City of Durham
Transportation Division

October 4, 2007

Memorandum

To: Durham City-County Planning Department

From: Bill Judge, P.E., Transportation Engineer

Subject: Washington Terrace Development (Z07-03) Traffic Impact Analysis

The City-County Unified Development Ordinance requires that a traffic impact analysis (TIA) be prepared for proposed developments estimated to generate 150 or more vehicle trips during the peak hour. The proposed Washington Terrace Development is located on the east side of highway NC 55, south of Riddle Road in southeast Durham. The proposed development plan consists of a 48,000 square feet supermarket, a 23,900 square feet shopping center, two 8,000 square feet high-turnover sit-down restaurants, a 16,000 square feet office building, and a 21,100 square foot office building. The proposed development is expected to be completed by 2010.

The current development plan is estimated to generate 10,046 trips per day of which 521 vehicle trips would occur during the AM peak hour and 1,138 vehicle trips would occur during the PM peak hour. A TIA report was prepared by Wilbur Smith Associates in June, 2007 to analyze the impacts of the proposed rezoning development plan.

Study Area

The TIA study area includes analysis of eight (8) intersections in the vicinity of the proposed site. These intersections are listed below.

Signalized

- NC 55 and Alston Avenue/Cecil Street
- NC 55 and Riddle Road
- NC 55 and Cornwallis Road
- NC 55 and Martin Luther King Jr. Parkway

Unsignalized

- NC 55 and Whilden Drive
- NC 55 and Site Access #1
- NC 55 and Site Access #2
- Riddle Rd and Site Access #3

Trip Generation

Site generated traffic for the proposed development was computed based on ITE's *Trip Generation Manual, 7th Edition, 2003* and is summarized in the report. The development plan will generate a total of 521 vehicle trips in the AM peak hour and 1,138 vehicle trips in the PM peak hour. Adjustments were made to the gross traffic generation volumes for the PM peak hour to take into account pass-by trips typical for retail uses. This resulted in 789 new vehicle trips to and from the site during the PM peak hour.

Trip Distribution and Assignment

The assignment of site traffic on the study area roadway network was based on the following trip distribution percentages:

- To/From the North on NC 55: 35% of site trips
- To/From the South on NC 55: 15% of site trips
- To/From the East on Riddle Road: 10% of site trips
- To/From the West on Riddle Road: 5% of site trips
- To/From the East on Cornwallis Road: 10% of site trips
- To/From the West on Cornwallis Road: 5% of site trips
- To/From the West on Martin Luther King Jr. Parkway: 10% of site trips
- To/From the East on Alston Avenue: 5% of site trips
- To/From the West on Cecil Street: 5% of site trips

The development is proposed to have two (2) full-movement access points on NC 55. An additional full movement access, Site Access #3, is planned to be constructed off of Riddle Road.

Approved Development

There are no approved developments in the vicinity of the study area. However, the TIA considered three percent per year growth for year 2011 background traffic.

Roadway Improvements

NCDOT TIP #R-2906 widened NC 55 to multi-lanes from US 64 to SR 1121 (Cornwallis Road). This widening project was completed in June 2006, which resulted in improved traffic flow along NC 55. NCDOT will also be constructing a small urban intersection improvement project at the intersection of NC 55 and Riddle Road. The project will include the addition of eastbound and westbound left-turn lanes on Riddle Road at NC 55. This project is anticipated to be constructed in 2008.

Traffic Impact Analysis

The following scenarios were analyzed for AM and PM peak hour traffic conditions:

- Existing conditions (2006)
- No-Build conditions (2011): Existing traffic + Background traffic growth at three percent per year
- Build conditions (2011): No-Build + Washington Terrace Development

NC 55 and Alston Avenue / Cecil Street (Signalized)

The following table summarizes the Level of Service (LOS) for this signalized intersection:

Scenario	AM LOS	PM LOS
Existing (2006)	**B**	**C**
No-Build (2011)	**B**	**D**
Build (2011)	**B**	**D**

This intersection currently operates at a LOS C or better under existing conditions for both the AM and PM peak hours. With the additional background growth and site traffic, the intersection delay will increase slightly for both the AM and PM peak hours and the LOS will decrease to an acceptable LOS D during the PM peak hour. No improvements at this intersection are proposed or required.

NC 55 and Riddle Road (Signalized)

The following table summarizes the Level of Service (LOS) for this signalized intersection:

Scenario	AM LOS	PM LOS
Existing (2006)	**B**	**B**
No-Build (2011)	**C**	**B**
Build (2011)	**C**	**B**

This intersection currently operates at a LOS B under existing conditions during both the AM and PM peak hours. With the additional background growth and site traffic, the delay will increase slightly during the AM and PM peak hours and the LOS will decrease to an acceptable LOS C during the AM peak hour. No additional improvements at this intersection are proposed or required.

NC 55 and Cornwallis Road (Signalized)

The following table summarizes the Level of Service (LOS) for this signalized intersection:

Scenario	AM LOS	PM LOS
Existing (2006)	**C**	**C**
No-Build (2011)	**D**	**C**
Build (2011)	**D**	**C**

This intersection currently operates at a LOS C under existing conditions during both the AM and PM peak hours. With the additional background growth and site traffic, the delay will increase slightly during AM and PM peak hours and the LOS will decrease to an acceptable D during the AM peak hour. No additional improvements at this intersection are proposed or required.

NC 55 and Martin Luther King Jr. Parkway (Signalized)

The following table summarizes the Level of Service (LOS) for this signalized intersection:

Scenario	AM LOS	PM LOS
Existing (2006)	**B**	**C**
No-Build (2011)	**B**	**B**
Build (2011)	**B**	**C**

This intersection currently operates at a LOS C or better under existing conditions for both the AM and PM peak hours. With the additional background growth and site traffic, the intersection delay will increase slightly for both the AM and PM peak hours but the LOS will remain at an acceptable LOS C or better for both the AM and PM peak hours. No improvements at this intersection are proposed or required.

NC 55 and Whilden Drive (Unsignalized)

The following table summarizes the Level of Service (LOS) for the worst approach at this unsignalized intersection:

Scenario	AM LOS	PM LOS
Existing (2006)	**B***	**B***
No-Build (2011)	**B***	**B***
Build (2011)	**B***	**C***

* Unsignalized operation, with LOS reported for the worst westbound approach on Whilden Dr

Whilden Drive is an existing gravel driveway connection to NC 55 within an existing private street easement. The westbound approach of Whilden Drive currently operates at a LOS B under existing conditions during both the AM and PM peak hours. With the additional background growth and site traffic, the delay will increase slightly during AM and PM peak hours and the LOS will decrease to an acceptable C during the AM peak hour. No additional improvements at this intersection are proposed or required.

NC 55 and Site Access #1 (full access)

The following table summarizes the Level of Service (LOS) for this intersection.

Scenario	AM LOS	PM LOS
Build (2011)	**C***	**F***
Build Improved (2011)	**B**	**B**

* Unsignalized operation, with LOS reported for the worst Site Access approach

As an unsignalized intersection, the westbound approach of Site Access #1 will function at a LOS C during AM peak hour and a LOS F during PM peak hour (with 163 seconds of average delay per vehicle). The TIA recommended improvements included the following:

- Construct a northbound right-turn lane with a minimum of 100 feet of full-width storage
- Revise the pavement markings on southbound NC 55 to provide an exclusive left-turn lane with a minimum of 150 feet of full-width storage
- Provide a traffic signal warrant analysis, and if a traffic signal is warranted and approved by NCDOT, install a new traffic signal with steel poles and mast arms
- Construct Site Access #1 with two egress lanes and one ingress lane

With the above improvements the intersection will operate at an acceptable LOS B for both the AM and the PM peak hour.

NC 55 and Site Access#2 (Unsignalized, full access)

The following table summarizes the Level of Service (LOS) for the worst approach at this unsignalized intersection.

Scenario	AM LOS	PM LOS
Build (2011)	**C***	**D***

* Unsignalized operation, with LOS reported for the worst Site Access approach

The westbound approach of Site Access #2 will function at an acceptable LOS C during the AM peak hour and at an acceptable LOS D during PM peak hour (with 33.5 seconds of delay per vehicle) with the following TIA recommended improvements:

- Construct a northbound right-turn lane with a minimum of 100 feet of full-width storage
- Revise the pavement markings on southbound NC 55 to provide an exclusive left-turn lane with a minimum of 150 feet of full-width storage
- Construct Site Access #2 with one egress lane and one ingress lane

Riddle Road and Site Access#3 (Unsignalized, full access)

The following table summarizes the Level of Service for the worst approach at this unsignalized intersection.

Scenario	AM LOS	PM LOS
Build (2011)	**B***	**C***

* Unsignalized operation, with LOS reported for the worst Site Access approach

The northbound approach of Site Access #3 will function at an acceptable LOS B during the AM peak hour and at an acceptable LOS C during the PM peak hour (with 17 seconds of delay per vehicle) with the TIA recommended improvements:

- Construct an eastbound right-turn lane on Riddle Road with a minimum of 100 feet of full-width storage
- Construct a westbound left-turn lane on Riddle Road with a minimum of 100 feet of storage
- Construct Site Access #3 (aligned with the existing auto salvage driveway) with one egress lane and one ingress lane

Summary of TIA Required Improvements

NC 55 and Site Access #1:

1. Construct a northbound right-turn lane on NC 55 with adequate storage and taper.
2. Revise the pavements markings on NC 55 to provide an exclusive southbound left-turn lane with adequate storage and appropriate taper.
3. Install a traffic signal with steel poles and mast arms (subject to MUTCD warrants and approval by NCDOT).
4. Construct Site Access #1 with two egress lanes and one ingress lane.

NC 55 and Site Access #2:

1. Construct a northbound right-turn lane on NC 55 with adequate storage and taper.
2. Revise the pavements markings on NC 55 to provide an exclusive southbound left-turn lane with adequate storage and appropriate taper.
3. Construct Site Access #2 with one egress lane and one ingress lane.

Riddle Road and Site Access #3:

1. Construct an eastbound right-turn lane on Riddle Road with adequate storage and taper.
2. Construct a westbound left-turn lane on Riddle Road with adequate storage and taper.
3. Construct Site Access #3 (aligned with the existing auto salvage driveway) with one egress lane and one ingress lane.