CITY OF DURHAM | NORTH CAROLINA

Date: **April 3, 2014**

To: **Danny Cultra, Durham City County Planning Department**
From: **Bill Judge PE, City of Durham Department of Transportation**
Subject: **Newhope Church Expansion (D1300344) Traffic Impact Analysis**

The Unified Development Ordinance (UDO) requires that a Traffic Impact Analysis (TIA) be prepared for proposed developments estimated to generate 150 or more peak-hour vehicle trips. The proposed development, Newhope Church Expansion, is a 750 seat expansion to an existing 826 seat place of worship for a total of 1,576 seats. The proposed church will generate an additional 1,388 daily trips on Sundays with 457 trips (229 entering and 228 exiting) during the Sunday peak-hour. The church is located on the east side of Fayetteville Road, south of Massey Chapel Road.

The site will utilize two existing driveway connections to Fayetteville Road. The expected completion year is 2015, and the TIA analysis year is 2016. VHB Engineering NC, P.C. prepared the TIA in November 2013 and the Transportation Management Plan (TMP) in March 2014. UDO Sections 3.3.3 and 3.3.8 also require a Transportation Special Use Permit (TSUP), as the cumulative trip generation of a 1,576 seat place of worship is in excess of 600 peak-hour trips. At full build-out the cumulative impact is estimated to generate 2,916 daily trips on Sundays with 961 trips (481 entering and 480 exiting) during the Sunday peak-hour.

Study Area
The study area includes the following intersections:

- Fayetteville Road and Renaissance Parkway / Village Circle Way;
- Fayetteville Road and Massey Chapel Road (northern intersection);
- Fayetteville Road and Massey Chapel Road (southern intersection);
- Fayetteville Road and Atkins Heights Boulevard;
- Fayetteville Road and Antler Point Drive / Site Access #1;
- Fayetteville Road and Site Access #2; and
- Fayetteville Road and Chancellor's Ridge Drive.

Trip Generation
Trip generation rates are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th *Edition*, 2012. By utilizing Land Use Code 560 (Church), the site is expected to generate an additional 457 trips in the Sunday peak-hour (229 entering and 228 exiting).

Traffic Data Collection

The peak-hour intersection turning movement counts were taken from 10:30 a.m. until 12:30 p.m. on Sunday September 15, 2013.

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 via Fayetteville Road: 45% of site trips;
- To/From the South via Fayetteville Road: 25% of site trips;
- To/From the West via Renaissance Parkway: 15% of site trips;
- To/From the East via Massey Chapel Road: 4% of site trips;
- To/From the West via Massey Chapel Road: 5% of site trips;
- To/From the West via Antler Point Drive: 2% of site trips; and
- To/From the West via Chancellor's Ridge Drive: 4% of site trips.

Approved Developments and Background Growth

There are no approved projects in the vicinity. A uniform annual compounded growth rate of 3% was utilized to determine the background traffic projections.

TIP Roadway Improvements

There are no significant scheduled transportation improvement projects in the study area vicinity.

Capacity Analysis

Capacity analyses were performed using the a.m. and p.m. peak hour for the following scenarios:

- Existing (2013) conditions;
- No-Build (2016) conditions (2013 Existing + Background growth traffic); and
- Build (2016) conditions (2013 Existing + Background growth traffic + Site traffic).

This development and project study area are located within the Suburban Tier where the adopted Level of Service (LOS) standard is LOS D. The following table summarizes the average delay for the various Levels of Service for unsignalized and signalized intersections:

	Signalized Intersections	Unsignalized Intersections
Level of Service	**Average Vehicle Delay (Seconds)**	**Average Vehicle Delay (Seconds)**
A	**0-10**	**0-10**
B	**10-20**	**10-15**
C	**20-35**	**15-25**
D	**35-55**	**25-35**
E	**55-80**	**35-50**
F	**>80**	**>50**

Fayetteville Road & Renaissance Parkway / Village Circle Way

The following table summarizes the Levels of Service at this existing signalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**C (21.9 seconds)**
No-Build (2016)	**C (22.3 seconds)**
Build (2016)	**C (22.5 seconds)**

For the Sunday peak-hour, this intersection will operate at an acceptable LOS C with an average intersection delay of 23 seconds in the 2016 Build condition. No improvements are proposed or required at this intersection.

Fayetteville Road and Massey Chapel Road (northern intersection)

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**B* (13.2 seconds)**
No-Build (2016)	**B* (14.0 seconds)**
Build (2016)	**C* (17.6 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (WB)

For the Sunday peak-hour, this intersection will operate at an acceptable LOS C with an average delay of 18 seconds for the westbound movement in the 2016 Build condition. No improvements are proposed or required at this intersection.

Fayetteville Road and Massey Chapel Road (southern intersection)

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**B* (12.4 seconds)**
No-Build (2016)	**B* (13.1 seconds)**
Build (2016)	**C* (16.0 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (EB)

For the Sunday peak-hour, this intersection will operate at an acceptable LOS C with an average delay of 16 seconds for the eastbound in the 2016 Build condition. No improvements are proposed or required at this intersection.

Fayetteville Road and Atkins Heights Boulevard

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**C* (16.1 seconds)**
No-Build (2016)	**C* (17.5 seconds)**
Build (2016)	**C* (25.0 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (WB)

For the Sunday peak-hour, this intersection will operate at an acceptable LOS C with an average delay of 25 seconds for the westbound movement in the 2016 Build condition. No improvements are proposed or required at this intersection.

Fayetteville Road and Antler Point Drive / Site Access #1

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**C* (30.3 seconds)**
No-Build (2016)	**C* (34.1 seconds)**
Build (2016)	**E* (67.2 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (EB)

For the Sunday peak hour, this intersection will operate at a LOS E with an average delay of 67 seconds for the eastbound movement in the 2016 Build condition. Although a LOS E is undesirable at signalized intersections, a LOS E or F is typical of many unsignalized intersections and driveways during peak hours as the delay is limited to the side street (or driveway) approach. A traffic signal is not appropriate at this location as the delay is limited to the Sunday peak-hour.

To provide additional mitigation measures, a Transportation Management Plan (TMP) was prepared for this intersection. The TMP recommended the following required improvement:

- Continue to provide a uniformed law enforcement officer to direct traffic at this intersection during the Sunday peak operational times.

Fayetteville Road and Site Access # 2

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**B* (10.6 seconds)**
No-Build (2016)	**B* (10.9 seconds)**
Build (2016)	**B* (13.2 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (WB)

For the Sunday peak hour, this intersection will operate at an acceptable LOS B with an average delay of 13 seconds for the westbound movement in the 2016 Build condition. No improvements are proposed or required at this intersection.

Fayetteville Road and Chancellor's Ridge Drive

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	Sunday Peak-Hour LOS (delay in seconds)
Existing (2013)	**B* (10.7 seconds)**
No-Build (2016)	**B* (11.0 seconds)**
Build (2016)	**B* (12.4 seconds)**

* Unsignalized operation, with LOS reported for the worst approach (EB)

For the Sunday peak-hour, this intersection will operate at an acceptable LOS C with an average delay of 12 seconds for the eastbound movement in the 2016 Build condition. No improvements are proposed or required at this intersection.

Summary of Required Improvements:

Transportation Management Plan

1. Implementation and adherence to the March 19, 2014 Transportation Management Plan (TMP) for the Sunday peak hour. Future adjustments to the TMP require advance written concurrence from the Durham Department of Transportation and NCDOT (as applicable) prior to implementation.