FX OB	CLSN TYPE	MOVE V1 V2	PROBABLE CAUSE
13.87		013103	1 Inj.	2P	DAY	WET			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
14.03		122705	PROPERTY	10A	DAY	DRY			OTHER	ES ES	FELL ASLEEP, FAINTED, ETC.
14.08		092305	PROPERTY	4P	DAY	DRY		05	FXOBJ	ES na	UNKNOWN OR OTHER CAUSE
14.19		030803	1 Inj.	11A	DAY	DRY			PED	WS na	UNKNOWN OR OTHER CAUSE
14.19	√	112204	PROPERTY	7A	DAY	WET			ANGLE	NL ES	FAIL TO YIELD RIGHT OF WAY
14.19	√	022004	PROPERTY	2P	DAY	DRY			OTHER	SS SU	EXCEEDED SPEED LIMIT
14.33		061803	PROPERTY	6P	DAY	DRY			RREND	WS WS	FAIL TO GIVE FULL TIME/ATTENT
14.33		111905	2 Inj.	1P	DAY	DRY			RREND	SS SS	FAIL TO GIVE FULL TIME/ATTENT
14.38		120203	2 Inj.	8A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
14.40	√	061104	PROPERTY	6P	DAY	WET			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
14.41	√	082703	1 Inj.	7A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
14.41		101705	PROPERTY	11A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
14.42	√	091903	PROPERTY	11A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT
14.42	√	061703	PROPERTY	1P	DAY	WET			ANGLE	ES NL	FAIL TO GIVE FULL TIME/ATTENT
14.42	√	121004	PROPERTY	1P	DAY	WET			ANGLE	WS SS	FAIL TO GIVE FULL TIME/ATTENT
14.42		111304	PROPERTY	11A	DAY	DRY			RREND	ES ES	FAIL TO GIVE FULL TIME/ATTENT

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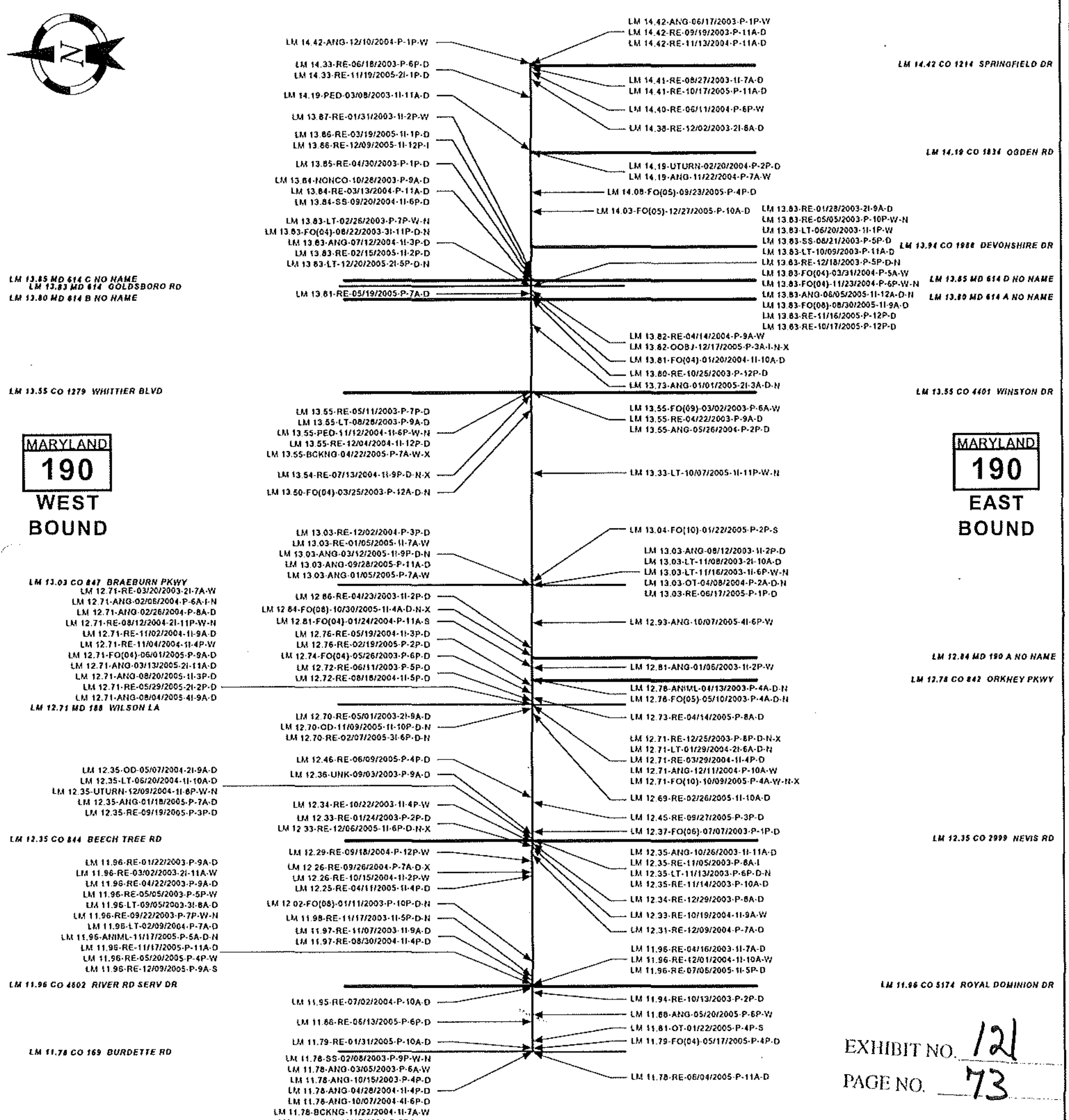
(01)=Bridge (02)=Building (03)=Culver/Ditch (04)=Curb (05)=Guardrail/Barrier (06)=Embankment (07)=Fence
(08)=Light Pole (09)=Sign Post (10)=Other Pole (11)=Tree/Shrubbery (12)=Construc. Barrier (13)=Crash Attenuator

SHA State Highway Administration

Office of Traffic & Safety
Traffic Development & Support Division
Crash Analysis Safety Team

Location: MD 190 from Burdette Road to Springfield Drive
County: MONTGOMERY
Study Period: 01/01/2003 to 12/31/2005
Analyst: Dennis McMullen Date: 04/25/2007



KEY:LogMile-CollisionType (FixedObjectStruck) -Date-Severity-Time-Surface-Illumination-Alcohol

template 06-27-06

.talities
I - Injury
P - Property Damage
OD - Opposite Direction
LT - Left Turn
RE - Rear End
ANG - Angle

SS - Sideswipe
PARKD - Parked Vehicle
PED - Pedestrian
BIKE - Bicycle
PEDAL - Other Pedalcycle
CONVY - Other Conveyance
ANIML - Animal

FO - Fixed Object
OOBJ - Other Object
OT - Overturn
SPILL - Spilled Cargo
JCKKNF - Jackknife
SPRTD - Units Separated
NCOLL - Other Non Collision

OFFRD - Off Road
RUNWY - Downhill Runaway
FIRE - Explosion Fire
BCKNG - Backing
UTURN - U-Turn
OTHR - Other
UNK - Unknown

00 - Not Applicable
01 - Bridge or Overpass
02 - Building
03 - Culvert or Ditch
04 - Curb
05 - Guardrail or Barrier
06 - Embankment
07 - Fence

08 - Light Support Pole
09 - Sign Support Pole
10 - Other Pole
11 - Tree Shrubbery
12 - Construction Barrier
13 - Crash Attenuater
88 - Other
99 - Unknown

N - Night
X - Alcohol
D - Dry Surface
W - Wet Surface
I - Icy Surface
S - Snowy Surface

Appendix N: 2005 Turning Movement Counts

Time	NB Royal Dominion Drive				EB River Road				SB Holton-Arms Driveway				Westbound River Road			
	Right	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*	*Right*	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*
5:00 AM	0	0	0	0	0	82	2	0	0	0	0	0	1	21	0	0
5:15 AM	0	0	1	0	1	104	4	0	1	1	0	0	0	32	0	0
5:30 AM	0	0	0	0	0	168	2	0	0	0	1	0	0	45	0	0
5:45 AM	0	0	0	0	0	199	1	0	0	0	1	0	0	56	0	0
6:00 AM	0	0	2	0	2	209	3	0	0	0	0	0	0	89	1	0
6:15 AM	4	0	1	0	1	275	2	0	1	0	0	2	3	108	1	0
6:30 AM	3	0	2	0	0	307	4	0	1	0	1	0	6	148	2	0
6:45 AM	7	0	2	1	2	460	6	0	2	0	2	0	6	187	2	1
7:00 AM	12	0	0	0	2	519	12	0	3	0	9	0	11	252	2	0
7:15 AM	6	0	11	0	1	576	38	0	15	0	9	0	21	322	6	0
7:30 AM	13	1	5	0	1	540	79	0	31	0	21	0	45	364	2	0
7:45 AM	13	3	4	0	8	568	103	0	72	2	49	2	94	377	11	0
8:00 AM	9	1	19	0	14	569	37	0	51	4	51	0	53	388	12	0
8:15 AM	27	1	43	1	18	643	17	0	9	0	7	1	8	384	15	1
8:30 AM	17	0	20	0	21	590	8	0	10	0	2	0	8	364	7	0
8:45 AM	9	0	12	0	10	603	2	0	1	0	2	0	3	347	3	0
9:00 AM	12	0	7	1	12	622	3	0	2	0	0	0	2	338	5	0
9:15 AM	7	0	4	0	4	520	5	0	5	0	6	0	12	312	4	0
9:30 AM	7	0	6	0	1	590	2	0	4	0	4	0	2	293	1	0
9:45 AM	1	0	8	0	0	510	9	0	5	3	2	0	3	285	4	0
10:00 AM	3	1	5	0	4	434	6	0	5	1	3	0	3	291	2	0
10:15 AM	8	39	5	0	0	345	7	0	7	0	5	0	4	255	4	0
10:30 AM	5	0	16	0	0	347	0	0	2	0	2	0	0	283	2	0
10:45 AM	3	1	9	0	2	577	5	0	2	0	2	0	2	285	1	0
11:00 AM	7	0	0	0	4	410	2	0	2	0	5	0	2	294	2	0
11:15 AM	3	0	1	0	2	508	7	0	7	0	4	0	3	333	0	0
11:30 AM	4	0	4	0	1	570	2	0	5	0	2	0	3	355	2	0
11:45 AM	5	0	4	0	2	448	10	0	5	0	2	0	2	360	2	1
12:00 PM	3	2	4	0	2	486	5	0	3	0	1	0	5	372	1	0
12:15 PM	7	0	2	0	2	416	0	0	8	1	2	0	2	350	12	0
12:30 PM	4	0	8	0	9	456	7	0	3	0	3	0	2	394	10	0
12:45 PM	5	0	15	3	1	363	16	0	5	1	4	0	3	244	1	0
1:00 PM	3	0	0	0	4	321	5	0	2	0	0	3	6	316	0	0
1:15 PM	4	0	3	0	0	301	6	0	3	1	1	0	2	306	2	0
1:30 PM	2	0	4	0	0	339	9	0	2	0	3	0	2	376	2	0
1:45 PM	6	0	4	1	4	325	23	0	4	0	3	0	9	423	1	0
2:00 PM	6	0	3	1	7	348	30	0	6	0	4	0	14	407	2	0
2:15 PM	6	0	10	0	9	324	23	0	4	0	5	1	11	407	10	0
2:30 PM	6	3	12	0	20	383	21	0	4	1	6	0	16	401	47	0
2:45 PM	22	2	44	0	14	398	21	0	11	6	14	0	12	391	10	0
3:00 PM	10	0	21	3	2	389	42	0	47	0	31	0	16	375	5	4
3:15 PM	2	0	9	2	2	398	23	0	55	0	26	0	22	507	5	0
3:30 PM	7	0	6	0	6	447	30	0	26	0	28	0	34	493	6	0
3:45 PM	9	0	1	1	3	432	28	0	24	1	22	0	14	465	10	0
4:00 PM	8	0	2	3	4	420	26	0	35	1	23	0	28	541	4	0
4:15 PM	4	0	5	1	1	411	30	0	26	0	16	0	10	464	10	0
4:30 PM	4	1	8	0	0	379	10	0	23	0	26	0	10	353	9	0
4:45 PM	7	0	7	0	2	359	10	0	11	0	16	0	14	370	2	0
5:00 PM	3	0	4	0	1	470	16	0	36	0	30	0	8	381	4	0
5:15 PM	4	0	11	0	2	513	21	0	41	0	33	0	16	476	9	0
5:30 PM	4	0	6	0	2	438	11	0	20	2	15	0	11	506	5	0
5:45 PM	8	0	3	1	0	452	12	0	19	10	38	0	11	494	0	0
6:00 PM	6	0	3	0	1	517	8	0	9	0	6	0	7	480	3	0
6:15 PM	4	0	0	0	1	399	24	0	17	0	10	0	9	418	10	0
6:30 PM	4	0	3	1	1	431	21	0	12	0	18	0	15	447	5	0
6:45 PM	6	3	6	0	2	367	26	0	18	0	5	1	15	391	3	0
7:00 PM	2	0	4	2	3	390	18	0	16	0	9	0	10	352	4	0
7:15 PM	1	0	5	0	1	324	7	0	5	0	1	0	5	377	5	0
7:30 PM	4	0	2	0	2	294	3	0	6	0	4	0	1	375	7	0
7:45 PM	3	0	1	0	1	242	4	0	1	0	1	0	1	276	6	0
8:00 PM	2	1	2	0	2	233	1	0	9	0	3	0	1	316	8	0
8:15 PM	0	0	1	0	1	221	4	0	30	1	8	0	1	267	6	0
8:30 PM	3	0	4	0	1	168	0	0	10	0	5	0	0	233	5	0
8:45 PM	2	0	5	0	3	180	2	0	14	0	5	0	4	208	6	0

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Appendix O: 2003 Turning Movement Counts from Lee Cunningham & Ass, 10/1/2003

(4:30 – 6:00 pm volumes are averages from SHA counts dated: 2/24/04 & 9/25/02)

Time	NB Royal Dominion Drive				EB River Road				SB Holton-Arms Driveway				Westbound River Road			
	Right	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*	*Right*	*Thru*	*Left*	*Peds*	*Righ*	*Thru*	*Left*	*Peds*
5:00 AM																
5:15 AM																
5:30 AM																
5:45 AM																
6:00 AM																
6:15 AM																
6:30 AM																
6:45 AM																
7:00 AM	9	0	7		16	199	1		16	0	2		0	611	32	
7:15 AM	26	0	11		34	329	8		15	0	9		3	653	52	
7:30 AM	45	0	38		70	350	7		4	1	3		3	595	85	
7:45 AM	81	6	52		91	409	10		8	4	13		10	531	101	
8:00 AM	37	2	40		56	427	19		8	2	7		19	645	30	
8:15 AM	3	0	4		10	465	19		39	0	46		15	625	11	
8:30 AM	6	0	3		7	436	11		17	1	12		15	654	8	
8:45 AM	5	0	2		5	473	4		10	0	17		2	616	6	
9:00 AM	1	0	0		2	323	0		4	0	6		1	523	0	
9:15 AM	4	0	2		3	359	0		8	1	5		2	551	0	
9:30 AM																
9:45 AM																
10:00 AM																
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1:45 PM																
2:00 PM																
2:15 PM																
2:30 PM	11	0	4		8	467	13		8	0	5		16	384	13	
2:45 PM	11	0	1		16	462	11		17	2	30		15	408	25	
3:00 PM	20	0	16		17	498	8		20	6	29		4	383	41	
3:15 PM	58	0	31		23	551	8		8	0	13		5	407	38	
3:30 PM	48	0	36		21	532	8		7	0	5		3	404	37	
3:45 PM	23	1	15		21	535	7		3	0	7		3	490	26	
4:00 PM	33	0	28		20	486	3		11	0	6		3	418	23	
4:15 PM	44	2	27		18	395	13		12	0	6		4	477	50	
4:30 PM	*25*	*0*	*22*		*6*	*601*	*3*		*2*	*0*	*6*		*3*	*407*	*12*	
4:45 PM	*20*	*0*	*18*		*10*	*588*	*5*		*6*	*0*	*5*		*0*	*403*	*11*	
5:00 PM	*20*	*1*	*14*		*13*	*600*	*10*		*5*	*1*	*7*		*1*	*405*	*15*	
5:15 PM	*10*	*1*	*11*		*7*	*650*	*6*		*5*	*1*	*5*		*3*	*441*	*10*	
5:30 PM	*11*	*0*	*12*		*7*	*595*	*6*		*5*	*0*	*6*		*1*	*421*	*7*	
5:45 PM	*10*	*0*	*12*		*8*	*602*	*6*		*4*	*1*	*5*		*1*	*431*	*6*	
6:00 PM																
6:15 PM																
6:30 PM																
6:45 PM																
7:00 PM																
7:15 PM																
7:30 PM																
7:45 PM																
8:00 PM																
8:15 PM																
8:30 PM																
8:45 PM																

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Appendix P: Holton Arms Trip Generation Table

Time	2007 Counts Enrollment=667		2005 Counts Enrollment=672		2003 Counts Enrollment=653	
	Hourly Trips	Trip Rate	Hourly Trips	Trip Rate	Hourly Trips	Trip Rate
5:00 AM	14	0.02	14	0.02		
5:15 AM	19	0.03	14	0.02		
5:30 AM	39	0.06	14	0.02		
5:45 AM	49	0.07	23	0.03		
6:00 AM	66	0.10	37	0.06		
6:15 AM	107	0.16	69	0.10		
6:30 AM	189	0.28	146	0.22		
6:45 AM	383	0.57	311	0.46		
7:00 AM	683	1.02	618	0.92	761	1.17
7:15 AM	872	1.31	780	1.16	864	1.32
7:30 AM	805	1.21	739	1.10	769	1.18
7:45 AM	621	0.93	590	0.88	555	0.85
8:00 AM	322	0.48	275	0.41	238	0.36
8:15 AM	97	0.15	85	0.13	74	0.11
8:30 AM	74	0.11	71	0.11	56	0.09
8:45 AM	92	0.14	55	0.08		
9:00 AM	82	0.12	69	0.10		
9:15 AM	86	0.13	81	0.12		
9:30 AM	80	0.12	115	0.17		
9:45 AM	45	0.07	107	0.16		
10:00 AM	46	0.07	97	0.14		
.0:15 AM	44	0.07	89	0.13		
10:30 AM	49	0.07	48	0.07		
.0:45 AM	58	0.09	56	0.08		
11:00 AM	67	0.10	63	0.09		
.1:15 AM	79	0.12	68	0.10		
11:30 AM	92	0.14	60	0.09		
.1:45 AM	95	0.14	63	0.09		
12:00 PM	108	0.16	73	0.11		
.2:15 PM	98	0.15	70	0.10		
12:30 PM	96	0.14	70	0.10		
.2:45 PM	110	0.16	71	0.11		
1:00 PM	89	0.13	81	0.12		
1:15 PM	90	0.13	122	0.18		
1:30 PM	89	0.13	152	0.23		
1:45 PM	93	0.14	187	0.28		
2:00 PM	115	0.17	214	0.32		
2:15 PM	161	0.24	296	0.44		
2:30 PM	221	0.33	379	0.56	341	0.52
2:45 PM	370	0.55	446	0.66	447	0.68
3:00 PM	491	0.74	469	0.70	478	0.73
3:15 PM	554	0.83	446	0.66	482	0.74
3:30 PM	557	0.84	402	0.60	473	0.72
3:45 PM	434	0.65	354	0.53		
4:00 PM	364	0.55	316	0.47		
4:15 PM	301	0.45	293	0.44		
4:30 PM	292	0.44	322	0.48		
4:45 PM	350	0.52	311	0.46		
5:00 PM	345	0.52	350	0.52		
5:15 PM	342	0.51	290	0.43		
5:30 PM	313	0.47	239	0.36		
5:45 PM	268	0.40	246	0.37		
6:00 PM	240	0.36	223	0.33		
6:15 PM	195	0.29	246	0.37		
6:30 PM	170	0.25	204	0.30		
6:45 PM	97	0.15	152	0.23		
7:00 PM	47	0.07	92	0.14		
7:15 PM	43	0.06	54	0.08		
7:30 PM	26	0.04	80	0.12		
7:45 PM	25	0.04	81	0.12		
8:00 PM	19	0.03	99	0.15		
8:15 PM	9	0.01	73	0.11		
8:30 PM	3	0.00	34	0.05		
8:45 PM	1	0.00	19	0.03		

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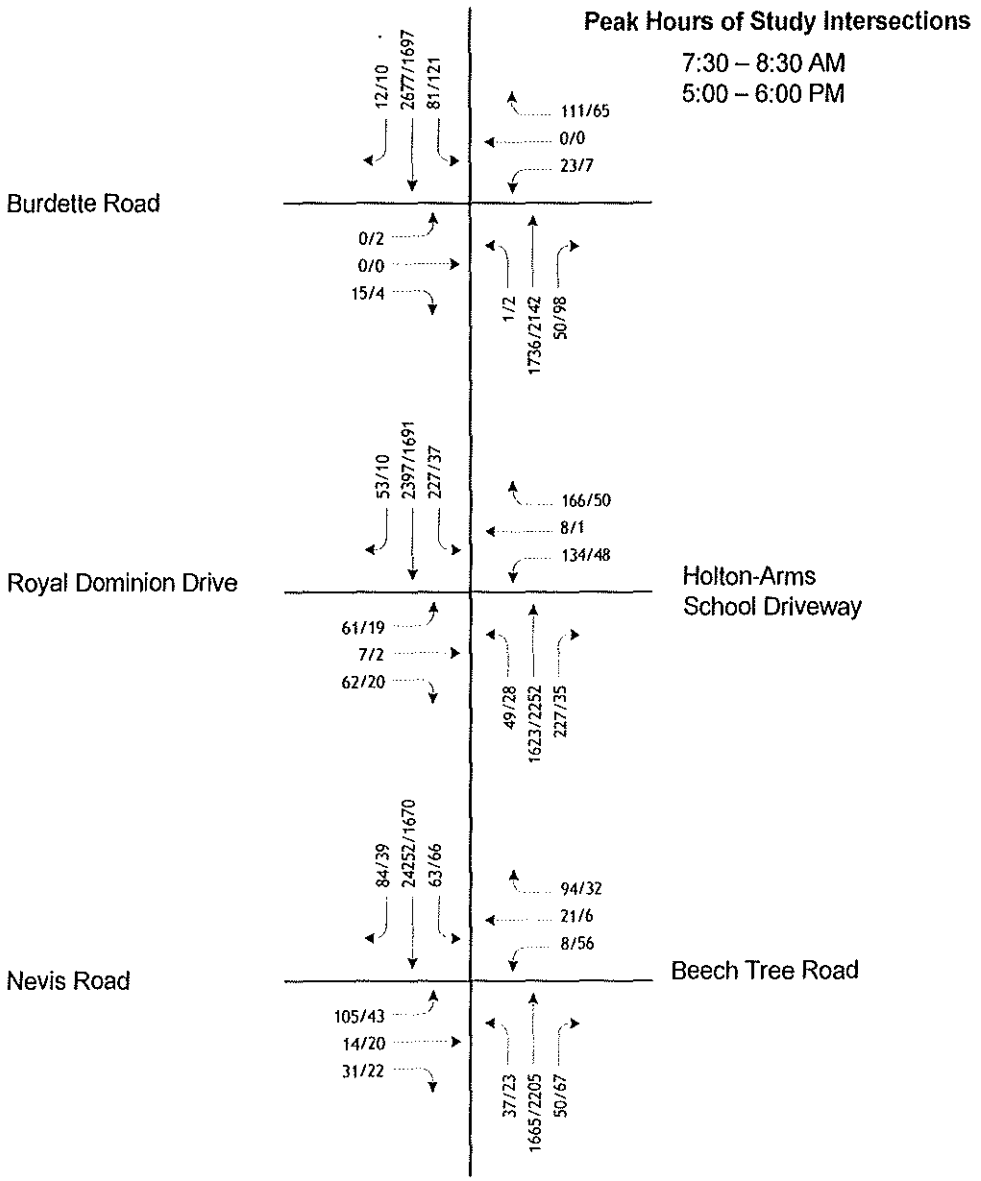
Appendix Q1: Study Intersection Turning Movement Volumes

Pre-Modification (2003) Total Traffic Peak Hours



Legend

XXX/XXX - AM/PM Weekday Peak Hour Traffic Volumes
— Indicates a Public Roadway

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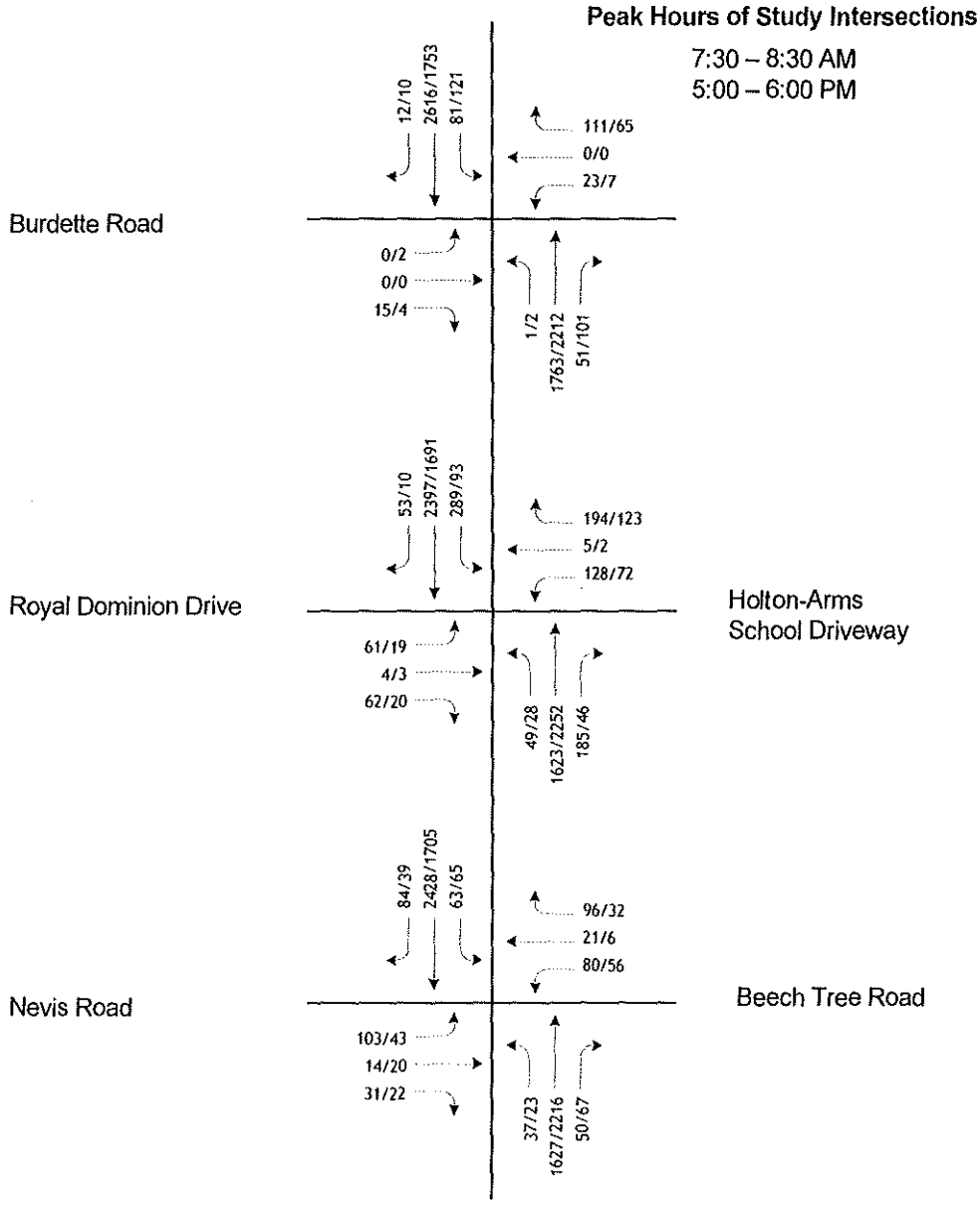
Appendix Q2: Study Intersection Turning Movement Volumes

Post-Modification (2007) Total Traffic Peak Hours



Legend

XXX-XXX - AM/PM Weekday Peak Hour Traffic Volumes
—— Indicates a Public Roadway

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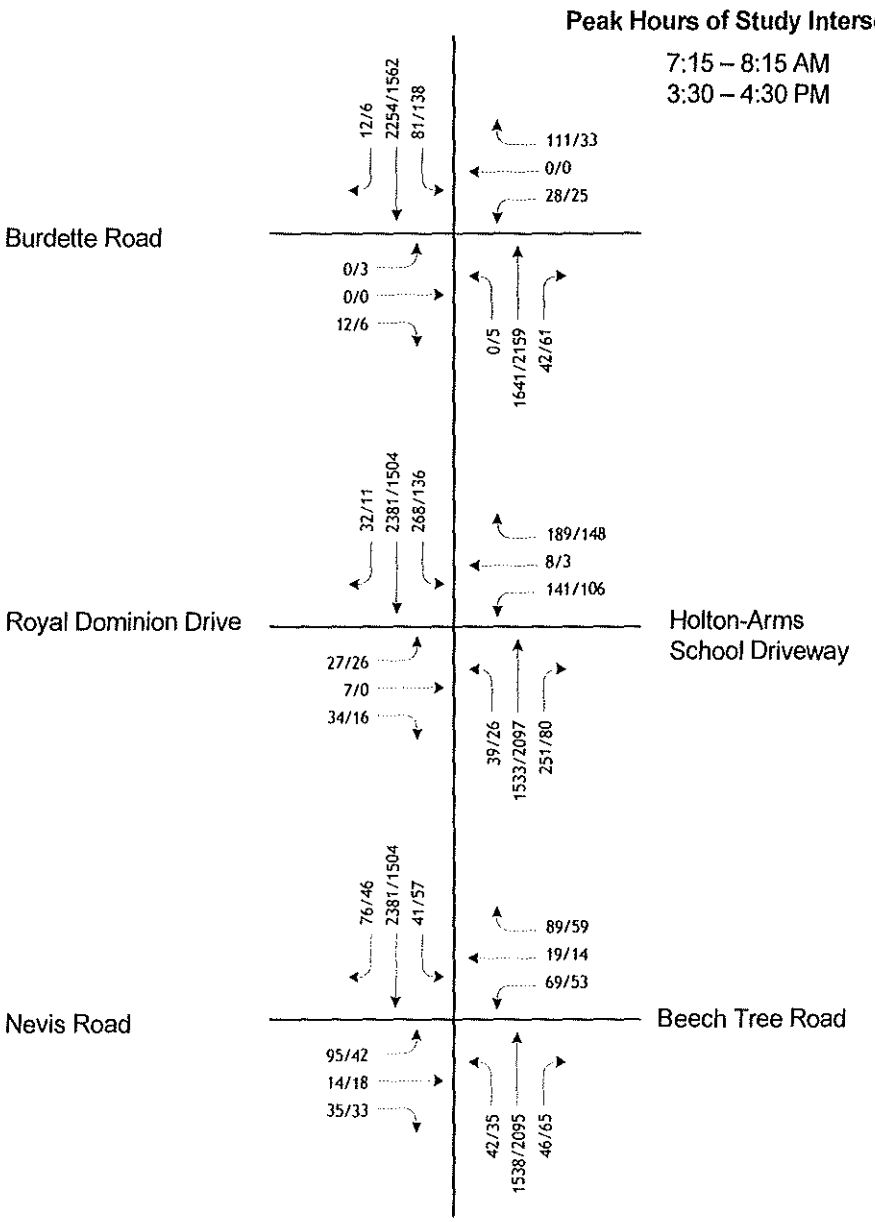
PAGE NO. 78

Appendix Q3: Study Intersection Turning Movement Volumes

Pre-Modification (2003) Holton Peak Hours



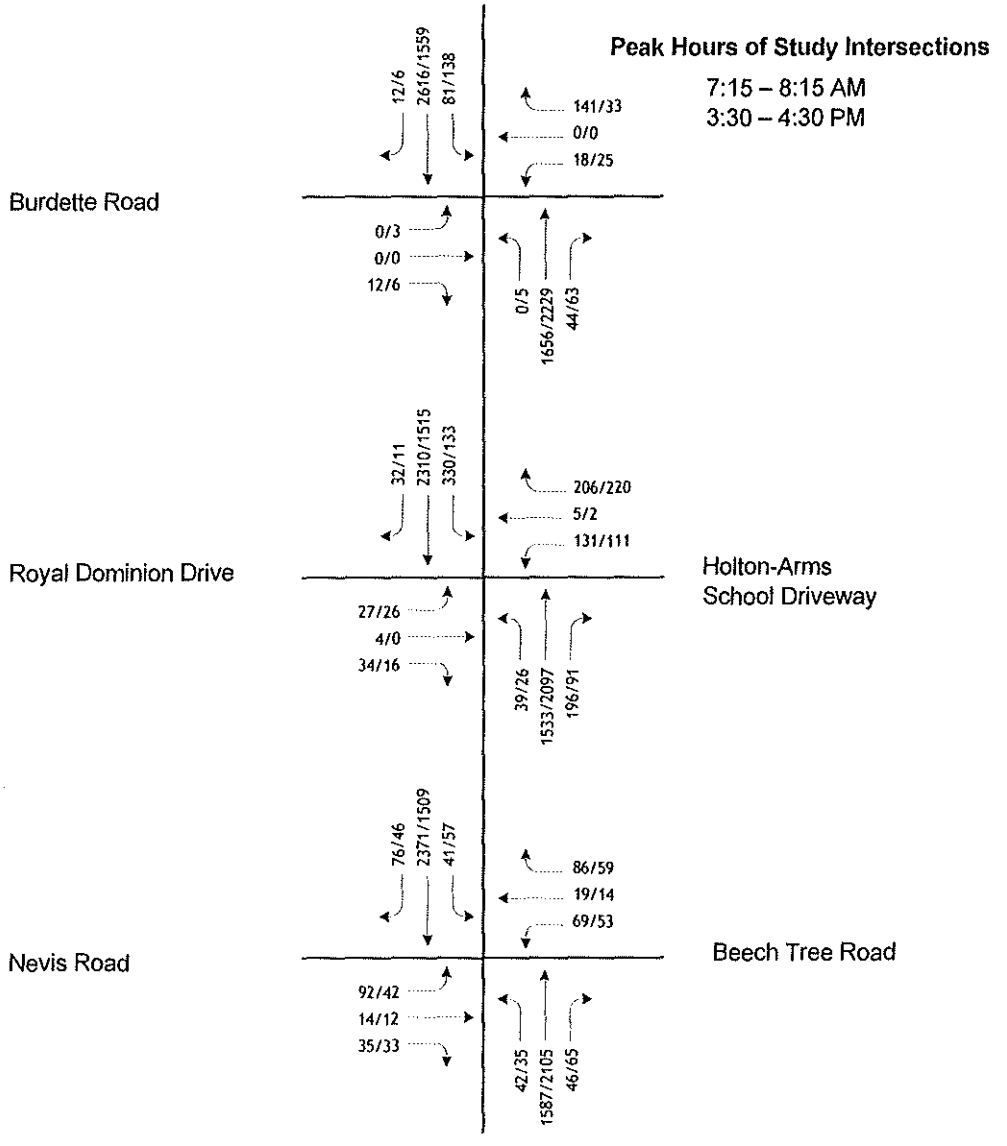
Legend

XXX-XXX - AM/PM Weekday Peak Hour Traffic Volumes
—— Indicates a Public Roadway

EXHIBIT NO. 121
PAGE NO. 79

Appendix Q4: Study Intersection Turning Movement Volumes

Post-Modification (2007) Holton Peak Hour



Legend

XXX-XXX - AM/PM Weekday Peak Hour Traffic Volumes
—— Indicates a Public Roadway

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PAGE NO. 80

ATTACHMENT 8

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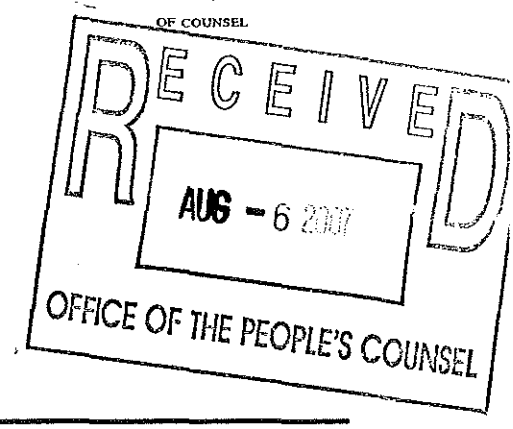
August 6, 2007



MEMORANDUM

TO: Neighborhood Liaison Committee

FROM: Elsie L. Reid, Esq. Elsie L. Reid

RE: July 2, 2007 Traffic Impact Study

Please find enclosed the Supplement dated August 6, 2007 to the July 2, 2007 Traffic Impact Study prepared by Gorove/Slade Associates. I regret that conflicting vacation/work schedules delayed its release until today. Once again, however, we are delivering the GSA report by messenger to expedite your receipt.

I believe the Supplement is fully responsive to the questions and comments made at the July 24th meeting of the NLC, and I will anticipate delivery of the neighborhood association comments to Martin Klauber and the Holton representatives of the NLC by August 10th as initially agreed. Please let me know if that date is a problem. Thank you.

ELR/jmt

GOROVE/SLADE ASSOCIATES, INC.
1140 Connecticut Ave / Suite 700 / Washington, DC 20036

MEMORANDUM

DATE: August 6, 2007

TO: The Holton-Arms School

CC: Elsie Reid
Megan Wallace

FROM: Louis Slade
Jeff Price

SUPPLEMENT TO SUBJECT: July 2, 2007, Holton-Arms Traffic Impact study (the "July 2, 2007 Traffic Study").

The goal of this supplemental memorandum is to address comments made by representatives of the community at the July 24, 2007 meeting of the Neighborhood Liaison Committee ("NLC").

Supplemental information and corrections to the July 2, 2007 Study:

1. Study Definition of Queue for the July2, 2007 Traffic Study; Westbound River Road Vehicle Right Turn Queue Counts at Holton-Arms Driveway.

   For the Holton-Arms study, the instantaneous number of vehicles in a standing queue was counted in the field or from videotape. At the two signalized intersections, the count was made of the vehicles stopped at the start of the green interval of the traffic signal for the approach being studied.

   At the Holton-Arms driveway, the WB right-turn lane approach has a continuous right-turn movement with either a green signal interval, or right-turn-on-red interval. There is no signal phase in which the WB right turns into the school are prohibited; therefore, this one movement is not the "typical" queue situation. Other movements at the intersection are controlled by the traffic signal.

   In the July 2, 2007 Traffic Study Gorove/Slade ("GSA") identified this WB turning movement as having no queues due to its geometric characteristics and the traffic control operations in place. At the request of the community, a videotape segment was shown on August 1, 2007, to Linda Kauskay, BBCA and Joseph Cutro, BBCA's traffic expert.

   The review of the videotape of this particular movement revealed that on a handful of occasions between 7:45 a.m. and 8:15 a.m., usually one, but in one instance five, vehicles experienced minor delays waiting in the turn lane to enter the school, either because of a transit bus stopping in the turning lane, or because of the need to yield to cars making the EB left-turning movement into the school. For reporting purposes, GSA did not consider such insubstantial delays a queue: (i) the right turn is generally free-flowing and not

regulated by the signal; (ii) field observations revealed no excessive stacking of cars in this turn lane; (iii) and at no time did the vehicles in the right turn lane exceed the capacity of the turning lane, blocking through movements in the main travel lanes of River Road.

2. CLV and HCM calculations for 2007 traffic counts. At the request of the NLC, the Critical Lane Volume (CLV) results prepared according to the standard Montgomery County methodology are provided in Table 1 below. The Highway Capacity Manual (HCM) results are provided below in Tables 2-4 for the three Study Intersections. These calculations were conducted for the AM and PM peak hours based on the 2007 traffic counts.

Critical Lane Volume

Critical Lane Volume (CLV) is the standard intersection capacity analysis methodology for Montgomery County under the Local Area Transportation Review Guidelines (LATR) of the Montgomery County Planning Board. The analysis calculates a total CLV figure for the intersection based on peak hour traffic volumes and intersection geometry. The peak hour CLV is compared to the CLV standard set by the County, which varies for different planning policy areas throughout the County.

For the intersection of River Road/Holton-Arms, the AM and PM peak hour CLV was calculated to be 1,640 and 1,440, respectively. These CLV totals are within the 1,650 CLV congestion standard applicable at this location at the time of the Opinion. Table 1 shows the CLV calculation for the study intersection.

Table 1: CLV Calculations of 2007 Study Intersections

Name	AM Peak	PM Peak
River/Holton	1,640	1,440
River/Burdette	1,521	1,472
River/Beech Tree	1,544	1,346

Highway Capacity Manual Methodology

The intersection traffic capacity was also analyzed using the Highway Capacity Manual (HCM) method. This analysis results in the calculation of delay and Level of Service (LOS) for each intersection approach. The delay is a calculation of the average seconds lost for each driver passing through the intersection, as compared to the driver's travel time if the intersection did not exist. LOS is a qualitative measure of intersection quality based on the delay, and uses letter grades (F being the worst, and A best). The results of this analysis are shown in Tables 2 – 4. These results are calculated based on traffic count data collected on March 20, 2007.

Intersection of River Road/Holton-Arms

Based on the March 20, 2007 counts, the morning and afternoon peak hours for total traffic at his intersection were found to be from 7:30 a.m. to 8:30 a.m. and 5:15 p.m. to 6:15 p.m. Observations at this intersection indicate that the signal timing strategy appears focused on the commuting traffic. Thus, the

objective may be to reach LOS B or C for east and westbound traffic, and LOS D or E for the north and south approaches. This would explain why the traffic signal operates under a long cycle length, 180 seconds in the morning and 150 seconds in the afternoon and why the eastbound left turn movement has a limited green time (a short green arrow).

As shown in Table 2, the intersection operates at LOS E during the AM peak and LOS B in the PM peak with some approaches operating at LOS F. Typically LOS E or better is considered acceptable. The higher overall delay in the AM peak hour is in part due to the amount of left turns into the school, which have a higher average delay than through vehicles, and use a portion of the signal time generally allotted to westbound vehicles. In general, the high average delays for the northbound and southbound approaches are expected as the intersection signal timing prioritizes green time for the high vehicle volumes along the eastbound and westbound approaches.

Table 2 – Summary of HCM Results for Intersection of River Road/Holton Arms (Total Traffic Peak)

Intersection & Approach	AM Peak Hour 7:30-8:30 am		PM Peak Hour 5:15-6:15 pm	
	Delay (sec./veh.)	*Level of Service*	*Delay (sec./veh.)*	*Level of Service*
Overall	**58.3**	**E**	**12.4**	**B**
Eastbound (River Road)	70.1	E	8.7	A
Westbound (River Road)	35.2	D	8.3	A
Northbound (Royal Dominion Drive)	84.9	F	69.9	E
Southbound (Holton-Arms Driveway)	80.5	F	78.3	E

Intersection of River Road/Burdette Road

Based on the March 20, 2007 counts, the morning and afternoon peak hours for total traffic at this intersection were found to be from 7:30 a.m. to 8:30 a.m. and 5:30 p.m. to 6:30 p.m. The volume of traffic on the southbound and northbound approaches to the un-signalized intersection of Burdette and River Roads is relatively low; however the simulation and capacity analyses show that these movements operate over capacity at LOS F. The unsatisfactory level of service of the approaches is mainly due to the high volume of through traffic on River Road. Vehicles attempting left turn movements from Burdette Road will experience lengthy delays and queuing because the gaps required to safely merge into traffic on River Road are minimal. However, regular commuters have learned to find the necessary break or gap in the flow of traffic eastbound along River Road (or take another route) and this fact would have yielded a better LOS result for Burdette north and southbound approaches. Signalization of the intersection of Burdette and River Roads is programmed and will occur in the near future. Table 3 shows the HCM results for River Road/Burdette Road.

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Table 3 – Summary of HCM Results for Intersection of River Road/Burdette Road (Total Traffic Peak)

Intersection & Approach	AM Peak Hour 7:30-8:30 am		PM Peak Hour 5:15-6:15 pm	
	Delay (sec./veh.)	*Level of Service*	*Delay (sec./veh.)*	*Level of Service*
Overall				
Northbound (Burdette Road)	excessive	F	excessive	F
Southbound (Burdette Road)	excessive	F	excessive	F

Intersection of River Road/Beech Tree Road

Based on the March 20, 2007 counts, the morning and afternoon peak hours for total traffic at this intersection were found to be from 7:30 a.m. to 8:30 a.m. and 5:30 p.m. to 6:30 p.m. As shown in Table 4, the intersection operates at LOS C during the AM peak and LOS B in the PM peak with one approach operating at LOS F.

Table 4 – Summary of HCM Results for Intersection of River Road/Beech Tree Road (Total Traffic Peak)

Intersection & Approach	AM Peak Hour 7:30-8:30 am		PM Peak Hour 5:30-6:30 pm	
	Delay (sec./veh.)	*Level of Service*	*Delay (sec./veh.)*	*Level of Service*
River Road & Holton-Arms Driveway				
Overall	**27.3**	**C**	**13.2**	**B**
Eastbound (River Road)	31.0	C	7.3	A
Westbound (River Road)	11.4	B	14.2	B
Northbound (Nevis Road)	81.9	F	65.7	E
Southbound (Beech Tree Road)	78.1	E	65.9	E

3. Errata/Addenda Sheet.

   a. July 2, 2007 Traffic Study, Safety Analysis, Page 16. The traffic consultant to the community suggested that additional analysis of the accident data that was compiled for River Road should be supplied. This additional analysis would compare intersection accident rates for different locations that are included within this data set.

   In GSA's opinion, based on our substantial experience in the study and analysis of traffic safety/operations, further comparative analysis is unwarranted given the conclusion in the State Highway Administration letter that none of the individual accident categories met the criteria for being significantly high during the overall study period as defined by the SHA analysis. Study area accident rates were shown to be consistently lower than statewide rates. From our inspection of the data, we determined that the incident level was low. In the event further comparative analysis is later determined to be essential, it can be performed from the data reported.

b. July 2, 2007 Traffic Study, Table 4, Page 17. The traffic data shown on Table 4 calculates the percent difference as the difference between 2003 and 2007 divided by the 2007 value. This method of calculation corresponded to that used in the 2005 report completed by Gorove/Slade Associates. At the July 24, 2007 meeting some of the neighborhood representatives questioned this methodology. Another way to calculate the percent difference is as follows: the difference between 2003 and 2007 divided by the 2003 value. Use of this alternate method results in no change in the Holton AM Peak calculations and only a modest change in the Holton PM Peak, where the difference for the Holton Total P.M. Peak was calculated in the July 2, 2007 Traffic Study as:

(557-482)/557 x 100% = 13.5%

The alternate method of calculating the percentage increase in Total Holton PM Peak would be:

(557-482)/482 x 100% = 15.5%

The result of this calculation yields a percentage difference between 2003 and 2007 of 15.5%.

Below is an alternate Table 4 showing the percentage increases calculated by using the alternate method. Whichever percentage value is reported, GSA's conclusion remains, the same, that the overall traffic generated by the school has been relatively constant between 2003 and 2007, with the single exception due to the increased volume of cars waiting on campus to leave the school during one segment of the afternoon school peak hour. This increase is not attributable to an overall increase in school afternoon traffic volumes, which remained relatively stable over the comparison years. The impact of this increase affects only those Holton vehicles on campus waiting to leave the school.

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Alternate Table 4 in July 2, 2007 Traffic Study, p. 17.

Table 4 Alternate: Holton Arms Trip Generation Calculations and Comparison

Date of Count	Total School + Day Care Enrollment	Holton AM Peak			Holton PM Peak		
		In	*Out*	*Total*	*In*	*Out*	*Total*
March 2007 School Generated Traffic 7:15-8:15am, 3:30-4:30pm	---	530	342	872	224	333	557
Trip Rate	667	0.79	0.51	1.31	0.34	0.5	0.84
May 2005 School Generated Traffic	---	476	304	780	202	267	469
Trip Rate	672	0.71	0.45	1.16	0.3	0.4	0.7
October 2003 School Generated Traffic	---	526	338	864	209	273	482
Trip Rate	653	0.81	0.52	1.32	0.32	0.42	0.74
Percent Difference 2003-2007 School Generated Traffic		**0.8%**	**1.2%**	**0.9%**	**7.2%**	**22.0%**	**15.5%**
Trip Rate	**2.1%**	**-2.5%**	**-2.0%**	**-0.8%**	**6.3%**	**19.0%**	**13.5%**

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c. July 2, 2007 Traffic Study, Table 7, Page 21. Stopped delay data has been added for Westbound River Road 7:15 – 7:30 am and 3:00 – 3:15 pm in Table 7.

Table 7 – Summary of Stopped Delay Results for Intersection of River Road/Holton Arms

Intersection & Approach	AM Period	*Delay (sec./veh.)*	*Level of Service**	PM Period	*Delay (sec./veh.)*	*Level of Service*
River Road/Holton-Arms						
Eastbound River Road	7:15 – 8:15 am	21.8	C	3:00 – 4:00 pm	9.6	A
Eastbound River Road	7:30 – 8:30 am	21.3	C	3:00 – 3:15 pm	9.5	A
Eastbound River Road	7:15 – 8:30 am	17.5	B	3:15 – 3:30 pm	8.4	A
Eastbound River Road	7:15 – 7:30 am	4.0	A	3:30 – 3:45 pm	10.3	B
Eastbound River Road	7:30 – 7:45 am	10.4	B	3:45 – 4:00 pm	10.1	B
Eastbound River Road	7:45 – 8:00 am	25.1	C			
Eastbound River Road	8:00 – 8:15 am	20.6	C			
Eastbound River Road	8:15 – 8:30 am	22.5	C			
Westbound River Road	7:30 – 8:30 am	13.9	B	3:15 – 4:00 pm	27.9	C
Westbound River Road	7:15 – 7:30 am	16.1	B	3:00 – 3:15 pm	15.1**	B
Westbound River Road	7:30 – 7:45 am	13.6	B	3:15 – 3:30 pm	22.7	C
Westbound River Road	7:45 – 8:00 am	12.2	B	3:30 – 3:45 pm	24.6	C
Westbound River Road	8:00 – 8:15 am	14.4	B	**3:45 – 4:00 pm**	**36.6**	**D**
Westbound River Road	8:15 – 8:30 am	15.7	B			

***The LOS calculation is based on level of service criteria for signalized intersections, HCM, 1985.**

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d. July 2, 2007 Traffic Study, Table 10, Page 24. Average values for the Measured Stopped Delay column have been added per request of the community to Table 10.

Table 10: Comparison of the Observed and Calculated Existing Conditions (2007 traffic counts) at the Intersection of River Road/Holton Arms during Holton Peak Hours (7:15- 8:15 a.m. & 3:30-4:30 p.m.)

Intersection & Approach	**AM Peak Hour** 7:15- 8:15 a.m.					
	Measured Max Queues (# of vehs)	*Calculated Max Queues (# of vehs)*	*Measured Travel Time (sec)*	*Calculated Travel Time (sec)*	*Measured Stopped Delay (sec./veh.)*	*Calculated Stopped Delay (sec./veh.)*
River Road & Holton-Arms Driveway			Average (Range)		Average (Range)	
Eastbound (River Road)	Thru 60 Left 22	Thru 52 Left 21	78 (44-110)	93.5	21.8 (4.0-25.1)	21.2
Westbound (River Road)	56	57	96 (46-154)	98.7	13.9 (12.2-14.4)	21.3
Northbound (Royal Dominion Drive)						
Southbound (Holton-Arms Driveway)	15	7				
Intersection & Approach	**PM Peak Hour** 3:30-4:30 p.m.					
	Measured Max Queues (# of vehs)	*Calculated Max Queues (# of vehs)*	*Measured Travel Time (sec)*	*Calculated Travel Time (sec)*	*Measured Stopped Delay (sec./veh.)*	*Calculated Stopped Delay (sec./veh.)*
River Road & Holton-Arms Driveway			Average (Range)		Average (Range)	
Eastbound (River Road)	Thru 24, Left 12	Thru 13, Left 13	49 (40-58)	51.3	9.6 (10.1-10.3)	12.4
Westbound (River Road)	63	70	145 (84-181)	84.7	27.9 (24.6-36.6)	8.8
Northbound (Royal Dominion Drive)						
Southbound (Holton-Arms Driveway)	12	7				

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e. July 2, 2007 Traffic Study, Page 24. Last paragraph, first sentence should read: "For the PM Peak hour, measured queue values were found to be generally similar to the calculated queues."

f. July 2, 2007 Traffic Study, Table 15, Page 28. Third column title should be Post-Modification instead of Pre-Modification.

g. July 2, 2007 Traffic Study, Table 16, Page 29. Third column title should be Post-Modification instead of Pre-Modification.

h. July 2, 2007 Traffic Study, Appendix D. The second time listed as "8:15" in the column entitled "Time" should be "8:30".

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ATTACHMENT 9

BURNING TREE CIVIC ASSOCIATION
8436 Burning Tree Road
Bethesda MD 20817

August 15, 2007

Board of Appeals for Montgomery County
c/o Allison Ishihara Fultz, Chairman
Stella B. Werner Council Office Building
100 Maryland Avenue, Room 217
Rockville MD 20850

Re: Holton-Arms School Special Exception Case No. CBA-1174-D, S2467-A, S-2503

Dear Chairman Fultz and Members of the Board:

The Burning Tree Civic Association can offer at this time only limited comments on the latest traffic study conducted for the Holton-Arms School. Key members of our group are away until early September. Also, comments are due by August 17 and Holton delivered additional information for consideration on August 6. We should be able to complete our final comments by mid-September.

In general, we feel that the new traffic study conducted by Gorove-Slade is sufficient to satisfy the requirements of the Board's latest Opinion.

However we do not understand some of the information included in the Supplement Memorandum [Page 2 -- Critical Lane Volume (CLV)]. For example, does the peak hour data refer to Holton peak hour or River Road peak hour? Are the critical lane volumes calculated using actual traffic counts or counts taken from the computer simulations? Also, the previous study (2005) showed a non-failing AM level of service (LOS) (CLV=1479 at Holton's entrance) and the present study shows a failing LOS (CLV=1640). A significant difference like this should be discussed in the report. In addition, the report fails to mention that the present standard for the Critical Lane Volume for a failing LOS was reduced from 1650 to 1600 in July 2004.

The information for the other roads is also disturbing. For the River/Burdette intersection, Lee Cunningham's study in 2000 showed an AM CLV of 1654 vs 1521 in Table 1 for the present study. We find it difficult to believe that the level of service actually improved in seven years. For the River/Beech Tree intersection, we have the results of a Maryland State Highway study done in 2002 when they were installing a new traffic signal at our request. That study showed a LOS of F which meant that the CLV exceeded 1650. Table 1 shows a CLV of 1544. Another case where the level of service improved in five years?

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One additional comment. We feel strongly that any contact between the parties and Mr. Etemadi should not be permitted until he has completed his report. Alternately, if necessary for him to question any party, all parties should be present. If written information is requested, copies of any correspondence should be forwarded to all parties.

George B. Springston

George B. Springston, President
Burning Tree Civic Association

Copy to: Martin Klauber, Esq., Office of People's Counsel
The Holton-Arms School, Kim Samperton
Elsie L. Reid, Esq., Furey, Doolan, and Abell, LLP
Linda Kauskay, President, BBCA

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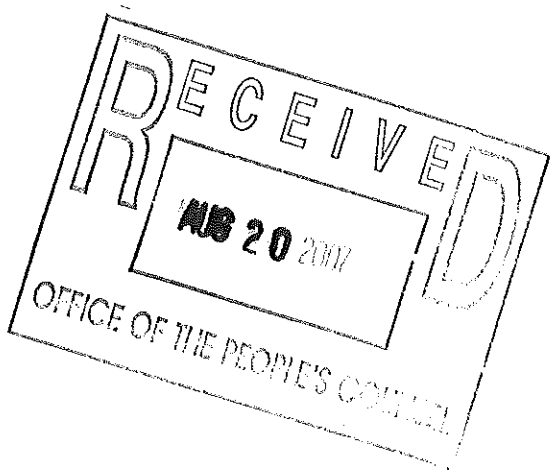
ATTACHMENT 10

BRADLEY BOULEVARD CITIZENS ASSOCIATION
7101 Longwood Drive
Bethesda, MD 20817

August 20, 2007



DELIVERED BY E-MAIL TO MARTIN KLAUBER, ESQ.
Chairman Allison Ishihara Fultz and Members
of the Board of Appeals
Montgomery County Board of Appeals
Stella Werner Office Building
100 Maryland Avenue
Room 217
Rockville, MD 20850

Re: CBA 1174-D, S-2467, S-2503-A

Dear Chairman Fultz and Members of the Board:

In its March 23, 2004, opinion issued in the above matters, the Board of Appeals approved special exception modifications that permitted the Holton-Arms School to increase the enrollment in its academic, day care and summer camp programs, to continue existing after-school programs and to initiate other after-school programs. The Board conditioned its approval, *inter alia*, upon the school's subsequent submission of a traffic study documenting that its operations as modified did not have an adverse traffic impact. Holton-Arms submitted a post-modification traffic study in 2005, but the Board of Appeals ruled that it was too narrow in scope to comply with the condition it had imposed. After consultation with the Neighborhood Liaison Committee ("NLC"), the school commissioned a second traffic study from Gorove/Slade Associates, Inc. ("Gorove/Slade"), which study was completed in July of this year.

The current study is larger in scope than the 2005 report and is designed to address the previous concerns raised by the Board of Appeals. However, the Bradley Boulevard Citizens Association ("BBCA") regretfully submits that the study is substantially flawed and, as a result, the conclusions it makes are questionable. What the study does clearly establish is that the River Road corridor is congested, that Holton-Arms' traffic contributes significantly to that congestion, and that the current study cannot be used to justify any additional expansion of Holton-Arms' operations.

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1. ***Because Holton-Arms was not fully enrolled at the time the current traffic study was performed, the results do not accurately portray the traffic generated by the modifications.***

The Board of Appeals' 2004 opinion approved an increase in Holton-Arms' regular enrollment to 665 students and its day care enrollment to 20 children, for a total enrollment of 685. In conditioning its approval upon the submission of a subsequent traffic study, the Board stated that the traffic study must "evaluate the traffic generated *by the increased enrollment* and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site...." See Opinion and Resolution dated March 23, 2004, Condition No. 5. (Emphasis added). At the time the current study was performed, however, there were 652 students enrolled in the school's regular program and 15 children in day care, for a total of 667 – only 2 more than were permitted before the modifications, and fully 18 less than the enrollment approved in the modifications. See Traffic Impact Study, pp. 9 and 18 (Table 5). We recognize that many factors beyond the school's control contribute to its ability to enroll at full capacity, and we do not argue here that the school be required to conduct a third traffic study. However, the current under-enrollment effectively thwarts the study's purpose, because ***the study cannot measure an enrollment increase that is not in place.***[1] When BBCA representatives questioned Holton-Arms' traffic expert, Mr. Slade, about the implications of under-enrollment at the last NLC meeting, he conceded that traffic measurements would be higher (though not necessarily in direct proportion) if the school were fully enrolled.

The fact that the traffic study necessarily understates the full impact of the 2004 modifications must be taken into consideration in evaluating each of the study's conclusions. For example, the eastbound left-turn lane on River Road, one of the two main directions from which cars enter Holton-Arms' campus, has a stacking capacity of 22 cars. The traffic study concludes that the traffic queues are well-contained within the turn lane because on the day traffic observations were done, maximum queues of 19 vehicles were counted in the left-turn lane. See Traffic Impact Study, p. 15. In fact, queues of 19 cars occurred 4 out of 5 light cycles during one segment of the AM peak traffic hour. Id. The standard wisdom is that traffic will vary by 10% on any given day, which means that the left-turn lane will near capacity with some frequency. Under a full enrollment scenario, the additional increase in vehicle trips related to 18 additional students/children will result in queue lengths that do exceed the lane's stacking capacity and interfere with through traffic, even if trips do not increase in direct proportion to the added enrollment. This would subvert the conclusion that turning lane queues have no impact upon the through traffic lanes. *Because the traffic study cannot accurately portray the traffic impact of the current modifications, it is unacceptable for use as a baseline for evaluating any proposals to modify the school's operations in the future.*

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[1] The school's under-enrollment was not brought to the neighborhood's attention prior to completion of the traffic study. When questioned during the NLC discussion of the completed study, the school's traffic expert indicated that the traffic simulation software employed in parts of the study could have been used to simulate traffic conditions under full enrollment but that effort was not undertaken.

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2. The calibration of the simulation failed to produce reliable proxies for measured data.

One of the Board's criticisms of the earlier post-modification traffic study was the failure of the study to compare some of the post-modification traffic data to data from the pre-modification period. However, because the 2003 pre-modification traffic study was limited in scope, some of the data needed for comparison had not been measured and thus was not available. In an effort to obtain data for purposes of comparison, Holton-Arms' traffic experts proposed using a traffic simulation program to generate usable data. Although the simulation program had been designed to create prospective rather than historical data, both the school's and the BBCA's traffic experts thought the program could be adapted.

Gorove/Slade's plan, which was discussed at some length in two NLC meetings, was to enter traffic counts collected in the 2007 traffic study and run simulations of current traffic conditions that would permit the traffic experts to calibrate the program to field observations made during the 2007 study. The 2007 traffic counts would then be replaced with 2003 traffic counts, and simulations would be run to generate the missing data from the pre-modification period. Both the school and neighborhood representatives agreed to this approach with the expectation that the study could be calibrated to produce reasonably reliable data. (Neighborhood representatives did not contemplate nor agree to the use of simulated data in lieu of measured data when the latter was available, although such substitutions were made for 2007 data in Tables 11-16 of the Traffic Impact Study). Although Holton-Arms and Gorove/Slade had agreed that Gorove/Slade would consult with the BBCA's traffic expert, Joseph Cutro, regarding the calibration of the simulation, Mr. Cutro was never shown the simulation nor given an opportunity to provide input into the calibration. While we believe the school and its experts otherwise undertook the simulation project in good faith, the results demonstrate quite plainly that it failed as a reasonable proxy for field measured data.

Of the 16 variables used to calibrate the simulation (the reference to seventeen variables is in error), the study notes that nine "compare favorably as the calculated and observed values are within fifteen percent." See Traffic Impact Study, p. 24. As noted above, it is generally accepted that traffic conditions will vary by 10% on any given day, and the Traffic Impact Study text offers no explanation as to why a greater deviation should be acceptable here. Moreover, it follows that 7 of the 16 variables, or nearly half, had a deviation of more than fifteen percent, which coupled with daily variation could rise to a deviation of more than 25%. For many of the variables, the deviation is substantially higher. For example, the average PM measured travel time of 145 seconds for westbound River Road approaching the school is 71% longer than the 84.7 seconds calculated by the simulation, see Traffic Impact Study, p. 24 (Table 10), and the average measured PM stopped delay of 27.9 seconds for westbound River Road is more than 3 times the 8.8 seconds calculated by the simulation. See Supplement to Traffic Impact Study (August 6, 2007), p. 8 (Revised Table 10). Conversely, the calculated stopped delay of 21.3 seconds for westbound River Road approaching the Holton-Arms

entrance during the school's AM peak traffic hour is 58% longer than the average measured delay for that approach and time period. See Traffic Impact Study, p.24 (Table 10). A comparison of other measured data with the simulation calculations reveals equally large discrepancies. For example, the overall measured delay of 27.3 seconds at the Beech Tree/River Road intersection during the total traffic AM peak hour is 37% longer than the 19.8 seconds calculated by the simulation for the same location and time period, and the measured delay of 31 seconds in the eastbound approach to that intersection during the total traffic AM peak hour is 71% longer than the 18.1 second delay calculated by the simulation for that approach and time period. Compare Supplement, p. 4 (Table 4) with Traffic Impact Study, p. 29 (Table 16). Variation in the calculated values themselves is equally disconcerting. In Table 10 of the Traffic Impact Study, the calculated maximum AM queue for westbound River Road at the Holton-Arms entrance is reported as 57 vehicles, while in Table 11 the calculated maximum queue for the same approach and time is reported to be 78. See Traffic Impact Study, pp. 24-25. If the latter is correct, the simulated maximum queue is 36% higher than the measured maximum queue shown for the same approach and time period in Table 10. (This does not surprise given the discrepancy we observed between field conditions and the reported queue data discussed below.) Although all the parties were hopeful that the simulation could be calibrated in a manner that would produce meaningful data, the number of significant and substantial deviations between the measured and calculated values render the simulated data, and the comparisons that employ them, unreliable.

3. *Discrepancies between actual field conditions and reported measured data.*

The traffic study's report of the maximum AM queue lengths on the westbound River Road approach to the school's entrance are not supported by the video data. The BBCA had asked to review the videotape of that approach for the 7:45-8:15 a.m. time period because the Traffic Study's assertion that ***no*** queues were observed in the westbound, right-turn lane into the school did not comport with reports from residents. In contrast, the BBCA's traffic expert recorded 13 queues ranging from 1 to 5 vehicles in length during the 30 minute video clip, although none exceeded the stacking capacity of the right turn lane. We did observe many cars with activated right turn signals trapped in the through lane queue because the right turn lane is so short they were unable to reach it until they approached the school. The through lane queues were striking, as they backed up ***beyond*** Beech Tree Road on two occasions during the 8:00-8:15 period, one of them for five consecutive minutes. (We had not focused on through lane queues during the first 15 minutes of our review, and Holton-Arms' attorney objected to our request to review that segment a second time.)

It was impossible to count all the cars in the queue visually, as beyond a certain point they were an indistinguishable stream.[2] It is, however, possible to calculate them.

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[2] Holton-Arms and Gorove/Slade had agreed that Gorove/Slade would consult with the neighborhood's traffic expert, Joseph Cutro, regarding the design of the data collection for the traffic study. When Gorove/Slade sent Mr. Cutro a copy of the proposed video camera locations, Mr. Cutro pointed out that placing a camera on the same side of the road as the westbound traffic would make it difficult to capture

The distance from Beech Tree Road to Holton-Arms' entrance is .39 miles or 2,059 feet in length. See Traffic Impact Study Appendix, p. 21. Allowing 22 feet per car, one lane would contain 93 cars, and both through lanes would contain a total queue of 186 cars. This is, in fact, a conservative estimate because the queue extended beyond Beech Tree Road. In contrast, the traffic study reported a maximum queue length (which Gorove/Slade representatives explained was the sum of both through lanes) of only 56 cars. See Traffic Impact Study, p. 24 (Table 10). This is less than a third of what we observed in the maximum queue during our review of the videotape. Given the length of the backup, we must question whether the range of stopped delay reported at that approach for the AM peak hour (12.2-14.4 seconds), see id., is possible and whether the stopped delay measurements reported the full length of delay for cars that may have had to wait more than one light cycle or restarted the delay counts with each light cycle. In addition, given the size of the discrepancy between what we observed and what was reported for this time period and approach, we are concerned that there may be other reporting discrepancies in the study that cannot be identified without a review of the underlying video recordings.

4. Other discrepancies in measured data.

There are other discrepancies in the reported measured data that are equally disconcerting. Appendices Q1 through Q4 display the "measured" turning movement volumes at the three study intersections and presumably served as input into the pre-modification and post-modification traffic simulations. The data in the post-modification graphics, Appendices Q2 and Q4, all appear to have been taken from Gorove/Slade's 2007 turning movement counts. Compare Appendix A with Appendices Q2 and Q4. The data in the pre-modification graphics, Appendices Q1 and Q3, however, appear to come from two different sources. For the Burdette/River Road and Beech Tree/River Road intersections, the data appears to be the 2007 volumes with the estimated difference in Holton-Arms' traffic subtracted out. This process is explained by the absence of pre-existing 2003 data for those intersections. However, for the Holton-Arms/River Road intersection (for which actual 2003 data exists), half of the turning movements appear to have been calculated in the foregoing manner, while the other half appear to come from the actual 2003 traffic counts, which show entirely different directional characteristics than the adjusted and unadjusted 2007 volumes. Compare Appendix O with Appendices Q1 and Q3. (Determining the source of this data was complicated by the fact that in Appendix O, which summarizes the actual 2003 turning movement counts, eastbound River Road traffic volumes were transposed with westbound, and Royal Dominion volumes were transposed with those departing the Holton-Arms' driveway.) The failure to note or explain why more than one source was used to arrive at the volumes for this intersection raises concerns as to whether selective sourcing was employed to produce a simulation result more favorable to the applicant.

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the entire length of the westbound traffic queues. We subsequently learned that the traffic observations had been completed before Gorove/Slade sent Mr. Cutro the information regarding the video camera locations.

5. The Traffic Impact Study and Supplement do not consistently employ the same peak traffic hours in reporting and comparing data.

In the pre-modification and first post-modification traffic studies, Holton-Arms' peak traffic hours were identified as 7:15-8:15 a.m. and 3-4 p.m. The current study establishes that the school's PM peak traffic hour is now 3:30-4:30 p.m. In comparing pre-modification and post-modification data regarding the percentage of River Road traffic Holton-Arms' traffic represents, stopped delays, maximum queues, critical lane volumes, measured delays and level of service, the Traffic Impact Study compares data from the current peak traffic hour to actual or simulated data from the same time slot for 2003, without noting that the comparison excludes one-half of the school's PM peak hour traffic for the pre-modification period. See Traffic Impact Study, Tables 6A and 10-16. Conversely, when Gorove/Slade reviewed the videotapes of traffic movements to analyze queuing, they counted queues during the 3-4 p.m. time period (which had been agreed upon in an NLC meeting with the understanding that it was still the school's PM peak traffic hour), even though it had become apparent that the school's PM peak traffic hour had shifted to 3:30-4:30 p.m. Gorove/Slade explained during the NLC discussion of the study that the peak queuing hour began a half-hour before the peak traffic hour, but there is no evidence to this effect in the study itself, nor does it intuitively make sense. In addition, the pre-modification and post-modification comparisons that employ simulated data for the total traffic peak hours report data for an afternoon peak hour of 5-6 p.m. despite the fact that both the 2005 and the 2007 traffic studies established a total traffic PM peak hour of 5:15-6:15 p.m. Compare Traffic Impact Study, p. 10, with Tables 12, 14, and 16. Although Gorove/Slade explains that this shift was made because no traffic counts were performed after 6 p.m. in 2003, see Traffic Impact Study, p. 23, the net effect is that the impact of the 2007 traffic is further understated. In addition, when Holton-Arms produced its Supplement, which contained actual measured delays for the three study intersections, see Supplement, pp. 3-4, Tables 2, 3 & 4, these values could not be compared to the simulated ones reported in Table 16 of the Traffic Impact Study because of the time differentials. The Supplement further confuses the issues, as it reports different total traffic peak hours (5:30-6:30 p.m.) for two of the three study intersections, but nonetheless reports data for one of them for the 5:15-6:15 p.m. time slot. See Supplement, pp. 3-4 and Table 3. Given the discrepancies between all of these time periods, it would be difficult to conclude that the data comparisons are meaningful.

6. The Study does not provide a meaningful analysis of safety.

The Safety Analysis merely repeats rather than analyzes the crash data obtained from the Maryland State Highway Administration ("SHA"). The traffic impact study makes no attempt to compare accident rates at the three study intersections to those at other intersections along the River Road corridor, which was the point of obtaining accident data down to and including Springfield Drive, or to similar intersections in Montgomery County. Instead, it simply repeats the statement in correspondence from

SHA that "none of the individual accident categories met the criteria for being *significantly high* during the overall study period" without providing any explanation as to what those criteria are (or any consideration as to whether the *combined* accident categories *would* meet the criteria). If the criteria simply involve a determination of whether the accident rates exceed statewide averages, it should be noted that the "comparable weighted statewide average accident rates" that were provided by SHA appear to have been derived from "similarly designed highways under state maintenance" without regard to whether those highways had similar or higher traffic volumes.[3] See Appendix to Traffic Impact Study, p. 14.

7. The conclusions of the Traffic Impact Study regarding the impact of the modifications do not appear to be supported by the data.

Holton-Arms' traffic study understandably seeks to minimize the school's contribution to traffic along the River Road corridor, concluding that the school generates a "small fraction of the total traffic on all approaches to its intersection with River Road." See Traffic Impact Study, p. 6. In fact, Holton-Arms accounts for 18% of the total traffic – nearly 1 out of every 5 cars – at that intersection during the school's morning peak traffic hour, and 13% -- nearly 1 out of every 7 cars – during the school's afternoon peak traffic hour. Holton-Arms accounts for 16% -- or nearly 1 out of every 6 cars – in the morning peak traffic hour for all River Road traffic, and 8% -- or nearly 1 out of every 12 cars -- in the afternoon peak traffic hour for all River Road traffic. These are hardly "small fractions." Although the school's presence on River Road is lighter during off-peak hours, on the day traffic observations were made, there was not a single 15 minute interval, from 5 a.m. to 7:45 p.m. when cars were not entering or leaving the school's campus. See Traffic Impact Study Appendix, p.1. The fact that these percentages have not changed significantly (and the fact that the total numbers of Holton cars on the road have not changed significantly) since 2003 is consistent with our observation that the current study cannot measure an enrollment increase which is not in place. Even with an increased enrollment, however, the stability of the percentage would not be probative of the traffic impact. If this were the case, the school could expand its operations at the same pace that total traffic increases on River Road due to upcounty development, without regard to the effect queuing and delays would have on the surrounding intersections. Neither is the relative stability of the school's traffic generation rate probative, except to establish that the school's efforts to increase carpooling have met with limited success.

Due to the deficiencies of the Traffic Impact Study, it is impossible to assess the assertions that queuing and delays have not changed significantly since the 2004 modifications. What the study *does* establish is that River Road is congested, that during peak traffic hours the study intersections are at or approaching failure, and that there are significant delays along the study intersection corridor. For example, the Holton-

[3] We also note that the accident data includes only those accidents for which a police report was filed. See Appendix to Traffic Impact Study, p. 14. The standard Montgomery County policy is that Montgomery County police will not take an accident report unless an individual leaves the accident in an ambulance or one of the vehicles has to be towed away from the scene. We have no information as to whether the other jurisdictions which reported data to the SHA follow this policy as well.

Arms/River Road intersection exceeds the current CLV congestion standard of 1600 and operates just above failure under the Highway Capacity Manual ("HCM") test. See Supplement to Traffic Impact Study, pp. 2-3. The Burdette/River Road intersection approaches the CLV congestion standard in the AM peak hour and fails under the HCM test. The Beech Tree/River Road intersection approaches the CLV congestion standard in the AM peak hour, and two of its four approaches fail the HCM test. Id., pp. 2-4. During the PM peak traffic hour, westbound traffic on River Road slows to an average of 15 miles per hour through these intersections. See Traffic Impact Study, p. 16. Adding any further traffic to this corridor will only exacerbate the situation.

Conclusions

We thank Holton-Arms for working with our community through the NLC in an effort to devise a traffic study that would measure accurately all the traffic aspects we believe the Board of Appeals requested. We are disappointed that the execution of the study had so many deficiencies, as discussed above.

We had hoped that the traffic study would provide a baseline for evaluating any future special exception modification request that might increase the number of trips to and from Holton-Arms' campus. However, because the study did not really measure the traffic that would be generated by the currently authorized modifications, and because of the other deficiencies discussed above, it would not be a reliable tool for future use. Similarly, we had hoped that the traffic study would provide an accurate assessment of current traffic conditions. Again, for the reasons discussed above, the reliability of the traffic study conclusions is questionable. We defer to the Board of Appeals on the issue of whether the study, with the deficiencies noted, is sufficient to satisfy the Board of Appeals' requirements.

What the study clearly establishes, in our view, is that River Road, at the relevant intersections, is currently congested and that Holton-Arms' traffic is substantially contributing to this congestion. We have established, in our earlier submissions to the Board of Appeals, that the traffic generated by Holton-Arms is well in excess of similar private schools as set forth in the LATR guidelines. Holton-Arms should be on notice that any future modifications must be traffic neutral, whether by the use of bussing, carpooling, or compensatory reduction in other activities.

Respectfully submitted,

Linda C. Kauskay
President

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Copies by e-mail to: Martin Klauber, Esq.
Elsie Reid, Esq.
George Springston

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ATTACHMENT 11

August 21, 2007

Mr. Shahriar Etemadi
Transportation Planning Division
Montgomery County Planning Department
8787 Georgia Avenue
Silver Spring, Maryland 20910-3760

Re: Holton-Arms Traffic Impact Study of July 2, 2007

Dear Mr. Etemadi:

The Board of Appeals in its Resolution in Case Nos. CBA-1174-D, S-2467-A, and S-2503-A (Effective Date: January 5, 2007) established the following condition:

> "5. Petitioner shall conduct a traffic study as follows:
>
> No later than February 28, 2007, the Petitioner will submit a traffic study to the Board of Appeals and the Transportation Planning staff of the Maryland-National Capital Park & Planning Commission, after consultation with the Bradley Boulevard Citizens Association (BBCA), the Burning Tree Civic Association (BTCA), and the Office of the People's Counsel (OPC) and Transportation Planning staff as to the parameters of the traffic study. Copies of the study shall be provided to the BBCA, BTCA, and the OPC. In accordance with Section 59-G-2.19(b), the traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton generated traffic at all affected intersections and roadways. Upon receipt of the analysis and comments of the Transportation Planning staff and other interested parties, the Board of Appeals may conduct a public hearing to discuss the study and the analysis and comments of the Transportation Planning staff. Should the Board of Appeals determine that there has been an adverse traffic impact due to the modified uses, then the Board may, after a public hearing, amend the conditions of approval for the modified uses approved in its March 23, 2004 Opinion and Resolution; however, every effort will be made to avoid any reduction in enrollment from the approved level of 665."

In this same Resolution the Board made the following finding:

> "The Board of Appeals considered the Hearing Examiner's Report and Recommendation at its Worksession on November 29, 2006. . . The Board finds the

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Report and Recommendation thorough and persuasive as to the need for an additional traffic study with revised parameters. However, the Board amends the recommended condition to require submission of the study by no later than **June 1, 2007***."

Please find the following documents, which are attachments to this letter:

1. Board of Appeals Resolution in these cases effective January 5, 2007
2. Gorove/Slade Traffic Impact Study of July 2, 2007
3. Gorove/Slade Traffic Impact Study APPENDIX of July 2, 2007
4. Gorove/Slade Supplemental Memorandum of August 6, 2007
5. Burning Tree Civic Association's August 15, 2007, comments on the Traffic Impact Study
6. Bradley Boulevard Citizens Association August 20, 2007, comments on the Traffic Impact Study

I respectfully request that you analyze the Gorove/Slade Traffic Impact Study (including the APPENDIX and the Supplemental Memorandum), taking into consideration the comments of the Burning Tree Civic Association and the Bradley Boulevard Citizens Association to determine whether condition No. 5 has been satisfied based on Section 59-G-2.19(b) of the Zoning Ordinance and whether the Board of Appeal's finding concerning the need for "an additional traffic study with revised parameters" has been addressed by the Traffic Impact Study and related materials that have been submitted by the Petitioner.

When completed, kindly transmit your analysis to this Office. Should you have any questions, please do not hesitate to contact me at your earliest convenience.

Thanking you for your assistance and cooperation, I am

Sincerely yours,

Martin Klauber
People's Counsel

MK/fh

Attachments (6)

cc: Katherine Freeman, Esquire (without attachments)
Linda Kauskay, Esquire (without attachments)
Elsie Reid, Esquire (without attachments)
George Springston (without attachments)

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* The Board of Appeals Worksession Minutes of Wednesday, May 16, 2007 (Item 7) indicate that, based on a request from the Petitioner's counsel, the Board of Appeals "Granted the extension of time for submission of the traffic study until 9/15/07."

ATTACHMENT 12

MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

August 27, 2007

Mr. Martin Klauber,
People's Council
100 Maryland Avenue, Room 226
Rockville, MD 20850

Dear Mr. Klauber:

I received copies of Holton-Arms Traffic Impact Study conducted by Grove/Slade on August 23, 2007. You have requested that I review the study and submit to you my findings. I will be out of the office between August 29, 2007 and September 17, 2007.

I expect to review the study and submit to you my recommendations by mid October. Thank you for opportunity to review and comment on this study.

Sincerely,

Shahriar Etemadi
Transportation Planning Supervisor

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ATTACHMENT 13

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RALPH J. MOORE, JR.+
VINCENT C. BURKE, III
OF COUNSEL

August 30, 2007

Chair Allison Fultz
Board of Appeals
Montgomery County Board of Appeals
Stella B. Werner Council Office Building
100 Maryland Avenue, Room 217
Rockville, MD 20850

Re: Special Exception Case No. CBA-1174-D
The Holton Arms School, Inc.

Dear Ms. Fultz :

Pursuant to the Resolutions of the Board of Appeals dated January 5, 2007 and May 16, 2007, requiring The Holton Arms School to submit a new traffic study in connection with modifications to its special exceptions for a private school, child care camp and child care center, I am pleased to transmit the enclosed Final Traffic Impact Study Report dated July 2, 2007 ("Report") and Appendix dated July 2, 2007 ("Appendix") prepared by Gorove/Slade Associates, Inc., the school's traffic engineers. Along with the Report and Appendix I am transmitting a Supplemental Report dated August 6, 2007, and the Holton-Arms Traffic Study Approach dated March 9, 2007 which states the agreed upon parameters for the traffic study developed after three meetings of the Neighborhood Liaison Committee ("NLC").

In conformance with the procedure agreed upon by the NLC members and facilitated by Martin Klauber, the Report was transmitted by hand delivery to the NLC members on July 3, and the Appendix on July 5. Holton then presented the Report at a meeting of the NLC on July 24, at which two representatives of Gorove/Slade presented their findings to the NLC; Joseph Cutro, Bradley Boulevard Citizens Association's ("BBCA") traffic consultant, and Norman Knopf, BBCA's counsel were also present. Subsequently, the Supplemental Report was prepared in response to community questions.

As agreed upon with the NLC representatives, the Report, Appendix and Supplemental Report were transmitted by Mr. Klauber, along with comments from the Burning Tree Civic Association ("BTCA") dated August 15 and comments from the BBCA dated August 20 to Shahriar Etemadi, Transportation Planning Division Supervisor for the Planning Department of MNCPPC-MC. By letter dated August 27, Mr. Etemadi has advised Mr. Klauber that he expects to review the traffic study and deliver a report in mid-October. All the parties would like the opportunity to comment upon Mr. Etemadi's analysis prior to its delivery to the Board of Appeals.

Accordingly, we respectfully request that the Board of Appeals accept the transmission of the Report as being timely submitted by the school, but that the Board not consider the Report until such time as Mr. Etemadi's analysis and any further commentary from the parties is submitted, which we anticipate would occur sometime in November. Mr. Klauber has agreed to collect Mr. Etemadi's analysis and any parties' comments for delivery to the Board. Linda Kauskay of the BBCA, George Springston of the BTCA, and Mr. Klauber have authorized me to state that they join in this request. Thank you.

Sincerely,

Elsie L. Reid

Enclosures:
(1) Holton-Arms Traffic Study Approach dated March 9, 2007 (4 copies)
(2) Final Traffic Impact Study dated July 2, 2007 (4 copies)
(3) Final Traffic Impact Study Appendix dated July 2, 2007 (4 copies)
(4) Holton-Arms Traffic Impact Study Supplement dated August 6, 2007 (4 copies)

cc: Susanna Jones (w/o enclosures)
Diane Coulton Beebe (w/o enclosures)
Kim Samperton (w/o enclosures)
Susanne Wean (w/o enclosures)
Rich Esposito (w/o enclosures)
Janice Demare (w/o enclosures)
Norman Knopf (w/o enclosures)
Linda Kauskay (w/o enclosures)
George Springston (w/o enclosures)
Shahriar Etemadi (w/o enclosures)
Louis Slade (w/o enclosures)

ATTACHMENT 14

MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

October 30, 2007

Mr. Martin Klauber, People's Counsel
Office of People's Counsel
100 Maryland Avenue, Room 226
Rockville, MD 20850

RE: Holton-Arms Traffic Impact Study of July 2, 2007- Case Nos. CBA -1174-D, S-2467-A, and-2503-A

Dear Mr. Klauber:

Thank you for the opportunity to review and comment on the above-referenced traffic study. In accordance with the FY 2003-05 Annual Growth Policy (AGP) adopted by the County Council on October 28, 2003, "Subdivision applications" and " all other regulatory actions" (i.e., zoning, mandatory referral, and special exception) are subject to only one transportation test called the Local Area Transportation Review (LATR)." The Planning Board in accordance with the AGP has adopted LATR Guidelines to test all regulatory applications. In a traffic study dated June 29, 2005, the applicant followed the Guidelines and submitted a traffic study that met the requirement of the Board of Appeals' March 23, 2004 Opinion condition number 5. The Planning staff at the time conducted an independent evaluation of that study by checking the validity of the traffic counts and observation of the traffic operation in the field to confirm the findings of the applicant's traffic study. We concluded that the findings of the study were valid and the applicant had met the Board of Appeals condition for continuation of the additional student enrollment.

However, the Board of Appeals in its January 5, 2007 opinion requested that an additional study be done based on a scope prepared in cooperation with the Bradley Boulevard Citizen Association. It is our understanding that the applicant met and agreed to a series of studies based on various traffic study methodologies. These studies are unprecedented in scope and scale to assess an additional 16 peak hour trips resulting from 15 more school students and 5 more childcare enrollments. The proposed change in number of students could result in about 5 additional Critical Lane Volume (CLV) movements that are practically inconsequential in producing more vehicular delays at the three evaluated intersections that carry a range of approximately 4,600 to more than 5,000 peak hour trips.

However, the Planning staff was requested to evaluate the result of these studies and comment on them. Our comments are:

1. The additional student enrollment has an insignificant impact on the area transportation system. In fact, the result of the most recent studies show lower CLVs as compared to

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the study conducted in the year 2000 when the original application was submitted. There have been three other studies conducted in the year 2003 and 2005 that showed comparable results.

One of these traffic studies by Grove/Slade Associates in 2005, showed no significant change in the level of congestion or traffic operation in the area since the year 2000. In addition to CLV analysis, this study also used Highway Capacity Manual intersection capacity analysis that resulted in calculating average delay and Level of Service (LOS). The result between past and present conditions showed insignificant change in the overall delay and LOS during the AM and PM peak hours.

On a major arterial such as River Road the traffic signal timing favors through movements, with less relative green time allocated to the minor street such as the school driveway that intersects it. The priority of "green time" given to this major road results in a much better level of service for the major road and higher delay for minor roads --in this case Holton Arms Driveway, Burdette and Beech Tree. However, overall travel delay is minimized and the intersections function acceptably under County standards.

2. The most recent study (July 2, 2007) conducted by Grove/Slade and Associates based on the scope of study agreed to by the Citizen Associations included many different methodologies. The study included 16 hours of traffic counts, elaborate calculation of trip generation rates, videotaping and field observation of traffic operation and queuing, traffic modeling and accident study. Each of these procedures measures different aspects of the roadway network, and so will have somewhat different results. Daily traffic and even hourly variations in traffic flows can be expected to produce different results. It is our understanding that all evaluations could not be done in the same day so to avoid variations in the traffic flow. These variations in traffic flow make it impossible for any traffic model to calibrate the simulated traffic to replicate the actual traffic on the road. This again causes the result of simulated traffic to be different than what we observe. For example, traffic counts were taken in a different day than the day they were videotaping or collecting data for travel time/speed study. It is an impossible task to reconcile the differences in the result of all these studies. It is my opinion that the varying methodologies used in the study resulted in a significant data output with varying range of results. Although, the results may seem different, they all showed a similar pattern with no significant qualitative difference in the traffic operation before and after the school expansion. For example, comparison of calculated trip generations for the school activities in different years from 2003, 2005 and 2007 showed relatively constant results especially in the morning hours when the school's peak hour traffic coincides with the peak hour traffic on River Road. In the afternoon, between the hours of 3:30 and 4:30 PM, there was about 13 percent increase in the trip rates for school users. But the afternoon peak hour trips of the school generally end before the peak hour traffic of River Road begins. Therefore the impact of school's traffic in the afternoon may not be as significant as in the mornings.

3. The traffic study provided the result of Stopped Delay and Queuing analysis and again the pre-modification and post modification at the school showed no significant differences in traffic operation related to delay, queuing and level of service.

4. The study provided data on traffic accidents on River Road at the subject intersections for three years. According to these data and evaluation of the State Highway Administration, the number of accidents in this segment of River Road did not meet the criteria for being significantly high as compared to other similar facilities. Planning staff evaluated the accident data and confirms that number of accidents on River Road were in all categories less than those for the similar statewide roadways.

In conclusion, the staff believes that the submitted study has by far exceeded the requirements of evaluating the impact of the additional student enrollment at Holton Arms School related to condition No. 5 of the Board of Appeals' opinion. The study has satisfied the condition because there is no significant change in the overall traffic operation in the area as the result of the increase in enrollment.

Sincerely,

Shahriar Etemadi
Transportation Planning Supervisor

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ATTACHMENT 15

MONTGOMERY COUNTY, MARYLAND

November 6, 2007

Linda Kauskay, President
Bradley Boulevard Citizens Association
8711 Burning Tree Road
Bethesda, MD 20817

Elsie Reid, Esquire
Furey, Doolan & Abel
8401 Connecticut Avenue, Suite 1100
Chevy Chase, MD 20815

George Springston, President
Burning Tree Civic Association
8436 Burning Tree Road
Bethesda, MD 20817

Dear CLC Member:

Re: Shahriar Etemadi's Evaluation and Comments

Attached please find a copy of Shahriar Etemadi's evaluation and comments on the Holton-Arms Traffic Impact Study of July 2, 2007.

I respectfully request that you transmit to me your analysis, evaluation, and comments on Mr. Etemadi's report and your final comments on the Traffic Impact Study by close of business on Friday, November 30, 2007.

The Traffic Impact Study, Mr. Etemadi's report and your comments will then be transmitted to the Board of Appeals for consideration in this case.

Should any party need additional time to prepare analysis, evaluation, or comment on Mr. Etemadi's report or the Traffic Impact Study, please do not hesitate to contact me at your earliest convenience.

Sincerely yours,

Martin Klauber
People's Counsel

Attachment (1)

cc: Katherine Freeman, Executive Director
Board of Appeals (w/o attachment)
Martin Grossman, Hearing Examiner
Office of Zoning and Administrative Hearings (w/o attachment)

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ATTACHMENT 16

Klauber, Martin

From: George Springston [gspring@olg.com]
Sent: Wednesday, November 28, 2007 4:21 PM
To: Klauber, Martin
Cc: Elsie Reid; Linda Kauskay; Jason Smolen; Norman Knopf
Subject: Report date

Hi all,

I will not be able to complete BTCA's comments by Friday, November 30, as planned because of travel, Dr.s appointments, etc. I need another week if that is OK with everyone. Sorry for the change in plans and thanks for your cooperation.

George

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ATTACHMENT 17

LAW OFFICES

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RALPH J. MOORE, JR.+
VINCENT C. BURKE, III
OF COUNSEL

November 30, 2007

Chairman Allison I. Fultz,
Members of the Board of Appeals
Montgomery County Board of Appeals
Stella Werner Office Building
100 Maryland Avenue, Room 217
Rockville, MD 20850

Attn: Katherine Freeman, Exec. Secretary

Re: The Holton-Arms School
CBA-1174-C; S-2467; and S-2503

Dear Members of the Board of Appeals:

On behalf of the Holton Arms School, I am pleased to provide the School's observations on the Gorove/Slade Traffic Report with Appendix dated July 2, as supplemented on August 6, 2007, which report has now been reviewed, favorably, by the Transportation Planning Division of the Maryland National Capital Park & Planning Commission.

The "2007 Gorove/Slade Study" is submitted to satisfy Condition No. 5 of the Board of Appeals March 23, 2004 Resolution and Opinion approving modifications to the above referenced special exceptions (the "2004 Modifications"), as such condition was revised by a January 5, 2007 resolution of the Board of Appeals.[1] The purpose of 2007 Gorove/Slade Traffic Study was to "determine whether traffic generated by Holton-Arms has changed as a result of the modifications to enrollment and programs (including after hours programs) so as to adversely affect the community." (See Board of Appeals Resolution January 7, 2007, at p. 2.) The statutory context for the study is § 59-G-2.19(b).

[1] The date for submittal of the 2007 Gorove/Slade Study was later extended to September 15, 2007 by Resolution of the Board of Appeals dated June 14, 2007. The School submitted the study to the Board under cover of a transmittal letter from Elsie L. Reid dated August 30, 2007.

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Revised Condition No. 5 reads:

> No later than February 28, 2007 [September 15, 2007], the Petitioner will submit a traffic study to the Board of Appeals and the Transportation Planning staff of the Maryland-National Capital Park & Planning Commission, after consultation wit the Bradley Boulevard Citizens Association (BBCA), the Burning Tree Civic Association (BTCA), the Office of the People's Counsel (OPC) and Transportation Planning staff as to the parameters of the traffic study. Copies of the study shall be provided to the BBCA, BTCA, and the OPC. In accordance with Section 59-G-2.19(b), the traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site, including any adverse effects on pedestrian and vehicular traffic safety, capacity, queuing, delays and turning movements arising from Holton generated traffic at all affected intersections and roadways. Upon receipt of the analysis and comments of the Transportation Planning staff and other interested parties, the Board of Appeals may conduct a public hearing to discuss the study and the analysis and comments of the Transportation Planning staff. Should the Board of Appeals determine that there has been an adverse traffic impact due to the modified uses, then the Board may, after a public hearing, amend the conditions of approval for the modified uses approved in its March 23, 2004 Opinion and Resolution; however, every effort will be made to avoid any reduction in enrollment from the approved level of 665.

This condition first required the Holton-Arms School to consult with the Bradley Boulevard Citizens Association (BBCA), the Burning Tree Civic Association (BTCA), the Office of the People's Counsel (OPC), and the Transportation Planning Staff of the Montgomery County Planning Board, as to the parameters of the study. Through the Neighborhood Liaison Committee (NLC), the School initiated several meetings, attended by its advisors and traffic consultants, to decide upon the parameters for the study. After several hours of discussion the parties settled upon the parameters of the traffic study, as memorialized in the Gorove/Slade Traffic Study Proposal dated March 9, 2007. (See Attachment #1.)

Gorove/Slade, after discussing study techniques with Mr. Joseph Cutro, BBCA's traffic consultant, undertook to perform the study in the Spring of 2007. On a regular school day, Gorove/Slade conducted traffic counts and proceeded with other traffic data collection. Gorove/Slade's final report, along with a lengthy appendix, was delivered to each member of the Liaison Committee on July 3, and then presented orally at a meeting of the NCL on July 24,

2007. Thereafter, a supplemental report was prepared, addressing several questions raised by representatives of the NLC, and delivered to the NLC on August 6, 2007. (See Attachments #2, #3 and #4).

When the Board of Appeals adopted the Zoning Hearing Examiner's Recommendation and Report in January of 2007, requiring an additional traffic study (beyond that rendered in 2005 by Gorove/Slade), the Board adopted the Hearing Examiner's finding that a second traffic study was required to answer the question of the traffic impact on the community resulting from the 2004 Modifications. In reaching that conclusion, the Hearing Examiner identified three deficiencies in the 2005 Study, which he felt a more comprehensive report should address. First, the 2005 Study did not provide comparative traffic counts at the School for a full day of activities, but had reported only on traffic during the School's peak hours. Secondly, the 2005 Study had only studied traffic conditions at the School's entrance on River Road. The Hearing Examiner found that additional intersections along River Road, particularly one to the west, Burdette Road and River Road, and one to the east, at Beech Tree and River Road, be included. Third, the Hearing Examiner recommended that the study not rely solely on the critical lane volume (CLV) methodology under the Local Area Transportation Review (LATR) guidelines for evaluating intersection capacity, but that other methodologies, such as intersection delay analysis be used. (See Board of Appeals Resolution, dated January 5, 2007, p. 2 and OZAH Report and Recommendation, dated November 9, 2006, at p.47.)[2]

With these considerations in mind, the 2007 Gorove/Slade Study included (i) full day traffic counts for an entire 16 hour cycle at the School's entrance which data was tabulated and compared to data collected in 2003 before the 2004 Modifications; (ii) the study was expanded to three intersections along River Road as agreed with BBCA and BTCA; and (iii) the study analyzed intersection capacity, using four methodologies: a CLV analysis, the Highway Capacity Manual analysis, a travel time delay analysis, and measured delay analysis.

Where actual historical traffic counts were available, they were compared to the data collected in 2007 to show any changes in traffic counts and trip rates, before and after the 2004 Modifications. There were no pre-Modification counts conducted by the School (i.e., pre 2004 data), however, for all the study intersections. Gorove/Slade suggested, and the NLC representatives agreed, to use a computerized modeling technique, known as SYNCHRO, to create a traffic model for the study corridor along River Road. The methodology was to develop a tool for making retrospective projections of traffic to create a pre-Modification model to compare to the 2007 traffic model.

Gorove/Slade used the SYNCHRO computer program to create a model of traffic conditions along the River Road corridor from Beech Tree Road on the east, past Holton-Arms

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[2] The OZAH recommended the study be done in advance of the anticipated new traffic light to be installed by others at the Burdette and River Road intersection, and so the 2007 Study proceeded, as agreed upon by the NLC.

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to Burdette Road on the west, by entering 2007 actual data as to actual traffic counts, travel times and recorded queues; then Gorove/Slade created a pre-Modification model by subtracting out the trips attributable to the 2004 Modifications (the "new enrollment" and other activities) to illustrate pre-Modification conditions, based on the same traffic and travel assumptions used in creating the 2007 model. By comparing the two models, conclusions were drawn as to the differences in traffic counts and movements from before and after the 2004 Modifications. This analytic tool was not expected to create an exact replica of actual traffic conditions (which fluctuate daily in any event), but rather to develop a reasonable method of comparing before and after conditions using similar assumptions as to overall traffic volumes and travel times in the affected River Road corridor. All the parties agreed to this analytic approach.

With respect to the study of intersection capacity in the River Road corridor, the study relied not only on the CLV methodology, which is the standard "capacity" methodology used in Montgomery County under the LATR guidelines, but also the Highway Capacity Manual used by the Maryland State Highway Administration, a time travel study methodology, and an actual measured time delay method which was requested particularly by the Bradley Boulevard Citizens Association. Based on an analysis of all these methodologies, Gorove/Slade concluded that the 2004 Modifications approved by the Board of Appeals had resulted in no measurable, adverse effect upon the neighborhood. The only identified increase in traffic was a slight increase in the number of cars exiting the School in the afternoon during its dismissal period, caused by a scheduling change unrelated to the 2004 Modifications. Most significantly the effect of that change is borne solely by the School patrons queuing up to leave the School.

The School reminds the Board that the singular purpose of this 2007 study was to determine, from a comprehensive look at the three affected intersections over an entire day of activities at the School, whether the increased enrollment and other activities as approved by the Board in 2004 have created an adverse traffic effect upon the neighborhood. Based on all of the criteria and analyses done, the School's traffic volumes and trip rates have proven to be relatively unchanged over the four years in question, with no measurable impacts upon the community associated with the 2004 Modifications. The School has successfully operated within its enlarged enrollment caps[3] for the School and daycare and administered the after and non-school activities per the 2004 Modifications, in accordance with its approvals.

The School has, in our view, produced probative, competent and thorough expert testimony, substantiated by the review by the Transportation Planning Division, that there have been no adverse traffic conditions generated as a result of the 2004 Modifications. Questions raised by some of the NLC members as to whether this 2007 Gorove/Slade Study is sufficient to create "a baseline" for future cases or intimations that the School overall trip rate is "excessive" (which the school disputes) are not germane to the question now before the Board, that is, the traffic impact of the 2004 Modifications.

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[3] The enrollment figures for the School are part of the public record in these proceedings. See OZAH transcript for hearing held September 18, 2006 at pp.120-122.

The 2007 Gorove/Slade Study, one of the most comprehensive ever done according to Mr. Etemadi, was completed at substantial effort and expense, within the study deadline, after extensive consultation with the BBCA, BTCA and the OPC. It analyzes intersection capacity along the affected River Road corridor using several methodologies in addition to the CLV/LATR guidelines. This study, therefore, addresses the concerns raised by both the Board and the Hearing Examiner as to the previous study done in 2005. We urge that the Board accept the 2007 Gorove/Slade Study as satisfying Condition No. 5, thus leaving in place the 2004 Modifications as approved. Thank you.

Sincerely,

Elsie L. Reid

Elsie L. Reid

ELR/jts
Enclosures
cc: Susanna Jones, Head of School, The Holton-Arms School, Inc.
Martin Klauber, Esq., Office of People's Counsel
Norman G. Knopf, Esq., Knopf & Brown
Linda Kauskay, Bradley Boulevard Citizens Association
George Springston, Burning Tree Civic Association
Shahriar Etemadi, Transportation Planning Coordinator, Montgomery County Department of Park & Planning

ATTACHMENT 18

BRADLEY BOULEVARD CITIZENS ASSOCIATION
8711 Burning Tree Road
Bethesda, Maryland 20817

November 30, 2007

Via Martin Klauber, Esq.

Chairman Allison Ishihara Fultz
and Members of the Board
Montgomery County Board of Appeals
Stella Warner Office Building
100 Maryland Avenue
Room 217
Rockville, MD 20850

Re: **CBA 1174-D, S-2467, S-2503A**
Holton Arms Traffic Study

Dear Chair Fultz and Members of the Board:

People's Counsel, Martin Klauber, has forwarded to the Bradley Boulevard Citizens Association ("BBCA") a copy of the Planning Board Transportation Department's evaluation of The Holton Arms Traffic Impact Study of July 2, 2007. Mr. Klauber has requested that any response to this evaluation that we wish to be transmitted to the Board be sent via Mr. Klauber. Our response is as follows:

1. According to Mr. Etemadi, who prepared the Transportation Department's comments, the County has "only one transportation test" which is to be used to evaluate traffic. That test is the LATR, which uses the CLV methodology to determine whether there is adequate road capacity. Mr. Etemadi, therefore, indicates surprise (and apparent disapproval) that other methodologies were considered in evaluating Holton Arms traffic, such as queuing and delay.

We strongly disagree with the contention that the sole criterion for evaluating traffic impact is whether the traffic exceeds road capacity as measured by the CLV, particularly with regard to a special exception for a private school. As the Hearing Examiner and the Board have recognized, §59-G-2.19(b), governing special exceptions for private schools, specifically provides that in evaluating traffic impact, the Board must consider all impacts irrespective of whether the traffic exceeds the capacity of the road – i.e., not just the CLV capacity methodology.

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> "In evaluating traffic impacts on the community, the Board must take into consideration the total cumulative number of expected car trips generated by the regular academic program and the after school or summer programs, ***whether or not the traffic exceeds the capacity of the road.***" (Emphasis added). §59-G-2.19(b).

2. With regard to evaluating the Holton Arms traffic, it is the deficiencies of the CLV methodology and the expanded evaluation required by §59-G-2.19(b) that led the citizens to request, and the Board properly to require a more thorough analysis than merely CLV. The deficiencies of CLV and the appropriateness and necessity of evaluating traffic impacts by other than CLV methodology have been recognized in other land use matters. For example, recently, in a matter involving a rezoning application, (Zoning Application Nos. G-862 and G-863, Glenmont Layhill Associates, LLC), Hearing Examiner Françoise Carrier noted the deficiencies of the CLV methodology. (See pp. 62, 69-70, 72-73, 80 and 189 of the Hearing Examiner's Report and Recommendation, dated October 18, 2007, which is incorporated by reference. For convenience of the Board, copies of the most relevant pages are attached to this letter as Attachment A.) In this rezoning matter, it was concluded that the deficiencies resulted in total inconsistency between the CLV methodology, which showed traffic conditions at acceptable levels and what was actually occurring, traffic congestion at unacceptable levels. For this reason, the Hearing Examiner recommended traffic evaluation by different methodologies "such as a queuing and delay analysis". (P.189). The same situation exists with regard to Holton Arms traffic. Mr. Etemadi's conclusion that the traffic study showed no significant change in the level of traffic congestion since 2000 (P.2) demonstrates the deficiencies of such studies rather than the actual situation.

3. The Holton Arms Traffic Impact Study of July 2, 2007 seeks to evaluate traffic impacts by the CLV methodology as well as other methodology. In BBCA's letter to the Board of Appeals of August 20, 2007, we noted that the study was "substantially flawed and, as a result, the conclusions it makes are questionable." (P.1. For the convenience of the Board, the entire letter is attached to this letter as Attachment B.) Mr. Etemadi's comments do not address the numerous flaws discussed in our August 20th letter. For example, the purpose of the study was to provide for an accurate assessment of current traffic conditions and how they may be affected by the increased trips authorized by the Board of Appeals in approving the special exception modification. Since almost all of the increased enrollment of the school and day care authorized by the Board of Appeals modification had not occurred when the traffic study was done, the study did not provide an accurate assessment of conditions under full enrollment.

Mr. Etemadi attempts to explain the inconsistencies we noted in the study's data by implying the traffic study was done over several days. This is not reflected in the study itself, which appears to be based on a March 20, 2007 traffic count. In any event, this would not explain the degree of inconsistencies we found nor would it

explain such discrepancies as the conflict between actual field conditions video taped and the data purportedly taken from that videotape. Rather than repeating all the issues we raised in our August 20th, we have submitted it as an attachment to this letter and incorporate it by reference.

The failure of Mr. Etemadi to address these and other deficiencies seriously undermines his evaluation of the traffic study. As set forth in our August 20th letter, we submit that these deficiencies undermine the reliability of the study and its usefulness as a baseline for evaluating future special exception modifications generating an increase in trips.

We thank the Board for consideration of our comments.

Respectfully submitted,

Linda P. Kauskay

cc: Martin Klauber, Esq..
People's Counsel
Elsie Reid, Esq.
Furey, Doolan & Abell
George Springston, Esq.
Burning Tree CA

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The Applicant carried out its own traffic studies where no recent traffic studies were available. For the key intersection of Georgia Avenue and Randolph Road, the Applicant did two counts, in January 2006 and January 2007. Both sets of counts were lower than counts taken by others, at the same intersection, in September 2005 and February 2006. *See* Ex. 62(a) at A18. Technical Staff decided that the most appropriate approach was to use an average of the four counts. *See* Transportation Planning Staff Memorandum of May 23, 2007, attached to Staff Report.

b. Stage 1 Analysis

The Stage 1 analysis found that all of the studied intersections currently operate below their applicable CLV congestion standards.[13] *See id.* at 6. Thus, all nine of the intersections studied are considered to have acceptable levels of congestion under LATR. This finding contrasts starkly with testimony and photographic evidence, discussed in more detail in Part III.F. below, indicating that the intersection of Randolph Road and Georgia Avenue experiences heavy peak period congestion on a routine basis. *See* testimony of Craig Hedberg, Richard Kauffunger, and Vicki Vergagni; Exhibits 121(a)-(d).

The Stage 1 analysis did not include any programmed (publicly funded) or committed (privately funded) roadway improvements. Background traffic consisted of the approved Indian Spring subdivision, with 773 dwelling units, and the approved second Glenmont Metro Parking Garage. *See id.* at 7. Northbound through traffic was decreased by ten percent at intersections south of the access roads to the Metro garages. *See id.* The Stage 1 analysis found that all of the intersections studied would still operate at acceptable levels of congestion with background traffic except for one: the intersection of Georgia Avenue and Randolph Road, where CLV would rise from 1,763 in the morning peak hour and 1,687 in the afternoon peak hour under current conditions, to 1,803 in the morning peak hour and 1,811 in the evening peak hour with background traffic. *See id.* at 6, 11.

Stage 1 of the proposed Glenmont Metrocenter development was estimated to generate 201 "Net New Trips" during the morning peak hour and 244 during the afternoon peak hour.

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[13] Some of the intersections are in the Kensington/Wheaton policy area or the Aspen Hill policy area, which have lower congestion standards than the Metro Station policy areas.

add. Mr. Hedberg conceded that he has not personally been involved in creating a neighborhood circulator shuttle, but he estimated that a good shuttle could take enough trips off the roads during the peak hours to allow the Applicant to build an additional 35 dwelling units.

With the combination of trip credits and a shuttle, Mr. Hedberg estimated that the Applicant could receive authorization to build between 255 and 335 new units (depending on the mix of townhouses and multi-family units) without making any roadway improvements. This would be in addition to 275 replacement units in Stage 1, which are not considered to generate any new traffic. Thus, the Applicant has the potential to build between 255 and 335 new units and 275 replacement units based on transit and pedestrian-safety improvements. This would not relieve the Applicant of the obligation to make the proposed at-grade roadway improvements in order to complete Phase 1, but it would allow the Applicant to begin construction on Stage 1 while waiting for the grade-separated interchange to be funded. As will appear more fully in the next section, the Hearing Examiner is concerned about the impact of the subject development on congestion at the Randolph Road/Georgia Avenue intersection. Trip credits for non-roadway traffic mitigation may exacerbate problems at that location by allowing new development without remedies particular to that intersection. No evidence was presented as to how much the CLV at the intersection of Randolph Road and Georgia Avenue would increase due to the trips that the 255 to 335 new units would generate, or whether the non-roadway improvements would reduce congestion at that intersection in a way that would partially or fully offset the impact of the new trips.

f. Adequacy of Traffic Study to Demonstrate Compatibility

Potential adverse traffic impact is an important consideration with regard to compatibility. Typically, evidence that the requirements of LATR are satisfied has been considered sufficient for a rezoning applicant in Montgomery County to demonstrate that the project's traffic will not have an adverse impact on the surrounding area. In the present cases, however, the evidence calls into question whether the submitted LATR evidence is sufficient for the Applicant to meet its burdens of proof and persuasion. The Applicant bears the burden to demonstrate that it is more likely than not (the "preponderance of the evidence" standard) that the proposed development will not have

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an adverse impact on traffic conditions in the surrounding area. Based on the evidence submitted to date, the Hearing Examiner concludes that the Applicant has not met that burden.

First, the traffic study is not flawless. Mr. Kauffunger pointed out that on page ten, which shows how background traffic was assigned to the roadway network for Stage 1, boxes seven and four display some confusing data. *See* Tr. July 24 at 55. They show a breakdown of southbound traffic expected on Layhill Road when the background developments are completed, and how much of that stream of traffic makes it onto Georgia Avenue, and thence potentially to the intersection of Georgia and Randolph. The table shows 175 vehicles on Layhill Road going south through the intersection of Glenallan Avenue and Layhill Road during the morning peak hour. *See id.* Only 26 vehicles arrive at the next signalized intersection on Layhill Road, which is Georgia Avenue, a short distance away. This indicates that 148 vehicles exited Layhill Road between Glenallan Avenue and Georgia Avenue.

Mr. Hedberg stated during the hearing that there is an entrance to the Metro parking garage on Layhill Road, and he believes there was an assignment of 149 trips from southbound Layhill into that garage. Mr. Kauffunger remarked that he drives south on Layhill Road to the Glenmont Metro station, and he turns right on Glenallan Avenue to use the main Metro garage entrance. Mr. Hedberg offered no explanation for the implicit assumption that the vast majority of cars driving down Layhill Road in Glenmont (1) are heading to the Metro and (2) choose to use the Layhill Road entrance to the garage; he simply stated that he got the numbers from a traffic study that Metro prepared, which was in the background data for the Indian Springs subdivision and which Technical Staff provided to Mr. Hedberg as background data for these cases. Mr. Hedberg then expressed some confusion as to whether the 149 trips on Layhill Road were assigned to the existing Metro garage entrance or the proposed new Metro garage on the west side of Georgia Avenue. The Applicant's written rebuttal, submitted some weeks after the hearing, states that the new garage is assumed to increase traffic at the existing garage because the new garage will free up spaces in the existing one.

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opined that the merge can be done safely, but conceded that the merge could create delays on the south side of the intersection. The Applicant chose not to submit any additional evidence as to whether those delays would make the cure worse than the problem.

The Applicant's trip generation calculation reduced the trips expected from the proposed development by the number of trips that would normally be expected from the existing 352 units. It is undisputed, however, that the existing apartment complex on the site has a high vacancy rate. Community member Vicki Vergagni stated in a post-hearing submission that there are currently 219 residents at the existing complex. *See* Ex. 134(a). This could argue for a smaller reduction in trips for the replacement units, which arguably are likely to generate more residents, and therefore more traffic, than the number of people actually living on the site today.

The most important weakness of the traffic study is not, however, related to an error or a faulty assumption. It relates to the CLV methodology that LATR employs. When Mr. Kauffunger asked Mr. Hedberg (the Applicant's traffic expert) whether the CLV technique has any shortcomings, Mr. Hedberg replied that it only measures conflicting movements that go through an intersection, which could be considered a shortcoming. *See* Tr. July 24 at 84-85. Mr. Hedberg observed that if there is something preventing the flow of traffic through an intersection, such as an accident, the CLV count will be relatively low because cars are not moving. Mr. Hedberg acknowledged that an intersection with heavy congestion may not have a high CLV because the congestion limits the number of vehicles that can get through. *See id.* at 85-86. He argued, however, that an intersection with that much congestion will normally exceed the congestion standard when background traffic is added in, because the background traffic is just numbers added to the traffic counts – background traffic cannot be blocked by conditions on the ground. *See id.* at 86. Mr. Hedberg also observed that when intersections are closely spaced, there may be back-ups between them if the signal timing is not well-coordinated. *See id.* at 87.

Mr. Kauffunger described conversations he had with two transportation professionals at the University of Maryland and two SHA officials, all of whom agreed, with varying degrees of vehemence, that the CLV technique has serious limitations. *See* discussion in Part III.H below, under

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Kauffunger paragraph 5. One of the academics he spoke with explained that when intersections are close together, CLV fails to measure the effect of spillback from one intersection to the one before it. *See id.* at 280-81. The other academic described CLV analysis as very dangerous to use with congested intersections because it measures only the traffic that signals let through, not the number of vehicles trying to get through. *See id.* at 282-83. The Administrator of the SHA, Neil Peterson, stated that CLV is very unreliable in relation to unstable, over-capacity intersections. *See id.* at 283-84. The weight to be given to these remarks is limited by the fact that they are all hearsay – Mr. Kauffunger was repeating statements that others made to him outside the hearing room, for the purpose of proving that what they said is true. Such remarks would carry a great deal more weight if the speakers were present in the hearing room, subject to cross-examination, or even if they were made in a signed writing. The hearsay testimony is entitled to some credence, nonetheless, because it is consistent with Mr. Hedberg's testimony and because hearsay may be admitted in administrative proceedings if it appears to be reliable and probative. *See* Code §2A-8(e).

More persuasive than the theoretical discussion of the limitations of CLV as a technique is the overwhelming evidence that the intersection of Georgia Avenue and Randolph Road is seriously congested, with lengthy back-ups common during the peak hours. Mr. Hedberg testified that in his two or three peak-hour visits to the intersection, the worst back-up he saw on Georgia Avenue was approaching the Layhill Road intersection, which he estimated to be a distance of about 800 feet. *See* Tr. July 24 at 82-84. Community member Vicki Vergagni testified that it is not unusual for through traffic on Georgia Avenue back up from Randolph Road past the intersection with Layhill Road and even past the intersection with Glenallan Avenue. *See* Tr. July 24 at 151. She added that it may take three or four lights to turn left from Georgia Avenue to Layhill, and it is often impossible to turn left from Layhill onto Georgia Avenue because traffic on Georgia is not moving, and there is no where to go. Community member Susan Lois Johnson described the intersection of Georgia Avenue and Randolph Road as "failing." *See* Tr. June 29 at 204; Ex. 97. Community members Ann Ambler, Max Bronstein and Michael McAteer complained that the intersection of Randolph Road and Georgia Avenue is heavily congested during peak hours. *See* Part III.F. above. Mr. Kauffunger testified that

The Applicant did not attempt to refute the testimony and photographic evidence of lengthy back-ups on Glenmont roads caused by congestion at the intersection of Randolph Road and Georgia Avenue, nor did the Applicant attempt to refute the evidence that CLV is a poor technique to measure whether a congested intersection is operating at an acceptable level. The Applicant considers evidence about the limitations of CLV analysis irrelevant to these proceedings, because CLV is the technique prescribed in the LATR Guidelines. *See* Ex. 142 at 51. The Applicant has chosen to stand on the argument that it satisfied LATR and nothing more is required.

The Hearing Examiner is persuaded that regardless of its theoretical value as a measure of traffic congestion, in these cases, CLV analysis failed to adequately assess traffic conditions at Georgia Avenue and Randolph Road. Even assuming that its flaws are not enough to undercut its findings, the LATR study concluded that the intersection of Georgia Avenue and Randolph Road operates at an acceptable level currently, and would continue to do so with the proposed development and associated at-grade improvements to Georgia Avenue. The picture painted by CLV analysis, however, suggests that the intersection is operating acceptably, because the number of conflicting movements going through the intersection is below the level of congestion the County considers acceptable in a Metro area. *See* Ex. 62(a) at 6. Yet, testimony from Mr. Hedberg and community members, supported by Mr. Kauffunger's photographs and unrefuted by any contrary evidence, establishes that under current conditions the intersection is heavily congested, and is not operating in a manner that any reasonable person would consider acceptable.

Working from the premise that the intersection is working properly, the traffic study goes on to calculate that although background traffic and Stage 1 of the proposed development would cause the intersection to exceed the congestion standard slightly, and Stage 2 would cause the intersection to exceed the congestion standard by a much larger margin, the proposed at-grade improvements would bring the intersection significantly below the congestion standard with Stage 1, and slightly below it with Stage 2. All of these conclusions are based on the faulty premise that the intersection is operating at an acceptable level under current conditions, a premise that is undercut by the unrefuted evidence of serious congestion.

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VII. RECOMMENDATION

I, therefore, recommend that (1) Zoning Application No. G-862, which requests reclassification from the R-T 12.5, R-30 and O-M Zones to the TS-R Zone of 23.9 acres of land located at the intersection of Georgia Avenue and Glenallan Avenue in Silver Spring, Maryland, in the 13th Election District, consisting of Lots 1 through 49 and Parcels A, B and C in the Glenmont Mews Subdivision; part of Parcel A in the Glenmont Park Subdivision; part of Parcel B in the Glenmont Park subdivision; Parcel C in the Glenmont Park Subdivision; Parcel E in the Glenmont Park Subdivision; Parcel F in the Glenmont Park subdivision; and part of Parcel G in the Glenmont Park Subdivision; and (2) Zoning Application No. G-863, which requests reclassification from the R-30 Zone to the TS-R Zone of 7.0514 acres of land adjacent to the land covered by Application No. G-862, consisting of parts of Parcels A, B and G in the Glenmont Park Subdivision; be ***remanded*** to the Hearing Examiner to provide the Applicant with the opportunity to present additional evidence (i) concerning traffic conditions at the intersection of Randolph Road and Georgia Avenue, such as a queuing and delay analysis; (ii) to show what steps the Applicant is willing to take to mitigate its traffic impacts, which may include but need not be limited to the at-grade improvements already proposed; and (iii) to demonstrate that the proposed mitigation would prevent adverse traffic impacts on the surrounding area from Stage 1 or the combined Stage 1 and Stage 2 of the proposed Glenmont Metrocenter.

Dated: October 18, 2007

Respectfully submitted,

Françoise M. Carrier
Hearing Examiner

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ATTACHMENT 19

BURNING TREE CIVIC ASSOCIATION
8436 Burning Tree Road
Bethesda MD 20817

December 7, 2007

Board of Appeals for Montgomery County
c/o Allison Ishihara Fultz, Chairman
Stella B. Werner Council Office Building
100 Maryland Avenue, Room 217
Rockville MD 20850

RE: Board of Appeals Case No. CBA-1174-D

Dear Chairman Fultz and Members of the Board:

The Burning Tree Civic Association (BTCA) is pleased to submit our analysis and comments on the traffic studies conducted by the Holton-Arms School for the above referenced case. The studies are required by Condition 5 of the Board's Opinions dated March 23, 2004, and January 5, 2007.

Strong differences of opinion about the interpretation of Condition 5 became apparent between the school and the two neighboring Associations from the outset. As background information, basically the school's position is that "In accordance with Section 59-G-2.19b, the traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities". The neighborhood's interpretation is that "In accordance with Section 59-G-2.19b, the traffic study will evaluate the traffic generated by the increased enrollment and by the After-Hours/Non-School activities in combination with all other approved activities on the special exception site".

These issues were never resolved, and the studies were performed and analyzed using the Holton interpretation. The remainder of this report describes our analysis and comments on the studies prepared by Holton's contractor, Gorove/Slade Associates, Inc., and the comments submitted by Mr. Etemadi of the Montgomery County Planning Department on October 30, 2007.

Unfortunately, at the time of the March 07 traffic study, there was essentially no increase in total enrollment from an earlier authorized level of 650 students enrolled at the school and 15 children in daycare -- an increase of only two additional students enrolled at the school and no additional children in daycare. Thus, it is impossible to determine the effect of the authorized increases in enrollment using Holton's interpretation of Condition 5. Mr. Etemadi failed to account for this difference in his analysis of the report.

However, we can easily determine any adverse traffic impact using the neighborhood's interpretation of Condition 5. Mr. Etemadi states that "all other regulatory actions (i.e., zoning, mandatory referral, and special exception) are subject to only one transportation test called the Local Area Transportation Review (LATR)." We will show both an adverse effect on local roads and non-compliance with the LATR Guidelines.

TRAFFIC COUNTS

Observers from BTCA were not present during either the traffic study conducted on May 10, 2005, or the study conducted on March 20, 2007, despite repeated requests for permission to observe them. We were given copies of the Gorove/Slade reports for review.

TRIP GENERATION

BACKGROUND

In a resolution effective March 15, 2006, the Board referred this case to the Hearing Examiner to review the adequacy of the traffic study submitted by the school in satisfaction of Condition No. 5 of the Board's March 23, 2004 opinion. The Board also set forth specific questions to be addressed by the Montgomery County Planning Department staff at the hearing, among which was Question 4, as follows:

4. As a general issue, do trip generation rates above the LATR thresholds constitute a non-inherent adverse effect, and at what point would additional mitigation be necessary?

COMMENTS

Mr. Etemadi offered his opinion on the first part of the question by stating "The answer is no. It is not an inherently adverse effect that needs additional mitigation." He failed to mention that the Board had previously found that Holton's trip generation rate of 1.30 is NON-INHERENT (emphasis added) to a private educational institution and necessitated remedial amendments to the special exception conditions.

None of the participants at the hearing offered any specific guidance relative to the second part of the question as to when additional mitigation is necessary. However, quantative information can be found in the Trip Generation Report (6th Edition) published by the Institute of Transportation Engineers.

An analysis of the data for private schools (K-12) shows that AM peak-hour trips increase linearly with school size and have an average trip generation rate of 0.92. The deviation from the average line (i.e., scatter of data) is about 9 percent for the smaller schools, and about half that amount for the larger schools like Holton.

The rate shown in Table 2 of the Gorove/Slade study of the 2007 survey far exceeds the expected values in the LATR Guidelines. The computed trip rate of 1.31 exceeds the guidelines by 42 percent.

The Board's Opinion in Case No. CBA-1174 (Sep 7, 2001) stated that the traffic impacts were greater than should be expected (trip generation rate of 1.30) and are not inherent to a private educational institution. Chapter 59-G-1.2.1 of the Montgomery County Code states that "Non-inherent adverse effects, alone or in conjunction with inherent adverse effects, are a sufficient basis to deny a special exception". The Board found that several accessory uses, along with overenrollment at the school and at the day care facility, were a substantial cause of excessive traffic impact, which necessitated remedial amendments. Consequently, the Board amended the condition of enrollment from 650 to 645 students.

Holton's position on granting approvals based on trip generations is clearly stated in one of their earlier letters.

"Land use practice is this County is based on granting approvals based on projected trip generations. This is nothing new. We do not believe there is any basis in law or policy for a deviation from that practice here. Therefore, the approval should be granted, if the Board of Appeals concludes that we have demonstrated no adverse effect based upon the traffic counts and projections from any new activities."

Clearly, Holton has not demonstrated compliance with the established Guidelines, in fact just the opposite. Based on the current traffic survey results, it is clear that the trip generation rate is still unsatisfactory due to excessive enrollment and/or inadequate functioning of the traffic management plan. Thus, remedial amendments to the special exception conditions would be appropriate. It should be noted that several years ago, the McLean School in Potomac negotiated an agreement with the neighborhood to bus all of its students which solved the recurring traffic issues.

CRITICAL LANE VOLUME

BACKGROUND

As the BTCA discussed in our preliminary comments dated August 15, 2007, we have significant issues with the data obtained during the study. We decided to review all the traffic studies we could find between 1997 and 2007 with respect to traffic counts, Critical Lane Volumes, and Level of Service. Eight studies are available, done by either the MD State Highway Administration (SHA), or Holton's traffic consultants, i.e., Lee Cunningham (LC) and Gorove-Slade (G-S).

COMMENTS

We decided our review would concentrate on the eastbound lanes of River Road between Burdette road and Holton's driveway since that is the section of road with the largest peak hour volume for Holton. From these studies, we determined the number of eastbound cars in the peak hour. The results are shown in Figure 1, along with the source, date, and number of cars noted for each data point.

The six green circles show a general increase in traffic with time over the six year period. The red circles, representing the Gorove/Slade studies, also show an increase but the amount of traffic is basically much lower than the other studies. Although traffic volume normally varies from day to day, the difference between the two groups is too large to be caused by normal traffic variations. This leads us to question the validity of the data.

Critical Lane Volumes

The Critical Lane Volumes (CLV) presented in the Gorove/Slade 2007 report show a CLV of 1534 for the Holton intersection which is barely below the failing standard of 1600 CLV units. The level of service is E based on the scale of A (best grade) to F (failing grade). The report neglects to mention the fact that none of the 526 cars that enter Holton's campus from River Road during the AM peak hour are counted in the calculation of the CLV. Nevertheless, these cars are adding to the congestion on River Road at the adjacent neighborhood intersection of Burdette Road/River Road.

As the BTCA testified at the OZAH hearing on Nov 14, 2003, Holton's traffic at the Burdette Road intersection was sufficient to cause failure of that intersection to meet either the old congestion standard of 1650, or the new reduced standard of 1600 CLV's, based on the latest data available at that time. In the present study, the CLV at Burdette Road is 1515 giving a level of service grade of E. Without Holton's traffic, the CLV would be 1341 with a level of service slightly less than C which demonstrates an adverse effect of almost two grades on the surrounding neighborhood.

In addition, a Maryland State Highway Administration (SHA) survey in 2003 at the Beech Tree Road/River Road intersection also shows a failing level of service. Clearly, Holton traffic contributes significantly to the congestion on River Road and has a major adverse impact on the adjacent neighborhood intersections. This is why the neighborhood associations argued strongly that the present survey should include traffic counts at these two intersections.

Highway Capacity Manual Methodology

The discussion in this section of the report is focused on delay times and level of service at the entrance to Holton. It is interesting to note that the delay times and level of service are

never mentioned for River Road eastbound or westbound at the River Road/Burdette Road intersection (Table 15 of the report). While the data presented in the table may be representative of the delay times, it should also be noted that the SHA and the Planning Department use the Critical Lane Volume to determine traffic congestion and level of service, not the alternate method using intersection delay calculations as suggested in the Highway Capacity Manual.

CONCLUSIONS AND RECOMMENDATIONS

Based on the information in the report and other pertinent documents, we conclude and recommend the following:

1. The data obtained during the present traffic study is unrealistic compared to numerous earlier surveys. The reason for this is not apparent from any information in the report, but we do not believe that the volume of traffic on River Road has decreased as indicated.

2. The traffic study fails to meet the requirements of the Board's Opinion dated March 23, 2004, and the Montgomery County Code, Zoning Ordinance Chapter 59, Articles 59-G-2.19(b) and Articles 59-G-1.21, because it contains no information on the effect of an increased enrollment at Holton and no analysis of an adverse effect of the existing traffic on the surrounding neighborhood. Article 59-G-1.21(c) stipulates that "The applicant for a special exception has the burden of proof to show that the proposed use satisfies all applicable general and specific standards under this Article". The report merely compares changes that have occurred between the present survey and computer simulations of previous traffic conditions.

3. Traffic congestion at the school's entrance meets the county standard of 1600 CLV since none of Holton's traffic (526 cars) entering the campus from River Road is counted in the calculation. However, this excessive traffic causes the adjacent intersection at Burdette Road to operate at a reduced level of service of almost two grades. The intersection at Beech Tree Road was also operating at a failing level of service in 2003 according to a traffic study conducted by the SHA, but the current survey shows a level of service at grade E.

4. We recommend that the Board evaluate the problem of non-compliance with the LATR Guidelines with respect to the excessive trip generation rate and the adverse effect of the school's traffic on neighboring intersections. If remedial measures are appropriate, the conditions for approval of Holton's special exception could be amended to include:

a. Prepare and implement a plan to reduce the trip generation rate to meet the LATR Guidelines, and

b. Prepare and implement a plan to reduce Holton traffic on neighboring intersections on River Road.

c. Provisions to verify at a later date that the plans are working successfully.

5. We firmly believe that the temporary increase in enrollment at the school and the child care center should not be made permanent.

We request that the Board include this document as an exhibit in the case file to document our concerns and conclusions about the current traffic study.

Respectfully submitted,

George B. Springston

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President

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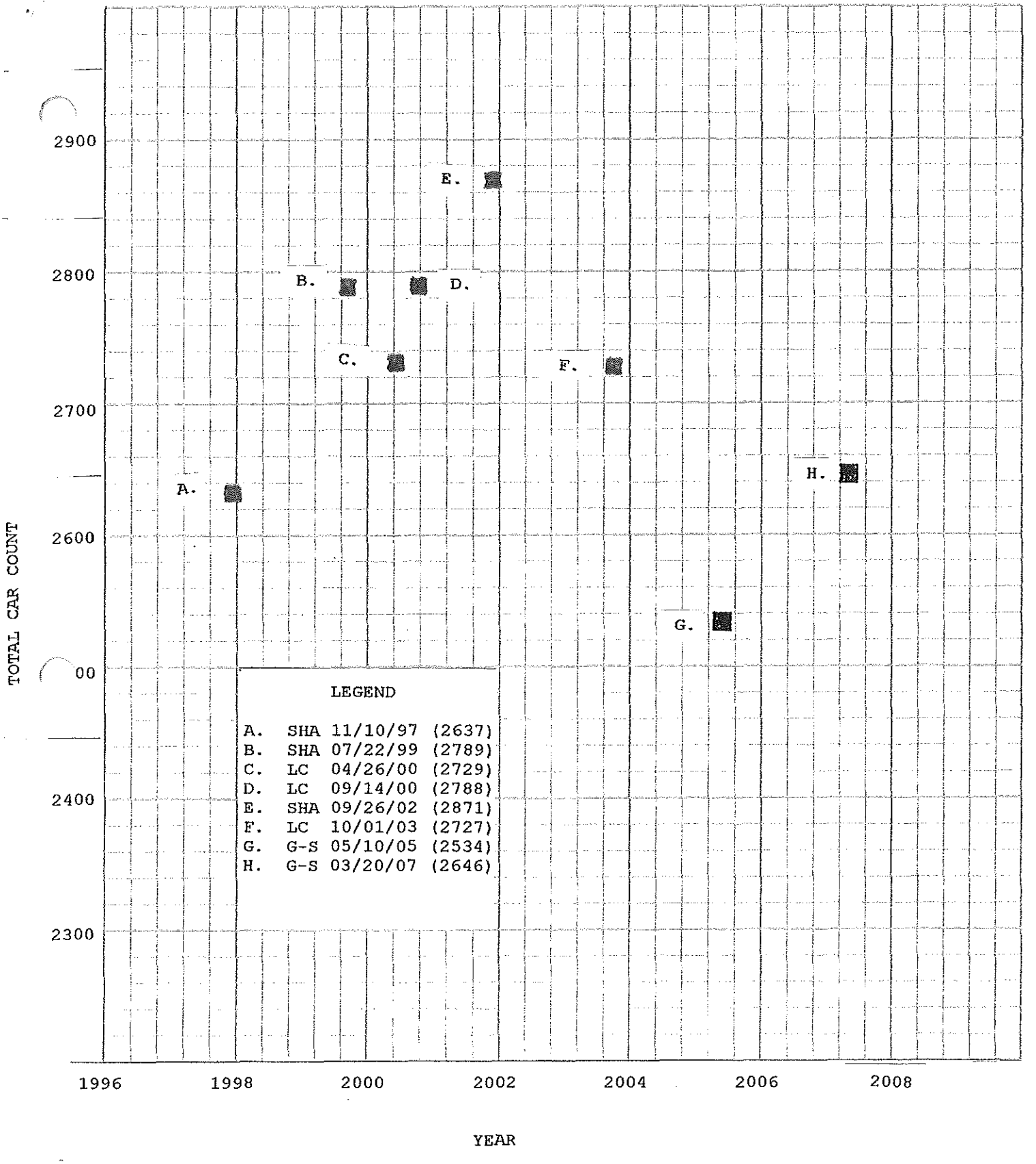

Figure 1- Eastbound car count on River Road at Burdette Road

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