



## EXECUTIVE SUMMARY

### Project Overview

Expansion of the existing Performance Motors BMW facility is being proposed for construction on the US 15-501 frontage road north of Old Durham Road in Chapel Hill. **Figure ES-1** shows the general site location of the existing Performance Motors BMW facility. The project is anticipated to be complete by 2006. This report analyzes the full build-out scenario for the year 2007 (one year after full buildout), the no-build scenario for 2007, as well as 2004 existing year traffic conditions. The report details all applicable issues related to the impacts of the site development including: safety, access, bicycles and pedestrians, public transportation, traffic operations, and geometric features.

### Existing Conditions

#### **Study Area**

The land upon which the site expansion will be constructed is currently part of the Performance Motors facility and an adjacent unoccupied bank building. The specific parcel location, site layout, and access driveway connections to the US 15-501 Frontage Road and Old Durham Road are shown in the site plan in **Figure ES-2**. The proposed site will have direct access to the US 15-501 Frontage Road at three full access site driveways and direct access to Old Durham Road via one enter-only driveway and one exit-only driveway. The proposed expansion will require demolition and modification of existing Performance BMW buildings and demolition of the existing bank building. The project plans also include a small expansion of the existing employee parking area across Old Durham Road on property owned by Performance Motors.

This report analyzes and presents the transportation impacts that the Performance Motors BMW expansion will have on the following intersections in the project study area:

- US 15-501 and Sage Road/Old Durham Road
- US 15-501 and Eastowne Drive (Blue Cross Blue Shield Entrance)
- Old Durham Road and US 15-501 Frontage Road
- Old Durham Road and Scarlett Drive
- Old Durham Road and Site Exit Driveway
- Old Durham Road and Cooper Street/Site Entrance Driveway
- US 15-501 Frontage Road and Performance Motors Main Entrance Driveway
- US 15-501 Frontage Road and Site Driveway
- US 15-501 Frontage Road and Former Bank Driveway



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All of the analyzed intersections currently serve study area traffic, except for the Former Bank Driveway, which will serve site traffic as part of the Performance Motors BMW facility expansion. The intersections of US 15-501 at Sage Road/Old Durham Road and the intersection of US 15-501 and Eastowne Drive are currently signalized. The other intersections are currently unsignalized and are assumed to remain unsignalized in the 2007 analysis year.

**Site Traffic Generation**

With the addition of new peak hour trips during the AM, midday, PM and Saturday peak periods, there are potential site traffic impacts to the study area intersections. **Table ES-1**, below, shows the site trip generation details using AM, PM and Saturday generation rates from the *ITE Trip Generation Manual, Volume 7*, and averaged to estimate the midday peak time period for each trip generation type. Site trip generation was calculated by assessing information from the *Manual* for Land Use Type 841 – New Car Sales. No reduction percentage was estimated for transit, bicycle, or pedestrian trips, although it is likely that there will be ample opportunities for these modes of transportation, considering the site location and proximity of transit routes and bicycle/sidewalk facilities.

**Table ES-1**  
**Trip Generation Summary**  
**Performance Motors BMW Expansion**  
*ITE Land Use Code 841 (New Car Sales)*

**Trip Summary for 23.8 Th.Gr.Sq.Ft. of New Car Sales**

Period Analyzed	% Traffic Entering	% Traffic Exiting	TOTAL TRIPS		Total Trips Generated
			IN	OUT	
AM Peak	73%	27%	36	13	49
Midday Peak	54%	46%	30	26	56
PM Peak	40%	60%	25	38	63
<b>Overall Weekday Total</b>	<b>50%</b>	<b>50%</b>	<b>397</b>	<b>397</b>	<b>794</b>
Saturday Peak	51%	49%	36	35	71

**Background Traffic**

The Performance Motors BMW facility expansion study area has four Town-approved developments that will contribute to study area traffic levels in the 2007 build-out+1 year: *Wilson Assemblage Development, Erwin Road Subdivision, Europa Office Building Development*, and the *Erwin Road Residence Inn*. All four projects are assumed to be complete and fully operational by the 2007 design year. Per discussions with Town of Chapel Hill staff, a rate increase of five percent per year is appropriate to estimate short-term ambient traffic growth in the study area to be added to the specific traffic volumes of the four approved projects.



**Impact Analysis**

**Peak Hour Intersection Level of Service**

With the addition of AM, midday, PM and Saturday peak hour projected 2007 background traffic volumes, no intersection in the study area will experience peak period deficient traffic operations. The addition of site traffic to these volumes will cause any deficient conditions. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-2** below.

**Table ES-2. Peak Hour Intersection LOS and Delay (Sec/Veh) Results**

Intersection	Time Period	2004 Existing		2007 No-Build		2007 Build	
		Delay	LOS	Delay	LOS	Delay	LOS
US 15-501 and Sage Rd / Old Durham Rd	AM	33.0	C	38.5	D	38.9	D
	Midday	32.6	C	37.9	D	38.7	D
	PM	34.3	C	43.3	D	44.7	D
	Saturday	32.0	C	37.7	D	41.7	D
US 15-501 and Eastowne Drive (Blue Cross Blue Shield Entrance)	AM	14.6	B	16.3	B	17.0	B
	Midday	15.2	B	17.4	B	17.7	B
	PM	25.9	C	26.9	C	29.4	C
	Saturday	10.8	B	13.8	B	15.0	B
Old Durham Road and US 15-501 Frontage Road	AM	11.9	B	12.4	B	12.5	B
	Midday	13.2	B	14.1	B	14.1	B
	PM	12.9	B	14.5	B	14.5	B
	Saturday	12.0	B	13.1	B	13.2	B
Old Durham Road and Scarlett Drive	AM	14.1	B	15.7	C	15.9	C
	Midday	19.9	C	26.2	D	27.2	D
	PM	17.1	C	22.6	C	23.4	C
	Saturday	16.4	C	20.1	C	20.9	C
Old Durham Road and Site Exit Driveway	AM	11.5	B	12.4	B	12.4	B
	Midday	10.4	B	11.0	B	11.0	B
	PM	13.2	B	14.2	B	14.2	B
	Saturday	11.6	B	11.6	B	11.4	B



**Table ES-2 (Continued). Peak Hour Intersection LOS and Delay (Sec/Veh) Results**

Intersection	Time Period	2004 Existing		2007 No-Build		2007 Build	
		Delay	LOS	Delay	LOS	Delay	LOS
Old Durham Road and Cooper Street/Site Entrance Driveway	AM	11.3	B	12.3	B	12.4	B
	Midday	10.6	B	11.2	B	11.3	B
	PM	16.2	C	18.3	C	18.7	C
	Saturday	10.4	B	10.8	B	10.8	B
US 15-501 Frontage Road and Performance Motors Main Entrance Driveway	AM	8.9	A	9.0	A	9.0	A
	Midday	9.0	A	9.1	A	9.2	A
	PM	9.1	A	9.3	A	9.5	A
	Saturday	8.8	A	8.9	A	9.1	A
US 15-501 Frontage Road and Site Driveway	AM	8.6	A	8.6	A	8.8	A
	Midday	8.9	A	8.9	A	9.1	A
	PM	8.7	A	8.8	A	9.0	A
	Saturday	8.7	A	8.8	A	9.1	A
US 15-501 Frontage Road and Former Bank Driveway	AM	N/A	N/A	N/A	N/A	8.9	A
	Midday	N/A	N/A	N/A	N/A	8.9	A
	PM	N/A	N/A	N/A	N/A	8.9	A
	Saturday	N/A	N/A	N/A	N/A	8.8	A

**Access Analysis**

Vehicular site access is to be accommodated through one enter-only driveway from Old Durham Road, one exit-only driveway onto Old Durham Road, and three entry/exit driveways onto US 15-501 Frontage Road. The driveways will all be stop-controlled and form T-intersections, with the exception of the entrance driveway on Old Durham Road. This driveway on Old Durham Road will form a stop-controlled crossroad intersection including Cooper Street. Site access from the major US 15-501 thoroughfare is currently made via the Old Durham Road and Eastowne Drive signalized intersections along US 15-501. Site access is adequate and should not be negatively impacted by the proposed expansion.

**Pedestrian and Bicycle Analysis**

Both pedestrian and bicycle facilities exist in the study area. There is continuous sidewalk along Old Durham and Sage Roads. No pedestrian provisions exist for the crossing of US 15-501 at Sage Road, but there is a crosswalk and pedestrian signals at the US 15-501 & Eastowne Drive intersection. However, the Performance Motors BMW expansion is not expected to generate significant pedestrian or bicycle volumes.



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### **Public Transportation Analysis**

Fixed route transit service provided by Chapel Hill Transit and the Triangle Transit Authority currently exists to serve the study area. However, the Performance Motors BMW expansion is not expected to generate significant transit demand.

### **Intersection Accident Analysis**

Between January, 2002 and October, 2004 over 226 reported crashes occurred in the study area. 88 of these occurred at the US 15-501 & Sage Road/Old Durham Road intersection, 123 occurred at the US 15-501 & Eastowne Drive intersection, 2 occurred at the Old Durham Road & US 15-501 Frontage Road intersection, and 13 occurred at the Old Durham Road & Scarlett Drive intersection. Many of these accidents are typical of those found at congested intersections. Field observation noted numerous vehicular conflicts during the peak periods due to large speed differentials, driver impatience, and red-light running. No accidents were reported for the driveway access points along the US 15-501 Frontage Road and/or Old Durham Road.

### **Generalized Daily Link Level of Service Analysis**

A daily link Level of Service analysis was conducted for existing and long range 2030 forecast traffic in the study area. US 15-501 has more daily traffic volume than capacity, with the corridor in the study area operating at a daily LOS F for existing and future forecast conditions. NCDOT TIP Project U-2807 plans to widen US 15-501 in the study area to six travel lanes. This project, not currently funded, is accounted for the long range travel demand models of the area. Even with additional widening, daily traffic on US 15-501 is projected, by the latest version of the Triangle Regional Travel Demand Model, to nearly double over the next 20+ years to over 80,000 vehicles per day. Sage Road and Old Durham Road corridors operate at a LOS C for existing and 2030 daily traffic scenarios. Impacts due to the Performance Motors BMW Expansion (less than 800 total daily trips adjacent to a corridor that is projected to carry over 80,000 daily trips) are expected to only marginally affect capacity along US 15-501 in the long term.

### **Special Analysis/Issues**

No special issues were noted for this analysis.



### **Mitigation Measures/Recommendations**

Existing 2004 and 2007 design year capacity analyses do not indicate a need for additional improvements to maintain adequate traffic operations on study area facilities. In addition, no improvements are necessary due to impacts caused by the Performance Motors BMW Expansion, which is expected to add only a relatively small percentage of traffic increase to most study area intersections. There are some mitigation measures recommended for study area intersections to improve traffic safety and overall vehicular flow in the area where Old Durham Road, Scarlett Drive, and the US 15-501 Frontage Roads all intersect. These changes are discussed in the **Necessary Improvements** section on the next page.

### **Planned Improvements**

The North Carolina Department of Transportation is planning to upgrade the intersection of US 15-501 and Erwin Road by constructing a superstreet to the south of the study area. This project, TIP U-4008, is currently scheduled to be let for contract on December 12, 2004. No improvement projects by the Town of Chapel Hill or private developers are anticipated to be complete by 2007 and were not analyzed in this study.

### **Background Committed Improvements**

None of the background traffic studies – *Wilson Assemblage Development, Erwin Road Subdivision, Europa Office Building Development, and Erwin Road Residence Inn* contain any improvements that affect study area intersections for the 2007 design year.

### **Applicant Committed Improvements**

To provide access for the site-generated trips, the Performance Motors BMW site plan currently shows the addition of one access point on to the US 15-501 Frontage Road – this driveway will essentially replace an existing driveway to the vacant bank building. No new sidewalk, pedestrian or bicycle access is identified on the site plan. No off-site improvements to existing facilities were noted on the site plan.

### **Necessary Improvements**

No off-site improvements are required to mitigate the additional site traffic impact due to the Performance Motors BMW Expansion project. However, there are improvements to the area to the south of the US 15-501 & Sage Road intersection that would improve traffic flow and safety for vehicular movements on Old Durham Road, Scarlett Drive, the US 15-501 Frontage Road approaches. By limiting some of the intersection approach movements, as described below, the potential exists to improve operations at the US 15-501 & Sage Road traffic signal without limiting primary vehicular access and circulation in this area. The need for this improvement has also been identified by the Town of Chapel Hill Transportation Board, which has officially notified Town Council that it should be studied (October, 2004).

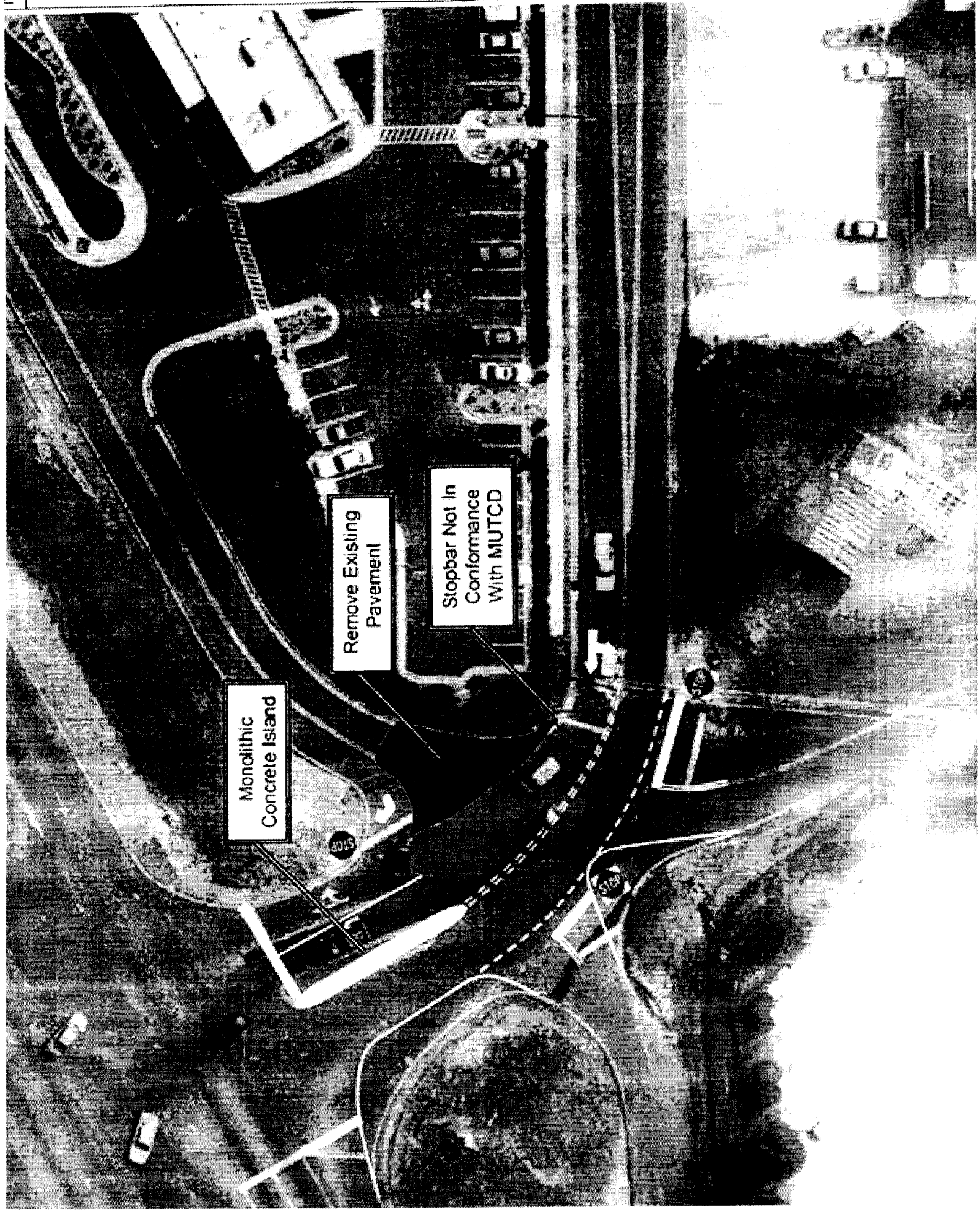
The unsignalized intersections of Old Durham Road & Scarlett Drive, and Old Durham Road & the 15-501 Frontage Road are within 100 feet of the signal US 15-501. The



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westbound queues on Old Durham Road from the signal extend past the Scarlett Drive and 15-501 Frontage Road intersections. Due to the close proximity to the signal, these intersections operate as part of the signal during peak traffic periods and cause driver confusion entering this intersection – which essentially has five approaches. The resulting traffic operations are unsafe and inefficient, and the overall intersection design has poor geometrics and sight distance limitations. It is recommended that the Scarlett Drive and 15-501 Frontage Road intersections on Old Durham Road be reconfigured, including restricting some movements, modifying the pavement markings, adding an island and eliminating access to one approach. This list of improvements is shown in **Figure ES-3**.

The improvements are recommended to improve sight distance and reduce confusion at the intersections of Old Durham Road and Scarlett Drive, and Old Durham Road and 15-501 Frontage Road. These improvements will have practically no effect on the level of service and delay at any of the altered intersections. Improvements should be considered with or without the expansion of the Performance Motors BMW site and the degree of improvement will remain essentially the same whether this improvement is completed now or by 2007, when the Performance Motors project is complete and fully operational.



Mondlithic  
Concrete Island

Remove Existing  
Pavement

Stopbar Not In  
Conformance  
With MUTCD

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**Kumar Neppalli**

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**From:** Craig Scheffler [CScheffler@HNTB.com]  
**Sent:** Thursday, March 03, 2005 10:55 AM  
**To:** Kumar Neppalli  
**Subject:** Performance BMW  
**Importance:** High

Kumar,

As far as I can discern from notes and drawings made when we had our meeting with Phil Post - there was no specific mention that I recorded that both driveways would change to two-way operation. However, on a marked up map of the original site plan that I still have, someone made a notation of arrows pointing in both directions at these driveways on Old Durham Road. So, to counter any confusion, and get them through the process, I am attaching a quick analysis addendum of the following:

Reanalyzing both site driveways on Old Durham Road as two-way  
Redistributing traffic (existing site traffic in 2007 + new site generated traffic) from the one-way operation to two-way

Only accounting for this change as part of the 2007 "Build" scenario

Please review the attachment and note LOS/delay numbers. Based on this analysis, the driveways do not require any mitigation based on Chapel Hill Guidelines. Let me know if you have further questions. Again, sorry for the confusion.

<<Performance BMW Driveways Addendum.doc>>

**Craig R. Scheffler, PE**  
Transportation Engineer

**HNTB North Carolina, PC**  
343 E. Six Forks Road, Suite 200  
Raleigh, NC 27609  
Direct Phone: 919.424.0428  
Office Phone: 919.546.8997 ext 40428  
Fax: 919.546.9421  
Email: cscheffler@hntb.com

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