



*Revised Traffic Impact Analysis*

# Hinton Oaks Industrial Knightdale, NC

Prepared for:  
Merritt Construction  
Services

**Kimley»»Horn**

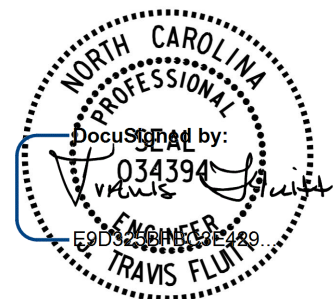
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Revised Traffic Impact Analysis for  
**Hinton Oaks Industrial**  
Knightdale, North Carolina

Prepared for:  
Merritt Construction Services  
Baltimore, MD

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**Executive Summary**

Kimley-Horn and Associates, Inc. has revised the Traffic Impact Analysis prepared for the Hinton Oaks Industrial development, which is proposed to be located north of The Shoppes at Midway Plantation east of Hinton Oaks Boulevard in Knightdale, NC, to address comments received from the Town of Knightdale. As currently envisioned, the site will include approximately 127,200 square feet of Industrial Park space, 84,800 square feet of General Office space, and 88,000 square feet of Business Park space. The site is proposed to be accessed by two full-movement driveways onto Hinton Oaks Boulevard. Build-out of the development is anticipated in 2022.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2020) traffic condition, the projected background and build-out +1 (2023) traffic conditions, and the projected background and build-out +10 (2032) traffic conditions per the Town of Knightdale’s UDO. The weekday AM and PM peak hours were studied.

As shown in Table ES-1, the proposed development has the potential to generate 3,618 new daily trips, 283 new trips during the AM peak hour, and 280 trips during the PM peak hour on a typical weekday.

<b>Table ES-1 ITE Traffic Generation (Vehicles)</b>									
<b>Land Use Code</b>	<b>Land Use</b>	<b>Intensity</b>		<b>Daily</b>		<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
				<b>In</b>	<b>Out</b>	<b>In</b>	<b>Out</b>	<b>In</b>	<b>Out</b>
130	Industrial Park	127,200	s.f.	532	532	41	10	11	40
710	General Office Building	84,800	s.f.	452	452	91	15	16	81
770	Business Park	88,000	s.f.	825	825	107	19	34	98
<b>Total Net New Trips</b>		300,000	s.f.	<b>1,809</b>	<b>1,809</b>	<b>239</b>	<b>44</b>	<b>61</b>	<b>219</b>

Capacity analyses were performed using Synchro Version 10.3 software. Analyses were performed both with and without the proposed Legacy Oaks development located in the northwest quadrant of US 64 Business (Knightdale Boulevard) at I-540 as this development is not yet approved but would have an impact on site traffic operations. Table ES-2 summarizes the operation of the study intersections for the AM and PM peak hour traffic conditions.

<b>Table ES-2 Level-of-Service Summary</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
<b>US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard (Signalized)</b>				
Existing (2020) Traffic	B (13.1)	B (17.3)	-	-
+1 (2023) Traffic	B (15.4)	B (19.7)	C (24.8)*	C (21.0)*
+10 (2032) Traffic	B (17.4)	C (24.1)	C (28.9)*	C (25.2)*
+1 (2023) Traffic – with Legacy Oaks	B (15.8)	C (20.2)	C (25.3)*	C (21.7)*
+10 (2032) Traffic – with Legacy Oaks	B (18.1)	C (25.3)	C (30.7)*	C (26.9)*
<b>US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps (Signalized)</b>				
Existing (2020) Traffic	B (11.6)	B (18.5)	-	-
+1 (2023) Traffic	B (15.6)	C (21.3)	B (19.7)	C (22.0)
+10 (2032) Traffic	B (18.9)	C (25.4)	C (23.2)	C (26.9)
+1 (2023) Traffic – with Legacy Oaks	B (18.0)	C (21.5)	C (21.7)	C (22.3)
+10 (2032) Traffic – with Legacy Oaks	C (22.0)	C (26.0)	C (26.1)	C (27.6)
<b>US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps (Signalized)</b>				
Existing (2020) Traffic	A (2.9)	A (5.4)	-	-
+1 (2023) Traffic	A (5.0)	A (9.8)	A (6.5)	B (12.7)
+10 (2032) Traffic	A (6.3)	B (11.1)	A (7.8)	B (13.6)
+1 (2023) Traffic – with Legacy Oaks	A (5.7)	B (10.3)	A (7.1)	B (12.7)
+10 (2032) Traffic – with Legacy Oaks	A (7.1)	B (11.4)	A (8.4)	B (13.6)

\*With improvement

<b>Table ES-2 Level-of-Service Summary (cont.)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
<b>US 64 Business (Knightdale Boulevard) at Widewaters Parkway (Signalized)</b>				
Existing (2020) Traffic	B (19.7)	C (29.0)	-	-
+1 (2023) Traffic	C (21.8)	D (35.1)	C (21.4)	D (35.6)
+10 (2032) Traffic	C (23.8)	D (41.5)	C (23.1)	D (43.2)
+1 (2023) Traffic – with Legacy Oaks	C (22.0)	D (35.2)	C (21.3)	D (35.7)
+10 (2032) Traffic – with Legacy Oaks	C (24.0)	D (41.4)	C (23.2)	D (43.0)
<b>Hinton Oaks Boulevard at Shoppes at Midway Drive (Unsignalized)</b>				
Existing (2020) Traffic	WB – A (9.3)	WB – A (9.9)	-	-
+1 (2023) Traffic	WB – A (9.7)	WB – B (10.2)	WB – B (10.0)*	WB – A (9.6)*
+10 (2032) Traffic	WB – A (9.8)	WB – B (10.4)	WB – B (10.1)*	WB – A (9.7)*
+1 (2023) Traffic – with Legacy Oaks	WB – A (9.7)	WB – B (10.2)	WB – B (10.0)*	WB – A (9.6)*
+10 (2032) Traffic – with Legacy Oaks	WB – A (9.8)	WB – B (10.4)	WB – B (10.1)*	WB – A (9.7)*
<b>Hinton Oaks Boulevard at Shoppes at Midway Driveway/Midtown Commons(Unsignalized)</b>				
Existing (2020) Traffic	EB – B (11.1) WB – B (11.5) NBL – A (7.5) SBL – A (7.6)	EB – B (11.8) WB – C (17.3) NBL – A (7.8) SBL – A (7.5)	-	-
+1 (2023) Traffic	EB – B (11.7) WB – B (12.3) NBL – A (7.5) SBL – A (7.8)	EB – B (13.1) WB – C (19.9) NBL – A (7.9) SBL – A (7.5)	EB – C (15.3) WB – C (17.3) NBL – A (7.7) SBL – A (8.6)	EB – C (18.1) WB – E (37.4) NBL – A (8.7) SBL – A (7.7)
+10 (2032) Traffic	EB – B (11.8) WB – B (12.5) NBL – A (7.6) SBL – A (7.8)	EB – B (13.3) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)	EB – C (15.5) WB – C (17.6) NBL – A (7.7) SBL – A (8.6)	EB – C (18.6) WB – E (39.4) NBL – A (8.7) SBL – A (7.7)
+1 (2023) Traffic – with Legacy Oaks	EB – B (11.7) WB – B (12.3) NBL – A (7.5) SBL – A (7.8)	EB – B (13.1) WB – C (19.9) NBL – A (7.9) SBL – A (7.5)	EB – C (15.3) WB – C (17.3) NBL – A (7.7) SBL – A (8.6)	EB – C (18.1) WB – E (37.4) NBL – A (8.7) SBL – A (7.7)
+10 (2032) Traffic – with Legacy Oaks	EB – B (11.8) WB – B (12.5) NBL – A (7.6) SBL – A (7.8)	EB – B (13.3) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)	EB – C (15.5) WB – C (17.6) NBL – A (7.7) SBL – A (8.6)	EB – C (18.6) WB – E (39.4) NBL – A (8.7) SBL – A (7.7)

\*With improvement

<b>Table ES-2 Level-of-Service Summary (cont.)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
<b>Hinton Oaks Boulevard at Hinton Pond Road/Site Driveway #1 (Unsignalized)</b>				
Existing (2020) Traffic	EB – A (9.6) WB – B (10.0) NBL – A (7.4) SBL – A (7.8)	EB – A (9.6) WB – B (10.4) NBL – A (7.7) SBL – A (7.3)	-	-
+1 (2023) Traffic	EB – B (10.1) WB – B (10.8) NBL – A (7.4) SBL – A (8.0)	EB – B (10.1) WB – B (11.1) NBL – A (7.9) SBL – A (7.4)	EB – B (12.0) WB – B (14.4) NBL – A (7.4) SBL – A (9.0)	EB – B (10.8) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)
+10 (2032) Traffic	EB – B (10.2) WB – B (10.9) NBL – A (7.4) SBL – A (8.0)	EB – B (10.2) WB – B (11.3) NBL – A (7.9) SBL – A (7.4)	EB – B (11.3) WB – B (12.9) NBL – A (7.4) SBL – A (8.7)	EB – B (10.9) WB – C (21.5) NBL – A (8.1) SBL – A (7.5)
+1 (2023) Traffic – with Legacy Oaks	EB – B (10.1) WB – B (10.8) NBL – A (7.4) SBL – A (8.0)	EB – B (10.1) WB – B (11.1) NBL – A (7.9) SBL – A (7.4)	EB – B (12.0) WB – B (14.4) NBL – A (7.4) SBL – A (9.0)	EB – B (10.8) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)
+10 (2032) Traffic – with Legacy Oaks	EB – B (10.2) WB – B (10.9) NBL – A (7.4) SBL – A (8.0)	EB – B (10.2) WB – B (11.3) NBL – A (7.9) SBL – A (7.4)	EB – B (11.3) WB – B (12.9) NBL – A (7.4) SBL – A (8.7)	EB – B (10.9) WB – C (21.5) NBL – A (8.1) SBL – A (7.5)
<b>Hinton Oaks Boulevard at Site Driveway #2 (Unsignalized)</b>				
+1 (2023) Traffic	-	-	WB – A (9.6) SBL – A (7.9)	WB – A (9.9) SBL – A (7.4)
+10 (2032) Traffic	-	-	WB – A (9.6) SBL – A (7.9)	WB – B (10.0) SBL – A (7.4)
+1 (2023) Traffic – with Legacy Oaks	-	-	WB – A (9.6) SBL – A (7.9)	WB – A (9.9) SBL – A (7.4)
+10 (2032) Traffic – with Legacy Oaks	-	-	WB – A (9.6) SBL – A (7.9)	WB – B (10.0) SBL – A (7.4)

The proposed development is in the vicinity of the Knightdale Industrial development which has committed to the following roadway improvement:

US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard:

- Modify the traffic signal phasing/timings to reduce queuing at the intersection

The following improvements are recommended to be performed to accommodate existing and projected Hinton Oaks Industrial site traffic based on the capacity analysis presented herein:

US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard:

- Extend the dual eastbound left-turn lanes to provide 400 feet of storage each

Hinton Oaks Boulevard:

- Provide two northbound through lanes on Hinton Oaks Boulevard from US 64 Business (Knightdale Boulevard) to the Midway Commons/Shoppes at Midway Plantation Driveway with the inside lane dropping as a left-turn lane at the Midway Commons Driveway. [NOTE: Advance warning signage may be required to alert drivers to this change in traffic patterns.]
- Construct an exclusive northbound right-turn lane with 75 feet of storage at Shoppes at Midway Drive

All of the signalized study intersections are expected to operate at an acceptable LOS in the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions. Some long queues are expected on US 64 (Knightdale Boulevard) with or without the proposed development in place. However, the improvement to mitigate these queues is the widening of Knightdale Boulevard to provide an additional through lanes, which is beyond the scope of this development.

The committed and recommended laneage is shown on **Figure ES-1**.



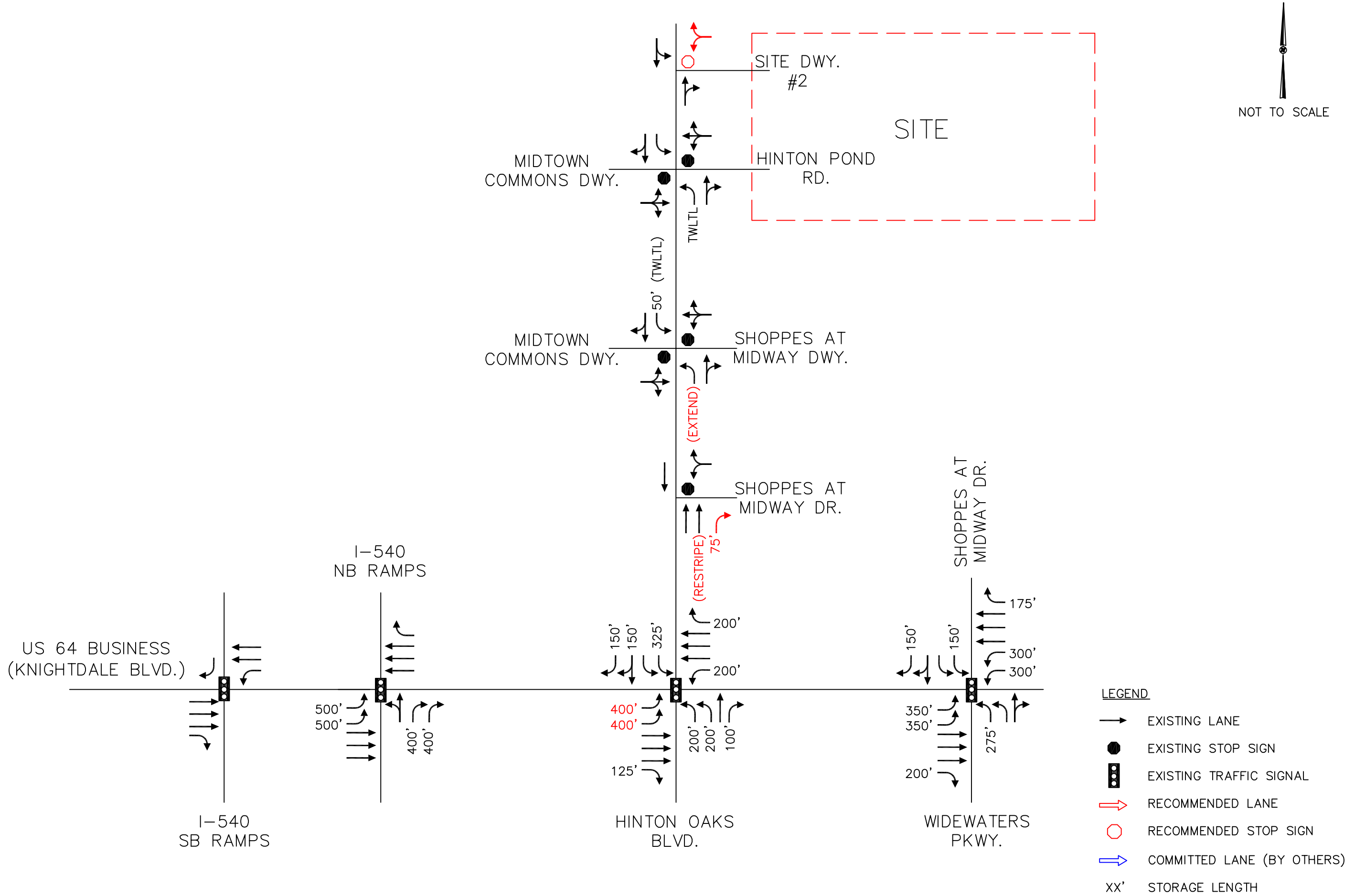


FIGURE ES-1

RECOMMENDED ROADWAY LANEAGE

HINTON OAKS INDUSTRIAL KNIGHTDALE, NC TRAFFIC IMPACT ANALYSIS



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## **1.0 Introduction**

Kimley-Horn and Associates, Inc. has revised the Traffic Impact Analysis prepared for the Hinton Oaks Industrial development, which is proposed to be located north of The Shoppes at Midway Plantation east of Hinton Oaks Boulevard in Knightdale, NC, to address comments received from the Town of Knightdale. As currently envisioned, the site will include approximately 127,200 square feet of Industrial Park space, 84,800 square feet of General Office space, and 88,000 square feet of Business Park space. The site is proposed to be accessed by two full-movement driveways onto Hinton Oaks Boulevard. Build-out of the development is anticipated in 2022.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2020) traffic condition, the projected background and build-out +1 (2023) traffic conditions, and the projected background and build-out +10 (2032) traffic conditions per the Town of Knightdale's UDO. The weekday AM and PM peak hours were studied.

North Carolina Department of Transportation (NCDOT) and Town of Knightdale staff provided background data and were consulted regarding the elements to be covered in this analysis. The approved Memorandum of Understanding is included in the Appendix of this report.

## 2.0 Inventory

### 2.1 Study Area

The study area for this development includes the following intersections:

- US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard
- US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps
- US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps
- US 64 Business (Knightdale Boulevard) at Widewaters Parkway
- Hinton Oaks Boulevard at Shoppes at Midway Drive
- Hinton Oaks Boulevard at Shoppes at Midway Driveway/Midtown Commons Driveway
- Hinton Oaks Boulevard at Hinton Pond Road/Site Driveway #1
- Hinton Oaks Boulevard at Site Driveway #2

**Figure 1** shows the site location. The preliminary site plan is shown on **Figure 2**.

### 2.2 Existing Conditions

The proposed Hinton Oaks Industrial project is located north of the Shoppes at Midway Plantation east of Hinton Oaks Boulevard in Knightdale, NC. Roadways in the study area include I-540, US 64 Business (Knightdale Boulevard), Hinton Oaks Boulevard, and Widewaters Parkway. The existing roadway laneage is shown in **Figure 3**.

I-540 is a six-lane divided freeway with a posted speed limit of 70 mph. Per the Town of Knightdale 2035 Comprehensive Plan, this roadway is classified as a limited access facility. The reported 2018 AADT volume was approximately 67,500 vpd north of US 64 Business (Knightdale Boulevard) and 59,500 vpd south of US 64 Business (Knightdale Boulevard).

US 64 Business (Knightdale Boulevard) is a six-lane divided roadway with a posted speed limit of 45 miles per hour (mph). Per the Town of Knightdale 2035 Comprehensive Plan, this roadway is classified as a state-maintained arterial. The reported 2018 AADT volume was approximately 37,500 vehicles per day (vpd).

Hinton Oaks Boulevard is a three-lane undivided roadway in the vicinity of the site with a two-way left-turn lane (TWLTL) and a posted speed limit of 25 mph. The Town of Knightdale 2035 Comprehensive Plan classifies this roadway as a town-maintained arterial north of US 64 Business (Knightdale Boulevard) and a collector road south of US 64 Business (Knightdale Boulevard). The estimated ADT on Hinton Oaks Boulevard is approximately 4,700 vpd.

Widewaters Parkway has a variable section and a posted speed limit of 25 mph. Per the Town of Knightdale 2035 Comprehensive Plan, this roadway is classified as a town-maintained collector. The estimated ADT on Widewaters Parkway is approximately 6,300 vpd.



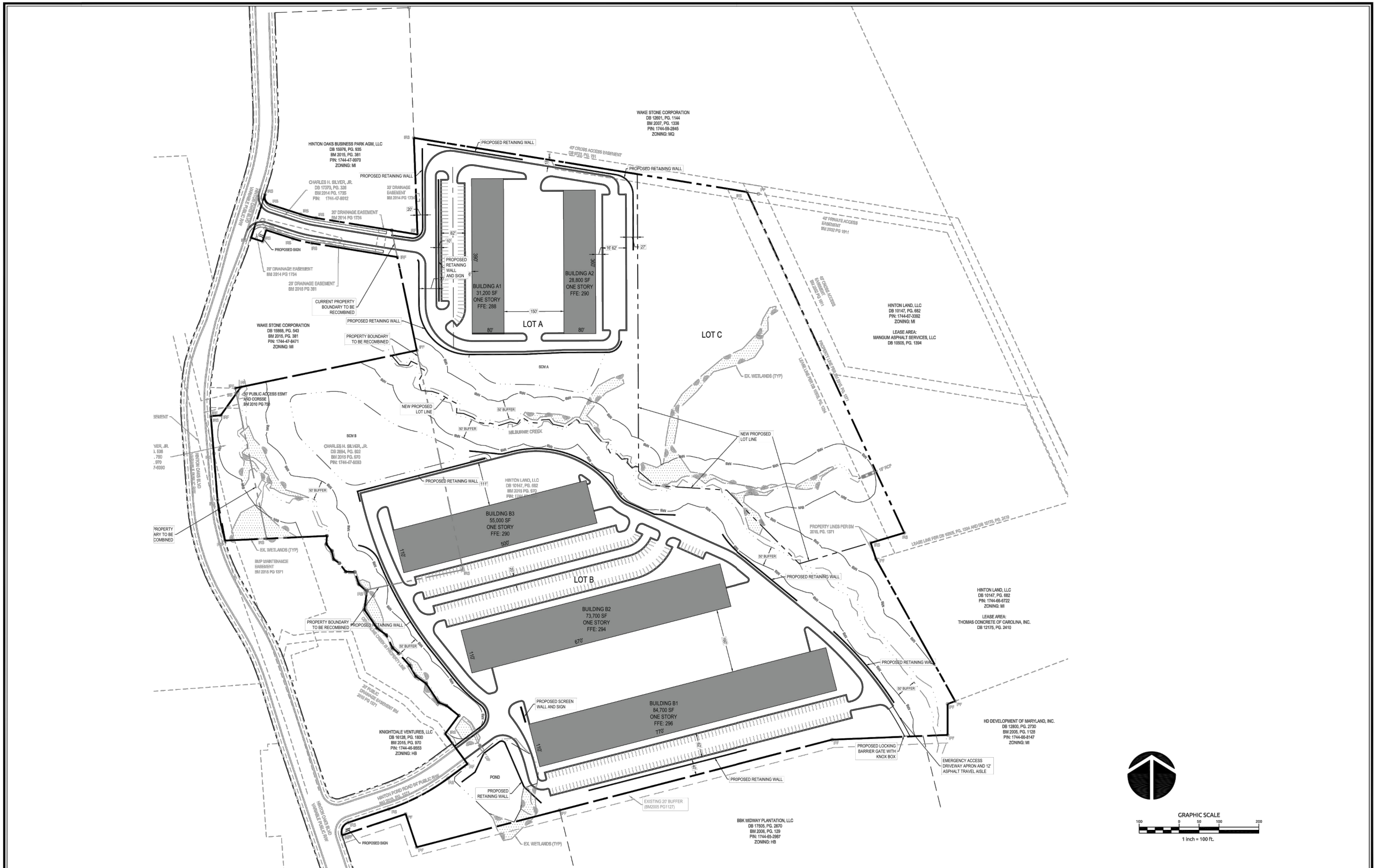
HINTON OAKS INDUSTRIAL  
KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS

SITE LOCATION

FIGURE  
1

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No.	Revision	Date	By	Designer	Scale
					AS NOTED
					Date: 05/18/20
					Checked By: Job No. 190080

**MERRITT HINTON OAKS**

**SITE PLAN EXHIBIT**

**WithersRavenel**  
Engineers | Planners  
137 S Wilmington Street | Suite 200 | Raleigh, NC 27601 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No.  
**SP-5**

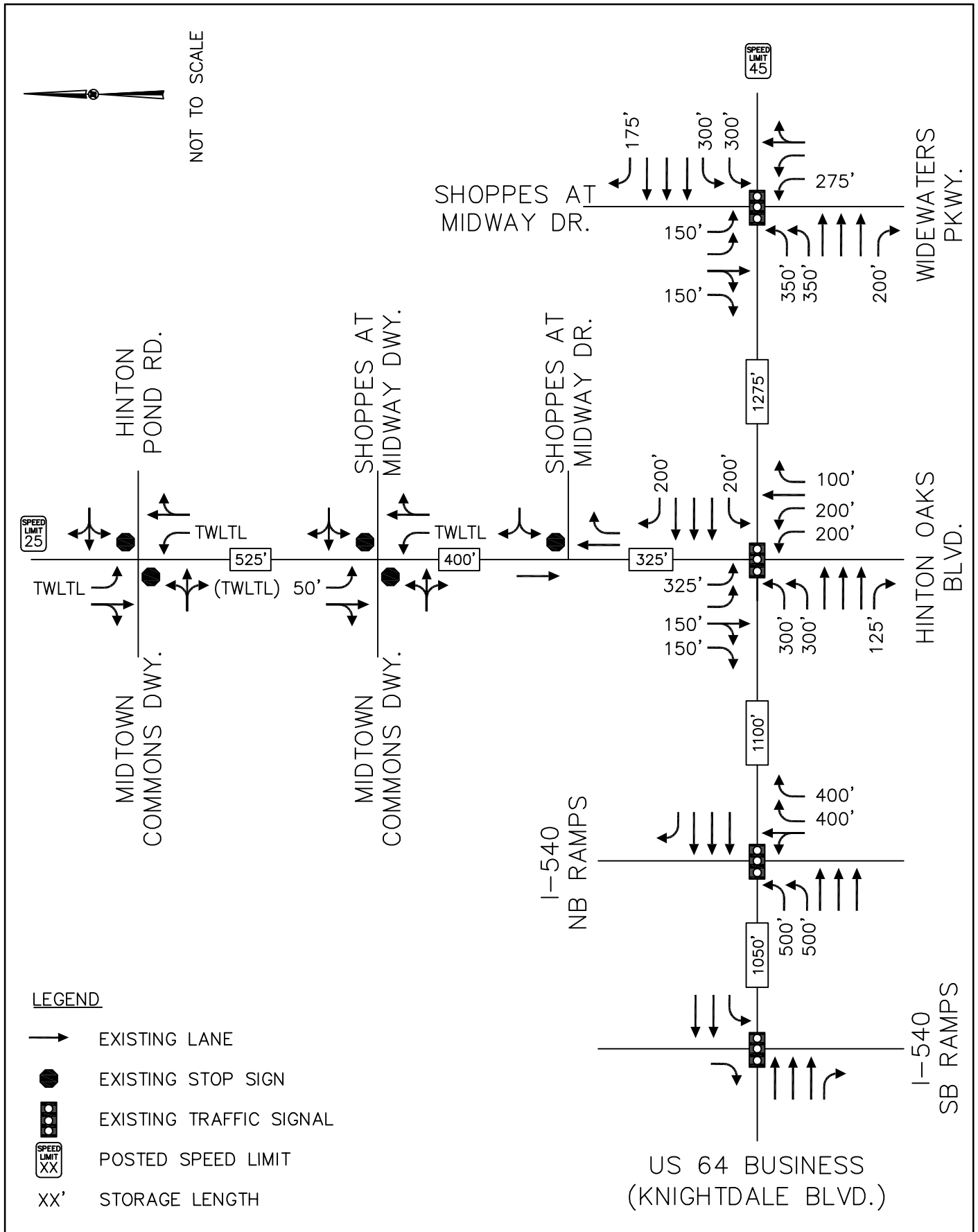
**FIGURE**  
**2**

**CONCEPTUAL SITE PLAN**

**HINTON OAKS INDUSTRIAL  
KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS**



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KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS

EXISTING (2019)  
ROADWAY LANEAGE

FIGURE  
3

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### 3.0 Traffic Generation

The traffic generation potential of the proposed development was determined using the traffic generation rates published in *Trip Generation* (Institute of Transportation Engineers, Tenth Edition, 2017). As currently envisioned, the site will include approximately 127,200 square feet of Industrial Park space, 84,800 square feet of General Office space, and 88,000 square feet of Business Park space.

<b>Table 3.0 ITE Traffic Generation (Vehicles)</b>									
<b>Land Use Code</b>	<b>Land Use</b>	<b>Intensity</b>		<b>Daily</b>		<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
				<b>In</b>	<b>Out</b>	<b>In</b>	<b>Out</b>	<b>In</b>	<b>Out</b>
130	Industrial Park	127,200	s.f.	532	532	41	10	11	40
710	General Office Building	84,800	s.f.	452	452	91	15	16	81
770	Business Park	88,000	s.f.	825	825	107	19	34	98
<b>Total Net New Trips</b>		300,000	s.f.	<b>1,809</b>	<b>1,809</b>	<b>239</b>	<b>44</b>	<b>61</b>	<b>219</b>

Table 3.0 shows that the proposed development has the potential to generate 3,618 new trips during a typical weekday with 283 new trips during the AM peak hour and 280 new trips during the PM peak hour.

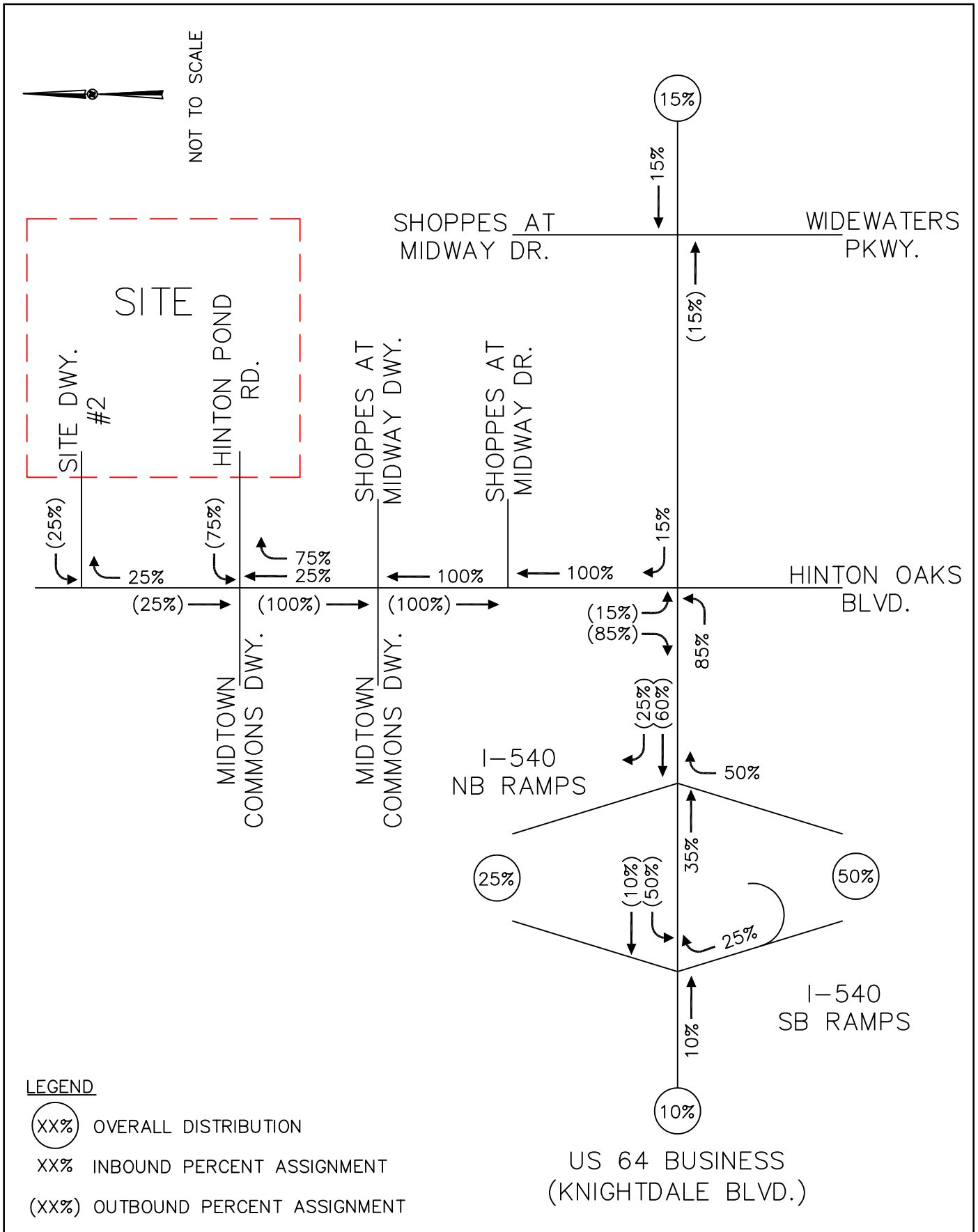
Detailed trip generation calculations are included in the Appendix of this report.

#### **4.0 Site Traffic Distribution**

The proposed generated trips for the build-out scenario was assigned to the surrounding roadway network. The directional distribution and assignment are based on existing travel patterns.

- 50% to/from the south on I-540
- 25% to/from the north on I-540
- 15% to/from the east on US 64 Business (Knightdale Boulevard)
- 10% to/from the west on US 64 Business (Knightdale Boulevard)

The site traffic distribution and percent assignment for the net new site trips are shown on **Figure 4**.



HINTON OAKS INDUSTRIAL  
KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS

SITE TRAFFIC DISTRIBUTION  
AND PERCENT ASSIGNMENT

FIGURE  
4

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## 5.0 Projected Traffic Volumes

### 5.1 Existing Traffic

AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) turning movement counts were performed or obtained from an NCDOT signal timing study at the following intersections:

- US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard January 30, 2020
- US 64 Business (Knightdale Boulevard)  
at I-540 Northbound Ramps January 30, 2020
- US 64 Business (Knightdale Boulevard)  
at I-540 Southbound Ramps January 30, 2020
- US 64 Business (Knightdale Boulevard) at Widewaters Parkway January 30, 2020
- Hinton Oaks Boulevard at Shoppes at Midway Plantation Drive January 30, 2020
- Hinton Oaks Boulevard at Shoppes at Midway Plantation  
Driveway/Midtown Commons Driveway January 30, 2020
- Hinton Oaks Boulevard at Midtown Commons Driveway/  
Hampton Inn Driveway January 30, 2020
- Hinton Oaks Boulevard at AG&M South Driveway January 30, 2020

The existing AM and PM peak hour traffic volumes are shown on **Figures 5 and 6**. The traffic count data are included in the Appendix.

### 5.2 Historic Growth Traffic

Historic growth traffic is the increase in traffic due to usage increases and non-specific growth throughout the area. To be conservative, an annual growth rate of 3% was applied to the existing volumes up to the proposed build-out year + 1 (2023) and a 1% annual growth rate was applied to the proposed build-out year +1 (2023) volumes up to the proposed build-out year +10 (2032). Background growth calculations are detailed on intersection spreadsheets in the Appendix of this report.

### 5.3 Approved Development Traffic

Approved development traffic is generated by approved but not yet constructed projects in the vicinity of the proposed project. There are two approved developments in the study area identified for inclusion as background traffic. Those are the Knightdale Industrial Center and the Parkstone development.

- Knightdale Industrial Center
  - Location: Hinton Oaks Boulevard north of US 64 Business
  - Proposed: 250,000 SF of industrial space with 100 employees

- Trips for the proposed development were obtained from the *Hinton Oaks Industrial – Trip Generation Letter* (Ramey Kemp, October 2019) and assigned to the network using the site trip distribution from the *Updated Traffic Impact Analysis for the Knightdale Industrial Center* (Ramey Kemp, September 2014).
- Parkstone
  - Location: Southeast quadrant of US 64 Business at Parkstone Towne Boulevard
  - Status: The Sheetz and apartments have been constructed, the trips corresponding to the remaining development were added to the traffic network as approved development trips
  - Proposed and remaining to be built: 130-room hotel, 12 screen multiplex movie theater, and 224,050 square feet of retail and restaurant space
  - Traffic for the remaining uses was generated and assigned to the network using the site traffic distribution from the *Parkstone Traffic Impact Analysis* (Kimley-Horn & Associates, August 2016)

While not yet approved, analyses were also performed with and without traffic from the proposed Legacy Oaks development.

- Legacy Oaks (NW Quadrant of US 64 Business at I-540)
  - Proposed: Approximately 217 single family dwelling units, 165 multifamily dwelling units, a 130-room hotel, and 16,000 square feet of retail space
  - Existing: 4,069 square foot Sam’s Xpress with 10 fuel pumps, 544 mid-rise apartments, and a 40,560 square foot urgent care (Kimley-Horn & Associates, 2020)

Background traffic volumes consisting of existing, historic growth, and approved development traffic for the analysis year 2023 are shown on **Figures 5 and 6** for the AM and PM peak hours, respectively. Background traffic volumes with the Legacy Oaks development included for the 2023 analysis year are shown on **Figures 7 and 8** for the AM and PM peak hours, respectively.

Background traffic volumes consisting of projected (2023) background volumes and historic growth for the analysis year 2032 are shown on **Figures 9 and 10** for the AM and PM peak hours, respectively. Background traffic volumes with the Legacy Oaks development included for the 2032 analysis year are shown on **Figures 11 and 12** for the AM and PM peak hours, respectively.

#### 5.4 Site Traffic

The proposed site traffic was generated and assigned to the adjacent roadway network according to the distribution discussed previously in Section 4.0. The site traffic volumes for the AM and PM peak hours are shown on **Figures 13 and 14** for the year 2023, respectively. The site traffic

volumes for the AM and PM peak hours with the Legacy Oaks development are shown on **Figures 15 and 16**, respectively.

The site traffic volumes for the AM and PM peak hours are shown on **Figures 17 and 18** for the year 2032, respectively. The site traffic volumes for the AM and PM peak hours with the Legacy Oaks development are shown on **Figures 19 and 20**, respectively.

### 5.5 *Build-Out Traffic*

To obtain the projected (2023) build-out +1 traffic volumes, the projected site traffic volumes were added to the projected (2023) background traffic. To obtain the projected (2032) build-out +10 traffic volumes, the projected site traffic volumes were added the projected (2032) background traffic. Traffic volume calculations are detailed in intersection spreadsheets in the Appendix of this report. **Figures 13 and 14** show the projected (2023) build-out +1 AM and PM peak hour traffic volumes, respectively. **Figures 15 and 16** show the projected (2023) build-out +1 AM and PM peak hour traffic volumes, respectively, with the Legacy Oaks development. **Figures 17 and 18** show the projected (2032) build-out +10 AM and PM peak hour traffic volumes, respectively. **Figures 19 and 20** show the projected (2032) build-out +10 AM and PM peak hour traffic volumes, respectively, with the Legacy Oaks development.



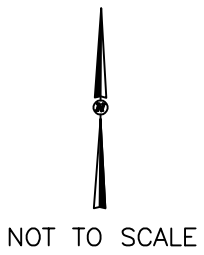
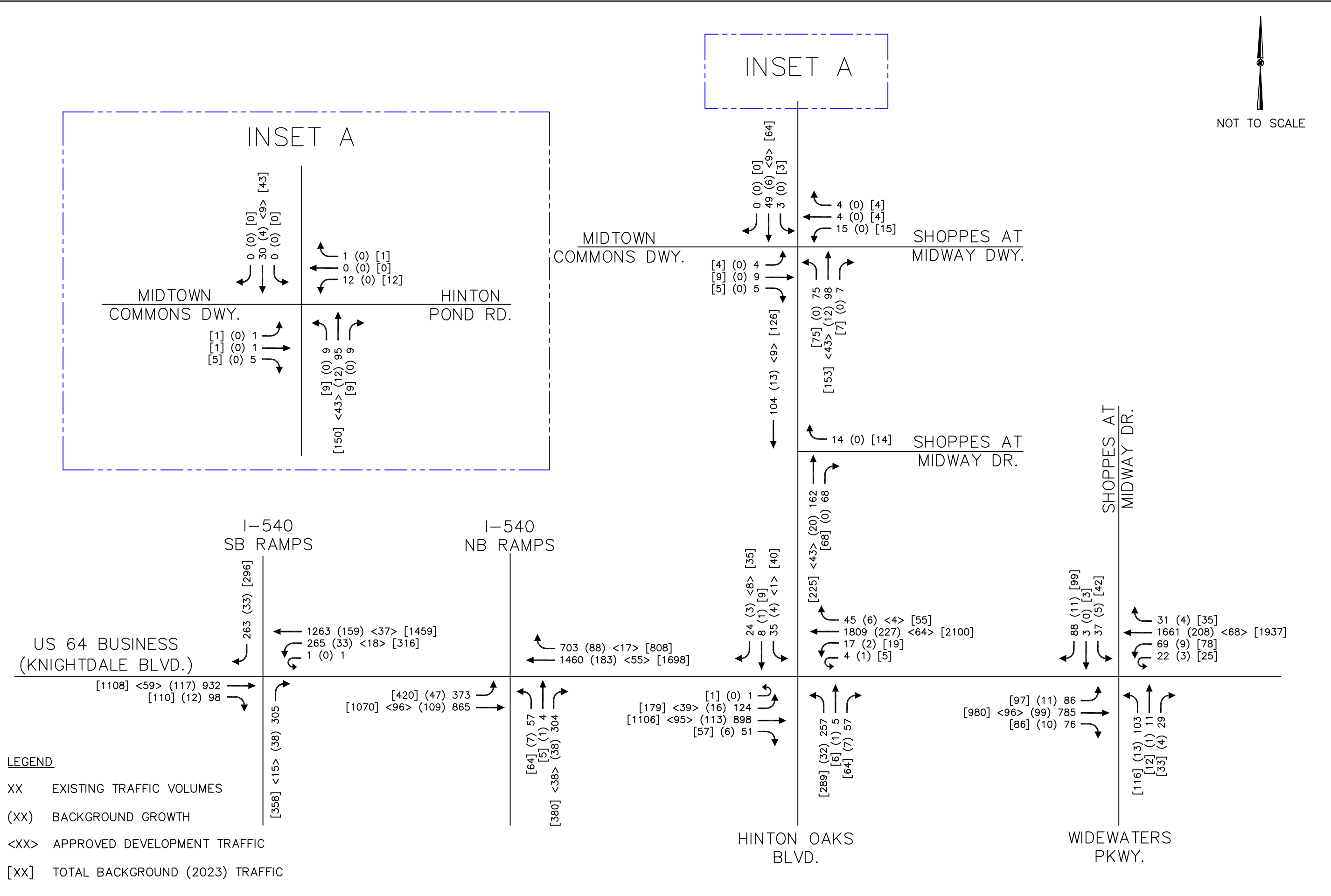


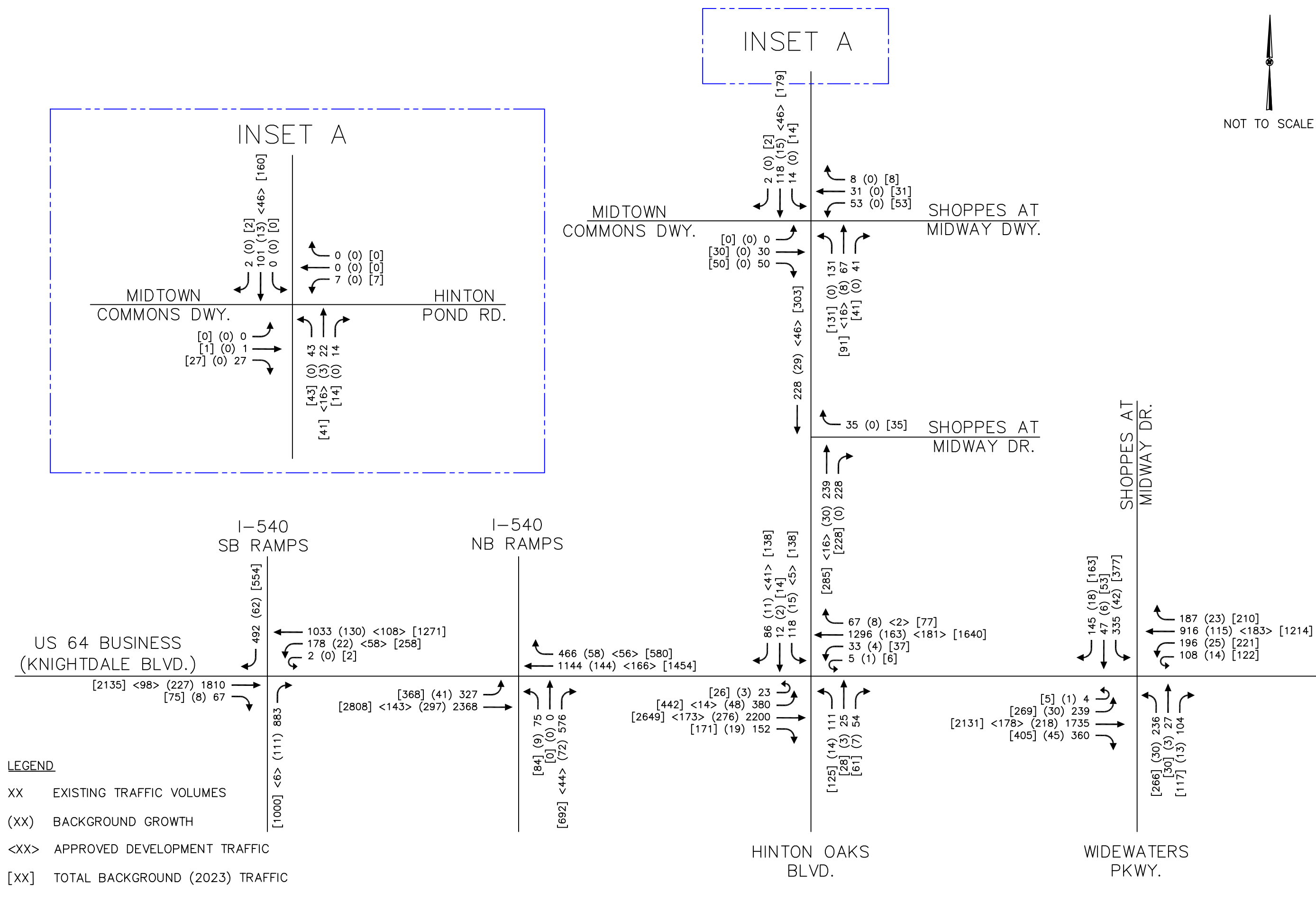
FIGURE 5

EXISTING (2020) AND BACKGROUND (2023) AM PEAK HOUR TRAFFIC VOLUMES

HINTON OAKS INDUSTRIAL KNIGHTDALE, NC TRAFFIC IMPACT ANALYSIS



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- LEGEND**
- XX EXISTING TRAFFIC VOLUMES
  - (XX) BACKGROUND GROWTH
  - <XX> APPROVED DEVELOPMENT TRAFFIC
  - [XX] TOTAL BACKGROUND (2023) TRAFFIC

FIGURE 6

EXISTING (2020) AND BACKGROUND (2023) PM PEAK HOUR TRAFFIC VOLUMES

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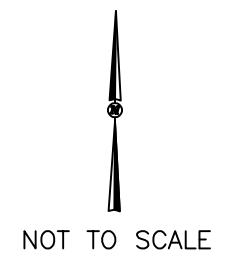
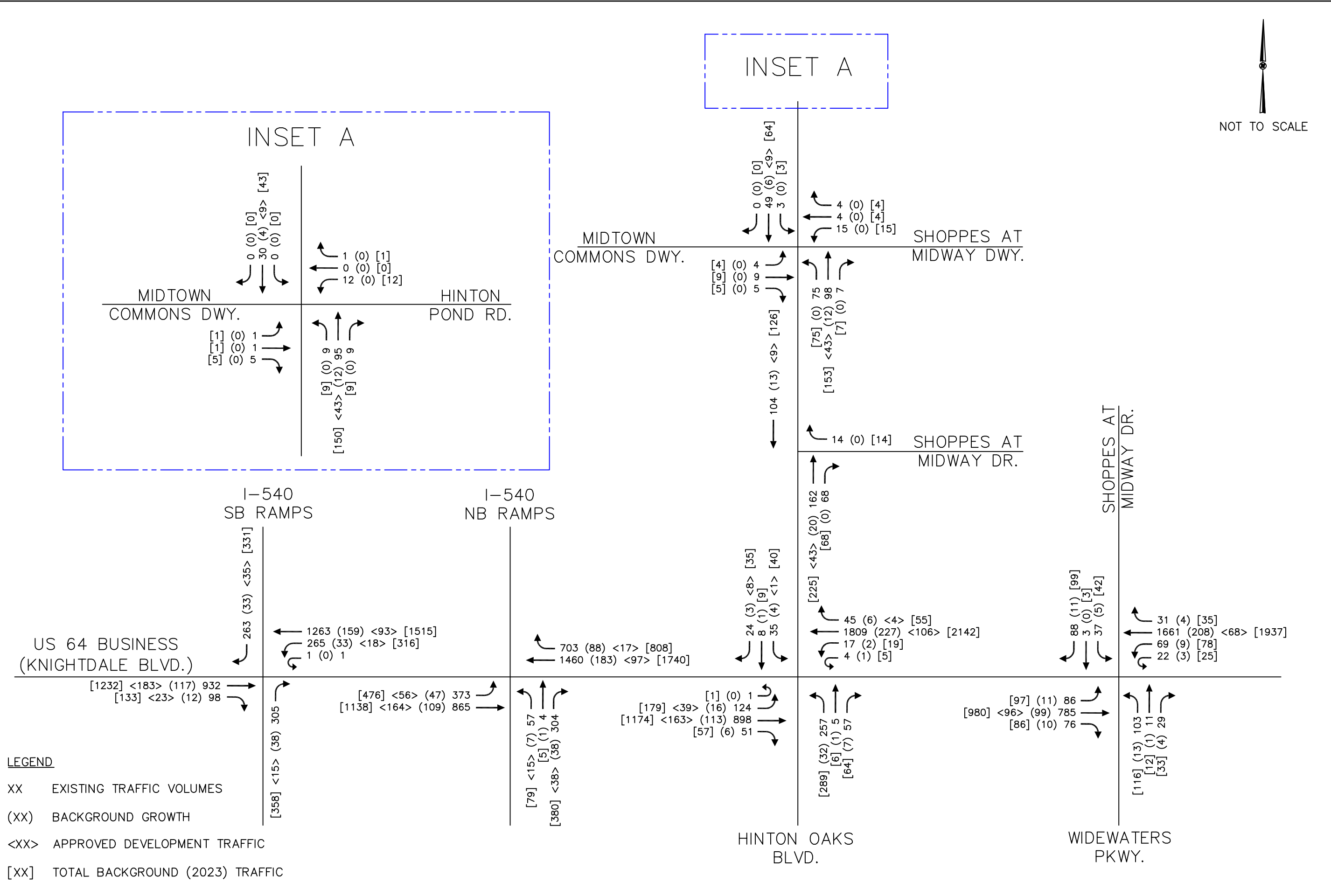


FIGURE 7

EXISTING (2020) AND BACKGROUND (2023) AM PEAK HOUR TRAFFIC VOLUMES WITH LEGACY OAKS

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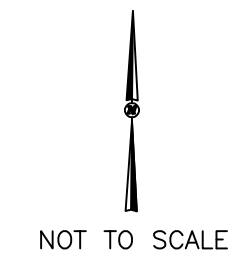
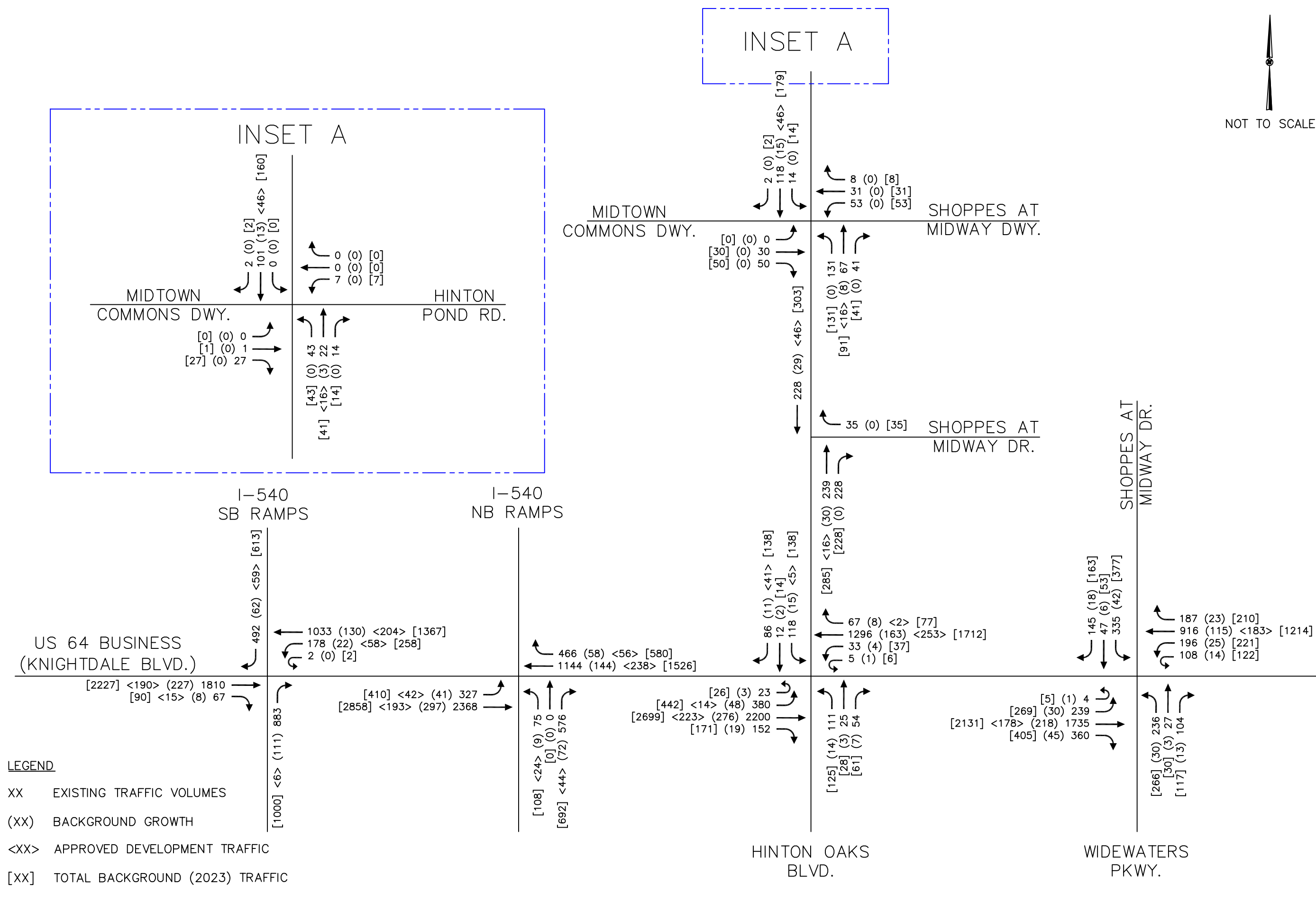


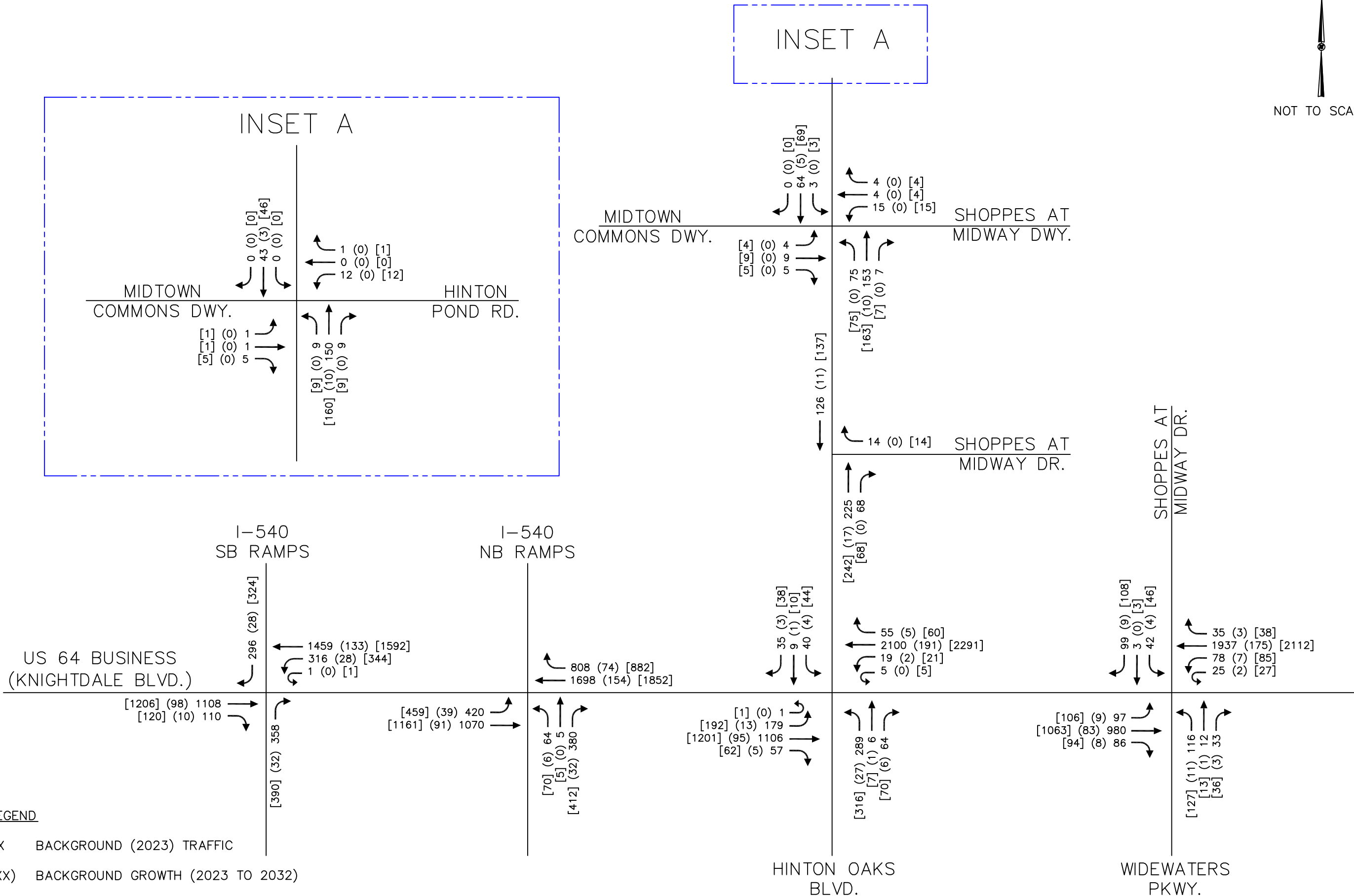
FIGURE 8

EXISTING (2020) AND BACKGROUND (2023) PM PEAK HOUR TRAFFIC VOLUMES WITH LEGACY OAKS

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**LEGEND**

XX BACKGROUND (2023) TRAFFIC

(XX) BACKGROUND GROWTH (2023 TO 2032)

[XX] TOTAL BACKGROUND (2032) TRAFFIC

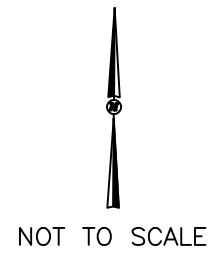


FIGURE 9

PROJECTED (2032) BACKGROUND AM PEAK HOUR TRAFFIC VOLUMES

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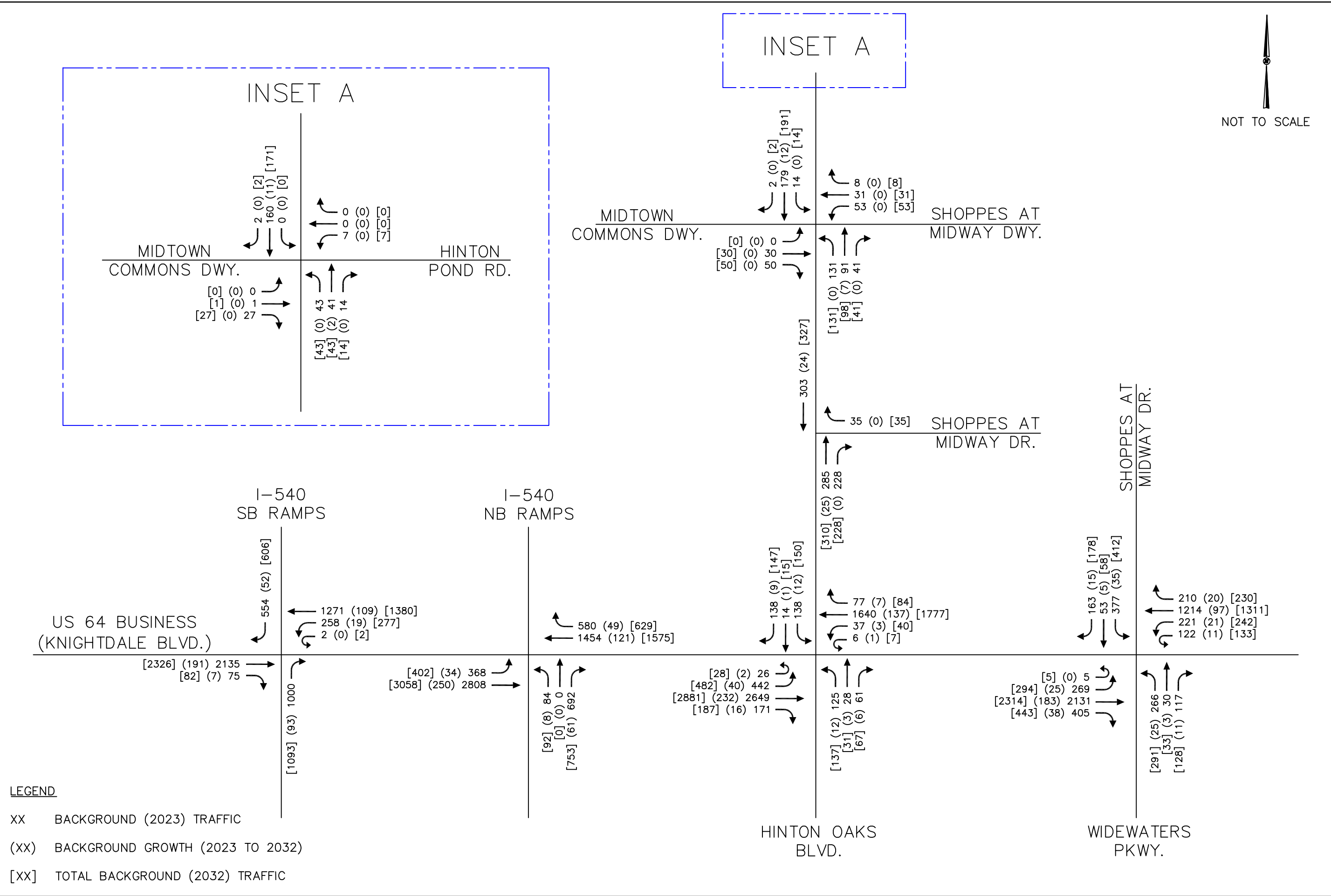


FIGURE 10

PROJECTED (2032) BACKGROUND PM PEAK HOUR TRAFFIC VOLUMES

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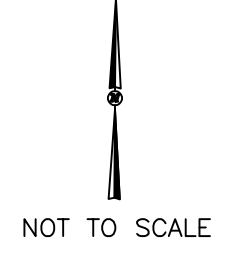
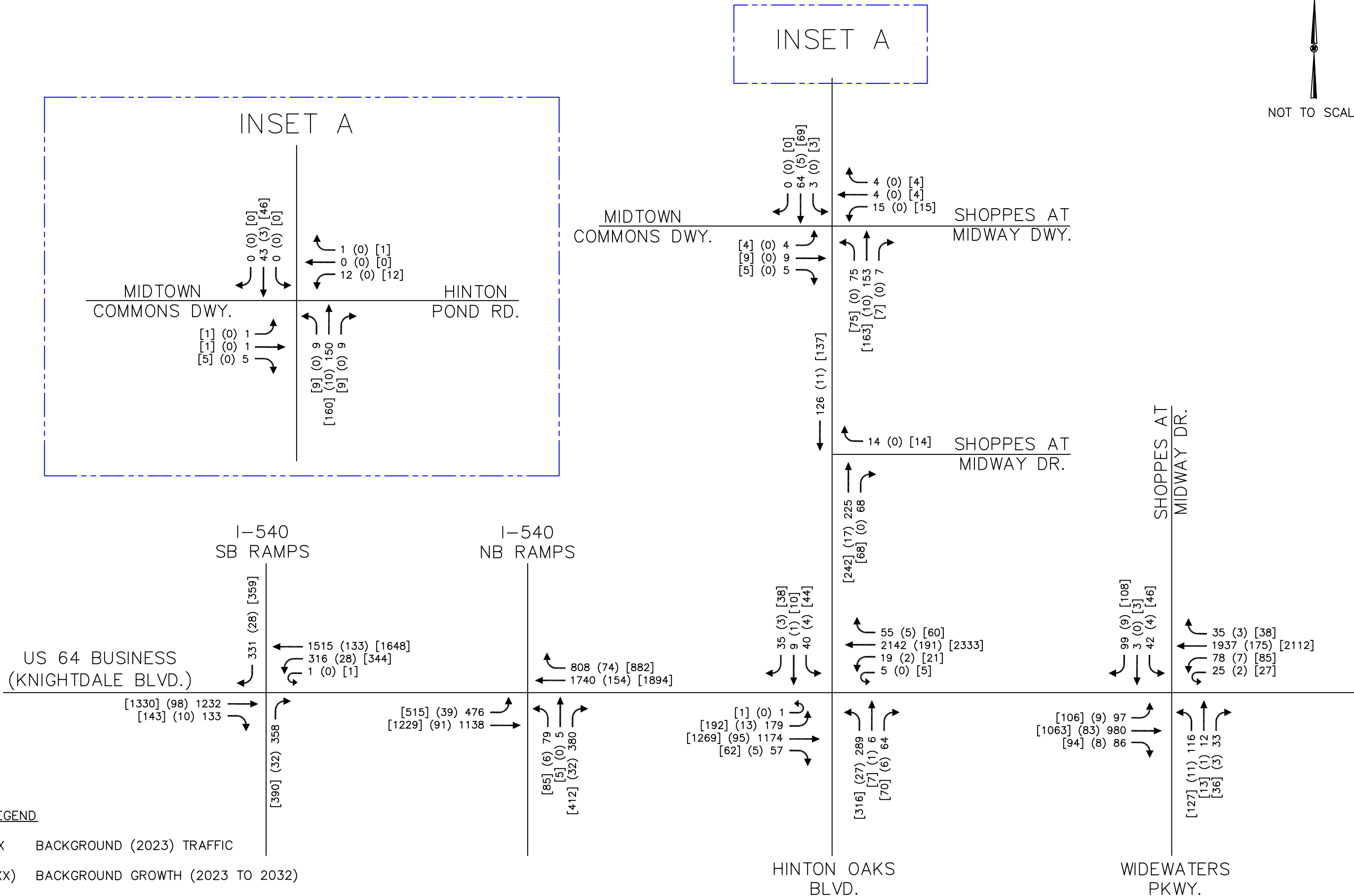


FIGURE 11

PROJECTED (2032) BACKGROUND AM PEAK HOUR TRAFFIC VOLUMES WITH LEGACY OAKS

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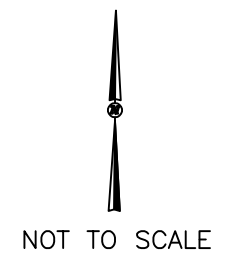
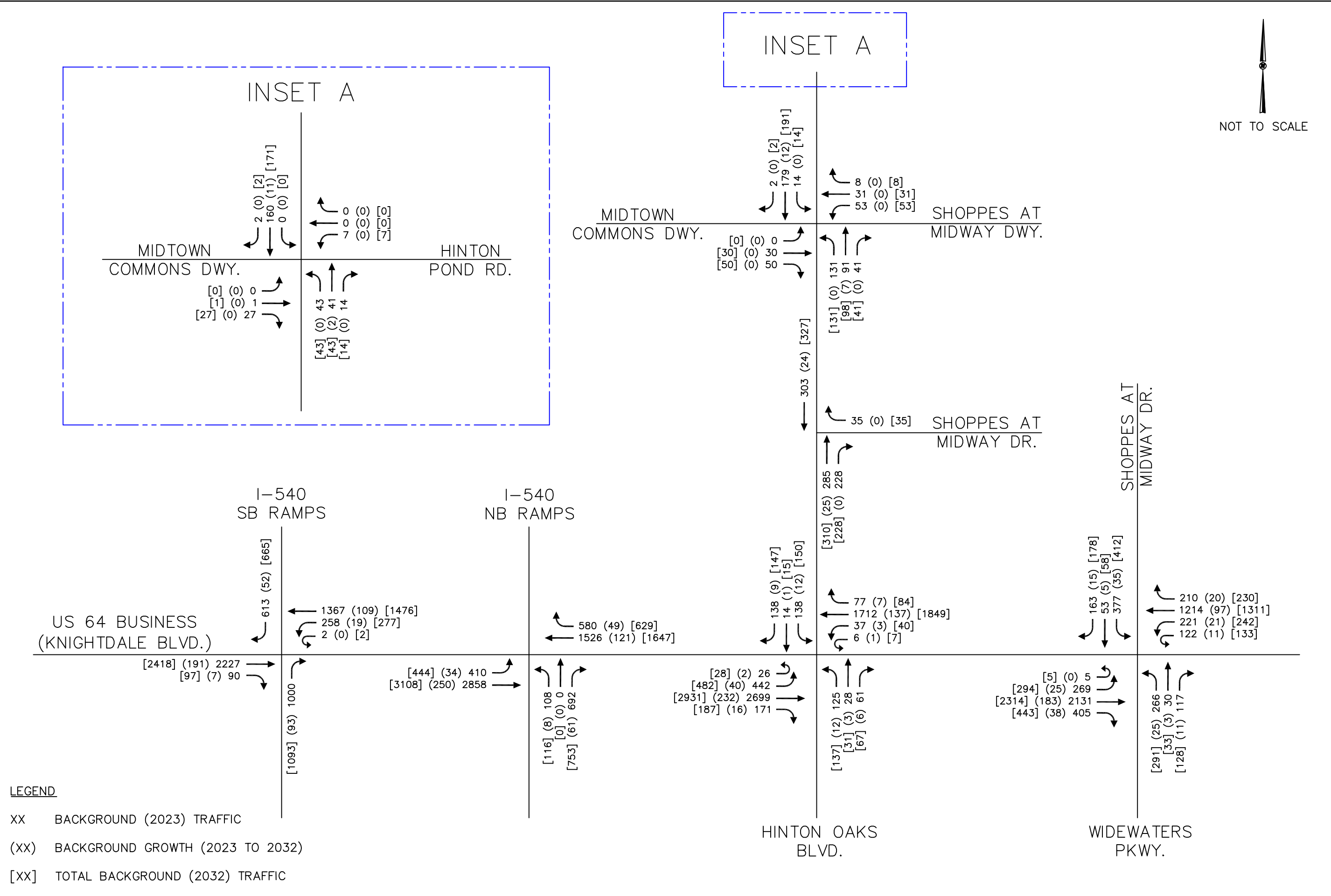


FIGURE 12

PROJECTED (2032) BACKGROUND PM PEAK HOUR TRAFFIC VOLUMES WITH LEGACY OAKS

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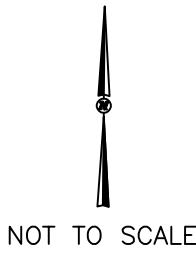
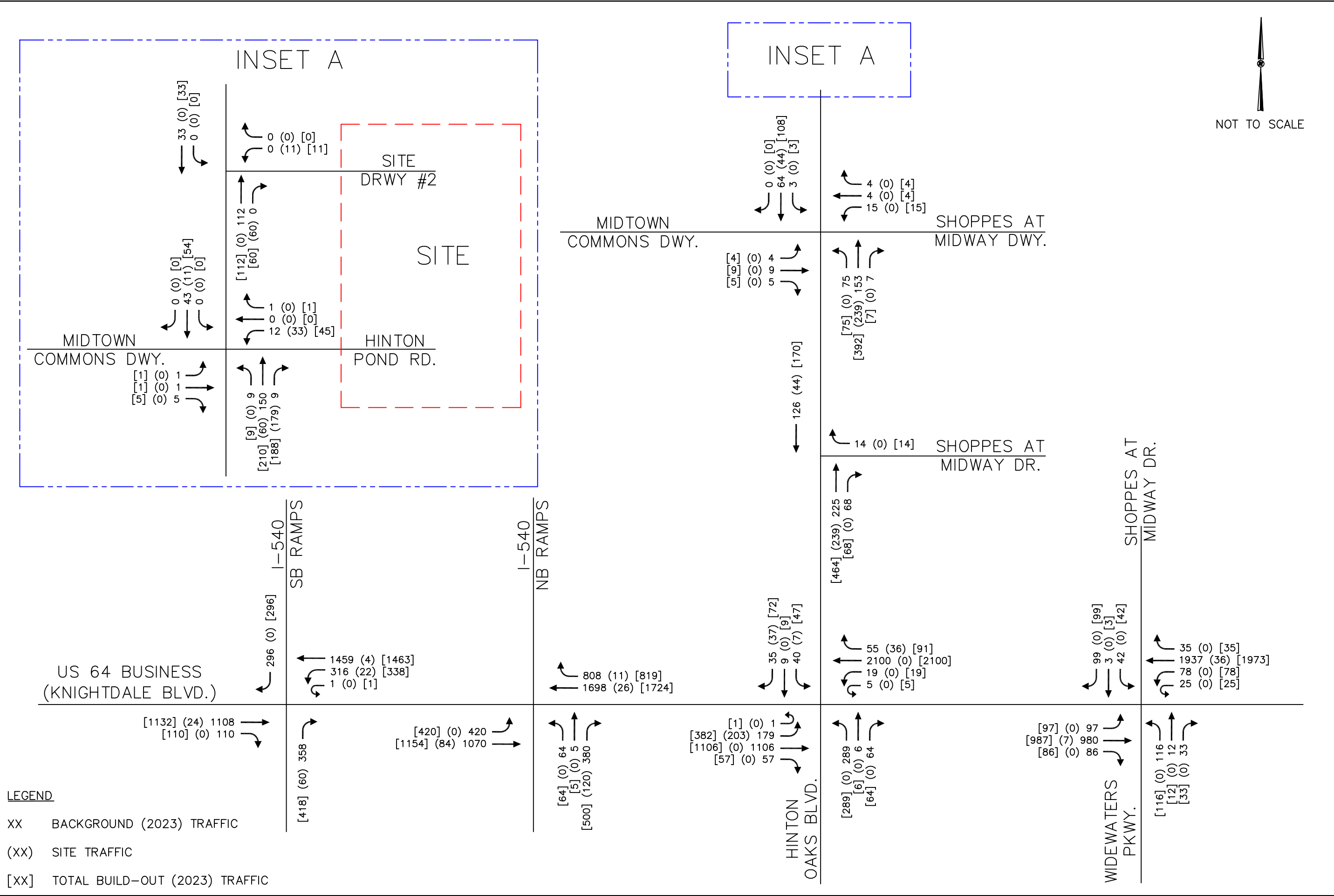


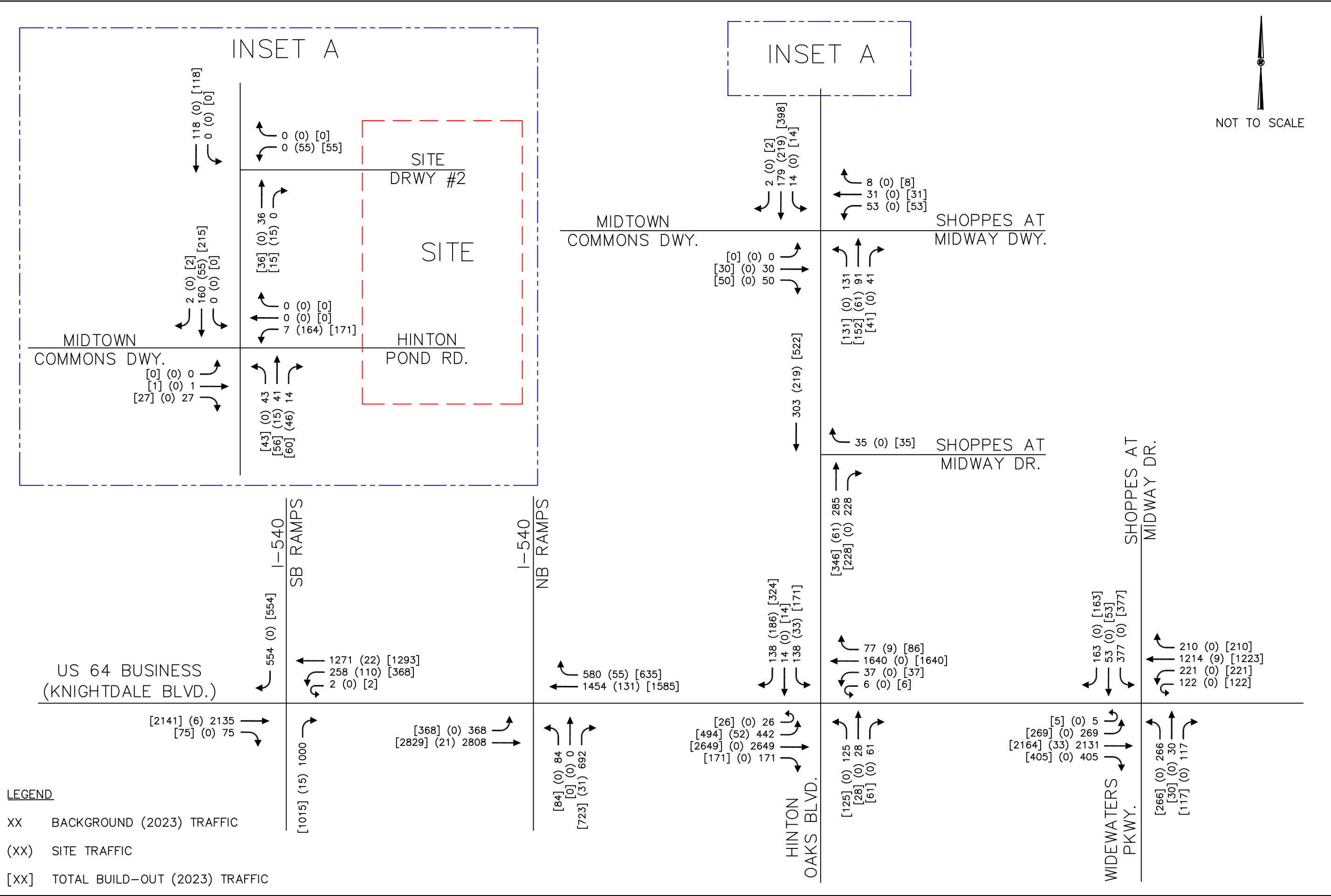
FIGURE 13

PROJECTED (2023) BUILD-OUT +1 AM PEAK HOUR TRAFFIC VOLUMES

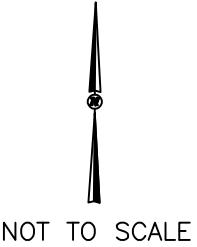
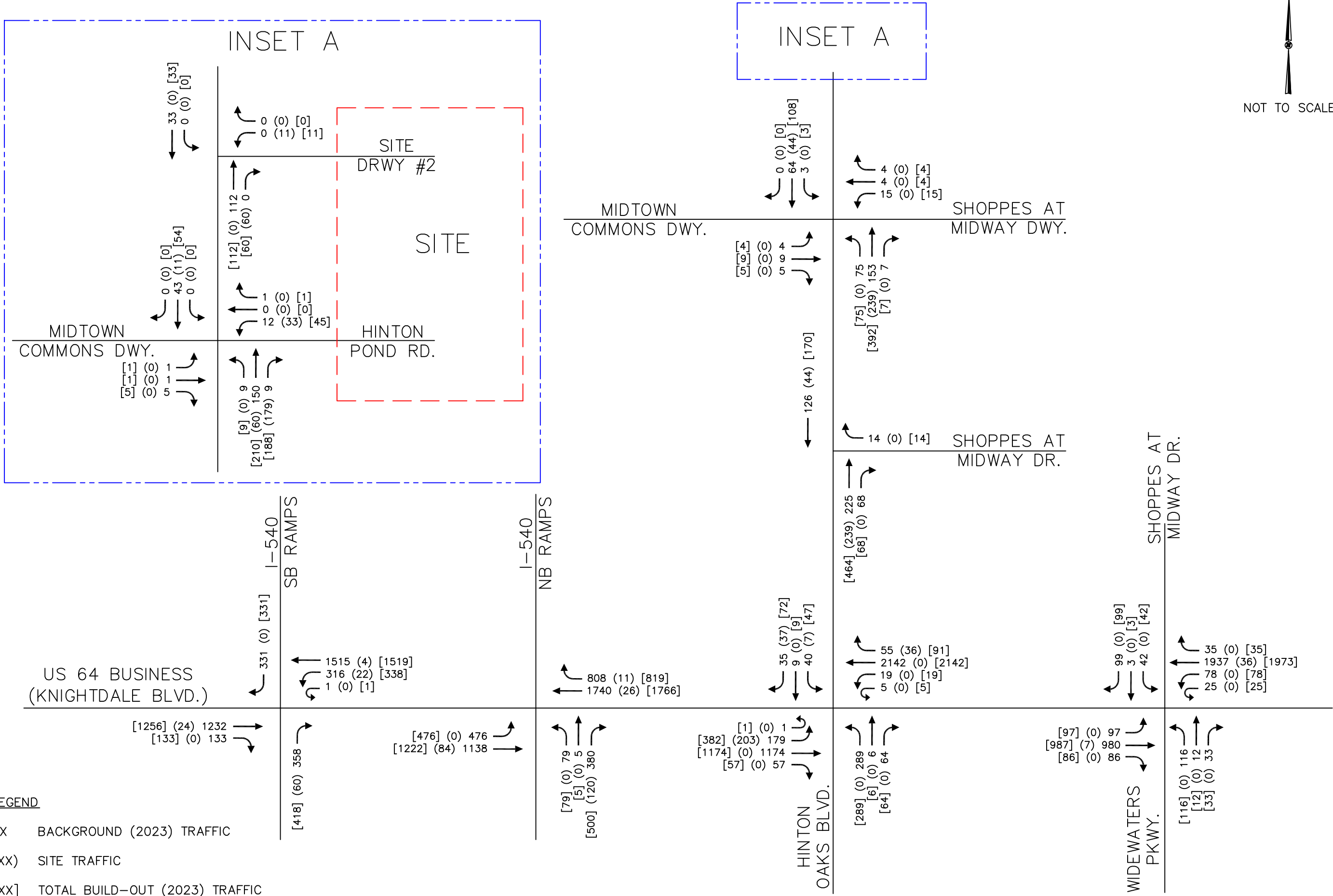
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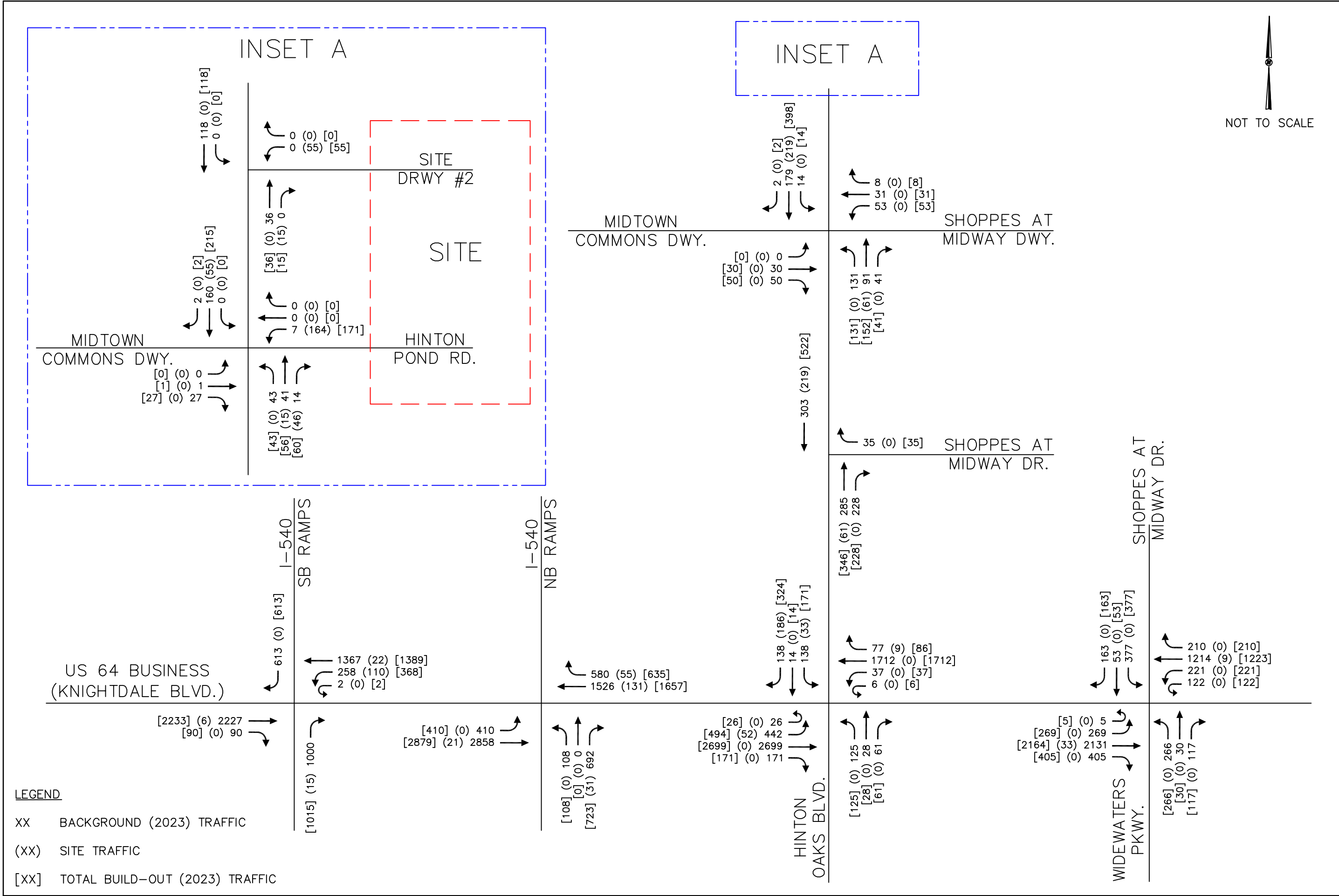
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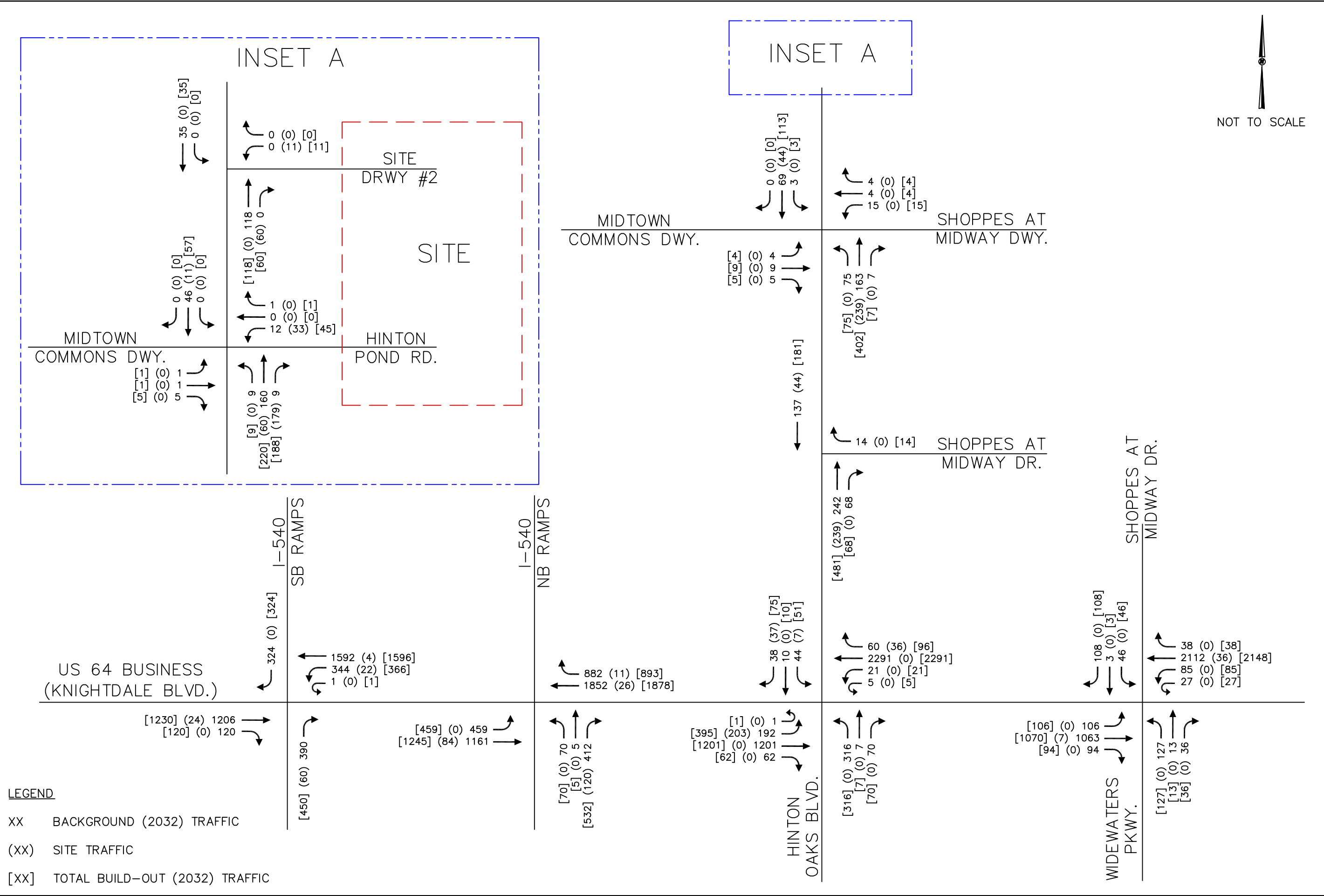


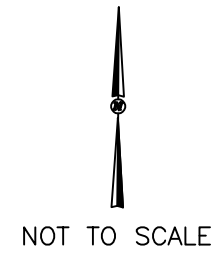
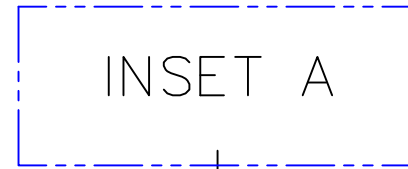
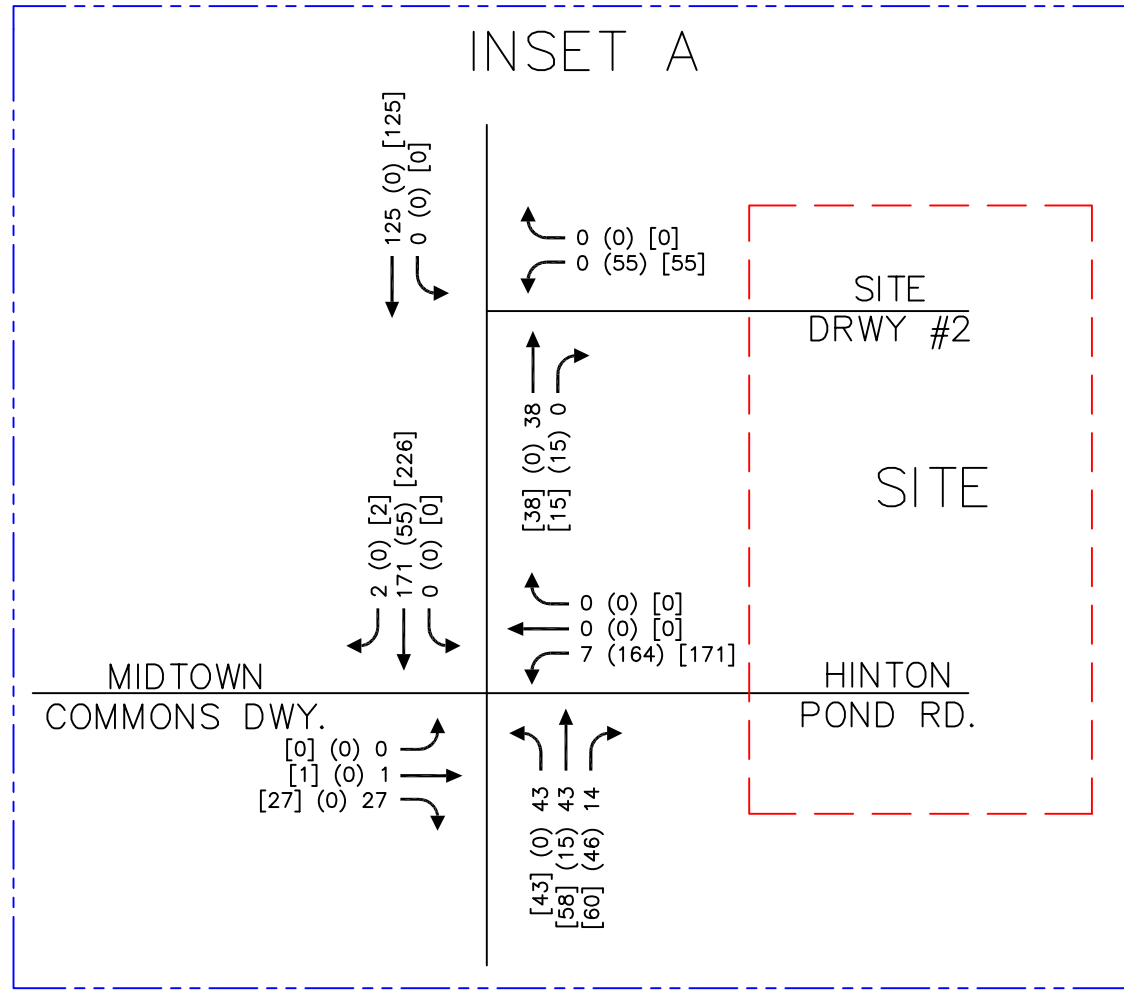
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- LEGEND**
- XX BACKGROUND (2032) TRAFFIC
  - (XX) SITE TRAFFIC
  - [XX] TOTAL BUILD-OUT (2032) TRAFFIC

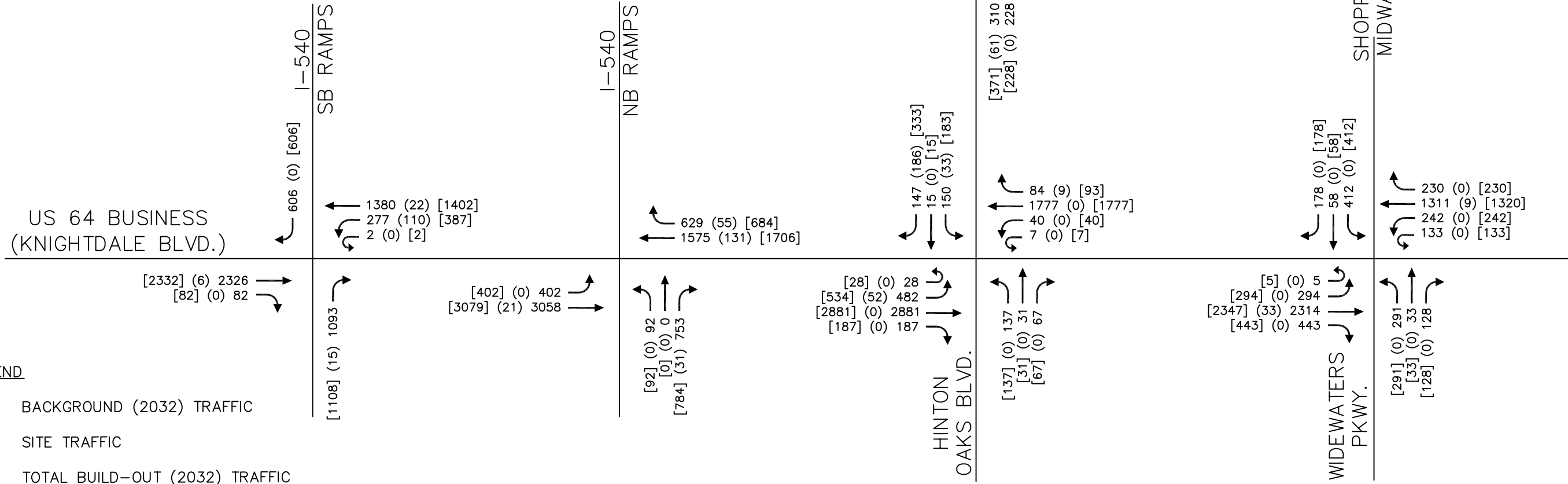


FIGURE 18

PROJECTED (2032) BUILD-OUT +10 PM PEAK HOUR TRAFFIC VOLUMES

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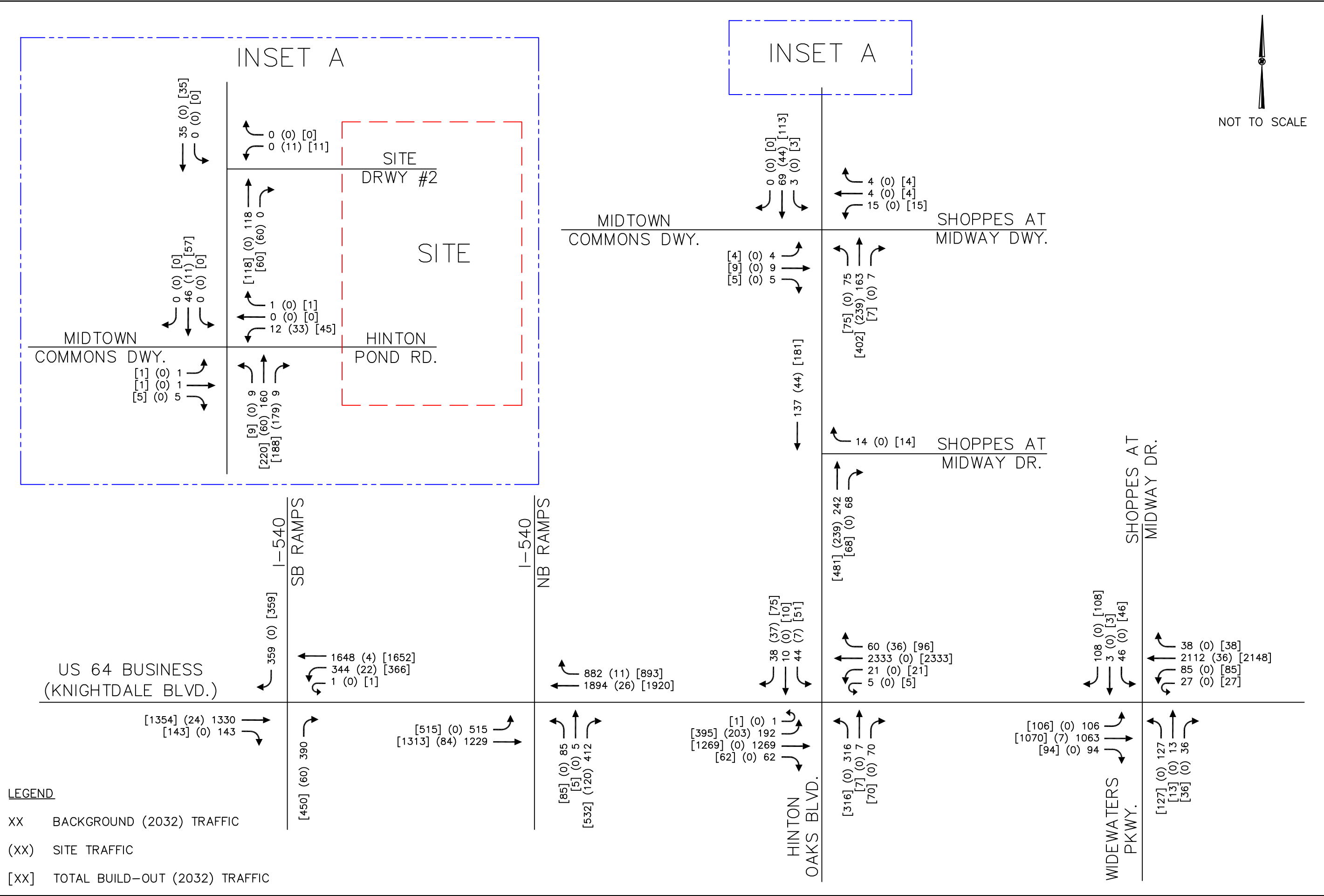


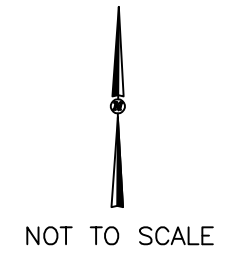
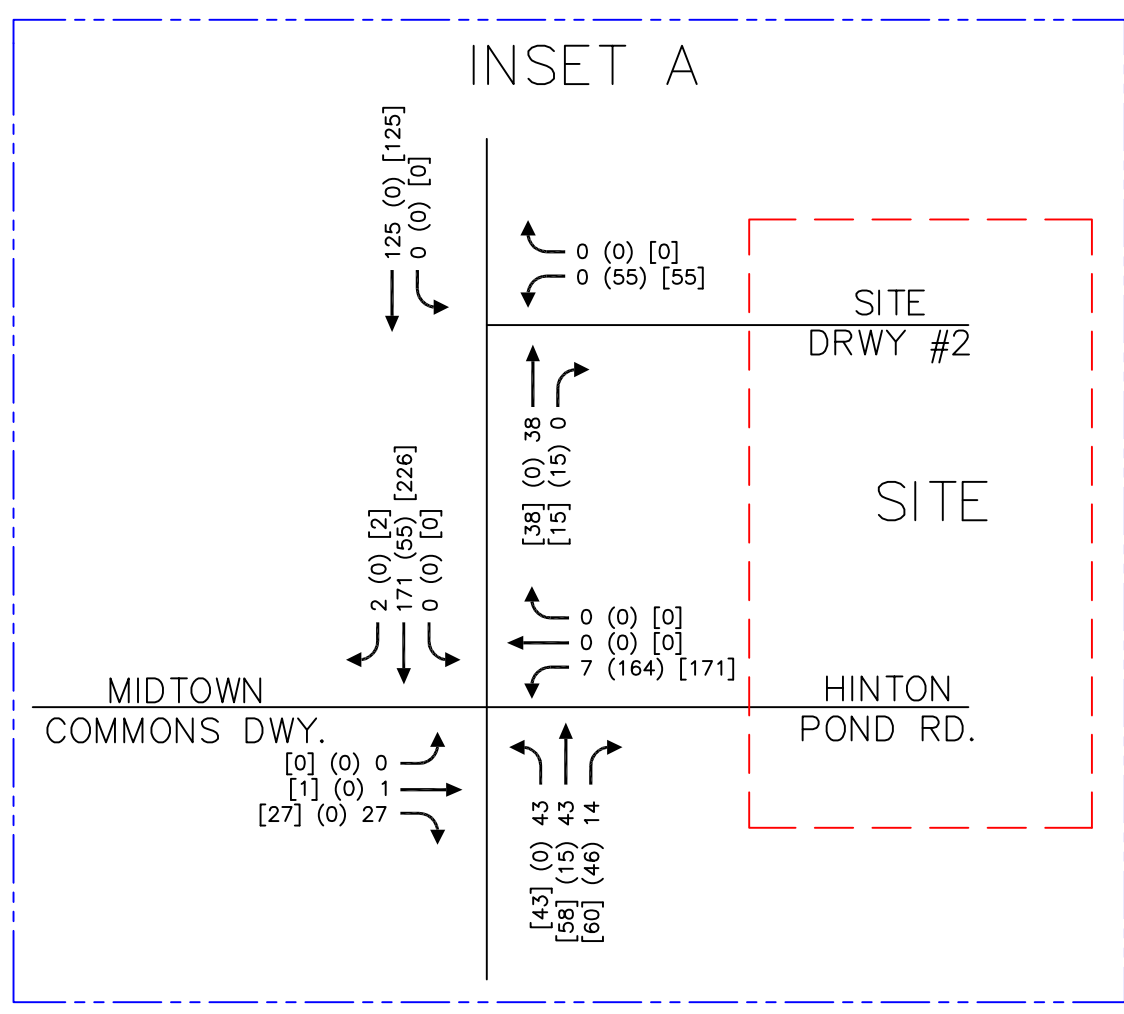
FIGURE 19

PROJECTED (2032) BUILD-OUT +10 AM PEAK HOUR TRAFFIC VOLUMES WITH LEGACY OAKS

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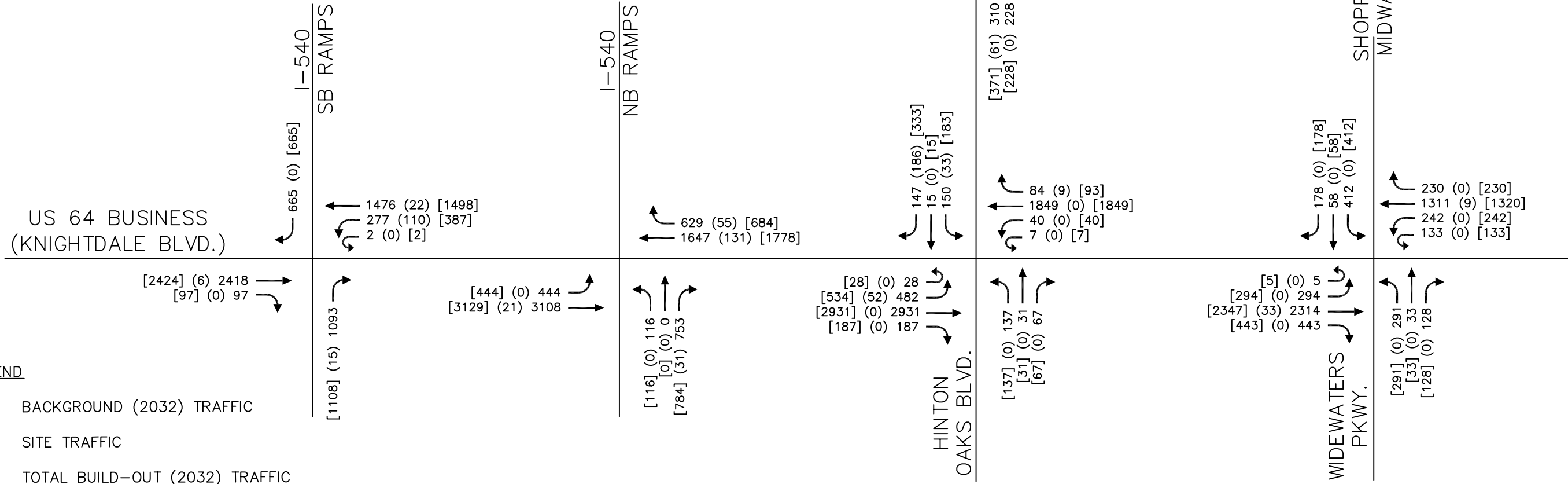


**LEGEND**

XX BACKGROUND (2032) TRAFFIC

(XX) SITE TRAFFIC

[XX] TOTAL BUILD-OUT (2032) TRAFFIC



HINTON OAKS INDUSTRIAL  
KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS

PROJECTED (2032) BUILD-OUT +10  
PM PEAK HOUR TRAFFIC VOLUMES  
WITH LEGACY OAKS

FIGURE  
20



## 6.0 Capacity Analysis

Capacity analyses (see Appendix) were performed for the AM and PM peak hours for the existing traffic condition (2020), the projected (2023) background and build-out +1 traffic conditions, and the projected (2032) background and build-out +10 traffic conditions using Synchro/SimTraffic Version 10.3 software to determine the operating characteristics of the adjacent road network and the impacts of the proposed project.

Capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a set time duration. Capacity is combined with Level-of-Service (LOS) to describe the operating characteristics of a road segment or intersection. LOS is a qualitative measure that describes operational conditions and motorist perceptions within a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A representing the shortest average delays and F representing the longest average delays. LOS D is the typically accepted standard for signalized intersections in urbanized areas. For signalized intersections, LOS is defined for the overall intersection operation.

For unsignalized intersections, only the movements that must yield right-of-way experience control delay. Therefore, LOS criteria for the overall intersection is not reported by Synchro/SimTraffic Version 10.3 or computable using methodology published in the *Highway Capacity Manual*. It is typical for stop sign controlled side streets and driveways intersecting major streets to 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 6.0 lists the LOS control delay thresholds published in the *Highway Capacity Manual* for signalized and unsignalized intersections.

Table 6.0 Level-of-Service Control Delay Thresholds			
Level-of-Service	Signalized Intersections – Control Delay Per Vehicle [sec/veh]	Unsignalized Intersections – Average Control Delay [sec/veh] & Qualitative Operational Description	
A	≤ 10	≤ 10	Short Delays
B	> 10 – 20	> 10 – 15	
C	> 20 – 35	> 15 – 25	
D	> 35 – 55	> 25 – 35	Moderate Delays
E	> 55 – 80	> 35 – 50	
F	> 80	> 50	Long Delays

Existing signal timings were obtained from NCDOT and were not modified unless noted. Existing peak hour factors (PHF's) were used for all conditions except at new intersections,

where a PHF of 0.90 was used. Right turns on red and permitted + protected left-turn signal phasing were permitted where allowed today.

Capacity analyses were performed for the existing (2020) traffic condition, projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions for the following intersections:

- US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard
- US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps
- US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps
- US 64 Business (Knightdale Boulevard) at Widewaters Parkway
- Hinton Oaks Boulevard at Shoppes at Midway Drive
- Hinton Oaks Boulevard at Shoppes at Midway Driveway/Midtown Commons Driveway
- Hinton Oaks Boulevard at Hinton Pond Road/Site Driveway #1
- Hinton Oaks Boulevard at Site Driveway #2

6.1 US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard

Analyses indicate that the intersection of US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard currently operates at LOS B in both the AM and PM peak hours.

In the projected (2023) background traffic condition, the intersection is expected to continue to operate at LOS B in both the AM and PM peak hours. When the Legacy Oaks development is included, the intersection is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour for the projected (2023) background condition.

In the projected (2032) background traffic condition, the intersection is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour with or without the Legacy Oaks development in place.

The following roadway improvement is recommended at this intersection:

- Extend the dual eastbound left-turn lanes to provide 400 feet of storage each

Signal timings were modified slightly for the analysis at project build-out with the recommended improvement in place. Upon project build-out the intersection is expected to operate at LOS C in both the AM and PM peak hours with or without the Legacy Oaks development in place.

Table 6.1 summarizes the operation of the intersection of US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.1 Level-of-Service US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard (Signalized)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Existing (2020) Traffic	B (13.1)	B (17.3)	-	-
+1 (2023) Traffic	B (15.4)	B (19.7)	C (24.8)*	C (21.0)*
+10 (2032) Traffic	B (17.4)	C (24.1)	C (28.9)*	C (25.2)*
+1 (2023) Traffic – with Legacy Oaks	B (15.8)	C (20.2)	C (25.3)*	C (21.7)*
+10 (2032) Traffic – with Legacy Oaks	B (18.1)	C (25.3)	C (30.7)*	C (26.9)*

\*With improvement

6.2 US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps

Analyses indicate that the intersection of US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps is currently operating at LOS B in both the AM and PM peak hours.

In the projected (2023) background traffic condition, the intersection is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour with or without the Legacy Oaks development in place. In the projected (2032) background traffic condition, the intersection is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour without Legacy Oaks. With the Legacy Oaks development in place, the intersection is expected to operate at LOS C in both the AM and PM peak hours for the projected (2023) background condition.

For the projected (2023) build-out +1 traffic condition, the intersection is expected to operate at LOS B in the AM peak hour and LOS C in the PM peak hour without Legacy Oaks. With the Legacy Oaks development in place, the intersection is expected to operate at LOS C in both the AM and PM peak hours. In the projected (2032) build-out +10 traffic condition, the intersection is expected to operate at LOS C in both the AM and PM peak hours with or without the Legacy Oaks development in place. Therefore, no roadway improvements are recommended at this intersection.

Table 6.2 summarizes the operation of the intersection of US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.2 Level-of-Service US 64 Business (Knightdale Boulevard) at I-540 Northbound Ramps (Signalized)</b>				
	Background		Build-Out	
Condition	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Existing (2020) Traffic	B (11.6)	B (18.5)	-	-
+1 (2023) Traffic	B (15.6)	C (21.3)	B (19.7)	C (22.0)
+10 (2032) Traffic	B (18.9)	C (25.4)	C (23.2)	C (26.9)
+1 (2023) Traffic – with Legacy Oaks	B (18.0)	C (21.5)	C (21.7)	C (22.3)
+10 (2032) Traffic – with Legacy Oaks	C (22.0)	C (26.0)	C (26.1)	C (27.6)

**6.3 US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps**

Analyses indicate that the intersection of US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps is currently operating at LOS A in both the AM and PM peak hours.

In the projected (2023) background traffic condition, the intersection is expected to continue to operate at LOS A in both the AM and PM peak hours without Legacy Oaks. With the Legacy Oaks development in place, the intersection is expected to operate at LOS A in the AM peak hour and LOS B in the PM peak hour. In the projected (2032) background traffic condition, the intersection is expected to operate at LOS A in the AM peak hour and LOS B in the PM peak hour with or without the Legacy Oaks development in place.

For the projected (2023) build-out +1 and (2032) build-out +10 traffic conditions the intersection is expected to operate at LOS A in the AM peak hour and LOS B in the PM peak hour with or without the Legacy Oaks development in place. Therefore, no roadway improvements are recommended at this intersection.

Table 6.3 summarizes the operation of the intersection of US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.3 Level-of-Service US 64 Business (Knightdale Boulevard) at I-540 Southbound Ramps (Signalized)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Existing (2020) Traffic	A (2.9)	A (5.4)	-	-
+1 (2023) Traffic	A (5.0)	A (9.8)	A (6.5)	B (12.7)
+10 (2032) Traffic	A (6.3)	B (11.1)	A (7.8)	B (13.6)
+1 (2023) Traffic – with Legacy Oaks	A (5.7)	B (10.3)	A (7.1)	B (12.7)
+10 (2032) Traffic – with Legacy Oaks	A (7.1)	B (11.4)	A (8.4)	B (13.6)

6.4 US 64 Business (Knightdale Boulevard) at Widewaters Parkway

Analyses indicate that the intersection of US 64 Business (Knightdale Boulevard) at Widewaters Parkway currently operates at LOS B in the AM peak hour and LOS C in the PM peak hour.

The intersection is expected to operate at LOS C in the AM peak hour and LOS D in the PM peak hour with or without the Legacy Oaks development in place for both the projected (2023) and (2032) background traffic conditions.

Analysis indicates that the intersection will operate at LOS C in the AM peak hour and LOS D in the PM peak hour with or without Legacy Oaks for both the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions. No roadway improvements are recommended at this intersection.

SimTraffic simulations show the potential for long queues on US 64 Business (Knightdale Boulevard) with or without the development in place. However, the improvement to mitigate these queues is the widening of Knightdale Boulevard to provide an additional through lane, which is beyond the scope of this development.

Table 6.4 summarizes the operation of the intersection of US 64 Business (Knightdale Boulevard) at Widewaters Parkway for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.4 Level-of-Service US 64 Business (Knightdale Boulevard) at Widewaters Parkway (Signalized)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Existing (2020) Traffic	B (19.7)	C (29.0)	-	-
+1 (2023) Traffic	C (21.8)	D (35.1)	C (21.4)	D (35.6)
+10 (2032) Traffic	C (23.8)	D (41.5)	C (23.1)	D (43.2)
+1 (2023) Traffic – with Legacy Oaks	C (22.0)	D (35.2)	C (21.3)	D (35.7)
+10 (2032) Traffic – with Legacy Oaks	C (24.0)	D (41.4)	C (23.2)	D (43.0)

6.5 Hinton Oaks Boulevard at Shoppes at Midway Drive

Analyses indicate that the intersection of Hinton Oaks Boulevard at Shoppes at Midway Drive currently operates with short delays in both the AM and PM peak hour for the minor street approach (Shoppes at Midway Drive).

The intersection is projected to continue to operate with short delays for the minor street approach (Shoppes at Midway Drive) in both the AM and PM peak hours in the projected (2023) background and build-out +1 traffic conditions as well as the projected (2032) background and build-out +10 traffic conditions. When the Legacy Oaks development is included, the delays are projected to remain short for the minor street approach for all scenarios.

The following improvements are recommended to be performed to accommodate existing and projected Hinton Oaks Industrial site traffic:

- Convert the existing northbound right-turn lane to an additional northbound through lane
- Construct an exclusive northbound right-turn lane with 75 feet of storage

Table 6.5 summarizes the operation of the intersection of Hinton Oaks Boulevard at Shoppes at Midway Drive for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.5 Level-of-Service Hinton Oaks Boulevard at Shoppes at Midway Drive (Unsignalized)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Existing (2020) Traffic	WB – A (9.3)	WB – A (9.9)	-	-
+1 (2023) Traffic	WB – A (9.7)	WB – B (10.2)	WB – B (10.0)*	WB – A (9.6)*
+10 (2032) Traffic	WB – A (9.8)	WB – B (10.4)	WB – B (10.1)*	WB – A (9.7)*
+1 (2023) Traffic – with Legacy Oaks	WB – A (9.7)	WB – B (10.2)	WB – B (10.0)*	WB – A (9.6)*
+10 (2032) Traffic – with Legacy Oaks	WB – A (9.8)	WB – B (10.4)	WB – B (10.1)*	WB – A (9.7)*

\*With improvement

## 6.6 *Hinton Oaks Boulevard at Shoppes at Midway Plantation Driveway/Midtown Commons Driveway*

Analyses indicate that the intersection of Hinton Oaks Boulevard at Shoppes at Midway Plantation Driveway/Midtown Commons Driveway currently operates with short delays in both the AM and PM peak hours for the minor street approaches (Shoppes at Midway Plantation Driveway and Midtown Commons Driveway).

The intersection is projected to continue to operate with short delays in the AM and PM peak hours in the projected (2023) background and projected (2032) background traffic conditions for the minor street approaches with or without the Legacy Oaks development in place.

The delays in the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions will be short in the AM peak hour for the minor street approaches with or without the Legacy Oaks development. In the PM peak hour, however, the eastbound minor street approach (Midtown Commons Driveway) will operate with short delays whereas the westbound minor street approach (Shoppes at Midway Plantation Driveway) will operate with moderate delays with or without the Legacy Oaks development in place.

The following improvements are recommended to be performed to accommodate existing and projected Hinton Oaks Industrial site traffic:

- Provide two northbound through lanes on Hinton Oaks Boulevard from US 64 Business (Knightdale Boulevard) to the Midway Commons/Shoppes at Midway Plantation Driveway with the inside lane dropping as a left-turn lane at the Midway Commons Driveway [NOTE: Advance warning signage may be required to alert drivers to this change in traffic patterns.]

Table 6.6 summarizes the operation of the intersection of Hinton Oaks Boulevard at Shoppes at Midway Plantation Driveway/Midtown Commons Driveway for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.



<b>Table 6.6</b> <b>Level-of-Service</b> <b>Hinton Oaks Boulevard at Shoppes at Midway Plantation Driveway/Midtown Commons</b> <b>Driveway (Unsignalized)</b>				
	Background		Build-Out	
Condition	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Existing (2020) Traffic	EB – B (11.1) WB – B (11.5) NBL – A (7.5) SBL – A (7.6)	EB – B (11.8) WB – C (17.3) NBL – A (7.8) SBL – A (7.5)	-	-
+1 (2023) Traffic	EB – B (11.7) WB – B (12.3) NBL – A (7.5) SBL – A (7.8)	EB – B (13.1) WB – C (19.9) NBL – A (7.9) SBL – A (7.5)	EB – C (15.3) WB – C (17.3) NBL – A (7.7) SBL – A (8.6)	EB – C (18.1) WB – E (37.4) NBL – A (8.7) SBL – A (7.7)
+10 (2032) Traffic	EB – B (11.8) WB – B (12.5) NBL – A (7.6) SBL – A (7.8)	EB – B (13.3) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)	EB – C (15.5) WB – C (17.6) NBL – A (7.7) SBL – A (8.6)	EB – C (18.6) WB – E (39.4) NBL – A (8.7) SBL – A (7.7)
+1 (2023) Traffic – with Legacy Oaks	EB – B (11.7) WB – B (12.3) NBL – A (7.5) SBL – A (7.8)	EB – B (13.1) WB – C (19.9) NBL – A (7.9) SBL – A (7.5)	EB – C (15.3) WB – C (17.3) NBL – A (7.7) SBL – A (8.6)	EB – C (18.1) WB – E (37.4) NBL – A (8.7) SBL – A (7.7)
+10 (2032) Traffic – with Legacy Oaks	EB – B (11.8) WB – B (12.5) NBL – A (7.6) SBL – A (7.8)	EB – B (13.3) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)	EB – C (15.5) WB – C (17.6) NBL – A (7.7) SBL – A (8.6)	EB – C (18.6) WB – E (39.4) NBL – A (8.7) SBL – A (7.7)

6.7 Hinton Oaks Boulevard at Hinton Pond Road/Site Driveway #1

Analyses indicate that the intersection of Hinton Oaks Boulevard at Hinton Pond Road currently operates with short delays in both the AM and PM peak hours for the minor street approaches (Hinton Pond Road).

The site is proposed to be accessed via a connection to Hinton Pond Road. The intersection is projected to continue to operate with short delays on the minor street approaches in the AM and PM peak hours in the projected (2023) background and build-out +1 traffic conditions as well as the projected (2032) background and build-out +10 traffic conditions with or without the Legacy Oaks development in place.

Table 6.7 summarizes the operation of the intersection of Hinton Oaks Boulevard at Site Driveway #1 for the existing (2020), projected (2023) background and build-out +1 traffic conditions, and projected (2032) background and build-out +10 traffic conditions.

<b>Table 6.7 Level-of-Service Hinton Oaks Boulevard at Hinton Pond Road/Site Driveway #1 (Unsignalized)</b>				
	<b>Background</b>		<b>Build-Out</b>	
<b>Condition</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
Existing (2020) Traffic	EB – A (9.6) WB – B (10.0) NBL – A (7.4) SBL – A (7.8)	EB – A (9.6) WB – B (10.4) NBL – A (7.7) SBL – A (7.3)	-	-
+1 (2023) Traffic	EB – B (10.1) WB – B (10.8) NBL – A (7.4) SBL – A (8.0)	EB – B (10.1) WB – B (11.1) NBL – A (7.9) SBL – A (7.4)	EB – B (12.0) WB – B (14.4) NBL – A (7.4) SBL – A (9.0)	EB – B (10.8) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)
+10 (2032) Traffic	EB – B (10.2) WB – B (10.9) NBL – A (7.4) SBL – A (8.0)	EB – B (10.2) WB – B (11.3) NBL – A (7.9) SBL – A (7.4)	EB – B (11.3) WB – B (12.9) NBL – A (7.4) SBL – A (8.7)	EB – B (10.9) WB – C (21.5) NBL – A (8.1) SBL – A (7.5)
+1 (2023) Traffic – with Legacy Oaks	EB – B (10.1) WB – B (10.8) NBL – A (7.4) SBL – A (8.0)	EB – B (10.1) WB – B (11.1) NBL – A (7.9) SBL – A (7.4)	EB – B (12.0) WB – B (14.4) NBL – A (7.4) SBL – A (9.0)	EB – B (10.8) WB – C (20.6) NBL – A (8.0) SBL – A (7.5)
+10 (2032) Traffic – with Legacy Oaks	EB – B (10.2) WB – B (10.9) NBL – A (7.4) SBL – A (8.0)	EB – B (10.2) WB – B (11.3) NBL – A (7.9) SBL – A (7.4)	EB – B (11.3) WB – B (12.9) NBL – A (7.4) SBL – A (8.7)	EB – B (10.9) WB – C (21.5) NBL – A (8.1) SBL – A (7.5)

6.8 Hinton Oaks Boulevard at Site Driveway #2

A full-movement site driveway is proposed on Hinton Oaks Boulevard approximately 1,600 feet north of Hinton Pond Road.

Analyses indicate that in the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions the intersection of Hinton Oaks Boulevard at the Site Driveway #2 is expected to operate with short delays for the minor street approach (Site Driveway #2) in the AM and PM peak hours.

Table 6.8 summarizes the operation of the intersection of Hinton Oaks Boulevard at Site Driveway #2 for the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions

<b>Table 6.8 Level-of-Service Hinton Oaks Boulevard at Site Driveway #2 (Unsignalized)</b>				
	Background		Build-Out	
Condition	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
+1 (2023) Traffic	-	-	WB – A (9.6) SBL – A (7.9)	WB – A (9.9) SBL – A (7.4)
+10 (2032) Traffic	-	-	WB – A (9.6) SBL – A (7.9)	WB – B (10.0) SBL – A (7.4)
+1 (2023) Traffic – with Legacy Oaks	-	-	WB – A (9.6) SBL – A (7.9)	WB – A (9.9) SBL – A (7.4)
+10 (2032) Traffic – with Legacy Oaks	-	-	WB – A (9.6) SBL – A (7.9)	WB – B (10.0) SBL – A (7.4)

## 7.0 Recommendations

The proposed development is in the vicinity of the Knightdale Industrial Center development which has committed to the following improvement:

### US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard:

- Modify the traffic signal phasing/timings to reduce queueing at the intersection

The following improvements are recommended to be performed to accommodate existing and projected Hinton Oaks Industrial site traffic based on the capacity analysis presented herein:

### US 64 Business (Knightdale Boulevard) at Hinton Oaks Boulevard:

- Extend the eastbound left-turn lanes to provide 400 feet of storage each

### Hinton Oaks Boulevard:

- Provide two northbound through lanes on Hinton Oaks Boulevard from US 64 Business (Knightdale Boulevard) to the Midway Commons/Shoppes at Midway Plantation Driveway with the inside lane dropping as a left-turn lane at the Midway Commons Driveway [NOTE: Advance warning signage may be required to alert drivers to this change in traffic patterns.]
- Construct an exclusive northbound right-turn lane with 75 feet of storage at Shoppes at Midway Drive

All of the signalized study intersections are expected to operate at an acceptable LOS in the projected (2023) build-out +1 and projected (2032) build-out +10 traffic conditions. Some long queues are expected on US 64 (Knightdale Boulevard) with or without the proposed development in place. However, the improvement to mitigate these queues is the widening of Knightdale Boulevard to provide an additional through lanes, which is beyond the scope of this development.

The committed and recommended laneage is shown on **Figure 21**.

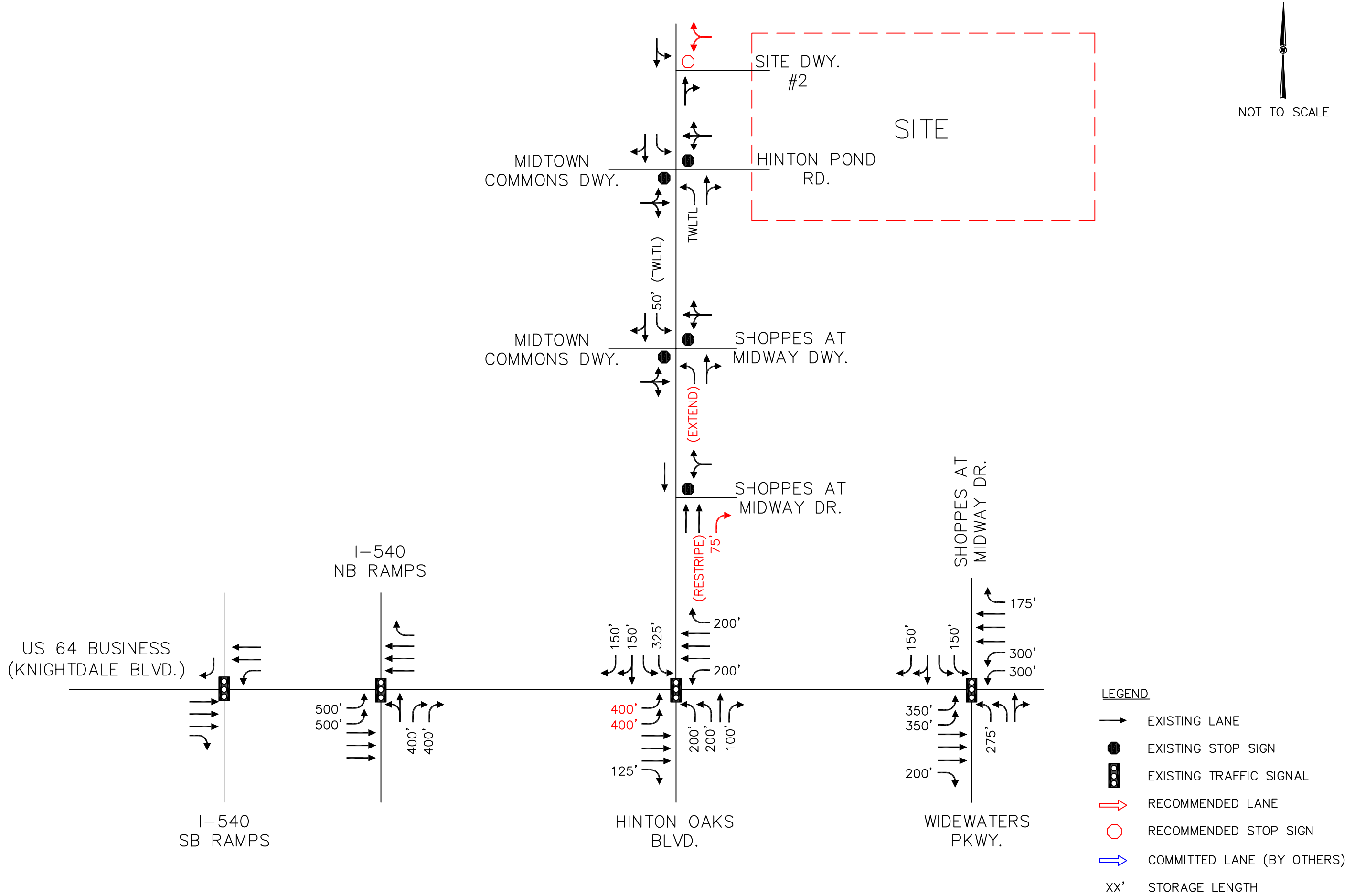


FIGURE 21

RECOMMENDED ROADWAY LANEAGE

HINTON OAKS INDUSTRIAL KNIGHTDALE, NC TRAFFIC IMPACT ANALYSIS



THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

# Appendix

**Appendix A:**  
**Memorandum of Understanding**

**Preliminary Assumptions  
Hinton Oaks Industrial - Traffic Impact Analysis  
Knightdale, North Carolina**

KHA will perform an analysis for the proposed Hinton Oaks Industrial project located north of The Shoppes at Midway Plantation between Hinton Oaks Boulevard and Old Montague Lane in Knightdale, North Carolina. The following assumptions will be used in the analysis of the site (based on a scoping meeting on November 25, 2019):

**Study Scenarios:**

The anticipated build-out year is 2022. Therefore, per the Town of Knightdale's UDO, the study scenarios will consist of:

- Existing (2019)
- Background +1 (2022 + 1 = 2023)
- Build-out +1 (2022 + 1 = 2023)
- Background +10 (2022 + 10 = 2032)
- Build-out +10 (2022 + 10 = 2032)

For this analysis, the weekday AM (7:00 – 9:00 AM) and PM (4:00 – 6:00 PM) peak hours will be analyzed.

**Study Intersections:**

The study area will consist of the following intersections:

- Knightdale Boulevard (US 64 Business) at Hinton Oaks Boulevard
- Knightdale Boulevard (US 64 Business) at I-540 Northbound Ramps
- Knightdale Boulevard (US 64 Business) at I-540 Southbound Ramps
- Knightdale Boulevard (US 64 Business) at Wide Waters Parkway
- Hinton Oaks Boulevard at Shoppes at Midway Drive
- Hinton Oaks Boulevard at Shoppes at Midway Plantation Driveway/Midtown Commons Driveway
- Hinton Oaks Boulevard at Site Driveway 1
- Hinton Oaks Boulevard at Site Driveway 2

**Traffic Counts:**

AM and PM peak hour turning movement counts will be collected in 15-minute intervals for the AM peak hour (7:00 to 9:00 AM) and PM peak hour (4:00 to 6:00 PM) at each of the existing study intersections when Wake County Public Schools are in session.

**Approved Developments:**

Based on discussions with the Town and NCDOT, there are two approved developments in the study area that were identified for inclusion as background traffic. These approved developments include:

- Legacy Oaks
  - Has not been approved yet
  - Will perform analysis with and without this development



- Parkstone
  - Currently under construction
  - The Sheetz and apartments for the “Parkstone” development have been constructed, the trips corresponding to the remaining development will be added to the traffic network as approved development trips.

### **Background Growth:**

Based on discussions with the Town, a 3% annual growth rate will be applied from the existing year (2019) to the proposed build-out + 1 analysis scenario (2022 + 1 = 2023) and a 1% annual growth rate will be applied from the existing year to the proposed build-out + 10 analysis scenario (2022 + 10 = 2032).

### **Site Traffic Distribution:**

The following distribution will be used for the net new site trips (see attached distribution figure):

- 50% to/from the south on I-540
- 25% to/from the north on I-540
- 15% to/from the east on US 64 Business (Knightdale Boulevard)
- 10% to/from the west on US 64 Business (Knightdale Boulevard)

### **Proposed Uses and Trip Generation:**

The property is currently vacant, and as currently envisioned will include approximately 127,200 square feet of Industrial Park space, 84,800 square feet of General Office space, and 88,000 square feet of Business Park space. Trip generation calculations are attached.

### **Site Access:**

This site is proposed to be accessed by two full-movement driveways onto Hinton Oaks Boulevard.

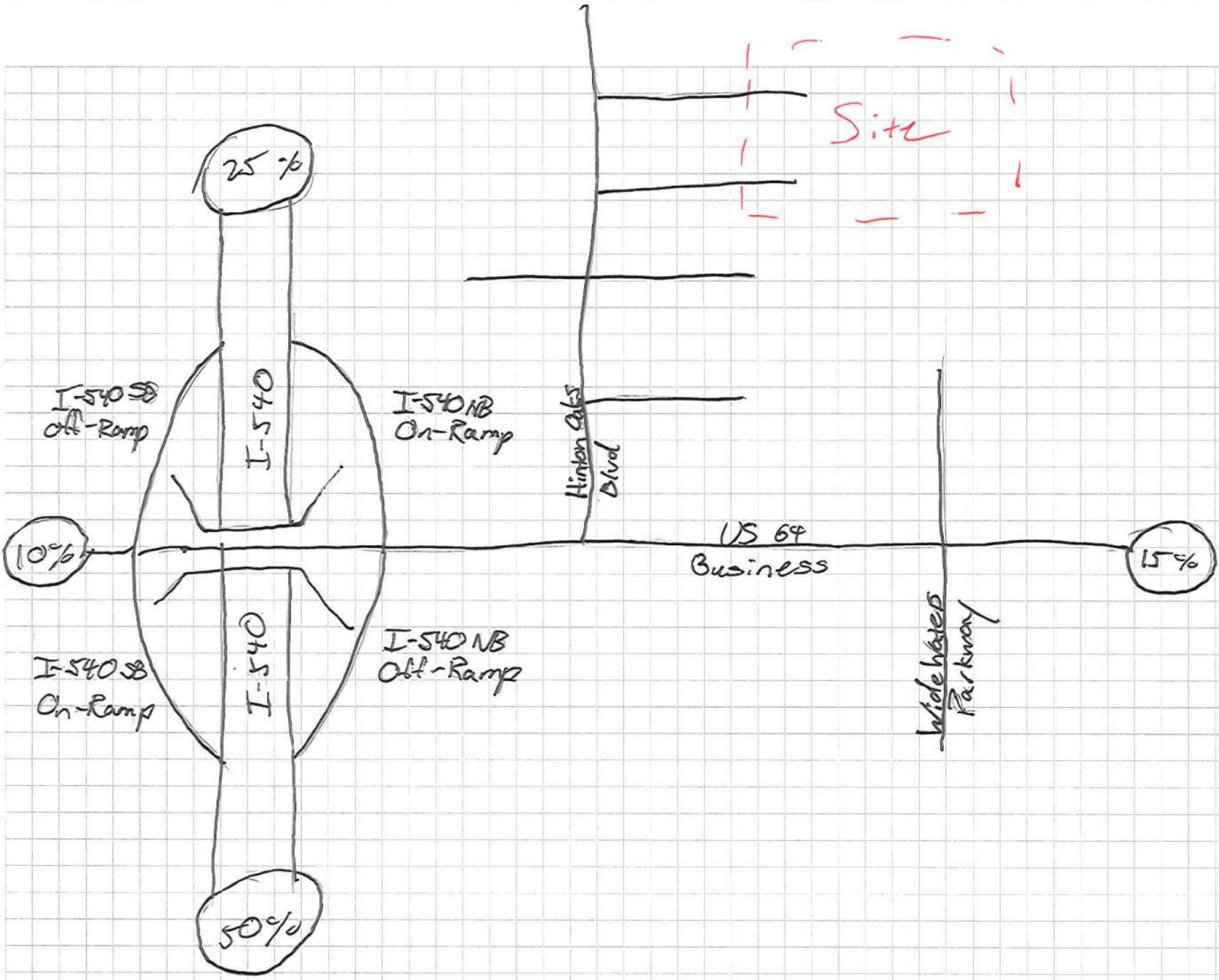
### **Other Study Assumptions:**

Existing peak hour factors (PHF's) will be used at existing intersections, and a PHF of 0.90 will be used at new intersections. Right-turns on red (RTOR) and permitted + protected phasing will be permitted in the analysis where currently allowed.

**Hinton Oaks Industrial Site**

**Table 1 - Trip Generation**

Land Use	Intensity		Daily			AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out	Total	In	Out
130 Industrial Park	127,200	s.f.	1,064	532	532	51	41	10	51	11	40
710 General Office Building	84,800	s.f.	904	452	452	106	91	15	97	16	81
770 Business Park <sup>4</sup>	88,000	s.f.	1,650	825	825	126	107	19	132	34	98
<b>Subtotal</b>			<b>3,618</b>	<b>1,809</b>	<b>1,809</b>	<b>283</b>	<b>239</b>	<b>44</b>	<b>280</b>	<b>61</b>	<b>219</b>



**Appendix B:**  
**Trip Generation**

**Hinton Oaks Industrial Site**

**Table 1 - Trip Generation**

Land Use	Intensity		Daily			AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out	Total	In	Out
130 Industrial Park	127,200	s.f.	1,064	532	532	51	41	10	51	11	40
710 General Office Building	84,800	s.f.	904	452	452	106	91	15	97	16	81
770 Business Park <sup>4</sup>	88,000	s.f.	1,650	825	825	126	107	19	132	34	98
<b>Subtotal</b>			<b>3,618</b>	<b>1,809</b>	<b>1,809</b>	<b>283</b>	<b>239</b>	<b>44</b>	<b>280</b>	<b>61</b>	<b>219</b>

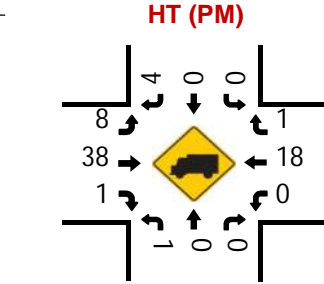
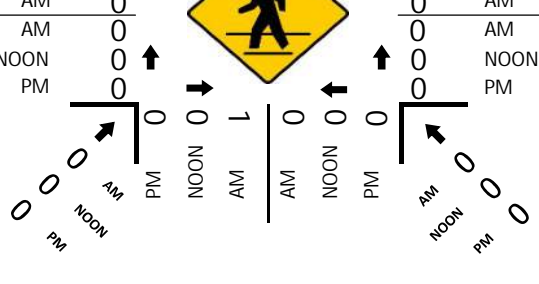
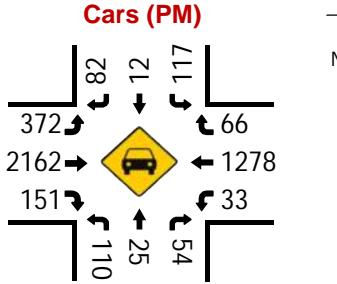
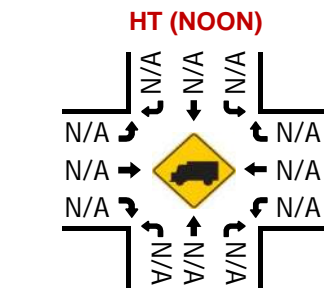
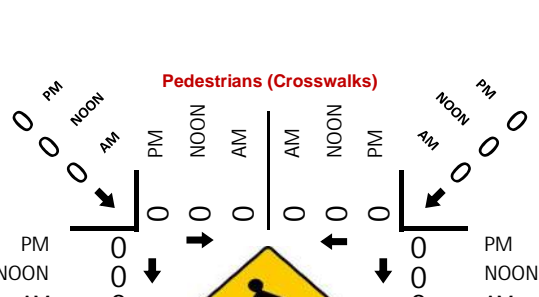
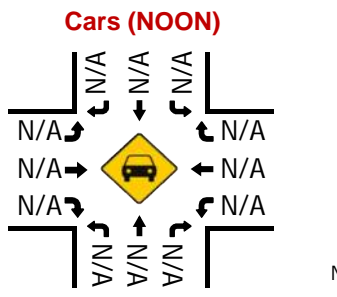
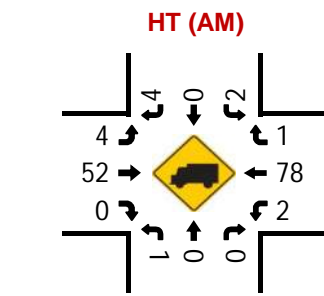
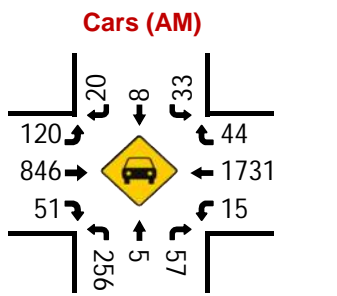
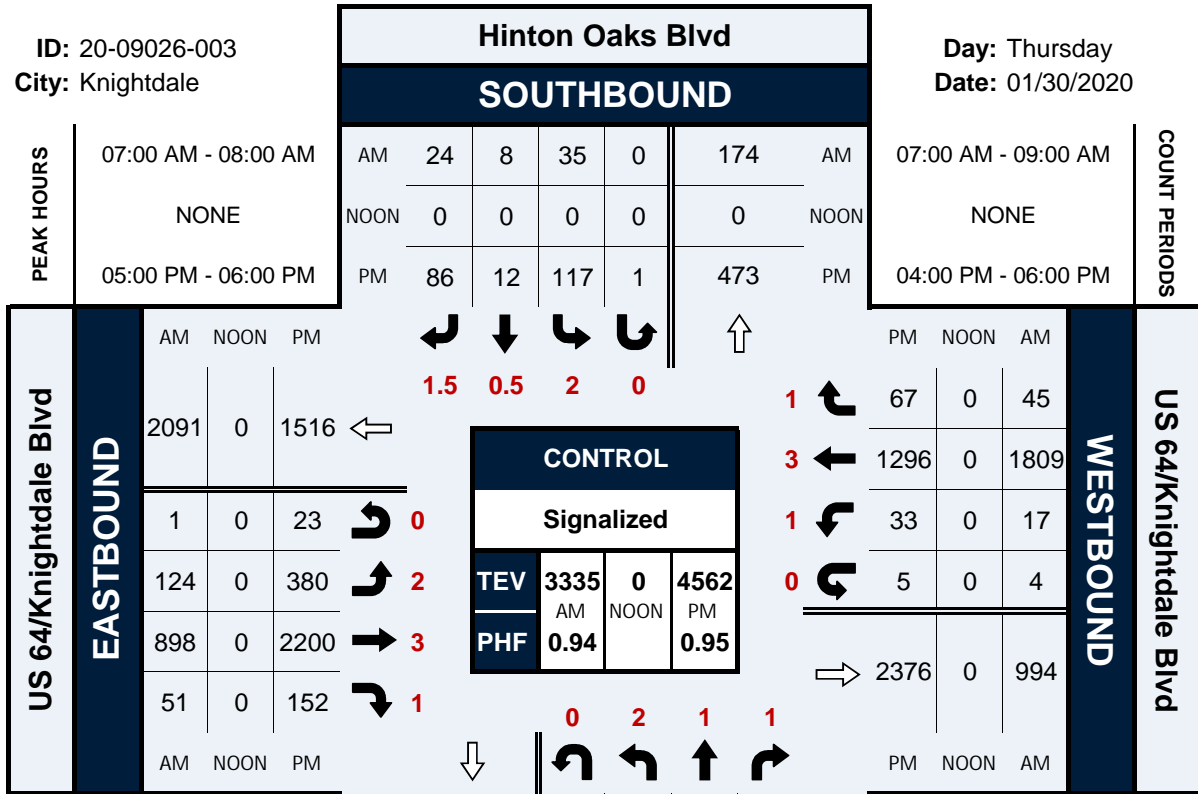
**Appendix C:**  
**Traffic Count Data**

# Hinton Oaks Blvd & US 64/Knightdale Blvd

## Peak Hour Turning Movement Count

ID: 20-09026-003  
City: Knightdale

Day: Thursday  
Date: 01/30/2020





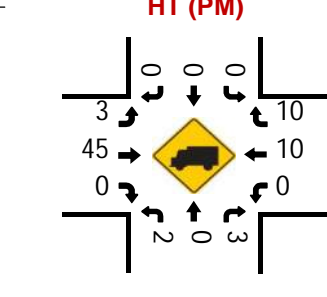
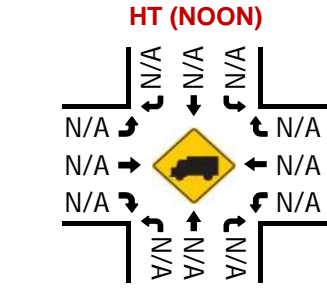
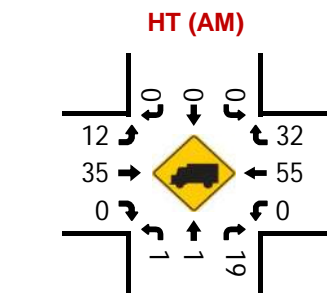
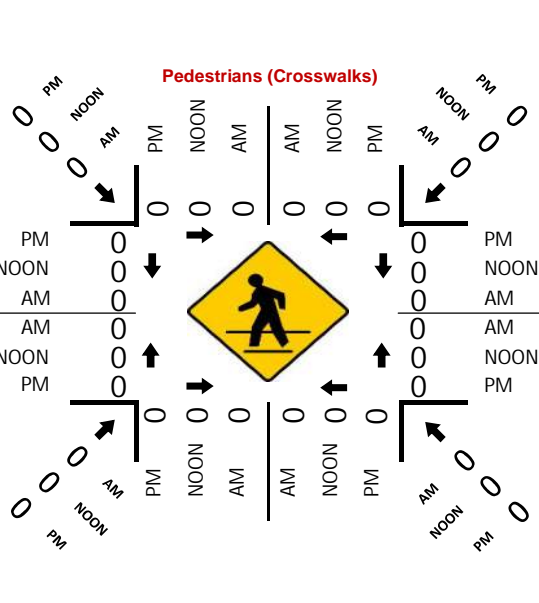
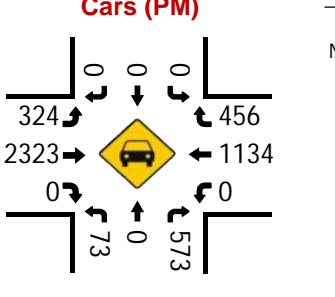
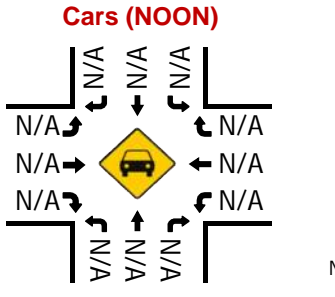
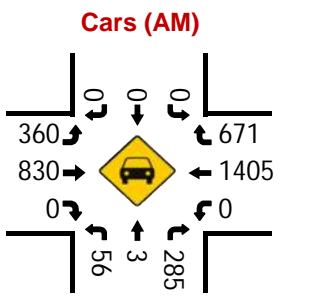
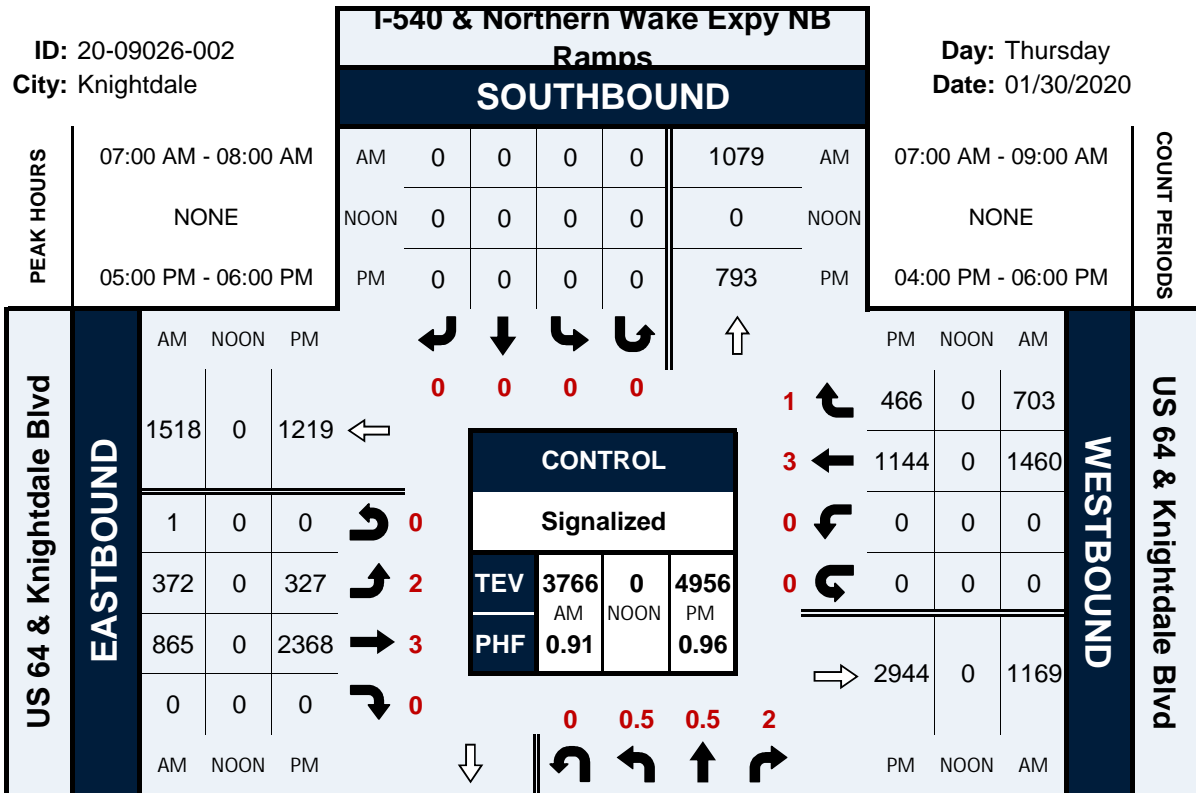


# I-540 & Northern Wake Expy NB Ramps & US 64 & Knightdale Blvd

## Peak Hour Turning Movement Count

ID: 20-09026-002  
City: Knightdale

Day: Thursday  
Date: 01/30/2020



Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	I-540 & Northern Wake Expy NB Ramps Northbound						I-540 & Northern Wake Expy NB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
7:00 AM	13	0	54	0	0	67	0	0	0	0	0	80	189	0	0	269	0	350	174	0	0	524	860		
7:15 AM	9	0	60	0	0	69	0	0	0	0	0	99	203	0	1	303	0	362	183	0	0	545	917		
7:30 AM	20	2	97	0	0	119	0	0	0	0	0	104	216	0	0	320	0	412	179	0	0	591	1030		
7:45 AM	15	2	93	0	0	110	0	0	0	0	0	89	257	0	0	346	0	336	167	0	0	503	959		
<b>Total</b>	57	4	304	0	0	365	0	0	0	0	0	372	865	0	1	1238	0	1460	703	0	0	2163	3766		
8:00 AM	17	0	72	0	0	89	0	0	0	0	0	67	226	0	1	294	0	339	138	0	0	477	860		
8:15 AM	12	0	98	0	0	110	0	0	0	0	0	90	210	0	1	301	0	298	119	0	0	417	828		
8:30 AM	14	0	78	0	0	92	0	0	0	0	0	68	228	0	0	296	0	268	141	0	0	409	797		
8:45 AM	17	0	79	0	0	96	0	0	0	0	0	83	208	0	0	291	0	221	122	0	0	343	730		
<b>Total</b>	60	0	327	0	0	387	0	0	0	0	0	308	872	0	2	1182	0	1126	520	0	0	1646	3215		
***BREAK***																									
4:00 PM	12	0	133	0	0	145	0	0	0	0	1	51	441	0	2	494	0	256	116	0	0	372	1011		
4:15 PM	18	1	151	0	0	170	0	0	0	0	0	73	479	0	1	553	0	250	109	0	0	359	1082		
4:30 PM	25	1	137	0	0	163	0	0	0	0	0	82	488	0	0	570	0	273	107	0	0	380	1113		
4:45 PM	13	0	135	0	0	148	0	0	0	0	0	77	534	0	1	612	0	269	114	0	0	383	1143		
<b>Total</b>	68	2	556	0	0	626	0	0	0	0	1	283	1942	0	4	2229	0	1048	446	0	0	1494	4349		
5:00 PM	18	0	156	0	0	174	0	0	0	0	0	103	572	0	0	675	0	265	112	0	0	377	1226		
5:15 PM	11	0	137	0	0	148	0	0	0	0	0	87	612	0	0	699	0	306	138	0	0	444	1291		
5:30 PM	30	0	143	0	0	173	0	0	0	0	0	66	621	0	0	687	0	273	117	0	0	390	1250		
5:45 PM	16	0	140	0	0	156	0	0	0	0	0	71	563	0	0	634	0	300	99	0	0	399	1189		
<b>Total</b>	75	0	576	0	0	651	0	0	0	0	0	327	2368	0	0	2695	0	1144	466	0	0	1610	4956		
Grand Total	260	6	1763	0	0	2029	0	0	0	0	1	1290	6047	0	7	7344	0	4778	2135	0	0	6913	16286		
Apprch %	12.8	0.3	86.9	0.0	0.0		0.0	0.0	0.0	0.0	0.0	17.6	82.3	0.0	0.1	0.0	0.0	69.1	30.9	0.0	0.0				
Total %	1.6	0.0	10.8	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	7.9	37.1	0.0	0.0	45.1	0.0	29.3	13.1	0.0	0.0	42.4			
Cars, PU, Vans	254	5	1710	0	0	1969	0	0	0	0	0	1254	5855	0	6	7115	0	4639	2045	0	0	6684	15768		
% Cars, PU, Vans	97.7	83.3	97.0	0.0	0.0	97.0	0.0	0.0	0.0	0.0	0.0	97.2	96.8	0.0	85.7	96.9	0.0	97.1	95.8	0.0	0.0	96.7	96.8		
Heavy Trucks	6	1	53	0	0	60	0	0	0	0	0	36	192	0	1	229	0	139	90	0	0	229	518		
% Heavy Trucks	2.3	16.7	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	2.8	3.2	0.0	14.3	3.1	0.0	2.9	4.2	0.0	0.0	3.3	3.2		

PEAK HOURS

AM

Start Time	I-540 & Northern Wake Expy NB Ramps Northbound						I-540 & Northern Wake Expy NB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM Peak Hour for Entire Intersection Begins at 07:00 AM																									
7:00 AM	13	0	54	0	0	67	0	0	0	0	0	80	189	0	0	269	0	350	174	0	0	524	860		
7:15 AM	9	0	60	0	0	69	0	0	0	0	0	99	203	0	1	303	0	362	183	0	0	545	917		
7:30 AM	20	2	97	0	0	119	0	0	0	0	0	104	216	0	0	320	0	412	179	0	0	591	1030		
7:45 AM	15	2	93	0	0	110	0	0	0	0	0	89	257	0	0	346	0	336	167	0	0	503	959		
<b>Total Volume</b>	57	4	304	0	0	365	0	0	0	0	0	372	865	0	1	1238	0	1460	703	0	0	2163	3766		
% App. Total	15.6	1.1	83.3	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	30.0	69.9	0.0	0.1	100	0.0	67.5	32.5	0.0	0.0	100			
PHF	0.767						0.895						0.915						0.914						
Cars, PU, Vans	56	3	285	0	0	344	0	0	0	0	0	360	830	0	1	1191	0	1405	671	0	0	2076	3611		
% Cars, PU, Vans	98.2	75.0	93.8	0.0	0.0	94.2	0.0	0.0	0.0	0.0	0.0	96.8	96.0	0.0	100.0	96.2	0.0	96.2	95.4	0.0	0.0	96.0	95.9		
Heavy Trucks	1	1	19	0	0	21	0	0	0	0	0	12	35	0	0	47	0	55	32	0	0	87	155		
% Heavy Trucks	1.8	25.0	6.3	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0	3.2	4.0	0.0	0.0	3.8	0.0	3.8	4.6	0.0	0.0	4.0	4.1		

PM

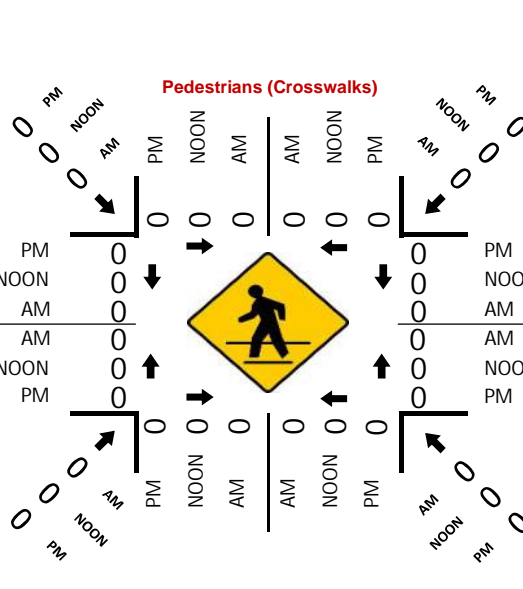
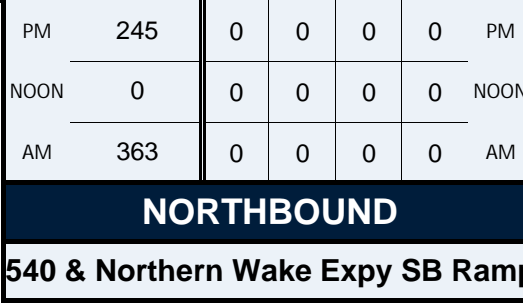
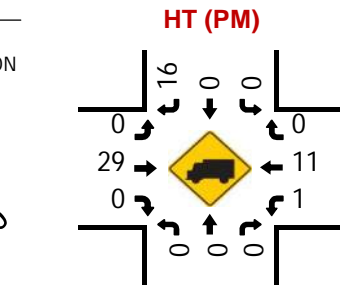
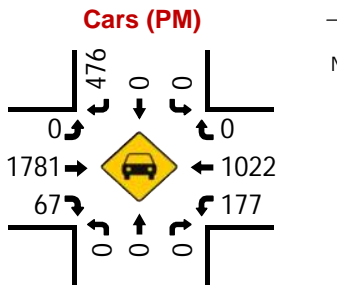
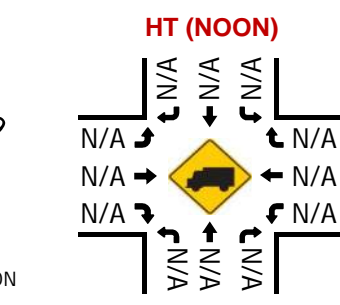
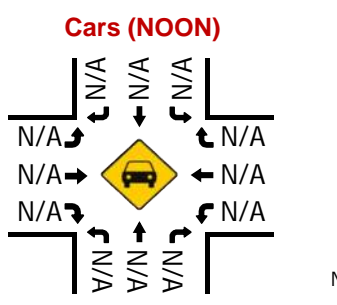
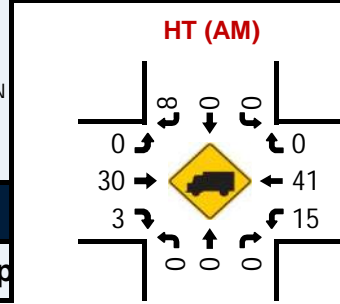
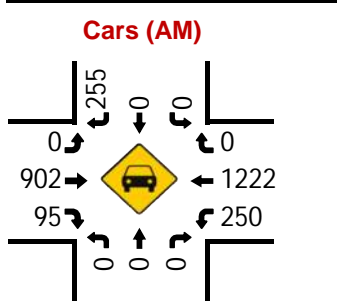
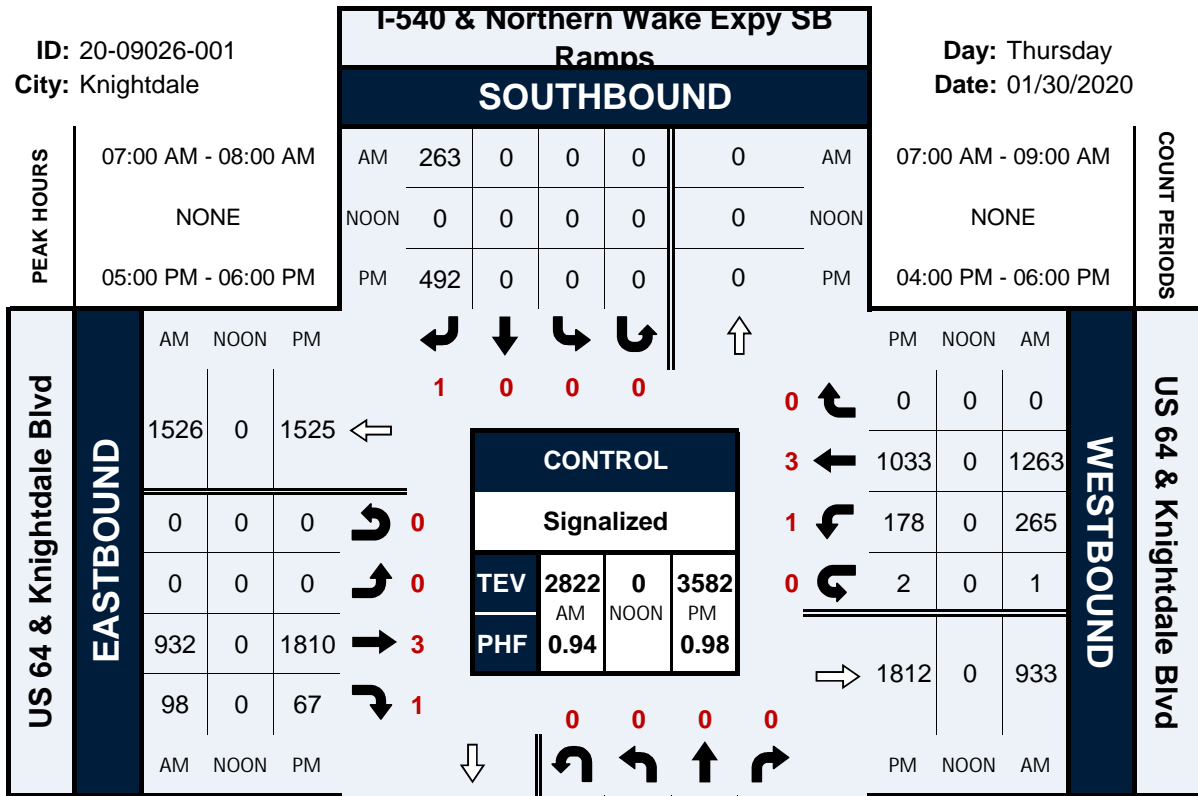
Start Time	I-540 & Northern Wake Expy NB Ramps Northbound						I-540 & Northern Wake Expy NB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM Peak Hour for Entire Intersection Begins at 05:00 PM																									
5:00 PM	18	0	156	0	0	174	0	0	0	0	0	103	572	0	0	675	0	265	112	0	0	377	1226		
5:15 PM	11	0	137	0	0	148	0	0	0	0	0	87	612	0	0	699	0	306	138	0	0	444	1291		
5:30 PM	30	0	143	0	0	173	0	0	0	0	0	66	621	0	0	687	0	273	117	0	0	390	1250		
5:45 PM	16	0	140	0	0	156	0	0	0	0	0	71	563	0	0	634	0	300	99	0	0	399	1189		
<b>Total Volume</b>	75	0	576	0	0	651	0	0	0	0	0	327	2368	0	0	2695	0	1144	466	0	0	1610	4956		
% App. Total	11.5	0.0	88.5	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	12.1	87.9	0.0	0.0	100	0.0	71.1	28.9	0.0	0.0	100			
PHF	0.935						0.964						0.907						0.960						
Cars, PU, Vans	73	0	573	0	0	646	0	0	0	0	0	324	2323	0	0	2647	0	1134	456	0	0	1590	4883		
% Cars, PU, Vans	97.3	0.0	99.5	0.0	0.0	99.2	0.0	0.0	0.0	0.0	0.0	99.1	98.1	0.0	0.0	98.2	0.0	99.1	97.9	0.0	0.0	98.8	98.5		
Heavy Trucks	2	0	3	0	0	5	0	0	0	0	0	3	45	0	0	48	0	10	10	0	0	20	73		
% Heavy Trucks	2.7	0.0	0.5	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.9	1.9	0.0	0.0	1.8	0.0	0.9	2.1	0.0	0.0	1.2	1.5		

# I-540 & Northern Wake Expy SB Ramps & US 64 & Knightdale Blvd

## Peak Hour Turning Movement Count

ID: 20-09026-001  
City: Knightdale

Day: Thursday  
Date: 01/30/2020



Project ID: 20-09026-001  
 Location: I-540 & Northern Wake Expy SB Ramps & US 64 & Knightdale Blvd  
 City: Knightdale

Day: Thursday  
 Date: 01/30/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	I-540 & Northern Wake Expy SB Ramps Northbound						I-540 & Northern Wake Expy SB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	0	62	0	62	0	257	19	0	276	55	308	0	0	0	0	0	363	701
7:15 AM	0	0	0	0	0	0	0	0	48	0	48	0	217	29	0	246	64	321	0	0	0	0	0	385	679
7:30 AM	0	0	0	0	0	0	0	0	62	0	62	0	237	30	0	267	73	349	0	0	0	0	0	422	751
7:45 AM	0	0	0	0	0	0	0	0	91	0	91	0	221	20	0	241	73	285	0	1	0	0	359	691	
Total	0	0	0	0	0	0	0	0	263	0	263	0	932	98	0	1030	265	1263	0	1	0	1	1529	2822	
8:00 AM	0	0	0	0	0	0	0	0	73	0	73	0	222	26	0	248	56	278	0	1	0	0	335	656	
8:15 AM	0	0	0	0	0	0	0	0	102	0	102	0	203	17	0	220	58	261	0	3	0	0	322	644	
8:30 AM	0	0	0	0	0	0	0	0	62	0	62	0	213	26	0	239	47	220	0	2	0	0	269	570	
8:45 AM	0	0	0	0	0	0	0	0	57	0	57	0	205	14	0	219	49	205	0	1	0	0	255	531	
Total	0	0	0	0	0	0	0	0	294	0	294	0	843	83	0	926	210	964	0	7	0	0	1181	2401	
***BREAK***																									
4:00 PM	0	0	0	0	0	0	0	0	102	0	102	0	334	33	0	367	54	210	0	1	0	0	265	734	
4:15 PM	0	0	0	0	0	0	0	0	116	0	116	0	377	21	0	398	67	206	0	1	0	0	274	788	
4:30 PM	0	0	0	0	0	0	0	0	106	0	106	0	399	22	0	421	67	242	0	1	0	0	310	837	
4:45 PM	0	0	0	0	0	0	0	0	103	0	103	0	426	21	0	447	41	228	0	0	0	0	269	819	
Total	0	0	0	0	0	0	0	0	427	0	427	0	1536	97	0	1633	229	886	0	3	0	0	1118	3178	
5:00 PM	0	0	0	0	0	0	0	0	117	0	117	0	478	18	0	496	44	256	0	1	0	0	301	914	
5:15 PM	0	0	0	0	0	0	0	0	135	0	135	0	450	12	0	462	51	240	0	1	0	0	292	889	
5:30 PM	0	0	0	0	0	0	0	0	126	0	126	0	457	18	0	475	41	271	0	0	0	0	312	913	
5:45 PM	0	0	0	0	0	0	0	0	114	0	114	0	425	19	0	444	42	266	0	0	0	0	308	866	
Total	0	0	0	0	0	0	0	0	492	0	492	0	1810	67	0	1877	178	1033	0	2	0	0	1213	3582	
Grand Total	0	0	0	0	0	0	0	0	1476	0	1476	0	5121	345	0	5466	882	4146	0	13	0	0	5041	11983	
Approch %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.1	0.0	93.7	6.3	0.0	0.0	17.5	82.2	0.0	0.3	0.0				
Total %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3	0.0	0.0	0.0	42.7	2.9	0.0	0.0	45.6	7.4	34.6	0.0	0.1	0.0	42.1		
Cars, PU, Vans	0	0	0	0	0	0	0	0	1423	0	1423	0	4981	336	0	5317	848	4034	0	13	0	0	4895	11635	
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.4	0.0	96.4	0.0	97.3	97.4	0.0	97.3	96.1	97.3	0.0	100.0	0.0	0.0	97.1	97.1	
Heavy Trucks	0	0	0	0	0	0	0	0	53	0	53	0	140	9	0	149	34	112	0	0	0	0	146	348	
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	3.6	0.0	2.7	2.6	0.0	2.7	3.9	2.7	0.0	0.0	0.0	0.0	2.9	2.9	

Project ID: 20-09026-001  
 Location: I-540 & Northern Wake Expy SB Ramps & US 64 &  
 City: Knightdale

PEAK HOURS

Day: Thursday  
 Date: 01/30/2020

AM

Start Time	I-540 & Northern Wake Expy SB Ramps Northbound						I-540 & Northern Wake Expy SB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																									
Peak Hour for Entire Intersection Begins at 07:00 AM																									
7:00 AM	0	0	0	0	0	0	0	0	62	0	62	0	257	19	0	276	55	308	0	0	0	0	363	701	
7:15 AM	0	0	0	0	0	0	0	0	48	0	48	0	217	29	0	246	64	321	0	0	0	0	385	679	
7:30 AM	0	0	0	0	0	0	0	0	62	0	62	0	237	30	0	267	73	349	0	0	0	0	422	751	
7:45 AM	0	0	0	0	0	0	0	0	91	0	91	0	221	20	0	241	73	285	0	1	0	0	359	691	
Total Volume	0	0	0	0	0	0	0	0	263	0	263	0	932	98	0	1030	265	1263	0	1	0	1	1529	2822	
% App. Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100	0.0	90.5	9.5	0.0	100	17.3	82.6	0.0	0.1	0.0	100			
PHF	0.723											0.933						0.906						0.939	
Cars, PU, Vans	0	0	0	0	0	0	0	0	255	0	255	0	902	95	0	997	250	1222	0	1	0	1	1473	2725	
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.0	0.0	97.0	0.0	96.8	96.9	0.0	96.8	94.3	96.8	0.0	100.0	0.0	0.0	96.3	96.6	
Heavy Trucks	0	0	0	0	0	0	0	0	8	0	8	0	30	3	0	33	15	41	0	0	0	0	56	97	
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	0.0	3.2	3.1	0.0	3.2	5.7	3.2	0.0	0.0	0.0	0.0	3.7	3.4	

PM

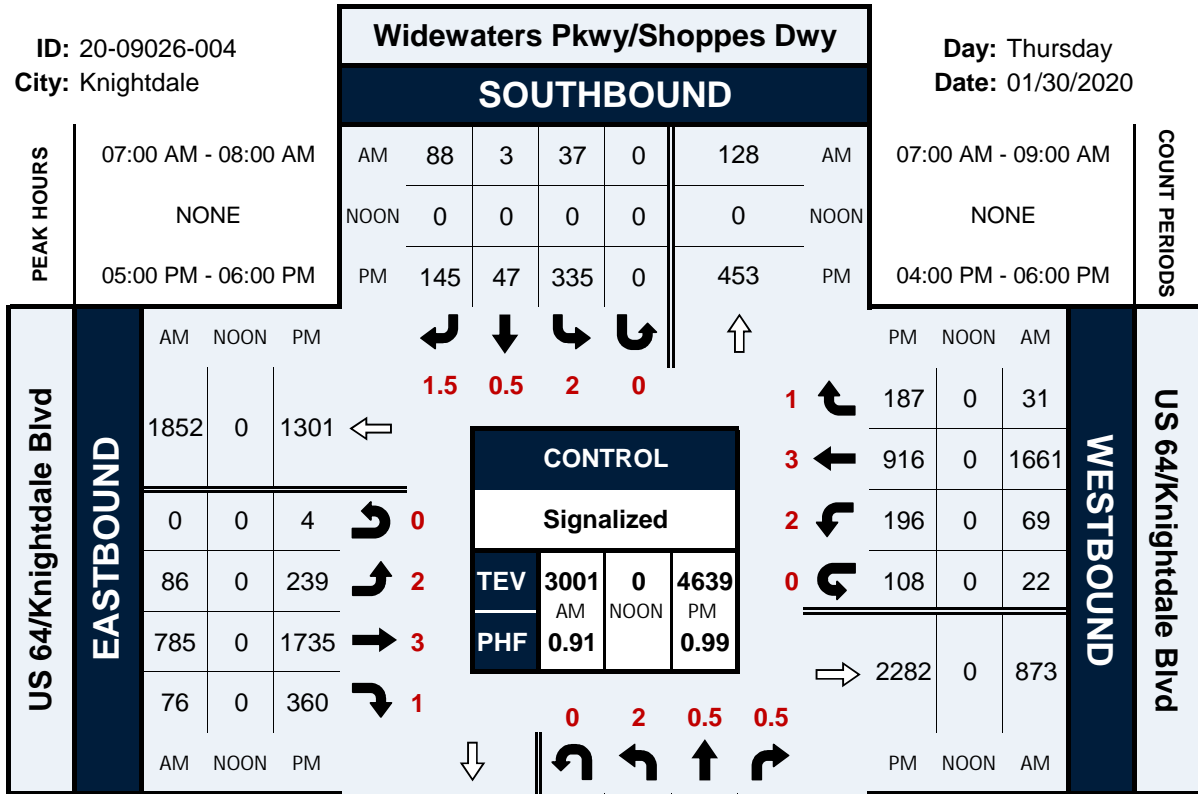
Start Time	I-540 & Northern Wake Expy SB Ramps Northbound						I-540 & Northern Wake Expy SB Ramps Southbound						US 64 & Knightdale Blvd Eastbound						US 64 & Knightdale Blvd Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
Peak Hour Analysis from 04:00 PM to 06:00 PM																									
Peak Hour for Entire Intersection Begins at 05:00 PM																									
5:00 PM	0	0	0	0	0	0	0	0	117	0	117	0	478	18	0	496	44	256	0	1	0	0	301	914	
5:15 PM	0	0	0	0	0	0	0	0	135	0	135	0	450	12	0	462	51	240	0	1	0	0	292	889	
5:30 PM	0	0	0	0	0	0	0	0	126	0	126	0	457	18	0	475	41	271	0	0	0	0	312	913	
5:45 PM	0	0	0	0	0	0	0	0	114	0	114	0	425	19	0	444	42	266	0	0	0	0	308	866	
Total Volume	0	0	0	0	0	0	0	0	492	0	492	0	1810	67	0	1877	178	1033	0	2	0	0	1213	3582	
% App. Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100	0.0	96.4	3.6	0.0	100	14.7	85.2	0.0	0.2	100				
PHF	0.911											0.946						0.972						0.980	
Cars, PU, Vans	0	0	0	0	0	0	0	0	476	0	476	0	1781	67	0	1848	177	1022	0	2	0	2	1201	3525	
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.7	0.0	96.7	0.0	98.4	100.0	0.0	98.5	99.4	98.9	0.0	100.0	0.0	0.0	99.0	98.4	
Heavy Trucks	0	0	0	0	0	0	0	0	16	0	16	0	29	0	0	29	1	11	0	0	0	12	57		
%Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	3.3	0.0	1.6	0.0	0.0	1.5	0.6	1.1	0.0	0.0	0.0	1.0	1.6		

# Widewaters Pkwy/Shoppes Dwy & US 64/Knightdale Blvd

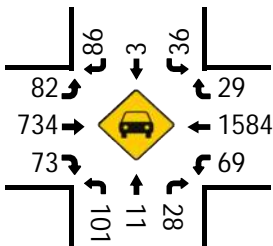
## Peak Hour Turning Movement Count

ID: 20-09026-004  
City: Knightdale

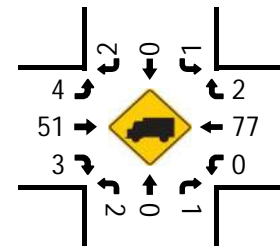
Day: Thursday  
Date: 01/30/2020



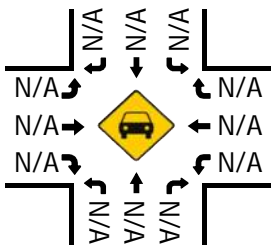
Cars (AM)



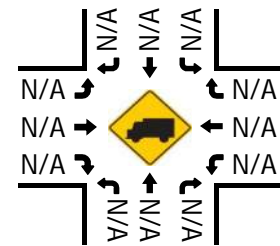
HT (AM)



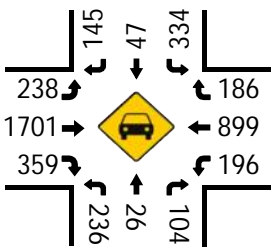
Cars (NOON)



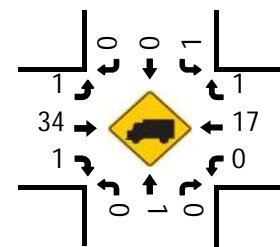
HT (NOON)



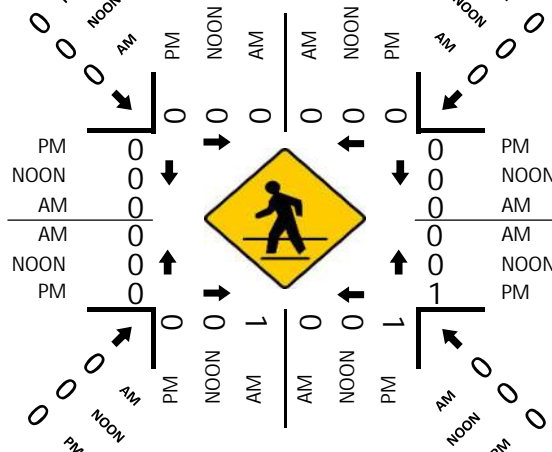
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)



Project ID: 20-09026-004  
 Location: Widewaters Pkwy/Shoppes Dwy & US 64/Knightdale Blvd  
 City: Knightdale

Day: Thursday  
 Date: 01/30/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Widewaters Pkwy/Shoppes Dwy Northbound						Widewaters Pkwy/Shoppes Dwy Southbound						US 64/Knightdale Blvd Eastbound						US 64/Knightdale Blvd Westbound						Int.	Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total		
7:00 AM	24	1	13	0	0	38	5	0	18	0	23	16	193	18	0	227	12	451	3	6	0	472	760			
7:15 AM	19	5	5	0	0	29	10	0	17	0	27	17	187	13	0	217	15	407	5	4	0	431	704			
7:30 AM	22	2	5	0	0	29	6	1	23	0	30	25	199	21	0	245	24	479	12	8	0	523	827			
7:45 AM	38	3	6	0	1	47	16	2	30	0	48	28	206	24	0	258	18	324	11	4	0	357	710			
Total	103	11	29	0	1	143	37	3	88	0	128	86	785	76	0	947	69	1661	31	22	0	1783	3001			
8:00 AM	19	3	6	0	0	28	12	2	23	0	37	37	184	18	0	239	28	369	20	5	0	422	726			
8:15 AM	37	3	5	0	0	45	17	2	29	0	46	33	177	28	0	238	33	279	16	11	0	339	670			
8:30 AM	29	3	3	0	0	35	15	1	31	0	47	25	191	30	1	247	18	293	19	7	0	337	666			
8:45 AM	20	4	4	0	0	28	25	3	33	0	61	27	160	31	0	218	25	235	15	9	0	284	591			
Total	105	13	18	0	0	136	69	8	116	0	193	122	712	107	1	942	104	1176	70	32	0	1382	2653			
***BREAK***																										
4:00 PM	50	10	24	0	0	84	88	8	24	0	120	50	317	62	1	430	31	215	39	16	0	301	935			
4:15 PM	41	15	20	0	0	76	62	14	43	0	119	45	424	76	3	548	41	219	41	19	0	320	1063			
4:30 PM	49	11	34	0	0	94	92	14	36	0	142	57	382	84	2	525	42	217	35	24	0	318	1079			
4:45 PM	44	9	17	0	0	70	67	17	35	0	119	50	408	90	0	548	45	211	44	26	2	326	1063			
Total	184	45	95	0	0	324	309	53	138	0	500	202	1531	312	6	2051	159	862	159	85	2	1265	4140			
5:00 PM	62	11	27	0	0	100	82	14	30	0	126	69	435	101	1	606	46	215	46	28	0	335	1167			
5:15 PM	52	2	25	0	1	79	86	9	36	0	131	51	449	72	0	572	57	243	49	33	1	382	1164			
5:30 PM	51	5	31	0	0	87	66	14	46	0	126	68	474	92	2	636	33	226	42	18	0	319	1168			
5:45 PM	71	9	21	0	0	101	101	10	33	0	144	51	377	95	1	524	60	232	50	29	0	371	1140			
Total	236	27	104	0	1	367	335	47	145	0	523	239	1735	360	4	2338	196	916	187	108	1	1407	4639			
Grand Total	628	96	246	0	2	970	750	111	487	0	1348	649	4763	855	11	6278	528	4615	447	247	3	5837	14433			
Approch %	64.7	9.9	25.4	0.0	0.2		55.6	8.2	36.1	0.0	0.0	10.3	75.9	13.6	0.2	0.0	9.0	79.1	7.7	4.2	0.1					
Total %	4.4	0.7	1.7	0.0	0.0	6.7	5.2	0.8	3.4	0.0	9.3	4.5	33.0	5.9	0.1	0.0	43.5	3.7	32.0	3.1	1.7	0.0	40.4			
Cars, PU, Vans	620	95	245	0	0	960	746	111	481	0	1338	639	4555	849	11	6054	526	4413	443	244		5626	13978			
% Cars, PU, Vans	98.7	99.0	99.6	0.0	0.0	99.0	99.5	100.0	98.8	0.0	99.3	98.5	95.6	99.3	100.0	96.4	99.6	95.6	99.1	98.8		96.4	96.8			
Heavy Trucks	8	1	1	0	0	10	4	0	6	0	10	10	208	6	0	224	2	202	4	3		211	455			
% Heavy Trucks	1.3	1.0	0.4	0.0	0.0	1.0	0.5	0.0	1.2	0.0	0.7	1.5	4.4	0.7	0.0	3.6	0.4	4.4	0.9	1.2		3.6	3.2			

Project ID: 20-09026-004  
 Location: Widewaters Pkwy/Shoppes Dwy & US 64/Knightdale  
 City: Knightdale

Day: Thursday  
 Date: 01/30/2020

PEAK HOURS

AM

Start Time	Widewaters Pkwy/Shoppes Dwy Northbound						Widewaters Pkwy/Shoppes Dwy Southbound						US 64/Knightdale Blvd Eastbound						US 64/Knightdale Blvd Westbound						Int.	Total		
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total				
7:00 AM	24	1	13	0	0	38	5	0	18	0	23	16	193	18	0	227	12	451	3	6	472	760						
7:15 AM	19	5	5	0	0	29	10	0	17	0	27	17	187	13	0	217	15	407	5	4	431	704						
7:30 AM	22	2	5	0	0	29	6	1	23	0	30	25	199	21	0	245	24	479	12	8	523	827						
7:45 AM	38	3	6	0	1	47	16	2	30	0	48	28	206	24	0	258	18	324	11	4	357	710						
Total Volume	103	11	29	0	1	143	37	3	88	0	128	86	785	76	0	947	69	1661	31	22	1783	3001						
% App. Total	72.0	7.7	20.3	0.0	0.0	100	28.9	2.3	68.8	0.0	100	9.1	82.9	8.0	0.0	100	3.9	93.2	1.7	1.2	100							
PHF	0.761												0.667						0.918						0.852		0.907	
Cars, PU, Vans	101	11	28	0	0	140	36	3	86	0	125	82	734	73	0	889	69	1584	29	21	1703	2857						
% Cars, PU, Vans	98.1	100.0	96.6	0.0	0.0	97.9	97.3	100.0	97.7	0.0	97.7	95.3	93.5	96.1	0.0	93.9	100.0	95.4	93.5	95.5	95.5		95.2					
Heavy Trucks	2	0	1	0	0	3	1	0	2	0	3	4	51	3	0	58	0	77	2	1	80	144						
% Heavy Trucks	1.9	0.0	3.4	0.0	2.1		2.7	0.0	2.3	0.0	2.3	4.7	6.5	3.9	0.0	6.1	0.0	4.6	6.5	4.5	4.5		4.8					

PM

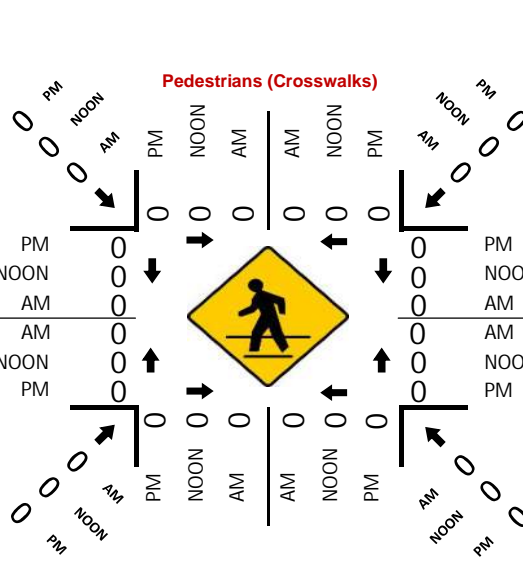
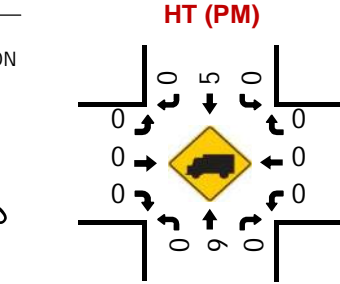
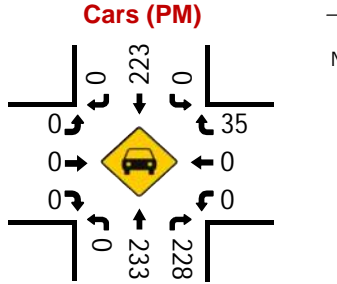
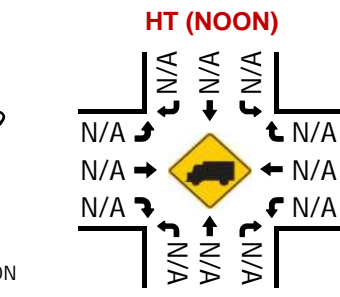
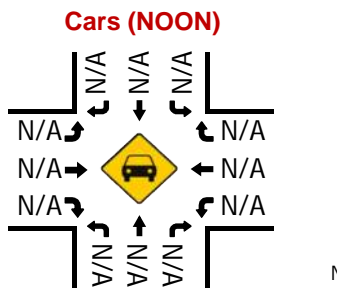
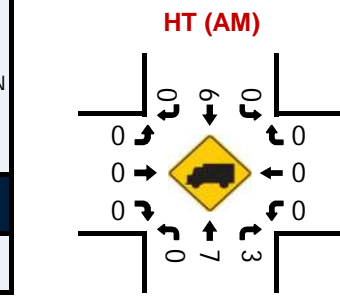
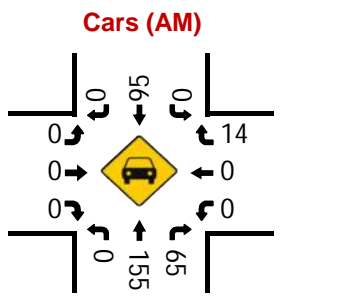
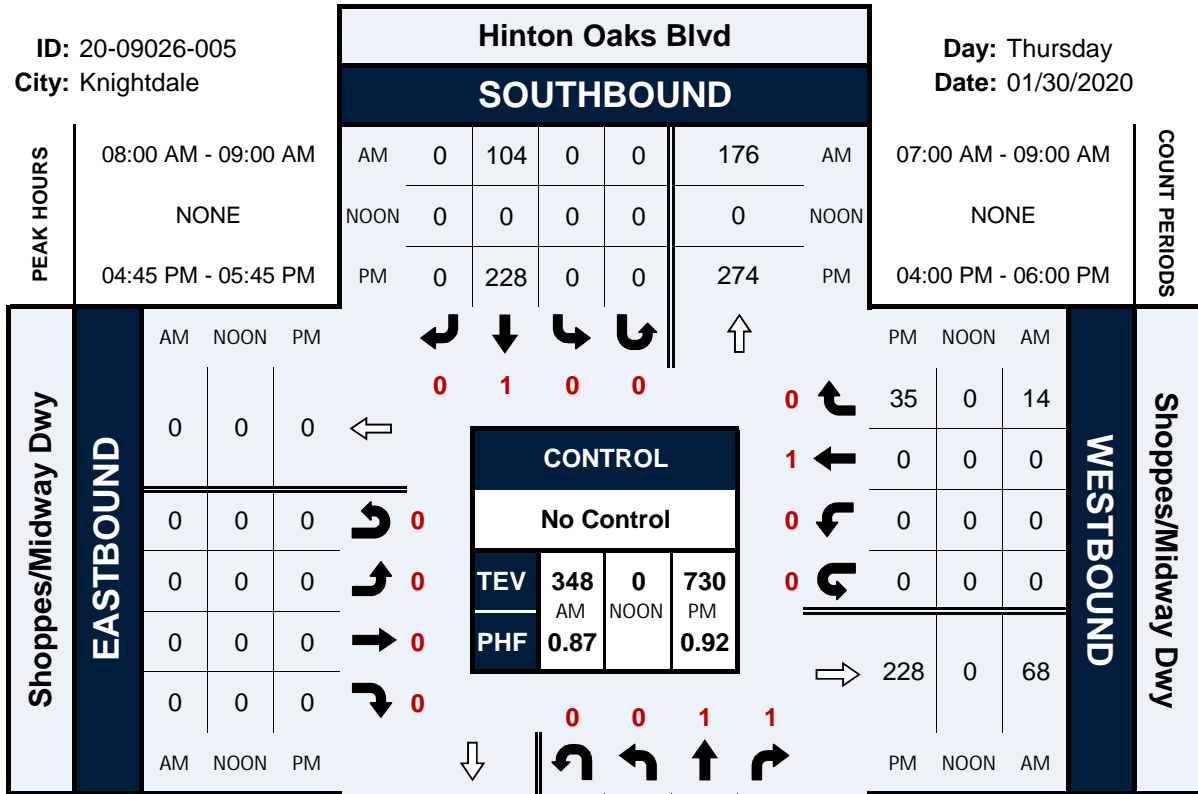
Start Time	Widewaters Pkwy/Shoppes Dwy Northbound						Widewaters Pkwy/Shoppes Dwy Southbound						US 64/Knightdale Blvd Eastbound						US 64/Knightdale Blvd Westbound						Int.	Total		
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total				
5:00 PM	62	11	27	0	0	100	82	14	30	0	126	69	435	101	1	606	46	215	46	28	335	1167						
5:15 PM	52	2	25	0	0	79	86	9	36	0	131	51	449	72	0	572	57	243	49	33	382	1164						
5:30 PM	51	5	31	0	0	87	66	14	46	0	126	68	474	92	2	636	33	226	42	18	319	1168						
5:45 PM	71	9	21	0	0	101	101	10	33	0	144	51	377	95	1	524	60	232	50	29	371	1140						
Total Volume	236	27	104	0	0	367	335	47	145	0	523	239	1735	360	4	2338	196	916	187	108	1407	4639						
% App. Total	64.3	7.4	28.3	0.0	0.0	100	63.6	8.9	27.5	0.0	100	10.2	74.2	15.4	0.2	100	13.9	65.1	13.3	7.7	100							
PHF	0.908												0.915						0.919						0.921		0.993	
Cars, PU, Vans	236	26	104	0	0	366	334	47	145	0	526	238	1701	359	4	2302	196	899	186	107	1388	4582						
% Cars, PU, Vans	100.0	96.3	100.0	0.0	0.0	99.7	99.7	100.0	100.0	0.0	99.8	99.6	98.0	99.7	100.0	98.5	100.0	98.1	99.5	99.1		98.6	98.8					
Heavy Trucks	0	1	0	0	0	1	1	0	0	0	1	1	34	1	0	36	0	17	1	1	19	57						
% Heavy Trucks	0.0	3.7	0.0	0.0	0.3		0.3	0.0	0.0	0.0	0.2	0.4	2.0	0.3	0.0	1.5	0.0	1.9	0.5	0.9	1.4		1.2					

# Hinton Oaks Blvd & Shoppes/Midway Dwy

## Peak Hour Turning Movement Count

ID: 20-09026-005  
City: Knightdale

Day: Thursday  
Date: 01/30/2020





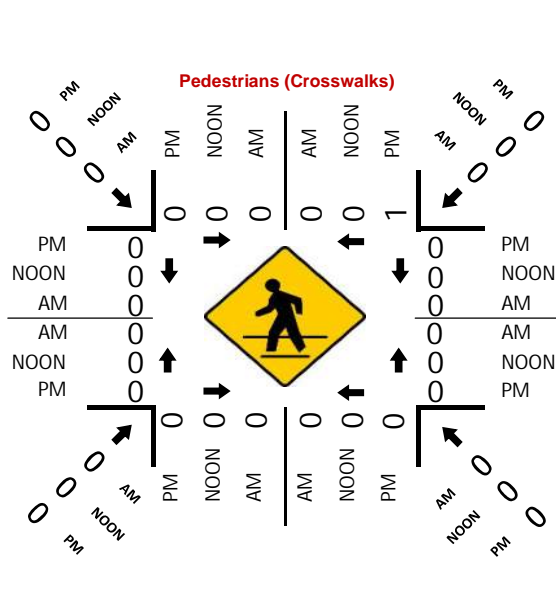
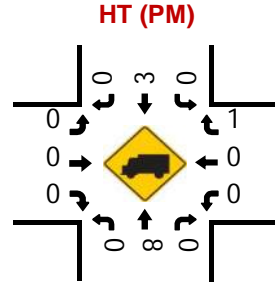
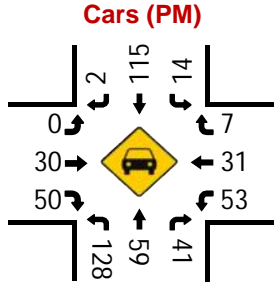
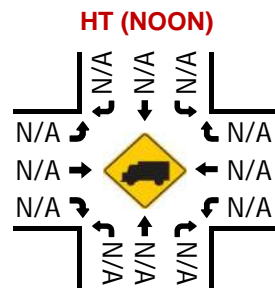
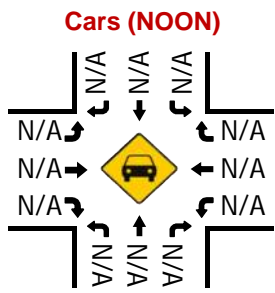
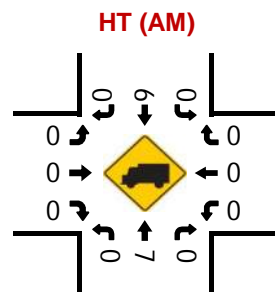
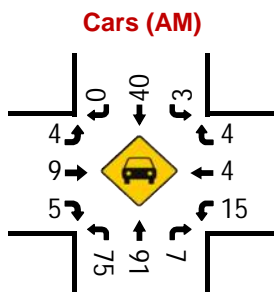
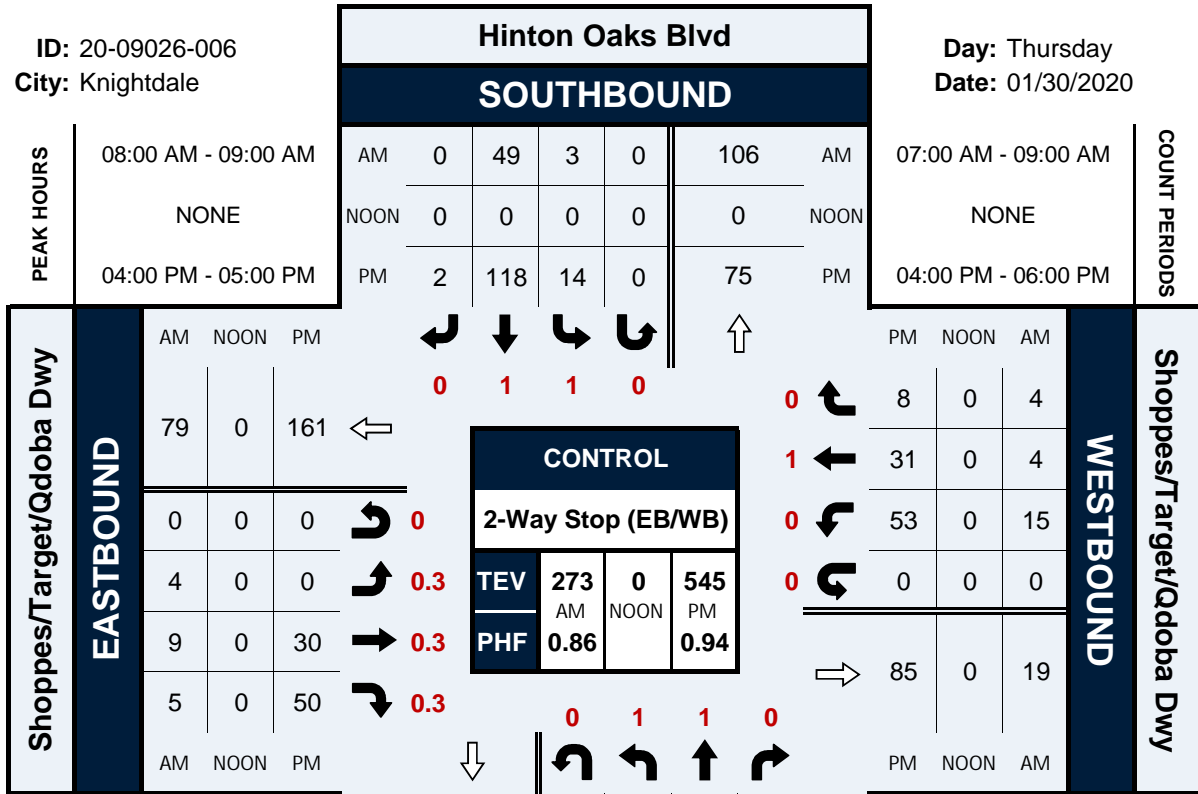


# Hinton Oaks Blvd & Shoppes/Target/Qdoba Dwy

## Peak Hour Turning Movement Count

ID: 20-09026-006  
City: Knightdale

Day: Thursday  
Date: 01/30/2020



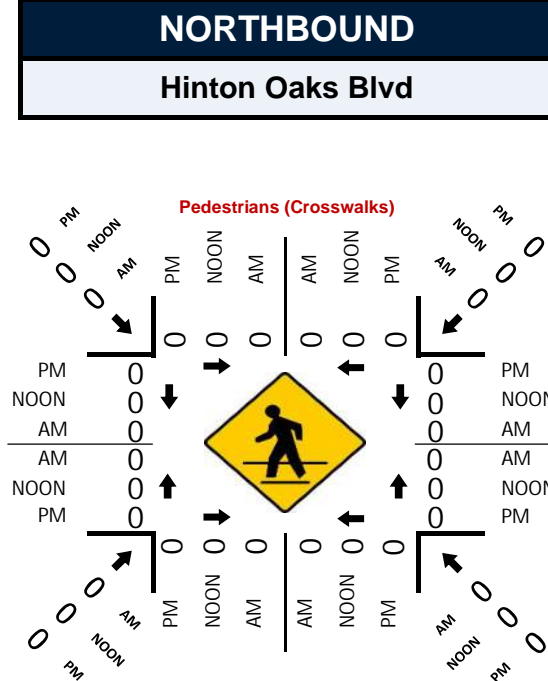
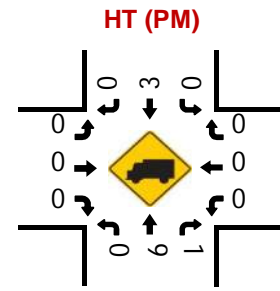
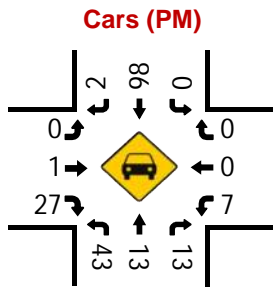
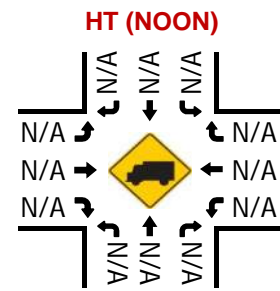
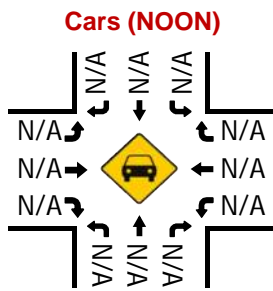
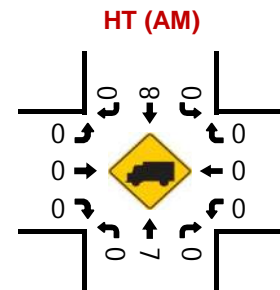
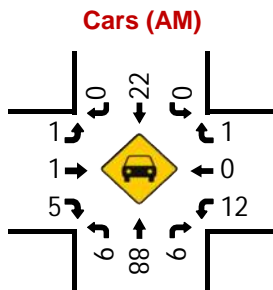
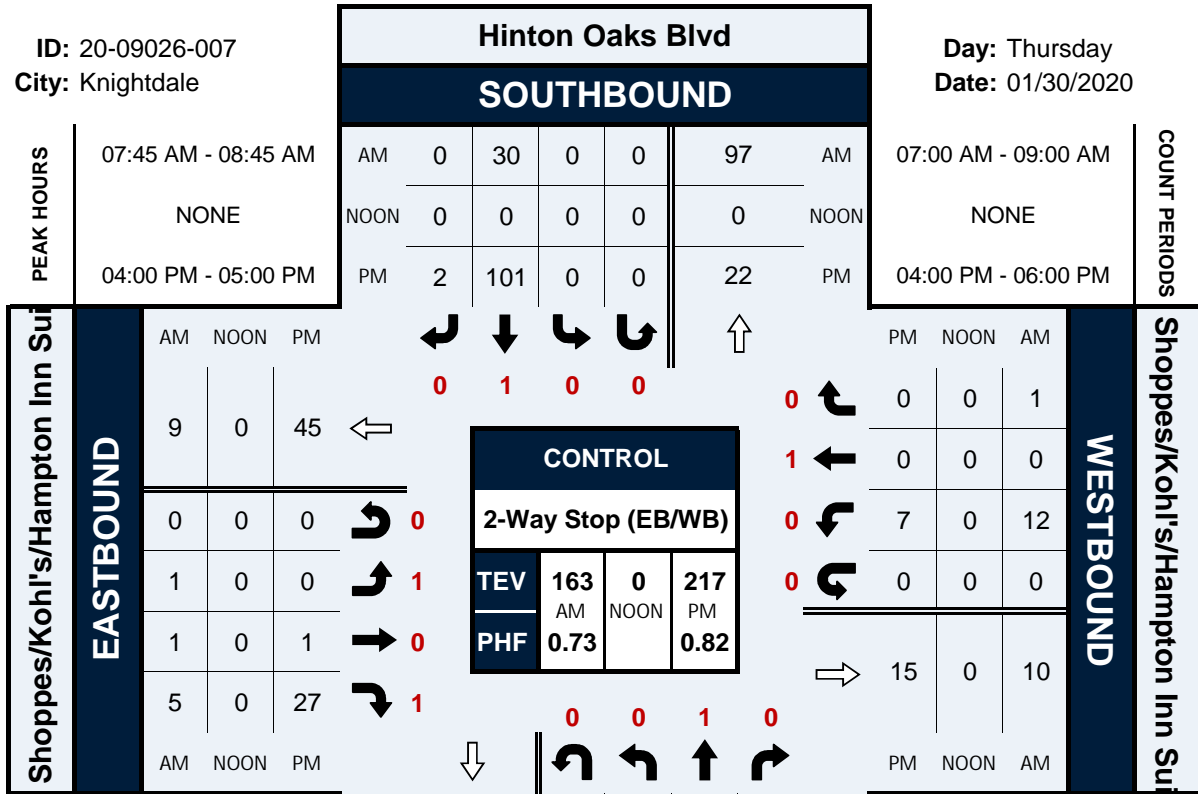


# Hinton Oaks Blvd & Shoppes/Kohl's/Hampton Inn Suites Dwy

## Peak Hour Turning Movement Count

ID: 20-09026-007  
City: Knightdale

Day: Thursday  
Date: 01/30/2020



Groups Printed - Cars, PU, Vans - Heavy Trucks

Table with 24 columns: Start Time, Hinton Oaks Blvd Northbound (Left, Thru, Rgt, Uturn, Peds, App. Total), Hinton Oaks Blvd Southbound (Left, Thru, Rgt, Uturn, Peds, App. Total), Shoppes/Kohl's/Hampton Inn Suites Dwy Eastbound (Left, Thru, Rgt, Uturn, Peds, App. Total), Shoppes/Kohl's/Hampton Inn Suites Dwy Westbound (Left, Thru, Rgt, Uturn, Peds, App. Total), Int. Total. Rows include time intervals from 7:00 AM to 8:45 AM, PM intervals from 4:00 PM to 5:45 PM, Grand Total, and breakdowns for Cars, PU, Vans, and Heavy Trucks.

PEAK HOURS

AM  
Table with 24 columns: Start Time, Hinton Oaks Blvd Northbound, Hinton Oaks Blvd Southbound, Shoppes/Kohl's/Hampton Inn Suites Dwy Eastbound, Shoppes/Kohl's/Hampton Inn Suites Dwy Westbound, Int. Total. Includes peak hour analysis (07:00 AM to 09:00 AM), peak hour for entire intersection (07:45 AM), and volume/PHF data.

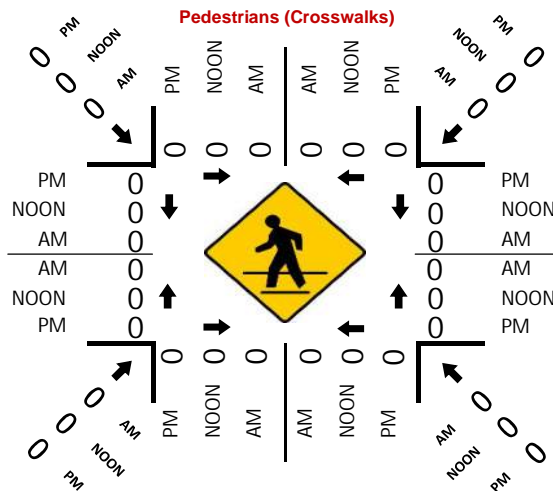
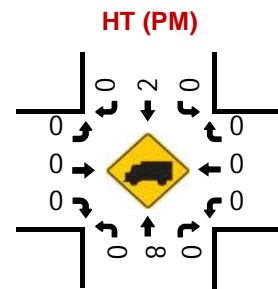
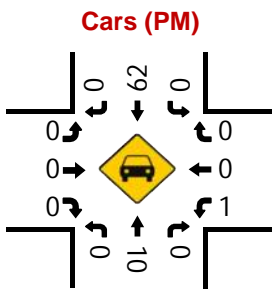
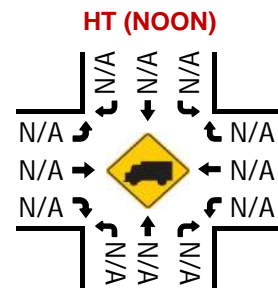
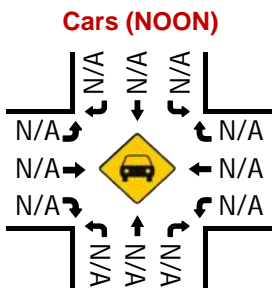
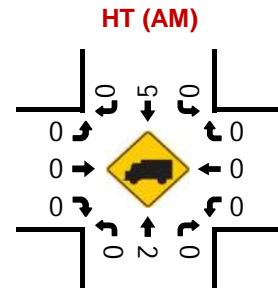
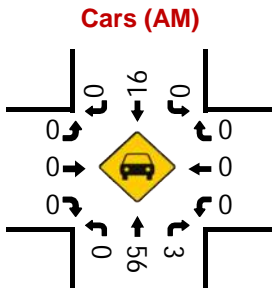
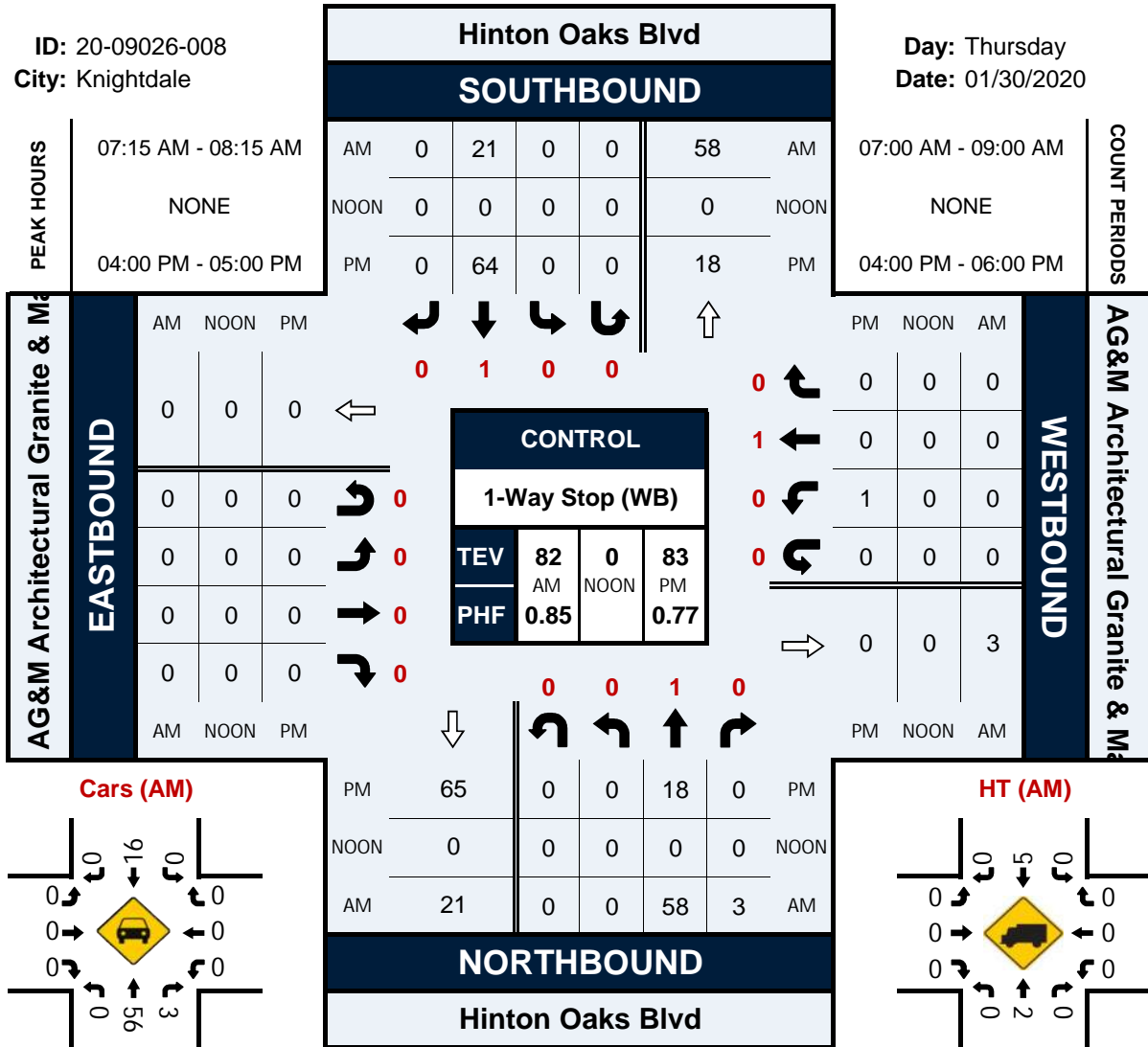
PM  
Table with 24 columns: Start Time, Hinton Oaks Blvd Northbound, Hinton Oaks Blvd Southbound, Shoppes/Kohl's/Hampton Inn Suites Dwy Eastbound, Shoppes/Kohl's/Hampton Inn Suites Dwy Westbound, Int. Total. Includes peak hour analysis (04:00 PM to 06:00 PM), peak hour for entire intersection (04:00 PM), and volume/PHF data.

# Hinton Oaks Blvd & AG&M Architectural Granite & Marble South Dwy

## Peak Hour Turning Movement Count

ID: 20-09026-008  
City: Knightdale

Day: Thursday  
Date: 01/30/2020





**Appendix D:**  
**Approved Development**

October 11, 2019

Chris Hills, AICP, CZO  
Town of Knightdale  
950 Steeple Square Court  
Knightdale, NC 27545  
Phone: 919.217.2240  
Email: [chris.hills@knightdalenc.gov](mailto:chris.hills@knightdalenc.gov)

Subject: Hinton Oaks Industrial – **Trip Generation Letter**  
Knightdale, North Carolina

Dear Mr. Hills:

This letter provides an estimate of the updated trip generation and a comparison to the previously submitted and approved TIA for the existing Hinton Oaks Industrial facility located along Hinton Oaks Boulevard in Knightdale, North Carolina. The existing facility is approximately 262,500 square feet (s.f.) with three operational buildings and 172 employees present during a shift. The previous master plan included two (2) 120,000 s.f. buildings that are not fully operational at the time of this study. The proposed expansion is expected to add approximately 100 employees, and up to an additional 250,000 s.f. for a total square footage of 752,500 s.f. with approximately 272 employees present during a shift. Site access for the existing three-building facility is provided via five (5) site driveways along Hinton Oaks Boulevard. The expansion is expected to add two (2) additional site driveways bringing the total number of site driveways for the proposed development to seven. A Traffic Impact Analysis (TIA) was conducted for the existing Hinton Oaks Industrial facility (formerly named Knightdale Industrial Center) in July of 2014 and was updated in September of 2014. The original and updated TIA assumed an approximate 502,500 s.f. warehouse development at full build-out. Refer to the attachments for excerpts from the updated TIA. It should be noted that roadway improvements were identified and implemented based on the assumptions of trips calculated in the updated TIA conducted in September 2014.

### **Trip Generation**

Average weekday AM and PM peak hour trips for the existing Hinton Oaks Industrial facility were estimated using traffic counts conducted by Ramey Kemp & Associates, Inc. (RKA), at the five operational site driveways in September of 2019 during weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods. It should be noted that these times are expected to capture the shift changes of the facility. Refer to the attachments for the count data at the existing site drives. Table 1 provides the current number of trips generated from the existing facility based on the 2019 traffic count data. The table also shows trip generation rates calculated for the expansion of the facility using the trip generation data gathered from the existing facility.



**Table 1: Trip Generation for Existing Hinton Oaks Industrial Facility**

Land Use	Intensity	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
		Enter	Exit	Enter	Exit
Existing Hinton Oaks Industrial Facility	172 employees	74	15	28	79
<b>Calculated Trip Generation Rates (based on 2019 traffic count data)</b>					
<b>AM Peak Hour Rate</b>			<b>PM Peak Hour Rate</b>		
0.52 trips/employee			0.62 trips/employee		
Enter: 83%	Exit: 17%	Enter: 26%	Exit: 74%		

As shown in Table 1, September 2019 traffic count data estimates that the existing facility is currently generating 89 trips (74 entering and 15 exiting) during the weekday AM peak hour and 107 trips (28 entering and 79 exiting) during the weekday PM peak hour. It should be noted that the development was built-out to approximately 262,500 s.f. with 172 employees present during the shift that count data was collected.

Trip generation data for the existing facility was utilized to calculate a rate (trips per employee) for the weekday AM and PM peak hours. Illustrated in Table 1, the weekday AM peak hour is expected to generate 0.52 trips per employee for the expanded Hinton Oaks Industrial facility, with 83% of vehicles entering and 17% of vehicles exiting. The weekday PM peak hour is estimated to generate 0.62 trips per employee for the expanded facility, with 26% of vehicles entering and 74% of vehicles exiting. Table 2, below, shows the number of trips expected to be generated by the expanded facility based on the weekday AM and PM peak hour rates calculated in Table 1.

**Table 2: Trip Generation for Expanded Hinton Oaks Industrial Facility**

Land Use (ITE Code)	Intensity	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
		Enter	Exit	Enter	Exit
Existing Hinton Oaks Industrial Facility	172 employees	74	15	28	79
Proposed Expansion	100 employees	43	9	16	46
<b>Expanded Hinton Oaks Industrial Facility (Total)</b>	<b>272 employees</b>	<b>117</b>	<b>24</b>	<b>44</b>	<b>125</b>

Based on the trip generation rates calculated in Table 1, Table 2 shows that the expanded Hinton Oaks Industrial facility is expected to generate 141 total trips (117 entering and 24 exiting) during the weekday AM peak hour and 169 trips (44 entering and 125 exiting) during the weekday PM peak hour.

Table 3, below, provides a comparison of trip generation potential for the site based on the 2014 TIA trip generation (*ITE Trip Generation Manual*, 9<sup>th</sup> Edition) and trip generation data calculated for the expanded facility.

**Table 3: Trip Generation Comparison**

Land Use (ITE Code)	Intensity	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
		Enter	Exit	Enter	Exit
Expanded Hinton Oaks Industrial Facility	272 employees	117	24	44	125
Original TIA – Hinton Oaks Industrial Facility at Full Build-Out	502,500 s.f.	158	42	42	125
<b>Difference</b>		<b>-41</b>	<b>-18</b>	<b>+2</b>	<b>0</b>

As shown in Table 3, based on the *ITE Trip Generation Manual*, 9<sup>th</sup> Edition, the updated TIA estimated that the proposed Hinton Oaks Industrial facility at full build-out was expected to generate 200 trips (158 entering and 42 exiting) during the weekday AM peak hour and 167 trips (42 entering and 125 exiting) during the weekday PM peak hour. The expanded Hinton Oaks Industrial facility is expected to generate a fewer number of trips during the weekday AM peak hour and a slightly greater number of trips in the weekday PM peak hour, compared to the number of trips calculated in the updated TIA. There are expected to be 59 fewer trips (41 entering and 18 exiting) during the weekday AM peak hour and 2 more trips (2 entering and 0 exiting) during the weekday PM peak hour.

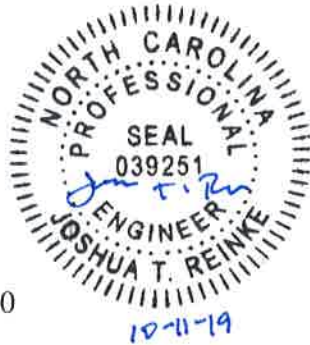
**Findings and Summary**

The calculations provided in this letter are estimations of the trip generation potential for the expanded Hinton Oaks Industrial facility based on traffic count data conducted in September of 2019. Trips generated from the expanded facility were then compared to the trip generation data calculated (using the *ITE Trip Generation Manual*, 9<sup>th</sup> Edition) in the 2014 TIA for the proposed development at full build-out. Based on the trip generation results, it is expected that the expanded Hinton Oaks Industrial facility will generate fewer trips than what was calculated for the proposed facility at full build-out in the updated TIA during the weekday AM peak hour and only 2 additional trips during the weekday PM peak hour. The improvements identified in the updated TIA are expected to sufficiently handle the existing facility with the proposed expansion.

If you should have any questions, please feel free to contact me at (919) 872-5115

Sincerely,

**RAMEY KEMP & ASSOCIATES, INC.**



Joshua Reinke, P.E.  
Transportation Manager  
NC Corporate License # C-0910

Attachments: Excerpts from Original TIA  
Count Data

UPDATED TRAFFIC IMPACT  
ANALYSIS  
FOR THE

Knightdale Industrial Center

LOCATED  
IN  
Knightdale, NORTH CAROLINA

Prepared For:  
Sam Bartton  
PO Box 190  
Knightdale, NC 27545

Prepared By:  
Ramey Kemp & Associates, Inc.  
5808 Faringdon Place, Suite 100  
Raleigh, NC 27609  
NC Corporate License # C-0910

September 2014

RKA Project #14118



## 11. RECOMMENDATIONS

Based on the findings of this study, specific geometric and traffic control improvements have been identified at study intersections. The improvements are summarized below and are illustrated in Figure 10.

### Knightdale Boulevard (US 64) and Hinton Oaks Boulevard

- Provide signal timing adjustments better accommodate the future traffic patterns and reduce queuing for the eastbound left-turn lane. It should be noted that the signal timing adjustments are not needed to maintain an overall LOS D for the combined (2023) conditions, but are needed due to the expected background increase in traffic for the eastbound left-turn movement and the additional site traffic for this movement. It should be noted that if the background traffic volumes continue to grow as expected, signal timings along the Knightdale Boulevard corridor will likely need to be retimed to best accommodate the future traffic volumes by the build-out year (2023).

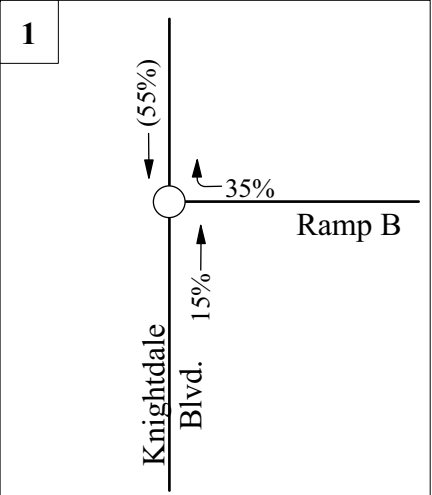
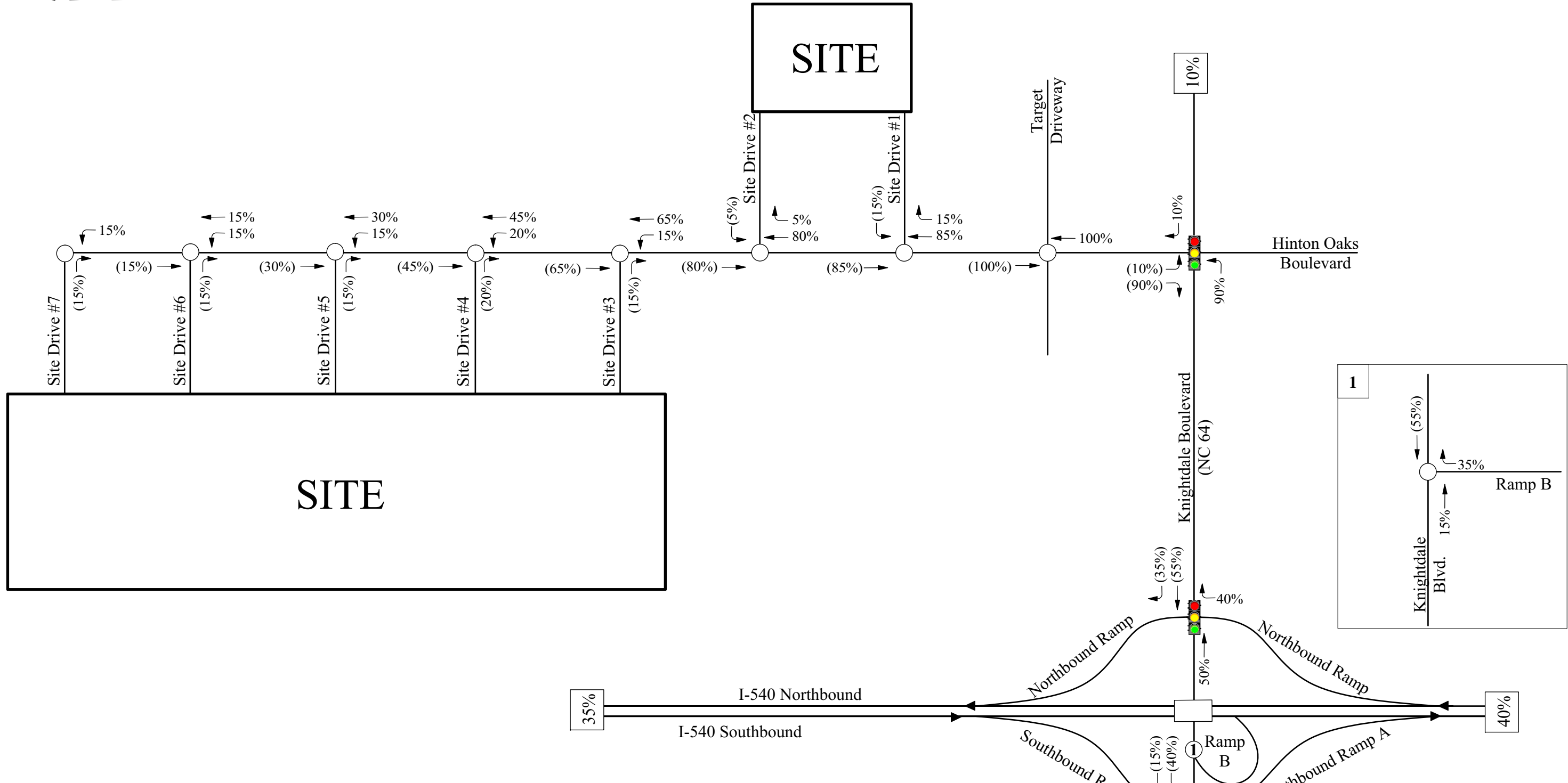
### Hinton Oaks Boulevard and Target Driveway




- While, it is not likely that this intersection will have sustained traffic volumes that would warrant a traffic signal due to the relatively low thru traffic volumes on Hinton Oaks Boulevard at site build-out, it is recommended that a traffic signal warrant be conducted when the delays become significant on the minor street approaches.

### Hinton Oaks Boulevard and Site Driveways # 1 - # 7

- Provide one (1) ingress lane and one (1) egress lane for all site driveways.
- Provide appropriate stop sign control for the minor street approaches for all site driveways.

It should be noted that the extension of Hinton Oaks Boulevard will need to be constructed to meet the Town standards.



- LEGEND**
-  Signalized Intersection
  -  Unsignalized Intersection
  - X% (Y%)  Entering (Exiting) Trips



Industrial Center Knightdale, North Carolina		
Site Trip Distribution		
	Scale: Not to Scale	Figure 6

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightsdale Industrial Center</b>
<b>Location:</b>	<b>Knightsdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>Hinton Oaks Boulevard</b>
<b>E/W Street:</b>	<b>US 64 Business (Knightsdale Boulevard)</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0
<b>Annual Growth Rate:</b>			<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0		<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	90%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	39	0	0	0	0	4	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	90%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	1	0	8
<b>Total Project Traffic</b>	39	0	0	0	0	4	0	0	0	1	0	8

### PM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	90%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	14	0	0	0	0	2	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	90%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	5	0	41
<b>Total Project Traffic</b>	14	0	0	0	0	2	0	0	0	5	0	41

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightsdale Industrial Center</b>
<b>Location:</b>	<b>Knightsdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>I-540 Northbound Ramps</b>
<b>E/W Street:</b>	<b>US 64 Business (Knightsdale Boulevard)</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0

<b>Annual Growth Rate:</b>		<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0	<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			I-540 Northbound Ramps <u>Northbound</u>			I-540 Northbound Ramps <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	50%	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%
Inbound Project Traffic	0	22	0	0	0	0	0	0	17	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	55%	35%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	5	3	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	22	0	0	5	3	0	0	17	0	0	0

### PM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			I-540 Northbound Ramps <u>Northbound</u>			I-540 Northbound Ramps <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	50%	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%
Inbound Project Traffic	0	8	0	0	0	0	0	0	6	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	55%	35%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	25	16	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	8	0	0	25	16	0	0	6	0	0	0



## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightsdale Industrial Center</b>
<b>Location:</b>	<b>Knightsdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>I-540 Southbound Ramps</b>
<b>E/W Street:</b>	<b>US 64 Business (Knightsdale Boulevard)</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0
<b>Annual Growth Rate:</b>			<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0		<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			I-540 Southbound Ramps <u>Northbound</u>			I-540 Southbound Ramps <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	15%	0%	0%	0%	0%	0%	0%	35%	0%	0%	0%
Inbound Project Traffic	0	6	0	0	0	0	0	0	15	0	0	0
Percent Assignment Outbound	0%	0%	0%	40%	15%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	4	1	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	6	0	4	1	0	0	0	15	0	0	0

### PM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			I-540 Southbound Ramps <u>Northbound</u>			I-540 Southbound Ramps <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	15%	0%	0%	0%	0%	0%	0%	35%	0%	0%	0%
Inbound Project Traffic	0	2	0	0	0	0	0	0	6	0	0	0
Percent Assignment Outbound	0%	0%	0%	40%	15%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	18	7	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	2	0	18	7	0	0	0	6	0	0	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightsdale Industrial Center</b>
<b>Location:</b>	<b>Knightsdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>Widewaters Parkway</b>
<b>E/W Street:</b>	<b>US 64 Business (Knightsdale Boulevard)</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0

<b>Annual Growth Rate:</b>		<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0	<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			Widewaters Parkway <u>Northbound</u>			Widewaters Parkway <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	4	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	1	0	0	0	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	1	0	0	4	0	0	0	0	0	0	0

### PM PEAK HOUR

Description	US 64 Business (Knightsdale <u>Eastbound</u> )			US 64 Business (Knightsdale <u>Westbound</u> )			Widewaters Parkway <u>Northbound</u>			Widewaters Parkway <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	2	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	5	0	0	0	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	5	0	0	2	0	0	0	0	0	0	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightdale Industrial Center</b>
<b>Location:</b>	<b>Knightdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>Hinton Oaks Boulevard</b>
<b>E/W Street:</b>	<b>Shoppes at Midway Driveway</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0
<b>Annual Growth Rate:</b>			<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0		<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	Shoppes at Midway Driveway <u>Eastbound</u>			Shoppes at Midway Driveway <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	43	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	43	0	0	9	0

### PM PEAK HOUR

Description	Shoppes at Midway Driveway <u>Eastbound</u>			Shoppes at Midway Driveway <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	16	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	46	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	16	0	0	46	0

## INTERSECTION ANALYSIS SHEET

**Project:** Knightdale Industrial Center  
**Location:** Knightdale, NC  
**Scenario:** Approved Development Assignment  
**N/S Street:** Hinton Oaks Boulevard  
**E/W Street:** Shoppes at Midway Driveway/Midtown Commons Driveway

	AM In	AM Out	PM In	PM Out
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0
<b>Annual Growth Rate:</b>				
<b>Growth Factor:</b>	0			
<b>Existing Year:</b>	0			
<b>Buildout Year:</b>	0			

### AM PEAK HOUR

Description	Shoppes at Midway <u>Eastbound</u>			Shoppes at Midway <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	43	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	43	0	0	9	0

### PM PEAK HOUR

Description	Shoppes at Midway <u>Eastbound</u>			Shoppes at Midway <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	16	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	46	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	16	0	0	46	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightsdale Industrial Center</b>
<b>Location:</b>	<b>Knightsdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>Hinton Oaks Boulevard</b>
<b>E/W Street:</b>	<b>Hinton Pond Road</b>

AM In    AM Out    PM In    PM Out

<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0

<b>Annual Growth Rate:</b>		<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0	<b>Buildout Year:</b>	0

### AM PEAK HOUR

Description	Hinton Pond Road <u>Eastbound</u>			Hinton Pond Road <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	43	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	43	0	0	9	0

### PM PEAK HOUR

Description	Hinton Pond Road <u>Eastbound</u>			Hinton Pond Road <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	16	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	46	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	16	0	0	46	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>Knightdale Industrial Center</b>
<b>Location:</b>	<b>Knightdale, NC</b>
<b>Scenario:</b>	<b>Approved Development Assignment</b>
<b>N/S Street:</b>	<b>Hinton Oaks Boulevard</b>
<b>E/W Street:</b>	<b>Site Driveway 2</b>

	AM In	AM Out	PM In	PM Out
<b>Net New Trips:</b>	43	9	16	46
<b>Pass-By Trips:</b>	0	0	0	0

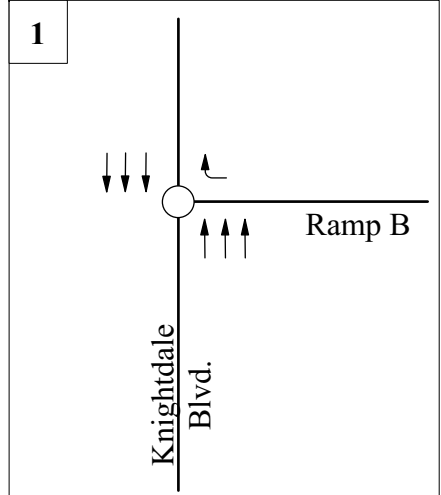
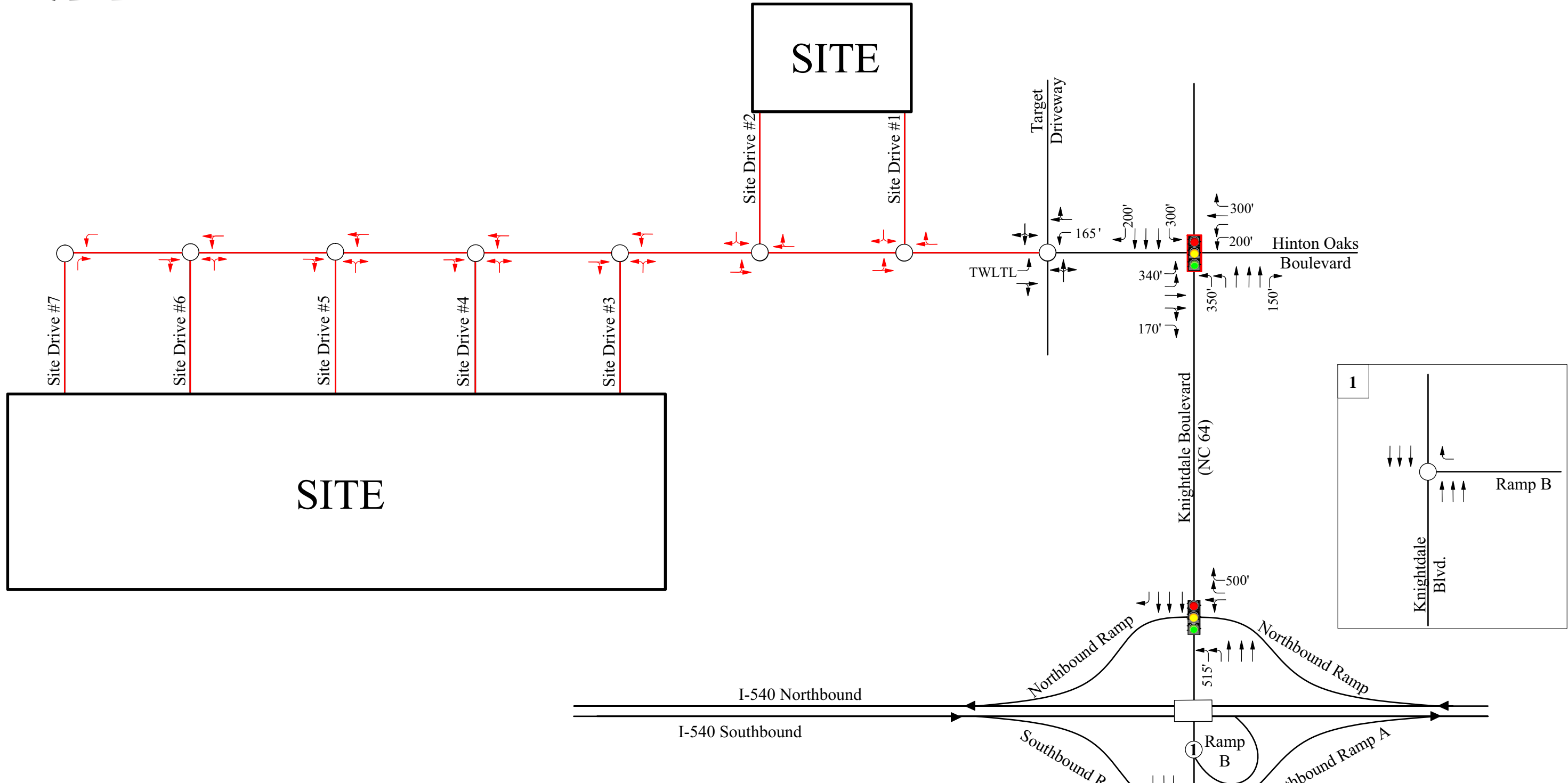
<b>Annual Growth Rate:</b>		<b>Existing Year:</b>	0
<b>Growth Factor:</b>	0	<b>Buildout Year:</b>	0

### AM PEAK HOUR






Description	- <u>Eastbound</u>			Site Driveway 2 <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	43	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	9	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	43	0	0	9	0

### PM PEAK HOUR

Description	- <u>Eastbound</u>			Site Driveway 2 <u>Westbound</u>			Hinton Oaks Boulevard <u>Northbound</u>			Hinton Oaks Boulevard <u>Southbound</u>		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>												
Percent Assignment Inbound	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
Inbound Project Traffic	0	0	0	0	0	0	0	16	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	46	0
<b>Total Project Traffic</b>	0	0	0	0	0	0	0	16	0	0	46	0



**LEGEND**

-  Signalized Intersection
-  Unsignalized Intersection
-  Existing Lane with Storage
-  Recommended Lane with Storage
-  Phasing/Signal Timing Improvements - Needed for Queue Reduction, Not for LOS D



Industrial Center Knightdale, North Carolina		
Recommended Lanes		
	Scale: Not to Scale	Figure 10

**Traffic Impact Analysis  
for  
ParkStone  
Knightdale, North Carolina**

**Prepared for:  
The Widewaters Group, Inc.  
Charlotte, NC**

**Prepared by:  
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**August 2016  
017254001**



8/19/2016

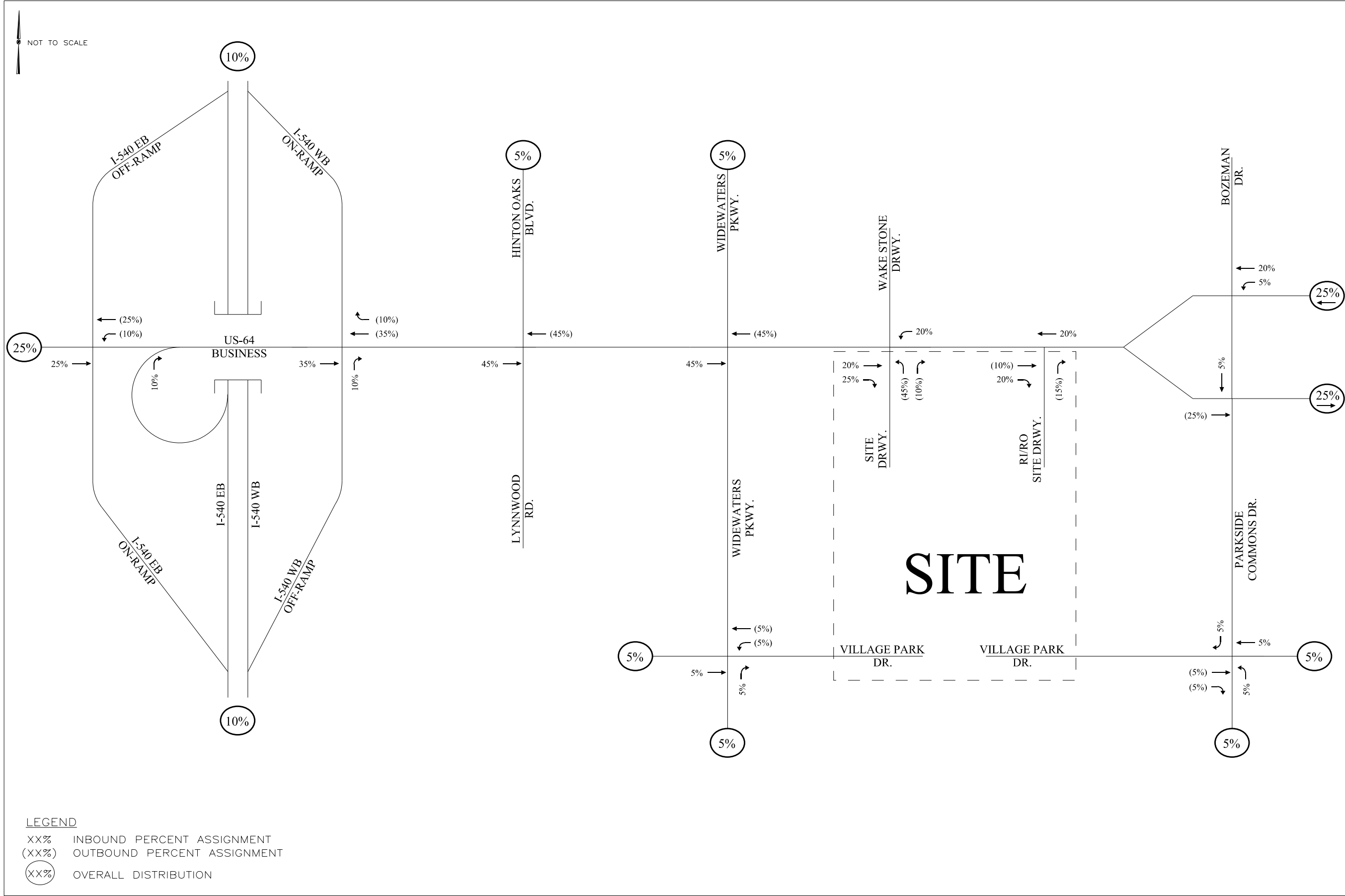


## Executive Summary

Kimley-Horn and Associates, Inc. has revised the original Traffic Impact Analysis dated May 13, 2016 for the proposed ParkStone multi-use development to address comments provided by both the North Carolina Department of Transportation (NCDOT) and the Town of Knightdale. This development is proposed to be located south of US 64 Business across from the Wake Stone quarry in Knightdale, NC. The site is currently vacant and adjacent land uses are generally a mix of commercial and residential. As currently envisioned, the development will consist of approximately 350 apartments, a 130-room hotel, a 12-screen movie theater, approximately 212,500 square feet of general retail space, and three outparcels, which were assumed to include an 8,000 SF automobile parts sales store, a 2,500 SF fast-food restaurant, and a gas station with 12 fueling positions. The development is proposed to be accessed by one full-movement driveway on US 64 Business across from the Wake Stone Driveway and one right-in/right-out site driveway on US 64 Business, as well as the extension of Village Park Drive through the site. Build-out of the development is anticipated in 2019, so the horizon years 2020 and 2029 were studied as part of this analysis per Town of Knightdale requirements.

This report presents trip generation, distribution, traffic analyses, and recommendations for transportation improvements required to meet anticipated traffic demands in conjunction with the development. The traffic conditions studied include the existing (2016) traffic condition, the projected (2020) background and build-out traffic conditions, and the projected (2029) background and build-out traffic conditions. The weekday AM and PM peak hours were studied.

As shown in table ES-1, the proposed development has the potential to generate 6,356 new trips in and 6,356 new trips out during a typical weekday with 264 new trips entering and 285 new trips exiting during the AM peak hour and 475 new trips entering and 464 new trips exiting during the PM peak hour.



PARKSTONE  
KNIGHTDALE, NC  
TRAFFIC IMPACT ANALYSIS

SITE TRAFFIC DISTRIBUTION  
AND PERCENT ASSIGNMENT

FIGURE  
4

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

**ParkStone**  
**Table 1 - Trip Generation**

Land Use	Intensity		Daily			AM Peak Hour			PM Peak Hour			
			Total	In	Out	Total	In	Out	Total	In	Out	
220 Apartment	350	d.u.	2,246	1,123	1,123	175	35	140	210	137	73	
310 Hotel	130	rooms	1,062	531	531	69	41	28	78	40	38	
445 Multiplex Movie Theater <sup>3</sup>	12	screens	1,640	820	820	-	-	-	164	74	90	
820 Shopping Center	212,550	s.f.	11,086	5,543	5,543	247	153	94	993	477	516	
843 Automobile Parts Sales	8,000	s.f.	498	249	249	18	9	9	48	24	24	
934 Fast-Food Restaurant with Drive-Through Window	3,500	s.f.	1,736	868	868	159	81	78	114	59	55	
945 Gasoline/Service Station with Convenience Market	12	f.p.	1,954	977	977	122	61	61	162	81	81	
<b>Subtotal</b>			<b>20,222</b>	<b>10,111</b>	<b>10,111</b>	<b>790</b>	<b>380</b>	<b>410</b>	<b>1,769</b>	<b>892</b>	<b>877</b>	
<i>Internal Capture</i>												
Apartment			793	387	406	20	3	17	119	78	41	
Hotel			236	108	128	9	2	7	22	13	9	
Multiplex Movie Theater <sup>3</sup>			265	142	123	0	0	0	49	23	26	
Shopping Center			1,156	529	627	24	11	13	153	65	88	
Automobile Parts Sales			52	24	29	2	1	1	7	3	4	
Fast-Food Restaurant with Drive-Through Window			964	552	412	55	40	15	71	30	41	
Gasoline/Service Station with Convenience Market			204	93	110	13	4	8	25	11	14	
<b>Internal Capture Total</b>			<b>25.21%</b>	<b>3,670</b>	<b>1,835</b>	<b>1,835</b>	<b>122</b>	<b>61</b>	<b>61</b>	<b>446</b>	<b>223</b>	<b>223</b>
<b>Total External Trips</b>				<b>16,552</b>	<b>8,276</b>	<b>8,276</b>	<b>668</b>	<b>319</b>	<b>349</b>	<b>1,323</b>	<b>669</b>	<b>654</b>
<i>Pass-By Traffic (ITE)</i>			<u>AM</u>	<u>PM</u>								
820 Shopping Center	0%	34%	2,850	1425	1,425	0	0	0	285	140	145	
934 Fast-Food Restaurant with Drive-Through Window	49%	50%	220	110	110	51	20	31	22	15	7	
945 Gasoline/Service Station with Convenience Market	62%	56%	770	385	385	68	35	33	77	39	38	
Pass-By Total:	<b>21.71%</b>		<b>3,840</b>	<b>1,920</b>	<b>1,920</b>	<b>119</b>	<b>55</b>	<b>64</b>	<b>384</b>	<b>194</b>	<b>190</b>	
<b>Total Net New External Trips</b>				<b>12,712</b>	<b>6,356</b>	<b>6,356</b>	<b>549</b>	<b>264</b>	<b>285</b>	<b>939</b>	<b>475</b>	<b>464</b>
<b>Total Trips from Developed Land Uses</b>				<b>2,433</b>	<b>1,235</b>	<b>1,199</b>	<b>196</b>	<b>54</b>	<b>143</b>	<b>151</b>	<b>90</b>	<b>61</b>
<b>Total Trips Remaining</b>				<b>10,278</b>	<b>5,121</b>	<b>5,157</b>	<b>353</b>	<b>210</b>	<b>142</b>	<b>788</b>	<b>385</b>	<b>403</b>

<sup>3</sup> For the Multiplex Movie Theater land use, daily trip generation was not provided in the ITE Trip Generation Manual. Therefore, it was estimated to be 10 times the PM peak hour.

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	ParkStone
<b>Location:</b>	Knightdale, NC
<b>N/S Street:</b>	Hinton Oaks Blvd./Lynnwood Rd.
<b>E/W Street:</b>	US 64 Business

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	210	142	385	403
<b>Pass-By Trips:</b>	55	64	194	190

### AM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				Lynwood Rd. <u>Northbound</u>			Hinton Oaks Blvd. <u>Southbound</u>		
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>														
Percent Assignment Inbound	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	95	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	64	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	95	0	0	0	64	0	0	0	0	0	0	0

### PM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				Lynwood Rd. <u>Northbound</u>			Hinton Oaks Blvd. <u>Southbound</u>		
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>														
Percent Assignment Inbound	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	173	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	181	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	173	0	0	0	181	0	0	0	0	0	0	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>ParkStone</b>
<b>Location:</b>	<b>Knightdale, NC</b>
<b>N/S Street:</b>	<b>NC 540 WB Ramps</b>
<b>E/W Street:</b>	<b>US 64 Business</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Full Development Net New Trips:</b>	210	142	385	403
<b>Full Development Pass-By Trips:</b>	55	64	194	190

### AM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>			NC 540 WB Ramps <u>Northbound</u>			NC 540 WB Ramps <u>Southbound</u>		
	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>													
Percent Assignment Inbound	0%	0%	35%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%
Inbound Project Traffic	0	0	74	0	0	0	0	0	0	21	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	35%	10%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	50	14	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	74	0	0	50	14	0	0	21	0	0	0

### PM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>			NC 540 WB Ramps <u>Northbound</u>			NC 540 WB Ramps <u>Southbound</u>		
	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>													
Percent Assignment Inbound	0%	0%	35%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%
Inbound Project Traffic	0	0	135	0	0	0	0	0	0	38	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	35%	10%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	141	40	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	135	0	0	141	40	0	0	38	0	0	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	<b>ParkStone</b>
<b>Location:</b>	<b>Knightdale, NC</b>
<b>N/S Street:</b>	<b>NC 540 EB Ramps</b>
<b>E/W Street:</b>	<b>US 64 Business</b>

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	210	142	385	403
<b>Pass-By Trips:</b>	55	64	194	190

### AM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				NC 540 EB Ramps <u>Northbound</u>			NC 540 EB Ramps <u>Southbound</u>		
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>														
Percent Assignment Inbound	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%
Inbound Project Traffic	0	0	53	0	0	0	0	0	0	0	21	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	10%	25%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	14	36	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	53	0	0	14	36	0	0	0	21	0	0	0

### PM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				NC 540 EB Ramps <u>Northbound</u>			NC 540 EB Ramps <u>Southbound</u>		
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
<b>Project Traffic</b>														
Percent Assignment Inbound	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%
Inbound Project Traffic	0	0	96	0	0	0	0	0	0	0	38	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	10%	25%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	40	101	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	96	0	0	40	101	0	0	0	38	0	0	0

## INTERSECTION ANALYSIS SHEET

<b>Project:</b>	ParkStone
<b>Location:</b>	Knightdale, NC
<b>N/S Street:</b>	Widewaters Parkway
<b>E/W Street:</b>	US 64 Business

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
<b>Net New Trips:</b>	210	142	385	403
<b>Pass-By Trips:</b>	55	64	194	190

### AM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				Widewaters Parkway <u>Northbound</u>			Widewaters Parkway <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right
<b>Project Traffic</b>															
Percent Assignment Inbound	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inbound Project Traffic	0	0	95	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%
Outbound Project Traffic	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	95	0	0	0	64	0	0	0	0	0	0	0	0

### PM PEAK HOUR

Description	US 64 Business <u>Eastbound</u>				US 64 Business <u>Westbound</u>				Widewaters Parkway <u>Northbound</u>			Widewaters Parkway <u>Southbound</u>			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	U-Turn	Left	Through	Right
<b>Project Traffic</b>															
Percent Assignment Inbound	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.00%
Inbound Project Traffic	0	0	173	0	0	0	0	0	0	0	0	0	0	0	0
Percent Assignment Outbound	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	181	0	0	0	0	0	0	0	0
<b>Total Project Traffic</b>	0	0	173	0	0	0	181	0	0	0	0	0	0	0	0

**Appendix E:**  
**Intersection Spreadsheets**



**INTERSECTION ANALYSIS SHEET**

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	US 64 Business (Knightdale Blvd)

Net New Trips:	AM In	AM Out	PM In	PM Out
	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR  
AM PHF = 0.94**

Description	US 64 Business (Knightdale Blvd)				US 64 Business (Knightdale Blvd)				Hinton Oaks Blvd			Hinton Oaks Blvd		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	1	124	898	51	4	17	1809	45	257	5	57	35	8	24
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	1	124	898	51	4	17	1809	45	257	5	57	35	8	24
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	16	113	6	1	2	227	6	32	1	7	4	1	3
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	13	95	5	0	2	191	5	27	1	6	4	1	3
Approved Developments														
Knightdale Industrial Center	0	39	0	0	0	0	0	4	0	0	0	1	0	8
Parkstone	0	0	95	0	0	0	64	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	39	95	0	0	0	64	4	0	0	0	1	0	8
2023 Background Traffic	1	179	1106	57	5	19	2100	55	289	6	64	40	9	35
2032 Background Traffic	1	192	1201	62	5	21	2291	60	316	7	70	44	10	38
Project Traffic														
Percent Assignment Inbound	0.00%	85.00%	0.00%	0.00%	0.00%	0.00%	15.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	203	0	0	0	0	0	36	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	15.00%	0.00%	85.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	7	0	37
Total Project Traffic	0	203	0	0	0	0	0	36	0	0	0	7	0	37
2023 Buildout Total	1	382	1106	57	5	19	2100	91	289	6	64	47	9	72
2032 Buildout Total	1	395	1201	62	5	21	2291	96	316	7	70	51	10	75

**PM PEAK HOUR  
PM PHF = 0.95**

Description	US 64 Business (Knightdale Blvd)				US 64 Business (Knightdale Blvd)				Hinton Oaks Blvd			Hinton Oaks Blvd		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	3	48	276	19	1	4	163	8	14	3	7	15	2	11
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	2	40	232	16	1	3	137	7	12	3	6	12	1	9
Approved Developments														
Knightdale Industrial Center	0	14	0	0	0	0	0	2	0	0	0	5	0	41
Parkstone	0	0	173	0	0	0	181	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	14	173	0	0	0	181	2	0	0	0	5	0	41
2023 Background Traffic	26	442	2649	171	6	37	1640	77	125	28	61	138	14	138
2032 Background Traffic	28	482	2881	187	7	40	1777	84	137	31	67	150	15	147
Project Traffic														
Percent Assignment Inbound	0.00%	85.00%	0.00%	0.00%	0.00%	0.00%	15.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	52	0	0	0	0	0	9	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	15.00%	0.00%	85.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	33	0	186
Total Project Traffic	0	52	0	0	0	0	0	9	0	0	0	33	0	186
2023 Buildout Total	26	494	2649	171	6	37	1640	86	125	28	61	171	14	324
2032 Buildout Total	28	534	2881	187	7	40	1777	93	137	31	67	183	15	333

### INTERSECTION ANALYSIS SHEET

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	I-540 Northbound Ramps
E/W Street:	US 64 Business (Knightdale Blvd)

Net New Trips:	AM In	AM Out	PM In	PM Out
Pass-By Trips:	239	44	61	219
	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

#### AM PEAK HOUR AM PHF = 0.91

Description	US 64 Business (Knightdale Blvd)			US 64 Business (Knightdale Blvd)			I-540 Northbound Ramps			I-540 Northbound Ramps		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	373	865	0	0	1460	703	57	4	304	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	373	865	0	0	1460	703	57	4	304	0	0	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	47	109	0	0	183	88	7	1	38	0	0	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	39	91	0	0	154	74	6	0	32	0	0	0
Approved Developments												
Knightdale Industrial Center	0	22	0	0	5	3	0	0	17	0	0	0
Parkstone	0	74	0	0	50	14	0	0	21	0	0	0
Total Approved Dev. Traffic	0	96	0	0	55	17	0	0	38	0	0	0
2023 Background Traffic	420	1070	0	0	1698	808	64	5	380	0	0	0
2032 Background Traffic	459	1161	0	0	1852	882	70	5	412	0	0	0
Project Traffic												
Percent Assignment Inbound	0.00%	35.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	84	0	0	0	0	0	0	120	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	60.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	26	11	0	0	0	0	0	0
Total Project Traffic	0	84	0	0	26	11	0	0	120	0	0	0
2023 Buildout Total	420	1154	0	0	1724	819	64	5	500	0	0	0
2032 Buildout Total	459	1245	0	0	1878	893	70	5	532	0	0	0

#### PM PEAK HOUR PM PHF = 0.96

Description	US 64 Business (Knightdale Blvd)			US 64 Business (Knightdale Blvd)			I-540 Northbound Ramps			I-540 Northbound Ramps		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	327	2368	0	0	1144	466	75	0	576	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	327	2368	0	0	1144	466	75	0	576	0	0	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	41	297	0	0	144	58	9	0	72	0	0	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	34	250	0	0	121	49	8	0	61	0	0	0
Approved Developments												
Knightdale Industrial Center	0	8	0	0	25	16	0	0	6	0	0	0
Parkstone	0	135	0	0	141	40	0	0	38	0	0	0
Total Approved Dev. Traffic	0	143	0	0	166	56	0	0	44	0	0	0
2023 Background Traffic	368	2808	0	0	1454	580	84	0	692	0	0	0
2032 Background Traffic	402	3058	0	0	1575	629	92	0	753	0	0	0
Project Traffic												
Percent Assignment Inbound	0.00%	35.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	21	0	0	0	0	0	0	31	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	60.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	131	55	0	0	0	0	0	0
Total Project Traffic	0	21	0	0	131	55	0	0	31	0	0	0
2023 Buildout Total	368	2829	0	0	1585	635	84	0	723	0	0	0
2032 Buildout Total	402	3079	0	0	1706	684	92	0	784	0	0	0

## INTERSECTION ANALYSIS SHEET

**Project:** Hinton Oaks Industrial  
**Location:** Knightdale, NC  
**Count:** 1/30/2020  
**N/S Street:** I-540 Southbound Ramps  
**E/W Street:** US 64 Business (Knightdale Blvd)

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

### AM PEAK HOUR AM PHF = 0.94

Description	US 64 Business (Knightdale Blvd) Eastbound			US 64 Business (Knightdale Blvd) Westbound				I-540 Southbound Ramps Northbound			I-540 Southbound Ramps Southbound		
	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	932	98	1	265	1263	0	0	0	0	0	0	263
Count Balancing	0	0	0	0	0	0	0	0	0	305	0	0	0
2019 Existing Traffic	0	932	98	1	265	1263	0	0	0	305	0	0	263
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	117	12	0	33	159	0	0	0	38	0	0	33
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	98	10	0	28	133	0	0	0	32	0	0	28
<u>Approved Developments</u>													
Knightdale Industrial Center	0	6	0	0	4	1	0	0	0	15	0	0	0
Parkstone	0	53	0	0	14	36	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	59	0	0	18	37	0	0	0	15	0	0	0
2023 Background Traffic	0	1108	110	1	316	1459	0	0	0	358	0	0	296
2032 Background Traffic	0	1206	120	1	344	1592	0	0	0	390	0	0	324
<u>Project Traffic</u>													
Percent Assignment Inbound	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	24	0	0	0	0	0	0	0	60	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	50.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	22	4	0	0	0	0	0	0	0
Total Project Traffic	0	24	0	0	22	4	0	0	0	60	0	0	0
2023 Buildout Total	0	1132	110	1	338	1463	0	0	0	418	0	0	296
2032 Buildout Total	0	1230	120	1	366	1596	0	0	0	450	0	0	324

### PM PEAK HOUR PM PHF = 0.98

Description	US 64 Business (Knightdale Blvd) Eastbound			US 64 Business (Knightdale Blvd) Westbound				I-540 Southbound Ramps Northbound			I-540 Southbound Ramps Southbound		
	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	1810	67	2	178	1033	0	0	0	0	0	0	492
Count Balancing	0	0	0	0	0	0	0	0	0	883	0	0	0
2019 Existing Traffic	0	1810	67	2	178	1033	0	0	0	883	0	0	492
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	227	8	0	22	130	0	0	0	111	0	0	62
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	191	7	0	19	109	0	0	0	93	0	0	52
<u>Approved Developments</u>													
Knightdale Industrial Center	0	2	0	0	18	7	0	0	0	6	0	0	0
Parkstone	0	96	0	0	40	101	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	98	0	0	58	108	0	0	0	6	0	0	0
2023 Background Traffic	0	2135	75	2	258	1271	0	0	0	1000	0	0	554
2032 Background Traffic	0	2326	82	2	277	1380	0	0	0	1093	0	0	606
<u>Project Traffic</u>													
Percent Assignment Inbound	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	6	0	0	0	0	0	0	0	15	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	50.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	110	22	0	0	0	0	0	0	0
Total Project Traffic	0	6	0	0	110	22	0	0	0	15	0	0	0
2023 Buildout Total	0	2141	75	2	368	1293	0	0	0	1015	0	0	554
2032 Buildout Total	0	2332	82	2	387	1402	0	0	0	1108	0	0	606

**INTERSECTION ANALYSIS SHEET**

Project: **Hinton Oaks Industrial**  
 Location: **Knightsdale, NC**  
 Count: **1/30/2020**  
 N/S Street: **Widewaters Pkwy**  
 E/W Street: **US 64 Business (Knightsdale Blvd)**

Net New Trips:	AM In	AM Out	PM In	PM Out
	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR**  
**AM PHF = 0.91**

Description	US 64 Business (Knightsdale Blvd)				US 64 Business (Knightsdale Blvd)				Widewaters Pkwy			Widewaters Pkwy		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	86	785	76	22	69	1661	31	103	11	29	37	3	88
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	86	785	76	22	69	1661	31	103	11	29	37	3	88
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	11	99	10	3	9	208	4	13	1	4	5	0	11
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	9	83	8	2	7	175	3	11	1	3	4	0	9
Approved Developments														
Knightsdale Industrial Center	0	0	1	0	0	0	4	0	0	0	0	0	0	0
Parkstone	0	0	95	0	0	0	64	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	96	0	0	0	68	0	0	0	0	0	0	0
2023 Background Traffic	0	97	980	86	25	78	1937	35	116	12	33	42	3	99
2032 Background Traffic	0	106	1063	94	27	85	2112	38	127	13	36	46	3	108
Project Traffic														
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	36	0	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	7	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	7	0	0	0	36	0	0	0	0	0	0	0
2023 Buildout Total	0	97	987	86	25	78	1973	35	116	12	33	42	3	99
2032 Buildout Total	0	106	1070	94	27	85	2148	38	127	13	36	46	3	108

**PM PEAK HOUR**  
**PM PHF = 0.99**

Description	US 64 Business (Knightsdale Blvd)				US 64 Business (Knightsdale Blvd)				Widewaters Pkwy			Widewaters Pkwy		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	1	30	218	45	14	25	115	23	30	3	13	42	6	18
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	25	183	38	11	21	97	20	25	3	11	35	5	15
Approved Developments														
Knightsdale Industrial Center	0	0	5	0	0	0	2	0	0	0	0	0	0	0
Parkstone	0	0	173	0	0	0	181	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	178	0	0	0	183	0	0	0	0	0	0	0
2023 Background Traffic	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
2032 Background Traffic	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Project Traffic														
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	9	0	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	33	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	33	0	0	0	9	0	0	0	0	0	0	0
2023 Buildout Total	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
2032 Buildout Total	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178

## INTERSECTION ANALYSIS SHEET

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	Shoppes at Midway Dr

Net New Trips:	AM In	AM Out	PM In	PM Out
Pass-By Trips:	239	44	61	219
	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

### AM PEAK HOUR AM PHF = 0.87

Description	Shoppes at Midway Dr			Shoppes at Midway Dr			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	0	0	0	0	0	14	0	162	68	0	104	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	0	0	0	0	14	0	162	68	0	104	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	20	0	0	13	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	17	0	0	11	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	0	0	0	0	0	14	0	225	68	0	126	0
2032 Background Traffic	0	0	0	0	0	14	0	242	68	0	137	0
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	239	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	44	0
Total Project Traffic	0	0	0	0	0	0	0	239	0	0	44	0
2023 Buildout Total	0	0	0	0	0	14	0	464	68	0	170	0
2032 Buildout Total	0	0	0	0	0	14	0	481	68	0	181	0

### PM PEAK HOUR PM PHF = 0.92

Description	Shoppes at Midway Dr			Shoppes at Midway Dr			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	0	0	0	0	0	35	0	239	228	0	228	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	0	0	0	0	35	0	239	228	0	228	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	30	0	0	29	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	25	0	0	24	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	0	0	0	0	35	0	285	228	0	303	0
2032 Background Traffic	0	0	0	0	0	35	0	310	228	0	327	0
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	61	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	219	0
Total Project Traffic	0	0	0	0	0	0	0	61	0	0	219	0
2023 Buildout Total	0	0	0	0	0	35	0	346	228	0	522	0
2032 Buildout Total	0	0	0	0	0	35	0	371	228	0	546	0

**INTERSECTION ANALYSIS SHEET**

Project: Hinton Oaks Industrial  
 Location: Knightdale, NC  
 Count: 1/30/2020  
 N/S Street: Hinton Oaks Blvd  
 E/W Street: Shoppes at Midway Dr/Midtown Commons Dwy

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%
Growth Factor (Buildout +1):	0.125509
Annual Growth Rate (Buildout +10):	1.0%
Growth Factor (Buildout +10):	0.093685

Existing Year:	2019
Buildout+1 Year:	2023
Buildout+10 Year:	2032

**AM PEAK HOUR**  
AM PHF = 0.86

Description	Midtown Commons			Shoppes at Midway Plantation			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	4	9	5	15	4	4	75	98	7	3	49	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	4	9	5	15	4	4	75	98	7	3	49	0
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	12	0	0	6	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	10	0	0	5	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	4	9	5	15	4	4	75	153	7	3	64	0
2032 Background Traffic	4	9	5	15	4	4	75	163	7	3	69	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	239	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	44	0
Total Project Traffic	0	0	0	0	0	0	0	239	0	0	44	0
2023 Buildout Total	4	9	5	15	4	4	75	392	7	3	108	0
2032 Buildout Total	4	9	5	15	4	4	75	402	7	3	113	0

**PM PEAK HOUR**  
PM PHF = 0.94

Description	Midtown Commons			Shoppes at Midway Plantation			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	30	50	53	31	8	131	67	41	14	118	2
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	30	50	53	31	8	131	67	41	14	118	2
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	8	0	0	15	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	7	0	0	12	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	30	50	53	31	8	131	91	41	14	179	2
2032 Background Traffic	0	30	50	53	31	8	131	98	41	14	191	2
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	61	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	219	0
Total Project Traffic	0	0	0	0	0	0	0	61	0	0	219	0
2023 Buildout Total	0	30	50	53	31	8	131	152	41	14	398	2
2032 Buildout Total	0	30	50	53	31	8	131	159	41	14	410	2

## INTERSECTION ANALYSIS SHEET

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	Midtown Commons Dwy/Hinton Pond Rd

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%
Growth Factor (Buildout +1):	0.125509
Annual Growth Rate (Buildout +10):	1.0%
Growth Factor (Buildout +10):	0.093685

Existing Year:	2019
Buildout+1 Year:	2023
Buildout+10 Year:	2032

### AM PEAK HOUR AM PHF = 0.73

Description	Midtown Commons Driveway			Hinton Pond Road			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Eastbound			Westbound			Northbound			Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	1	1	5	12	0	1	9	95	9	0	30	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	1	1	5	12	0	1	9	95	9	0	30	0
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	12	0	0	4	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	10	0	0	3	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	1	1	5	12	0	1	9	150	9	0	43	0
2032 Background Traffic	1	1	5	12	0	1	9	160	9	0	46	0
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	60	179	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%
Outbound Project Traffic	0	0	0	33	0	0	0	0	0	0	11	0
Total Project Traffic	0	0	0	33	0	0	0	60	179	0	11	0
2023 Buildout Total	1	1	5	45	0	1	9	210	188	0	54	0
2032 Buildout Total	1	1	5	45	0	1	9	220	188	0	57	0

### PM PEAK HOUR PM PHF = 0.82

Description	Midtown Commons Driveway			Hinton Pond Road			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Eastbound			Westbound			Northbound			Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	1	27	7	0	0	43	22	14	0	101	2
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	1	27	7	0	0	43	22	14	0	101	2
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	3	0	0	13	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	2	0	0	11	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	1	27	7	0	0	43	41	14	0	160	2
2032 Background Traffic	0	1	27	7	0	0	43	43	14	0	171	2
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	15	46	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%
Outbound Project Traffic	0	0	0	164	0	0	0	0	0	0	55	0
Total Project Traffic	0	0	0	164	0	0	0	15	46	0	55	0
2023 Buildout Total	0	1	27	171	0	0	43	56	60	0	215	2
2032 Buildout Total	0	1	27	171	0	0	43	58	60	0	226	2

**INTERSECTION ANALYSIS SHEET**

Project: Hinton Oaks Industrial  
 Location: Knightdale, NC  
 Count: 1/30/2020  
 N/S Street: Hinton Oaks Blvd  
 E/W Street: Site Driveway #2

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR**  
AM PHF = 0.85

Description	Eastbound			Site Driveway #2 Westbound			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	61	0	0	21	0
2019 Existing Traffic	0	0	0	0	0	0	0	61	0	0	21	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	0	0	0	0	0	0	8	0	0	3	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	0	0	0	0	0	0	6	0	0	2	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	0	0	0	0	0	0	0	112	0	0	33	0
2032 Background Traffic	0	0	0	0	0	0	0	118	0	0	35	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	0	60	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	11	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	0	11	0	0	0	0	60	0	0	0
2023 Buildout Total	0	0	0	11	0	0	0	112	60	0	33	0
2032 Buildout Total	0	0	0	11	0	0	0	118	60	0	35	0

**PM PEAK HOUR**  
PM PHF = 0.77

Description	Eastbound			Site Driveway #2 Westbound			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	18	0	0	64	0
2019 Existing Traffic	0	0	0	0	0	0	0	18	0	0	64	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	0	0	0	0	0	0	2	0	0	8	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	0	0	0	0	0	0	2	0	0	7	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	0	0	0	0	0	0	36	0	0	118	0
2032 Background Traffic	0	0	0	0	0	0	0	38	0	0	125	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	0	15	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	55	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	0	55	0	0	0	0	15	0	0	0
2023 Buildout Total	0	0	0	55	0	0	0	36	15	0	118	0
2032 Buildout Total	0	0	0	55	0	0	0	38	15	0	125	0



### INTERSECTION ANALYSIS SHEET

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	US 64 Business (Knightdale Blvd)

Net New Trips:	AM In	AM Out	PM In	PM Out
	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

#### AM PEAK HOUR AM PHF = 0.94

Description	US 64 Business (Knightdale Blvd)				US 64 Business (Knightdale Blvd)				Hinton Oaks Blvd			Hinton Oaks Blvd		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	1	124	898	51	4	17	1809	45	257	5	57	35	8	24
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	1	124	898	51	4	17	1809	45	257	5	57	35	8	24
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	16	113	6	1	2	227	6	32	1	7	4	1	3
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	13	95	5	0	2	191	5	27	1	6	4	1	3
Approved Developments														
Knightdale Industrial Center	0	39	0	0	0	0	0	4	0	0	0	1	0	8
Legacy Oaks	0	0	68	0	0	0	42	0	0	0	0	0	0	0
Parkstone	0	0	95	0	0	0	64	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	39	163	0	0	0	106	4	0	0	0	1	0	8
2023 Background Traffic	1	179	1174	57	5	19	2142	55	289	6	64	40	9	35
2032 Background Traffic	1	192	1269	62	5	21	2333	60	316	7	70	44	10	38
Project Traffic														
Percent Assignment Inbound	0.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	203	0	0	0	0	0	36	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	85.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	7	0	37
Total Project Traffic	0	203	0	0	0	0	0	36	0	0	0	7	0	37
2023 Buildout Total	1	382	1174	57	5	19	2142	91	289	6	64	47	9	72
2032 Buildout Total	1	395	1269	62	5	21	2333	96	316	7	70	51	10	75

#### PM PEAK HOUR PM PHF = 0.95

Description	US 64 Business (Knightdale Blvd)				US 64 Business (Knightdale Blvd)				Hinton Oaks Blvd			Hinton Oaks Blvd		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	3	48	276	19	1	4	163	8	14	3	7	15	2	11
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	2	40	232	16	1	3	137	7	12	3	6	12	1	9
Approved Developments														
Knightdale Industrial Center	0	14	0	0	0	0	0	2	0	0	0	5	0	41
Legacy Oaks	0	0	50	0	0	0	72	0	0	0	0	0	0	0
Parkstone	0	0	173	0	0	0	181	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	14	223	0	0	0	253	2	0	0	0	5	0	41
2023 Background Traffic	26	442	2699	171	6	37	1712	77	125	28	61	138	14	138
2032 Background Traffic	28	482	2931	187	7	40	1849	84	137	31	67	150	15	147
Project Traffic														
Percent Assignment Inbound	0.00%	85.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	52	0	0	0	0	0	9	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	85.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	0	33	0	186
Total Project Traffic	0	52	0	0	0	0	0	9	0	0	0	33	0	186
2023 Buildout Total	26	494	2699	171	6	37	1712	86	125	28	61	171	14	324
2032 Buildout Total	28	534	2931	187	7	40	1849	93	137	31	67	183	15	333

**INTERSECTION ANALYSIS SHEET**

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	I-540 Northbound Ramps
E/W Street:	US 64 Business (Knightdale Blvd)

Net New Trips:	AM In	AM Out	PM In	PM Out
Pass-By Trips:	239	44	61	219
	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR**  
AM PHF = 0.91

Description	US 64 Business (Knightdale Blvd)			US 64 Business (Knightdale Blvd)			I-540 Northbound Ramps			I-540 Northbound Ramps		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	373	865	0	0	1460	703	57	4	304	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	373	865	0	0	1460	703	57	4	304	0	0	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	47	109	0	0	183	88	7	1	38	0	0	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	39	91	0	0	154	74	6	0	32	0	0	0
<u>Approved Developments</u>												
Knightdale Industrial Center	0	22	0	0	5	3	0	0	17	0	0	0
Legacy Oaks	56	68	0	0	42	0	15	0	0	0	0	0
Parkstone	0	74	0	0	50	14	0	0	21	0	0	0
Total Approved Dev. Traffic	56	164	0	0	97	17	15	0	38	0	0	0
2023 Background Traffic	476	1138	0	0	1740	808	79	5	380	0	0	0
2032 Background Traffic	515	1229	0	0	1894	882	85	5	412	0	0	0
<u>Project Traffic</u>												
Percent Assignment Inbound	0.00%	35.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	84	0	0	0	0	0	0	120	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	60.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	26	11	0	0	0	0	0	0
Total Project Traffic	0	84	0	0	26	11	0	0	120	0	0	0
2023 Buildout Total	476	1222	0	0	1766	819	79	5	500	0	0	0
2032 Buildout Total	515	1313	0	0	1920	893	85	5	532	0	0	0

**PM PEAK HOUR**  
PM PHF = 0.96

Description	US 64 Business (Knightdale Blvd)			US 64 Business (Knightdale Blvd)			I-540 Northbound Ramps			I-540 Northbound Ramps		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	327	2368	0	0	1144	466	75	0	576	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	327	2368	0	0	1144	466	75	0	576	0	0	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	41	297	0	0	144	58	9	0	72	0	0	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	34	250	0	0	121	49	8	0	61	0	0	0
<u>Approved Developments</u>												
Knightdale Industrial Center	0	8	0	0	25	16	0	0	6	0	0	0
Legacy Oaks	42	50	0	0	72	0	24	0	0	0	0	0
Parkstone	0	135	0	0	141	40	0	0	38	0	0	0
Total Approved Dev. Traffic	42	193	0	0	238	56	24	0	44	0	0	0
2023 Background Traffic	410	2858	0	0	1526	580	108	0	692	0	0	0
2032 Background Traffic	444	3108	0	0	1647	629	116	0	753	0	0	0
<u>Project Traffic</u>												
Percent Assignment Inbound	0.00%	35.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	21	0	0	0	0	0	0	31	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	60.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	131	55	0	0	0	0	0	0
Total Project Traffic	0	21	0	0	131	55	0	0	31	0	0	0
2023 Buildout Total	410	2879	0	0	1657	635	108	0	723	0	0	0
2032 Buildout Total	444	3129	0	0	1778	684	116	0	784	0	0	0

**INTERSECTION ANALYSIS SHEET**

Project: **Hinton Oaks Industrial**  
 Location: **Knightdale, NC**  
 Count: **1/30/2020**  
 N/S Street: **I-540 Southbound Ramps**  
 E/W Street: **US 64 Business (Knightdale Blvd)**

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR  
AM PHF = 0.94**

Description	US 64 Business (Knightdale Blvd) Eastbound			US 64 Business (Knightdale Blvd) Westbound				I-540 Southbound Ramps Northbound			I-540 Southbound Ramps Southbound		
	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	932	98	1	265	1263	0	0	0	0	0	0	263
Count Balancing	0	0	0	0	0	0	0	0	0	305	0	0	0
2019 Existing Traffic	0	932	98	1	265	1263	0	0	0	305	0	0	263
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	117	12	0	33	159	0	0	0	38	0	0	33
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	98	10	0	28	133	0	0	0	32	0	0	28
<u>Approved Developments</u>													
Knightdale Industrial Center	0	6	0	0	4	1	0	0	0	15	0	0	0
Legacy Oaks	0	124	23	0	0	56	0	0	0	0	0	0	35
Parkstone	0	53	0	0	14	36	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	183	23	0	18	93	0	0	0	15	0	0	35
2023 Background Traffic	0	1232	133	1	316	1515	0	0	0	358	0	0	331
2032 Background Traffic	0	1330	143	1	344	1648	0	0	0	390	0	0	359
<u>Project Traffic</u>													
Percent Assignment Inbound	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	24	0	0	0	0	0	0	0	60	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	50.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	22	4	0	0	0	0	0	0	0
Total Project Traffic	0	24	0	0	22	4	0	0	0	60	0	0	0
2023 Buildout Total	0	1256	133	1	338	1519	0	0	0	418	0	0	331
2032 Buildout Total	0	1354	143	1	366	1652	0	0	0	450	0	0	359

**PM PEAK HOUR  
PM PHF = 0.98**

Description	US 64 Business (Knightdale Blvd) Eastbound			US 64 Business (Knightdale Blvd) Westbound				I-540 Southbound Ramps Northbound			I-540 Southbound Ramps Southbound		
	Left	Through	Right	U-Turn	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	1810	67	2	178	1033	0	0	0	0	0	0	492
Count Balancing	0	0	0	0	0	0	0	0	0	883	0	0	0
2019 Existing Traffic	0	1810	67	2	178	1033	0	0	0	883	0	0	492
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	227	8	0	22	130	0	0	0	111	0	0	62
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	191	7	0	19	109	0	0	0	93	0	0	52
<u>Approved Developments</u>													
Knightdale Industrial Center	0	2	0	0	18	7	0	0	0	6	0	0	0
Legacy Oaks	0	92	15	0	0	96	0	0	0	0	0	0	59
Parkstone	0	96	0	0	40	101	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	190	15	0	58	204	0	0	0	6	0	0	59
2023 Background Traffic	0	2227	90	2	258	1367	0	0	0	1000	0	0	613
2032 Background Traffic	0	2418	97	2	277	1476	0	0	0	1093	0	0	665
<u>Project Traffic</u>													
Percent Assignment Inbound	0.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	6	0	0	0	0	0	0	0	15	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	50.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	0	110	22	0	0	0	0	0	0	0
Total Project Traffic	0	6	0	0	110	22	0	0	0	15	0	0	0
2023 Buildout Total	0	2233	90	2	368	1389	0	0	0	1015	0	0	613
2032 Buildout Total	0	2424	97	2	387	1498	0	0	0	1108	0	0	665

**INTERSECTION ANALYSIS SHEET**

Project: **Hinton Oaks Industrial**  
 Location: **Knightsdale, NC**  
 Count: **1/30/2020**  
 N/S Street: **Widewaters Pkwy**  
 E/W Street: **US 64 Business (Knightsdale Blvd)**

Net New Trips:	AM In	AM Out	PM In	PM Out
Pass-By Trips:	239	44	61	219
	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR  
AM PHF = 0.91**

Description	US 64 Business (Knightsdale Blvd)				US 64 Business (Knightsdale Blvd)				Widewaters Pkwy			Widewaters Pkwy		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	86	785	76	22	69	1661	31	103	11	29	37	3	88
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	86	785	76	22	69	1661	31	103	11	29	37	3	88
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	11	99	10	3	9	208	4	13	1	4	5	0	11
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	9	83	8	2	7	175	3	11	1	3	4	0	9
Approved Developments														
Knightsdale Industrial Center	0	0	1	0	0	0	4	0	0	0	0	0	0	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	95	0	0	0	64	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	96	0	0	0	68	0	0	0	0	0	0	0
2023 Background Traffic	0	97	980	86	25	78	1937	35	116	12	33	42	3	99
2032 Background Traffic	0	106	1063	94	27	85	2112	38	127	13	36	46	3	108
Project Traffic														
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	36	0	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	7	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	7	0	0	0	36	0	0	0	0	0	0	0
2023 Buildout Total	0	97	987	86	25	78	1973	35	116	12	33	42	3	99
2032 Buildout Total	0	106	1070	94	27	85	2148	38	127	13	36	46	3	108

**PM PEAK HOUR  
PM PHF = 0.99**

Description	US 64 Business (Knightsdale Blvd)				US 64 Business (Knightsdale Blvd)				Widewaters Pkwy			Widewaters Pkwy		
	U-Turn	Eastbound		Right	U-Turn	Westbound		Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	1	30	218	45	14	25	115	23	30	3	13	42	6	18
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	25	183	38	11	21	97	20	25	3	11	35	5	15
Approved Developments														
Knightsdale Industrial Center	0	0	5	0	0	0	2	0	0	0	0	0	0	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	173	0	0	0	181	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	178	0	0	0	183	0	0	0	0	0	0	0
2023 Background Traffic	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
2032 Background Traffic	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Project Traffic														
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	9	0	0	0	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	33	0	0	0	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	33	0	0	0	9	0	0	0	0	0	0	0
2023 Buildout Total	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
2032 Buildout Total	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178

**INTERSECTION ANALYSIS SHEET**

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	Shoppes at Midway Dr

Net New Trips:	AM In	AM Out	PM In	PM Out
Pass-By Trips:	239	44	61	219
	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%	Existing Year:	2019
Growth Factor (Buildout +1):	0.125509	Buildout+1 Year:	2023
Annual Growth Rate (Buildout +10):	1.0%	Buildout+10 Year:	2032
Growth Factor (Buildout +10):	0.093685		

**AM PEAK HOUR**  
AM PHF = 0.87

Description	Shoppes at Midway Dr			Shoppes at Midway Dr			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	0	0	0	0	0	14	0	162	68	0	104	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	0	0	0	0	14	0	162	68	0	104	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	20	0	0	13	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	17	0	0	11	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	0	0	0	0	0	14	0	225	68	0	126	0
2032 Background Traffic	0	0	0	0	0	14	0	242	68	0	137	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	239	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	44	0
Total Project Traffic	0	0	0	0	0	0	0	239	0	0	44	0
2023 Buildout Total	0	0	0	0	0	14	0	464	68	0	170	0
2032 Buildout Total	0	0	0	0	0	14	0	481	68	0	181	0

**PM PEAK HOUR**  
PM PHF = 0.92

Description	Shoppes at Midway Dr			Shoppes at Midway Dr			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	0	0	0	0	0	35	0	239	228	0	228	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	0	0	0	0	35	0	239	228	0	228	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	30	0	0	29	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	25	0	0	24	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	0	0	0	0	35	0	285	228	0	303	0
2032 Background Traffic	0	0	0	0	0	35	0	310	228	0	327	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	61	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	219	0
Total Project Traffic	0	0	0	0	0	0	0	61	0	0	219	0
2023 Buildout Total	0	0	0	0	0	35	0	346	228	0	522	0
2032 Buildout Total	0	0	0	0	0	35	0	371	228	0	546	0

**INTERSECTION ANALYSIS SHEET**

Project: Hinton Oaks Industrial  
 Location: Knightdale, NC  
 Count: 1/30/2020  
 N/S Street: Hinton Oaks Blvd  
 E/W Street: Shoppes at Midway Dr/Midtown Commons Dwy

	AM In	AM Out	PM In	PM Out
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%
Growth Factor (Buildout +1):	0.125509
Annual Growth Rate (Buildout +10):	1.0%
Growth Factor (Buildout +10):	0.093685

Existing Year:	2019
Buildout+1 Year:	2023
Buildout+10 Year:	2032

**AM PEAK HOUR**  
AM PHF = 0.86

Description	Midtown Commons			Shoppes at Midway Plantation			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	4	9	5	15	4	4	75	98	7	3	49	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	4	9	5	15	4	4	75	98	7	3	49	0
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	12	0	0	6	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	10	0	0	5	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	4	9	5	15	4	4	75	153	7	3	64	0
2032 Background Traffic	4	9	5	15	4	4	75	163	7	3	69	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	239	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	44	0
Total Project Traffic	0	0	0	0	0	0	0	239	0	0	44	0
2023 Buildout Total	4	9	5	15	4	4	75	392	7	3	108	0
2032 Buildout Total	4	9	5	15	4	4	75	402	7	3	113	0

**PM PEAK HOUR**  
PM PHF = 0.94

Description	Midtown Commons			Shoppes at Midway Plantation			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	30	50	53	31	8	131	67	41	14	118	2
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	30	50	53	31	8	131	67	41	14	118	2
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	8	0	0	15	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	7	0	0	12	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	30	50	53	31	8	131	91	41	14	179	2
2032 Background Traffic	0	30	50	53	31	8	131	98	41	14	191	2
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	61	0	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Outbound Project Traffic	0	0	0	0	0	0	0	0	0	0	219	0
Total Project Traffic	0	0	0	0	0	0	0	61	0	0	219	0
2023 Buildout Total	0	30	50	53	31	8	131	152	41	14	398	2
2032 Buildout Total	0	30	50	53	31	8	131	159	41	14	410	2

**INTERSECTION ANALYSIS SHEET**

Project: Hinton Oaks Industrial  
 Location: Knightdale, NC  
 Count: 1/30/2020  
 N/S Street: Hinton Oaks Blvd  
 E/W Street: Midtown Commons Dwy/Hinton Pond Rd

	<b>AM In</b>	<b>AM Out</b>	<b>PM In</b>	<b>PM Out</b>
Net New Trips:	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%
Growth Factor (Buildout +1):	0.125509
Annual Growth Rate (Buildout +10):	1.0%
Growth Factor (Buildout +10):	0.093685

Existing Year:	2019
Buildout+1 Year:	2023
Buildout+10 Year:	2032

**AM PEAK HOUR**  
**AM PHF = 0.73**

Description	Midtown Commons Driveway			Hinton Pond Road			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	1	1	5	12	0	1	9	95	9	0	30	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	1	1	5	12	0	1	9	95	9	0	30	0
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	12	0	0	4	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	10	0	0	3	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	1	1	5	12	0	1	9	150	9	0	43	0
2032 Background Traffic	1	1	5	12	0	1	9	160	9	0	46	0
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	60	179	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%
Outbound Project Traffic	0	0	0	33	0	0	0	0	0	0	11	0
Total Project Traffic	0	0	0	33	0	0	0	60	179	0	11	0
2023 Buildout Total	1	1	5	45	0	1	9	210	188	0	54	0
2032 Buildout Total	1	1	5	45	0	1	9	220	188	0	57	0

**PM PEAK HOUR**  
**PM PHF = 0.82**

Description	Midtown Commons Driveway			Hinton Pond Road			Hinton Oaks Blvd			Hinton Oaks Blvd		
	Left	Eastbound Through	Right	Left	Westbound Through	Right	Left	Northbound Through	Right	Left	Southbound Through	Right
2019 Traffic Count	0	1	27	7	0	0	43	22	14	0	101	2
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0
2019 Existing Traffic	0	1	27	7	0	0	43	22	14	0	101	2
Growth Factor (3.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.000	0.126	0.000
2023 Background Growth	0	0	0	0	0	0	0	3	0	0	13	0
Growth Factor (1.0% per year)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.000	0.094	0.000
2032 Background Growth	0	0	0	0	0	0	0	2	0	0	11	0
<b>Approved Developments</b>												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	1	27	7	0	0	43	41	14	0	160	2
2032 Background Traffic	0	1	27	7	0	0	43	43	14	0	171	2
<b>Project Traffic</b>												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	75.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	15	46	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%
Outbound Project Traffic	0	0	0	164	0	0	0	0	0	0	55	0
Total Project Traffic	0	0	0	164	0	0	0	15	46	0	55	0
2023 Buildout Total	0	1	27	171	0	0	43	56	60	0	215	2
2032 Buildout Total	0	1	27	171	0	0	43	58	60	0	226	2

## INTERSECTION ANALYSIS SHEET

Project:	Hinton Oaks Industrial
Location:	Knightdale, NC
Count:	1/30/2020
N/S Street:	Hinton Oaks Blvd
E/W Street:	Site Driveway #2

Net New Trips:	AM In	AM Out	PM In	PM Out
	239	44	61	219
Pass-By Trips:	0	0	0	0

Annual Growth Rate (Buildout +1):	3.0%
Growth Factor (Buildout +1):	0.125509
Annual Growth Rate (Buildout +10):	1.0%
Growth Factor (Buildout +10):	0.093685

Existing Year:	2019
Buildout+1 Year:	2023
Buildout+10 Year:	2032

### AM PEAK HOUR AM PHF = 0.85

Description	Eastbound			Site Driveway #2 Westbound			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	61	0	0	21	0
2019 Existing Traffic	0	0	0	0	0	0	0	61	0	0	21	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	0	0	0	0	0	0	8	0	0	3	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	0	0	0	0	0	0	6	0	0	2	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	43	0	0	9	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	43	0	0	9	0
2023 Background Traffic	0	0	0	0	0	0	0	112	0	0	33	0
2032 Background Traffic	0	0	0	0	0	0	0	118	0	0	35	0
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	0	60	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	11	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	0	11	0	0	0	0	60	0	0	0
2023 Buildout Total	0	0	0	11	0	0	0	112	60	0	33	0
2032 Buildout Total	0	0	0	11	0	0	0	118	60	0	35	0

### PM PEAK HOUR PM PHF = 0.77

Description	Eastbound			Site Driveway #2 Westbound			Hinton Oaks Blvd Northbound			Hinton Oaks Blvd Southbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2019 Traffic Count	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	18	0	0	64	0
2019 Existing Traffic	0	0	0	0	0	0	0	18	0	0	64	0
Growth Factor (3.0% per year)	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
2023 Background Growth	0	0	0	0	0	0	0	2	0	0	8	0
Growth Factor (1.0% per year)	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094	0.094
2032 Background Growth	0	0	0	0	0	0	0	2	0	0	7	0
Approved Developments												
Knightsdale Industrial Center	0	0	0	0	0	0	0	16	0	0	46	0
Legacy Oaks	0	0	0	0	0	0	0	0	0	0	0	0
Parkstone	0	0	0	0	0	0	0	0	0	0	0	0
Total Approved Dev. Traffic	0	0	0	0	0	0	0	16	0	0	46	0
2023 Background Traffic	0	0	0	0	0	0	0	36	0	0	118	0
2032 Background Traffic	0	0	0	0	0	0	0	38	0	0	125	0
Project Traffic												
Percent Assignment Inbound	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%
Inbound Project Traffic	0	0	0	0	0	0	0	0	15	0	0	0
Percent Assignment Outbound	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Outbound Project Traffic	0	0	0	55	0	0	0	0	0	0	0	0
Total Project Traffic	0	0	0	55	0	0	0	0	15	0	0	0
2023 Buildout Total	0	0	0	55	0	0	0	36	15	0	118	0
2032 Buildout Total	0	0	0	55	0	0	0	38	15	0	125	0



**Appendix F:  
Synchro Output:  
Existing (2020)**

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	125	898	51	4	17	1809	45	257	5	57	35	8	24
Future Volume (vph)	125	898	51	4	17	1809	45	257	5	57	35	8	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	300		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	300				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1532	1408
Flt Permitted	0.950				0.404			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	726	4915	1530	3382	1835	1560	3213	1532	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153			150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													35%
Lane Group Flow (vph)	133	955	54	0	22	1924	48	273	5	61	37	18	17
Turn Type	Prot	NA	pm+ov	custom	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3		1	6	7	3	8	!	7	4	5
Permitted Phases			2	!			6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	10.6	75.5	90.6		11.3	73.5	94.8	15.1	9.8	14.2	16.3	9.1	14.4
Actuated g/C Ratio	0.09	0.63	0.76		0.09	0.61	0.79	0.13	0.08	0.12	0.14	0.08	0.12
v/c Ratio	0.45	0.31	0.05		0.32	0.64	0.04	0.64	0.03	0.19	0.09	0.15	0.06
Control Delay	54.0	8.7	0.1		46.7	6.0	0.1	57.4	49.6	1.3	45.1	37.5	0.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	8.7	0.1		46.7	6.0	0.1	57.4	49.6	1.3	45.1	37.5	0.4
LOS	D	A	A		D	A	A	E	D	A	D	D	A
Approach Delay		13.6				6.3			47.2			32.6	
Approach LOS		B				A			D			C	
Queue Length 50th (ft)	43	79	0		16	49	0	103	4	0	12	7	0
Queue Length 95th (ft)	84	164	0		m28	60	m0	151	16	0	31	31	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	300		125		200		200	200		100	325		150
Base Capacity (vph)	332	3094	1164		72	3011	1234	437	215	327	448	135	315
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.31	0.05		0.31	0.64	0.04	0.62	0.02	0.19	0.08	0.13	0.05

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Existing (2020) AM  
 03/11/2020

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 13.1 Intersection LOS: B  
 Intersection Capacity Utilization 67.3% ICU Level of Service C  
 Analysis Period (min) 15  
 Description: 05-2267  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	373	865	0	0	1460	703	57	4	304	0	0	0
Future Volume (vph)	373	865	0	0	1460	703	57	4	304	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						664			295			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	410	951	0	0	1604	773	0	67	334	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	99.9			74.9	74.9		10.1	10.1			
Actuated g/C Ratio	0.17	0.83			0.62	0.62		0.08	0.08			
v/c Ratio	0.73	0.23			0.52	0.64		0.47	0.68			
Control Delay	51.7	2.3			7.2	4.3		63.0	16.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	51.7	2.3			7.2	4.3		63.0	16.4			
LOS	D	A			A	A		E	B			
Approach Delay		17.2			6.2			24.2				
Approach LOS		B			A			C				
Queue Length 50th (ft)	156	39			109	16		51	16			
Queue Length 95th (ft)	212	63			78	56		96	65			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	4173			3098	1213		423	885			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.73	0.23			0.52	0.64		0.16	0.38			

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 11.6

Intersection LOS: B

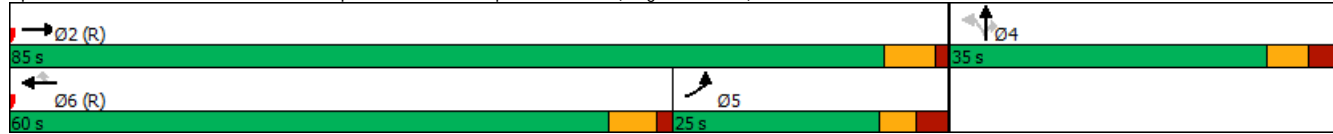
Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

Description: 05-2152

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	932	98	266	1263	0	0	0	0	0	0	263
Future Volume (vph)	0	932	98	266	1263	0	0	0	0	0	0	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.267								
Satd. Flow (perm)	0	4963	1545	490	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104									187
Link Speed (mph)		45		45				35			35	
Link Distance (ft)		965			302			601			428	
Travel Time (s)		14.6			4.6			11.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	991	104	283	1344	0	0	0	0	0	0	280
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		88.1	88.1	110.0	120.0							120.0
Actuated g/C Ratio		0.73	0.73	0.92	1.00							1.00
v/c Ratio		0.27	0.09	0.42	0.39							0.18
Control Delay		5.8	1.2	5.3	1.0							0.2
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		5.8	1.2	5.3	1.0							0.2
LOS		A	A	A	A							A
Approach Delay		5.3			1.7						0.2	
Approach LOS		A			A						A	
Queue Length 50th (ft)		86	0	17	33							0
Queue Length 95th (ft)		110	15	62	11							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3643	1161	719	3458							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.27	0.09	0.39	0.39							0.18

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 2.9

Intersection LOS: A

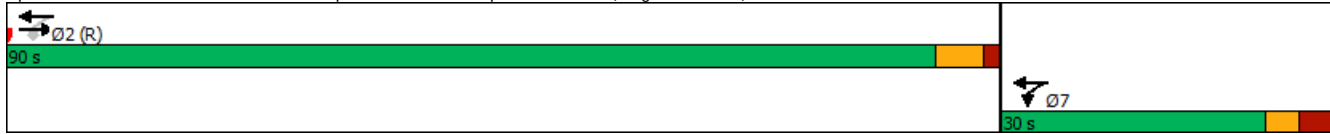
Intersection Capacity Utilization 43.6%

ICU Level of Service A

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations														
Traffic Volume (vph)	86	785	76	22	69	1661	31	103	11	29	37	4	88	
Future Volume (vph)	86	785	76	22	69	1661	31	103	11	29	37	4	88	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)	0%		0%					-2%			0%			
Storage Length (ft)	350	200		300			175	275	0		150	150		
Storage Lanes	2	1		2			1	1	0		1	1		
Taper Length (ft)	300			300				100			100			
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1660	0	3400	1511	1490	
Flt Permitted	0.950				0.950				0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3331	4940	1538	3434	1660	0	3400	1511	1490	
Right Turn on Red				Yes			Yes			Yes				
Satd. Flow (RTOR)				95			96			32				
Link Speed (mph)	45			45				35			35			
Link Distance (ft)	1283			1388				649			378			
Travel Time (s)	19.4			21.0				12.6			7.4			
Confl. Peds. (#/hr)	1			1										
Confl. Bikes (#/hr)														
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)														
Mid-Block Traffic (%)	0%			0%				0%			0%			
Shared Lane Traffic (%)											48%			
Lane Group Flow (vph)	95	863	84	0	100	1825	34	113	44	0	41	51	50	
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov	
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5	
Permitted Phases	2			6				4			4			
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5	
Switch Phase														
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0	
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0	
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0	
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%	
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2	
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5	
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7	
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None	
Act Effct Green (s)	10.7	67.4	78.4		15.0	71.7	85.6	11.0	11.5		8.9	9.4	22.3	
Actuated g/C Ratio	0.09	0.56	0.65		0.12	0.60	0.71	0.09	0.10		0.07	0.08	0.19	
v/c Ratio	0.33	0.32	0.08		0.24	0.62	0.03	0.36	0.24		0.16	0.32	0.13	
Control Delay	61.7	12.7	0.5		49.1	17.9	0.1	54.0	25.1		53.5	21.8	0.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Total Delay	61.7	12.7	0.5		49.1	17.9	0.1	54.0	25.1		53.5	21.8	0.7	
LOS	E	B	A		D	B	A	D	C		D	C	A	
Approach Delay	16.2						19.2			45.9		23.5		
Approach LOS	B						B			D		C		
Queue Length 50th (ft)	39	92	1		36	325	0	43	9		15	3	0	
Queue Length 95th (ft)	68	130	2		63	440	0	71	44		34	44	0	
Internal Link Dist (ft)	1203						1308			569		298		
Turn Bay Length (ft)	350	200		300			175	275			150	150		
Base Capacity (vph)	409	2723	1052		416	2953	1198	429	235		425	230	447	
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0	
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0	
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0	
Reduced v/c Ratio	0.23	0.32	0.08		0.24	0.62	0.03	0.26	0.19		0.10	0.22	0.11	

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120



4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 19.7

Intersection LOS: B

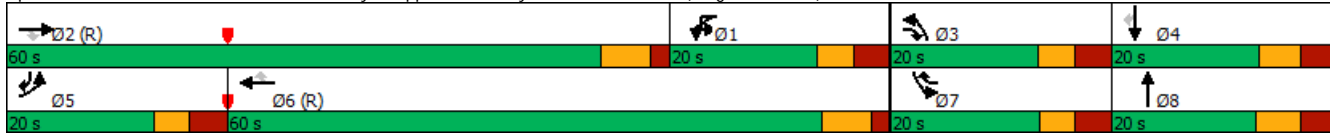
Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

Description: 05-2148

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	162	68	0	104
Future Volume (vph)	0	14	162	68	0	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1810	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	1810	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	186	78	0	120
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.5%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	14	162	68	0	104
Future Vol, veh/h	0	14	162	68	0	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	186	78	0	120
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	186	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	856	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	-	856	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	9.3	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	856	-		
HCM Lane V/C Ratio	-	-	0.019	-		
HCM Control Delay (s)	-	-	9.3	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	9	5	15	4	4	75	98	7	4	49	4
Future Volume (vph)	4	9	5	15	4	4	75	98	7	4	49	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1809	0	1530	1591	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1809	0	1530	1591	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)			2	2					1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	122	0	5	62	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 21.5% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	9	5	15	4	4	75	98	7	4	49	4
Future Vol, veh/h	4	9	5	15	4	4	75	98	7	4	49	4
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	114	8	5	57	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	367	367	62	373	365	119	62	0	0	123	0	0
Stage 1	70	70	-	293	293	-	-	-	-	-	-	-
Stage 2	297	297	-	80	72	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	589	562	1003	584	563	933	1528	-	-	1371	-	-
Stage 1	940	837	-	715	670	-	-	-	-	-	-	-
Stage 2	712	668	-	929	835	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	555	527	1001	544	528	932	1528	-	-	1370	-	-
Mov Cap-2 Maneuver	555	527	-	544	528	-	-	-	-	-	-	-
Stage 1	886	834	-	674	631	-	-	-	-	-	-	-
Stage 2	663	629	-	907	832	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.1			11.5			3.1			0.5		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1528	-	-	615	583	1370	-	-				
HCM Lane V/C Ratio	0.057	-	-	0.034	0.046	0.003	-	-				
HCM Control Delay (s)	7.5	-	-	11.1	11.5	7.6	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.1	0	-	-				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	5	12	4	4	9	95	9	4	30	4
Future Volume (vph)	4	4	5	12	4	4	9	95	9	4	30	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1734	0	0	1760	0	1687	1753	0	1421	1472	0
Flt Permitted		0.986			0.970		0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1760	0	1687	1753	0	1421	1472	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			425	
Travel Time (s)		8.1			10.0			10.0			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	26	0	12	142	0	5	46	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	17.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	5	12	4	4	9	95	9	4	30	4
Future Vol, veh/h	4	4	5	12	4	4	9	95	9	4	30	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	16	5	5	12	130	12	5	41	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	219	220	44	220	216	136	46	0	0	142	0	0
Stage 1	54	54	-	160	160	-	-	-	-	-	-	-
Stage 2	165	166	-	60	56	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	737	678	1026	736	682	913	1530	-	-	1301	-	-
Stage 1	958	850	-	842	766	-	-	-	-	-	-	-
Stage 2	837	761	-	951	848	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	722	670	1026	720	674	913	1530	-	-	1301	-	-
Mov Cap-2 Maneuver	722	670	-	720	674	-	-	-	-	-	-	-
Stage 1	950	847	-	835	760	-	-	-	-	-	-	-
Stage 2	820	755	-	935	845	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.6			10			0.6			0.8		
HCM LOS	A			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1530	-	-	793	741	1301	-	-				
HCM Lane V/C Ratio	0.008	-	-	0.022	0.037	0.004	-	-				
HCM Control Delay (s)	7.4	-	-	9.6	10	7.8	-	-				
HCM Lane LOS	A	-	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations															
Traffic Volume (vph)	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86	
Future Volume (vph)	23	380	2200	152	5	33	1296	67	111	25	54	118	12	86	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)			-1%				1%			3%				0%	
Storage Length (ft)		300		125		200		200	200		100	325		150	
Storage Lanes		2		1		1		1	2		1	1		1	
Taper Length (ft)		300				100			100			100			
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1570	1504	
Flt Permitted		0.950				0.950			0.950			0.950			
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1570	1504	
Right Turn on Red				Yes				Yes			Yes			Yes	
Satd. Flow (RTOR)				91				81			130			126	
Link Speed (mph)			45				45			35				35	
Link Distance (ft)			1128				1286			476				368	
Travel Time (s)			17.1				19.5			9.3				7.2	
Confl. Peds. (#/hr)															
Confl. Bikes (#/hr)															
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)															
Mid-Block Traffic (%)			0%				0%			0%				0%	
Shared Lane Traffic (%)														44%	
Lane Group Flow (vph)	0	424	2316	160	0	40	1364	71	117	26	57	124	53	51	
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!	
Permitted Phases				2				6			8			4	
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5	
Switch Phase															
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0	
Total Split (s)	28.0	28.0	80.0	20.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0	
Total Split (%)	20.0%	20.0%	57.1%	14.3%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%	
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6	
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0	
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None	
Act Effct Green (s)		23.0	93.6	111.7			9.7	77.6	97.9	12.1	9.5	15.8	15.3	10.1	31.3
Actuated g/C Ratio		0.16	0.67	0.80			0.07	0.55	0.70	0.09	0.07	0.11	0.11	0.07	0.22
v/c Ratio		0.75	0.68	0.12			0.33	0.49	0.06	0.40	0.21	0.20	0.33	0.35	0.12
Control Delay		56.2	11.4	1.0			88.2	8.0	0.1	64.3	65.2	1.5	60.2	30.5	0.6
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		56.2	11.4	1.0			88.2	8.0	0.1	64.3	65.2	1.5	60.2	30.5	0.6
LOS		E	B	A			F	A	E	A	E	A	E	C	A
Approach Delay			17.4				9.8			46.5				39.9	
Approach LOS			B				A			D				D	
Queue Length 50th (ft)		195	279	5			37	148	0	53	23	0	56	11	0
Queue Length 95th (ft)		m254	448	m13			78	172	1	84	55	0	87	57	0
Internal Link Dist (ft)			1048				1206			396			288		
Turn Bay Length (ft)		300		125			200		200	200		100	325		150
Base Capacity (vph)		566	3417	1307			188	2804	1112	362	196	345	420	203	434
Starvation Cap Reductn		0	0	0			0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0			0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0			0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.75	0.68	0.12			0.21	0.49	0.06	0.32	0.13	0.17	0.30	0.26	0.12

Intersection Summary

Area Type: Other

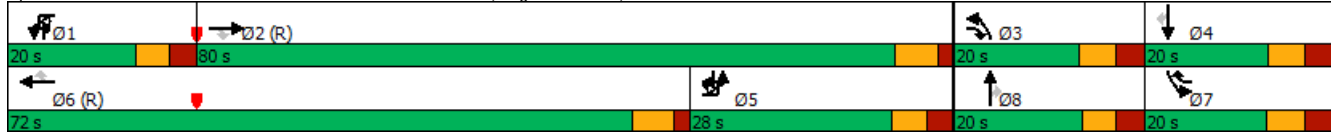
Cycle Length: 140

Actuated Cycle Length: 140



Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 17.3 Intersection LOS: B  
 Intersection Capacity Utilization 76.7% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2267  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	327	2368	0	0	1144	466	75	4	576	0	0	0
Future Volume (vph)	327	2368	0	0	1144	466	75	4	576	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1761	2759	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1761	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						485			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	341	2467	0	0	1192	485	0	82	600	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	98.8			68.8	68.8		31.2	31.2			
Actuated g/C Ratio	0.18	0.71			0.49	0.49		0.22	0.22			
v/c Ratio	0.55	0.68			0.48	0.48		0.21	0.90			
Control Delay	52.5	9.8			9.5	1.8		44.6	63.3			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	52.5	9.8			9.5	1.8		44.6	63.3			
LOS	D	A			A	A		D	E			
Approach Delay		15.0			7.2			61.0				
Approach LOS		B			A			E				
Queue Length 50th (ft)	147	441			78	0		61	268			
Queue Length 95th (ft)	200	212			89	4		106	343			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3608			2488	1021		440	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.55	0.68			0.48	0.48		0.19	0.81			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 18.5

Intersection LOS: B

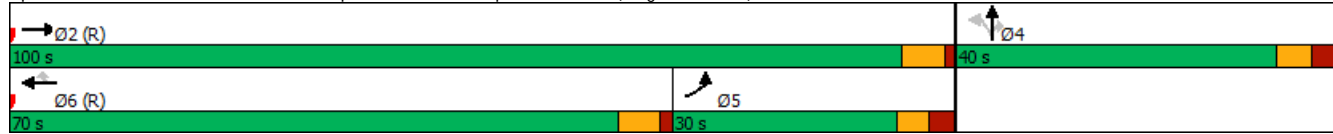
Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

Description: 05-2152

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	0	1810	67	4	178	1033	0	0	0	0	0	0	492
Future Volume (vph)	0	1810	67	4	178	1033	0	0	0	0	0	0	492
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%				-1%			0%				2%
Storage Length (ft)	0		0		0		0	0		0	0		0
Storage Lanes	0		1		1		0	0		0	0		1
Taper Length (ft)	25				25			25			25		
Satd. Flow (prot)	0	5060	1575	0	1778	3557	0	0	0	0	0	0	1564
Flt Permitted					0.099								
Satd. Flow (perm)	0	5060	1575	0	185	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			68										277
Link Speed (mph)		45				45			35				35
Link Distance (ft)		980				302			601				428
Travel Time (s)		14.8				4.6			11.7				8.3
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%				0%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	1847	68	0	186	1054	0	0	0	0	0	0	502
Turn Type		NA	Perm	custom	D.P+P	NA							Free
Protected Phases		2			7	2.7							
Permitted Phases			2	7	2								Free
Detector Phase		2	2	7	7	2.7							
Switch Phase													
Minimum Initial (s)		12.0	12.0	7.0	7.0								
Minimum Split (s)		19.0	19.0	15.0	15.0								
Total Split (s)		100.0	100.0	40.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%	28.6%								
Yellow Time (s)		4.4	4.4	3.0	3.0								
All-Red Time (s)		1.6	1.6	3.1	3.1								
Lost Time Adjust (s)		-1.0	-1.0		-1.1								
Total Lost Time (s)		5.0	5.0		5.0								
Lead/Lag													
Lead-Lag Optimize?													
Recall Mode		C-Max	C-Max	None	None								
Act Effct Green (s)		110.4	110.4		130.0	140.0							140.0
Actuated g/C Ratio		0.79	0.79		0.93	1.00							1.00
v/c Ratio		0.46	0.05		0.47	0.30							0.32
Control Delay		5.9	1.2		40.0	1.1							0.5
Queue Delay		0.0	0.0		0.0	0.0							0.0
Total Delay		5.9	1.2		40.0	1.1							0.5
LOS		A	A		D	A							A
Approach Delay		5.7				7.0							0.5
Approach LOS		A				A							A
Queue Length 50th (ft)		168	0		98	32							0
Queue Length 95th (ft)		271	13		163	15							0
Internal Link Dist (ft)		900				222			521			348	
Turn Bay Length (ft)													
Base Capacity (vph)		3989	1255		576	3557							1564
Starvation Cap Reductn		0	0		0	0							0
Spillback Cap Reductn		0	0		0	0							0
Storage Cap Reductn		0	0		0	0							0
Reduced v/c Ratio		0.46	0.05		0.32	0.30							0.32

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 5.4

Intersection LOS: A

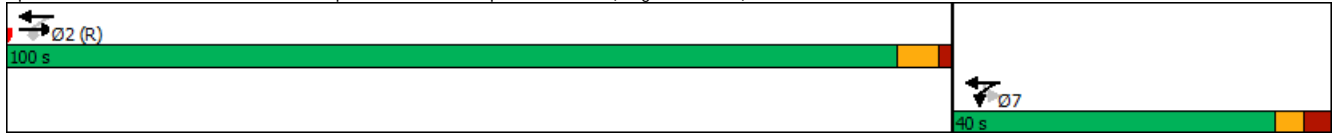
Intersection Capacity Utilization 96.4%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Future Volume (vph)	4	239	1735	360	108	196	916	187	236	27	104	335	47	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1639	0	3433	1628	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3432	5085	1583	3467	1639	0	3428	1628	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				306				189		94			34	129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	245	1753	364	0	307	925	189	238	132	0	338	100	93
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	69.7	88.3			18.5	68.2	93.1	18.7		19.9	13.1	38.1
Actuated g/C Ratio		0.14	0.50	0.63			0.13	0.49	0.66	0.13		0.14	0.09	0.27
v/c Ratio		0.50	0.69	0.33			0.68	0.37	0.17	0.52		0.69	0.55	0.18
Control Delay		46.6	20.4	2.3			65.6	23.8	1.7	60.3		64.8	50.1	2.8
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		46.6	20.4	2.3			65.6	23.8	1.7	60.3		64.8	50.1	2.8
LOS		D	C	A			E	C	A	E		C	D	A
Approach Delay			20.3				29.9			49.9				51.2
Approach LOS			C				C			D				D
Queue Length 50th (ft)		97	177	0			138	187	0	105	33	152	61	0
Queue Length 95th (ft)		137	295	90			189	252	29	146	98	202	121	17
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200			300		175	275		150		150
Base Capacity (vph)		490	2530	1118			496	2477	1107	506	314	517	261	503
Starvation Cap Reductn		0	0	0			0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0			0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0			0	0	0	0		0	0	0
Reduced v/c Ratio		0.50	0.69	0.33			0.62	0.37	0.17	0.47		0.65	0.38	0.18

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)

03/11/2020

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 29.0

Intersection LOS: C

Intersection Capacity Utilization 76.8%

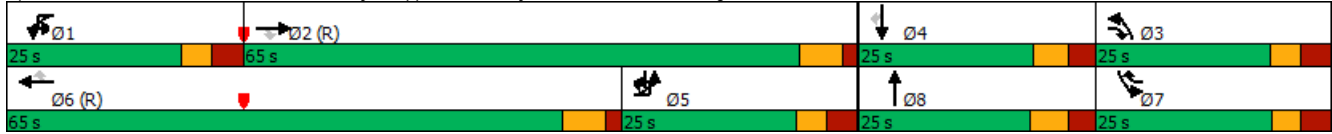
ICU Level of Service D

Analysis Period (min) 15

Description: 05-2148

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	239	228	0	228
Future Volume (vph)	0	35	239	228	0	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1863	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	1863	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	260	248	0	248
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.6%
ICU Level of Service	A
Analysis Period (min)	15



Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	239	228	0	228
Future Vol, veh/h	0	35	239	228	0	228
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	260	248	0	248
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	260	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	779	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	-	779	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	9.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	779	-		
HCM Lane V/C Ratio	-	-	0.049	-		
HCM Control Delay (s)	-	-	9.9	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.2	-		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	30	50	53	31	8	131	67	41	14	118	4
Future Volume (vph)	0	30	50	53	31	8	131	67	41	14	118	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1706	0	0	1789	0	1736	1723	0	1752	1835	0
Flt Permitted					0.972		0.950			0.950		
Satd. Flow (perm)	0	1706	0	0	1789	0	1736	1723	0	1752	1835	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	85	0	0	98	0	139	115	0	15	130	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 35.5% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	30	50	53	31	8	131	67	41	14	118	4
Future Vol, veh/h	0	30	50	53	31	8	131	67	41	14	118	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	0	32	53	56	33	9	139	71	44	15	126	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	551	551	128	572	531	94	130	0	0	115	0	0
Stage 1	158	158	-	371	371	-	-	-	-	-	-	-
Stage 2	393	393	-	201	160	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	445	442	922	431	454	963	1443	-	-	1468	-	-
Stage 1	844	767	-	649	620	-	-	-	-	-	-	-
Stage 2	632	606	-	801	766	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	380	396	922	351	406	962	1443	-	-	1468	-	-
Mov Cap-2 Maneuver	380	396	-	351	406	-	-	-	-	-	-	-
Stage 1	763	759	-	587	560	-	-	-	-	-	-	-
Stage 2	532	548	-	716	758	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.8			17.3			4.3			0.8		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1443	-	-	615	390	1468	-	-				
HCM Lane V/C Ratio	0.097	-	-	0.138	0.251	0.01	-	-				
HCM Control Delay (s)	7.8	-	-	11.8	17.3	7.5	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.3	-	-	0.5	1	0	-	-				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	7	4	4	43	22	14	4	101	4
Future Volume (vph)	4	4	27	7	4	4	43	22	14	4	101	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1754	0	1597	1584	0	1752	1834	0
Flt Permitted		0.994			0.977		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1754	0	1597	1584	0	1752	1834	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		355			448			505			454	
Travel Time (s)		8.1			10.2			11.5			8.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	19	0	52	44	0	5	128	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	27	7	4	4	43	22	14	4	101	4
Future Vol, veh/h	4	4	27	7	4	4	43	22	14	4	101	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	9	5	5	52	27	17	5	123	5
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	281	284	126	295	278	36	128	0	0	44	0	0
Stage 1	136	136	-	140	140	-	-	-	-	-	-	-
Stage 2	145	148	-	155	138	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	671	625	924	657	630	1037	1393	-	-	1558	-	-
Stage 1	867	784	-	863	781	-	-	-	-	-	-	-
Stage 2	858	775	-	847	782	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	643	600	924	610	605	1037	1393	-	-	1558	-	-
Mov Cap-2 Maneuver	643	600	-	610	605	-	-	-	-	-	-	-
Stage 1	835	782	-	831	752	-	-	-	-	-	-	-
Stage 2	817	746	-	809	780	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	9.6		10.4		4.2			0.3				
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1393	-	-	831	684	1558	-	-				
HCM Lane V/C Ratio	0.038	-	-	0.051	0.027	0.003	-	-				
HCM Control Delay (s)	7.7	-	-	9.6	10.4	7.3	-	-				
HCM Lane LOS	A	-	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-				

**Appendix G:  
Synchro Output:  
Background (2023)**

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	180	1106	57	5	19	2100	55	289	6	64	40	9	35
Future Volume (vph)	180	1106	57	5	19	2100	55	289	6	64	40	9	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	300		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	300				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1510	1408
Flt Permitted	0.950				0.404			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	727	4915	1530	3382	1835	1560	3213	1510	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		14	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													39%
Lane Group Flow (vph)	191	1177	61	0	25	2234	59	307	6	68	43	24	23
Turn Type	Prot	NA	pm+ov	custom	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3		1	6	7	3	8	!	7	4	5
Permitted Phases			2	!			6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	11.4	72.4	87.8		11.3	69.7	93.9	15.4	9.7	14.1	19.2	9.2	17.0
Actuated g/C Ratio	0.10	0.60	0.73		0.09	0.58	0.78	0.13	0.08	0.12	0.16	0.08	0.14
v/c Ratio	0.61	0.40	0.05		0.37	0.78	0.05	0.71	0.04	0.21	0.08	0.19	0.07
Control Delay	58.6	10.7	0.9		44.5	8.3	0.1	60.0	49.8	1.5	42.7	34.4	0.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.6	10.7	0.9		44.5	8.3	0.1	60.0	49.8	1.5	42.7	34.4	0.4
LOS	E	B	A		D	A	A	E	D	A	D	C	A
Approach Delay		16.7				8.5			49.4			29.7	
Approach LOS		B				A			D			C	
Queue Length 50th (ft)	75	164	0		19	546	1	118	4	0	12	7	0
Queue Length 95th (ft)	115	242	m2		m25	67	m0	169	18	0	35	36	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	300		125		200		200	200		100	325		150
Base Capacity (vph)	332	2967	1129		72	2853	1222	440	215	326	525	138	334
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.40	0.05		0.35	0.78	0.05	0.70	0.03	0.21	0.08	0.17	0.07

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 15.4 Intersection LOS: B  
 Intersection Capacity Utilization 73.8% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2267  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	420	1070	0	0	1698	808	64	5	380	0	0	0
Future Volume (vph)	420	1070	0	0	1698	808	64	5	380	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						655			186			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	462	1176	0	0	1866	888	0	75	418	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	94.0			69.0	69.0		16.0	16.0			
Actuated g/C Ratio	0.17	0.78			0.58	0.58		0.13	0.13			
v/c Ratio	0.82	0.30			0.65	0.76		0.33	0.81			
Control Delay	56.5	4.3			9.6	7.7		49.4	40.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	56.5	4.3			9.6	7.7		49.4	40.2			
LOS	E	A			A	A		D	D			
Approach Delay		19.0			9.0			41.6				
Approach LOS		B			A			D				
Queue Length 50th (ft)	179	78			82	34		53	101			
Queue Length 95th (ft)	#256	125			272	713		95	155			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3926			2854	1166		423	803			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.82	0.30			0.65	0.76		0.18	0.52			

**Intersection Summary**

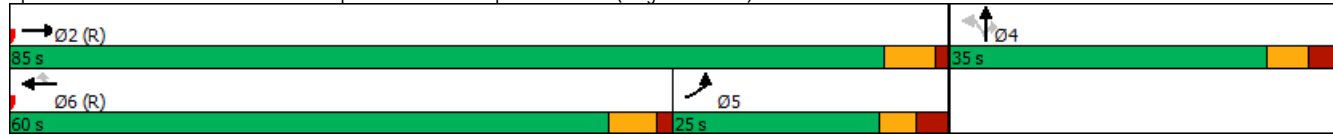
Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 15.6 Intersection LOS: B  
 Intersection Capacity Utilization 80.3% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2152  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1108	110	317	1459	0	0	0	0	0	0	296
Future Volume (vph)	0	1108	110	317	1459	0	0	0	0	0	0	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.212								
Satd. Flow (perm)	0	4963	1545	389	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117									141
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1179	117	337	1552	0	0	0	0	0	0	315
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		86.0	86.0	110.0	120.0							120.0
Actuated g/C Ratio		0.72	0.72	0.92	1.00							1.00
v/c Ratio		0.33	0.10	0.54	0.44							0.20
Control Delay		6.7	1.2	17.4	2.2							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		6.7	1.2	17.4	2.2							0.3
LOS		A	A	B	A							A
Approach Delay		6.2			4.9						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		114	0	62	28							0
Queue Length 95th (ft)		135	16	179	41							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3556	1140	641	3483							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.33	0.10	0.53	0.45							0.20

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 5.0

Intersection LOS: A

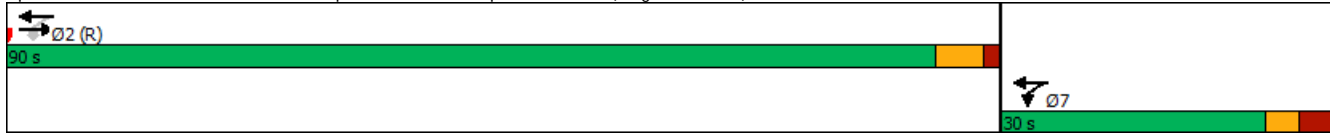
Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	97	980	86	25	78	1937	35	116	12	33	42	4	99
Future Volume (vph)	97	980	86	25	78	1937	35	116	12	33	42	4	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%					-2%			0%		
Storage Length (ft)	350	200		300			175	275	0		150	150	
Storage Lanes	2	1		2			1	1	0		1	1	
Taper Length (ft)	300			300				100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1658	0	3400	1509	1490
Flt Permitted	0.950		0.950					0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1658	0	3400	1509	1490
Right Turn on Red	Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)	95			96				36			52		
Link Speed (mph)	45			45				35			35		
Link Distance (ft)	1283			1388				649			378		
Travel Time (s)	19.4			21.0				12.6			7.4		
Confl. Peds. (#/hr)	1			1									
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)	0%			0%				0%			0%		
Shared Lane Traffic (%)													48%
Lane Group Flow (vph)	107	1077	95	0	113	2129	38	127	49	0	46	56	57
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases	2			6				4					
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.1	66.9	78.3		15.0	70.9	84.9	11.4	11.8		9.0	9.4	22.7
Actuated g/C Ratio	0.09	0.56	0.65		0.12	0.59	0.71	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.36	0.40	0.09		0.27	0.73	0.03	0.39	0.25		0.18	0.34	0.14
Control Delay	59.4	14.7	0.9		49.5	21.2	0.1	54.1	24.2		53.6	21.4	0.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	59.4	14.7	0.9		49.5	21.2	0.1	54.1	24.2		53.6	21.4	0.7
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay	17.4						22.3			45.8		23.3	
Approach LOS	B						C			D		C	
Queue Length 50th (ft)	44	138	2		41	429	0	48	9		17	3	0
Queue Length 95th (ft)	74	142	9		70	580	0	78	46		36	46	0
Internal Link Dist (ft)	1203						1308			569		298	
Turn Bay Length (ft)	350	200		300			175	275			150	150	
Base Capacity (vph)	409	2704	1046		416	2917	1187	429	240		425	234	447
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.26	0.40	0.09		0.27	0.73	0.03	0.30	0.20		0.11	0.24	0.13

Intersection Summary

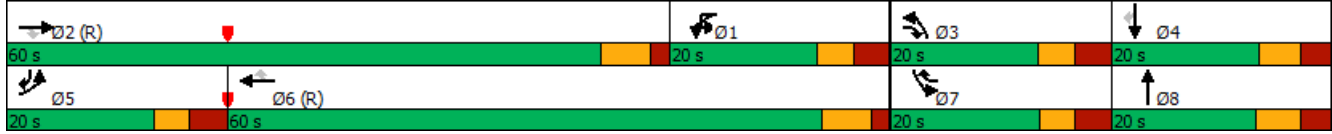
Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 21.8	Intersection LOS: C
Intersection Capacity Utilization 62.4%	ICU Level of Service B
Analysis Period (min) 15	
Description: 05-2148	

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	225	68	0	126
Future Volume (vph)	0	14	225	68	0	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1810	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	1810	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	259	78	0	145
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.8%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.3					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	14	225	68	0	126
Future Vol, veh/h	0	14	225	68	0	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	259	78	0	145

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	-	259	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	780	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	780	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	780	-
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s)	-	-	9.7	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	4	9	5	15	4	4	75	153	7	4	64	4	
Future Volume (vph)	4	9	5	15	4	4	75	153	7	4	64	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)	0%		0%				0%			0%			
Storage Length (ft)	0	0		0	0		50	0		50	0		
Storage Lanes	0	0		0	0		1	0		1	0		
Taper Length (ft)	25	25			100			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Flt Permitted	0.988		0.969			0.950			0.950			0.950	
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Link Speed (mph)	30			30			30			35			
Link Distance (ft)	190			469			388			515			
Travel Time (s)	4.3			10.7			8.8			10.0			
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)	0%			0%			0%			0%			
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	21	0	0	27	0	87	186	0	5	79	0	
Sign Control	Stop		Stop			Free			Free				

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.8%
ICU Level of Service	A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	3.1											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	9	5	15	4	4	75	153	7	4	64	4
Future Vol, veh/h	4	9	5	15	4	4	75	153	7	4	64	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	178	8	5	74	5

<b>Major/Minor</b>	<b>Minor2</b>			<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>		
Conflicting Flow All	448	447	77	451	445	182	79	0	0	186	0	0
Stage 1	87	87	-	356	356	-	-	-	-	-	-	-
Stage 2	361	360	-	95	89	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	521	506	984	519	508	861	1507	-	-	1298	-	-
Stage 1	921	823	-	661	629	-	-	-	-	-	-	-
Stage 2	657	626	-	912	821	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	490	475	984	484	477	861	1507	-	-	1298	-	-
Mov Cap-2 Maneuver	490	475	-	484	477	-	-	-	-	-	-	-
Stage 1	868	820	-	623	593	-	-	-	-	-	-	-
Stage 2	611	590	-	892	818	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>			<b>WB</b>			<b>NB</b>			<b>SB</b>		
HCM Control Delay, s	11.7			12.3			2.4			0.4		
HCM LOS	B			B								

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1507	-	-	559	522	1298	-	-
HCM Lane V/C Ratio	0.058	-	-	0.037	0.051	0.004	-	-
HCM Control Delay (s)	7.5	-	-	11.7	12.3	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	5	12	4	4	9	150	9	4	43	4
Future Volume (vph)	4	4	5	12	4	4	9	150	9	4	43	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1734	0	0	1760	0	1687	1761	0	1421	1478	0
Flt Permitted		0.986			0.970		0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1760	0	1687	1761	0	1421	1478	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			425	
Travel Time (s)		8.1			10.0			10.0			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	26	0	12	217	0	5	64	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	5	12	4	4	9	150	9	4	43	4
Future Vol, veh/h	4	4	5	12	4	4	9	150	9	4	43	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	16	5	5	12	205	12	5	59	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	312	313	62	313	309	211	64	0	0	217	0	0
Stage 1	72	72	-	235	235	-	-	-	-	-	-	-
Stage 2	240	241	-	78	74	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	641	602	1003	640	605	829	1507	-	-	1218	-	-
Stage 1	938	835	-	768	710	-	-	-	-	-	-	-
Stage 2	763	706	-	931	833	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	626	595	1003	625	598	829	1507	-	-	1218	-	-
Mov Cap-2 Maneuver	626	595	-	625	598	-	-	-	-	-	-	-
Stage 1	930	832	-	762	704	-	-	-	-	-	-	-
Stage 2	746	700	-	915	830	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.1			10.8			0.4			0.6		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1507	-	-	718	651	1218	-	-				
HCM Lane V/C Ratio	0.008	-	-	0.025	0.042	0.004	-	-				
HCM Control Delay (s)	7.4	-	-	10.1	10.8	8	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	26	442	2649	171	6	37	1640	77	125	28	61	138	14	138
Future Volume (vph)	26	442	2649	171	6	37	1640	77	125	28	61	138	14	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%				0%
Storage Length (ft)		300		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		300				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1552	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1552	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				85				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														46%
Lane Group Flow (vph)	0	492	2788	180	0	45	1726	81	132	29	64	145	82	78
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	28.0	28.0	80.0	20.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0
Total Split (%)	20.0%	20.0%	57.1%	14.3%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		23.0	89.7	107.1		10.0	73.9	97.7	12.5	9.7	16.2	18.8	10.6	33.6
Actuated g/C Ratio		0.16	0.64	0.76		0.07	0.53	0.70	0.09	0.07	0.12	0.13	0.08	0.24
v/c Ratio		0.87	0.85	0.15		0.36	0.65	0.07	0.44	0.23	0.22	0.31	0.46	0.17
Control Delay		57.3	16.0	1.2		89.8	9.5	0.1	64.7	65.5	1.7	58.0	27.0	1.4
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.3	16.0	1.2		89.8	9.5	0.1	64.7	65.5	1.7	58.0	27.0	1.4
LOS		E	B	A		F	A	A	E	E	A	E	C	A
Approach Delay			21.1				11.0			46.9				35.2
Approach LOS			C				B			D				D
Queue Length 50th (ft)		228	346	6		42	174	0	59	26	0	65	13	0
Queue Length 95th (ft)		m#267	m#945	m13		m82	203	0	92	59	0	98	69	6
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		300		125		200		200	200		100	325		150
Base Capacity (vph)		566	3273	1264		188	2672	1107	362	196	347	471	226	456
Starvation Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.87	0.85	0.14		0.24	0.65	0.07	0.36	0.15	0.18	0.31	0.36	0.17

Intersection Summary

Area Type: Other

Cycle Length: 140

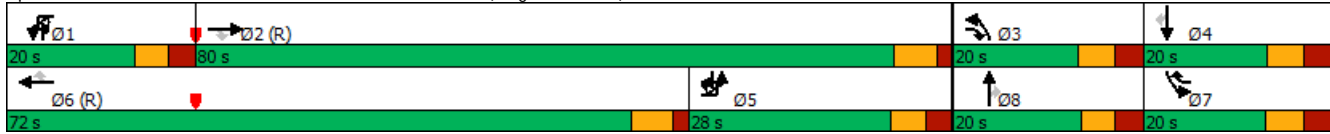
Actuated Cycle Length: 140

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Background+1 (2023) PM  
 03/11/2020

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 19.7 Intersection LOS: B  
 Intersection Capacity Utilization 85.3% ICU Level of Service E  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	2808	0	0	1454	580	84	4	692	0	0	0
Future Volume (vph)	368	2808	0	0	1454	580	84	4	692	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						575			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	383	2925	0	0	1515	604	0	92	721	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.2			65.2	65.2		34.8	34.8			
Actuated g/C Ratio	0.18	0.68			0.47	0.47		0.25	0.25			
v/c Ratio	0.62	0.84			0.64	0.58		0.21	0.98			
Control Delay	50.7	12.7			11.3	2.4		43.2	74.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	50.7	12.7			11.3	2.4		43.2	74.4			
LOS	D	B			B	A		D	E			
Approach Delay		17.1			8.8			70.9				
Approach LOS		B			A			E				
Queue Length 50th (ft)	168	246			176	0		67	341			
Queue Length 95th (ft)	223	258			110	m4		117	#486			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3475			2356	1040		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.62	0.84			0.64	0.58		0.21	0.97			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 21.3

Intersection LOS: C

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

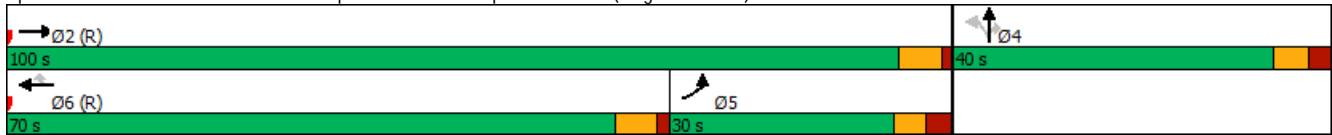
Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2135	75	260	1271	0	0	0	0	0	0	554
Future Volume (vph)	0	2135	75	260	1271	0	0	0	0	0	0	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.057								
Satd. Flow (perm)	0	5060	1575	107	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			77									200
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2179	77	265	1297	0	0	0	0	0	0	565
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		100.3	100.3	130.0	140.0							140.0
Actuated g/C Ratio		0.72	0.72	0.93	1.00							1.00
v/c Ratio		0.60	0.07	0.58	0.36							0.36
Control Delay		11.4	1.7	59.0	1.6							0.6
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		11.4	1.7	59.0	1.6							0.6
LOS		B	A	E	A							A
Approach Delay		11.0			11.3						0.6	
Approach LOS		B			B						A	
Queue Length 50th (ft)		350	0	195	41							0
Queue Length 95th (ft)		422	16	284	16							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3625	1150	519	3542							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.60	0.07	0.51	0.37							0.36

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 9.8

Intersection LOS: A

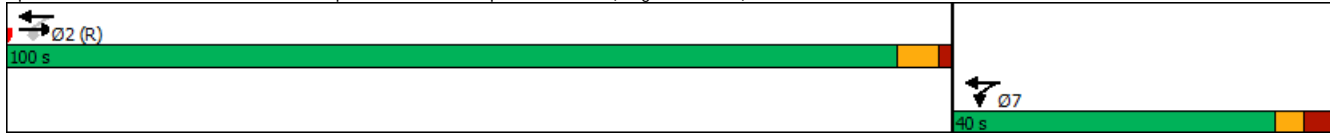
Intersection Capacity Utilization 109.8%

ICU Level of Service H

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
Future Volume (vph)	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1638	0	3433	1632	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3432	5085	1583	3467	1638	0	3428	1632	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				280				212		79			33	129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	277	2153	409	0	346	1226	212	269	148	0	381	113	106
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	66.3	86.7		19.1	65.4	91.2	20.4	13.8		20.7	14.1	39.1
Actuated g/C Ratio		0.14	0.47	0.62		0.14	0.47	0.65	0.15	0.10		0.15	0.10	0.28
v/c Ratio		0.57	0.89	0.38		0.74	0.52	0.19	0.53	0.64		0.75	0.58	0.21
Control Delay		52.9	32.3	3.6		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		52.9	32.3	3.6		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
LOS		D	C	A		E	C	A	E	D		E	D	A
Approach Delay			30.2				32.6			52.7				53.3
Approach LOS			C				C			D				D
Queue Length 50th (ft)		112	453	41		155	286	0	117	60		171	73	0
Queue Length 95th (ft)		m135	#814	m143		211	351	32	166	129		232	137	29
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2408	1084		494	2376	1100	522	301		521	261	513
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.57	0.89	0.38		0.70	0.52	0.19	0.52	0.49		0.73	0.43	0.21

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 35.1

Intersection LOS: D

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2148

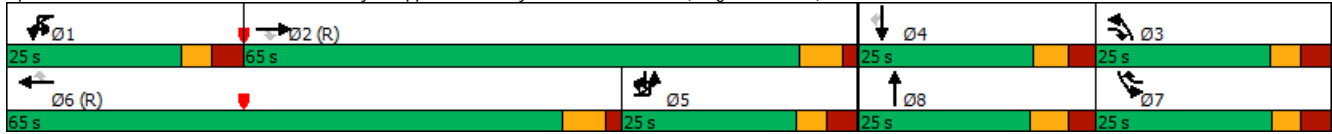
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	285	228	0	303
Future Volume (vph)	0	35	285	228	0	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1863	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	1863	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	310	248	0	329
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.0%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	35	285	228	0	303
Future Vol, veh/h	0	35	285	228	0	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	310	248	0	329
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	310	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.22	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.318	-	-	-	
Pot Cap-1 Maneuver	0	730	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	-	730	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	10.2	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	730	-		
HCM Lane V/C Ratio	-	-	0.052	-		
HCM Control Delay (s)	-	-	10.2	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0.2	-		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	30	50	53	31	8	131	91	41	14	179	4
Future Volume (vph)	4	30	50	53	31	8	131	91	41	14	179	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1741	0	1752	1839	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1741	0	1752	1839	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	141	0	15	194	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 38.7% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	30	50	53	31	8	131	91	41	14	179	4
Future Vol, veh/h	4	30	50	53	31	8	131	91	41	14	179	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	97	44	15	190	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	641	641	192	662	621	120	194	0	0	141	0	0
Stage 1	222	222	-	397	397	-	-	-	-	-	-	-
Stage 2	419	419	-	265	224	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	388	393	850	375	403	931	1367	-	-	1436	-	-
Stage 1	780	720	-	629	603	-	-	-	-	-	-	-
Stage 2	612	590	-	740	718	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	327	349	850	300	358	930	1367	-	-	1436	-	-
Mov Cap-2 Maneuver	327	349	-	300	358	-	-	-	-	-	-	-
Stage 1	700	713	-	565	541	-	-	-	-	-	-	-
Stage 2	511	530	-	656	711	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	13.1			19.9			4			0.5		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1367	-	-	535	338	1436	-	-				
HCM Lane V/C Ratio	0.102	-	-	0.167	0.29	0.01	-	-				
HCM Control Delay (s)	7.9	-	-	13.1	19.9	7.5	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1.2	0	-	-				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	7	4	4	43	41	14	4	160	4
Future Volume (vph)	4	4	27	7	4	4	43	41	14	4	160	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1754	0	1597	1618	0	1752	1837	0
Flt Permitted		0.994			0.977		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1754	0	1597	1618	0	1752	1837	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		355			448			505			454	
Travel Time (s)		8.1			10.2			11.5			8.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	19	0	52	67	0	5	200	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	2.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	27	7	4	4	43	41	14	4	160	4
Future Vol, veh/h	4	4	27	7	4	4	43	41	14	4	160	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	9	5	5	52	50	17	5	195	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	376	379	198	390	373	59	200	0	0	67	0	0
Stage 1	208	208	-	163	163	-	-	-	-	-	-	-
Stage 2	168	171	-	227	210	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	581	553	843	569	557	1007	1309	-	-	1528	-	-
Stage 1	794	730	-	839	763	-	-	-	-	-	-	-
Stage 2	834	757	-	776	728	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	555	529	843	525	533	1007	1309	-	-	1528	-	-
Mov Cap-2 Maneuver	555	529	-	525	533	-	-	-	-	-	-	-
Stage 1	762	728	-	805	732	-	-	-	-	-	-	-
Stage 2	792	727	-	738	726	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		11.1		3.5		0.2	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	748	605	1528	-	-
HCM Lane V/C Ratio	0.04	-	-	0.057	0.03	0.003	-	-
HCM Control Delay (s)	7.9	-	-	10.1	11.1	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

**Appendix H:  
Synchro Output:  
Background (2032)**

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	193	1201	62	5	21	2291	60	316	7	70	44	10	38
Future Volume (vph)	193	1201	62	5	21	2291	60	316	7	70	44	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	300		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	300				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1512	1408
Flt Permitted	0.950				0.404			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	727	4915	1530	3382	1835	1560	3213	1512	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		15	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													38%
Lane Group Flow (vph)	205	1278	66	0	27	2437	64	336	7	74	47	26	25
Turn Type	Prot	NA	pm+ov	custom	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3		1	6	7	3	8	!	7	4	5
Permitted Phases			2	!			6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	11.5	72.0	87.7		11.3	69.0	93.5	15.8	9.7	14.1	19.5	9.2	17.2
Actuated g/C Ratio	0.10	0.60	0.73		0.09	0.58	0.78	0.13	0.08	0.12	0.16	0.08	0.14
v/c Ratio	0.64	0.43	0.06		0.40	0.86	0.05	0.76	0.05	0.23	0.09	0.20	0.08
Control Delay	59.2	13.1	1.9		43.5	10.5	0.1	62.1	50.1	1.7	42.5	34.6	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.2	13.1	1.9		43.5	10.5	0.1	62.1	50.1	1.7	42.5	34.6	0.5
LOS	E	B	A		D	B	A	E	D	A	D	C	A
Approach Delay		18.7				10.6			51.2			29.7	
Approach LOS		B				B			D			C	
Queue Length 50th (ft)	81	175	0		21	641	1	130	5	0	14	8	0
Queue Length 95th (ft)	122	302	m10		m25	#86	m0	#198	20	0	37	38	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	300		125		200		200	200		100	325		150
Base Capacity (vph)	332	2948	1126		72	2827	1217	445	214	326	532	139	335
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.43	0.06		0.38	0.86	0.05	0.76	0.03	0.23	0.09	0.19	0.07

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 17.4 Intersection LOS: B  
 Intersection Capacity Utilization 78.3% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	459	1161	0	0	1852	882	70	5	412	0	0	0
Future Volume (vph)	459	1161	0	0	1852	882	70	5	412	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						652			151			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	504	1276	0	0	2035	969	0	82	453	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	90.8			65.8	65.8		19.2	19.2			
Actuated g/C Ratio	0.17	0.76			0.55	0.55		0.16	0.16			
v/c Ratio	0.89	0.34			0.75	0.85		0.30	0.82			
Control Delay	63.5	5.4			12.6	12.1		45.7	44.6			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	63.5	5.4			12.6	12.1		45.7	44.6			
LOS	E	A			B	B		D	D			
Approach Delay		21.9			12.5			44.7				
Approach LOS		C			B			D				
Queue Length 50th (ft)	200	101			191	29		57	131			
Queue Length 95th (ft)	#294	155			453	#793		99	185			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3793			2722	1141		423	777			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.89	0.34			0.75	0.85		0.19	0.58			

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 86.0%

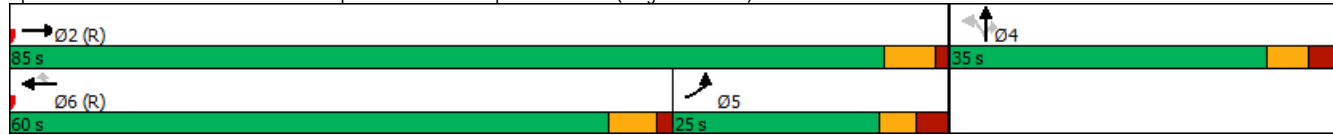
ICU Level of Service E

Analysis Period (min) 15

Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1206	120	345	1592	0	0	0	0	0	0	324
Future Volume (vph)	0	1206	120	345	1592	0	0	0	0	0	0	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.187								
Satd. Flow (perm)	0	4963	1545	343	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128									116
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1283	128	367	1694	0	0	0	0	0	0	345
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		85.3	85.3	110.0	120.0							120.0
Actuated g/C Ratio		0.71	0.71	0.92	1.00							1.00
v/c Ratio		0.36	0.11	0.61	0.49							0.22
Control Delay		7.1	1.1	26.8	2.9							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.1	1.1	26.8	2.9							0.3
LOS		A	A	C	A							A
Approach Delay		6.6			7.2						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		127	0	118	48							0
Queue Length 95th (ft)		150	17	233	58							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3527	1134	607	3462							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.36	0.11	0.60	0.49							0.22

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120



Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 6.3

Intersection LOS: A

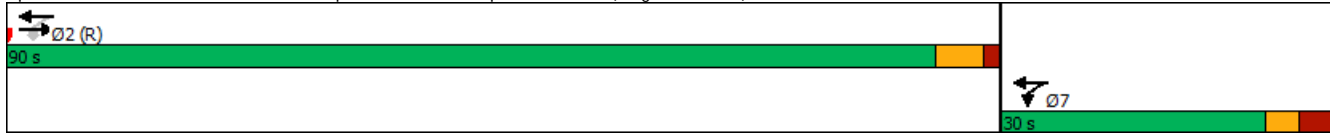
Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	106	1063	94	27	85	2112	38	127	13	36	46	4	108
Future Volume (vph)	106	1063	94	27	85	2112	38	127	13	36	46	4	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1656	0	3400	1507	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1656	0	3400	1507	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			103				96		40			58	150
Link Speed (mph)		45				45				35			35
Link Distance (ft)		1283				1388			649			378	
Travel Time (s)		19.4				21.0			12.6			7.4	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													49%
Lane Group Flow (vph)	116	1168	103	0	123	2321	42	140	54	0	51	62	61
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2				6						4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.3	66.4	78.3		15.0	70.1	84.2	11.8	12.1		9.1	9.5	23.0
Actuated g/C Ratio	0.09	0.55	0.65		0.12	0.58	0.70	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.38	0.44	0.10		0.30	0.80	0.04	0.41	0.27		0.20	0.36	0.15
Control Delay	60.4	16.1	1.6		49.8	24.2	0.1	54.1	23.5		53.7	20.6	0.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	60.4	16.1	1.6		49.8	24.2	0.1	54.1	23.5		53.7	20.6	0.8
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		18.7				25.0			45.6			23.4	
Approach LOS		B				C			D			C	
Queue Length 50th (ft)	47	156	3		45	510	0	53	10		19	3	0
Queue Length 95th (ft)	79	171	19		75	#712	0	84	48		39	48	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2684	1044		416	2886	1179	429	245		425	239	448
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.28	0.44	0.10		0.30	0.80	0.04	0.33	0.22		0.12	0.26	0.14

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 23.8

Intersection LOS: C

Intersection Capacity Utilization 66.6%

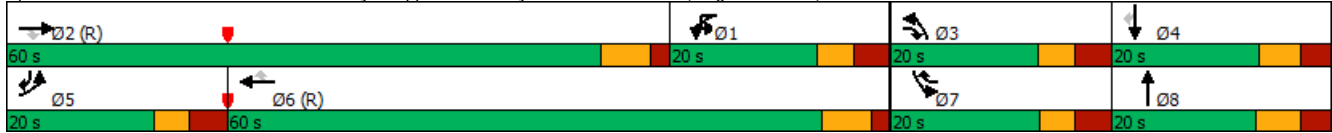
ICU Level of Service C

Analysis Period (min) 15

Description: 05-2148

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	242	68	0	137
Future Volume (vph)	0	14	242	68	0	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1810	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	1810	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	278	78	0	157
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.7%
ICU Level of Service	A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.3					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	14	242	68	0	137
Future Vol, veh/h	0	14	242	68	0	137
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	278	78	0	157

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	-	278	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	761	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	761	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	761	-
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s)	-	-	9.8	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	4	9	5	15	4	4	75	163	7	4	69	4	
Future Volume (vph)	4	9	5	15	4	4	75	163	7	4	69	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)	0%		0%				0%			0%			
Storage Length (ft)	0	0		0	0		50	0		50	0		
Storage Lanes	0	0		0	0		1	0		1	0		
Taper Length (ft)	25	25			100			100					
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Flt Permitted	0.988		0.969			0.950			0.950				
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Link Speed (mph)	30			30			30			35			
Link Distance (ft)	190			469			388			515			
Travel Time (s)	4.3			10.7			8.8			10.0			
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)	0%			0%			0%			0%			
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	21	0	0	27	0	87	198	0	5	85	0	
Sign Control	Stop		Stop			Free			Free				

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 20.8% ICU Level of Service A

Analysis Period (min) 15

**Intersection**

Int Delay, s/veh	3											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	9	5	15	4	4	75	163	7	4	69	4
Future Vol, veh/h	4	9	5	15	4	4	75	163	7	4	69	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	190	8	5	80	5

<b>Major/Minor</b>	<b>Minor2</b>			<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>		
Conflicting Flow All	466	465	83	469	463	194	85	0	0	198	0	0
Stage 1	93	93	-	368	368	-	-	-	-	-	-	-
Stage 2	373	372	-	101	95	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	507	495	976	505	496	847	1499	-	-	1284	-	-
Stage 1	914	818	-	652	621	-	-	-	-	-	-	-
Stage 2	648	619	-	905	816	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	477	464	976	470	465	847	1499	-	-	1284	-	-
Mov Cap-2 Maneuver	477	464	-	470	465	-	-	-	-	-	-	-
Stage 1	861	815	-	614	585	-	-	-	-	-	-	-
Stage 2	602	583	-	885	813	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	11.8	12.5	2.3	0.4
HCM LOS	B	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1499	-	-	547	508	1284	-	-
HCM Lane V/C Ratio	0.058	-	-	0.038	0.053	0.004	-	-
HCM Control Delay (s)	7.5	-	-	11.8	12.5	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	4	4	5	12	4	4	9	160	9	4	46	4	
Future Volume (vph)	4	4	5	12	4	4	9	160	9	4	46	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)	0%		0%				0%			0%			
Storage Length (ft)	0	0		0	0		50	0		50	0		
Storage Lanes	0	0		0	0		1	0		1	0		
Taper Length (ft)	25	25			100			100					
Satd. Flow (prot)	0	1734	0	0	1760	0	1687	1761	0	1421	1480	0	
Flt Permitted	0.986		0.970				0.950			0.950			
Satd. Flow (perm)	0	1734	0	0	1760	0	1687	1761	0	1421	1480	0	
Link Speed (mph)	30				30			35			35		
Link Distance (ft)	358				438			515			425		
Travel Time (s)	8.1				10.0			10.0			8.3		
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)	0%			0%			0%			0%			
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	17	0	0	26	0	12	231	0	5	68	0	
Sign Control	Stop			Stop			Free			Free			

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15



**Intersection**

Int Delay, s/veh	1.7											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	4	5	12	4	4	9	160	9	4	46	4
Future Vol, veh/h	4	4	5	12	4	4	9	160	9	4	46	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	16	5	5	12	219	12	5	63	5

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>		<b>Major1</b>			<b>Major2</b>				
Conflicting Flow All	330	331	66	331	327	225	68	0	0	231	0	0
Stage 1	76	76	-	249	249	-	-	-	-	-	-	-
Stage 2	254	255	-	82	78	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	623	588	998	622	591	814	1502	-	-	1203	-	-
Stage 1	933	832	-	755	701	-	-	-	-	-	-	-
Stage 2	750	696	-	926	830	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	609	581	998	608	584	814	1502	-	-	1203	-	-
Mov Cap-2 Maneuver	609	581	-	608	584	-	-	-	-	-	-	-
Stage 1	926	829	-	749	695	-	-	-	-	-	-	-
Stage 2	733	690	-	910	827	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10.2	10.9	0.4	0.6
HCM LOS	B	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1502	-	-	704	635	1203	-	-
HCM Lane V/C Ratio	0.008	-	-	0.025	0.043	0.005	-	-
HCM Control Delay (s)	7.4	-	-	10.2	10.9	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	28	482	2881	187	7	40	1777	84	137	31	67	150	15	147
Future Volume (vph)	28	482	2881	187	7	40	1777	84	137	31	67	150	15	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%				0%
Storage Length (ft)		300		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		300				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1554	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1554	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				85				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														46%
Lane Group Flow (vph)	0	536	3033	197	0	49	1871	88	144	33	71	158	87	84
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	28.0	28.0	80.0	20.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0
Total Split (%)	20.0%	20.0%	57.1%	14.3%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		23.0	86.2	104.0			10.2	73.4	97.5	12.8	9.9	16.7	19.2	10.8
Actuated g/C Ratio		0.16	0.62	0.74			0.07	0.52	0.70	0.09	0.07	0.12	0.14	0.08
v/c Ratio		0.95	0.96	0.16			0.38	0.71	0.08	0.46	0.26	0.24	0.34	0.47
Control Delay		63.1	23.6	1.6			89.7	10.4	0.1	65.0	65.9	1.9	58.1	26.8
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		63.1	23.6	1.6			89.7	10.4	0.1	65.0	65.9	1.9	58.1	26.8
LOS		E	C	A			F	B	A	E	A	E	C	A
Approach Delay			28.1				11.9			47.0				35.5
Approach LOS			C				B			D				D
Queue Length 50th (ft)		245	642	8			44	191	0	64	29	0	71	14
Queue Length 95th (ft)		m#268	m#1159	m17			m79	222	0	100	64	0	106	71
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		300		125			200		200	200		100	325	150
Base Capacity (vph)		566	3145	1226			188	2651	1113	362	196	349	475	229
Starvation Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.95	0.96	0.16			0.26	0.71	0.08	0.40	0.17	0.20	0.33	0.38

Intersection Summary

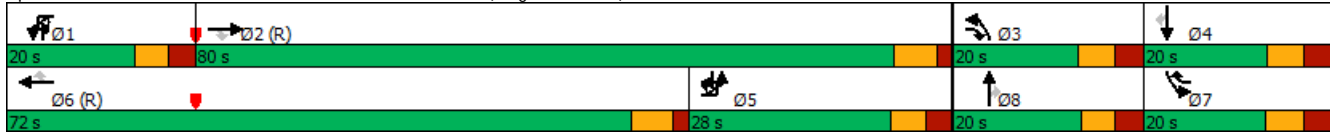
Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.96  
 Intersection Signal Delay: 24.1 Intersection LOS: C  
 Intersection Capacity Utilization 89.8% ICU Level of Service E  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	402	3058	0	0	1575	629	92	4	753	0	0	0
Future Volume (vph)	402	3058	0	0	1575	629	92	4	753	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						575			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	419	3185	0	0	1641	655	0	100	784	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.0			65.0	65.0		35.0	35.0			
Actuated g/C Ratio	0.18	0.68			0.46	0.46		0.25	0.25			
v/c Ratio	0.68	0.92			0.70	0.63		0.23	1.06			
Control Delay	51.3	16.3			11.6	2.8		43.5	93.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	51.3	16.3			11.6	2.8		43.5	93.9			
LOS	D	B			B	A		D	F			
Approach Delay		20.4			9.1			88.2				
Approach LOS		C			A			F				
Queue Length 50th (ft)	186	274			175	0		73	-414			
Queue Length 95th (ft)	244	286			m119	m6		125	#557			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3468			2349	1039		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.68	0.92			0.70	0.63		0.23	1.06			

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 25.4

Intersection LOS: C

Intersection Capacity Utilization 93.8%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2152

~ Volume exceeds capacity, queue is theoretically infinite.

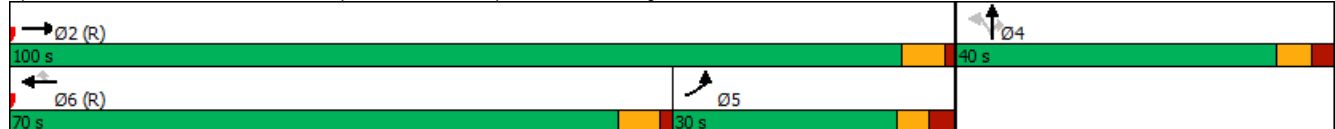
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2326	82	279	1380	0	0	0	0	0	0	606
Future Volume (vph)	0	2326	82	279	1380	0	0	0	0	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.041								
Satd. Flow (perm)	0	5060	1575	77	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			84									172
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2373	84	285	1408	0	0	0	0	0	0	618
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		98.3	98.3	130.0	140.0							140.0
Actuated g/C Ratio		0.70	0.70	0.93	1.00							1.00
v/c Ratio		0.67	0.07	0.62	0.40							0.40
Control Delay		13.4	1.6	63.5	1.8							0.7
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		13.4	1.6	63.5	1.8							0.7
LOS		B	A	E	A							A
Approach Delay		13.0			12.2						0.7	
Approach LOS		B			B						A	
Queue Length 50th (ft)		443	0	227	33							0
Queue Length 95th (ft)		490	17	317	20							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3551	1130	497	3549							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		79	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.68	0.07	0.57	0.40							0.40

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.1

Intersection LOS: B

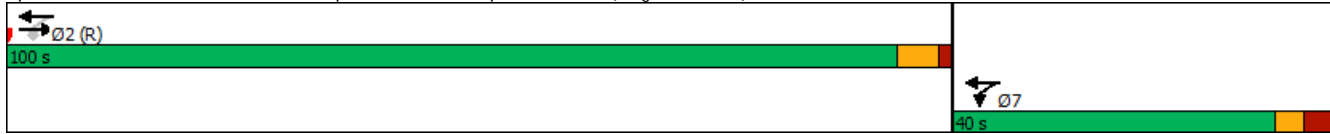
Intersection Capacity Utilization 119.3%

ICU Level of Service H

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Future Volume (vph)	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1639	0	3433	1630	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3433	5085	1583	3467	1639	0	3428	1630	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				282				232		70				129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	302	2337	447	0	378	1324	232	294	162	0	416	124	115
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	64.1	85.6		19.6	63.7	90.0	21.6	15.0		21.3	14.8	39.8
Actuated g/C Ratio		0.14	0.46	0.61		0.14	0.46	0.64	0.15	0.11		0.15	0.11	0.28
v/c Ratio		0.62	1.00	0.42		0.79	0.57	0.21	0.55	0.68		0.80	0.62	0.22
Control Delay		54.5	46.2	4.1		70.6	30.0	1.8	59.1	47.8		69.2	56.3	5.1
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		54.5	46.2	4.1		70.6	30.0	1.8	59.1	47.8		69.2	56.3	5.1
LOS		D	D	A		E	C	A	E	D		E	E	A
Approach Delay			40.9				34.5			55.1				55.5
Approach LOS			D				C			E				E
Queue Length 50th (ft)		124	-851	68		172	334	0	126	81		186	84	0
Queue Length 95th (ft)		m130	m#910	m139		230	387	33	180	155		#274	151	36
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2326	1071		493	2312	1092	539	294		528	261	519
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.62	1.00	0.42		0.77	0.57	0.21	0.55	0.55		0.79	0.48	0.22

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140



Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 41.5

Intersection LOS: D

Intersection Capacity Utilization 93.9%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2148

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

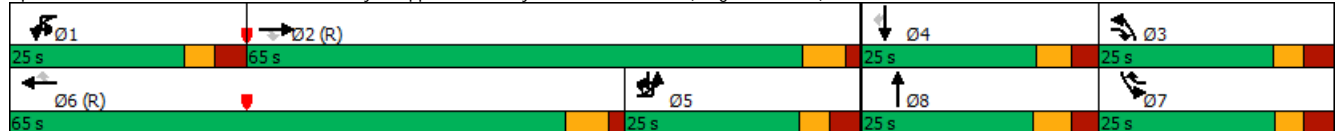
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	310	228	0	327
Future Volume (vph)	0	35	310	228	0	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1863	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	1863	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	337	248	0	355
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.3%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.4					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	35	310	228	0	327
Future Vol, veh/h	0	35	310	228	0	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	337	248	0	355

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	-	337	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	705	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	705	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	705	-
HCM Lane V/C Ratio	-	-	0.054	-
HCM Control Delay (s)	-	-	10.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	30	50	53	31	8	131	98	41	14	191	4
Future Volume (vph)	4	30	50	53	31	8	131	98	41	14	191	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1745	0	1752	1839	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1745	0	1752	1839	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	148	0	15	207	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.3%
ICU Level of Service	A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	6.4											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	30	50	53	31	8	131	98	41	14	191	4
Future Vol, veh/h	4	30	50	53	31	8	131	98	41	14	191	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	104	44	15	203	4

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>		<b>Major1</b>			<b>Major2</b>				
Conflicting Flow All	661	661	205	682	641	127	207	0	0	148	0	0
Stage 1	235	235	-	404	404	-	-	-	-	-	-	-
Stage 2	426	426	-	278	237	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	376	383	836	364	393	923	1352	-	-	1427	-	-
Stage 1	768	710	-	623	599	-	-	-	-	-	-	-
Stage 2	606	586	-	728	709	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	316	340	836	290	349	922	1352	-	-	1427	-	-
Mov Cap-2 Maneuver	316	340	-	290	349	-	-	-	-	-	-	-
Stage 1	689	702	-	559	537	-	-	-	-	-	-	-
Stage 2	505	526	-	644	701	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	13.3	20.6	3.9	0.5
HCM LOS	B	C		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1352	-	-	523	328	1427	-	-
HCM Lane V/C Ratio	0.103	-	-	0.171	0.298	0.01	-	-
HCM Control Delay (s)	8	-	-	13.3	20.6	7.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	7	4	4	43	43	14	4	171	4
Future Volume (vph)	4	4	27	7	4	4	43	43	14	4	171	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1754	0	1597	1619	0	1752	1837	0
Flt Permitted		0.994			0.977		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1754	0	1597	1619	0	1752	1837	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		355			448			505			454	
Travel Time (s)		8.1			10.2			11.5			8.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	19	0	52	69	0	5	214	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	27	7	4	4	43	43	14	4	171	4
Future Vol, veh/h	4	4	27	7	4	4	43	43	14	4	171	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	9	5	5	52	52	17	5	209	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	392	395	212	406	389	61	214	0	0	69	0	0
Stage 1	222	222	-	165	165	-	-	-	-	-	-	-
Stage 2	170	173	-	241	224	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	567	542	828	555	546	1004	1293	-	-	1526	-	-
Stage 1	780	720	-	837	762	-	-	-	-	-	-	-
Stage 2	832	756	-	762	718	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	541	519	828	512	523	1004	1293	-	-	1526	-	-
Mov Cap-2 Maneuver	541	519	-	512	523	-	-	-	-	-	-	-
Stage 1	749	718	-	804	732	-	-	-	-	-	-	-
Stage 2	789	726	-	724	716	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.2			11.3			3.4			0.2		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1293	-	-	734	593	1526	-	-				
HCM Lane V/C Ratio	0.041	-	-	0.058	0.031	0.003	-	-				
HCM Control Delay (s)	7.9	-	-	10.2	11.3	7.4	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-				

**Appendix I:**  
**Synchro Output:**  
**Background (2023) w/ Legacy Oaks**



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	180	1174	57	5	19	2142	55	289	6	64	40	9	35
Future Volume (vph)	180	1174	57	5	19	2142	55	289	6	64	40	9	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	300		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	300				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1510	1408
Flt Permitted	0.950				0.404			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	727	4915	1530	3382	1835	1560	3213	1510	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		14	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													39%
Lane Group Flow (vph)	191	1249	61	0	25	2279	59	307	6	68	43	24	23
Turn Type	Prot	NA	pm+ov	custom	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3		1	6	7	3	8	!	7	4	5
Permitted Phases			2	!			6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	11.4	72.4	87.8		11.3	69.7	93.9	15.4	9.7	14.1	19.2	9.2	17.0
Actuated g/C Ratio	0.10	0.60	0.73		0.09	0.58	0.78	0.13	0.08	0.12	0.16	0.08	0.14
v/c Ratio	0.61	0.42	0.05		0.37	0.80	0.05	0.71	0.04	0.21	0.08	0.19	0.07
Control Delay	58.1	11.6	1.2		44.5	8.9	0.1	60.0	49.8	1.5	42.7	34.4	0.4
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	11.6	1.2		44.5	8.9	0.1	60.0	49.8	1.5	42.7	34.4	0.4
LOS	E	B	A		D	A	A	E	D	A	D	C	A
Approach Delay		17.1				9.1			49.4			29.7	
Approach LOS		B				A			D			C	
Queue Length 50th (ft)	75	174	1		19	566	1	118	4	0	12	7	0
Queue Length 95th (ft)	114	275	m5		m25	68	m0	169	18	0	35	36	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	300		125		200		200	200		100	325		150
Base Capacity (vph)	332	2967	1129		72	2853	1222	440	215	326	525	138	334
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.42	0.05		0.35	0.80	0.05	0.70	0.03	0.21	0.08	0.17	0.07

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 15.8 Intersection LOS: B  
 Intersection Capacity Utilization 74.6% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2267  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	476	1138	0	0	1740	808	79	5	380	0	0	0
Future Volume (vph)	476	1138	0	0	1740	808	79	5	380	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						651			159			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	523	1251	0	0	1912	888	0	92	418	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	92.8			67.8	67.8		17.2	17.2			
Actuated g/C Ratio	0.17	0.77			0.56	0.56		0.14	0.14			
v/c Ratio	0.93	0.32			0.68	0.77		0.38	0.81			
Control Delay	68.2	4.7			10.5	8.1		49.6	42.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	68.2	4.7			10.5	8.1		49.6	42.9			
LOS	E	A			B	A		D	D			
Approach Delay		23.4			9.8			44.1				
Approach LOS		C			A			D				
Queue Length 50th (ft)	208	90			108	22		65	113			
Queue Length 95th (ft)	#311	141			314	709		110	165			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3877			2805	1156		423	783			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.93	0.32			0.68	0.77		0.22	0.53			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 81.9%

ICU Level of Service D

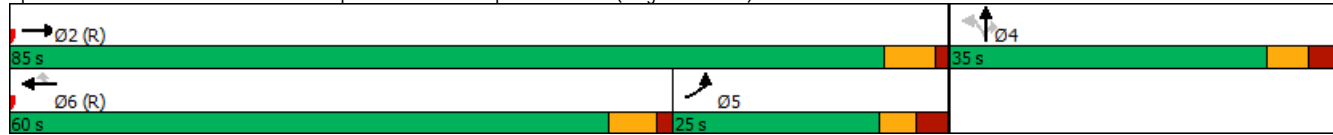
Analysis Period (min) 15

Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1232	133	317	1515	0	0	0	0	0	0	331
Future Volume (vph)	0	1232	133	317	1515	0	0	0	0	0	0	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.181								
Satd. Flow (perm)	0	4963	1545	332	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			141									130
Link Speed (mph)		45		45			35				35	
Link Distance (ft)		965		302			601				428	
Travel Time (s)		14.6		4.6			11.7				8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1311	141	337	1612	0	0	0	0	0	0	352
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		85.8	85.8	110.0	120.0							120.0
Actuated g/C Ratio		0.72	0.72	0.92	1.00							1.00
v/c Ratio		0.37	0.12	0.57	0.46							0.22
Control Delay		7.1	1.1	22.7	2.6							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.1	1.1	22.7	2.6							0.3
LOS		A	A	C	A							A
Approach Delay		6.5			6.0						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		131	0	83	37							0
Queue Length 95th (ft)		154	17	200	51							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3546	1144	600	3476							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.37	0.12	0.56	0.46							0.22

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 5.7

Intersection LOS: A

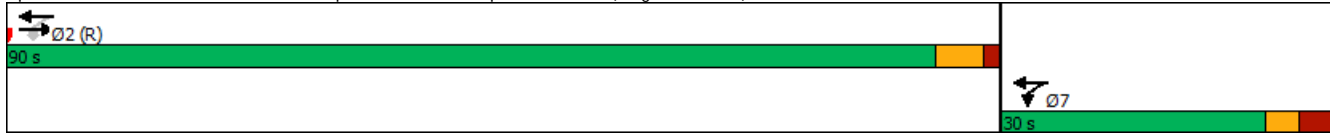
Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	97	980	86	25	78	1937	35	116	12	33	42	4	99
Future Volume (vph)	97	980	86	25	78	1937	35	116	12	33	42	4	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1658	0	3400	1509	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1658	0	3400	1509	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95				96		36			52	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1283				1388			649			378	
Travel Time (s)		19.4				21.0			12.6			7.4	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													48%
Lane Group Flow (vph)	107	1077	95	0	113	2129	38	127	49	0	46	56	57
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2			6							4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.1	66.9	78.3		15.0	70.9	84.9	11.4	11.8		9.0	9.4	22.7
Actuated g/C Ratio	0.09	0.56	0.65		0.12	0.59	0.71	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.36	0.40	0.09		0.27	0.73	0.03	0.39	0.25		0.18	0.34	0.14
Control Delay	59.5	15.3	1.3		49.5	21.2	0.1	54.1	24.2		53.6	21.4	0.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	59.5	15.3	1.3		49.5	21.2	0.1	54.1	24.2		53.6	21.4	0.7
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		18.0				22.3			45.8			23.3	
Approach LOS		B				C			D			C	
Queue Length 50th (ft)	44	141	2		41	429	0	48	9		17	3	0
Queue Length 95th (ft)	75	154	13		70	580	0	78	46		36	46	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2704	1046		416	2917	1187	429	240		425	234	447
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.26	0.40	0.09		0.27	0.73	0.03	0.30	0.20		0.11	0.24	0.13

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 22.0

Intersection LOS: C

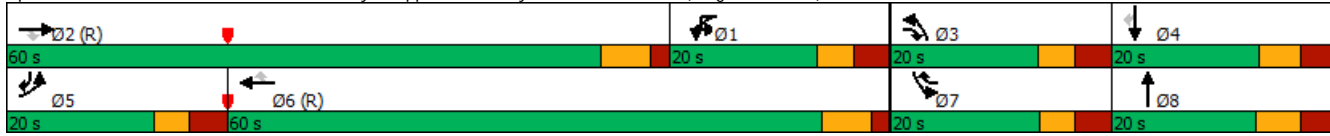
Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

Description: 05-2148

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	225	68	0	126
Future Volume (vph)	0	14	225	68	0	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1810	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	1810	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	259	78	0	145
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	21.8%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	14	225	68	0	126
Future Vol, veh/h	0	14	225	68	0	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	259	78	0	145

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	259	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	780	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	780	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	780	-
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s)	-	-	9.7	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	9	5	15	4	4	75	153	7	4	64	4
Future Volume (vph)	4	9	5	15	4	4	75	153	7	4	64	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	186	0	5	79	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	20.8%
ICU Level of Service	A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	3.1											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	9	5	15	4	4	75	153	7	4	64	4
Future Vol, veh/h	4	9	5	15	4	4	75	153	7	4	64	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	178	8	5	74	5

<b>Major/Minor</b>	<b>Minor2</b>			<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>		
Conflicting Flow All	448	447	77	451	445	182	79	0	0	186	0	0
Stage 1	87	87	-	356	356	-	-	-	-	-	-	-
Stage 2	361	360	-	95	89	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	521	506	984	519	508	861	1507	-	-	1298	-	-
Stage 1	921	823	-	661	629	-	-	-	-	-	-	-
Stage 2	657	626	-	912	821	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	490	475	984	484	477	861	1507	-	-	1298	-	-
Mov Cap-2 Maneuver	490	475	-	484	477	-	-	-	-	-	-	-
Stage 1	868	820	-	623	593	-	-	-	-	-	-	-
Stage 2	611	590	-	892	818	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>			<b>WB</b>			<b>NB</b>			<b>SB</b>		
HCM Control Delay, s	11.7			12.3			2.4			0.4		
HCM LOS	B			B								

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1507	-	-	559	522	1298	-	-
HCM Lane V/C Ratio	0.058	-	-	0.037	0.051	0.004	-	-
HCM Control Delay (s)	7.5	-	-	11.7	12.3	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	5	12	4	4	9	150	9	4	43	4
Future Volume (vph)	4	4	5	12	4	4	9	150	9	4	43	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0	0		0	0		50	0		50	0	
Storage Lanes	0	0		0	0		1	0		1	0	
Taper Length (ft)	25	25			100			100				
Satd. Flow (prot)	0	1734	0	0	1760	0	1687	1761	0	1421	1478	0
Flt Permitted	0.986		0.970				0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1760	0	1687	1761	0	1421	1478	0
Link Speed (mph)	30			30			35			35		
Link Distance (ft)	358			438			515			425		
Travel Time (s)	8.1			10.0			10.0			8.3		
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)	0%			0%			0%			0%		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	26	0	12	217	0	5	64	0
Sign Control	Stop		Stop				Free			Free		

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 18.4% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	1.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	5	12	4	4	9	150	9	4	43	4
Future Vol, veh/h	4	4	5	12	4	4	9	150	9	4	43	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	16	5	5	12	205	12	5	59	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	312	313	62	313	309	211	64	0	0	217	0	0
Stage 1	72	72	-	235	235	-	-	-	-	-	-	-
Stage 2	240	241	-	78	74	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	641	602	1003	640	605	829	1507	-	-	1218	-	-
Stage 1	938	835	-	768	710	-	-	-	-	-	-	-
Stage 2	763	706	-	931	833	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	626	595	1003	625	598	829	1507	-	-	1218	-	-
Mov Cap-2 Maneuver	626	595	-	625	598	-	-	-	-	-	-	-
Stage 1	930	832	-	762	704	-	-	-	-	-	-	-
Stage 2	746	700	-	915	830	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.1			10.8			0.4			0.6		
HCM LOS	B			B								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	718	651	1218	-	-
HCM Lane V/C Ratio	0.008	-	-	0.025	0.042	0.004	-	-
HCM Control Delay (s)	7.4	-	-	10.1	10.8	8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	26	442	2699	171	6	37	1712	77	125	28	61	138	14	138
Future Volume (vph)	26	442	2699	171	6	37	1712	77	125	28	61	138	14	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%			0%	
Storage Length (ft)		300		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		300				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1552	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1552	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				83				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														46%
Lane Group Flow (vph)	0	492	2841	180	0	45	1802	81	132	29	64	145	82	78
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	28.0	28.0	80.0	20.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0
Total Split (%)	20.0%	20.0%	57.1%	14.3%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		23.0	89.7	107.1		10.0	73.9	97.7	12.5	9.7	16.2	18.8	10.6	33.6
Actuated g/C Ratio		0.16	0.64	0.76		0.07	0.53	0.70	0.09	0.07	0.12	0.13	0.08	0.24
v/c Ratio		0.87	0.87	0.15		0.36	0.67	0.07	0.44	0.23	0.22	0.31	0.46	0.17
Control Delay		57.2	16.8	1.3		89.4	10.6	0.1	64.7	65.5	1.7	58.0	27.0	1.4
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.2	16.8	1.3		89.4	10.6	0.1	64.7	65.5	1.7	58.0	27.0	1.4
LOS		E	B	A		F	B	A	E	E	A	E	C	A
Approach Delay			21.7				12.0			46.9				35.2
Approach LOS			C				B			D				D
Queue Length 50th (ft)		225	367	6		40	189	0	59	26	0	65	13	0
Queue Length 95th (ft)		m261	m#1050	m13		m81	220	0	92	59	0	98	69	6
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		300		125		200		200	200		100	325		150
Base Capacity (vph)		566	3273	1264		188	2672	1107	362	196	347	471	226	456
Starvation Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.87	0.87	0.14		0.24	0.67	0.07	0.36	0.15	0.18	0.31	0.36	0.17

**Intersection Summary**

Area Type: Other

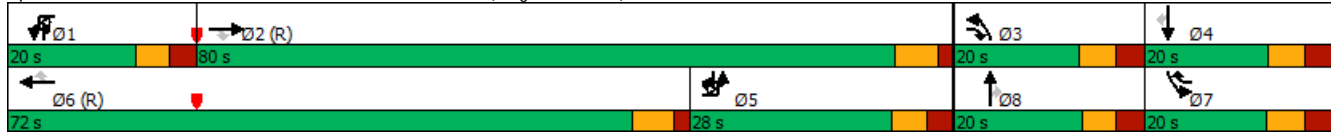
Cycle Length: 140

Actuated Cycle Length: 140

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 20.2 Intersection LOS: C  
 Intersection Capacity Utilization 86.3% ICU Level of Service E  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	410	2858	0	0	1526	580	108	4	692	0	0	0
Future Volume (vph)	410	2858	0	0	1526	580	108	4	692	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						548			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	427	2977	0	0	1590	604	0	117	721	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.2			65.2	65.2		34.8	34.8			
Actuated g/C Ratio	0.18	0.68			0.47	0.47		0.25	0.25			
v/c Ratio	0.69	0.86			0.67	0.59		0.27	0.98			
Control Delay	52.2	12.6			11.6	2.3		44.3	74.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	52.2	12.6			11.6	2.3		44.3	74.4			
LOS	D	B			B	A		D	E			
Approach Delay		17.6			9.0			70.2				
Approach LOS		B			A			E				
Queue Length 50th (ft)	190	248			190	0		86	341			
Queue Length 95th (ft)	248	260			113	m4		143	#486			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3475			2356	1026		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.69	0.86			0.67	0.59		0.27	0.97			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 21.5

Intersection LOS: C

Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

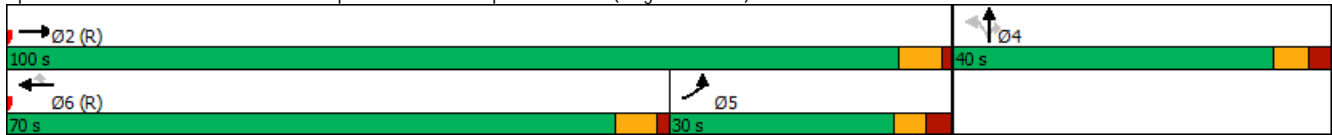
Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2227	90	260	1367	0	0	0	0	0	0	613
Future Volume (vph)	0	2227	90	260	1367	0	0	0	0	0	0	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.049								
Satd. Flow (perm)	0	5060	1575	92	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			92									175
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2272	92	265	1395	0	0	0	0	0	0	626
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		99.0	99.0	130.0	140.0							140.0
Actuated g/C Ratio		0.71	0.71	0.93	1.00							1.00
v/c Ratio		0.63	0.08	0.58	0.39							0.40
Control Delay		12.5	1.6	59.5	2.2							0.8
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		12.5	1.6	59.5	2.2							0.8
LOS		B	A	E	A							A
Approach Delay		12.0			11.3						0.8	
Approach LOS		B			B						A	
Queue Length 50th (ft)		402	0	199	63							0
Queue Length 95th (ft)		453	18	286	21							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3578	1140	508	3529							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		9	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.64	0.08	0.52	0.40							0.40

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 10.3

Intersection LOS: B

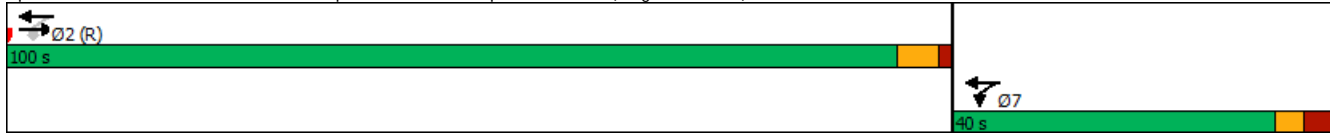
Intersection Capacity Utilization 111.6%

ICU Level of Service H

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
Future Volume (vph)	5	269	2131	405	122	221	1214	210	266	30	117	377	53	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1638	0	3433	1632	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3432	5085	1583	3467	1638	0	3428	1632	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				280				212		79			33	129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	277	2153	409	0	346	1226	212	269	148	0	381	113	106
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	66.3	86.7		19.1	65.4	91.2	20.4	13.8		20.7	14.1	39.1
Actuated g/C Ratio		0.14	0.47	0.62		0.14	0.47	0.65	0.15	0.10		0.15	0.10	0.28
v/c Ratio		0.57	0.89	0.38		0.74	0.52	0.19	0.53	0.64		0.75	0.58	0.21
Control Delay		53.2	32.6	3.6		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		53.2	32.6	3.6		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
LOS		D	C	A		E	C	A	E	D		E	D	A
Approach Delay			30.4				32.6			52.7				53.3
Approach LOS			C				C			D				D
Queue Length 50th (ft)		111	457	40		155	286	0	117	60		171	73	0
Queue Length 95th (ft)		m132	#813	m140		211	351	32	166	129		232	137	29
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2408	1084		494	2376	1100	522	301		521	261	513
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.57	0.89	0.38		0.70	0.52	0.19	0.52	0.49		0.73	0.43	0.21

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 35.2

Intersection LOS: D

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2148

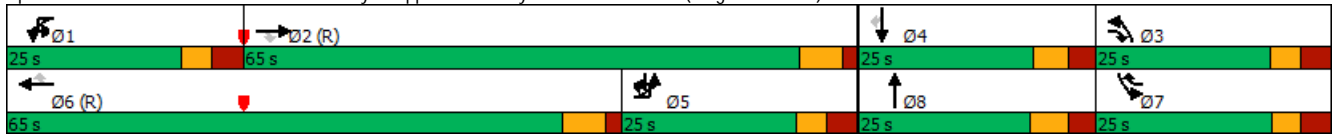
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	285	228	0	303
Future Volume (vph)	0	35	285	228	0	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1863	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	1863	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	310	248	0	329
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.0%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.4					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	35	285	228	0	303
Future Vol, veh/h	0	35	285	228	0	303
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	310	248	0	329

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	-	310	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	730	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	730	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	730	-
HCM Lane V/C Ratio	-	-	0.052	-
HCM Control Delay (s)	-	-	10.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	30	50	53	31	8	131	91	41	14	179	4
Future Volume (vph)	4	30	50	53	31	8	131	91	41	14	179	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1741	0	1752	1839	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1741	0	1752	1839	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	141	0	15	194	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 38.7% ICU Level of Service A

Analysis Period (min) 15

**Intersection**

Int Delay, s/veh	6.4											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	30	50	53	31	8	131	91	41	14	179	4
Future Vol, veh/h	4	30	50	53	31	8	131	91	41	14	179	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	97	44	15	190	4

<b>Major/Minor</b>	<b>Minor2</b>			<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>		
Conflicting Flow All	641	641	192	662	621	120	194	0	0	141	0	0
Stage 1	222	222	-	397	397	-	-	-	-	-	-	-
Stage 2	419	419	-	265	224	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	388	393	850	375	403	931	1367	-	-	1436	-	-
Stage 1	780	720	-	629	603	-	-	-	-	-	-	-
Stage 2	612	590	-	740	718	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	327	349	850	300	358	930	1367	-	-	1436	-	-
Mov Cap-2 Maneuver	327	349	-	300	358	-	-	-	-	-	-	-
Stage 1	700	713	-	565	541	-	-	-	-	-	-	-
Stage 2	511	530	-	656	711	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	13.1	19.9	4	0.5
HCM LOS	B	C		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1367	-	-	535	338	1436	-	-
HCM Lane V/C Ratio	0.102	-	-	0.167	0.29	0.01	-	-
HCM Control Delay (s)	7.9	-	-	13.1	19.9	7.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	7	4	4	43	41	14	4	160	4
Future Volume (vph)	4	4	27	7	4	4	43	41	14	4	160	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1754	0	1597	1618	0	1752	1837	0
Flt Permitted		0.994			0.977		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1754	0	1597	1618	0	1752	1837	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		355			448			505			454	
Travel Time (s)		8.1			10.2			11.5			8.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	19	0	52	67	0	5	200	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	2.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	27	7	4	4	43	41	14	4	160	4
Future Vol, veh/h	4	4	27	7	4	4	43	41	14	4	160	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	9	5	5	52	50	17	5	195	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	376	379	198	390	373	59	200	0	0	67	0	0
Stage 1	208	208	-	163	163	-	-	-	-	-	-	-
Stage 2	168	171	-	227	210	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	581	553	843	569	557	1007	1309	-	-	1528	-	-
Stage 1	794	730	-	839	763	-	-	-	-	-	-	-
Stage 2	834	757	-	776	728	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	555	529	843	525	533	1007	1309	-	-	1528	-	-
Mov Cap-2 Maneuver	555	529	-	525	533	-	-	-	-	-	-	-
Stage 1	762	728	-	805	732	-	-	-	-	-	-	-
Stage 2	792	727	-	738	726	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.1		11.1		3.5		0.2	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	748	605	1528	-	-
HCM Lane V/C Ratio	0.04	-	-	0.057	0.03	0.003	-	-
HCM Control Delay (s)	7.9	-	-	10.1	11.1	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

**Appendix J:**  
**Synchro Output:**  
**Background (2032) w/ Legacy Oaks**

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	193	1269	62	5	21	2333	60	316	7	70	44	10	38
Future Volume (vph)	193	1269	62	5	21	2333	60	316	7	70	44	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	300		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	300				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1512	1408
Flt Permitted	0.950				0.404			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	727	4915	1530	3382	1835	1560	3213	1512	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		15	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													38%
Lane Group Flow (vph)	205	1350	66	0	27	2482	64	336	7	74	47	26	25
Turn Type	Prot	NA	pm+ov	custom	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3		1	6	7	3	8	!	7	4	5
Permitted Phases			2	!			6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	11.5	72.0	87.7		11.3	69.0	93.5	15.8	9.7	14.1	19.5	9.2	17.2
Actuated g/C Ratio	0.10	0.60	0.73		0.09	0.58	0.78	0.13	0.08	0.12	0.16	0.08	0.14
v/c Ratio	0.64	0.46	0.06		0.40	0.88	0.05	0.76	0.05	0.23	0.09	0.20	0.08
Control Delay	58.8	14.4	2.1		43.5	11.3	0.1	62.1	50.1	1.7	42.5	34.6	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	14.4	2.1		43.5	11.3	0.1	62.1	50.1	1.7	42.5	34.6	0.5
LOS	E	B	A		D	B	A	E	D	A	D	C	A
Approach Delay		19.5				11.4			51.2			29.7	
Approach LOS		B				B			D			C	
Queue Length 50th (ft)	81	205	0		21	663	1	130	5	0	14	8	0
Queue Length 95th (ft)	122	335	m12		m25	#100	m0	#198	20	0	37	38	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	300		125		200		200	200		100	325		150
Base Capacity (vph)	332	2948	1126		72	2827	1217	445	214	326	532	139	335
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.46	0.06		0.38	0.88	0.05	0.76	0.03	0.23	0.09	0.19	0.07

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.88  
 Intersection Signal Delay: 18.1 Intersection LOS: B  
 Intersection Capacity Utilization 79.1% ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	515	1229	0	0	1894	882	85	5	412	0	0	0
Future Volume (vph)	515	1229	0	0	1894	882	85	5	412	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						649			129			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	566	1351	0	0	2081	969	0	98	453	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	89.9			64.9	64.9		20.1	20.1			
Actuated g/C Ratio	0.17	0.75			0.54	0.54		0.17	0.17			
v/c Ratio	1.00	0.36			0.78	0.86		0.35	0.82			
Control Delay	83.5	5.9			13.7	12.6		46.1	46.5			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	83.5	5.9			13.7	12.6		46.1	46.5			
LOS	F	A			B	B		D	D			
Approach Delay		28.8			13.4			46.4				
Approach LOS		C			B			D				
Queue Length 50th (ft)	-229	113			223	28		68	140			
Queue Length 95th (ft)	#351	171			515	m#773		113	194			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3755			2685	1133		423	760			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.00	0.36			0.78	0.86		0.23	0.60			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120



Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2152

~ Volume exceeds capacity, queue is theoretically infinite.

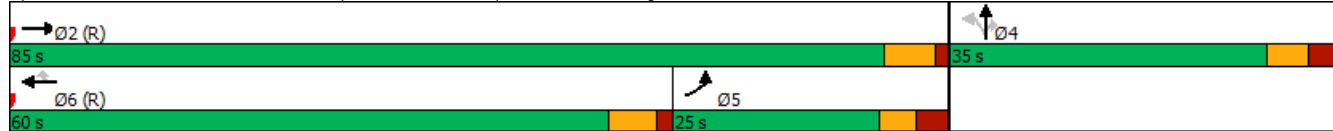
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1330	143	345	1648	0	0	0	0	0	0	359
Future Volume (vph)	0	1330	143	345	1648	0	0	0	0	0	0	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.158								
Satd. Flow (perm)	0	4963	1545	290	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152									107
Link Speed (mph)		45		45				35			35	
Link Distance (ft)		965		302				601			428	
Travel Time (s)		14.6		4.6				11.7			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1415	152	367	1753	0	0	0	0	0	0	382
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		85.0	85.0	110.0	120.0							120.0
Actuated g/C Ratio		0.71	0.71	0.92	1.00							1.00
v/c Ratio		0.40	0.13	0.65	0.50							0.24
Control Delay		7.5	1.1	32.5	3.3							0.4
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.5	1.1	32.5	3.3							0.4
LOS		A	A	C	A							A
Approach Delay		6.9			8.4						0.4	
Approach LOS		A			A						A	
Queue Length 50th (ft)		145	0	130	57							0
Queue Length 95th (ft)		171	18	m241	66							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3516	1138	568	3455							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.40	0.13	0.65	0.51							0.24

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 56.5%

ICU Level of Service B

Analysis Period (min) 15

Description: 05-2153

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	106	1063	94	27	85	2112	38	127	13	36	46	4	108
Future Volume (vph)	106	1063	94	27	85	2112	38	127	13	36	46	4	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1656	0	3400	1507	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1656	0	3400	1507	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			103				96		40			58	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1283				1388			649			378	
Travel Time (s)		19.4				21.0			12.6			7.4	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													49%
Lane Group Flow (vph)	116	1168	103	0	123	2321	42	140	54	0	51	62	61
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2			6							4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.3	66.4	78.3		15.0	70.1	84.2	11.8	12.1		9.1	9.5	23.0
Actuated g/C Ratio	0.09	0.55	0.65		0.12	0.58	0.70	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.38	0.44	0.10		0.30	0.80	0.04	0.41	0.27		0.20	0.36	0.15
Control Delay	60.7	16.5	1.9		49.8	24.2	0.1	54.1	23.5		53.7	20.6	0.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	60.7	16.5	1.9		49.8	24.2	0.1	54.1	23.5		53.7	20.6	0.8
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		19.1				25.0			45.6				23.4
Approach LOS		B				C			D				C
Queue Length 50th (ft)	48	146	3		45	510	0	53	10		19	3	0
Queue Length 95th (ft)	79	183	28		75	#712	0	84	48		39	48	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2684	1044		416	2886	1179	429	245		425	239	448
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.28	0.44	0.10		0.30	0.80	0.04	0.33	0.22		0.12	0.26	0.14

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 24.0

Intersection LOS: C

Intersection Capacity Utilization 66.6%

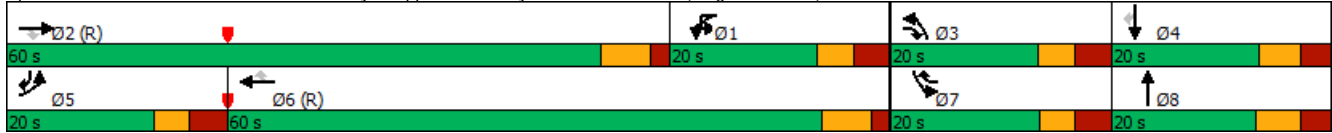
ICU Level of Service C

Analysis Period (min) 15

Description: 05-2148

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	242	68	0	137
Future Volume (vph)	0	14	242	68	0	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1810	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	1810	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	278	78	0	157
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.7%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.3					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	14	242	68	0	137
Future Vol, veh/h	0	14	242	68	0	137
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	278	78	0	157

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>		<b>Major2</b>	
Conflicting Flow All	-	278	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	761	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	761	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	761	-
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s)	-	-	9.8	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	4	9	5	15	4	4	75	163	7	4	69	4	
Future Volume (vph)	4	9	5	15	4	4	75	163	7	4	69	4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)	0%		0%				0%			0%			
Storage Length (ft)	0	0		0	0		50	0		50	0		
Storage Lanes	0	0		0	0		1	0		1	0		
Taper Length (ft)	25	25			100			100					
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Flt Permitted	0.988		0.969			0.950			0.950				
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1816	0	1530	1596	0	
Link Speed (mph)	30			30			30			35			
Link Distance (ft)	190			469			388			515			
Travel Time (s)	4.3			10.7			8.8			10.0			
Confl. Peds. (#/hr)													
Confl. Bikes (#/hr)													
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)	0%			0%			0%			0%			
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	21	0	0	27	0	87	198	0	5	85	0	
Sign Control	Stop		Stop			Free			Free				

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 20.8% ICU Level of Service A

Analysis Period (min) 15



**Intersection**

Int Delay, s/veh	3											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	9	5	15	4	4	75	163	7	4	69	4
Future Vol, veh/h	4	9	5	15	4	4	75	163	7	4	69	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	190	8	5	80	5

<b>Major/Minor</b>	<b>Minor2</b>			<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>		
Conflicting Flow All	466	465	83	469	463	194	85	0	0	198	0	0
Stage 1	93	93	-	368	368	-	-	-	-	-	-	-
Stage 2	373	372	-	101	95	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	507	495	976	505	496	847	1499	-	-	1284	-	-
Stage 1	914	818	-	652	621	-	-	-	-	-	-	-
Stage 2	648	619	-	905	816	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	477	464	976	470	465	847	1499	-	-	1284	-	-
Mov Cap-2 Maneuver	477	464	-	470	465	-	-	-	-	-	-	-
Stage 1	861	815	-	614	585	-	-	-	-	-	-	-
Stage 2	602	583	-	885	813	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>			<b>WB</b>			<b>NB</b>			<b>SB</b>		
HCM Control Delay, s	11.8			12.5			2.3			0.4		
HCM LOS	B			B								

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1499	-	-	547	508	1284	-	-
HCM Lane V/C Ratio	0.058	-	-	0.038	0.053	0.004	-	-
HCM Control Delay (s)	7.5	-	-	11.8	12.5	7.8	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	5	12	4	4	9	160	9	4	46	4
Future Volume (vph)	4	4	5	12	4	4	9	160	9	4	46	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1734	0	0	1760	0	1687	1761	0	1421	1480	0
Flt Permitted		0.986			0.970		0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1760	0	1687	1761	0	1421	1480	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			425	
Travel Time (s)		8.1			10.0			10.0			8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	26	0	12	231	0	5	68	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.0%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	4	5	12	4	4	9	160	9	4	46	4
Future Vol, veh/h	4	4	5	12	4	4	9	160	9	4	46	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	16	5	5	12	219	12	5	63	5
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	330	331	66	331	327	225	68	0	0	231	0	0
Stage 1	76	76	-	249	249	-	-	-	-	-	-	-
Stage 2	254	255	-	82	78	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	623	588	998	622	591	814	1502	-	-	1203	-	-
Stage 1	933	832	-	755	701	-	-	-	-	-	-	-
Stage 2	750	696	-	926	830	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	609	581	998	608	584	814	1502	-	-	1203	-	-
Mov Cap-2 Maneuver	609	581	-	608	584	-	-	-	-	-	-	-
Stage 1	926	829	-	749	695	-	-	-	-	-	-	-
Stage 2	733	690	-	910	827	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.2			10.9			0.4			0.6		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1502	-	-	704	635	1203	-	-				
HCM Lane V/C Ratio	0.008	-	-	0.025	0.043	0.005	-	-				
HCM Control Delay (s)	7.4	-	-	10.2	10.9	8	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	28	482	2931	187	7	40	1849	84	137	31	67	150	15	147
Future Volume (vph)	28	482	2931	187	7	40	1849	84	137	31	67	150	15	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%				0%
Storage Length (ft)		300		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		300				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1554	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1554	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				84				81			130			71
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														46%
Lane Group Flow (vph)	0	536	3085	197	0	49	1946	88	144	33	71	158	87	84
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	28.0	28.0	80.0	20.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0
Total Split (%)	20.0%	20.0%	57.1%	14.3%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		23.0	86.2	104.0			10.2	73.4	97.5	12.8	9.9	16.7	19.2	10.8
Actuated g/C Ratio		0.16	0.62	0.74			0.07	0.52	0.70	0.09	0.07	0.12	0.14	0.08
v/c Ratio		0.95	0.98	0.16			0.38	0.73	0.08	0.46	0.26	0.24	0.34	0.47
Control Delay		62.7	25.7	1.7			88.7	11.6	0.2	65.0	65.9	1.9	58.1	26.8
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		62.7	25.7	1.7			88.7	11.6	0.2	65.0	65.9	1.9	58.1	26.8
LOS		E	C	A			F	B	A	E	A	E	C	A
Approach Delay			29.7				13.0			47.0				35.5
Approach LOS			C				B			D				D
Queue Length 50th (ft)		246	718	8			45	206	0	64	29	0	71	14
Queue Length 95th (ft)		m262	m#1195	m16			m80	239	0	100	64	0	106	71
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		300		125			200		200	200		100	325	150
Base Capacity (vph)		566	3145	1226			188	2651	1113	362	196	349	475	229
Starvation Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.95	0.98	0.16			0.26	0.73	0.08	0.40	0.17	0.20	0.33	0.38

Intersection Summary

Area Type: Other

Cycle Length: 140

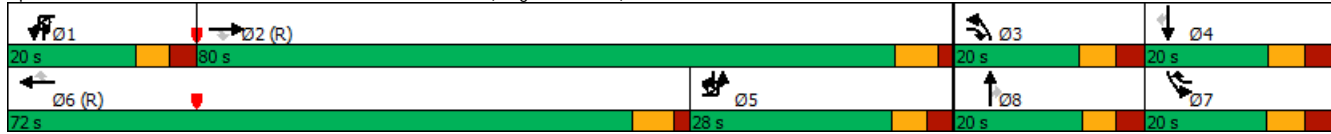
Actuated Cycle Length: 140

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Background+10 (2032) PM w/ Legacy Oaks  
 03/11/2020

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 25.3 Intersection LOS: C  
 Intersection Capacity Utilization 90.8% ICU Level of Service E  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	444	3108	0	0	1647	629	116	4	753	0	0	0
Future Volume (vph)	444	3108	0	0	1647	629	116	4	753	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						550			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	463	3238	0	0	1716	655	0	125	784	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.0			65.0	65.0		35.0	35.0			
Actuated g/C Ratio	0.18	0.68			0.46	0.46		0.25	0.25			
v/c Ratio	0.75	0.93			0.73	0.64		0.28	1.06			
Control Delay	53.5	17.1			11.9	2.7		44.5	93.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	53.5	17.1			11.9	2.7		44.5	93.9			
LOS	D	B			B	A		D	F			
Approach Delay		21.6			9.4			87.1				
Approach LOS		C			A			F				
Queue Length 50th (ft)	208	276			190	0		93	-414			
Queue Length 95th (ft)	271	287			m123	m6		152	#557			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3468			2349	1025		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.75	0.93			0.73	0.64		0.28	1.06			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 26.0

Intersection LOS: C

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2152

~ Volume exceeds capacity, queue is theoretically infinite.

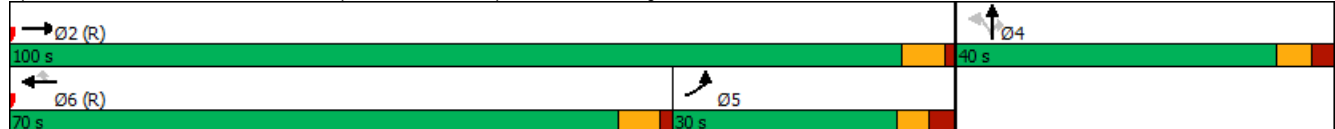
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2418	97	279	1476	0	0	0	0	0	0	665
Future Volume (vph)	0	2418	97	279	1476	0	0	0	0	0	0	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.041								
Satd. Flow (perm)	0	5060	1575	77	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			96									150
Link Speed (mph)		45		45			35				35	
Link Distance (ft)		980		302			601				428	
Travel Time (s)		14.8		4.6			11.7				8.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%		0%			0%				0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2467	99	285	1506	0	0	0	0	0	0	679
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		97.6	97.6	130.0	140.0							140.0
Actuated g/C Ratio		0.70	0.70	0.93	1.00							1.00
v/c Ratio		0.70	0.09	0.61	0.42							0.43
Control Delay		14.3	1.7	61.6	2.4							0.9
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		14.4	1.7	61.6	2.4							0.9
LOS		B	A	E	A							A
Approach Delay		13.9			11.8						0.9	
Approach LOS		B			B						A	
Queue Length 50th (ft)		478	1	224	51							0
Queue Length 95th (ft)		527	19	313	24							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3526	1126	497	3541							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		84	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.72	0.09	0.57	0.43							0.43

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140



Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 11.4

Intersection LOS: B

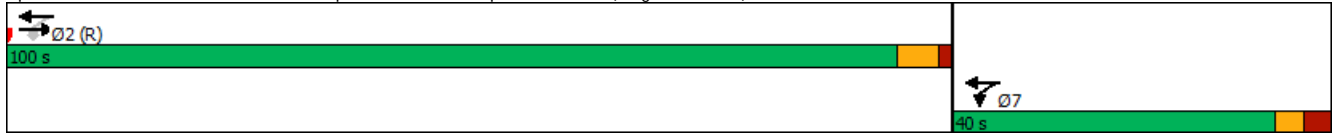
Intersection Capacity Utilization 121.1%

ICU Level of Service H

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Future Volume (vph)	5	294	2314	443	133	242	1311	230	291	33	128	412	58	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1639	0	3433	1630	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3433	5085	1583	3467	1639	0	3428	1630	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				282				232		70				129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	302	2337	447	0	378	1324	232	294	162	0	416	124	115
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	64.1	85.6		19.6	63.7	90.0	21.6	15.0		21.3	14.8	39.8
Actuated g/C Ratio		0.14	0.46	0.61		0.14	0.46	0.64	0.15	0.11		0.15	0.11	0.28
v/c Ratio		0.62	1.00	0.42		0.79	0.57	0.21	0.55	0.68		0.80	0.62	0.22
Control Delay		54.5	45.9	4.1		70.6	30.0	1.8	59.1	47.8		69.2	56.3	5.1
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		54.5	45.9	4.1		70.6	30.0	1.8	59.1	47.8		69.2	56.3	5.1
LOS		D	D	A		E	C	A	E	D		E	E	A
Approach Delay			40.7				34.5			55.1				55.5
Approach LOS			D				C			E				E
Queue Length 50th (ft)		124	-852	75		172	334	0	126	81		186	84	0
Queue Length 95th (ft)		m128	m#883	m136		230	387	33	180	155		#274	151	36
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2326	1071		493	2312	1092	539	294		528	261	519
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.62	1.00	0.42		0.77	0.57	0.21	0.55	0.55		0.79	0.48	0.22

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 41.4

Intersection LOS: D

Intersection Capacity Utilization 93.9%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2148

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

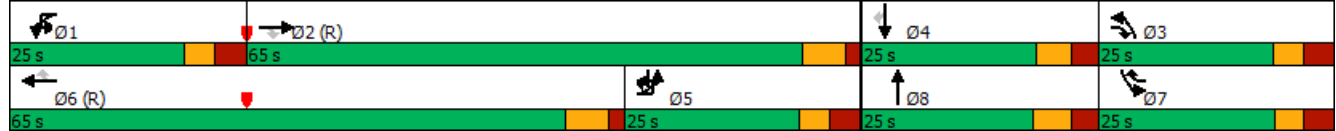
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	35	310	228	0	327
Future Volume (vph)	0	35	310	228	0	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	1863	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	1863	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	337	248	0	355
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	26.3%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	0.4					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations						
Traffic Vol, veh/h	0	35	310	228	0	327
Future Vol, veh/h	0	35	310	228	0	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	337	248	0	355

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	-	337	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	705	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	705	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBT</b>
Capacity (veh/h)	-	-	705	-
HCM Lane V/C Ratio	-	-	0.054	-
HCM Control Delay (s)	-	-	10.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	30	50	53	31	8	131	98	41	14	191	4
Future Volume (vph)	4	30	50	53	31	8	131	98	41	14	191	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1745	0	1752	1839	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1745	0	1752	1839	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	148	0	15	207	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 39.3% ICU Level of Service A

Analysis Period (min) 15

**Intersection**

Int Delay, s/veh	6.4											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	30	50	53	31	8	131	98	41	14	191	4
Future Vol, veh/h	4	30	50	53	31	8	131	98	41	14	191	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	104	44	15	203	4

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>		<b>Major1</b>			<b>Major2</b>				
Conflicting Flow All	661	661	205	682	641	127	207	0	0	148	0	0
Stage 1	235	235	-	404	404	-	-	-	-	-	-	-
Stage 2	426	426	-	278	237	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	376	383	836	364	393	923	1352	-	-	1427	-	-
Stage 1	768	710	-	623	599	-	-	-	-	-	-	-
Stage 2	606	586	-	728	709	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	316	340	836	290	349	922	1352	-	-	1427	-	-
Mov Cap-2 Maneuver	316	340	-	290	349	-	-	-	-	-	-	-
Stage 1	689	702	-	559	537	-	-	-	-	-	-	-
Stage 2	505	526	-	644	701	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	13.3	20.6	3.9	0.5
HCM LOS	B	C		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1352	-	-	523	328	1427	-	-
HCM Lane V/C Ratio	0.103	-	-	0.171	0.298	0.01	-	-
HCM Control Delay (s)	8	-	-	13.3	20.6	7.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	4	27	7	4	4	43	43	14	4	171	4
Future Volume (vph)	4	4	27	7	4	4	43	43	14	4	171	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%		0%				0%			0%		
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1754	0	1597	1619	0	1752	1837	0
Flt Permitted		0.994			0.977		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1754	0	1597	1619	0	1752	1837	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		355			448			505			454	
Travel Time (s)		8.1			10.2			11.5			8.8	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	19	0	52	69	0	5	214	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.9%
ICU Level of Service	A
Analysis Period (min)	15



**Intersection**

Int Delay, s/veh	2.7											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations												
Traffic Vol, veh/h	4	4	27	7	4	4	43	43	14	4	171	4
Future Vol, veh/h	4	4	27	7	4	4	43	43	14	4	171	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	9	5	5	52	52	17	5	209	5

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>		<b>Major1</b>			<b>Major2</b>				
Conflicting Flow All	392	395	212	406	389	61	214	0	0	69	0	0
Stage 1	222	222	-	165	165	-	-	-	-	-	-	-
Stage 2	170	173	-	241	224	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	567	542	828	555	546	1004	1293	-	-	1526	-	-
Stage 1	780	720	-	837	762	-	-	-	-	-	-	-
Stage 2	832	756	-	762	718	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	541	519	828	512	523	1004	1293	-	-	1526	-	-
Mov Cap-2 Maneuver	541	519	-	512	523	-	-	-	-	-	-	-
Stage 1	749	718	-	804	732	-	-	-	-	-	-	-
Stage 2	789	726	-	724	716	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10.2	11.3	3.4	0.2
HCM LOS	B	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1293	-	-	734	593	1526	-	-
HCM Lane V/C Ratio	0.041	-	-	0.058	0.031	0.003	-	-
HCM Control Delay (s)	7.9	-	-	10.2	11.3	7.4	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

**Appendix K:  
Build-out (2023)**



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	383	1106	57	5	19	2100	91	289	6	64	47	9	72
Future Volume (vph)	383	1106	57	5	19	2100	91	289	6	64	47	9	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	400		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	200				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1464	1408
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	1709	4915	1530	3382	1835	1560	3213	1464	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		34	150
Link Speed (mph)		45			45				35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													44%
Lane Group Flow (vph)	407	1177	61	0	25	2234	97	307	6	68	50	44	43
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6				8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	22.0	68.0	20.0	17.0	17.0	63.0	16.0	20.0	19.0	17.0	16.0	15.0	22.0
Total Split (%)	18.3%	56.7%	16.7%	14.2%	14.2%	52.5%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	18.3%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	16.9	69.7	84.9		11.3	61.4	89.3	15.2	9.7	14.1	22.9	9.3	24.4
Actuated g/C Ratio	0.14	0.58	0.71		0.09	0.51	0.74	0.13	0.08	0.12	0.19	0.08	0.20
v/c Ratio	0.87	0.41	0.06		0.16	0.89	0.08	0.72	0.04	0.21	0.08	0.31	0.11
Control Delay	67.8	18.4	2.8		35.0	17.6	0.2	60.4	50.0	1.5	41.3	27.8	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	18.4	2.8		35.0	17.6	0.2	60.4	50.0	1.5	41.3	27.8	0.5
LOS	E	B	A		C	B	A	E	D	A	D	C	A
Approach Delay		30.1				17.1			49.7			24.2	
Approach LOS		C				B			D			C	
Queue Length 50th (ft)	164	231	3		19	593	0	118	4	0	15	7	0
Queue Length 95th (ft)	#247	269	m11		m22	#251	m0	169	18	0	39	47	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	400		125		200		200	200		100	325		150
Base Capacity (vph)	470	2854	1095		171	2513	1163	436	214	326	614	153	406
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.41	0.06		0.15	0.89	0.08	0.70	0.03	0.21	0.08	0.29	0.11

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Build-out+1 (2023) AM + Imp  
 05/14/2020

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 24.8

Intersection LOS: C

Intersection Capacity Utilization 78.9%

ICU Level of Service D

Analysis Period (min) 15

Description: 05-2267

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↕			↕↕↕	↕↔		↕↔	↕↕↕			
Traffic Volume (vph)	420	1154	0	0	1724	819	64	5	500	0	0	0
Future Volume (vph)	420	1154	0	0	1724	819	64	5	500	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						655			153			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	462	1268	0	0	1895	900	0	75	549	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases					6	4		4				
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	86.6			61.6	61.6		23.4	23.4			
Actuated g/C Ratio	0.17	0.72			0.51	0.51		0.20	0.20			
v/c Ratio	0.82	0.35			0.74	0.81		0.23	0.86			
Control Delay	56.6	6.9			14.2	11.9		40.6	46.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	56.6	6.9			14.2	11.9		40.6	46.8			
LOS	E	A			B	B		D	D			
Approach Delay		20.2			13.5			46.0				
Approach LOS		C			B			D				
Queue Length 50th (ft)	179	119			314	587		49	173			
Queue Length 95th (ft)	#256	169			556	m669		88	232			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3617			2548	1111		423	778			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.82	0.35			0.74	0.81		0.18	0.71			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)

05/14/2020

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 19.7

Intersection LOS: B

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

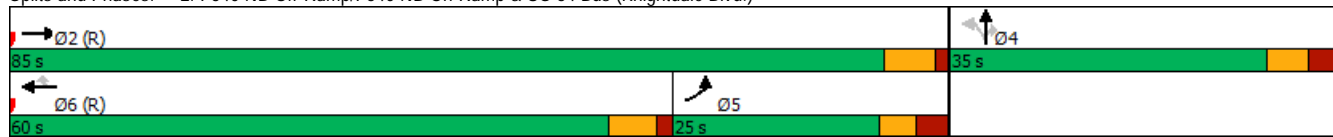
Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	1132	110	339	1463	0	0	0	0	0	0	296
Future Volume (vph)	0	1132	110	339	1463	0	0	0	0	0	0	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%				2%
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.206								
Satd. Flow (perm)	0	4963	1545	378	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117									140
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1204	117	361	1556	0	0	0	0	0	0	315
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		85.8	85.8	110.0	120.0							120.0
Actuated g/C Ratio		0.72	0.72	0.92	1.00							1.00
v/c Ratio		0.34	0.10	0.58	0.45							0.20
Control Delay		6.8	1.2	28.4	2.8							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		6.8	1.2	28.4	2.8							0.3
LOS		A	A	C	A							A
Approach Delay		6.3			7.6						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		117	0	144	61							0
Queue Length 95th (ft)		139	16	241	46							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3548	1138	633	3477							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.34	0.10	0.57	0.45							0.20

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 6.5

Intersection LOS: A

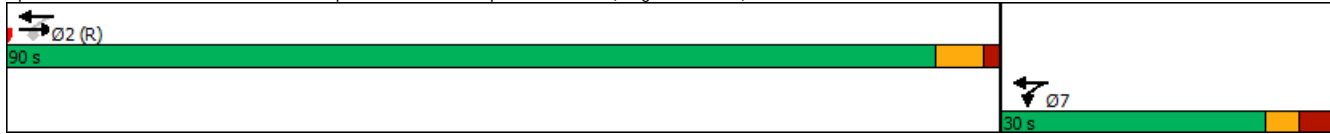
Intersection Capacity Utilization 54.4%

ICU Level of Service A

Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)





4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	97	987	86	25	78	1973	35	116	12	33	42	4	99
Future Volume (vph)	97	987	86	25	78	1973	35	116	12	33	42	4	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1658	0	3400	1509	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1658	0	3400	1509	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95				96		36			52	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1283				1388			649			378	
Travel Time (s)		19.4				21.0			12.6			7.4	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													48%
Lane Group Flow (vph)	107	1085	95	0	113	2168	38	127	49	0	46	56	57
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2			6							4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.1	66.9	78.3		15.0	70.9	84.9	11.4	11.8		9.0	9.4	22.7
Actuated g/C Ratio	0.09	0.56	0.65		0.12	0.59	0.71	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.36	0.40	0.09		0.27	0.74	0.03	0.39	0.25		0.18	0.34	0.14
Control Delay	65.8	11.8	0.8		49.5	21.6	0.1	54.1	24.2		53.6	21.4	0.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.8	11.8	0.8		49.5	21.6	0.1	54.1	24.2		53.6	21.4	0.7
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		15.5				22.6			45.8			23.3	
Approach LOS		B				C			D			C	
Queue Length 50th (ft)	44	86	3		41	443	0	48	9		17	3	0
Queue Length 95th (ft)	76	116	8		70	598	0	78	46		36	46	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2704	1046		416	2917	1187	429	240		425	234	447
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.26	0.40	0.09		0.27	0.74	0.03	0.30	0.20		0.11	0.24	0.13

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)

05/14/2020

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 21.4

Intersection LOS: C

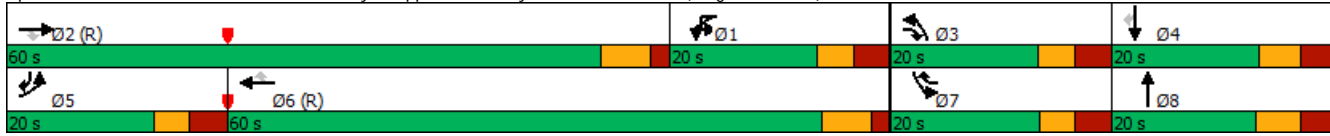
Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

Description: 05-2148

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↖
Traffic Volume (vph)	0	14	464	68	0	170
Future Volume (vph)	0	14	464	68	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3438	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	3438	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	533	78	0	195
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑↑	↑		↑
Traffic Vol, veh/h	0	14	464	68	0	170
Future Vol, veh/h	0	14	464	68	0	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	533	78	0	195
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	267	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.93	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.319	-	-	-	
Pot Cap-1 Maneuver	0	732	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	-	732	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	10	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	732	-		
HCM Lane V/C Ratio	-	-	0.022	-		
HCM Control Delay (s)	-	-	10	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		

6: Hinton Oaks Boulevard & Midtown Commons Dwy/Shoppes at Midway Dwy

05/14/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	9	5	15	4	4	75	392	7	4	108	4
Future Volume (vph)	4	9	5	15	4	4	75	392	7	4	108	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	464	0	5	131	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.1% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	9	5	15	4	4	75	392	7	4	108	4
Future Vol, veh/h	4	9	5	15	4	4	75	392	7	4	108	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	456	8	5	126	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	778	777	129	781	775	460	131	0	0	464	0	0
Stage 1	139	139	-	634	634	-	-	-	-	-	-	-
Stage 2	639	638	-	147	141	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	314	328	921	312	329	601	1442	-	-	1018	-	-
Stage 1	864	782	-	467	473	-	-	-	-	-	-	-
Stage 2	464	471	-	856	780	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	293	307	921	287	308	601	1442	-	-	1018	-	-
Mov Cap-2 Maneuver	293	307	-	287	308	-	-	-	-	-	-	-
Stage 1	812	778	-	439	445	-	-	-	-	-	-	-
Stage 2	428	443	-	835	776	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	17.3	1.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1442	-	-	372	320	1018	-	-
HCM Lane V/C Ratio	0.06	-	-	0.056	0.084	0.005	-	-
HCM Control Delay (s)	7.7	-	-	15.3	17.3	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	5	45	4	4	9	210	188	4	54	4
Future Volume (vph)	4	4	5	45	4	4	9	210	188	4	54	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1734	0	0	1770	0	1687	1650	0	1421	1483	0
Flt Permitted		0.986			0.959		0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1770	0	1687	1650	0	1421	1483	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			1567	
Travel Time (s)		8.1			10.0			10.0			30.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	72	0	12	546	0	5	79	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	5	45	4	4	9	210	188	4	54	4
Future Vol, veh/h	4	4	5	45	4	4	9	210	188	4	54	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	62	5	5	12	288	258	5	74	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	533	657	77	534	530	417	79	0	0	546	0	0
Stage 1	87	87	-	441	441	-	-	-	-	-	-	-
Stage 2	446	570	-	93	89	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	458	385	984	457	455	636	1488	-	-	909	-	-
Stage 1	921	823	-	595	577	-	-	-	-	-	-	-
Stage 2	591	505	-	914	821	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	445	380	984	444	449	636	1488	-	-	909	-	-
Mov Cap-2 Maneuver	445	380	-	444	449	-	-	-	-	-	-	-
Stage 1	914	818	-	590	572	-	-	-	-	-	-	-
Stage 2	576	501	-	897	816	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	14.4	0.2	0.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1488	-	-	529	455	909	-	-
HCM Lane V/C Ratio	0.008	-	-	0.034	0.16	0.006	-	-
HCM Control Delay (s)	7.4	-	-	12	14.4	9	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0	-	-





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	4	112	60	4	33
Future Volume (vph)	11	4	112	60	4	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				100	
Satd. Flow (prot)	1735	0	1741	0	1456	1532
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1735	0	1741	0	1456	1532
Link Speed (mph)	30		30			35
Link Distance (ft)	545		1567			668
Travel Time (s)	12.4		35.6			13.0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	191	0	4	37
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.6%
ICU Level of Service	A
Analysis Period (min)	15

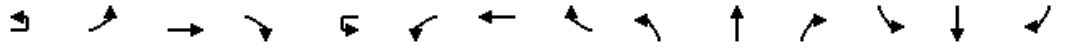
**Intersection**

Int Delay, s/veh	0.8					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations	W		T		T	T
Traffic Vol, veh/h	11	4	112	60	4	33
Future Vol, veh/h	11	4	112	60	4	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	4	4	24	24
Mvmt Flow	12	4	124	67	4	37

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	203	158	0	0	191
Stage 1	158	-	-	-	-
Stage 2	45	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.34
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.416
Pot Cap-1 Maneuver	786	887	-	-	1261
Stage 1	871	-	-	-	-
Stage 2	977	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	784	887	-	-	1261
Mov Cap-2 Maneuver	770	-	-	-	-
Stage 1	871	-	-	-	-
Stage 2	974	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	9.6	0	0.9
HCM LOS	A		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>
Capacity (veh/h)	-	-	798	1261	-
HCM Lane V/C Ratio	-	-	0.021	0.004	-
HCM Control Delay (s)	-	-	9.6	7.9	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	26	494	2649	171	6	37	1640	86	125	28	61	171	14	324
Future Volume (vph)	26	494	2649	171	6	37	1640	86	125	28	61	171	14	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%				0%
Storage Length (ft)		400		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		200				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				85				81			130			164
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														48%
Lane Group Flow (vph)	0	547	2788	180	0	45	1726	91	132	29	64	180	179	177
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	35.0	35.0	80.0	20.0	20.0	20.0	65.0	20.0	20.0	20.0	20.0	20.0	20.0	35.0
Total Split (%)	25.0%	25.0%	57.1%	14.3%	14.3%	14.3%	46.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	25.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		30.0	88.9	106.4		10.0	66.2	90.7	12.5	9.7	16.2	19.6	11.3	41.3
Actuated g/C Ratio		0.21	0.64	0.76		0.07	0.47	0.65	0.09	0.07	0.12	0.14	0.08	0.30
v/c Ratio		0.74	0.86	0.15		0.36	0.72	0.09	0.44	0.23	0.22	0.38	0.65	0.33
Control Delay		46.2	16.9	1.3		90.6	14.6	0.3	64.7	65.5	1.7	58.1	22.8	9.1
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		46.2	16.9	1.3		90.6	14.6	0.3	64.7	65.5	1.7	58.1	22.8	9.1
LOS		D	B	A		F	B	A	E	E	A	E	C	A
Approach Delay			20.6				15.8			46.9				30.1
Approach LOS			C				B			D				C
Queue Length 50th (ft)		235	424	7		42	204	0	59	26	0	80	13	27
Queue Length 95th (ft)		m273	m#1007	m14		m82	232	2	92	59	0	118	94	68
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		400		125		200		200	200		100	325		150
Base Capacity (vph)		739	3245	1256		188	2392	1039	362	196	347	481	310	532
Starvation Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.74	0.86	0.14		0.24	0.72	0.09	0.36	0.15	0.18	0.37	0.58	0.33

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Build-out+1 (2023) PM + Imp  
 05/14/2020

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 21.0

Intersection LOS: C

Intersection Capacity Utilization 86.9%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2267

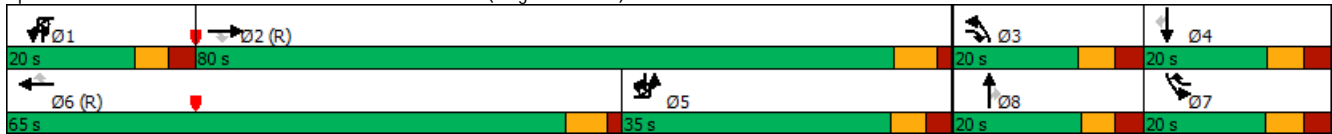
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	2829	0	0	1585	635	84	4	723	0	0	0
Future Volume (vph)	368	2829	0	0	1585	635	84	4	723	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						577			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	383	2947	0	0	1651	661	0	92	753	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases					6	6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.0			65.0	65.0		35.0	35.0			
Actuated g/C Ratio	0.18	0.68			0.46	0.46		0.25	0.25			
v/c Ratio	0.62	0.85			0.70	0.64		0.21	1.01			
Control Delay	49.7	12.1			11.8	3.0		43.1	83.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	49.7	12.1			11.8	3.0		43.1	83.1			
LOS	D	B			B	A		D	F			
Approach Delay		16.4			9.3			78.7				
Approach LOS		B			A			E				
Queue Length 50th (ft)	168	249			188	0		67	-372			
Queue Length 95th (ft)	223	261			135	5		117	#523			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3468			2349	1040		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.62	0.85			0.70	0.64		0.21	1.01			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 88.3%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2152

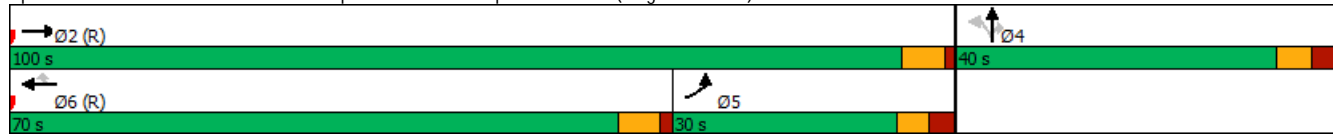
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	2141	75	370	1293	0	0	0	0	0	0	554
Future Volume (vph)	0	2141	75	370	1293	0	0	0	0	0	0	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%				2%
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.053								
Satd. Flow (perm)	0	5060	1575	99	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			77									194
Link Speed (mph)		45		45				35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2185	77	378	1319	0	0	0	0	0	0	565
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		96.4	96.4	130.0	140.0							140.0
Actuated g/C Ratio		0.69	0.69	0.93	1.00							1.00
v/c Ratio		0.63	0.07	0.77	0.37							0.36
Control Delay		13.2	1.7	70.7	1.2							0.6
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		13.2	1.7	70.7	1.2							0.6
LOS		B	A	E	A							A
Approach Delay		12.8			16.6						0.6	
Approach LOS		B			B						A	
Queue Length 50th (ft)		382	0	304	31							0
Queue Length 95th (ft)		424	16	404	7							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3484	1108	512	3557							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.63	0.07	0.74	0.37							0.36

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 12.7

Intersection LOS: B

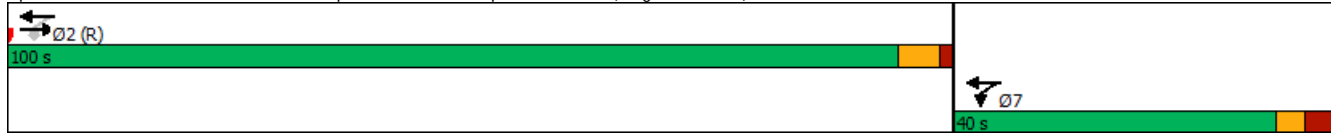
Intersection Capacity Utilization 110.9%

ICU Level of Service H

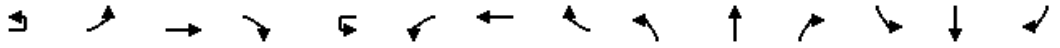
Analysis Period (min) 15

Description: 05-2153

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)







Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↑↑↑	↗		↔↔	↑↑↑	↗	↔↔	↔		↔↔	↔	↗
Traffic Volume (vph)	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
Future Volume (vph)	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%				0%
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1638	0	3433	1632	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3432	5085	1583	3467	1638	0	3428	1632	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				276				212		79				33
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	277	2186	409	0	346	1235	212	269	148	0	381	113	106
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	66.3	86.7		19.1	65.4	91.2	20.4	13.8		20.7	14.1	39.1
Actuated g/C Ratio		0.14	0.47	0.62		0.14	0.47	0.65	0.15	0.10		0.15	0.10	0.28
v/c Ratio		0.57	0.91	0.38		0.74	0.52	0.19	0.53	0.64		0.75	0.58	0.21
Control Delay		53.5	33.6	3.8		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		53.5	33.6	3.8		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
LOS		D	C	A		E	C	A	E	D		E	D	A
Approach Delay			31.3				32.6			52.7				53.3
Approach LOS			C				C			D				D
Queue Length 50th (ft)		110	449	40		155	289	0	117	60		171	73	0
Queue Length 95th (ft)		m134	#836	m142		211	354	32	166	129		232	137	29
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2408	1082		494	2376	1100	522	301		521	261	513
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.57	0.91	0.38		0.70	0.52	0.19	0.52	0.49		0.73	0.43	0.21

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 35.6

Intersection LOS: D

Intersection Capacity Utilization 88.3%

ICU Level of Service E

Analysis Period (min) 15

Description: 05-2148

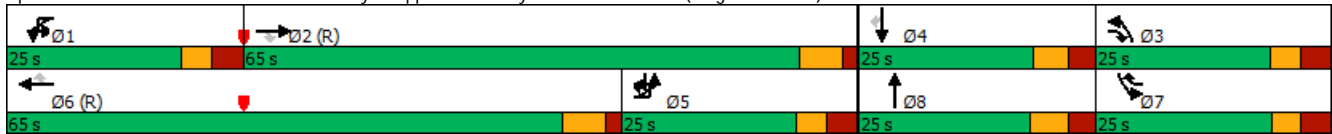
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↖
Traffic Volume (vph)	0	35	346	228	0	522
Future Volume (vph)	0	35	346	228	0	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	376	248	0	567
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑↑	↑		↑
Traffic Vol, veh/h	0	35	346	228	0	522
Future Vol, veh/h	0	35	346	228	0	522
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	376	248	0	567
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	188	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.93	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.319	-	-	-	
Pot Cap-1 Maneuver	0	823	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	-	823	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	823	-		
HCM Lane V/C Ratio	-	-	0.046	-		
HCM Control Delay (s)	-	-	9.6	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		

6: Hinton Oaks Boulevard & Midtown Commons Dwy/Shoppes at Midway Dwy

05/14/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	30	50	53	31	8	131	152	41	14	398	4
Future Volume (vph)	4	30	50	53	31	8	131	152	41	14	398	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1768	0	1752	1843	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1768	0	1752	1843	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	206	0	15	427	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	30	50	53	31	8	131	152	41	14	398	4
Future Vol, veh/h	4	30	50	53	31	8	131	152	41	14	398	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	162	44	15	423	4
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	939	939	425	960	919	185	427	0	0	206	0	0
Stage 1	455	455	-	462	462	-	-	-	-	-	-	-
Stage 2	484	484	-	498	457	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	244	264	629	236	271	857	1122	-	-	1359	-	-
Stage 1	585	569	-	580	565	-	-	-	-	-	-	-
Stage 2	564	552	-	554	568	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	194	229	629	174	235	856	1122	-	-	1359	-	-
Mov Cap-2 Maneuver	194	229	-	174	235	-	-	-	-	-	-	-
Stage 1	512	563	-	508	495	-	-	-	-	-	-	-
Stage 2	456	484	-	473	562	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	18.1		37.4		3.5			0.3				
HCM LOS	C		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1122	-	-	363	206	1359	-	-				
HCM Lane V/C Ratio	0.124	-	-	0.246	0.475	0.011	-	-				
HCM Control Delay (s)	8.7	-	-	18.1	37.4	7.7	-	-				
HCM Lane LOS	A	-	-	C	E	A	-	-				
HCM 95th %tile Q(veh)	0.4	-	-	1	2.3	0	-	-				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	27	171	4	4	43	56	60	4	215	4
Future Volume (vph)	4	4	27	171	4	4	43	56	60	4	215	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1772	0	1597	1550	0	1752	1839	0
Flt Permitted		0.994			0.954		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1772	0	1597	1550	0	1752	1839	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		355			448			505			1614	
Travel Time (s)		8.1			10.2			9.8			31.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	219	0	52	141	0	5	267	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.5%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	27	171	4	4	43	56	60	4	215	4
Future Vol, veh/h	4	4	27	171	4	4	43	56	60	4	215	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	209	5	5	52	68	73	5	262	5
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	489	520	265	503	486	105	267	0	0	141	0	0
Stage 1	275	275	-	209	209	-	-	-	-	-	-	-
Stage 2	214	245	-	294	277	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	489	461	774	479	481	949	1236	-	-	1436	-	-
Stage 1	731	683	-	793	729	-	-	-	-	-	-	-
Stage 2	788	703	-	714	681	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	466	440	774	439	459	949	1236	-	-	1436	-	-
Mov Cap-2 Maneuver	466	440	-	439	459	-	-	-	-	-	-	-
Stage 1	700	681	-	760	698	-	-	-	-	-	-	-
Stage 2	746	673	-	676	679	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	10.8		20.6		2.2			0.1				
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1236	-	-	666	445	1436	-	-				
HCM Lane V/C Ratio	0.042	-	-	0.064	0.491	0.003	-	-				
HCM Control Delay (s)	8	-	-	10.8	20.6	7.5	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.6	0	-	-				





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	4	36	15	4	118
Future Volume (vph)	55	4	36	15	4	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1765	0	1258	0	1736	1827
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1765	0	1258	0	1736	1827
Link Speed (mph)	30		30			35
Link Distance (ft)	628		1614			738
Travel Time (s)	14.3		36.7			14.4
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	45%	45%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	57	0	4	131
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.2%
	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	2.6					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations	W		T		T	T
Traffic Vol, veh/h	55	4	36	15	4	118
Future Vol, veh/h	55	4	36	15	4	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	45	45	4	4
Mvmt Flow	61	4	40	17	4	131

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	188	49	0	0	57
Stage 1	49	-	-	-	-
Stage 2	139	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236
Pot Cap-1 Maneuver	801	1020	-	-	1535
Stage 1	973	-	-	-	-
Stage 2	888	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	799	1020	-	-	1535
Mov Cap-2 Maneuver	782	-	-	-	-
Stage 1	973	-	-	-	-
Stage 2	885	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	9.9	0	0.2
HCM LOS	A		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>
Capacity (veh/h)	-	-	795	1535	-
HCM Lane V/C Ratio	-	-	0.082	0.003	-
HCM Control Delay (s)	-	-	9.9	7.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

**Appendix L:**  
**Build-out (2032)**



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	396	1201	62	5	21	2291	96	316	7	70	51	10	75
Future Volume (vph)	396	1201	62	5	21	2291	96	316	7	70	51	10	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%				0%
Storage Length (ft)	400		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	200				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1467	1408
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	1709	4915	1530	3382	1835	1560	3213	1467	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		35	150
Link Speed (mph)		45			45				35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													44%
Lane Group Flow (vph)	421	1278	66	0	27	2437	102	336	7	74	54	46	45
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6				8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	22.0	68.0	20.0	17.0	17.0	63.0	16.0	20.0	19.0	17.0	16.0	15.0	22.0
Total Split (%)	18.3%	56.7%	16.7%	14.2%	14.2%	52.5%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	18.3%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	17.0	69.4	84.9		11.3	61.0	89.2	15.4	9.7	14.1	23.2	9.3	24.6
Actuated g/C Ratio	0.14	0.58	0.71		0.09	0.51	0.74	0.13	0.08	0.12	0.19	0.08	0.20
v/c Ratio	0.89	0.45	0.06		0.17	0.98	0.09	0.77	0.05	0.23	0.09	0.32	0.11
Control Delay	69.2	19.2	2.9		33.6	25.2	0.1	63.6	50.1	1.7	41.3	28.3	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	19.2	2.9		33.6	25.2	0.1	63.6	50.1	1.7	41.3	28.3	0.5
LOS	E	B	A		C	C	A	E	D	A	D	C	A
Approach Delay		30.5				24.3			52.4				24.5
Approach LOS		C				C			D				C
Queue Length 50th (ft)	171	254	4		20	-740	0	130	5	0	16	8	0
Queue Length 95th (ft)	#260	295	m12		m23	#809	m0	#198	20	0	41	48	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	400		125		200		200	200		100	325		150
Base Capacity (vph)	471	2845	1092		171	2498	1161	435	214	326	620	154	407
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.45	0.06		0.16	0.98	0.09	0.77	0.03	0.23	0.09	0.30	0.11

**Intersection Summary**

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Build-out+10 (2032) AM + Imp  
 05/14/2020

Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.98  
 Intersection Signal Delay: 28.9 Intersection LOS: C  
 Intersection Capacity Utilization 83.7% ICU Level of Service E  
 Analysis Period (min) 15  
 Description: 05-2267  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	459	1245	0	0	1878	893	70	5	532	0	0	0
Future Volume (vph)	459	1245	0	0	1878	893	70	5	532	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						652			124			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	504	1368	0	0	2064	981	0	82	585	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases					6	4		4				
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	20.0	84.4			59.4	59.4		25.6	25.6			
Actuated g/C Ratio	0.17	0.70			0.50	0.50		0.21	0.21			
v/c Ratio	0.89	0.39			0.84	0.90		0.23	0.88			
Control Delay	63.6	7.9			17.7	17.2		39.2	51.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	63.6	7.9			17.7	17.2		39.2	51.1			
LOS	E	A			B	B		D	D			
Approach Delay		22.9			17.5			49.7				
Approach LOS		C			B			D				
Queue Length 50th (ft)	199	146			456	652		52	200			
Queue Length 95th (ft)	#294	182			m643	m676		95	269			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3525			2456	1094		423	756			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.89	0.39			0.84	0.90		0.19	0.77			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)

05/14/2020

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 86.7%

ICU Level of Service E

Analysis Period (min) 15

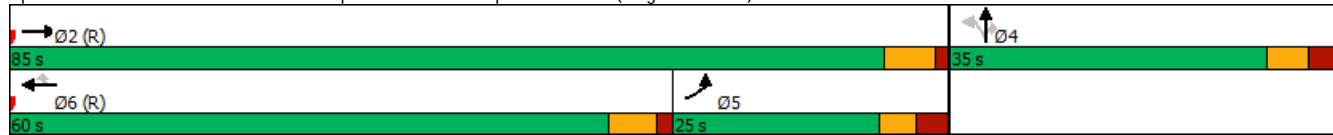
Description: 05-2152

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	1230	120	367	1596	0	0	0	0	0	0	324
Future Volume (vph)	0	1230	120	367	1596	0	0	0	0	0	0	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%				2%
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.181								
Satd. Flow (perm)	0	4963	1545	332	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128									116
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1309	128	390	1698	0	0	0	0	0	0	345
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		85.1	85.1	110.0	120.0							120.0
Actuated g/C Ratio		0.71	0.71	0.92	1.00							1.00
v/c Ratio		0.37	0.11	0.65	0.49							0.22
Control Delay		7.3	1.1	36.7	3.5							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.3	1.1	36.7	3.5							0.3
LOS		A	A	D	A							A
Approach Delay		6.7			9.7						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		131	0	182	82							0
Queue Length 95th (ft)		154	17	m242	87							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3518	1132	598	3456							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.37	0.11	0.65	0.49							0.22

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120



Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 7.8

Intersection LOS: A

Intersection Capacity Utilization 58.3%

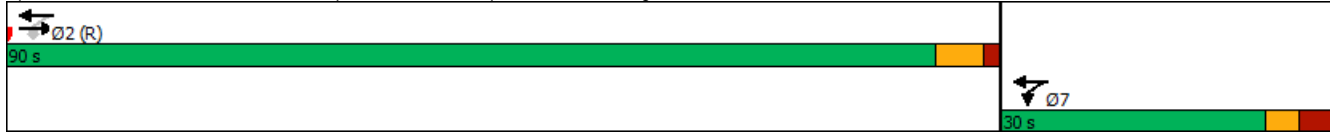
ICU Level of Service B

Analysis Period (min) 15

Description: 05-2153

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	106	1070	94	27	85	2148	38	127	13	36	46	4	108
Future Volume (vph)	106	1070	94	27	85	2148	38	127	13	36	46	4	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1656	0	3400	1507	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1656	0	3400	1507	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			103				96		40			58	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1283				1388			649			378	
Travel Time (s)		19.4				21.0			12.6			7.4	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													49%
Lane Group Flow (vph)	116	1176	103	0	123	2360	42	140	54	0	51	62	61
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2			6							4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.3	66.4	78.3		15.0	70.1	84.2	11.8	12.1		9.1	9.5	23.0
Actuated g/C Ratio	0.09	0.55	0.65		0.12	0.58	0.70	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.38	0.44	0.10		0.30	0.82	0.04	0.41	0.27		0.20	0.36	0.15
Control Delay	65.8	11.9	0.7		49.8	24.7	0.1	54.1	23.5		53.7	20.6	0.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.8	11.9	0.7		49.8	24.7	0.1	54.1	23.5		53.7	20.6	0.8
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		15.6				25.5			45.6				23.4
Approach LOS		B				C			D				C
Queue Length 50th (ft)	47	95	3		45	526	0	53	10		19	3	0
Queue Length 95th (ft)	81	126	7		75	#764	0	84	48		39	48	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2684	1044		416	2886	1179	429	245		425	239	448
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.28	0.44	0.10		0.30	0.82	0.04	0.33	0.22		0.12	0.26	0.14

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)

Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 66.6%

ICU Level of Service C

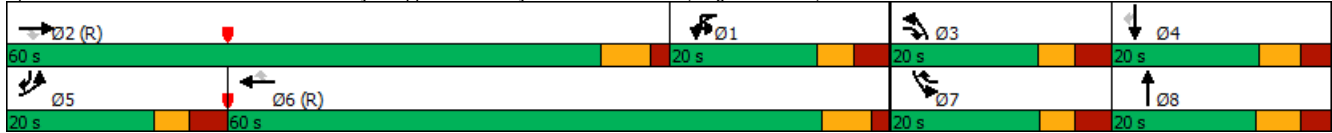
Analysis Period (min) 15

Description: 05-2148

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↖
Traffic Volume (vph)	0	14	481	68	0	181
Future Volume (vph)	0	14	481	68	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3438	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	3438	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	553	78	0	208
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑↑	↑		↑
Traffic Vol, veh/h	0	14	481	68	0	181
Future Vol, veh/h	0	14	481	68	0	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	553	78	0	208
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	277	0	0	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Critical Hdwy	-	6.93	-	-	-	
Critical Hdwy Stg 1	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-	-	-	
Follow-up Hdwy	-	3.319	-	-	-	
Pot Cap-1 Maneuver	0	721	-	-	0	
Stage 1	0	-	-	-	0	
Stage 2	0	-	-	-	0	
Platoon blocked, %	-	-	-	-	-	
Mov Cap-1 Maneuver	-	721	-	-	-	
Mov Cap-2 Maneuver	-	-	-	-	-	
Stage 1	-	-	-	-	-	
Stage 2	-	-	-	-	-	
Approach	WB	NB		SB		
HCM Control Delay, s	10.1	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	721	-		
HCM Lane V/C Ratio	-	-	0.022	-		
HCM Control Delay (s)	-	-	10.1	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		

6: Hinton Oaks Boulevard & Midtown Commons Dwy/Shoppes at Midway Dwy

05/14/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Volume (vph)	4	9	5	15	4	4	75	402	7	4	113	4
Future Volume (vph)	4	9	5	15	4	4	75	402	7	4	113	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	475	0	5	136	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.6% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	9	5	15	4	4	75	402	7	4	113	4
Future Vol, veh/h	4	9	5	15	4	4	75	402	7	4	113	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	467	8	5	131	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	794	793	134	797	791	471	136	0	0	475	0	0
Stage 1	144	144	-	645	645	-	-	-	-	-	-	-
Stage 2	650	649	-	152	146	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	306	321	915	305	322	593	1436	-	-	1009	-	-
Stage 1	859	778	-	461	467	-	-	-	-	-	-	-
Stage 2	458	466	-	850	776	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	285	300	915	280	301	593	1436	-	-	1009	-	-
Mov Cap-2 Maneuver	285	300	-	280	301	-	-	-	-	-	-	-
Stage 1	807	774	-	433	439	-	-	-	-	-	-	-
Stage 2	422	438	-	829	772	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	17.6	1.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1436	-	-	364	312	1009	-	-
HCM Lane V/C Ratio	0.061	-	-	0.058	0.086	0.005	-	-
HCM Control Delay (s)	7.7	-	-	15.5	17.6	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	5	45	4	4	9	220	188	4	57	4
Future Volume (vph)	4	4	5	45	4	4	9	220	188	4	57	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1730	0	0	1770	0	1687	1653	0	1421	1483	0
Flt Permitted		0.986			0.959		0.950			0.950		
Satd. Flow (perm)	0	1730	0	0	1770	0	1687	1653	0	1421	1483	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			1567	
Travel Time (s)		8.1			10.0			10.0			30.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	0	0	59	0	10	458	0	4	68	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.7%
ICU Level of Service	A
Analysis Period (min)	15



Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	4	4	5	45	4	4	9	220	188	4	57	4
Future Vol, veh/h	4	4	5	45	4	4	9	220	188	4	57	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	4	4	6	51	4	4	10	247	211	4	64	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	451	552	66	452	449	353	68	0	0	458	0	0
Stage 1	74	74	-	373	373	-	-	-	-	-	-	-
Stage 2	377	478	-	79	76	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	519	442	998	518	505	691	1502	-	-	983	-	-
Stage 1	935	833	-	648	618	-	-	-	-	-	-	-
Stage 2	644	556	-	930	832	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	508	437	998	507	499	691	1502	-	-	983	-	-
Mov Cap-2 Maneuver	508	437	-	507	499	-	-	-	-	-	-	-
Stage 1	928	830	-	643	614	-	-	-	-	-	-	-
Stage 2	631	552	-	916	829	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.3			12.9			0.2			0.5		
HCM LOS	B			B								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1502	-	-	590	517	983	-	-				
HCM Lane V/C Ratio	0.007	-	-	0.025	0.115	0.005	-	-				
HCM Control Delay (s)	7.4	-	-	11.3	12.9	8.7	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0	-	-				



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	R	L	R
Traffic Volume (vph)	11	4	118	60	4	35
Future Volume (vph)	11	4	118	60	4	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				100	
Satd. Flow (prot)	1735	0	1743	0	1456	1532
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1735	0	1743	0	1456	1532
Link Speed (mph)	30		30			35
Link Distance (ft)	545		1567			668
Travel Time (s)	12.4		35.6			13.0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	198	0	4	39
Sign Control	Stop		Free			Free

**Intersection Summary**

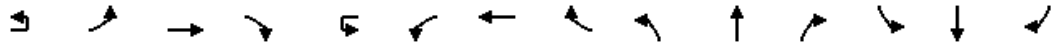
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Vol, veh/h	11	4	118	60	4	35
Future Vol, veh/h	11	4	118	60	4	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	4	4	24	24
Mvmt Flow	12	4	131	67	4	39

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	212	165	0	0	198
Stage 1	165	-	-	-	-
Stage 2	47	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.34
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.416
Pot Cap-1 Maneuver	776	879	-	-	1253
Stage 1	864	-	-	-	-
Stage 2	975	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	774	879	-	-	1253
Mov Cap-2 Maneuver	763	-	-	-	-
Stage 1	864	-	-	-	-
Stage 2	972	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	791	1253	-
HCM Lane V/C Ratio	-	-	0.021	0.004	-
HCM Control Delay (s)	-	-	9.6	7.9	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↕↕↕	↗			↖↖↖	↗	↔↔	↕	↗	↔↔	↖	↗
Traffic Volume (vph)	28	534	2881	187	7	40	1777	93	137	31	67	183	15	333
Future Volume (vph)	28	534	2881	187	7	40	1777	93	137	31	67	183	15	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%				0%
Storage Length (ft)		400		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		200				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				85				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%				0%
Shared Lane Traffic (%)														48%
Lane Group Flow (vph)	0	591	3033	197	0	49	1871	98	144	33	71	193	184	183
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	35.0	35.0	80.0	20.0	20.0	20.0	65.0	20.0	20.0	20.0	20.0	20.0	20.0	35.0
Total Split (%)	25.0%	25.0%	57.1%	14.3%	14.3%	14.3%	46.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	25.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)		30.0	85.5	103.3		10.2	65.7	90.5	12.8	9.9	16.7	19.8	11.5	41.5
Actuated g/C Ratio		0.21	0.61	0.74		0.07	0.47	0.65	0.09	0.07	0.12	0.14	0.08	0.30
v/c Ratio		0.80	0.97	0.16		0.38	0.79	0.09	0.46	0.26	0.24	0.40	0.66	0.34
Control Delay		48.5	24.8	1.7		90.2	16.1	0.4	65.0	65.9	1.9	58.3	22.9	9.5
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		48.5	24.8	1.7		90.2	16.1	0.4	65.0	65.9	1.9	58.3	22.9	9.5
LOS		D	C	A		F	B	A	E	E	A	E	C	A
Approach Delay			27.3				17.1			47.0				30.7
Approach LOS			C				B			D				C
Queue Length 50th (ft)		254	726	9		45	224	0	64	29	0	87	14	29
Queue Length 95th (ft)		m273	m#1148	m17		m79	284	3	100	64	0	125	95	72
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		400		125		200		200	200		100	325		150
Base Capacity (vph)		739	3120	1219		188	2373	1047	362	196	349	486	313	534
Starvation Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.80	0.97	0.16		0.26	0.79	0.09	0.40	0.17	0.20	0.40	0.59	0.34

**Intersection Summary**

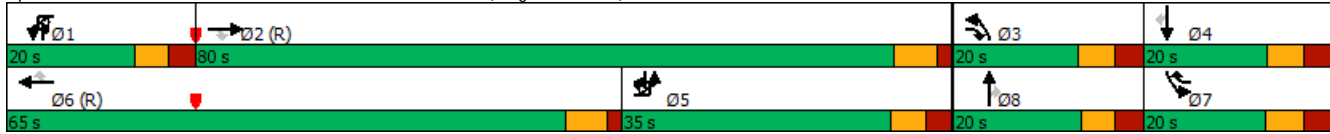
Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 25.2 Intersection LOS: C  
 Intersection Capacity Utilization 91.6% ICU Level of Service F  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	402	3079	0	0	1706	684	92	4	784	0	0	0
Future Volume (vph)	402	3079	0	0	1706	684	92	4	784	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						578			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	419	3207	0	0	1777	713	0	100	817	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases					6		4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	95.0			65.0	65.0		35.0	35.0			
Actuated g/C Ratio	0.18	0.68			0.46	0.46		0.25	0.25			
v/c Ratio	0.68	0.92			0.76	0.69		0.23	1.10			
Control Delay	50.6	16.1			12.2	3.5		43.5	107.7			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	50.6	16.1			12.2	3.5		43.5	107.7			
LOS	D	B			B	A		D	F			
Approach Delay		20.1			9.7			100.7				
Approach LOS		C			A			F				
Queue Length 50th (ft)	186	277			185	0		73	-450			
Queue Length 95th (ft)	244	289			150	6		125	#594			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3468			2349	1040		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.68	0.92			0.76	0.69		0.23	1.10			

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 26.9

Intersection LOS: C

Intersection Capacity Utilization 95.3%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2152

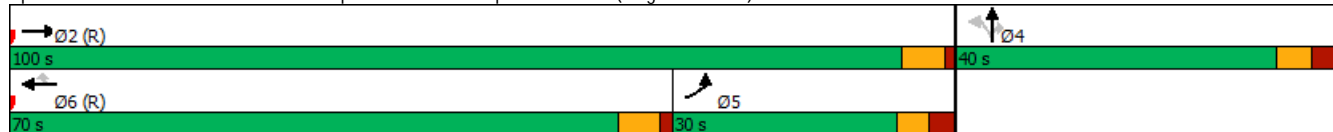
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	2332	82	389	1402	0	0	0	0	0	0	606
Future Volume (vph)	0	2332	82	389	1402	0	0	0	0	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%				2%
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.042								
Satd. Flow (perm)	0	5060	1575	79	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			84									167
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2380	84	397	1431	0	0	0	0	0	0	618
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		95.6	95.6	130.0	140.0							140.0
Actuated g/C Ratio		0.68	0.68	0.93	1.00							1.00
v/c Ratio		0.69	0.08	0.81	0.40							0.40
Control Delay		14.7	1.6	73.4	1.4							0.7
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		14.8	1.6	73.4	1.4							0.7
LOS		B	A	E	A							A
Approach Delay		14.3			17.0						0.7	
Approach LOS		B			B						A	
Queue Length 50th (ft)		445	0	331	33							0
Queue Length 95th (ft)		494	17	#436	11							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3454	1101	498	3541							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		86	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.71	0.08	0.80	0.40							0.40

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140



Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 13.6

Intersection LOS: B

Intersection Capacity Utilization 122.1%

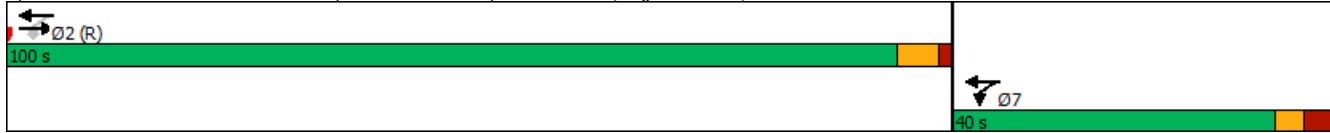
ICU Level of Service H

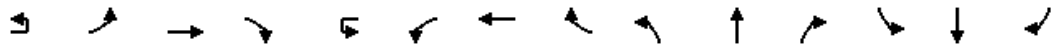
Analysis Period (min) 15

Description: 05-2153

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↕↕↕	↗		↔↔	↕↕↕	↗	↔↔	↔		↔↔	↔	↗
Traffic Volume (vph)	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178
Future Volume (vph)	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%			0%	
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1639	0	3433	1630	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3433	5085	1583	3467	1639	0	3428	1630	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				278				232		70				129
Link Speed (mph)			45				45				35			35
Link Distance (ft)			1286				1388			649				378
Travel Time (s)			19.5				21.0			12.6				7.4
Confl. Peds. (#/hr)				1		1					1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%			0%	
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	302	2371	447	0	378	1333	232	294	162	0	416	124	115
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		20.0	64.1	85.6		19.6	63.7	90.0	21.6	15.0		21.3	14.8	39.8
Actuated g/C Ratio		0.14	0.46	0.61		0.14	0.46	0.64	0.15	0.11		0.15	0.11	0.28
v/c Ratio		0.62	1.02	0.42		0.79	0.58	0.21	0.55	0.68		0.80	0.62	0.22
Control Delay		54.9	50.4	4.2		70.6	30.1	1.8	59.1	47.8		69.2	56.3	5.1
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		54.9	50.4	4.2		70.6	30.1	1.8	59.1	47.8		69.2	56.3	5.1
LOS		D	D	A		E	C	A	E	D		E	E	A
Approach Delay			44.2				34.6			55.1				55.5
Approach LOS			D				C			E				E
Queue Length 50th (ft)		124	-875	78		172	337	0	126	81		186	84	0
Queue Length 95th (ft)		m129	m#924	m138		230	390	33	180	155		#274	151	36
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2326	1069		493	2312	1092	539	294		528	261	519
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.62	1.02	0.42		0.77	0.58	0.21	0.55	0.55		0.79	0.48	0.22

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 43.2

Intersection LOS: D

Intersection Capacity Utilization 94.5%

ICU Level of Service F

Analysis Period (min) 15

Description: 05-2148

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

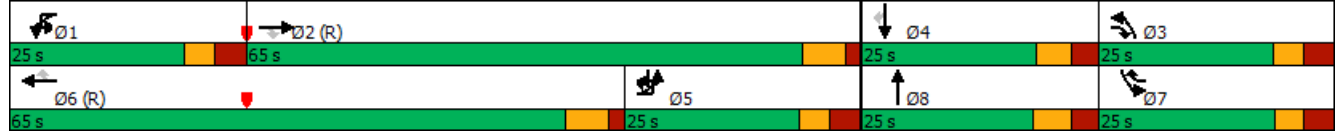
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↘		↖
Traffic Volume (vph)	0	35	371	228	0	546
Future Volume (vph)	0	35	371	228	0	546
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	403	248	0	593
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	32.1%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕↕	↗		↕
Traffic Vol, veh/h	0	35	371	228	0	546
Future Vol, veh/h	0	35	371	228	0	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	403	248	0	593

Major/Minor	Minor1	Major1	Major2	Major2	Major2
Conflicting Flow All	-	202	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-
Pot Cap-1 Maneuver	0	806	-	0	-
Stage 1	0	-	-	0	-
Stage 2	0	-	-	0	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	806	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	806	-
HCM Lane V/C Ratio	-	-	0.047	-
HCM Control Delay (s)	-	-	9.7	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

6: Hinton Oaks Boulevard & Midtown Commons Dwy/Shoppes at Midway Dwy

05/18/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	30	50	53	31	8	131	159	41	14	410	4
Future Volume (vph)	4	30	50	53	31	8	131	159	41	14	410	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1770	0	1752	1843	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1770	0	1752	1843	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	213	0	15	440	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.9% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	30	50	53	31	8	131	159	41	14	410	4
Future Vol, veh/h	4	30	50	53	31	8	131	159	41	14	410	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	169	44	15	436	4
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	959	960	438	981	940	193	440	0	0	214	0	0
Stage 1	468	468	-	470	470	-	-	-	-	-	-	-
Stage 2	491	492	-	511	470	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	237	257	619	229	264	849	1109	-	-	1350	-	-
Stage 1	575	561	-	574	560	-	-	-	-	-	-	-
Stage 2	559	548	-	545	560	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	187	222	619	167	228	847	1109	-	-	1349	-	-
Mov Cap-2 Maneuver	187	222	-	167	228	-	-	-	-	-	-	-
Stage 1	503	555	-	502	489	-	-	-	-	-	-	-
Stage 2	451	479	-	464	554	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	18.6		39.4		3.4			0.3				
HCM LOS	C		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1109	-	-	354	199	1349	-	-				
HCM Lane V/C Ratio	0.126	-	-	0.252	0.492	0.011	-	-				
HCM Control Delay (s)	8.7	-	-	18.6	39.4	7.7	-	-				
HCM Lane LOS	A	-	-	C	E	A	-	-				
HCM 95th %tile Q(veh)	0.4	-	-	1	2.4	0	-	-				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	27	171	4	4	43	58	60	4	226	4
Future Volume (vph)	4	4	27	171	4	4	43	58	60	4	226	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1772	0	1597	1554	0	1752	1839	0
Flt Permitted		0.994			0.954		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1772	0	1597	1554	0	1752	1839	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		355			448			505			1614	
Travel Time (s)		8.1			10.2			9.8			31.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	219	0	52	144	0	5	281	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.1%
ICU Level of Service	A
Analysis Period (min)	15



Intersection												
Int Delay, s/veh	7.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	27	171	4	4	43	58	60	4	226	4
Future Vol, veh/h	4	4	27	171	4	4	43	58	60	4	226	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	209	5	5	52	71	73	5	276	5
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	506	537	279	520	503	108	281	0	0	144	0	0
Stage 1	289	289	-	212	212	-	-	-	-	-	-	-
Stage 2	217	248	-	308	291	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	477	450	760	467	471	946	1221	-	-	1432	-	-
Stage 1	719	673	-	790	727	-	-	-	-	-	-	-
Stage 2	785	701	-	702	672	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	454	429	760	427	449	946	1221	-	-	1432	-	-
Mov Cap-2 Maneuver	454	429	-	427	449	-	-	-	-	-	-	-
Stage 1	688	671	-	756	696	-	-	-	-	-	-	-
Stage 2	742	671	-	664	670	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	10.9		21.5		2.2			0.1				
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1221	-	-	652	433	1432	-	-				
HCM Lane V/C Ratio	0.043	-	-	0.065	0.504	0.003	-	-				
HCM Control Delay (s)	8.1	-	-	10.9	21.5	7.5	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.8	0	-	-				



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	R	L	R
Traffic Volume (vph)	55	4	38	15	4	125
Future Volume (vph)	55	4	38	15	4	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1765	0	1259	0	1736	1827
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1765	0	1259	0	1736	1827
Link Speed (mph)	30		30			35
Link Distance (ft)	628		1614			738
Travel Time (s)	14.3		36.7			14.4
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	45%	45%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	59	0	4	139
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.6%
ICU Level of Service	A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	2.6					
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>
Lane Configurations	W		T		T	T
Traffic Vol, veh/h	55	4	38	15	4	125
Future Vol, veh/h	55	4	38	15	4	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	45	45	4	4
Mvmt Flow	61	4	42	17	4	139

<b>Major/Minor</b>	<b>Minor1</b>	<b>Major1</b>	<b>Major2</b>		
Conflicting Flow All	198	51	0	0	59
Stage 1	51	-	-	-	-
Stage 2	147	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236
Pot Cap-1 Maneuver	791	1017	-	-	1532
Stage 1	971	-	-	-	-
Stage 2	880	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	789	1017	-	-	1532
Mov Cap-2 Maneuver	774	-	-	-	-
Stage 1	971	-	-	-	-
Stage 2	877	-	-	-	-

<b>Approach</b>	<b>WB</b>	<b>NB</b>	<b>SB</b>
HCM Control Delay, s	10	0	0.2
HCM LOS	B		

<b>Minor Lane/Major Mvmt</b>	<b>NBT</b>	<b>NBR</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>
Capacity (veh/h)	-	-	787	1532	-
HCM Lane V/C Ratio	-	-	0.083	0.003	-
HCM Control Delay (s)	-	-	10	7.4	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

**Appendix M:**  
**Build-out (2023) w/ Legacy Oaks**



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	383	1174	57	5	19	2142	91	289	6	64	47	9	72
Future Volume (vph)	383	1174	57	5	19	2142	91	289	6	64	47	9	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	400		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	200				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1464	1408
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	1709	4915	1530	3382	1835	1560	3213	1464	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153		34	150
Link Speed (mph)		45				45			35			35	
Link Distance (ft)		1125				1283			476			346	
Travel Time (s)		17.0				19.4			9.3			6.7	
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													44%
Lane Group Flow (vph)	407	1249	61	0	25	2279	97	307	6	68	50	44	43
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1!	1	6	7	3	8	1!	7	4	5
Permitted Phases			2			6				8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	22.0	68.0	20.0	17.0	17.0	63.0	16.0	20.0	19.0	17.0	16.0	15.0	22.0
Total Split (%)	18.3%	56.7%	16.7%	14.2%	14.2%	52.5%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	18.3%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effect Green (s)	16.9	69.7	84.9		11.3	61.4	89.3	15.2	9.7	14.1	22.9	9.3	24.4
Actuated g/C Ratio	0.14	0.58	0.71		0.09	0.51	0.74	0.13	0.08	0.12	0.19	0.08	0.20
v/c Ratio	0.87	0.44	0.06		0.16	0.91	0.08	0.72	0.04	0.21	0.08	0.31	0.11
Control Delay	67.1	19.0	2.8		35.0	18.9	0.2	60.4	50.0	1.5	41.3	27.8	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	19.0	2.8		35.0	18.9	0.2	60.4	50.0	1.5	41.3	27.8	0.5
LOS	E	B	A		C	B	A	E	D	A	D	C	A
Approach Delay		29.8				18.3			49.7			24.2	
Approach LOS		C				B			D			C	
Queue Length 50th (ft)	164	253	3		19	615	0	118	4	0	15	7	0
Queue Length 95th (ft)	#247	290	m11		m22	#442	m0	169	18	0	39	47	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	400		125		200		200	200		100	325		150
Base Capacity (vph)	470	2854	1095		171	2513	1163	436	214	326	614	153	406
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.44	0.06		0.15	0.91	0.08	0.70	0.03	0.21	0.08	0.29	0.11

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	476	1222	0	0	1766	819	79	5	500	0	0	0
Future Volume (vph)	476	1222	0	0	1766	819	79	5	500	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						651			131			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	523	1343	0	0	1941	900	0	92	549	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	20.0	85.9			60.9	60.9	24.1	24.1				
Actuated g/C Ratio	0.17	0.72			0.51	0.51	0.20	0.20				
v/c Ratio	0.93	0.37			0.77	0.82	0.27	0.86				
Control Delay	68.3	7.3			15.1	12.2	41.1	48.9				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	68.3	7.3			15.1	12.2	41.1	48.9				
LOS	E	A			B	B	D	D				
Approach Delay		24.4			14.1		47.8					
Approach LOS		C			B		D					
Queue Length 50th (ft)	208	134			350	594	60	182				
Queue Length 95th (ft)	#311	179			606	m659	103	243				
Internal Link Dist (ft)		683			1045		741			337		
Turn Bay Length (ft)	500							400				
Base Capacity (vph)	564	3588			2519	1104	423	762				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.93	0.37			0.77	0.82	0.22	0.72				

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

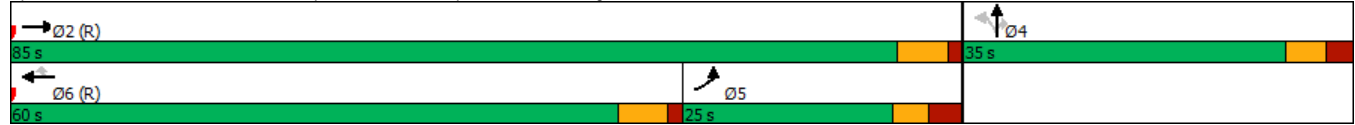
Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	
Description: 05-2152	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)







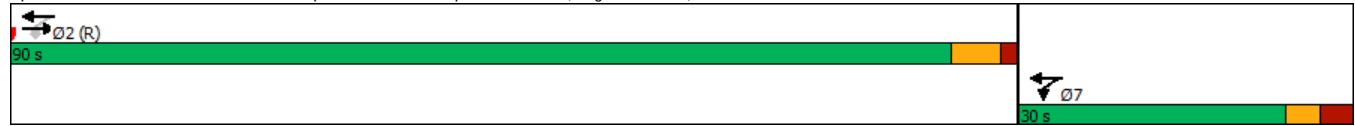
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑							↑
Traffic Volume (vph)	0	1256	133	339	1519	0	0	0	0	0	0	331
Future Volume (vph)	0	1256	133	339	1519	0	0	0	0	0	0	331
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.175								
Satd. Flow (perm)	0	4963	1545	321	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			141									129
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1336	141	361	1616	0	0	0	0	0	0	352
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effect Green (s)		85.5	85.5	110.0	120.0							120.0
Actuated g/C Ratio		0.71	0.71	0.92	1.00							1.00
v/c Ratio		0.38	0.12	0.62	0.46							0.22
Control Delay		7.2	1.1	33.8	3.0							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.2	1.1	33.8	3.0							0.3
LOS		A	A	C	A							A
Approach Delay		6.6			8.6						0.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)		134	0	158	71							0
Queue Length 95th (ft)		158	17	m247	52							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3537	1141	591	3470							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.38	0.12	0.61	0.47							0.22

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 57 (48%), Referenced to phase 2:EBWB and 6.; Start of Green  
 Natural Cycle: 40  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62

Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 56.8%	ICU Level of Service B
Analysis Period (min) 15	
Description: 05-2153	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	97	987	86	25	78	1973	35	116	12	33	42	4	99
Future Volume (vph)	97	987	86	25	78	1973	35	116	12	33	42	4	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%				0%			-2%			0%	
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1658	0	3400	1509	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1658	0	3400	1509	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95				96			36			150
Link Speed (mph)		45				45				35			35
Link Distance (ft)		1283				1388				649			378
Travel Time (s)		19.4				21.0				12.6			7.4
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%			0%	
Shared Lane Traffic (%)													48%
Lane Group Flow (vph)	107	1085	95	0	113	2168	38	127	49	0	46	56	57
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2				6						4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)	11.1	66.9	78.3		15.0	70.9	84.9	11.4	11.8		9.0	9.4	22.7
Actuated g/C Ratio	0.09	0.56	0.65		0.12	0.59	0.71	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.36	0.40	0.09		0.27	0.74	0.03	0.39	0.25		0.18	0.34	0.14
Control Delay	65.7	11.5	0.7		49.5	21.6	0.1	54.1	24.2		53.6	21.4	0.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.7	11.5	0.7		49.5	21.6	0.1	54.1	24.2		53.6	21.4	0.7
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		15.2				22.6			45.8			23.3	
Approach LOS		B				C			D			C	
Queue Length 50th (ft)	44	83	3		41	443	0	48	9		17	3	0
Queue Length 95th (ft)	77	113	7		70	598	0	78	46		36	46	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2704	1046		416	2917	1187	429	240		425	234	447
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.26	0.40	0.09		0.27	0.74	0.03	0.30	0.20		0.11	0.24	0.13

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.74

Intersection Signal Delay: 21.3

Intersection LOS: C

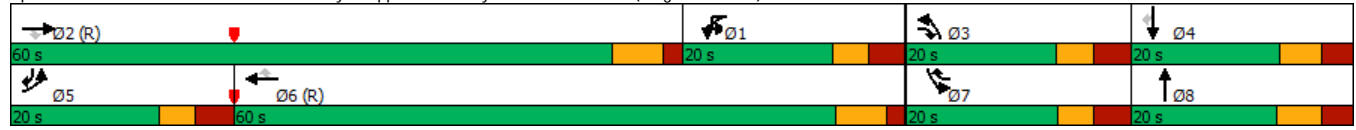
Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

Description: 05-2148

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↕	↖		↖
Traffic Volume (vph)	0	14	464	68	0	170
Future Volume (vph)	0	14	464	68	0	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3438	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	3438	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	533	78	0	195
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.8%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↕	↕↕	↕		↕
Traffic Vol, veh/h	0	14	464	68	0	170
Future Vol, veh/h	0	14	464	68	0	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	533	78	0	195
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	267	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	732	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	732	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	732	-		
HCM Lane V/C Ratio	-	-	0.022	-		
HCM Control Delay (s)	-	-	10	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	9	5	15	4	4	75	392	7	4	108	4
Future Volume (vph)	4	9	5	15	4	4	75	392	7	4	108	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	464	0	5	131	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.1%

ICU Level of Service A

Analysis Period (min) 15

**Intersection**

Int Delay, s/veh	2											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	9	5	15	4	4	75	392	7	4	108	4
Future Vol, veh/h	4	9	5	15	4	4	75	392	7	4	108	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	456	8	5	126	5

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>			
Conflicting Flow All	778	777	129	781	775	460	131	0	0	464	0	0
Stage 1	139	139	-	634	634	-	-	-	-	-	-	-
Stage 2	639	638	-	147	141	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	314	328	921	312	329	601	1442	-	-	1018	-	-
Stage 1	864	782	-	467	473	-	-	-	-	-	-	-
Stage 2	464	471	-	856	780	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	293	307	921	287	308	601	1442	-	-	1018	-	-
Mov Cap-2 Maneuver	293	307	-	287	308	-	-	-	-	-	-	-
Stage 1	812	778	-	439	445	-	-	-	-	-	-	-
Stage 2	428	443	-	835	776	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>		<b>WB</b>			<b>NB</b>			<b>SB</b>		
HCM Control Delay, s	15.3		17.3			1.2			0.3		
HCM LOS	C		C								

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1442	-	-	372	320	1018	-	-
HCM Lane V/C Ratio	0.06	-	-	0.056	0.084	0.005	-	-
HCM Control Delay (s)	7.7	-	-	15.3	17.3	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.3	0	-	-





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	5	45	4	4	9	210	188	4	54	4
Future Volume (vph)	4	4	5	45	4	4	9	210	188	4	54	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1734	0	0	1770	0	1687	1650	0	1421	1483	0
Flt Permitted		0.986			0.959		0.950			0.950		
Satd. Flow (perm)	0	1734	0	0	1770	0	1687	1650	0	1421	1483	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			1567	
Travel Time (s)		8.1			10.0			10.0			30.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	72	0	12	546	0	5	79	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	5	45	4	4	9	210	188	4	54	4
Future Vol, veh/h	4	4	5	45	4	4	9	210	188	4	54	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	5	5	7	62	5	5	12	288	258	5	74	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	533	657	77	534	530	417	79	0	0	546	0	0
Stage 1	87	87	-	441	441	-	-	-	-	-	-	-
Stage 2	446	570	-	93	89	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	458	385	984	457	455	636	1488	-	-	909	-	-
Stage 1	921	823	-	595	577	-	-	-	-	-	-	-
Stage 2	591	505	-	914	821	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	445	380	984	444	449	636	1488	-	-	909	-	-
Mov Cap-2 Maneuver	445	380	-	444	449	-	-	-	-	-	-	-
Stage 1	914	818	-	590	572	-	-	-	-	-	-	-
Stage 2	576	501	-	897	816	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12		14.4		0.2		0.6	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1488	-	-	529	455	909	-	-
HCM Lane V/C Ratio	0.008	-	-	0.034	0.16	0.006	-	-
HCM Control Delay (s)	7.4	-	-	12	14.4	9	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	4	112	60	4	33
Future Volume (vph)	11	4	112	60	4	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				100	
Satd. Flow (prot)	1735	0	1741	0	1456	1532
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1735	0	1741	0	1456	1532
Link Speed (mph)	30		30			35
Link Distance (ft)	545		1567			668
Travel Time (s)	12.4		35.6			13.0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	191	0	4	37
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.6%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	11	4	112	60	4	33
Future Vol, veh/h	11	4	112	60	4	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	4	4	24	24
Mvmt Flow	12	4	124	67	4	37

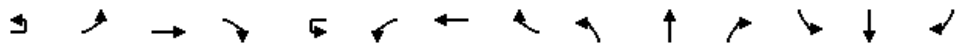
Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	203	158	0	0	191
Stage 1	158	-	-	-	-
Stage 2	45	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.34
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.416
Pot Cap-1 Maneuver	786	887	-	-	1261
Stage 1	871	-	-	-	-
Stage 2	977	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	784	887	-	-	1261
Mov Cap-2 Maneuver	770	-	-	-	-
Stage 1	871	-	-	-	-
Stage 2	974	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	798	1261	-
HCM Lane V/C Ratio	-	-	0.021	0.004	-
HCM Control Delay (s)	-	-	9.6	7.9	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Hinton Oaks Industrial  
1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Build-out+1 (2023) PM w Legacy Oaks + Imp  
05/14/2020



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↔↔↔	↔		↔	↔↔↔	↔	↔↔	↔	↔	↔↔	↔	↔
Traffic Volume (vph)	26	494	2699	171	6	37	1712	86	125	28	61	171	14	324
Future Volume (vph)	26	494	2699	171	6	37	1712	86	125	28	61	171	14	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%			0%	
Storage Length (ft)		400		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		200				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				83				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%			0%	
Shared Lane Traffic (%)														48%
Lane Group Flow (vph)	0	547	2841	180	0	45	1802	91	132	29	64	180	179	177
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	35.0	35.0	80.0	20.0	20.0	20.0	65.0	20.0	20.0	20.0	20.0	20.0	20.0	35.0
Total Split (%)	25.0%	25.0%	57.1%	14.3%	14.3%	14.3%	46.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	25.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effect Green (s)	30.0	88.9	106.4	10.0	66.2	90.7	12.5	9.7	16.2	19.6	11.3	41.3		
Actuated g/C Ratio	0.21	0.64	0.76	0.07	0.47	0.65	0.09	0.07	0.12	0.14	0.08	0.30		
v/c Ratio	0.74	0.88	0.15	0.36	0.75	0.09	0.44	0.23	0.22	0.38	0.65	0.33		
Control Delay	46.3	17.7	1.4	90.5	16.4	0.3	64.7	65.5	1.7	58.1	22.8	9.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	46.3	17.7	1.4	90.5	16.4	0.3	64.7	65.5	1.7	58.1	22.8	9.1		
LOS		D	B	A		F	B	A	E	E	A	E	C	A
Approach Delay			21.3				17.4			46.9			30.1	
Approach LOS			C				B			D			C	
Queue Length 50th (ft)		231	445	7		41	221	0	59	26	0	80	13	27
Queue Length 95th (ft)		m269	m#1043	m13		m82	256	2	92	59	0	118	94	68
Internal Link Dist (ft)			1048				1206			396			288	
Turn Bay Length (ft)		400		125		200		200	200		100	325		150
Base Capacity (vph)		739	3245	1255		188	2392	1039	362	196	347	481	310	532
Starvation Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.74	0.88	0.14		0.24	0.75	0.09	0.36	0.15	0.18	0.37	0.58	0.33

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.7      Intersection LOS: C

Intersection Capacity Utilization 87.9%      ICU Level of Service E

Analysis Period (min) 15

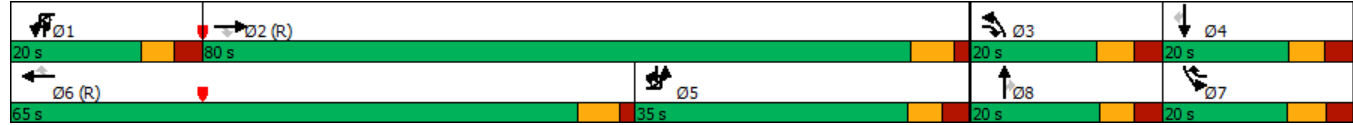
Description: 05-2267

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





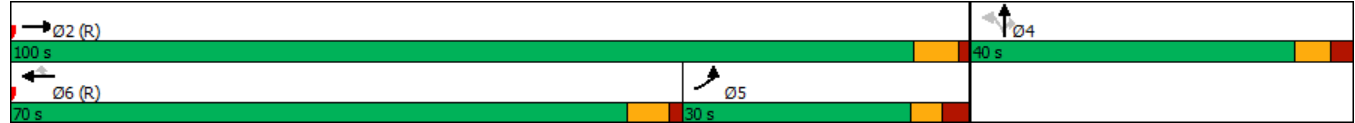
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	410	2879	0	0	1657	635	108	4	723	0	0	0
Future Volume (vph)	410	2879	0	0	1657	635	108	4	723	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						552			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	427	2999	0	0	1726	661	0	117	753	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	25.0	95.0			65.0	65.0		35.0	35.0			
Actuated g/C Ratio	0.18	0.68			0.46	0.46		0.25	0.25			
v/c Ratio	0.69	0.86			0.73	0.64		0.27	1.01			
Control Delay	51.4	12.3			11.9	2.8		44.2	83.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	51.4	12.3			11.9	2.8		44.2	83.1			
LOS	D	B			B	A		D	F			
Approach Delay		17.2			9.4			77.9				
Approach LOS		B			A			E				
Queue Length 50th (ft)	190	252			200	0		86	-372			
Queue Length 95th (ft)	248	263			136	5		143	#523			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3468			2349	1026		439	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.69	0.86			0.73	0.64		0.27	1.01			

Intersection Summary

Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.01

Intersection Signal Delay: 22.3	Intersection LOS: C
Intersection Capacity Utilization 89.3%	ICU Level of Service E
Analysis Period (min) 15	
Description: 05-2152	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





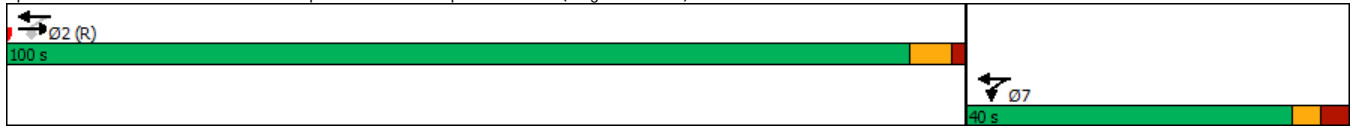


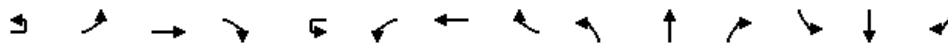
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑							↑
Traffic Volume (vph)	0	2233	90	370	1389	0	0	0	0	0	0	613
Future Volume (vph)	0	2233	90	370	1389	0	0	0	0	0	0	613
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.046								
Satd. Flow (perm)	0	5060	1575	86	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			92									170
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2279	92	378	1417	0	0	0	0	0	0	626
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effect Green (s)		95.9	95.9	130.0	140.0							140.0
Actuated g/C Ratio		0.68	0.68	0.93	1.00							1.00
v/c Ratio		0.66	0.08	0.77	0.40							0.40
Control Delay		13.9	1.6	70.4	1.5							0.8
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		13.9	1.6	70.4	1.5							0.8
LOS		B	A	E	A							A
Approach Delay		13.4			16.0						0.8	
Approach LOS		B			B						A	
Queue Length 50th (ft)		411	0	307	41							0
Queue Length 95th (ft)		456	18	405	12							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3467	1108	503	3550							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		16	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.66	0.08	0.75	0.40							0.40

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green  
 Natural Cycle: 45  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.77

Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 112.7%	ICU Level of Service H
Analysis Period (min) 15	
Description: 05-2153	

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)





Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↔↔↔	↔		↔↔	↔↔↔	↔	↔↔	↔		↔↔	↔	↔
Traffic Volume (vph)	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
Future Volume (vph)	5	269	2164	405	122	221	1223	210	266	30	117	377	53	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%			0%	
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1638	0	3433	1632	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3432	5085	1583	3467	1638	0	3428	1632	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				276				212		79			33	129
Link Speed (mph)			45				45			35			35	
Link Distance (ft)			1286				1388			649			378	
Travel Time (s)			19.5				21.0			12.6			7.4	
Confl. Peds. (#/hr)				1			1				1	1		
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%			0%	
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	277	2186	409	0	346	1235	212	269	148	0	381	113	106
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)	20.0	66.3	86.7		19.1	65.4	91.2	20.4	13.8		20.7	14.1	39.1	
Actuated g/C Ratio	0.14	0.47	0.62		0.14	0.47	0.65	0.15	0.10		0.15	0.10	0.28	
v/c Ratio		0.57	0.91	0.38		0.74	0.52	0.19	0.53	0.64		0.75	0.58	0.21
Control Delay		54.0	34.0	3.7		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		54.0	34.0	3.7		68.0	27.9	1.8	59.3	40.6		66.9	53.6	3.9
LOS		D	C	A		E	C	A	E	D		E	D	A
Approach Delay			31.6				32.6			52.7			53.3	
Approach LOS			C				C			D			D	
Queue Length 50th (ft)		110	469	41		155	289	0	117	60		171	73	0
Queue Length 95th (ft)		m131	#834	m139		211	354	32	166	129		232	137	29
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2408	1082		494	2376	1100	522	301		521	261	513
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.57	0.91	0.38		0.70	0.52	0.19	0.52	0.49		0.73	0.43	0.21

**Intersection Summary**

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 35.7 Intersection LOS: D

Intersection Capacity Utilization 88.3% ICU Level of Service E

Analysis Period (min) 15

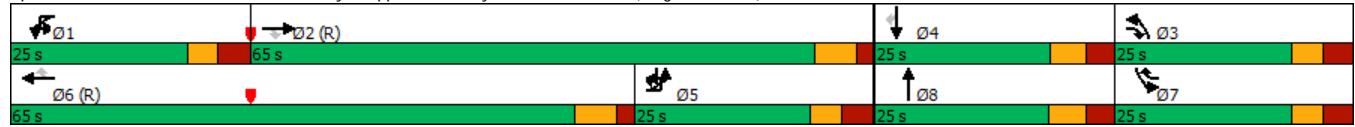
Description: 05-2148

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↕	↗		↖
Traffic Volume (vph)	0	35	346	228	0	522
Future Volume (vph)	0	35	346	228	0	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	376	248	0	567
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.8%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↕	↕↕	↕		↕
Traffic Vol, veh/h	0	35	346	228	0	522
Future Vol, veh/h	0	35	346	228	0	522
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	376	248	0	567
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	188	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	823	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	823	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	823	-		
HCM Lane V/C Ratio	-	-	0.046	-		
HCM Control Delay (s)	-	-	9.6	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	30	50	53	31	8	131	152	41	14	398	4
Future Volume (vph)	4	30	50	53	31	8	131	152	41	14	398	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1768	0	1752	1843	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1768	0	1752	1843	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	206	0	15	427	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

**Intersection**

Int Delay, s/veh	6.8											
<b>Movement</b>	<b>EBL</b>	<b>EBT</b>	<b>EBR</b>	<b>WBL</b>	<b>WBT</b>	<b>WBR</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	30	50	53	31	8	131	152	41	14	398	4
Future Vol, veh/h	4	30	50	53	31	8	131	152	41	14	398	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	162	44	15	423	4

<b>Major/Minor</b>	<b>Minor2</b>		<b>Minor1</b>			<b>Major1</b>			<b>Major2</b>			
Conflicting Flow All	939	939	425	960	919	185	427	0	0	206	0	0
Stage 1	455	455	-	462	462	-	-	-	-	-	-	-
Stage 2	484	484	-	498	457	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	244	264	629	236	271	857	1122	-	-	1359	-	-
Stage 1	585	569	-	580	565	-	-	-	-	-	-	-
Stage 2	564	552	-	554	568	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	194	229	629	174	235	856	1122	-	-	1359	-	-
Mov Cap-2 Maneuver	194	229	-	174	235	-	-	-	-	-	-	-
Stage 1	512	563	-	508	495	-	-	-	-	-	-	-
Stage 2	456	484	-	473	562	-	-	-	-	-	-	-

<b>Approach</b>	<b>EB</b>		<b>WB</b>			<b>NB</b>			<b>SB</b>		
HCM Control Delay, s	18.1		37.4			3.5			0.3		
HCM LOS	C		E								

<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>NBR</b>	<b>EBLn1</b>	<b>WBLn1</b>	<b>SBL</b>	<b>SBT</b>	<b>SBR</b>
Capacity (veh/h)	1122	-	-	363	206	1359	-	-
HCM Lane V/C Ratio	0.124	-	-	0.246	0.475	0.011	-	-
HCM Control Delay (s)	8.7	-	-	18.1	37.4	7.7	-	-
HCM Lane LOS	A	-	-	C	E	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1	2.3	0	-	-





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	27	171	4	4	43	56	60	4	215	4
Future Volume (vph)	4	4	27	171	4	4	43	56	60	4	215	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1772	0	1597	1550	0	1752	1839	0
Flt Permitted		0.994			0.954		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1772	0	1597	1550	0	1752	1839	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		355			448			505			1614	
Travel Time (s)		8.1			10.2			9.8			31.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	219	0	52	141	0	5	267	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 41.5%	ICU Level of Service A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	27	171	4	4	43	56	60	4	215	4
Future Vol, veh/h	4	4	27	171	4	4	43	56	60	4	215	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	209	5	5	52	68	73	5	262	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	489	520	265	503	486	105	267	0	0	141	0	0
Stage 1	275	275	-	209	209	-	-	-	-	-	-	-
Stage 2	214	245	-	294	277	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	489	461	774	479	481	949	1236	-	-	1436	-	-
Stage 1	731	683	-	793	729	-	-	-	-	-	-	-
Stage 2	788	703	-	714	681	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	466	440	774	439	459	949	1236	-	-	1436	-	-
Mov Cap-2 Maneuver	466	440	-	439	459	-	-	-	-	-	-	-
Stage 1	700	681	-	760	698	-	-	-	-	-	-	-
Stage 2	746	673	-	676	679	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s	10.8		20.6		2.2		0.1			
HCM LOS	B		C							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1236	-	-	666	445	1436	-	-
HCM Lane V/C Ratio	0.042	-	-	0.064	0.491	0.003	-	-
HCM Control Delay (s)	8	-	-	10.8	20.6	7.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.6	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	4	36	15	4	118
Future Volume (vph)	55	4	36	15	4	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1765	0	1258	0	1736	1827
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1765	0	1258	0	1736	1827
Link Speed (mph)	30		30			35
Link Distance (ft)	628		1614			738
Travel Time (s)	14.3		36.7			14.4
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	45%	45%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	57	0	4	131
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Vol, veh/h	55	4	36	15	4	118
Future Vol, veh/h	55	4	36	15	4	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	45	45	4	4
Mvmt Flow	61	4	40	17	4	131
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	188	49	0	0	57	0
Stage 1	49	-	-	-	-	-
Stage 2	139	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	801	1020	-	-	1535	-
Stage 1	973	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	799	1020	-	-	1535	-
Mov Cap-2 Maneuver	782	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.9	0		0.2		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	795	1535	-	
HCM Lane V/C Ratio	-	-	0.082	0.003	-	
HCM Control Delay (s)	-	-	9.9	7.4	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

**Appendix N:**  
**Build-out (2032) w/ Legacy Oaks**



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	396	1269	62	5	21	2333	96	316	7	70	51	10	75
Future Volume (vph)	396	1269	62	5	21	2333	96	316	7	70	51	10	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%				1%			3%			0%	
Storage Length (ft)	400		125		200		200	200		100	325		150
Storage Lanes	2		1		1		1	2		1	1		1
Taper Length (ft)	200				100			100			100		
Satd. Flow (prot)	3320	4918	1531	0	1710	4915	1530	3382	1835	1560	3213	1467	1408
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3320	4918	1499	0	1709	4915	1530	3382	1835	1560	3213	1467	1408
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			94				95			153			150
Link Speed (mph)		45				45			35				35
Link Distance (ft)		1125				1283			476				346
Travel Time (s)		17.0				19.4			9.3				6.7
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	6%	6%	5%	5%	5%	5%	2%	2%	2%	9%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%			0%				0%
Shared Lane Traffic (%)													44%
Lane Group Flow (vph)	421	1350	66	0	27	2482	102	336	7	74	54	46	45
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1!	1	6	7	3	8	1!	7	4	5
Permitted Phases			2				6			8			4
Detector Phase	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	22.0	68.0	20.0	17.0	17.0	63.0	16.0	20.0	19.0	17.0	16.0	15.0	22.0
Total Split (%)	18.3%	56.7%	16.7%	14.2%	14.2%	52.5%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	18.3%
Yellow Time (s)	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8		-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effect Green (s)	17.0	69.4	84.9		11.3	61.0	89.2	15.4	9.7	14.1	23.2	9.3	24.6
Actuated g/C Ratio	0.14	0.58	0.71		0.09	0.51	0.74	0.13	0.08	0.12	0.19	0.08	0.20
v/c Ratio	0.89	0.47	0.06		0.17	0.99	0.09	0.77	0.05	0.23	0.09	0.32	0.11
Control Delay	68.3	19.7	2.8		33.6	29.0	0.1	63.6	50.1	1.7	41.3	28.3	0.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	19.7	2.8		33.6	29.0	0.1	63.6	50.1	1.7	41.3	28.3	0.5
LOS	E	B	A		C	C	A	E	D	A	D	C	A
Approach Delay		30.2				27.9			52.4				24.5
Approach LOS		C				C			D				C
Queue Length 50th (ft)	171	274	4		20	-767	0	130	5	0	16	8	0
Queue Length 95th (ft)	m#257	317	m12		m23	#835	m0	#198	20	0	41	48	0
Internal Link Dist (ft)		1045				1203			396			266	
Turn Bay Length (ft)	400		125		200		200	200		100	325		150
Base Capacity (vph)	471	2845	1092		171	2498	1161	435	214	326	620	154	407
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.47	0.06		0.16	0.99	0.09	0.77	0.03	0.23	0.09	0.30	0.11

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99

Intersection Signal Delay: 30.7	Intersection LOS: C
Intersection Capacity Utilization 84.6%	ICU Level of Service E
Analysis Period (min) 15	
Description: 05-2267	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	
! Phase conflict between lane groups.	

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	515	1313	0	0	1920	893	85	5	532	0	0	0
Future Volume (vph)	515	1313	0	0	1920	893	85	5	532	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3384	5012	0	0	4963	1545	0	1695	2655	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						649			106			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1125			821			417	
Travel Time (s)		11.6			17.0			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	6%	6%	6%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	566	1443	0	0	2110	981	0	98	585	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	20.0	83.8			58.8	58.8		26.2	26.2			
Actuated g/C Ratio	0.17	0.70			0.49	0.49		0.22	0.22			
v/c Ratio	1.00	0.41			0.87	0.90		0.27	0.89			
Control Delay	83.6	8.3			18.8	17.4		39.7	52.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	83.6	8.3			18.8	17.4		39.7	52.8			
LOS	F	A			B	B		D	D			
Approach Delay		29.5			18.4			50.9				
Approach LOS		C			B			D				
Queue Length 50th (ft)	-229	161			524	650		63	206			
Queue Length 95th (ft)	#351	192			m648	m669		109	277			
Internal Link Dist (ft)		683			1045			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	564	3501			2433	1088		423	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	1.00	0.41			0.87	0.90		0.23	0.79			

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

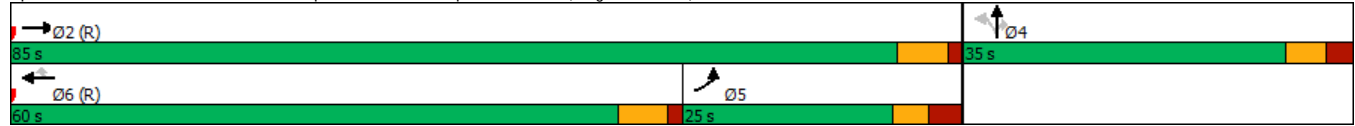
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00



Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	
Description: 05-2152	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)



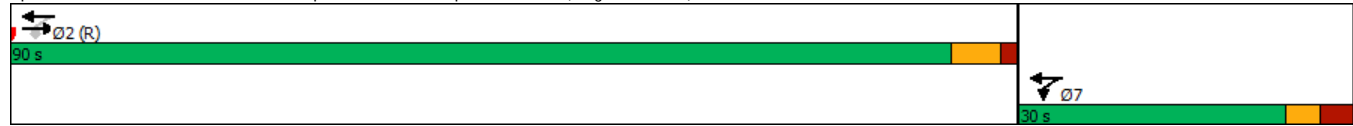


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑							↑
Traffic Volume (vph)	0	1354	143	367	1652	0	0	0	0	0	0	359
Future Volume (vph)	0	1354	143	367	1652	0	0	0	0	0	0	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	4963	1545	1744	3489	0	0	0	0	0	0	1580
Flt Permitted				0.153								
Satd. Flow (perm)	0	4963	1545	281	3489	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152									107
Link Speed (mph)		45			45			35				35
Link Distance (ft)		965			302			601				428
Travel Time (s)		14.6			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1440	152	390	1757	0	0	0	0	0	0	382
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effect Green (s)		85.0	85.0	110.0	120.0							120.0
Actuated g/C Ratio		0.71	0.71	0.92	1.00							1.00
v/c Ratio		0.41	0.13	0.69	0.50							0.24
Control Delay		7.6	1.1	42.1	3.9							0.4
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		7.6	1.1	42.1	3.9							0.4
LOS		A	A	D	A							A
Approach Delay		7.0			10.8						0.4	
Approach LOS		A			B						A	
Queue Length 50th (ft)		150	0	195	87							0
Queue Length 95th (ft)		175	18	m247	107							0
Internal Link Dist (ft)		885			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3515	1138	562	3489							1580
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.41	0.13	0.69	0.50							0.24

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 57 (48%), Referenced to phase 2:EBWB and 6.; Start of Green  
 Natural Cycle: 40  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.69

Intersection Signal Delay: 8.4	Intersection LOS: A
Intersection Capacity Utilization 60.7%	ICU Level of Service B
Analysis Period (min) 15	
Description: 05-2153	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



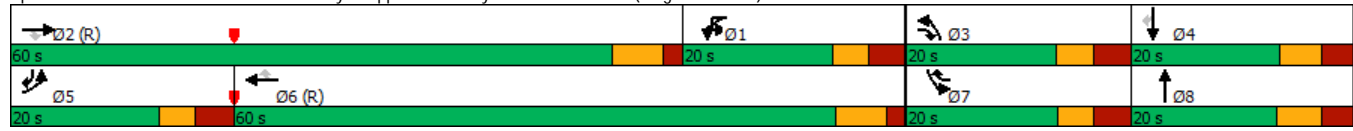


Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	106	1070	94	27	85	2148	38	127	13	36	46	4	108
Future Volume (vph)	106	1070	94	27	85	2148	38	127	13	36	46	4	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)	0%			0%			-2%			0%			
Storage Length (ft)	350		200		300		175	275		0	150		150
Storage Lanes	2		1		2		1	1		0	1		1
Taper Length (ft)	300				300			100			100		
Satd. Flow (prot)	3273	4848	1509	0	3335	4940	1538	3434	1656	0	3400	1507	1490
Flt Permitted	0.950				0.950			0.950			0.950		
Satd. Flow (perm)	3273	4848	1490	0	3332	4940	1538	3434	1656	0	3400	1507	1490
Right Turn on Red			Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			103				96			40			150
Link Speed (mph)		45				45				35			35
Link Distance (ft)		1283				1388				649			378
Travel Time (s)		19.4				21.0				12.6			7.4
Confl. Peds. (#/hr)			1		1								
Confl. Bikes (#/hr)													
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	7%	7%	5%	5%	5%	5%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)													
Mid-Block Traffic (%)		0%				0%				0%			0%
Shared Lane Traffic (%)													49%
Lane Group Flow (vph)	116	1176	103	0	123	2360	42	140	54	0	51	62	61
Turn Type	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	1	6	7	3	8		7	4	5
Permitted Phases			2				6						4
Detector Phase	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6		-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)	11.3	66.4	78.3		15.0	70.1	84.2	11.8	12.1		9.1	9.5	23.0
Actuated g/C Ratio	0.09	0.55	0.65		0.12	0.58	0.70	0.10	0.10		0.08	0.08	0.19
v/c Ratio	0.38	0.44	0.10		0.30	0.82	0.04	0.41	0.27		0.20	0.36	0.15
Control Delay	65.6	12.1	0.7		49.8	24.7	0.1	54.1	23.5		53.7	20.6	0.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	65.6	12.1	0.7		49.8	24.7	0.1	54.1	23.5		53.7	20.6	0.8
LOS	E	B	A		D	C	A	D	C		D	C	A
Approach Delay		15.8				25.5			45.6			23.4	
Approach LOS		B				C			D			C	
Queue Length 50th (ft)	47	94	2		45	526	0	53	10		19	3	0
Queue Length 95th (ft)	82	136	8		75	#764	0	84	48		39	48	0
Internal Link Dist (ft)		1203				1308			569			298	
Turn Bay Length (ft)	350		200		300		175	275			150		150
Base Capacity (vph)	409	2684	1044		416	2886	1179	429	245		425	239	448
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.28	0.44	0.10		0.30	0.82	0.04	0.33	0.22		0.12	0.26	0.14

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82

Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	
Description: 05-2148	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↕	↗		↘
Traffic Volume (vph)	0	14	481	68	0	181
Future Volume (vph)	0	14	481	68	0	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3438	1538	0	1743
Flt Permitted						
Satd. Flow (perm)	0	1611	3438	1538	0	1743
Link Speed (mph)	30		30			35
Link Distance (ft)	456		346			388
Travel Time (s)	10.4		7.9			7.6
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	5%	5%	9%	9%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	553	78	0	208
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	23.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↕	↕↕	↕		↕
Traffic Vol, veh/h	0	14	481	68	0	181
Future Vol, veh/h	0	14	481	68	0	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	2	5	5	9	9
Mvmt Flow	0	16	553	78	0	208
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	277	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	721	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	721	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.1	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	721	-		
HCM Lane V/C Ratio	-	-	0.022	-		
HCM Control Delay (s)	-	-	10.1	-		
HCM Lane LOS	-	-	B	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	9	5	15	4	4	75	402	7	4	113	4
Future Volume (vph)	4	9	5	15	4	4	75	402	7	4	113	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Flt Permitted		0.988			0.969		0.950			0.950		
Satd. Flow (perm)	0	1769	0	0	1760	0	1736	1821	0	1530	1601	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		190			469			388			515	
Travel Time (s)		4.3			10.7			8.8			10.0	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	18%	18%	18%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	0	0	27	0	87	475	0	5	136	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.6%

ICU Level of Service A

Analysis Period (min) 15



Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	
Traffic Vol, veh/h	4	9	5	15	4	4	75	402	7	4	113	4
Future Vol, veh/h	4	9	5	15	4	4	75	402	7	4	113	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	18	18	18
Mvmt Flow	5	10	6	17	5	5	87	467	8	5	131	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	794	793	134	797	791	471	136	0	0	475	0	0
Stage 1	144	144	-	645	645	-	-	-	-	-	-	-
Stage 2	650	649	-	152	146	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.28	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.362	-	-
Pot Cap-1 Maneuver	306	321	915	305	322	593	1436	-	-	1009	-	-
Stage 1	859	778	-	461	467	-	-	-	-	-	-	-
Stage 2	458	466	-	850	776	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	285	300	915	280	301	593	1436	-	-	1009	-	-
Mov Cap-2 Maneuver	285	300	-	280	301	-	-	-	-	-	-	-
Stage 1	807	774	-	433	439	-	-	-	-	-	-	-
Stage 2	422	438	-	829	772	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.5		17.6		1.2		0.3	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1436	-	-	364	312	1009	-	-
HCM Lane V/C Ratio	0.061	-	-	0.058	0.086	0.005	-	-
HCM Control Delay (s)	7.7	-	-	15.5	17.6	8.6	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.3	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	5	45	4	4	9	220	188	4	57	4
Future Volume (vph)	4	4	5	45	4	4	9	220	188	4	57	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1730	0	0	1770	0	1687	1653	0	1421	1483	0
Flt Permitted		0.986			0.959		0.950			0.950		
Satd. Flow (perm)	0	1730	0	0	1770	0	1687	1653	0	1421	1483	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		358			438			515			1567	
Travel Time (s)		8.1			10.0			10.0			30.5	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	7%	7%	7%	27%	27%	27%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	14	0	0	59	0	10	458	0	4	68	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	36.7%
	ICU Level of Service A
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	5	45	4	4	9	220	188	4	57	4
Future Vol, veh/h	4	4	5	45	4	4	9	220	188	4	57	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	27	27	27
Mvmt Flow	4	4	6	51	4	4	10	247	211	4	64	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	451	552	66	452	449	353	68	0	0	458	0	0
Stage 1	74	74	-	373	373	-	-	-	-	-	-	-
Stage 2	377	478	-	79	76	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.17	-	-	4.37	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.263	-	-	2.443	-	-
Pot Cap-1 Maneuver	519	442	998	518	505	691	1502	-	-	983	-	-
Stage 1	935	833	-	648	618	-	-	-	-	-	-	-
Stage 2	644	556	-	930	832	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	508	437	998	507	499	691	1502	-	-	983	-	-
Mov Cap-2 Maneuver	508	437	-	507	499	-	-	-	-	-	-	-
Stage 1	928	830	-	643	614	-	-	-	-	-	-	-
Stage 2	631	552	-	916	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	12.9	0.2	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1502	-	-	590	517	983	-	-
HCM Lane V/C Ratio	0.007	-	-	0.025	0.115	0.005	-	-
HCM Control Delay (s)	7.4	-	-	11.3	12.9	8.7	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.4	0	-	-

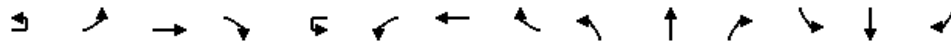


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	4	118	60	4	35
Future Volume (vph)	11	4	118	60	4	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				100	
Satd. Flow (prot)	1735	0	1743	0	1456	1532
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1735	0	1743	0	1456	1532
Link Speed (mph)	30		30			35
Link Distance (ft)	545		1567			668
Travel Time (s)	12.4		35.6			13.0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	4%	4%	24%	24%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	198	0	4	39
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 19.9%	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	11	4	118	60	4	35
Future Vol, veh/h	11	4	118	60	4	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	4	4	24	24
Mvmt Flow	12	4	131	67	4	39
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	212	165	0	0	198	0
Stage 1	165	-	-	-	-	-
Stage 2	47	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.34	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.416	-
Pot Cap-1 Maneuver	776	879	-	-	1253	-
Stage 1	864	-	-	-	-	-
Stage 2	975	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	774	879	-	-	1253	-
Mov Cap-2 Maneuver	763	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	972	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		0.8		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	791	1253	-	
HCM Lane V/C Ratio	-	-	0.021	0.004	-	
HCM Control Delay (s)	-	-	9.6	7.9	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	



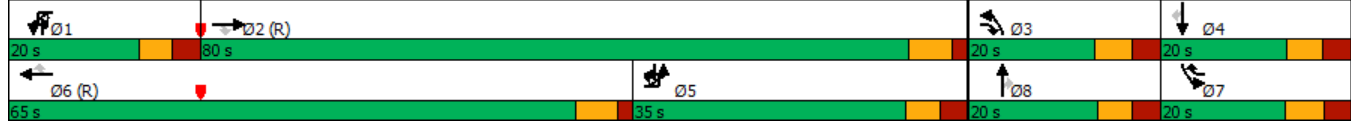
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↔↔↔	↔			↔↔↔	↔	↔↔	↔	↔	↔↔	↔	↔
Traffic Volume (vph)	28	534	2931	187	7	40	1849	93	137	31	67	183	15	333
Future Volume (vph)	28	534	2931	187	7	40	1849	93	137	31	67	183	15	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			-1%				1%			3%			0%	
Storage Length (ft)		400		125		200		200	200		100	325		150
Storage Lanes		2		1		1		1	2		1	1		1
Taper Length (ft)		200				100			100			100		
Satd. Flow (prot)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3450	5111	1591	0	1761	5060	1575	3382	1835	1560	3433	1527	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				84				81			130			126
Link Speed (mph)			45				45			35				35
Link Distance (ft)			1128				1286			476				368
Travel Time (s)			17.1				19.5			9.3				7.2
Confl. Peds. (#/hr)														
Confl. Bikes (#/hr)														
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%			0%	
Shared Lane Traffic (%)														48%
Lane Group Flow (vph)	0	591	3085	197	0	49	1946	98	144	33	71	193	184	183
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1!	1	6	7	3	8	1!	7	4	5!
Permitted Phases				2				6			8			4
Detector Phase	5	5	2	3	1	1	6	7	3	8	1	7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	35.0	35.0	80.0	20.0	20.0	20.0	65.0	20.0	20.0	20.0	20.0	20.0	20.0	35.0
Total Split (%)	25.0%	25.0%	57.1%	14.3%	14.3%	14.3%	46.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	25.0%
Yellow Time (s)	3.6	3.6	4.6	3.8	3.4	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	3.0	1.7	3.0	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)		-1.6	-1.3	-1.8			-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None	None	None	None	None
Act Effect Green (s)		30.0	85.5	103.3			10.2	65.7	90.5	12.8	9.9	16.7	19.8	11.5
Actuated g/C Ratio		0.21	0.61	0.74			0.07	0.47	0.65	0.09	0.07	0.12	0.14	0.08
v/c Ratio		0.80	0.99	0.16			0.38	0.82	0.09	0.46	0.26	0.24	0.40	0.66
Control Delay		48.6	27.4	1.8			89.4	18.1	0.4	65.0	65.9	1.9	58.3	22.9
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		48.6	27.4	1.8			89.4	18.1	0.4	65.0	65.9	1.9	58.3	22.9
LOS		D	C	A			F	B	A	E	E	A	E	C
Approach Delay			29.4					19.0			47.0			30.7
Approach LOS			C					B			D			C
Queue Length 50th (ft)		254	800	9			46	242	0	64	29	0	87	14
Queue Length 95th (ft)		m269	m#1184	m17			m81	528	3	100	64	0	125	95
Internal Link Dist (ft)			1048					1206			396			288
Turn Bay Length (ft)		400		125			200		200	200		100	325	150
Base Capacity (vph)		739	3120	1219			188	2373	1047	362	196	349	486	313
Starvation Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.80	0.99	0.16			0.26	0.82	0.09	0.40	0.17	0.20	0.40	0.59

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99

Hinton Oaks Industrial  
 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)

Intersection Signal Delay: 26.9 Intersection LOS: C  
 Intersection Capacity Utilization 92.6% ICU Level of Service F  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.  
 ! Phase conflict between lane groups.

Splits and Phases: 1: Hinton Oaks Boulevard & US 64 Bus (Knightdale Blvd.)





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	444	3129	0	0	1778	684	116	4	784	0	0	0
Future Volume (vph)	444	3129	0	0	1778	684	116	4	784	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1759	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						555			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	463	3259	0	0	1852	713	0	125	817	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8	-1.2	-1.2				
Total Lost Time (s)	5.0	5.0			5.0	5.0	5.0	5.0				
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	25.0	95.0			65.0	65.0	35.0	35.0				
Actuated g/C Ratio	0.18	0.68			0.46	0.46	0.25	0.25				
v/c Ratio	0.75	0.94			0.79	0.69	0.28	1.10				
Control Delay	52.9	17.0			12.6	3.5	44.5	107.7				
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0				
Total Delay	52.9	17.0			12.6	3.5	44.5	107.7				
LOS	D	B			B	A	D	F				
Approach Delay		21.5			10.1		99.3					
Approach LOS		C			B		F					
Queue Length 50th (ft)	208	279			196	0	93	-450				
Queue Length 95th (ft)	271	291			156	6	152	#594				
Internal Link Dist (ft)		683			1048		741			337		
Turn Bay Length (ft)	500							400				
Base Capacity (vph)	616	3468			2349	1028	439	743				
Starvation Cap Reductn	0	0			0	0	0	0				
Spillback Cap Reductn	0	0			0	0	0	0				
Storage Cap Reductn	0	0			0	0	0	0				
Reduced v/c Ratio	0.75	0.94			0.79	0.69	0.28	1.10				

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

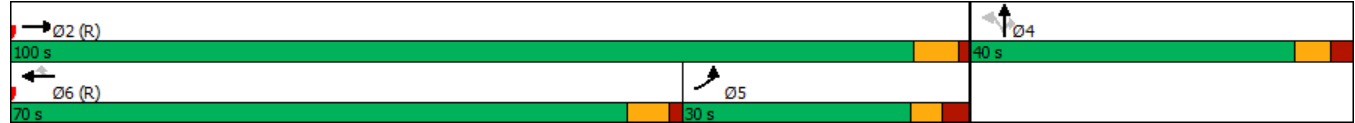
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10



Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 96.2%	ICU Level of Service F
Analysis Period (min) 15	
Description: 05-2152	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 2: I-540 NB Off-Ramp/I-540 NB On-Ramp & US 64 Bus (Knightdale Blvd.)





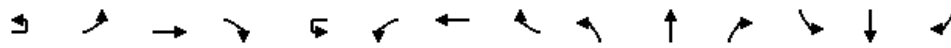
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑							↑
Traffic Volume (vph)	0	2424	97	389	1498	0	0	0	0	0	0	665
Future Volume (vph)	0	2424	97	389	1498	0	0	0	0	0	0	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		1%			-1%			0%			2%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.042								
Satd. Flow (perm)	0	5060	1575	79	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			96									146
Link Speed (mph)		45			45			35				35
Link Distance (ft)		980			302			601				428
Travel Time (s)		14.8			4.6			11.7				8.3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2473	99	397	1529	0	0	0	0	0	0	679
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effect Green (s)		95.4	95.4	130.0	140.0							140.0
Actuated g/C Ratio		0.68	0.68	0.93	1.00							1.00
v/c Ratio		0.72	0.09	0.81	0.43							0.43
Control Delay		15.5	1.7	71.3	1.9							0.9
Queue Delay		0.1	0.0	0.0	0.0							0.0
Total Delay		15.5	1.7	71.3	1.9							0.9
LOS		B	A	E	A							A
Approach Delay		15.0			16.2						0.9	
Approach LOS		B			B						A	
Queue Length 50th (ft)		480	1	327	43							0
Queue Length 95th (ft)		531	19	m#426	18							0
Internal Link Dist (ft)		900			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3448	1103	498	3537							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		88	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.74	0.09	0.80	0.43							0.43

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green  
 Natural Cycle: 50  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81

Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 122.1%	ICU Level of Service H
Analysis Period (min) 15	
Description: 05-2153	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 3: I-540 SB On-Ramp/I-540 SB Off-Ramp & US 64 Bus (Knightdale Blvd.)



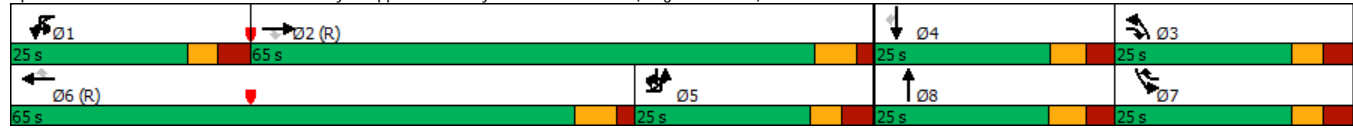


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↔↔↔	↔		↔↔	↔↔↔	↔	↔↔	↔		↔↔	↔	↔
Traffic Volume (vph)	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178
Future Volume (vph)	5	294	2347	443	133	242	1320	230	291	33	128	412	58	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)			0%				0%			-2%			0%	
Storage Length (ft)		350		200		300		175	275		0	150		150
Storage Lanes		2		1		2		1	1		0	1		1
Taper Length (ft)		300				300			100			100		
Satd. Flow (prot)	0	3433	5085	1583	0	3433	5085	1583	3467	1639	0	3433	1630	1504
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3433	5085	1564	0	3433	5085	1583	3467	1639	0	3428	1630	1504
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				278				232		70			33	129
Link Speed (mph)			45				45			35			35	
Link Distance (ft)			1286				1388			649			378	
Travel Time (s)			19.5				21.0			12.6			7.4	
Confl. Peds. (#/hr)				1			1					1	1	
Confl. Bikes (#/hr)														
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)														
Mid-Block Traffic (%)			0%				0%			0%			0%	
Shared Lane Traffic (%)														36%
Lane Group Flow (vph)	0	302	2371	447	0	378	1333	232	294	162	0	416	124	115
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	15.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	25.0	65.0	25.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	3.2	4.5	3.3	3.2	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	3.5	1.8	3.3	3.4	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)		-1.7	-1.3	-1.6			-1.6	-1.3	-1.5	-1.6		-1.5	-1.7	-1.7
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)	20.0	64.1	85.6		19.6	63.7	90.0	21.6	15.0		21.3	14.8	39.8	
Actuated g/C Ratio	0.14	0.46	0.61		0.14	0.46	0.64	0.15	0.11		0.15	0.11	0.28	
v/c Ratio	0.62	1.02	0.42		0.79	0.58	0.21	0.55	0.68		0.80	0.62	0.22	
Control Delay	54.9	50.0	4.2		70.6	30.1	1.8	59.1	47.8		69.2	56.3	5.1	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Total Delay	54.9	50.0	4.2		70.6	30.1	1.8	59.1	47.8		69.2	56.3	5.1	
LOS		D	D	A		E	C	A	E	D		E	E	A
Approach Delay			43.9				34.6			55.1			55.5	
Approach LOS			D				C			E			E	
Queue Length 50th (ft)		125	-875	76		172	337	0	126	81		186	84	0
Queue Length 95th (ft)		m127	m#897	m136		230	390	33	180	155		#274	151	36
Internal Link Dist (ft)			1206				1308			569			298	
Turn Bay Length (ft)		350		200		300		175	275			150		150
Base Capacity (vph)		490	2326	1069		493	2312	1092	539	294		528	261	519
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.62	1.02	0.42		0.77	0.58	0.21	0.55	0.55		0.79	0.48	0.22

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.02

Intersection Signal Delay: 43.0	Intersection LOS: D
Intersection Capacity Utilization 94.5%	ICU Level of Service F
Analysis Period (min) 15	
Description: 05-2148	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	
! Phase conflict between lane groups.	

Splits and Phases: 4: Wide Waters Parkway/Shoppes at Midway Drive & US 64 Bus (Knightdale Blvd.)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↕	↖		↕
Traffic Volume (vph)	0	35	371	228	0	546
Future Volume (vph)	0	35	371	228	0	546
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		75	0	
Storage Lanes	0	1		1	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	1611	3539	1583	0	1845
Flt Permitted						
Satd. Flow (perm)	0	1611	3539	1583	0	1845
Link Speed (mph)	30		30			35
Link Distance (ft)	460		368			393
Travel Time (s)	10.5		8.4			7.7
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	38	403	248	0	593
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 32.1%	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↕	↕↕	↕		↕
Traffic Vol, veh/h	0	35	371	228	0	546
Future Vol, veh/h	0	35	371	228	0	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	75	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	0	38	403	248	0	593
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	202	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	806	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	806	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	9.7	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT		
Capacity (veh/h)	-	-	806	-		
HCM Lane V/C Ratio	-	-	0.047	-		
HCM Control Delay (s)	-	-	9.7	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	30	50	53	31	8	131	159	41	14	410	4
Future Volume (vph)	4	30	50	53	31	8	131	159	41	14	410	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1710	0	0	1789	0	1736	1770	0	1752	1843	0
Flt Permitted		0.998			0.972		0.950			0.950		
Satd. Flow (perm)	0	1710	0	0	1789	0	1736	1770	0	1752	1843	0
Link Speed (mph)		30			30			30			35	
Link Distance (ft)		184			465			393			505	
Travel Time (s)		4.2			10.6			8.9			9.8	
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	4%	4%	4%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	98	0	139	213	0	15	440	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 50.9%

ICU Level of Service A

Analysis Period (min) 15



**Intersection**

Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	30	50	53	31	8	131	159	41	14	410	4
Future Vol, veh/h	4	30	50	53	31	8	131	159	41	14	410	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	4	4	4	3	3	3
Mvmt Flow	4	32	53	56	33	9	139	169	44	15	436	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	959	960	438	981	940	193	440	0	0	214	0	0
Stage 1	468	468	-	470	470	-	-	-	-	-	-	-
Stage 2	491	492	-	511	470	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.14	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.236	-	-	2.227	-	-
Pot Cap-1 Maneuver	237	257	619	229	264	849	1109	-	-	1350	-	-
Stage 1	575	561	-	574	560	-	-	-	-	-	-	-
Stage 2	559	548	-	545	560	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	187	222	619	167	228	847	1109	-	-	1349	-	-
Mov Cap-2 Maneuver	187	222	-	167	228	-	-	-	-	-	-	-
Stage 1	503	555	-	502	489	-	-	-	-	-	-	-
Stage 2	451	479	-	464	554	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB			
HCM Control Delay, s	18.6		39.4		3.4		0.3			
HCM LOS	C		E							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	354	199	1349	-	-
HCM Lane V/C Ratio	0.126	-	-	0.252	0.492	0.011	-	-
HCM Control Delay (s)	8.7	-	-	18.6	39.4	7.7	-	-
HCM Lane LOS	A	-	-	C	E	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1	2.4	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	4	4	27	171	4	4	43	58	60	4	226	4
Future Volume (vph)	4	4	27	171	4	4	43	58	60	4	226	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	50		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			100			100		
Satd. Flow (prot)	0	1659	0	0	1772	0	1597	1554	0	1752	1839	0
Flt Permitted		0.994			0.954		0.950			0.950		
Satd. Flow (perm)	0	1659	0	0	1772	0	1597	1554	0	1752	1839	0
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		355			448			505			1614	
Travel Time (s)		8.1			10.2			9.8			31.4	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	13%	13%	13%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	219	0	52	144	0	5	281	0
Sign Control		Stop			Stop			Free			Free	

**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 42.1%	ICU Level of Service A
Analysis Period (min)	15

**Intersection**

Int Delay, s/veh	7.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	4	4	27	171	4	4	43	58	60	4	226	4
Future Vol, veh/h	4	4	27	171	4	4	43	58	60	4	226	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2	13	13	13	3	3	3
Mvmt Flow	5	5	33	209	5	5	52	71	73	5	276	5

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	506	537	279	520	503	108	281	0	0	144	0	0
Stage 1	289	289	-	212	212	-	-	-	-	-	-	-
Stage 2	217	248	-	308	291	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.23	-	-	4.13	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.317	-	-	2.227	-	-
Pot Cap-1 Maneuver	477	450	760	467	471	946	1221	-	-	1432	-	-
Stage 1	719	673	-	790	727	-	-	-	-	-	-	-
Stage 2	785	701	-	702	672	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	454	429	760	427	449	946	1221	-	-	1432	-	-
Mov Cap-2 Maneuver	454	429	-	427	449	-	-	-	-	-	-	-
Stage 1	688	671	-	756	696	-	-	-	-	-	-	-
Stage 2	742	671	-	664	670	-	-	-	-	-	-	-

Approach	EB		WB			NB			SB		
HCM Control Delay, s	10.9		21.5			2.2			0.1		
HCM LOS	B		C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1221	-	-	652	433	1432	-	-
HCM Lane V/C Ratio	0.043	-	-	0.065	0.504	0.003	-	-
HCM Control Delay (s)	8.1	-	-	10.9	21.5	7.5	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	2.8	0	-	-



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	4	38	15	4	125
Future Volume (vph)	55	4	38	15	4	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1765	0	1259	0	1736	1827
Flt Permitted	0.955				0.950	
Satd. Flow (perm)	1765	0	1259	0	1736	1827
Link Speed (mph)	30		30			35
Link Distance (ft)	628		1614			738
Travel Time (s)	14.3		36.7			14.4
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	45%	45%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	65	0	59	0	4	139
Sign Control	Stop		Free			Free

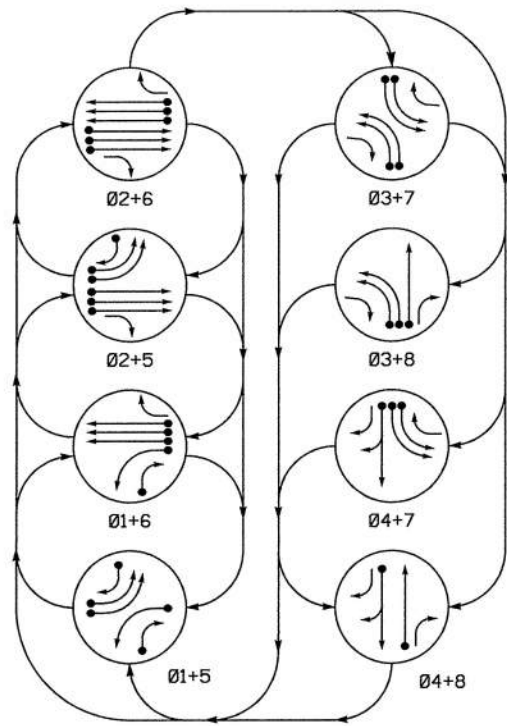
**Intersection Summary**

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.6%
	ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	↔
Traffic Vol, veh/h	55	4	38	15	4	125
Future Vol, veh/h	55	4	38	15	4	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	45	45	4	4
Mvmt Flow	61	4	42	17	4	139
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	198	51	0	0	59	0
Stage 1	51	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	791	1017	-	-	1532	-
Stage 1	971	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	789	1017	-	-	1532	-
Mov Cap-2 Maneuver	774	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	877	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10	0		0.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	787	1532	-	
HCM Lane V/C Ratio	-	-	0.083	0.003	-	
HCM Control Delay (s)	-	-	10	7.4	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.3	0	-	

**Appendix O:**  
**Signal Plans and Timings**

**PHASING DIAGRAM**



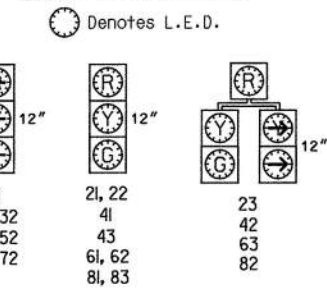
**PHASING DIAGRAM DETECTION LEGEND**

- ← ● DETECTED MOVEMENT
- ← ○ UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

**TABLE OF OPERATION**

SIGNAL FACE	PHASE							
	Ø1+5	Ø2+6	Ø3+7	Ø4+8	Ø5+9	Ø6+10	Ø7+11	Ø8+12
II	---	RR	RR	RR	RR	RR	RR	RR
21, 22	RR	RR	GG	GG	RR	RR	RR	RR
23	RR	RR	GG	GG	RR	RR	RR	RR
31, 32	RR	RR	GG	GG	RR	RR	RR	RR
41, 43	RR	RR	RR	RR	GG	GG	RR	RR
42	RR	RR	RR	RR	GG	GG	RR	RR
51, 52	---	---	---	---	---	---	---	---
61, 62	RR	RR	GG	GG	RR	RR	RR	RR
63	RR	RR	GG	GG	RR	RR	RR	RR
71, 72	RR	RR	GG	GG	RR	RR	RR	RR
81, 83	RR	RR	RR	RR	GG	GG	RR	RR
82	RR	RR	RR	RR	GG	GG	RR	RR

**SIGNAL FACE I.D.**



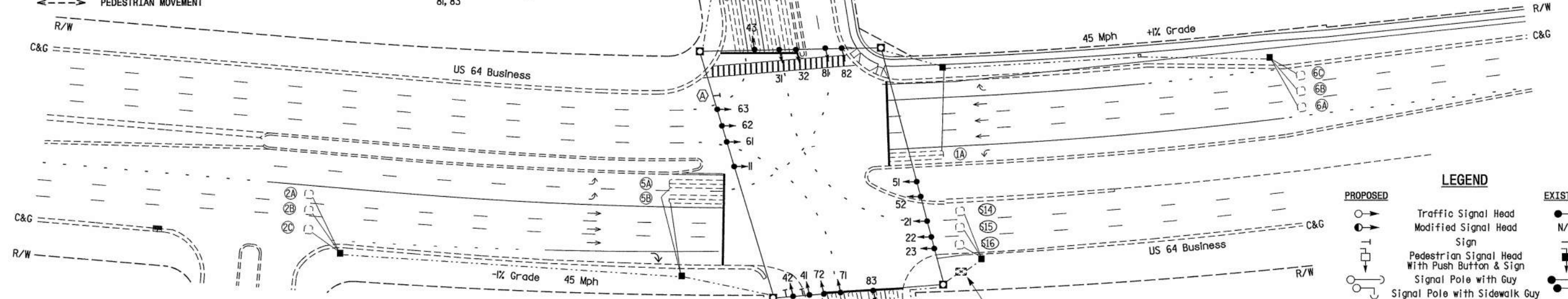
**2070L LOOP & DETECTOR INSTALLATION**

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
					PHASE	CALLING	EXTENSION	FULL TIME DELAY		
1A	6X40	0	2-4-2	---	1	Y	Y	---	---	Y
1B	6X40	0	2-4-2	---	1	Y	Y	---	15	---
2A	6X6	300	5	---	2	Y	Y	---	---	---
2B	6X6	300	5	---	2	Y	Y	---	---	---
2C	6X6	300	5	---	2	Y	Y	---	---	---
3A	6X40	0	2-4-2	---	3	Y	Y	---	---	---
3B	6X40	0	2-4-2	---	3	Y	Y	---	---	---
4A	6X40	0	2-4-2	---	4	Y	Y	---	---	---
5A	6X40	0	2-4-2	---	5	Y	Y	---	---	---
5B	6X40	0	2-4-2	---	5	Y	Y	---	---	---
5C	6X40	0	2-4-2	---	5	Y	Y	---	---	---
6A	6X6	300	5	---	6	Y	Y	---	---	---
6B	6X6	300	5	---	6	Y	Y	---	---	---
6C	6X6	300	5	---	6	Y	Y	---	---	---
7A	6X40	0	2-4-2	---	7	Y	Y	---	---	---
7B	6X40	0	2-4-2	---	7	Y	Y	---	---	---
8A	6X40	0	2-4-2	---	8	Y	Y	---	---	---
S14	6X6	170	4	---	SYSTEM DETECTOR				Y	Y
S15	6X6	170	4	---	SYSTEM DETECTOR				Y	Y
S16	6X6	170	4	---	SYSTEM DETECTOR				Y	Y

**8 Phase Fully Actuated (US 64 Business Knightdale Closed Loop Signal System)**

**NOTES**

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 or phase 5 may be lagged.
4. Phase 3 or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. Closed loop system data: Local Comm Addr # 3, Area Assignment # 1, Area Address # 3.



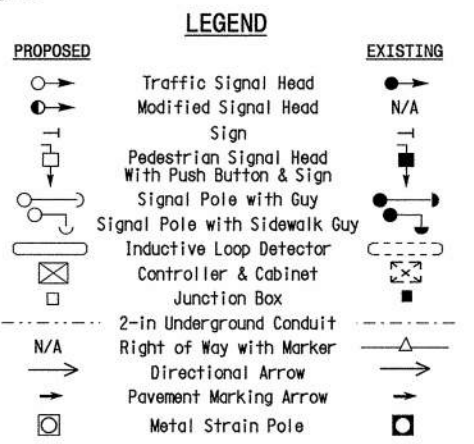
**2070L TIMING CHART**

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max Green 1 *	20	120	20	30	2.0	120	20	30
Yellow Clearance	3.4	4.6	3.8	3.8	3.6	4.4	4.1	3.6
Red Clearance	3.0	1.7	3.0	3.1	3.0	1.6	3.0	3.0
Walk 1 *	-	-	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.3	-	-	-	3.3	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

**SIGN I.D.**

- (A) Right Arrow "ONLY" Sign (R3-5R)
- (B) Combined Through and Right Arrow Sign (R3-6R)



This plan supersedes plan sealed on 1/3/2007

**SIGNAL UPGRADE**

122 N. McDowell St., Raleigh, NC 27603

**US 64 Business at Lynwood Road/ Midway Plantation Entrance**

Division 5 Wake County Knightdale

PLAN DATE: JANUARY 2007 REVIEWED BY:

PREPARED BY: MONIF BAZZARIE REVIEWED BY:

SCALE: 1"=40'

SEAL

STATE OF NORTH CAROLINA

PROFESSIONAL ENGINEER

SEAL 25463

ENGINEER

THOMAS J. BITTING

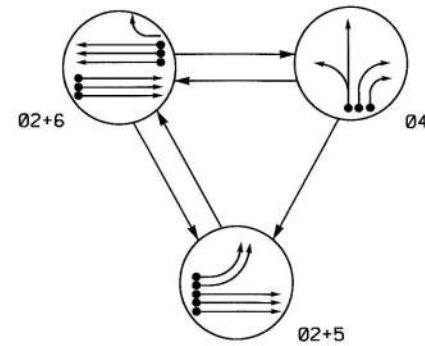
DATE: 1/16/07

SIG. INVENTORY NO. 05-2267





PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

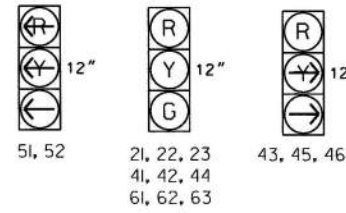
- DETECTED MOVEMENT
- ◄ UNDETECTED MOVEMENT (OVERLAP)
- ◄ UNSIGNALIZED MOVEMENT
- ◄ PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	02+5	02+6	04	04
21, 22, 23	G	G	R	Y
41, 42, 44	R	R	G	R
43, 45, 46	R	R	G	R
51, 52	←	←	←	←
61, 62, 63	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



OASIS 2070L LOOP & DETECTOR INSTALLATION CHART

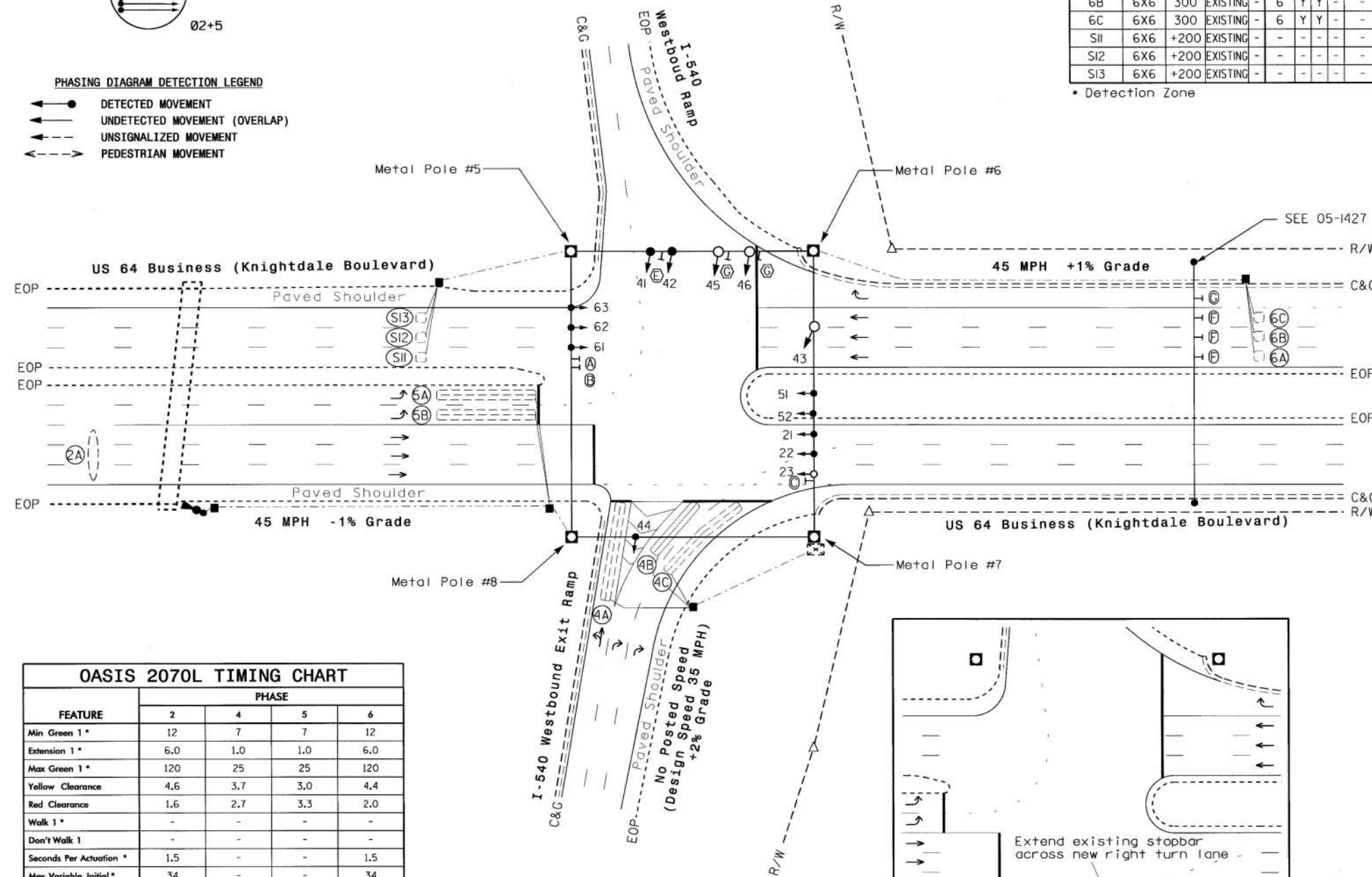
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD
				PHASE	CALLING EXTENSION	FULL TIME DELAY	STRETCH TIME		
*2A	6X30	300	N/A	-	2	Y	Y	-	-
4A	6X60	0	2-4-2	-	4	Y	Y	-	-
4B	6X40	0	2-4-2	Y	4	Y	Y	-	-
4C	6X60	0	2-4-2	-	4	Y	Y	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-
5B	6X60	0	2-4-2	-	5	Y	Y	-	-
6A	6X6	300	EXISTING	-	6	Y	Y	-	-
6B	6X6	300	EXISTING	-	6	Y	Y	-	-
6C	6X6	300	EXISTING	-	6	Y	Y	-	-
SI1	6X6	+200	EXISTING	-	-	-	-	-	Y
SI2	6X6	+200	EXISTING	-	-	-	-	-	Y
SI3	6X6	+200	EXISTING	-	-	-	-	-	Y

\* Detection Zone

3 Phase Fully Actuated (US 64-Knightdale Closed Loop System)

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Reposition existing signal heads numbered 21 and 22.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- Pavement markings are existing unless otherwise shown.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset #: 2152.



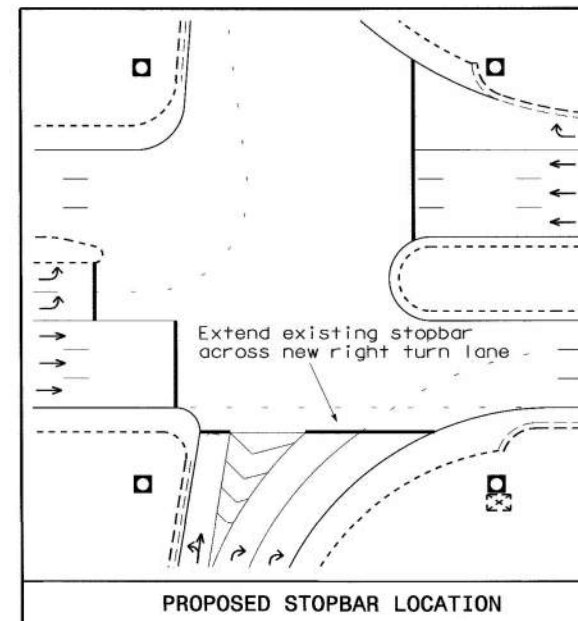
OASIS 2070L TIMING CHART

FEATURE	PHASE			
	2	4	5	6
Min Green 1*	12	7	7	12
Extension 1*	6.0	1.0	1.0	6.0
Max Green 1*	120	25	25	120
Yellow Clearance	4.6	3.7	3.0	4.4
Red Clearance	1.6	2.7	3.3	2.0
Walk 1*	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation*	1.5	-	-	1.5
Max Variable Initial*	34	-	-	34
Time Before Reduction*	15	-	-	15
Time To Reduce*	45	-	-	45
Minimum Gap	3.2	-	-	3.2
Recall Mode	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

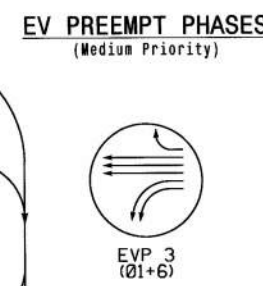
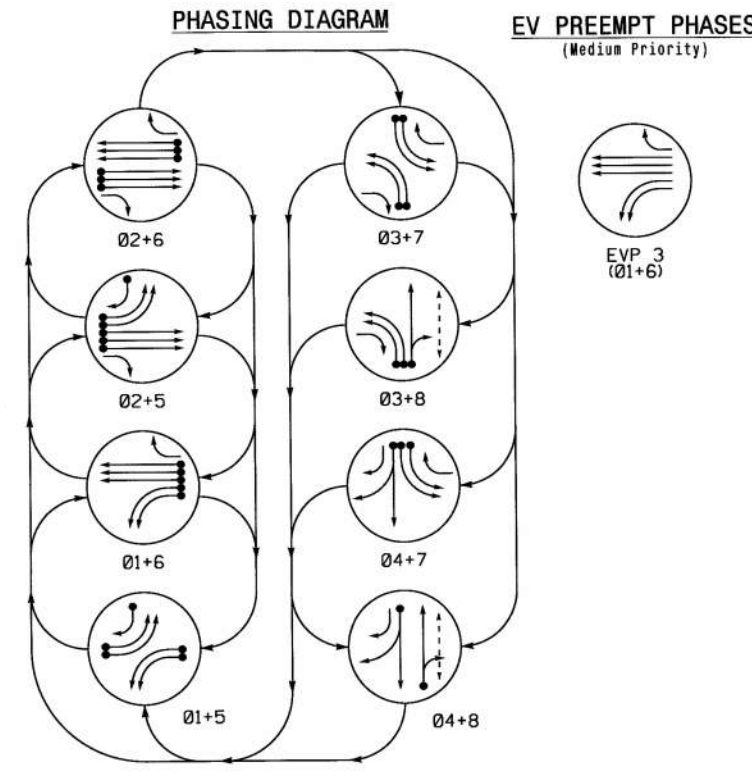
LEGEND

- | PROPOSED   | EXISTING                                       |
|--|--|
| ○ Traffic Signal Head                            | ● Traffic Signal Head                          |
| ○ Modified Signal Head                           | N/A  |
| ○ Sign   | ○ Sign   |
| ○ Pedestrian Signal Head With Push Button & Sign | ○ Pedestrian Signal Head                       |
| ○ Signal Pole with Guy                           | ○ Signal Pole with Guy                         |
| ○ Signal Pole with Sidewalk Guy                  | ○ Signal Pole with Sidewalk Guy                |
| ○ Inductive Loop Detector                        | ○ Inductive Loop Detector                      |
| ○ Controller & Cabinet                           | ○ Controller & Cabinet                         |
| ○ Junction Box                                   | ○ Junction Box                                 |
| ○ 2-in Underground Conduit                       | ○ 2-in Underground Conduit                     |
| N/A  | ○ Right of Way                                 |
| ○ Directional Arrow                              | ○ Directional Arrow                            |
| ○ Metal Strain Pole                              | ○ Metal Strain Pole                            |
| ○ Out of Pavement Detector                       | ○ Out of Pavement Detector                     |
| ○ Out of Pavement Detection Zone                 | ○ Out of Pavement Detection Zone               |
| ○ No U-Turn Sign (R3-4)                          | ○ No U-Turn Sign (R3-4)                        |
| ○ No Left Turn Sign (R3-2)                       | ○ No Left Turn Sign (R3-2)                     |
| ○ No Right Turn Sign (R3-1)                      | ○ No Right Turn Sign (R3-1)                    |
| ○ Combined Through and Left Arrow Sign (R3-6L)   | ○ Combined Through and Left Arrow Sign (R3-6L) |
| ○ Through Arrow "ONLY" Sign (R3-5A)              | ○ Through Arrow "ONLY" Sign (R3-5A)            |
| ○ Right Arrow "ONLY" Sign (R3-5R)                | ○ Right Arrow "ONLY" Sign (R3-5R)              |



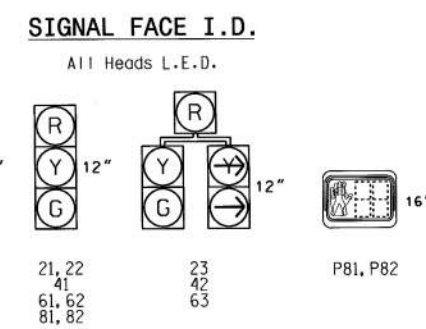
Signal Upgrade

Prepared in the Office of:  
  
**US 64 Business (Knightdale Blvd.) at I-540 Westbound Ramps**  
 Division 5 Wake County Knightdale  
 PLAN DATE: January 2012 REVIEWED BY:  
 PREPARED BY: C.E. Carter REVIEWED BY:  
 REVISIONS: INIT. DATE  
 SCALE: 1"=40'  
 SEAL: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 026486  
 SIGNATURE: [Signature] DATE: 1/12/12  
 SIG. INVENTORY NO. 05-2152



### TABLE OF OPERATION

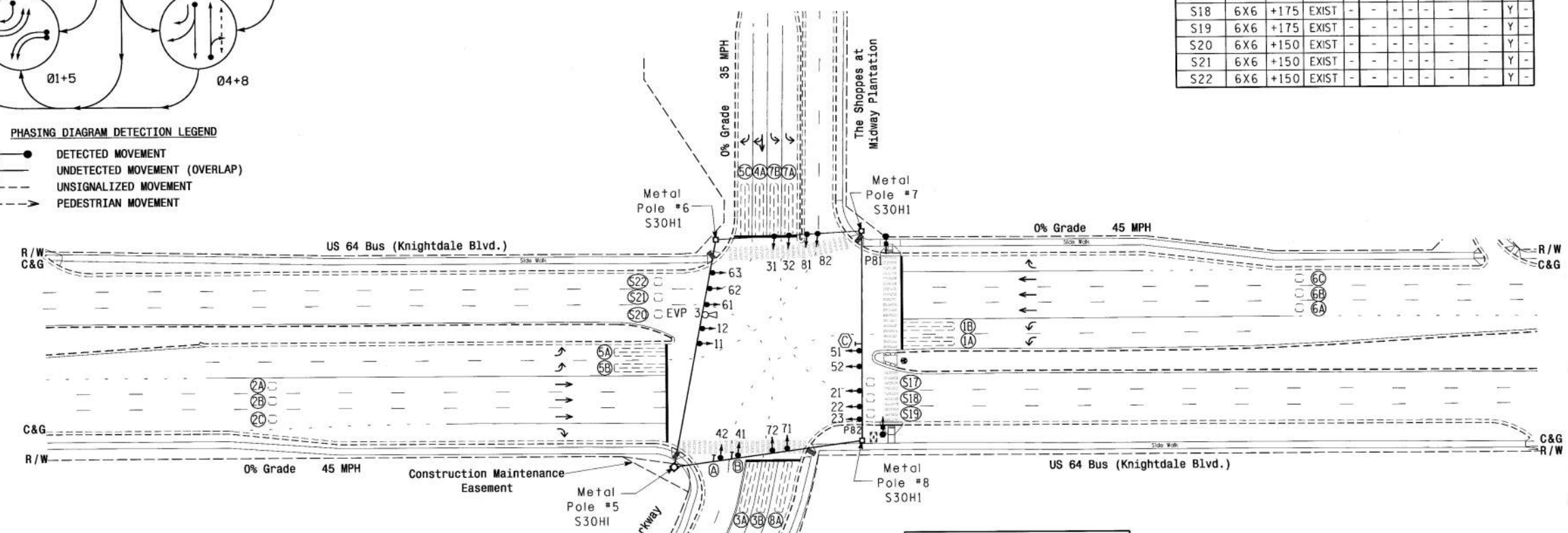
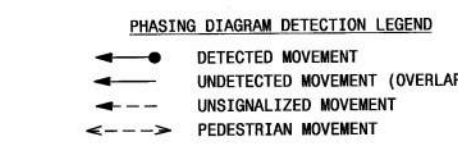
SIGNAL FACE	PHASE											
	01+5	01+6	02+5	02+6	03+7	03+8	04+7	04+8	04+9	04+10	04+11	04+12
11, 12	-	-	-	-	-	-	-	-	-	-	-	-
21, 22	R	R	G	G	R	R	R	R	R	R	R	Y
23	R	R	G	G	R	R	R	R	R	R	R	Y
31, 32	-	-	-	-	-	-	-	-	-	-	-	-
41	R	R	R	R	R	R	R	G	G	R	R	
42	R	R	R	R	R	R	R	G	G	R	R	
51, 52	-	-	-	-	-	-	-	-	-	-	-	-
61, 62	R	G	R	G	R	R	R	R	R	G	Y	
63	R	G	R	G	R	R	R	R	R	G	Y	
71, 72	-	-	-	-	-	-	-	-	-	-	-	-
81, 82	R	R	R	R	R	R	R	G	R	G	R	R
P81, P82	DW	DW	DW	DW	DW	DW	W	W	DW	DRK		



### 2070L LOOP & DETECTOR INSTALLATION

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	DETECTOR PROGRAMMING								
				PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CAB	
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
1B	6X40	0	2-4-2	-	1	Y	Y	-	-	-	-	-
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	-
2C	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	-	4	Y	Y	-	-	10	-	-
5A	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-
5B	6X40	0	2-4-2	-	5	Y	Y	-	-	-	-	-
5C	6X40	0	2-4-2	-	5	Y	Y	-	-	15	-	-
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	-
6C	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	-
7B	6X40	0	2-4-2	-	7	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	-
S17	6X6	+175	EXIST	-	-	-	-	-	-	-	Y	-
S18	6X6	+175	EXIST	-	-	-	-	-	-	-	Y	-
S19	6X6	+175	EXIST	-	-	-	-	-	-	-	Y	-
S20	6X6	+150	EXIST	-	-	-	-	-	-	-	Y	-
S21	6X6	+150	EXIST	-	-	-	-	-	-	-	Y	-
S22	6X6	+150	EXIST	-	-	-	-	-	-	-	Y	-

- ### 8 Phase Fully Actuated w/ EV Preemption (US 64 Business Knightdale CLS)
- #### NOTES
- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
  - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
  - Phase 1 and/or phase 5 may be lagged.
  - Phase 3 and/or phase 7 may be lagged.
  - Set all detector units to presence mode.
  - The Division Traffic Engineer will determine the Delay before Preempt and Preempt Dwell Min Green time for emergency vehicle preemption timing.
  - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
  - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
  - This intersection features an optical preemption system. Shown locations of optical detectors are conceptual only.
  - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
  - Closed loop system data: Controller Asset #: 2148.

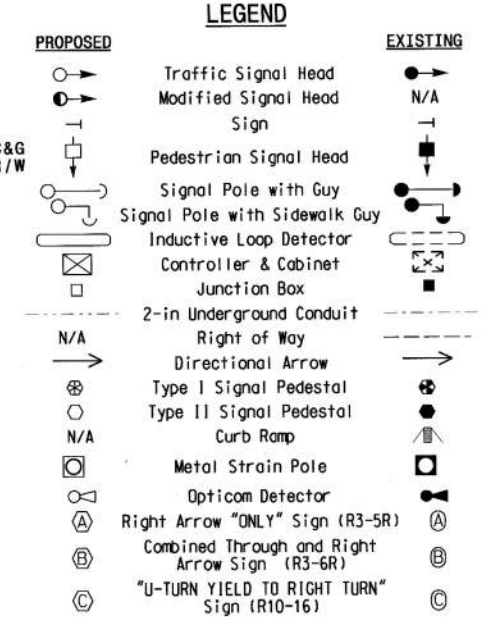


### OASIS 2070L TIMING CHART

FEATURE	PHASE							
	1	2	3	4	5	6	7	8
Min Green 1*	7	12	7	7	7	12	7	7
Extension 1*	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1*	20	120	20	15	20	120	20	15
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	4.0
Red Clearance	4.4	2.6	3.8	3.1	4.1	2.1	4.1	3.1
Walk 1*	-	-	-	-	-	-	-	7
Don't Walk 1	-	-	-	-	-	-	-	33
Seconds Per Actuation*	-	1.5	-	-	-	1.5	-	-
Max Variable Initial*	-	34	-	-	-	34	-	-
Time Before Reduction*	-	15	-	-	-	15	-	-
Time To Reduce*	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

### OASIS 2070 EV PREEMPT

FUNCTION	EVP 3
Interval 1 - Dwell Green	255
Interval 1 - Dwell Yellow	0.0*
Interval 1 - Dwell Red	0.0*
Interval 5 - Exit Green	1
Interval 5 - Yellow	0.0
Interval 5 - Red	0.0
Exit Phase(s)	2+6
Priority	MED
Delay Time	=
Min Green Before Pre	1
Pod Clear Before Pre	18
Yellow Clear Before Pre	0.0*
Red Clear Before Pre	0.0*
Dwell Min Time	=
Enable Backup Protection	N
Ped Clear Through Yellow	Y
Omit Overlaps	-
Preempt Extend**	2



\* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

\* Time defaults to time used for phase during normal operation  
 \*\* Program Timing on Optical Detection Unit  
 # See Note 6

### Signal Upgrade

Prepared in the Office of:  
 Transportation Mobility and Safety Operations  
 Division 5 Wake County Knightdale

US 64 Bus (Knightdale Blvd.)  
 at  
 Wide Waters Parkway and  
 The Shoppes at Midway Plantation

PLAN DATE: October 2013  
 PREPARED BY: L. Blount  
 REVIEWED BY: [Signature]

SCALE: 1"=50'

SEAL: ROBERT J. ZIEGLER, PROFESSIONAL ENGINEER, No. 026486

SIG. INVENTORY NO. 05-2148

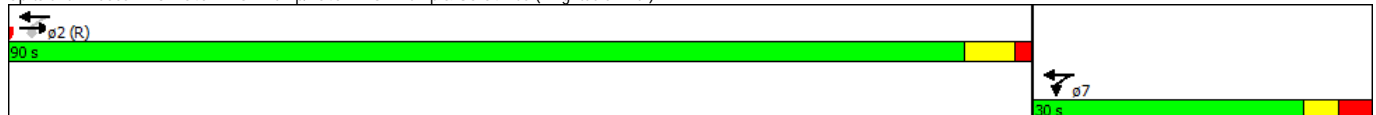
25-MOV-2013.131-8  
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 2/2/2014

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1038	92	193	1144	0	0	0	0	0	0	336
Future Volume (vph)	0	1038	92	193	1144	0	0	0	0	0	0	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1595
Flt Permitted				0.223								
Satd. Flow (perm)	0	5060	1575	417	3557	0	0	0	0	0	0	1595
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			102									207
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		961			302			601			428	
Travel Time (s)		14.6			4.6			11.7			8.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1153	102	214	1271	0	0	0	0	0	0	373
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		90.0	90.0	30.0								
Total Split (%)		75.0%	75.0%	25.0%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		89.9	89.9	110.0	120.0							120.0
Actuated g/C Ratio		0.75	0.75	0.92	1.00							1.00
v/c Ratio		0.30	0.08	0.35	0.36							0.23
Control Delay		1.9	0.2	3.5	1.0							0.3
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		1.9	0.2	3.5	1.0							0.3
LOS		A	A	A	A							A
Approach Delay		1.8			1.3							
Approach LOS		A			A							
Queue Length 50th (ft)		25	0	0	27							0
Queue Length 95th (ft)		51	m2	25	0							0
Internal Link Dist (ft)		881			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3789	1205	677	3526							1595
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.30	0.08	0.32	0.36							0.23

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 57 (48%), Referenced to phase 2:EBWB and 6:, Start of Green  
 Natural Cycle: 40  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.36  
 Intersection Signal Delay: 1.4 Intersection LOS: A  
 Intersection Capacity Utilization 47.3% ICU Level of Service A  
 Analysis Period (min) 15  
 Description: 05-2153  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: I-540 EB On-Ramp/I-540 EB Off-Ramp & US 64 Bus (Knightdale Blvd.)

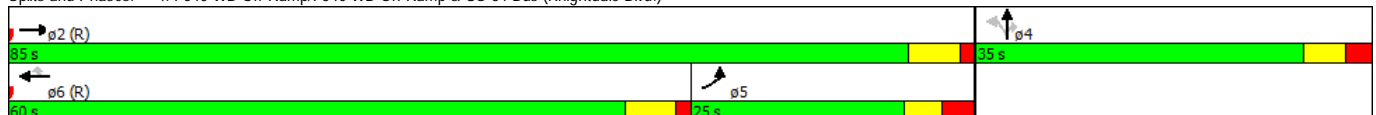


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	418	935	0	0	1265	701	34	4	222	0	0	0
Future Volume (vph)	418	935	0	0	1265	701	34	4	222	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1			2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1765	2759	0	0	0
Flt Permitted	0.950							0.957				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1765	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						658			246			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	464	1039	0	0	1406	779	0	42	247	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	25.0	85.0			60.0	60.0	35.0	35.0	35.0			
Total Split (%)	20.8%	70.8%			50.0%	50.0%	29.2%	29.2%	29.2%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8			-1.2			-1.2
Total Lost Time (s)	5.0	5.0			5.0	5.0			5.0			5.0
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	20.0	101.2			76.2	76.2		8.8	8.8			
Actuated g/C Ratio	0.17	0.84			0.64	0.64		0.07	0.07			
v/c Ratio	0.81	0.24			0.44	0.63		0.33	0.57			
Control Delay	51.3	1.8			6.8	4.2		59.5	12.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	51.3	1.8			6.8	4.2		59.5	12.2			
LOS	D	A			A	A		E	B			
Approach Delay		17.1			5.9			19.1				
Approach LOS		B			A			B				
Queue Length 50th (ft)	181	36			0	18		32	0			
Queue Length 95th (ft)	#254	50			60	52		68	44			
Internal Link Dist (ft)		683			1048			741			337	
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	575	4310			3213	1240		441	874			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.81	0.24			0.44	0.63		0.10	0.28			

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 11.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 73.7%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2152  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 4: I-540 WB Off-Ramp/I-540 WB On-Ramp & US 64 Bus (Knightdale Blvd.)

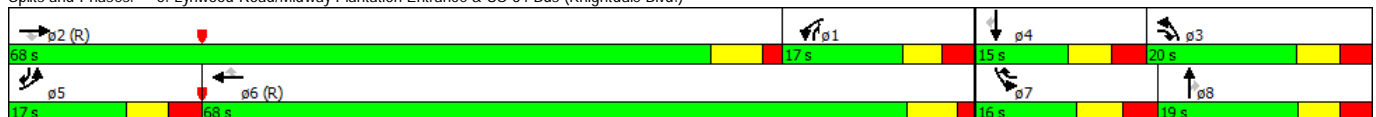


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	989	45	18	1728	19	245	4	82	8	4	12
Future Volume (vph)	83	989	45	18	1728	19	245	4	82	8	4	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%				1%			3%			0%
Storage Length (ft)	300		125	200		200	200		100	325		150
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	250			100			100			100		
Satd. Flow (prot)	3450	5111	1591	1761	5060	1575	3382	1835	1560	3433	1623	1504
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3450	5111	1591	1761	5060	1575	3382	1835	1560	3433	1623	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			95			153			5
Link Speed (mph)		45			45			35				35
Link Distance (ft)		1128			1286			476				408
Travel Time (s)		17.1			19.5			9.3				7.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												37%
Lane Group Flow (vph)	92	1099	50	20	1920	21	272	4	91	9	9	8
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	17.0	68.0	20.0	17.0	68.0	16.0	20.0	19.0	17.0	16.0	15.0	17.0
Total Split (%)	14.2%	56.7%	16.7%	14.2%	56.7%	13.3%	16.7%	15.8%	14.2%	13.3%	12.5%	14.2%
Yellow Time (s)	3.6	4.6	3.8	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8	-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	9.6	74.5	95.2	12.0	76.8	94.3	15.7	10.1	15.2	12.5	9.0	11.5
Actuated g/C Ratio	0.08	0.62	0.79	0.10	0.64	0.79	0.13	0.08	0.13	0.10	0.08	0.10
v/c Ratio	0.33	0.35	0.04	0.11	0.59	0.02	0.62	0.03	0.28	0.03	0.07	0.03
Control Delay	63.3	7.5	0.1	35.4	5.5	0.0	55.6	48.8	2.3	48.0	39.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	7.5	0.1	35.4	5.5	0.0	55.6	48.8	2.3	48.0	39.2	0.1
LOS	E	A	A	D	A	A	E	D	A	D	D	A
Approach Delay		11.3			5.7			42.3			30.2	
Approach LOS		B			A			D			C	
Queue Length 50th (ft)	37	83	0	14	65	0	103	3	0	3	3	0
Queue Length 95th (ft)	55	123	0	m27	95	m0	150	14	3	12	21	0
Internal Link Dist (ft)		1048			1206			396			328	
Turn Bay Length (ft)	300		125	200		200	200		100	325		150
Base Capacity (vph)	345	3171	1274	176	3240	1272	455	220	330	388	139	306
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.04	0.11	0.59	0.02	0.60	0.02	0.28	0.02	0.06	0.03

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 2 (2%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 11.6  
 Intersection LOS: B  
 Intersection Capacity Utilization 58.7%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: 05-2267  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Lynwood Road/Midway Plantation Entrance & US 64 Bus (Knightdale Blvd.)

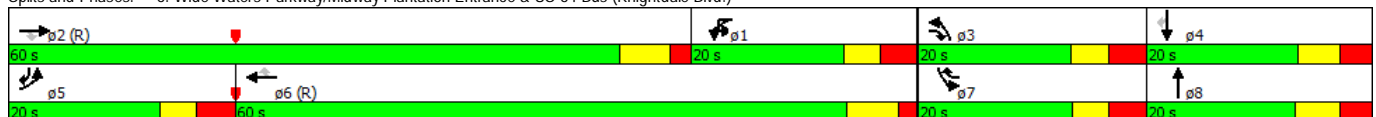


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	876	92	146	1433	53	117	12	72	65	9	99
Future Volume (vph)	118	876	92	146	1433	53	117	12	72	65	9	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-2%			0%	
Storage Length (ft)	350		200	300		175	275		0	150		150
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (ft)	300			300			100			100		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3467	1639	0	3433	1548	1504
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3467	1639	0	3433	1548	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			102			96		80			51	150
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1286			1388			649			378	
Travel Time (s)		19.5			21.0			12.6			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												46%
Lane Group Flow (vph)	131	973	102	162	1592	59	130	93	0	72	61	59
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	3	1	6	7	3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	20.0	60.0	20.0	20.0	60.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (%)	16.7%	50.0%	16.7%	16.7%	50.0%	16.7%	16.7%	16.7%		16.7%	16.7%	16.7%
Yellow Time (s)	3.2	4.5	3.3	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6	-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	11.6	66.7	79.1	15.0	70.1	84.7	11.5	11.4		9.6	9.6	23.5
Actuated g/C Ratio	0.10	0.56	0.66	0.12	0.58	0.71	0.10	0.10		0.08	0.08	0.20
v/c Ratio	0.40	0.34	0.09	0.38	0.54	0.05	0.39	0.41		0.26	0.36	0.14
Control Delay	67.0	12.0	0.5	31.7	3.3	0.1	54.1	19.6		53.9	23.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	67.0	12.0	0.5	31.7	3.3	0.1	54.1	19.6		53.9	23.7	0.7
LOS	E	B	A	C	A	A	D	B		D	C	A
Approach Delay		17.0			5.7			39.7			28.0	
Approach LOS		B			A			D			C	
Queue Length 50th (ft)	55	97	0	59	23	0	49	9		27	7	0
Queue Length 95th (ft)	90	124	1	m64	41	m0	79	59		51	52	0
Internal Link Dist (ft)		1206			1308			569			298	
Turn Bay Length (ft)	350		200	300		175	275			150		150
Base Capacity (vph)	429	2825	1107	429	2969	1212	433	274		429	238	453
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.31	0.34	0.09	0.38	0.54	0.05	0.30	0.34		0.17	0.26	0.13

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 112 (93%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.54  
 Intersection Signal Delay: 13.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 56.0%  
 ICU Level of Service B  
 Analysis Period (min) 15  
 Description: 05-2148  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Wide Waters Parkway/Midway Plantation Entrance & US 64 Bus (Knightdale Blvd.)

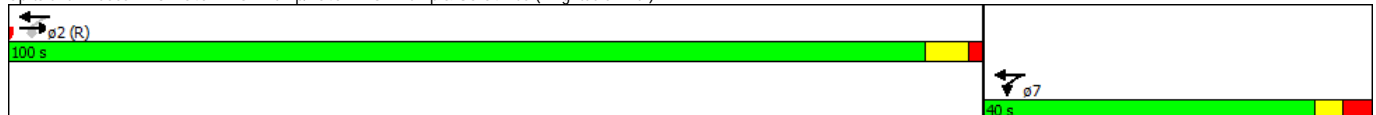


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1636	110	147	1069	0	0	0	0	0	0	578
Future Volume (vph)	0	1636	110	147	1069	0	0	0	0	0	0	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1595
Flt Permitted				0.102								
Satd. Flow (perm)	0	5060	1575	191	3557	0	0	0	0	0	0	1595
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			122									231
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		961			302			601			428	
Travel Time (s)		14.6			4.6			11.7			8.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1818	122	163	1188	0	0	0	0	0	0	642
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effect Green (s)		110.3	110.3	130.0	140.0							140.0
Actuated g/C Ratio		0.79	0.79	0.93	1.00							1.00
v/c Ratio		0.46	0.10	0.41	0.33							0.40
Control Delay		1.5	0.2	30.5	0.8							0.8
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		1.5	0.2	30.5	0.8							0.8
LOS		A	A	C	A							A
Approach Delay		1.4			4.3							
Approach LOS		A			A							
Queue Length 50th (ft)		36	0	67	4							0
Queue Length 95th (ft)		69	m0	143	16							0
Internal Link Dist (ft)		881			222			521			348	
Turn Bay Length (ft)												
Base Capacity (vph)		3988	1267	580	3557							1595
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.46	0.10	0.28	0.33							0.40

**Intersection Summary**

Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 72 (51%), Referenced to phase 2:EBWB and 6:, Start of Green  
 Natural Cycle: 40  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.46  
 Intersection Signal Delay: 2.3 Intersection LOS: A  
 Intersection Capacity Utilization 91.6% ICU Level of Service F  
 Analysis Period (min) 15  
 Description: 05-2153  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: I-540 EB On-Ramp/I-540 EB Off-Ramp & US 64 Bus (Knightdale Blvd.)

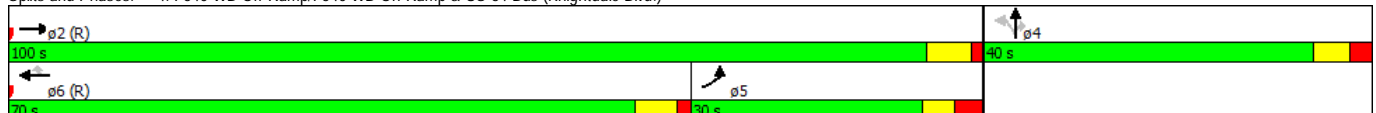


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	288	2232	0	0	1195	454	57	4	497	0	0	0
Future Volume (vph)	288	2232	0	0	1195	454	57	4	497	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		400	0		0
Storage Lanes	1		0	0		1	0		2	0		0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3450	5111	0	0	5060	1575	0	1761	2759	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3450	5111	0	0	5060	1575	0	1761	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						504			71			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		763			1128			821			417	
Travel Time (s)		11.6			17.1			16.0			8.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	320	2480	0	0	1328	504	0	67	552	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	100.0			70.0	70.0	40.0	40.0	40.0			
Total Split (%)	21.4%	71.4%			50.0%	50.0%	28.6%	28.6%	28.6%			
Yellow Time (s)	3.3	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.0	1.3			1.4	1.4	2.5	2.5	2.5			
Lost Time Adjust (s)	-1.3	-0.9			-0.8	-0.8		-1.2	-1.2			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	100.8			70.8	70.8		29.2	29.2			
Actuated g/C Ratio	0.18	0.72			0.51	0.51		0.21	0.21			
v/c Ratio	0.52	0.67			0.52	0.48		0.18	0.87			
Control Delay	43.4	4.2			6.7	1.9		45.1	61.6			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	43.4	4.2			6.7	1.9		45.1	61.6			
LOS	D	A			A	A		D	E			
Approach Delay		8.7			5.4			59.8				
Approach LOS		A			A			E				
Queue Length 50th (ft)	143	109			82	5		50	245			
Queue Length 95th (ft)	196	127			93	14		90	309			
Internal Link Dist (ft)		683			1048			741		337		
Turn Bay Length (ft)	500								400			
Base Capacity (vph)	616	3678			2557	1045		440	743			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.52	0.67			0.52	0.48		0.15	0.74			

Intersection Summary

Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 68 (49%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 13.5  
 Intersection LOS: B  
 Intersection Capacity Utilization 68.8%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: 05-2152

Splits and Phases: 4: I-540 WB Off-Ramp/I-540 WB On-Ramp & US 64 Bus (Knightdale Blvd.)



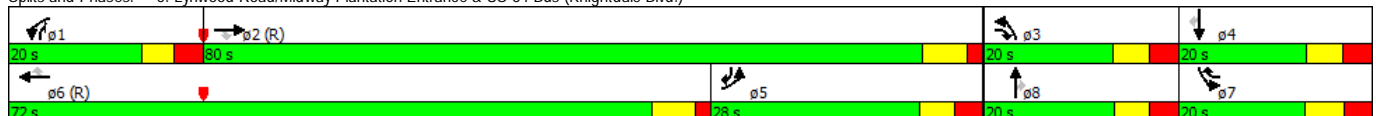


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	1970	179	38	1289	58	163	35	53	109	22	80
Future Volume (vph)	416	1970	179	38	1289	58	163	35	53	109	22	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			3%			0%	
Storage Length (ft)	300		125	200		200	200		100	325		150
Storage Lanes	2		1	1		1	2		1	1		1
Taper Length (ft)	250			100			100			100		
Satd. Flow (prot)	3450	5111	1591	1761	5060	1575	3382	1835	1560	3433	1612	1504
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3450	5111	1591	1761	5060	1575	3382	1835	1560	3433	1612	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			119			81			130		35	126
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1128			1286			476			408	
Travel Time (s)		17.1			19.5			9.3			7.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												39%
Lane Group Flow (vph)	462	2189	199	42	1432	64	181	39	59	121	59	54
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	20.0	16.0	15.0	15.0	15.0	16.0	15.0	15.0
Total Split (s)	28.0	80.0	20.0	20.0	72.0	20.0	20.0	20.0	20.0	20.0	20.0	28.0
Total Split (%)	20.0%	57.1%	14.3%	14.3%	51.4%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	20.0%
Yellow Time (s)	3.6	4.6	3.8	3.4	4.4	4.1	3.8	3.6	3.4	4.1	3.8	3.6
All-Red Time (s)	3.0	1.7	3.0	3.0	1.6	3.0	3.0	3.0	3.0	3.0	3.1	3.0
Lost Time Adjust (s)	-1.6	-1.3	-1.8	-1.4	-1.0	-2.1	-1.8	-1.6	-1.4	-2.1	-1.9	-1.6
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	23.0	91.5	111.3	9.8	75.6	94.4	13.8	10.3	18.3	13.8	10.4	31.7
Actuated g/C Ratio	0.16	0.65	0.80	0.07	0.54	0.67	0.10	0.07	0.13	0.10	0.07	0.23
v/c Ratio	0.82	0.66	0.15	0.34	0.52	0.06	0.55	0.29	0.19	0.36	0.39	0.12
Control Delay	54.6	10.7	0.8	87.3	5.0	0.1	66.3	66.3	1.3	61.6	37.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	10.7	0.8	87.3	5.0	0.1	66.3	66.3	1.3	61.6	37.2	0.6
LOS	D	B	A	F	A	A	E	E	A	E	D	A
Approach Delay		17.2			7.0			52.6			41.4	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)	209	232	7	36	136	0	81	34	0	54	22	0
Queue Length 95th (ft)	#273	385	m14	m72	161	m0	122	72	0	86	70	0
Internal Link Dist (ft)		1048			1206			396			328	
Turn Bay Length (ft)	300		125	200		200	200		100	325		150
Base Capacity (vph)	566	3340	1291	188	2731	1070	362	196	371	371	203	437
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.66	0.15	0.22	0.52	0.06	0.50	0.20	0.16	0.33	0.29	0.12

Intersection Summary

Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 78 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 17.2  
 Intersection LOS: B  
 Intersection Capacity Utilization 67.7%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 Description: 05-2267  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Lynwood Road/Midway Plantation Entrance & US 64 Bus (Knightdale Blvd.)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	1549	434	263	930	153	292	79	127	332	77	141
Future Volume (vph)	190	1549	434	263	930	153	292	79	127	332	77	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-2%			0%	
Storage Length (ft)	350		200	300		175	275		0	150		150
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (ft)	300			300			100			100		
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3467	1708	0	3433	1683	1504
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3467	1708	0	3433	1683	1504
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			285			170		48			15	129
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1286			1388			649			378	
Travel Time (s)		19.5			21.0			12.6			7.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												27%
Lane Group Flow (vph)	211	1721	482	292	1033	170	324	229	0	369	128	115
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Detector Phase	5	2	3	1	6	7	3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	20.0	15.0	15.0	20.0	15.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	25.0	65.0	25.0	25.0	65.0	25.0	25.0	25.0		25.0	25.0	25.0
Total Split (%)	17.9%	46.4%	17.9%	17.9%	46.4%	17.9%	17.9%	17.9%		17.9%	17.9%	17.9%
Yellow Time (s)	3.2	4.5	3.3	3.2	4.5	3.2	3.3	4.0		3.2	3.8	3.2
All-Red Time (s)	3.5	1.8	3.3	3.4	1.8	3.3	3.3	2.9		3.3	2.9	3.5
Lost Time Adjust (s)	-1.7	-1.3	-1.6	-1.6	-1.3	-1.5	-1.6	-1.9		-1.5	-1.7	-1.7
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead		Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)	20.0	63.7	86.1	18.0	61.7	86.0	22.3	19.0		19.3	16.0	41.0
Actuated g/C Ratio	0.14	0.46	0.62	0.13	0.44	0.61	0.16	0.14		0.14	0.11	0.29
v/c Ratio	0.43	0.74	0.45	0.66	0.46	0.16	0.59	0.84		0.78	0.62	0.22
Control Delay	52.8	30.3	4.9	64.8	18.6	0.8	59.7	71.8		70.6	65.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	52.8	30.3	4.9	64.8	18.6	0.8	59.7	71.8		70.6	65.1	5.1
LOS	D	C	A	E	B	A	E	E		E	E	A
Approach Delay		27.2			25.6			64.7			57.1	
Approach LOS		C			C			E			E	
Queue Length 50th (ft)	91	403	98	138	205	13	141	163		168	104	0
Queue Length 95th (ft)	119	283	150	175	260	m1	198	#296		225	173	36
Internal Link Dist (ft)		1206			1308			569			298	
Turn Bay Length (ft)	350		200	300		175	275			150		150
Base Capacity (vph)	490	2315	1082	490	2241	1024	552	285		490	253	531
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.74	0.45	0.60	0.46	0.17	0.59	0.80		0.75	0.51	0.22

Intersection Summary

Area Type: Other  
 Cycle Length: 140  
 Actuated Cycle Length: 140  
 Offset: 77 (55%), Referenced to phase 2:EBT and 6:WBT, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.84  
 Intersection Signal Delay: 34.4  
 Intersection LOS: C  
 Intersection Capacity Utilization 75.5%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 Description: 05-2148  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Wide Waters Parkway/Midway Plantation Entrance & US 64 Bus (Knightdale Blvd.)

