



CITY OF DURHAM | NORTH CAROLINA

Date: April 23, 2014

To: Amy Wolff - Durham City County Planning Department
From: Bill Judge, P.E. - City of Durham Department of Transportation
Subject: Erwin Terrace (Z1300031) Traffic Impact Analysis

The City-County Unified Development Ordinance requires that a Traffic Impact Analysis (TIA) study be prepared for site plans estimated to generate 150 or more vehicle trips during the peak hour. The proposed Erwin Terrace development plan (Z1300031) is an expansion of an existing mixed use development on the north side of Erwin Road and west side of LaSalle Street. The proposed expansion will include an additional 50,000 square-feet of retail, 325,000 square-feet of office and 225 apartment units. The development is expected to generate an additional 6,418 trips per day, with 577 a.m. peak-hour trips (418 entering and 159 exiting) and 710 p.m. peak-hour trips (249 entering and 461 exiting).

Site access will be provided via the existing site driveway connections to Lambeth Circle and LaSalle Street. The expected build-out year is 2017, and the TIA analysis year is 2018. The Erwin Terrace TIA was prepared by VHB Engineering NC, P.C. in November 2013.

Study Area

The study area includes the following intersections:

- Hillsborough Road and LaSalle Street;
- LaSalle Street and Campus Walk Avenue;
- LaSalle Street and Lambeth Circle (Site Driveway);
- Cameron Boulevard (NC 751) and Erwin Road;
- Erwin Road and Morreene Road / Towerview Drive;
- Erwin Road and Lambeth Circle (Site Driveway);
- Erwin Road and LaSalle Street; and
- Erwin Road and Douglas Street / Research Drive.

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 Space (Shopping Center)	50,000 square-feet	820
General Office	325,000 square-feet	710
Apartments	225 units	220

Trip reductions for pass-by trips, internal capture, Transportation Demand Management (TDM), and transit usage were included in the study. The final adjusted external trips for the proposed site resulted in 5,142 daily trips with 547 a.m. peak-hour trips (397 entering and 150 exiting) and 534 p.m. peak-hour trips (166 entering and 368 exiting).

Traffic Data Collection

The peak hour intersection turning movement counts were taken from 7-9 a.m. and 4-6 p.m. in August and September 2013. The data was collected within the twelve-month timeline prior to the development application as required under the City's TIA guidelines and on academic days for both Duke University and Durham Public Schools.

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 along LaSalle Street: 2% of site trips;
- To/From the West along Hillsborough Road: 10% of site trips;
- To/From the East along Hillsborough Road: 5% of site trips;
- To/From the West along Campus Walk Avenue: 3% of site trips;
- To/From the North along Douglas Street: 1% of site trips;
- To/From the South along Research Drive: 2% of site trips;
- To/From the East along Erwin Road: 32% of site trips;
- To/From the South along LaSalle Street: 5% of site trips;
- To/From the West along Morreene Road: 8% of site trips;
- To/From the East along Towerview Drive: 2% of site trips
- To/From the West along Cameron Boulevard (NC 751): 20% of site trips; and
- To/From the East along Cameron Boulevard (NC 751): 10% of site trips.

Approved Developments and Background Growth

There is a wide range of approved developments in the study area. Traffic and roadway improvements associated with these developments were included in the No-Build Condition:

- Duke University Vivarium Facility;
- Duke Medical Eye Clinic Expansion;
- Duke University Environmental Hall (LSRC Annex);
- Duke University Dining/Events Pavilion;
- Durham Place Apartments;

- Duke University 2012 West Campus Expansion Master TIA; and
- Erwin Terrace Phase III.

In addition to the traffic from these proposed developments, a uniform annual compounded growth rate of 3% was utilized as needed for all traffic movements where the background growth rate from approved developments was less than 3%.

TIP Roadway Improvements

There are no funded TIP projects in the study area. However, the proposed Durham-Orange Light Rail Transit project includes a proposed widening of Erwin Road to construct a station for the rail project in the center of Erwin Road at LaSalle Street. This project is partially funded.

Capacity Analysis

Capacity analyses were performed for the a.m. and p.m. peak hours under the following scenarios:

- Existing (2013) conditions;
- No-Build (2018) conditions (2013 Existing + Background growth traffic); and
- Build (2018) conditions (2013 Existing + Background growth traffic + Site traffic).

The development proposes a Comprehensive Plan Amendment to include the parcel within the Compact Neighborhood Tier where the adopted Level of Service (LOS) standard is LOS E. However, a portion of the study area is located within the Urban 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

Hillsborough Road and LaSalle Street

The following table summarizes the Levels of Service at this existing signalized intersection in the Urban Tier with an adopted LOS Standard of LOS D:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	C	C
No-Build (2018)	C	C
Build (2018)	C	C

This intersection will operate at an acceptable LOS C for both peak-hours in the Build (2018) condition. No improvements are proposed or required at this intersection.

LaSalle Street and Campus Walk Avenue

The following table summarizes the Levels of Service at this existing unsignalized intersection in the Compact Neighborhood Tier with an adopted LOS Standard of LOS E:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	B*	C*
No-Build (2018)	B*	C*
Build (2018)	C*	C*

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

This intersection will operate at an acceptable LOS C for both peak-hours in the Build (2018) condition. No improvements are proposed or required at this intersection.

LaSalle Street and Lambeth Circle (Site Driveway)

The following table summarizes the Levels of Service at this existing unsignalized intersection in the Compact Neighborhood Tier with an adopted LOS Standard of LOS E:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	B*	C*
No-Build (2018)	B*	C*
Build (2018)	E*	F*

* Unsignalized operation, with LOS reported for the worst side street approach

This intersection will operate at a LOE E in the a.m. peak-hour and a LOS F in the p.m. peak-hour in the Build (2018) condition with the following required improvement:

- Widen the eastbound approach to provide two egress lanes (an exclusive left-turn lane with a minimum of 150 feet of storage plus appropriate tapers and a shared through/right-turn lane).

A LOS F is typical at many unsignalized intersections and driveways during the peak hours since nearly all of the anticipated delay is confined to the side street approach. Given the spacing from the Erwin Road and LaSalle Street intersection, a traffic signal is not warranted or appropriate at this intersection.

Cameron Boulevard (NC 751) and Erwin Road

The following table summarizes the Levels of Service at this existing signalized intersection in the Urban Tier with an adopted LOS Standard of LOS D:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	B	C
No-Build (2018)	B	C
Build (2018)	C	D

This intersection will operate at an acceptable LOS D or better for both peak-hours in the Build (2018) condition. To address excessive queuing for the right-turn from southbound Erwin Road onto westbound Cameron Boulevard (NC 751), the following improvement is required:

- Restripe the southbound approach to provide three southbound lanes (an exclusive left-turn lane, a shared left/right-turn lane, and an exclusive right-turn lane).

Erwin Road and Morreene Road / Towerview Drive

The following table summarizes the Levels of Service at this existing signalized intersection in the Urban Tier with an adopted LOS Standard of LOS D:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	C	C
No-Build (2018)	C	C
Build (2018)	C	C

This intersection will operate at an acceptable LOS C for both peak-hours in the Build (2018) condition. No improvements are proposed or required at this intersection.

Erwin Road and Lambeth Circle (Site Driveway)

The following table summarizes the Levels of Service at this existing unsignalized intersection in the Compact Neighborhood Tier with an adopted LOS Standard of LOS E:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	B*	B*
No-Build (2018)	B*	B*
Build (2018)	B*	C*

* Unsignalized operation, with LOS reported for the worst side street approach (SB)

This intersection will operate at an acceptable LOS B in the a.m. peak-hour and an acceptable LOS C in the p.m. peak-hour in the Build (2018) condition with the following required improvement:

- Restripe the southbound approach to provide two egress lanes (an exclusive left-turn lane with a minimum of 100 feet of storage plus appropriate tapers and an exclusive right-turn lane).

Erwin Road and LaSalle Street

The following table summarizes the Levels of Service at this existing signalized intersection in the Compact Neighborhood Tier with an adopted LOS Standard of LOS E:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	B	C
No-Build (2018)	C	C
Build (2018)	C	C

This intersection will operate at an acceptable LOS C for both peak-hours in the Build (2018) condition. No improvements are proposed or required at this intersection.

Erwin Road and Douglas Street / Research Drive

The following table summarizes the Levels of Service at this existing signalized intersection in the Compact Neighborhood Tier with an adopted LOS Standard of LOS E:

Scenario	a.m. LOS	p.m. LOS
Existing (2013)	C	D
No-Build (2018)	C	D
Build (2018)	C	D

This intersection will operate at an acceptable LOS D or better for both peak-hours in the Build (2018) condition. No improvements are proposed or required at this intersection.

Summary of TIA Required Improvements

LaSalle Street and Lambeth Circle (Site Driveway)

1. Widen the eastbound approach to provide two egress lanes (an exclusive left-turn lane with adequate storage and appropriate tapers and a shared through/right-turn lane).

Cameron Boulevard (NC 751) and Erwin Road

1. Restripe the southbound approach to provide three southbound lanes (an exclusive left-turn lane, a shared left/right-turn lane, and an exclusive right-turn lane).

Erwin Road and Lambeth Circle (Site Driveway)

1. Restripe the southbound approach to provide two egress lanes (an exclusive left-turn lane with adequate storage and appropriate tapers and an exclusive right-turn lane).