

**CITY OF DURHAM | NORTH CAROLINA**

Date: March 24, 2015

To: Amy Wolff, Durham City County Planning Department
From: Bill Judge PE, City of Durham Department of Transportation
Subject: Straw Valley Development (Z1400033) Traffic Impact Analysis

The Unified Development Ordinance (UDO) requires a Traffic Impact Analysis (TIA) for proposed developments estimated to generate 150 or more peak-hour vehicle trips. The proposed Straw Valley development plan (Z1400033) is an expansion of an existing retail development on the south side of New Hope Commons Drive west of Mt. Moriah Road. The proposed expansion will include an additional 21,055 square-feet of retail, 16,300 square-feet of office, 11,450 square-feet of quality restaurants and 50 condominium units. The development is expected to generate an additional 2,461 trips per day, with 84 a.m. peak-hour trips (44 entering and 40 exiting) and 222 p.m. peak-hour trips (122 entering and 100 exiting).

Site access will be provided via three connections to New Hope Commons Drive. One of the three site access connections to New Hope Commons Drive (Site Access #3) will include a relocation of Hoffler Lane which will not only provide access to the site, but will also provide access from New Hope Commons Drive to the Durham/Chapel Hill Boulevard Service Road on the north side of US 15-501. The expected build-out year is 2015, and the TIA analysis year is 2016. The Straw Valley Development TIA was prepared by VHB Engineering NC, P.C. in October 2014.

Study Area

The study area includes the following intersections:

- Durham-Chapel Hill Boulevard (US 15-501) and Mt. Moriah Road;
- Mt. Moriah Road and New Hope Commons Drive;
- Mt. Moriah Road and New Hope Commons Main Driveway;
- New Hope Commons Drive and Site Access #1;
- New Hope Commons Drive and Site Access #2; and
- New Hope Commons Drive and Site Access #3 (realigned Hoffler Lane).

Trip Generation

Trip generation numbers are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition*, 2012. The TIA used the following ITE trip generation uses for the proposed development:

USE	SIZE	ITE CODE
Retail (Shopping Center)	21,055 square-feet	820
General Office	16,300 square-feet	710
Quality Restaurant	11,450 square-feet	931
Condominium/Townhouse	50 units	230

Trip reductions for pass-by trips and internal capture were included in the study. The final adjusted external trips for the proposed site resulted in an additional 2,461 daily trips with 84 a.m. peak-hour trips (44 entering and 40 exiting) and 222 p.m. peak-hour trips (122 entering and 100 exiting).

Traffic Data Collection

The weekday peak-hour intersection turning movement counts were taken from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. in April 2014. The data was collected within the twelve-month timeline prior to the development application as required under the City’s TIA guidelines.

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 West via Durham-Chapel Hill Boulevard (US 15-501): 30% of site trips;
- To/From the East via Durham-Chapel Hill Boulevard (US 15-501): 30% of site trips;
- To/From the North via Mt. Moriah Road: 20% of site trips;
- To/From the South via Mt. Moriah Road: 15% of site trips; and
- To/From the New Hope Commons Shopping Center: 5% 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

The following roadway improvement project is proposed in the area:

- The adopted US 15-501 Corridor Transportation Master Plan proposes a controlled access interchange at US 15-501 and Southwest Durham Drive. With the construction of the interchange Mt. Moriah Road north of Durham Chapel Hill Boulevard (US 15-501) will be realigned to connect to Southwest Durham Drive at the proposed interchange. The existing connection of Mt. Moriah Road at Durham-Chapel Hill Boulevard (US 15-501) will be removed and access to Mt. Moriah Road on the north side of Durham-Chapel Hill Boulevard will be limited to a right-in/right-out connection to a proposed one-way (westbound) distributor collector ramp. The proposed improvement is currently unfunded.

Capacity Analysis

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

- Existing (2014) conditions;
- No-Build (2016) conditions (2014 Existing + Background growth traffic);
- Build (2016) conditions (2014 Existing + Background growth traffic + Site traffic); and
- Build (2016) with Improvements conditions (2016 Build + Improvements).

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

Durham-Chapel Hill Boulevard (US 15-501) and Mt. Moriah Road

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

Scenario	a.m. LOS	p.m. LOS
Existing (2014)	C	D
No-Build (2016)	C	D
Build (2016)	C	D
Build (2016) with Improvements	C	D

The intersection currently operates at a LOS D or better during both the a.m. and p.m. peak hour. With the additional site traffic, the delays will increase and the intersection will continue to operate a LOS D or better for both peak hours. To address site impacts and excessive queuing on southbound Mt. Moriah Road, the TIA recommended the following required improvement:

- Construct an additional southbound right-turn lane with a minimum of 400 feet of storage plus appropriate tapers on Mt. Moriah at Durham-Chapel Hill Boulevard (US 15-501).

Mt. Moriah Road and New Hope Commons Drive

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

Scenario	a.m. LOS	p.m. LOS
Existing (2014)	B*	C*
No-Build (2016)	B*	C*
Build (2016)	B*	F*
Build (2016) with Improvements	A	A

* Unsignalized operation, with LOS reported for the worst approach

The unsignalized intersection currently operates at a LOS C or better during both the a.m. and p.m. peak hour. With the additional site traffic, the delays will increase and the intersection will continue to operate a LOS F in the p.m. peak hour. To address site impacts and excessive delays on eastbound New Hope Commons Drive, the TIA recommended the following required improvements:

- Construct a two-phase traffic signal with steel poles and mast arms to control eastbound New Hope Commons Drive, southbound Mt. Moriah Road, and the northbound left-turn on Mt. Moriah Road (subject to MUTCD warrants and approval by NCDOT);
- Remove the existing left-turn lane on New Hope Commons Drive and restrict the eastbound movement to right-turns; and
- Revise the existing median on Mt. Moriah Road to a left-over type median which will permit northbound left turns from Mt. Moriah Road and restrict eastbound and westbound New Hope Commons Drive to right turns only.

With the proposed improvements, the signalized intersection will operate at an acceptable LOS A for both the a.m. and p.m. peak hour.

Mt. Moriah Road and New Hope Commons Main Driveway

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

Scenario	a.m. LOS	p.m. LOS
Existing (2014)	B	C
No-Build (2016)	B	C
Build (2016)	B	D
Build (2016) with Improvements	B	C

The intersection currently operates at a LOS C or better during both the a.m. and p.m. peak hour. With the additional site traffic and the proposed improvements on Mt. Moriah Road at New Hope Commons Drive, the delays will increase slightly, but the intersection will continue to operate at an acceptable LOS C or better for both peak hours. No roadway improvements are required at this intersection to address the site traffic impacts.

New Hope Commons Drive and Site Access #1

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

Scenario	a.m. LOS	p.m. LOS
Build (2016)	A*	A*
Build (2016) with Improvements	A*	A*

* Unsignalized operation, with LOS reported for the worst approach

The TIA recommended the following improvement to accommodate site traffic:

- Construct Site Access #1 with one ingress lane and one egress lane.

With the improvement listed above, the intersection will operate at an acceptable LOS A for both the a.m. and p.m. peak hour. No additional improvements are proposed or required.

New Hope Commons Drive and Site Access #2

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

Scenario	a.m. LOS	p.m. LOS
Build (2016)	A*	A*
Build (2016) with Improvements	A*	A*

* Unsignalized operation, with LOS reported for the worst approach

The TIA recommended the following improvement to accommodate site traffic:

- Construct Site Access #2 with one ingress lane and one egress lane.

With the improvement listed above, the intersection will operate at an acceptable LOS A for both the a.m. and p.m. peak hour. No additional improvements are proposed or required.

New Hope Commons Drive and Site Access #3 (realigned Hoffer Lane)

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

Scenario	a.m. LOS	p.m. LOS
Existing (2014)	A*	A*
No-Build (2016)	A*	A*
Build (2016)	A*	A*
Build (2016) with Improvements	A*	A*

* Unsignalized operation, with LOS reported for the worst approach

The TIA recommended the following improvement to accommodate site traffic:

- Relocate Hoffer Lane to the east side of the site to provide access to the site from New Hope Commons Drive (Site Access #3) while maintaining public vehicle access from New Hope Commons Drive to the Durham-Chapel Hill Boulevard Service Road on the north side of US 15-501; and
- Construct the realigned Hoffer Lane (Site Access #3) with one ingress lane and one egress lane.

With the improvements listed above, the intersection will operate at an acceptable LOS A for both the a.m. and p.m. peak hour. No additional improvements are proposed or required.

Summary of Required Improvements:

Durham-Chapel Hill Boulevard (US 15-501) and Mt. Moriah Road

1. Construct an additional southbound right-turn lane with adequate storage and appropriate tapers on Mt. Moriah at Durham-Chapel Hill Boulevard (US 15-501).

Mt. Moriah Road and New Hope Commons Drive

1. Construct a two-phase traffic signal with steel poles and mast arms to control eastbound New Hope Commons Drive, southbound Mt. Moriah Road, and the northbound left turn on Mt. Moriah Road (subject to MUTCD warrants and approval by NCDOT).
2. Remove the existing left-turn lane on New Hope Commons Drive and restrict the eastbound movement to right turns.
3. Revise the existing median on Mt. Moriah Road to a left-over type median which will permit northbound left turns from Mt. Moriah Road and restrict eastbound and westbound New Hope Commons Drive to right turns only.

New Hope Commons Drive and Site Access #3 (realigned Hoffler Lane)

1. Relocate Hoffler Lane to the east side of the site to provide access to the site from New Hope Commons Drive (Site Access #3) while maintaining public vehicle access from New Hope Commons Drive to the Durham-Chapel Hill Boulevard Service Road on the north side of US 15-501.
2. Construct the realigned Hoffler Lane (Site Access #3) with one ingress lane and one egress lane.