

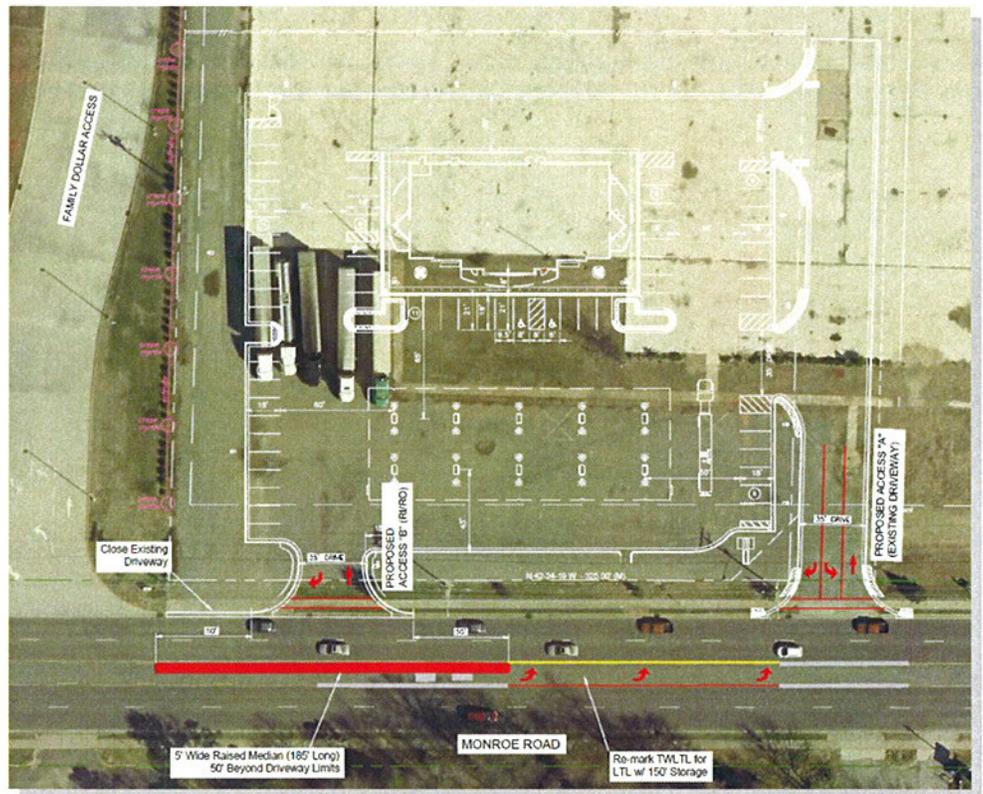
# TRAFFIC IMPACT ANALYSIS



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## QUIKTRIP No. 1028

Monroe Rd. (SR 1009), north of NC 51 (Matthews Twp. Pkwy.)  
Town of Matthews, North Carolina



for

QuikTrip Corporation

November 2013

336-019 (C-2165)



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## EXECUTIVE SUMMARY

QuikTrip Corporation proposes a combination gas station and convenience store with a maximum of 20 fueling positions on the east side of Monroe Road (SR 1009), between NC 51 (Matthews Township Pkwy.) and Galleria Boulevard in the Town of Matthews (Mecklenburg County), NC. The site is expected to be fully developed within one year (2014).



Monroe Road Facing North at Site

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C". It provides recommended access management for the site and intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2013 AM & PM Peak existing traffic conditions
- 2014 AM & PM Peak No Build traffic conditions
- 2014 AM & PM Peak Build traffic conditions

The area of influence of the study site as indicated by NCDOT and Town of Matthews staff includes the following three intersections:

1. Monroe Road (SR 1009) & Galleria Boulevard (signalized)
2. NC 51 (Matthews Township Pkwy.) & Monroe Road (SR 1009)/W. John Street (SR 1010) (signalized)
3. Monroe Road (SR 1009) & Proposed Access "A" (unsignalized)

According to the site plan, access to the development is expected to occur via two locations on Monroe Road:

- Proposed Access "A" is an existing 35-foot wide full movement driveway located approximately ½ mile south of Galleria Boulevard (midway between Galleria Boulevard and NC 51) (one entering lane and two exit lanes). In addition to serving the QuikTrip site, this driveway is expected to also be used for access to the remaining property east (behind) the QuikTrip development.



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- Proposed Access "B" is a proposed 35-foot wide right-in/right-out only located approximately 275 feet north of Proposed Access "A" (one entering lane and one exit lane). An existing driveway located immediately north of Proposed Access "B" will be removed.

The proposed trip generation results indicate that the development is expected to generate 121 new AM peak hour trips and 129 new PM peak hour trips (after passby reductions).

Currently, the signalized intersection of Monroe Road & Galleria operates at an acceptable Level of Service (LOS) of "B" during both peak hours; the signalized intersection of NC 51 & Monroe Road/John Street operates at a LOS of "E" during both peak hours. Typically, an intersection is said to be operating at capacity with a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better.

NCDOT ANALYSIS REQUIREMENTS – Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways*, the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exist when comparing the 2014 Buildout results to the 2014 No Build results:

- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is "F" for an intersection or an individual approach.*

This section of the driveway manual also states that, *mitigation improvements shall be identified when the analysis indicates that the 95<sup>th</sup> percentile queue exceeds the storage capacity of the existing lane.*

The intersections within the area of influence were then analyzed under the 2014 No Build and Build scenarios, with the growth in the background traffic.

2014 Build Scenario Analysis Results:

1. Monroe Road (SR 1009) & Galleria Boulevard (signalized)

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains a "B" during both peak hours (considerably under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.

2. NC 51 (Matthews Twp. Parkway) & Monroe Road (SR 1009)/W. John Street (SR 1010) (signalized)

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains an "E" during both peak hours (under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.

3. Monroe Road (SR 1009) & Proposed Access "A" (unsignalized)

Under the 2014 Build conditions the minor leg (Proposed Access "A") operates with long vehicle delays during both peak hours (due to the significant amount of through traffic in both directions on Monroe Road). The intersection layout we recommend includes:

- Re-mark the existing two-way left-turn lane on Monroe Road for a southbound left turn lane with 150 feet of storage.
- Construct the westbound approach (Proposed Access "A") for one ingress and two egress lanes (separate left and right turn lanes).

It is assumed that there are insufficient traffic volumes to warrant a traffic signal at this location (which is the only improvement that would generate an acceptable LOS in the peak hours). In addition, the existing traffic signal located approximately 2,300 feet south on Monroe Road at NC 51 will create gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection (which the analysis software does not take into consideration). Also, the existing traffic signal located approximately 1,725 feet north on Monroe Road at Gander Cove Lane/Family Dollar Access will further increase the gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection.



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**4. Monroe Road (SR 1009) & Proposed Access "B" (right-in/right out only)**

- Construct a raised median (minimum five-foot monolithic) on Monroe Road within the existing TWLTL that extends 50 feet beyond both sides of the driveway (approximately 185 feet in total length) to eliminate the possibility of left exiting and left entering vehicles from Proposed Access "B".
- Construct the westbound approach (Proposed Access "B") for one ingress and one egress lane.

These identified improvements will improve capacity and provide an acceptable level of service at these intersections and roadway corridors during the critical peak hours of the year 2014.



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### PROPOSED DEVELOPMENT

QuikTrip Corporation proposes a combination gas station and convenience store with a maximum of 20 fueling positions on the east side of Monroe Road (SR 1009), between NC 51 (Matthews Township Pkwy.) and Galleria Boulevard in the Town of Matthews (Mecklenburg County), NC (see Figure 1). The site is expected to be fully developed within one year (2014).



Monroe Road Facing South at Site



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According to the site plan provided by QuikTrip (see Figure 2), access to the development is expected to occur via two locations on Monroe Road:

- Proposed Access "A" is an existing 35-foot wide full movement driveway located approximately ½ mile south of Galleria Boulevard (midway between Galleria Boulevard and NC 51) (one entering lane and two exit lanes). In addition to serving the QuikTrip site, this driveway is expected to also be used for access to the remaining property east (behind) the QuikTrip development.
- Proposed Access "B" is a proposed 35-foot wide right-in/right-out only located approximately 275 feet north of Proposed Access "A" (one entering lane and one exit lane). An existing driveway located immediately north of Proposed Access "B" will be removed.





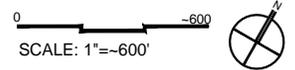
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## AREA of INFLUENCE MAP

SEPTEMBER 2013

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■ Figure 1



### LEGEND

- Traffic Signal
- Stop Sign Control

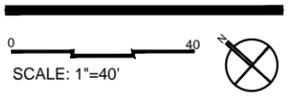


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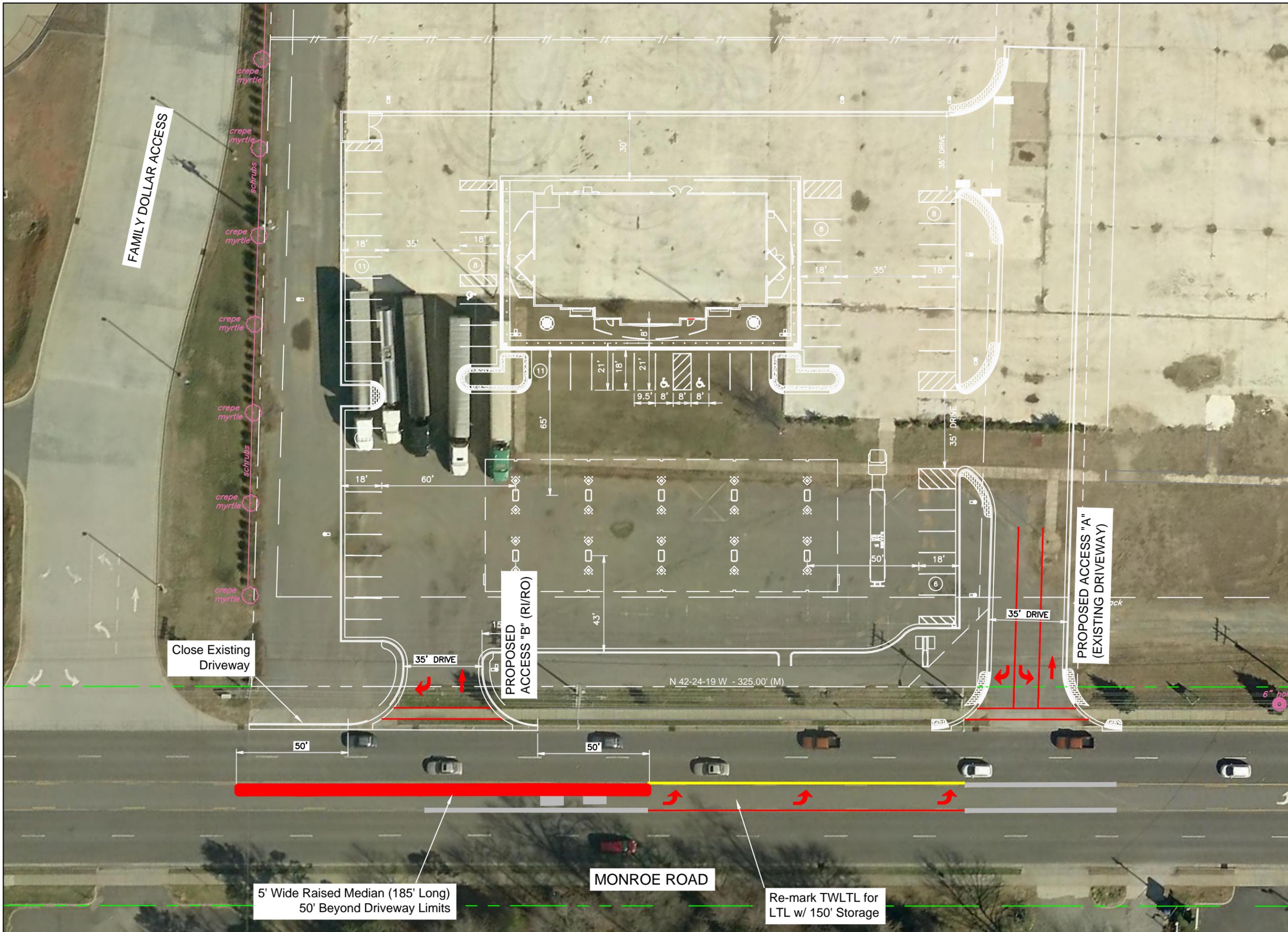
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**SITE PLAN on AERIAL**

SEPTEMBER 2013

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**Figure 2**



## AREA CONDITIONS

The area of influence of the study site as indicated by NCDOT and Town of Matthews staff includes the following four intersections:

1. Monroe Road (SR 1009) & Galleria Boulevard (signalized)
2. NC 51 (Matthews Township Pkwy.) & Monroe Road (SR 1009)/W. John Street (SR 1010) (signalized)
3. Monroe Road (SR 1009) & Proposed Access "A" (unsignalized)
4. Monroe Road (SR 1009) & Proposed Access "B" (unsignalized)



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Monroe Road Facing South From  
Proposed Access "A"



Monroe Road Facing North  
From Proposed Access "A"

As indicated on the most current roadway information for Mecklenburg County, Monroe Road (SR 1009) is a major thoroughfare (located on the west side of the site). The roadway is posted for 45 mph for vehicles traveling northbound and 35 mph for vehicles traveling southbound. Monroe Road is a two-way roadway five lanes wide (two lanes in each direction with occasional left turn lanes in a two-way left-turn lane). The roadway includes curb/gutter on both sides; planting strip and sidewalk is present on the west side and on the east side from the site to the south. CATS bus stops (routes 27 and 65x) are located on both sides of Monroe Road along the site frontage. Sight distance in both directions at the two access locations on Monroe Road are adequate, meeting or exceeding normal NCDOT requirements for a 45 mph posted roadway (50 mph design speed = 500 feet of sight distance).

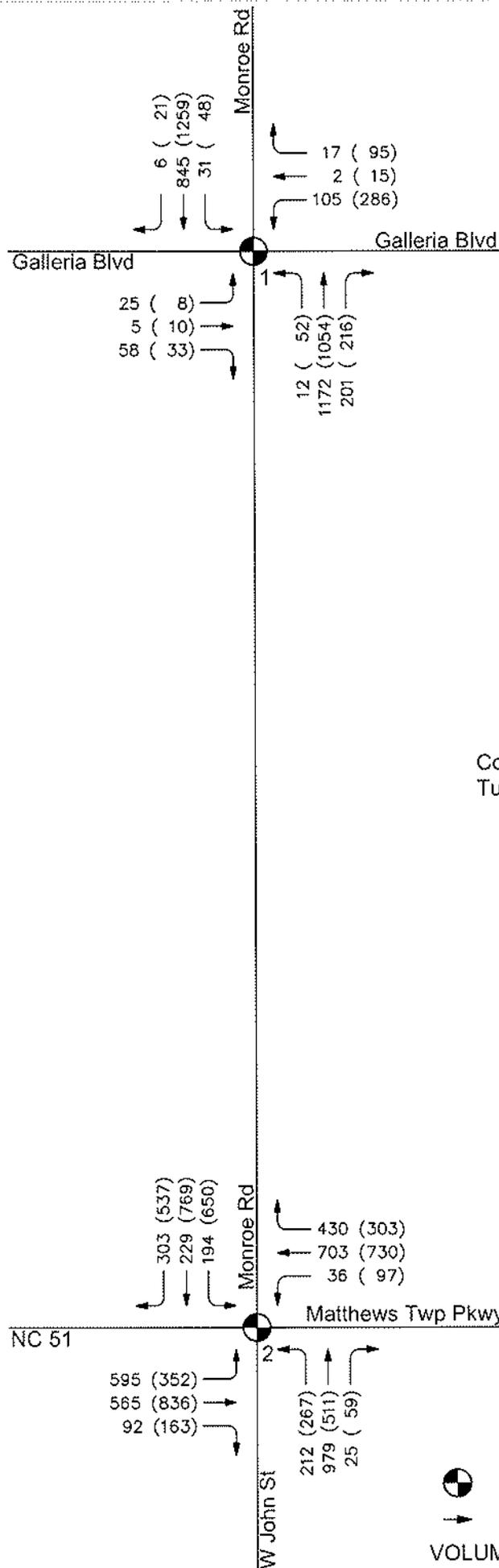
Peak period turning movement counts were conducted at the two existing signalized intersections from 7:00–9:00 AM and 4:00–6:00 PM on Tuesday, July 30, 2013. School was not in session when the peak hour counts were collected; NCDOT and the Town of Matthews staff accepted this variation in typical procedures. Figure 3 shows the 2013 existing traffic volumes for the AM and PM peak hours.



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**LEGEND**  
 Traffic Signal  
 Directional Movement  
 VOLUMES: AM (PM)

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SCALE: NTS

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2013 EXISTING  
 PEAK HOUR  
 TRAFFIC VOLUMES

AUGUST 2013

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Figure 3

**AADT Volumes and Accident Data:**

NCDOT is the source for average annual daily traffic (AADT) volumes in the vicinity of the proposed development. The latest (2012) AADT volumes are depicted in Table 1.



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**Table 1: Average Annual Daily Traffic Volumes (veh. per day)**

| Roadway                               | 2012   |
|---------------------------------------|--------|
| Monroe Rd., north of NC 51            | 32,000 |
| W. John St., south of NC 51           | 18,000 |
| NC 51, west of Monroe Rd./W. John St. | 33,000 |
| NC 51, east of Monroe Rd./W. John St. | 27,000 |

According to the latest high frequency crash data collected by NCDOT for 2007-2011:

- 32 reported accidents at the intersection of NC 51 & Monroe Road/W. John Street
- 27 reported accidents at the intersection of Monroe Road & Galleria Boulevard
- 41 reported accidents on the section of Monroe Road (along the site) between Industrial Drive and Gander Cove Lane

**PROJECTED TRAFFIC**

The projected background peak hour traffic volumes used in the analyses were developed from the existing (2013) peak-hour-turning-movement-count data. The existing intersection turning-movement volumes were increased using a 2 percent per year growth rate for the area to obtain 2014 background volumes, and was approved by NCDOT and Matthews staff.



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The daily and peak-hour-trip-generation data for the development is presented in Table 2. The trips generated by the site are obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9<sup>th</sup> Edition, 2012.

**Table 2: Trip Generation**

| Land Use [ITE Code]                   |    |    | Daily         | AM Peak Hour |             |             | PM Peak Hour |             |             |
|---------------------------------------|----|----|---------------|--------------|-------------|-------------|--------------|-------------|-------------|
|                                       |    |    |               | Enter        | Exit        | Total       | Enter        | Exit        | Total       |
| Convenience Market w/Gas Pumps [853]  | 20 | FP | 10,852        | 165          | 166         | 331         | 190          | 191         | 381         |
| <i>63% AM/66% PM Passby Reduction</i> |    |    | <i>-462</i>   | <i>-105</i>  | <i>-105</i> | <i>-210</i> | <i>-126</i>  | <i>-126</i> | <i>-252</i> |
| <b>Total New Trips</b>                |    |    | <b>10,390</b> | <b>60</b>    | <b>61</b>   | <b>121</b>  | <b>64</b>    | <b>65</b>   | <b>129</b>  |

References:

- Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.
- Passby taken in accordance with NCDOT Trip Generation Guidelines

The proposed trip generation results indicate that the development is expected to generate 121 new AM peak hour trips and 129 new PM peak hour trips (after passby reductions).

The directional trip distribution of the site traffic is provided in Figure 4, which was approved by NCDOT and the Town of Matthews. The trip assignments for the 2014 AM and PM peak hour traffic volumes are presented in Figures 5 and 6 (depending on scenario). The background traffic is indicated to the far left of the movement arrows followed by the site traffic in parentheses. The two volumes are added to obtain the projected total traffic for that movement:

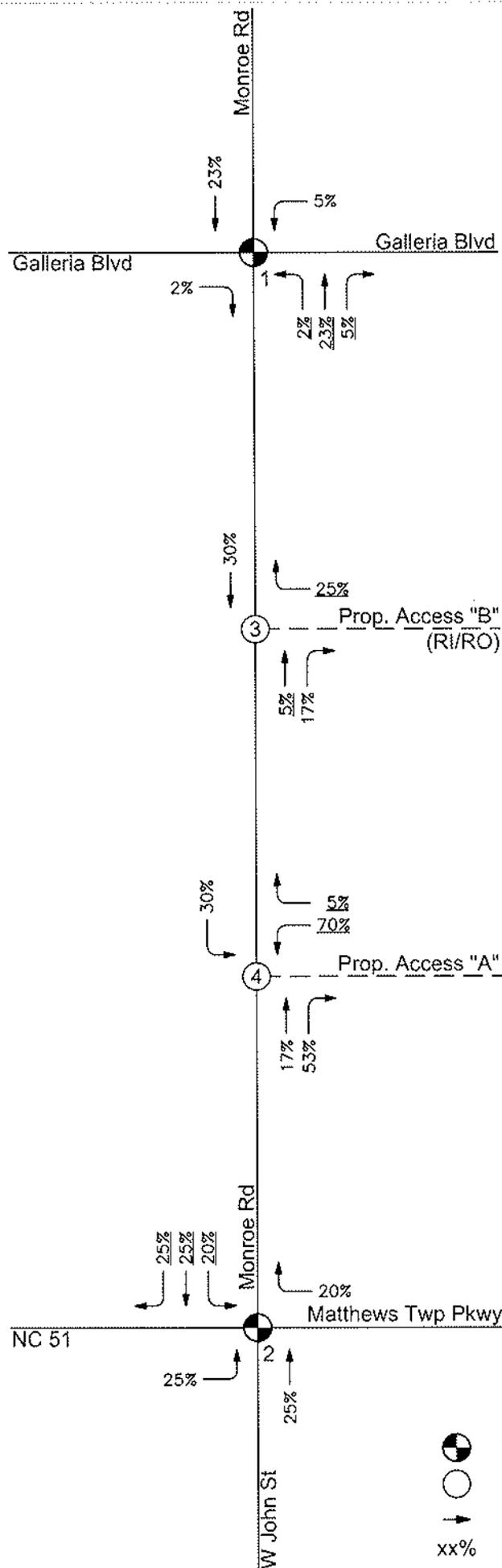
$$\text{Background} + (\text{Site}) = \text{Total}$$



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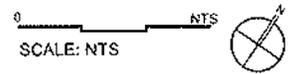
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Site  
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DIRECTIONAL DISTRIBUTION

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LEGEND

- Traffic Signal
- Stop Sign Control
- Directional Movement
- xx% Distribution %

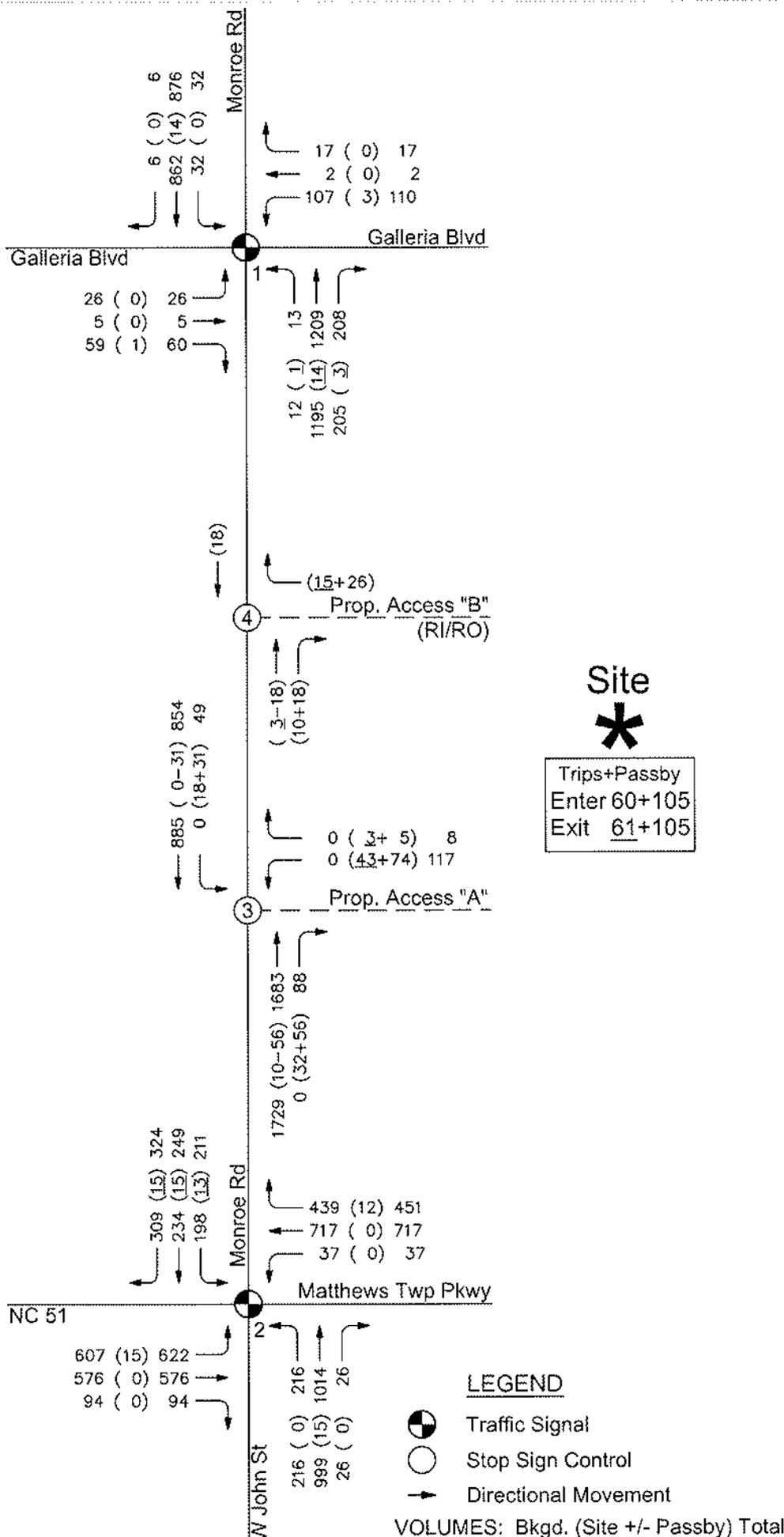
Figure 4



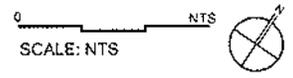
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**2014 AM PEAK  
BUILD TRAFFIC  
VOLUMES**

SEPTEMBER 2013

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**Figure 5**

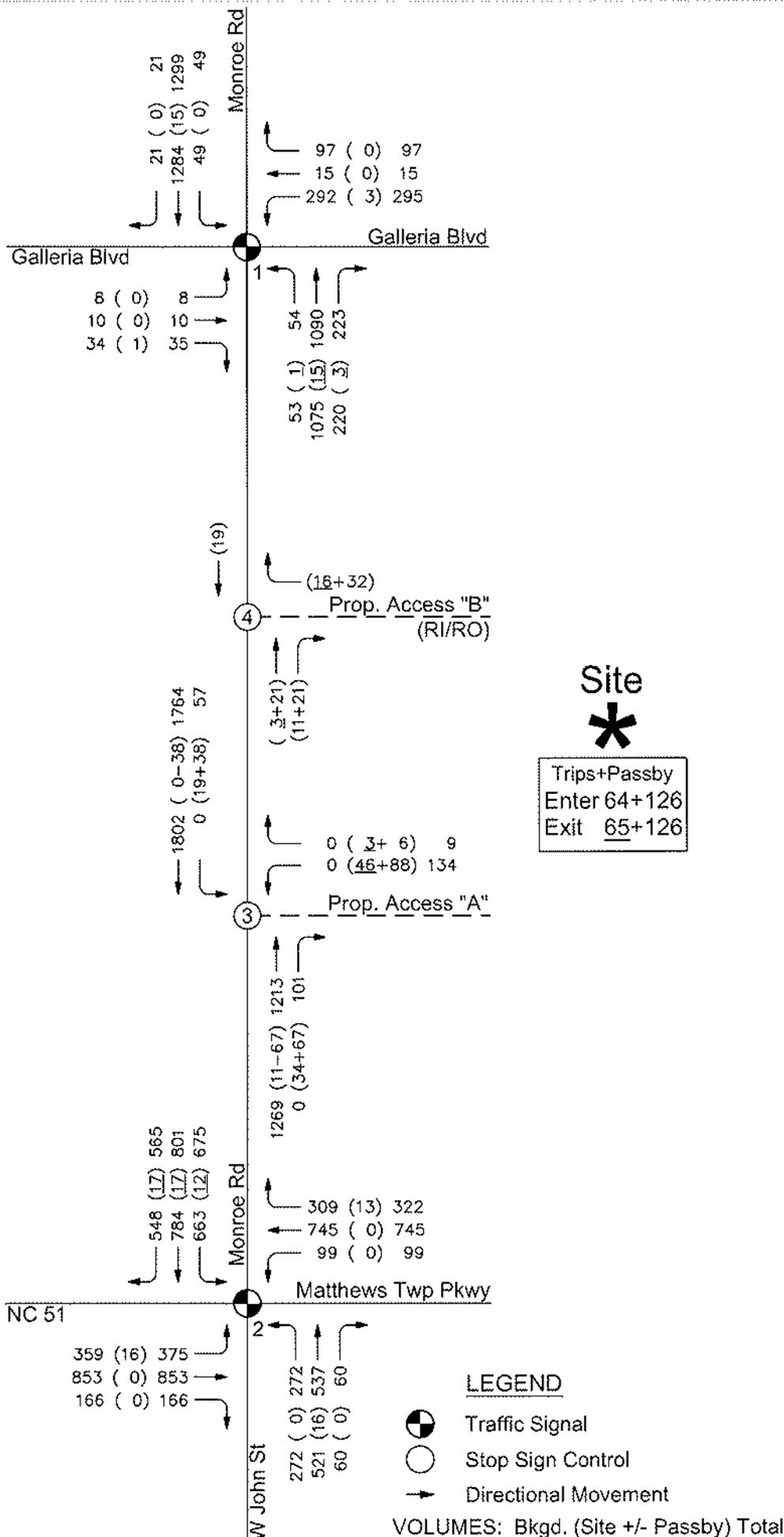
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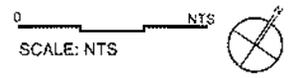
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**2014 PM PEAK  
BUILD TRAFFIC  
VOLUMES**

AUGUST 2013

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**Figure 6**

## TRAFFIC ANALYSIS

The intersections identified within the area of influence were analyzed to identify the traffic impact that the development has under the 2014 scenario. Recommendations for roadway improvements to accommodate the traffic are a result of the analysis. The traffic analysis is based on the LOS analysis at the identified intersections. The intersections were analyzed assuming full development in 2014. The laneage required for the intersection within the study area to operate at acceptable levels of service in the years 2014 with site traffic added to the background volumes were determined by the analysis.



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LOS is a qualitative measurement of traffic operations. It is a measure of delay time. The Transportation Research Board's Highway Capacity Manual<sup>1</sup> (HCM) defines six levels of service for intersections with LOS "A" representing the best operating condition and LOS "F" the worst. Table 16-2 of the HCM gives the criteria for signalized intersections.

| Signalized Level of Service | Signal Delay per Vehicle (sec/vehicle) |
|-----------------------------|--|
| A                           | <10.0                                  |
| B                           | > 10.0 and < 20.0                      |
| C                           | > 20.0 and < 35.0                      |
| D                           | > 35.0 and < 55.0                      |
| E                           | > 55.0 and < 80.0                      |
| F                           | >80.0                                  |

SYNCHRO Pro 7.0 was the software tool used in determining the delay, capacity and corresponding level of service at the study intersections. This software optimizes the intersection splits for the approach volumes for the signalized intersection. The intersection worksheet reports are provided in the Appendix.

For the analysis of unsignalized intersections, the vehicular movements that must stop at the intersection experience delay (i.e. the minor leg of the intersection). For descriptive purposes:

- LOS results between "A" and "C" for the side (minor) street approach are assumed to represent short vehicle delays
- LOS results between "D" and "E" for the side (minor) street approach are assumed to represent moderate delays

<sup>1</sup> National Research Council. Transportation Research Board. Highway Capacity Manual, Washington, DC. 2002. Chapters 2, 16, and 17.

- LOS results of "F" for the side (minor) street approach is assumed to represent long delays.

It should be noted that stop sign controlled streets/driveways intersecting major streets typically experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. Table 17-2 gives the criteria for unsignalized intersections.



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| Unsignalized Level of Service | Stopped Delay per Vehicle (sec/vehicle) | Delay Description       |
|-------------------------------|---|-------------------------|
| A                             | ≤ 10.0                                  | Short Vehicle Delays    |
| B                             | > 10.0 and ≤ 15.0                       |                         |
| C                             | > 15.0 and ≤ 25.0                       |                         |
| D                             | > 25.0 and ≤ 35.0                       | Moderate Vehicle Delays |
| E                             | > 35.0 and ≤ 50.0                       |                         |
| F                             | > 50.0                                  | Long Vehicle Delays     |

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C". It provides recommended access management for the site and intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2013 AM & PM Peak existing traffic conditions
- 2014 AM & PM Peak No Build traffic conditions
- 2014 AM & PM Peak Build traffic conditions

Currently, the signalized intersection of Monroe Road & Galleria operates at an acceptable Level of Service (LOS) of "B" during both peak hours; the signalized intersection of NC 51 & Monroe Road/John Street operates at a LOS of "E" during both peak hours. Typically, an intersection is said to be operating at capacity with a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better. The results of the 2013 existing conditions scenario are presented in Table 3.

Table 3: 2013 Existing Conditions Level of Service

| Intersection                   | AM Peak         |                |                  | PM Peak         |                |                  |
|--------------------------------|-----------------|----------------|------------------|-----------------|----------------|------------------|
|                                | Delay (sec/veh) | Capacity (v/c) | Level of Service | Delay (sec/veh) | Capacity (v/c) | Level of Service |
| 1. Monroe Rd. & Galleria Blvd. | 15.7            | 0.59           | B                | 19.0            | 0.66           | B                |
| 2. NC 51 & Monroe Rd./John St. | 67.1            | 0.89           | E                | 56.1            | 0.81           | E                |

Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways*, the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exist when comparing the 2014 Buildout results to the 2014 No Build results:



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- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is "F" for an intersection or an individual approach.*

This section of the driveway manual also states that, *mitigation improvements shall be identified when the analysis indicates that the 95<sup>th</sup> percentile queue exceeds the storage capacity of the existing lane.*

The study intersections and the proposed access locations were then analyzed under the 2014 No Build and Build scenarios, with the growth in background traffic and the addition of the site traffic (see Table 4).

Table 4: 2014 Levels of Service

| Intersection                                  | Intersection and Approach | AM Peak  |                |                  | PM Peak  |                |                  |
|---|---------------------------|--|----------------|------------------|--|----------------|------------------|
|   |                           | Delay (sec/veh)  | Capacity (v/c) | Level of Service | Delay (sec/veh)  | Capacity (v/c) | Level of Service |
| <b>2014 No Build</b>                          |                           |  |                |                  |  |                |                  |
| 1. Monroe Rd. & Galleria Blvd.                | <i>Intersection</i>       | <b>15.8</b>  | <b>0.60</b>    | <b>B</b>         | <b>19.2</b>  | <b>0.66</b>    | <b>B</b>         |
|   | Northbound                | 17.0   | -              | B                | 19.5   | -              | B                |
|   | Southbound                | 9.6  | -              | A                | 13.8   | -              | B                |
|   | Eastbound                 | 36.4   | -              | D                | 41.8   | -              | D                |
|   | Westbound                 | 32.7   | -              | C                | 33.5   | -              | C                |
| 2. NC 51 & Monroe Rd./John St.                | <i>Intersection</i>       | <b>69.4</b>  | <b>0.91</b>    | <b>E</b>         | <b>57.8</b>  | <b>0.83</b>    | <b>E</b>         |
|   | Northbound                | 82.2   | -              | F                | 67.3   | -              | E                |
|   | Southbound                | 51.2   | -              | D                | 58.8   | -              | E                |
|   | Eastbound                 | 59.8   | -              | E                | 52.2   | -              | D                |
|   | Westbound                 | 77.5   | -              | E                | 55.6   | -              | E                |
| <b>2014 Build</b>                             |                           |  |                |                  |  |                |                  |
| 1. Monroe Rd. & Galleria Blvd.                | <i>Intersection</i>       | <b>15.9</b>  | <b>0.61</b>    | <b>B</b>         | <b>19.3</b>  | <b>0.66</b>    | <b>B</b>         |
|   | Northbound                | 17.0   | -              | B                | 19.4   | -              | B                |
|   | Southbound                | 9.6  | -              | A                | 13.8   | -              | B                |
|   | Eastbound                 | 37.0   | -              | D                | 42.6   | -              | D                |
|   | Westbound                 | 33.2   | -              | C                | 34.4   | -              | C                |
| 2. NC 51 & Monroe Rd./John St.                | <i>Intersection</i>       | <b>71.3</b>  | <b>0.92</b>    | <b>E</b>         | <b>59.0</b>  | <b>0.84</b>    | <b>E</b>         |
|   | Northbound                | 84.3   | -              | F                | 68.7   | -              | E                |
|   | Southbound                | 52.3   | -              | D                | 60.2   | -              | E                |
|   | Eastbound                 | 62.4   | -              | E                | 53.3   | -              | D                |
|   | Westbound                 | 79.6   | -              | E                | 56.4   | -              | E                |
| 3. Monroe Rd. & Prop. Access "A" <sup>1</sup> | <i>Intersection</i>       | Long Vehicle Delays for the Minor Legs of the Intersection |                |                  | Long Vehicle Delays for the Minor Legs of the Intersection |                |                  |

<sup>1</sup> Laneage includes a SB left turn lane on Monroe (w/in TWLTL), one entering lane and two exit lanes on Proposed Access "A"

Table 5 shows the 2014 95<sup>th</sup> % queue lengths calculated by SimTraffic 7, a traffic simulation software application for unsignalized and signalized intersections (results are based on an average of four corridor simulations), or Synchro 7, - whichever produced the higher 95<sup>th</sup> % queue length.



Table 5: 95<sup>th</sup> % Queue Lengths

| Intersection and Approach        |    | Existing Storage |       | AM Peak 95 <sup>th</sup> % Queue Length (feet) |         |       | PM Peak 95 <sup>th</sup> % Queue Length (feet) |         |       |
|----------------------------------|----|------------------|-------|--|---------|-------|--|---------|-------|
|                                  |    | Left             | Right | Left   | Thru    | Right | Left   | Thru    | Right |
| <b>2014 No Build</b>             |    |                  |       |  |         |       |  |         |       |
| 1. Monroe Rd. & Galleria Blvd.   | NB | 240' + TWLTL     | 130'  | 29'  | 450'x2  | 174'  | 92'  | 438'x2  | 176'  |
|                                  | SB | 200'             | -     | 43'  | 209'x2  |       | 59'  | 442'x2  |       |
|                                  | EB | 215'             | 250'  | 58'  | 17'     | 60'   | 27'  | 30'     | 56'   |
|                                  | WB | 165' + Thru      | 250'  | 86'x2  |         | 29'   | 194'x2   |         | 63'   |
| 2. NC 51 & Monroe Rd./John St.   | NB | 240'x2           | 210'  | 232'x2   | 762'x2  | 174'  | 226'x2   | 412'x2  | 76'   |
|                                  | SB | 260'x2           | 120'  | 193'x2   | 189'x2  | 238'  | 581'x2   | 1354'x2 | 733'  |
|                                  | EB | 325'x2           | 100'  | 447'x2   | 311'x2  | 149'  | 295'x2   | 601'x2  | 261'  |
|                                  | WB | 170'x2           | 120'  | 91'x2  | 841'x2  | 567'  | 150'x2   | 576'x2  | 352'  |
| <b>2014 Build</b>                |    |                  |       |  |         |       |  |         |       |
| 1. Monroe Rd. & Galleria Blvd.   | NB | 240' + TWLTL     | 130'  | 29'  | 458'x2  | 141'  | 129'   | 446'x2  | 179'  |
|                                  | SB | 200'             | -     | 40'  | 214'x2  |       | 57'  | 450'x2  |       |
|                                  | EB | 215'             | 250'  | 54'  | 23'     | 64'   | 27'  | 39'     | 61'   |
|                                  | WB | 165' + Thru      | 250'  | 87'x2  |         | 30'   | 197'x2   |         | 76'   |
| 2. NC 51 & Monroe Rd./John St.   | NB | 240'x2           | 210'  | 260'x2   | 1010'x2 | 173'  | 226'x2   | 426'x2  | 87'   |
|                                  | SB | 260'x2           | 120'  | 209'x2   | 195'x2  | 324'  | 597'x2   | 1575'x2 | 771'  |
|                                  | EB | 325'x2           | 100'  | 562'x2   | 369'x2  | 142'  | 308'x2   | 601'x2  | 276'  |
|                                  | WB | 170'x2           | 120'  | 83'x2  | 1009'x2 | 763'  | 160'x2   | 644'x2  | 353'  |
| 3. Monroe Rd. & Prop. Access "A" | NB | -                | -     | -  | 20'     |       | -  | 11'     |       |
|                                  | SB | 150'             | -     | 42'  | 145'x2  | -     | 44'  | 184'x2  | -     |
|                                  | WB | Term.            | Term. | 236'   | -       | 3'    | 193'   | -       | 2'    |

<sup>1</sup> Laneage includes a SB left turn lane on Monroe (w/in TWLTL), one entering lane and two exit lanes on Proposed Access "A"

2014 Build Analysis Results:

**1. Monroe Road (SR 1009) & Galleria Boulevard (signalized)**

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains a "B" during both peak hours (considerably under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.

**2. NC 51 (Matthews Twp. Parkway) & Monroe Road (SR 1009)/W. John Street (SR 1010) (signalized)**

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains an "E" during both peak hours (under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.



### 3. Monroe Road (SR 1009) & Proposed Access "A" (unsignalized)

Under the 2014 Build conditions the minor leg (Proposed Access "A") operates with long vehicle delays during both peak hours (due to the significant amount of through traffic in both directions on Monroe Road). The intersection layout we recommend includes:

- Re-mark the existing two-way left-turn lane on Monroe Road for a southbound left turn lane with 150 feet of storage.
- Construct the westbound approach (Proposed Access "A") for one ingress and two egress lanes (separate left and right turn lanes).

It is assumed that there are insufficient traffic volumes to warrant a traffic signal at this location (which is the only improvement that would generate an acceptable LOS in the peak hours). In addition, the existing traffic signal located approximately 2,300 feet south on Monroe Road at NC 51 will create gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection (which the analysis software does not take into consideration). Also, the existing traffic signal located approximately 1,725 feet north on Monroe Road at Gander Cove Lane/Family Dollar Access will further increase the gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection.

The existing and recommended laneage is shown in Figure 7.



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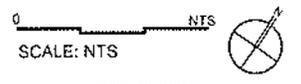


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CHECKED BY: REG

EXISTING/  
RECOMMENDED  
LANEAGE

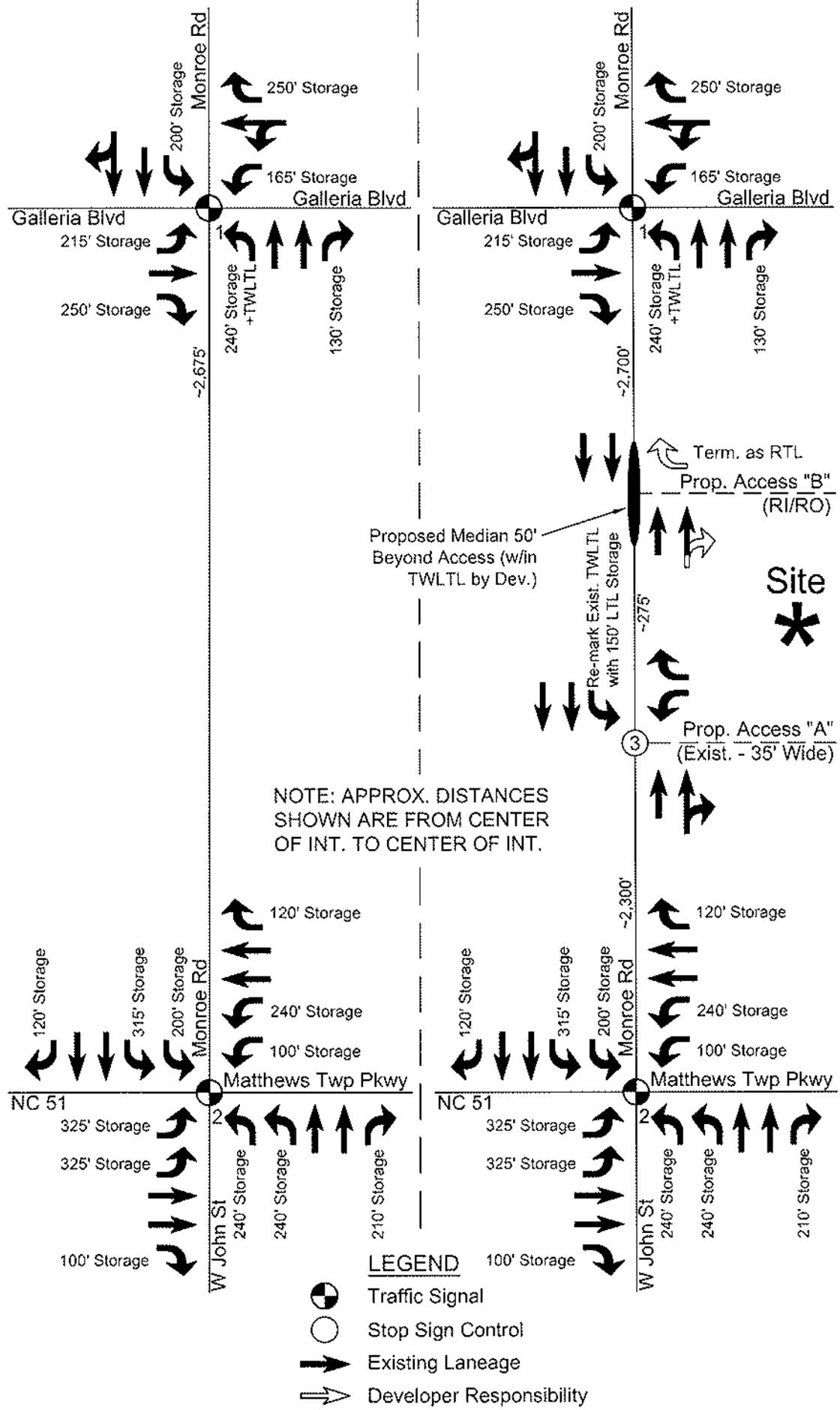
SEPTEMBER 2013

REVISIONS:  
1. XX

Figure 7

EXISTING LANEAGE

RECOMMENDED LANEAGE



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## CONCLUSIONS

### 2014 Build Scenario Analysis Results:

#### 1. Monroe Road (SR 1009) & Galleria Boulevard (signalized)

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains a "B" during both peak hours (considerably under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.

#### 2. NC 51 (Matthews Twp. Parkway) & Monroe Road (SR 1009)/W. John Street (SR 1010) (signalized)

When comparing the impact of the 2014 Buildout conditions to the 2014 No Build conditions the intersection LOS remains an "E" during both peak hours (under capacity during both peak hours). No approaches drop in LOS and all delays are within the allowed parameters. Therefore, mitigation is not required at this intersection.

#### 3. Monroe Road (SR 1009) & Proposed Access "A" (unsignalized)

Under the 2014 Build conditions the minor leg (Proposed Access "A") operates with long vehicle delays during both peak hours (due to the significant amount of through traffic in both directions on Monroe Road). The intersection layout we recommend includes:

- Re-mark the existing two-way left-turn lane on Monroe Road for a southbound left turn lane with 150 feet of storage.
- Construct the westbound approach (Proposed Access "A") for one ingress and two egress lanes (separate left and right turn lanes).

It is assumed that there are insufficient traffic volumes to warrant a traffic signal at this location (which is the only improvement that would generate an acceptable LOS in the peak hours). In addition, the existing traffic signal located approximately 2,300 feet south on Monroe Road at NC 51 will create gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection (which the analysis software does not take into consideration). Also, the existing traffic signal located approximately 1,725 feet north on Monroe Road at Gander Cove Lane/Family Dollar Access will further increase the gaps within the traffic flow, allowing vehicles to exit from the minor leg of the unsignalized intersection.



**4. Monroe Road (SR 1009) & Proposed Access "B" (right-in/right out only)**

- Construct a raised median (minimum five-foot monolithic) on Monroe Road within the existing TWLTL that extends 50 feet beyond both sides of the driveway (approximately 185 feet in total length) to eliminate the possibility of left exiting and left entering vehicles from Proposed Access "B".
- Construct the westbound approach (Proposed Access "B") for one ingress and one egress lane.

These identified improvements will improve capacity and provide an acceptable level of service at these intersections and roadway corridors during the critical peak hours of the year 2014.



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APPENDIX