TRAFFIC IMPACT STUDY FOR:

DEER CREEK INN & CONFERENCE CENTER

CITY OF NEW BERLIN, WISCONSIN

DATE SUBMITTED: January 29, 2007

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Deer Creek Inn & Conference Center
Traffic Impact Analysis
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CHAPTER I –EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

Deer Creek Inn & Conference Center LLC is proposing a lodging and commercial development to be located in the southwest corner of the State Trunk Highway (STH) 59 intersection with County Trunk Highway (CTH) O in the City of New Berlin, Wisconsin. A traffic impact analysis has been conducted by Traffic Analysis & Design, Inc. to determine the expected weekday morning, midday and evening peak hour operating conditions and recommendations at the study area intersections.

This report documents the procedures, findings and conclusions of the traffic impact analysis. The analysis identifies traffic operations and recommended improvements based on existing intersection geometrics, traffic volumes and additional traffic expected to be generated by the proposed Deer Creek Inn & Conference Center development.

PART B – EXECUTIVE SUMMARY

The executive summary includes a description of the study area, description of the development and conclusions based on the findings of the TIA.

B1. Study Area

The Deer Creek Inn & Conference Center is to be located in the southwest corner of the STH 59 intersection with CTH O in the City of New Berlin, WI. The study area includes the following intersections:

- STH 59 with CTH O (traffic signal control).
- STH 59 with Walgreen's driveway (stop sign control).
- CTH O with the Deer Creek Run Apartments driveway (stop sign control).

The site plan for the proposed development is shown in Exhibit 1-1 at the end of this chapter.

B2. On-Site Development Description

The Deer Creek Inn & Conference Center development is expected to consist of the following land uses:

- Hotel (405-suites).
- Sit-Down Restaurants (18,000 square feet (sf) total).
- Shopping Center (12,000-sf).

The proposed development was assumed to be fully built by the Year 2007 and is expected to generate 485 total new trips (265 entering and 220 exiting) during the weekday morning peak hour, 510 total new trips (245 entering and 265 exiting) during the weekday midday peak hour and 525 total trips (280 entering and 245 exiting) during the weekday evening peak hour. On a typical weekday (24-hour period), the proposed development is expected to generate 6,420 total trips (3,210 entering and 3,210 exiting).

B3. Access to Development

The Deer Creek Inn & Conference Center development is proposed to have right-in/right-out access along STH 59 offset to the east of the existing Walgreen's driveway approximately 430-

feet west of CTH O, as well as a right-in/right-out/left-in access along CTH O approximately 560-feet south of STH 59.

B4. Year 2007 Background Traffic Recommended Improvements

The study area intersections were analyzed based on the procedures set forth in the *2000 Highway Capacity Manual* (HCM). For the purpose of this study, LOS D was used to define acceptable peak hour operating conditions.

Select movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours under Year 2007 background traffic volumes (without development). The following improvements, shown in Exhibit 1-2, are recommended to improve the operations at this intersection.

STH 59 & CTH O

- Provide dual westbound right-turn lanes.
- Install right-turn traffic signal heads to accommodate the westbound right-turn movement. Initiate the right-turn signals during all non-conflicting phases.

With the recommended improvements for Year 2007 background traffic conditions, all but two movements at the study area intersections are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn at the intersection of STH 59 and CTH O is expected to operate at LOS E with 58.6 seconds of average delay per vehicle and the southbound left-turn movement is expected to operate at LOS E with 60.9 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

B5. Year 2017 Background Traffic Recommended Improvements

Under Year 2017 background traffic volumes (background growth of 1.3 percent per year), select movements at the STH 59 intersection with CTH O and the CTH O intersection with the Deer Creek Run Apartments driveway are expected to operate at LOS E/F conditions. The following improvements, shown in Exhibit 1-3, are recommended in addition to the Year 2007 background traffic recommended improvements (Exhibit 1-2).

STH 59 & CTH O

- Extend the southbound dual left-turn lanes.
- Extend the westbound dual right-turn lanes.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a third northbound through lane.

With the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha

County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 background traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. Opening a third northbound through lane at this intersection is recommended to reduce the expected eastbound left-turn delay. A third northbound lane can be opened with pavement marking modifications to the 12 foot existing auxiliary lane. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

B6. Year 2007 Total Traffic Recommended Improvements

To accommodate the Year 2007 total traffic volumes (with the Deer Creek Inn & Conference Center development), the following improvements, shown in Exhibit 1-4, are recommended at the study area intersections. These improvements are in addition to the Year 2007 background traffic recommended improvements shown in Exhibit 1-2.

STH 59 & Walgreen's/Deer Creek Inn & Conference Center Driveway (Drive A)

- Provide an exclusive right-turn lane on the northbound approach using proper channelization to prohibit the northbound left-turn movement. Install a "Right Turn Only" sign on the northbound approach.
- Provide an eastbound channelized right-turn lane. The channelized right-turn island will serve in prohibiting traffic from entering the Deer Creek Inn & Conference Center along STH 59 from the north and east. Place a "No Left Turn" sign in the STH 59 median facing to the east.
- It is recommended that any potential Deer Creek Inn & Conference Center signs placed in the corner of the STH 59 intersection with CTH O include text to encourage drivers to enter the site along CTH O.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a southbound right-turn lane.
- Provide a channelized northbound left-turn lane.

- Provide an exclusive right-turn lane on the eastbound approach using proper channelization to prohibit the eastbound left-turn movement. Install a "Right Turn Only" sign on the eastbound approach.

CTH O & Deer Creek Run Apartments Driveway

- Provide a southbound left-turn lane. Some of the traffic exiting the Deer Creek Inn & Conference Center is expected to make a u-turn from southbound to northbound at this intersection. A southbound left-turn lane would provide shelter from traffic heading southbound on CTH O.

With the recommended improvements, all but three movements at the study area intersections are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn, the southbound left-turn, and the northbound left-turn movement at the intersection of STH 59 and CTH O are expected to operate at LOS E with 60.7, 61.4, and 62.2 seconds of average delay per vehicle, respectively. In the evening peak hour the eastbound left-turn movement is expected to operate at LOS E with 55.1 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

B7. Year 2017 Total Traffic Recommended Improvements

The following improvements, shown in Exhibit 1-5, are recommended to accommodate the Year 2017 total traffic volumes (2017 background traffic plus Deer Creek Inn & Conference Center). These improvements are in addition to the Year 2017 background and Year 2007 total traffic recommended improvements shown in Exhibits 1-3 and 1-4.

STH 59 & CTH O

- Extend the westbound dual right-turn lanes.

With the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 total traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

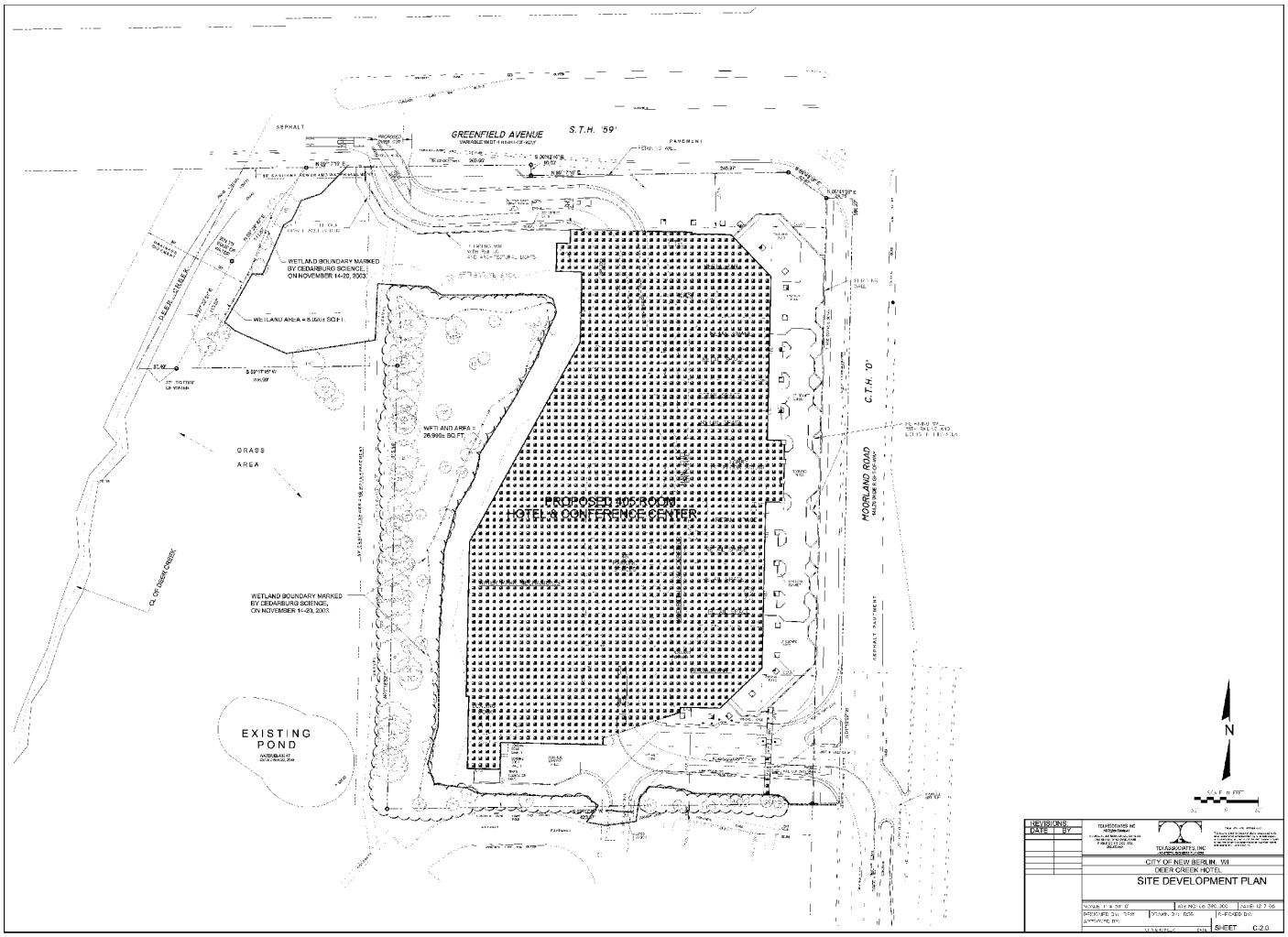
The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select

peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

PART C – CONCLUSION

Except where noted above, acceptable levels of traffic operations are expected at the study area intersections through the Year 2017 with the recommended improvements and full build-out of the Deer Creek Inn & Conference Center development.

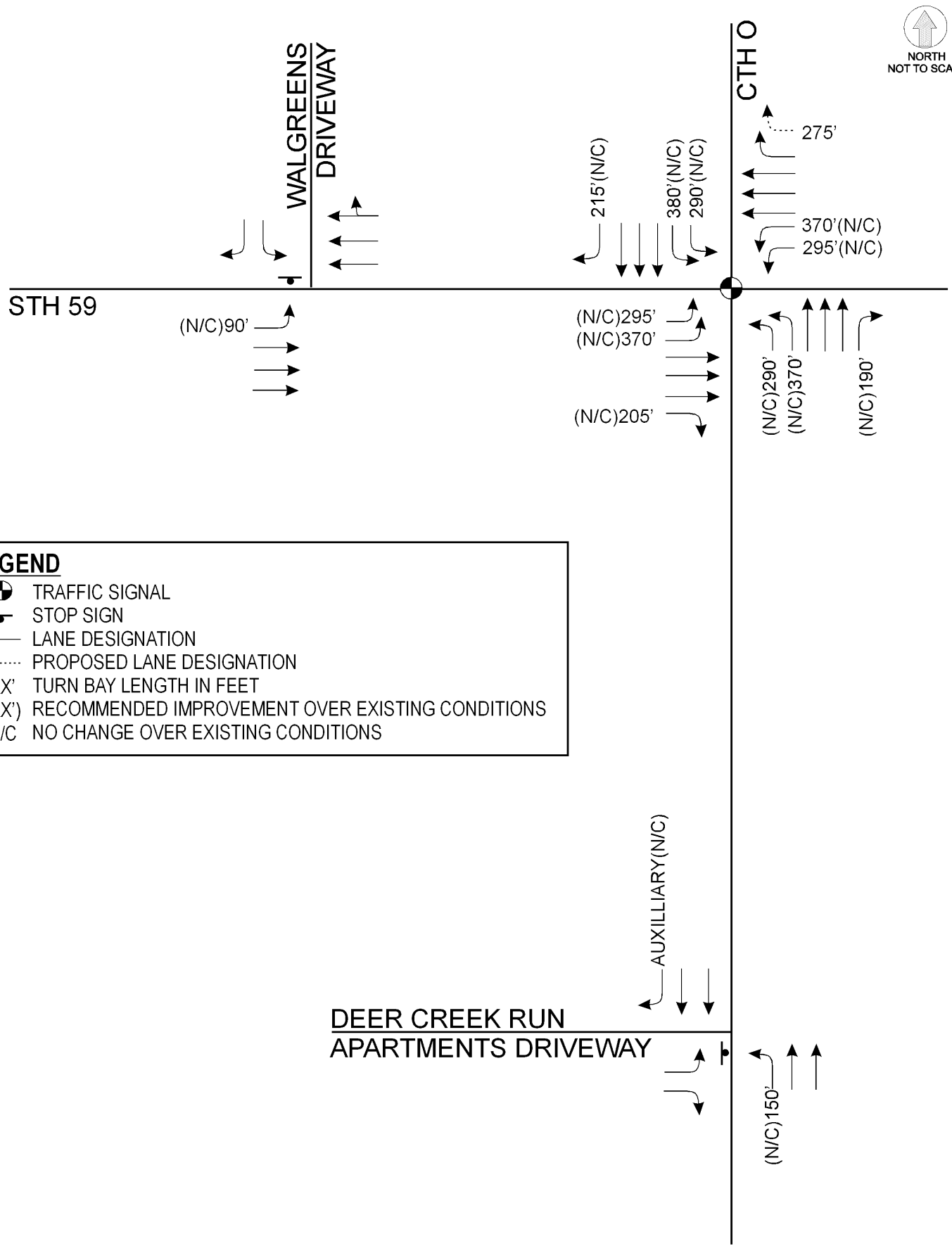
NORTH
NOT TO SCALE



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 1-1
SITE PLAN
DEER CREEK INN & CONFERENCE CENTER DEVELOPMENT
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 1-2
YEAR 2007 BACKGROUND TRAFFIC
RECOMMENDED IMPROVEMENTS
NEW BERLIN, WISCONSIN

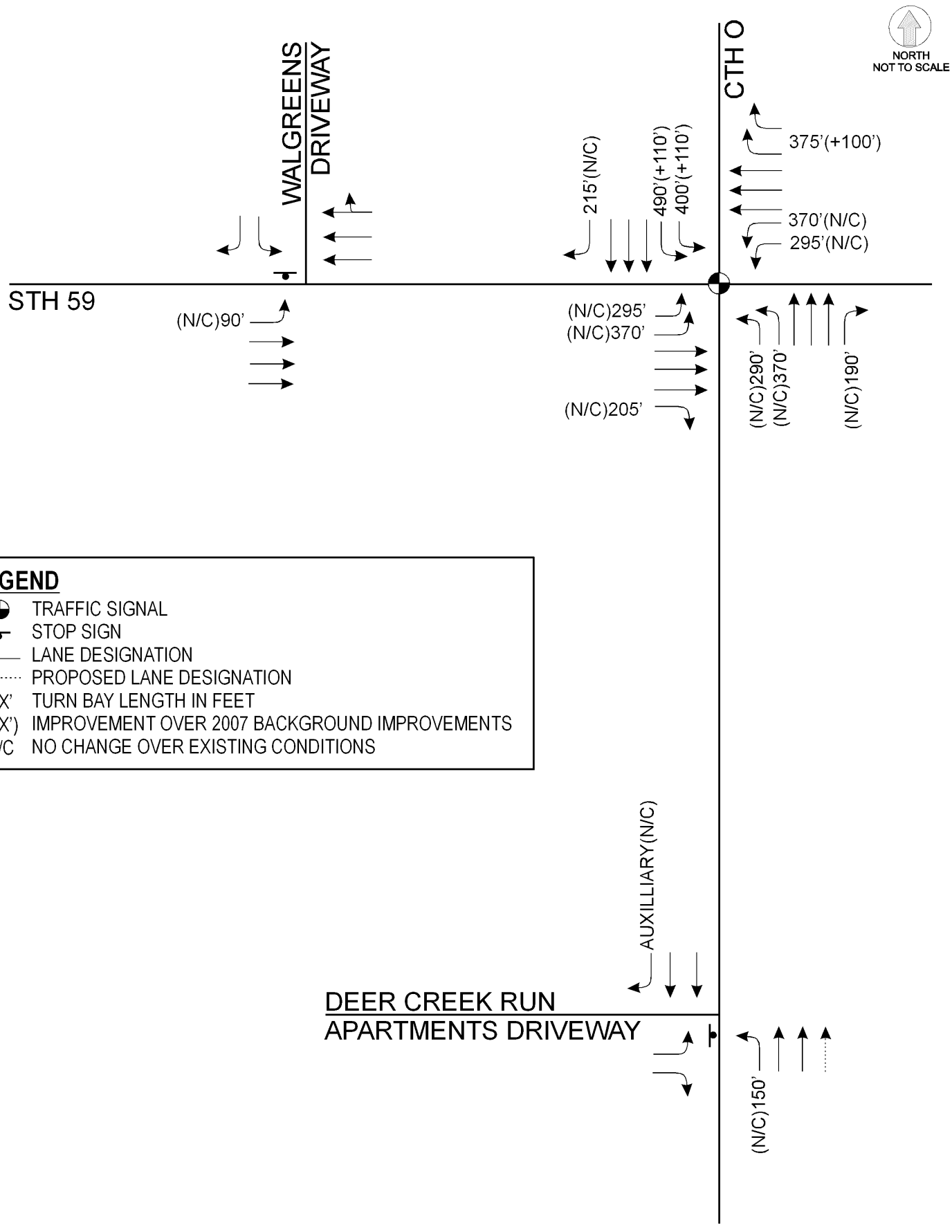


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EXHIBIT DATE: 01-29-07

EXHIBIT 1-3
YEAR 2017 BACKGROUND TRAFFIC
RECOMMENDED IMPROVEMENTS
NEW BERLIN, WISCONSIN

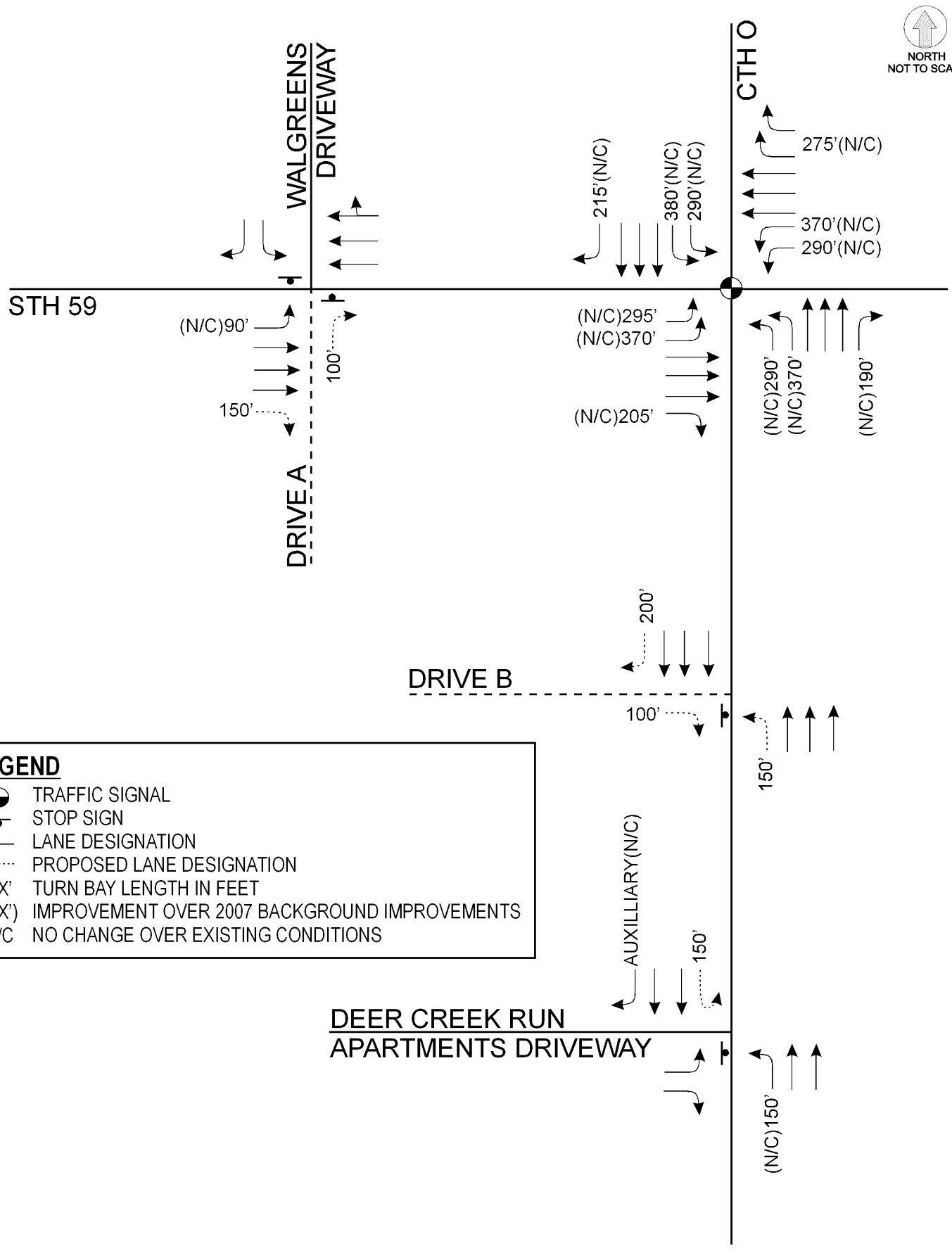

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EXHIBIT DATE: 01-29-07

EXHIBIT 1-4
YEAR 2007 TOTAL TRAFFIC
RECOMMENDED IMPROVEMENTS
NEW BERLIN, WISCONSIN

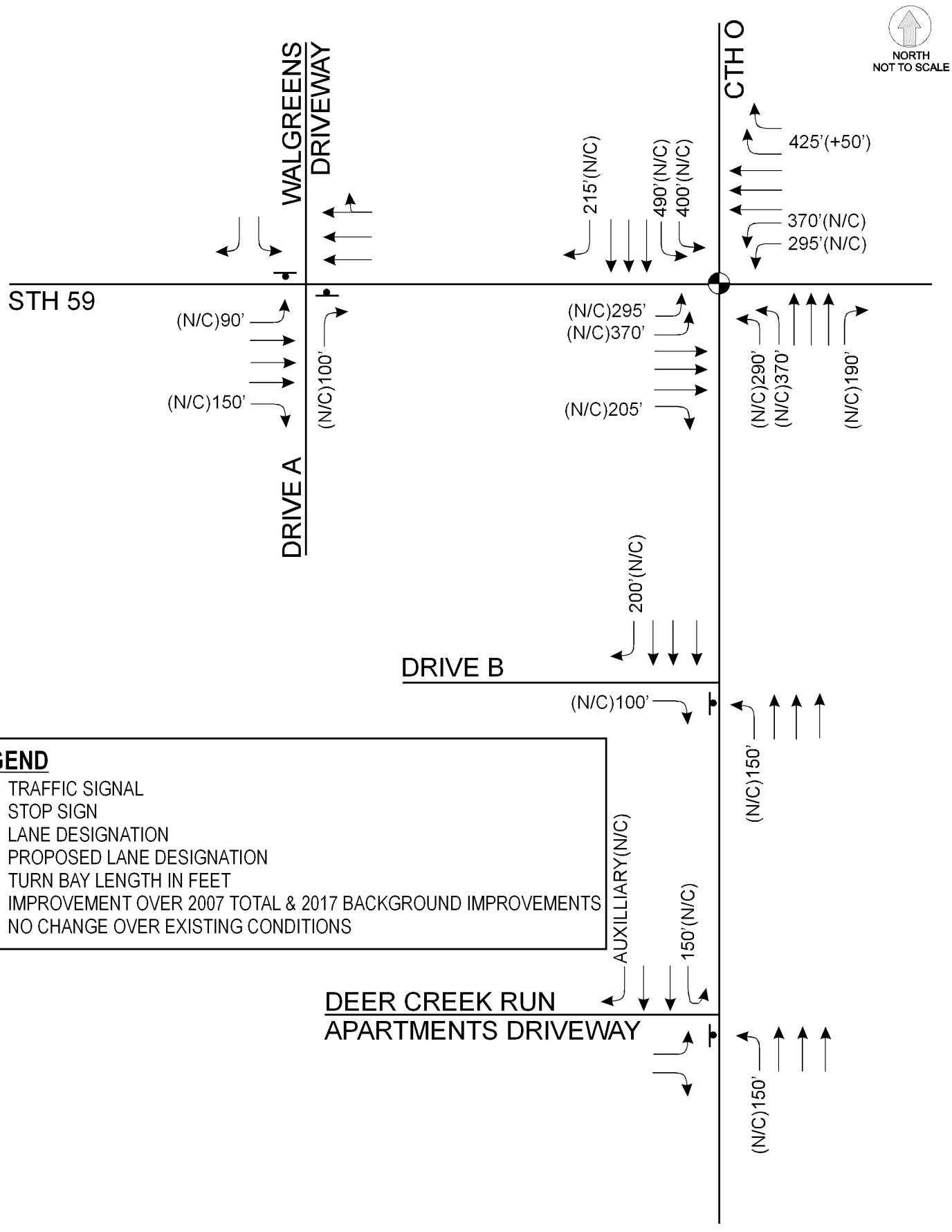

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EXHIBIT DATE: 01-29-07

EXHIBIT 1-5
YEAR 2017 TOTAL TRAFFIC
RECOMMENDED IMPROVEMENTS
NEW BERLIN, WISCONSIN

CHAPTER II – DEVELOPMENT

PART A – ON-SITE DEVELOPMENT

A1. Development Description and Site Location

The Deer Creek Inn & Conference Center development is proposed to be located in the southwest quadrant of the State Trunk Highway (STH) 59 intersection with County Trunk Highway (CTH) O in the City of New Berlin, Wisconsin. The development is proposed to consist of the following land uses:

- Hotel (405-suites).
- Sit-Down Restaurants (18,000 square feet (sf) total).
- Shopping Center (12,000-sf).

The proposed development was assumed to be constructed and operational by the Year 2007. Exhibit 2-1 shows the proposed site location for the proposed development.

A2. Site Plan

The preliminary site plan for the Deer Creek Inn & Conference Center development is shown in Exhibit 2-2. As illustrated, the development is proposed to have right-in/right-out access along STH 59 offset to the east of the existing Walgreen's driveway approximately 430-feet west of CTH O, as well as a right-in/right-out/left-in access along CTH O approximately 560-feet south of STH 59.

PART B – STUDY AREA

Area of Significant Traffic Impact

The study area for the Deer Creek Inn & Conference Center development includes the following intersections:

- STH 59 with CTH O (traffic signal control).
- STH 59 with Walgreen's driveway (stop sign control).
- CTH O with the Deer Creek Run Apartments driveway (stop sign control).

The proposed access points to the development are also included in the study area.

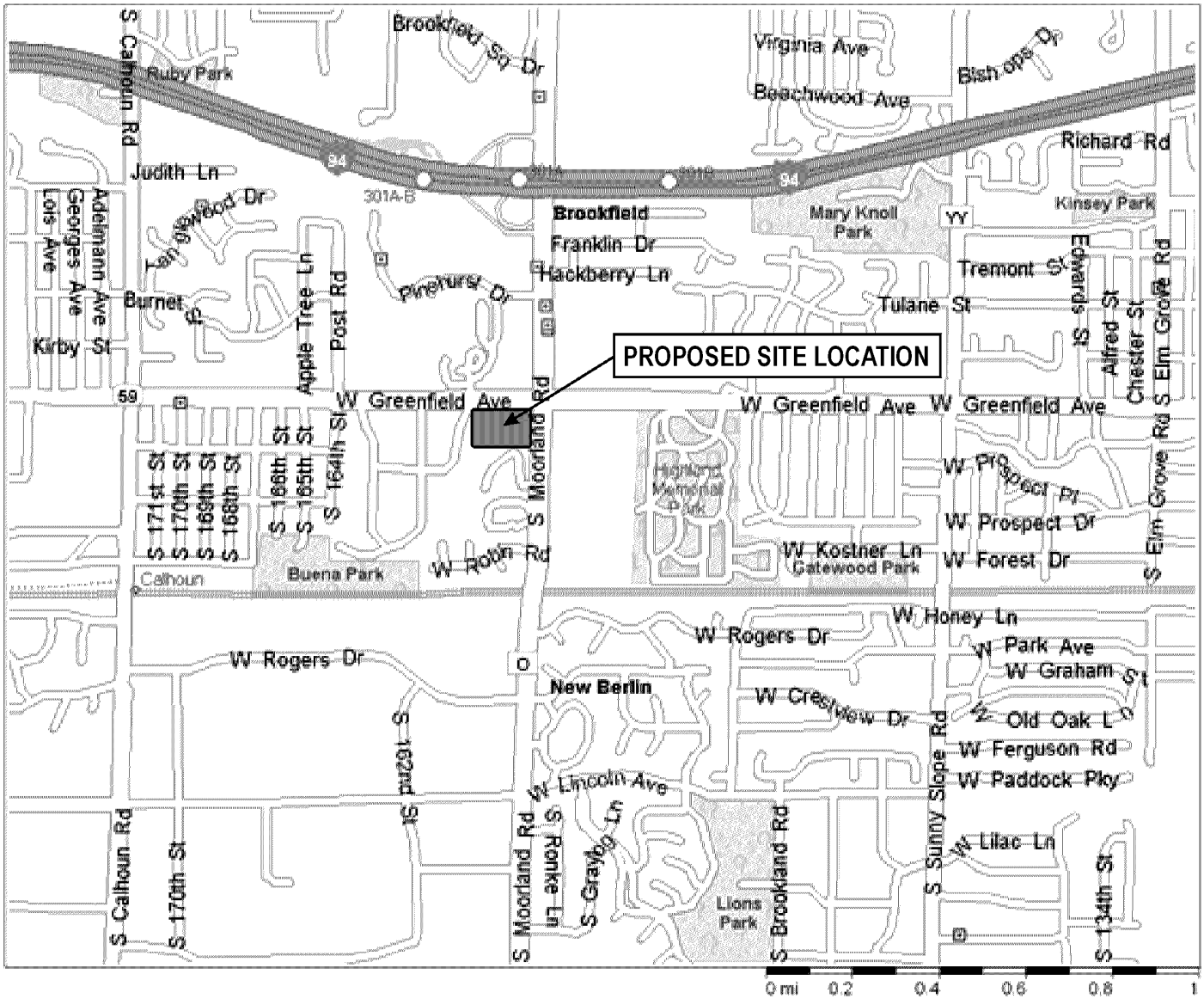
PART C – SITE ACCESSIBILITY

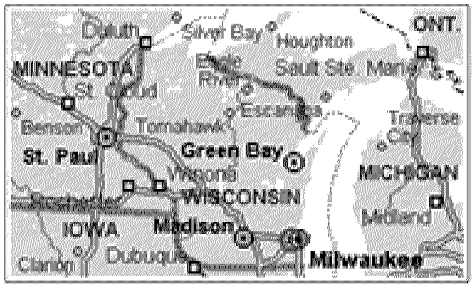
STH 59 is a six-lane divided east/west arterial highway in the immediate study area and a four-lane undivided highway approximately 300-feet west of the existing Walgreen's driveway. The posted speed limit along STH 59 is 40 miles per hour (mph) within the study area. According to the Wisconsin Department of Transportation (WisDOT), the Year 2003 average annual daily traffic volumes (AADT's) on STH 59 were approximately 19,100 vehicles per day (vpd) west of CTH O and 19,400-vpd east of CTH O. STH 59 is also designated as Greenfield Avenue.

CTH O is a six-lane divided north/south arterial highway in the vicinity of STH 59 and a four-lane divided highway with distress lanes in the vicinity of the Deer Creek Apartments driveway. The posted speed limit along CTH O is 40-mph within the study area. The WisDOT Year 2003 AADT's on CTH O were approximately 37,300-vpd north of STH 59 and 33,100-vpd south of STH 59. CTH O is also designated as Moorland Road.

NORTH
NOT TO SCALE

Wisconsin, United States, North America



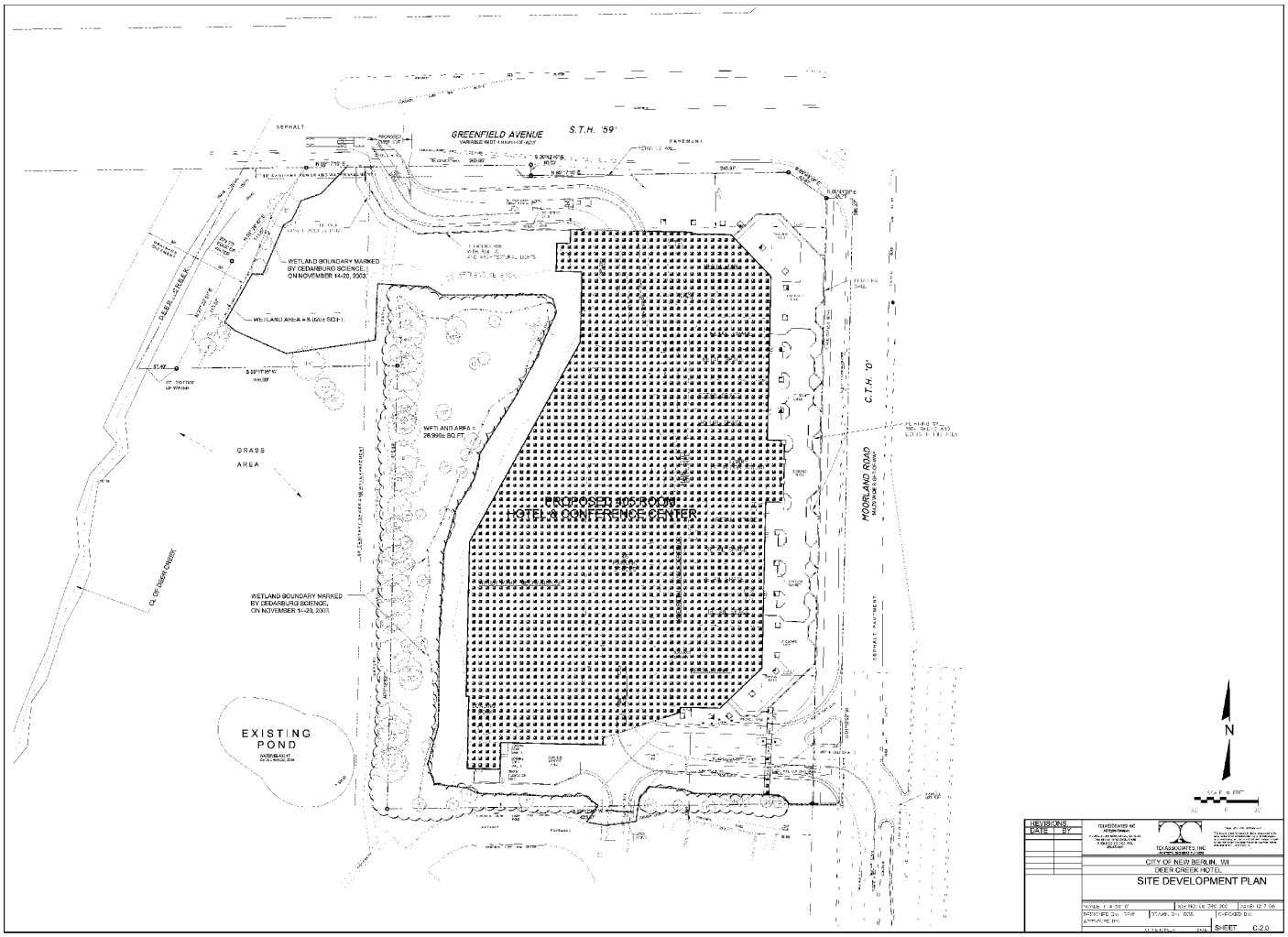


TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 2-1
PROPOSED SITE LOCATION
DEER CREEK INN & CONFERENCE CENTER DEVELOPMENT
NEW BERLIN, WISCONSIN

NORTH
NOT TO SCALE



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 2-2
SITE PLAN
DEER CREEK INN & CONFERENCE CENTER DEVELOPMENT
NEW BERLIN, WISCONSIN

CHAPTER III – ANALYSIS OF EXISTING CONDITIONS

PART A – PHYSICAL CHARACTERISTICS

Exhibit 3-1 shows the existing configuration of the study area intersection and roadways. More specifically, Exhibit 3-1 graphically illustrates existing intersection geometrics, posted speed limits, and the number of traveled lanes along roadways within the study area.

PART B – TRAFFIC VOLUMES

Weekday morning, midday and evening peak hour turning movement counts were conducted at the study area intersections by Traffic Analysis & Design, Inc. in January of 2007. Based on the turning movement count, the weekday morning, midday and evening peak hours were identified as being 7:15 to 8:15am, 11:45am to 12:45pm, and 4:30 to 5:30pm. The traffic counts used to determine peak hour factors and truck percents for each study area intersection have been included in the Appendix following this report.

For the purposes of this study, the Deer Creek Inn & Conference Center is expected to be constructed and operational by the Year 2007. Therefore, existing traffic volumes along STH 59 and CTH O were used to identify the Year 2007 background traffic volumes at the study area intersections. Traffic projections are discussed in greater detail in *Chapter IV—Projected Traffic*. The 2007 background traffic volumes are shown in Exhibit 3-2.

PART C – CAPACITY LEVEL OF SERVICE

The study area intersection was analyzed based on the procedures set forth in the *2000 Highway Capacity Manual* (HCM). Intersection operation is defined by "level of service". Level of Service (LOS) is a quantitative measure that refers to the overall quality of flow at an intersection ranging from very good, represented by LOS 'A', to very poor, represented by LOS 'F'. For the purpose of this study, LOS D has been identified as the acceptable LOS for peak hour operating conditions. Descriptions of the various levels of service are as follows:

LOS A is the highest level of service that can be achieved. Under this condition, intersection approaches appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation. At signalized and unsignalized intersections, average delays are less than 10 seconds.

LOS B represents stable operation. At signalized intersections, average vehicle delays are 10 to 20 seconds. At unsignalized intersections, average delays are 10 to 15 seconds.

LOS C still represents stable operation, but periodic backups of a few vehicles may develop behind turning vehicles. Most drivers begin to feel restricted, but not objectionably so. At signalized intersections, average vehicle delays are 20 to 35 seconds. At unsignalized intersections, average delays are 15 to 25 seconds.

LOS D represents increasing traffic restrictions as the intersection approaches instability. Delays to approaching vehicles may be substantial during short peaks within the peak period, but periodic clearance of long lines occurs, thus preventing excessive backups. At signalized intersections, average vehicle delays are 35 to 55 seconds. At unsignalized intersections, average delays are 25 to 35 seconds.

LOS E represents the capacity of the intersection. At signalized intersections, average vehicle delays are 55 to 80 seconds. At unsignalized intersections, average delays are 35 to 50 seconds.

LOS F represents jammed conditions where the intersection is over capacity and acceptable gaps for unsignalized intersections in the mainline traffic flow are minimal.

At signalized intersections, average vehicle delays exceed 80 seconds. At unsignalized intersections, average delays exceed 50 seconds.

C1. Year 2007 Background Traffic Operating Conditions

The Year 2007 background traffic peak hour operating conditions are shown in Table 1. The existing geometrics, shown in Exhibit 3-1, were used in the analysis.

Table 1
Year 2007 Background Traffic Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	C	C	**E**	D	**F**	**E**	D	C	**E**	D	D
		Midday	C	C	B	C	C	C	C	C	B	C	C	C
		PM	**E**	C	C	D	D	D	D	D	C	D	D	D
STH 59 & Walgreen's Driveway	One-Way Stop Sign	AM	C	-	A	-	A	A	-	-	-	A	A	-
		Midday	B	-	A	-	A	A	-	-	-	A	A	-
		PM	C	-	A	-	A	A	-	-	-	A	A	-
CTH O & Deer Creek Run Apartments Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	B	A	-	D*	-	A
		Midday	-	A	A	-	-	-	A	A	-	C	-	A
		PM	-	A	A	-	-	-	C	A	-	D*	-	B

NOTE: (-) indicates a movement that is not possible.
* The HCM methodology often overestimates delay at two-way stop controlled intersection. Based on field observation and a traffic gap analysis, all movements at the CTH O intersection with the Deer Creek Run Apartments currently operate at LOS D or better conditions.

As shown in Table 1, select movements at the STH 59 intersection with CTH O is expected to operate at LOS E/F conditions during the weekday morning peak hour. During the weekday evening peak hour, the southbound left-turn movement is expected to operate at LOS E conditions.

According to the HCM methodology, the eastbound left-turn movement at the CTH O intersection with the Deer Creek Run Apartments driveway is expected to operate at LOS F during the weekday morning and evening peak hours. However, the HCM methodology often overestimates delay at two-way stop controlled intersections. Based on field observation and a traffic gap analysis, all movements at the CTH O intersection with the Deer Creek Run Apartments are expected to operate at LOS D or better conditions.

Improvements to these operational deficiencies are discussed further in *Chapter V – Traffic and Improvement Analysis*. All other movements at the study area intersections are expected to operate at LOS D or better conditions during the weekday morning, midday and evening peak hours.

Traffic Gap Analysis – CTH O intersection with Deer Creek Run Apartments Driveway

Traffic gap studies measure the length of gaps, in time, between vehicles in roadway traffic streams to determine the ease of completing a turning maneuver onto a roadway. CTH O is a four-lane divided arterial highway, allowing a left-turning vehicle from the Deer Creek Run Apartments driveway to complete the maneuver in two stages – a left-turning vehicle first finds an acceptable gap in southbound traffic, crosses to the median refuge, then finds an acceptable gap in northbound traffic to complete the maneuver.

Traffic Analysis & Design, Inc. conducted gap studies along CTH O at the location of the Deer Creek Run Apartments driveway during the weekday morning, midday, and evening peak hours. Table 2 summarizes the findings of the gap study.

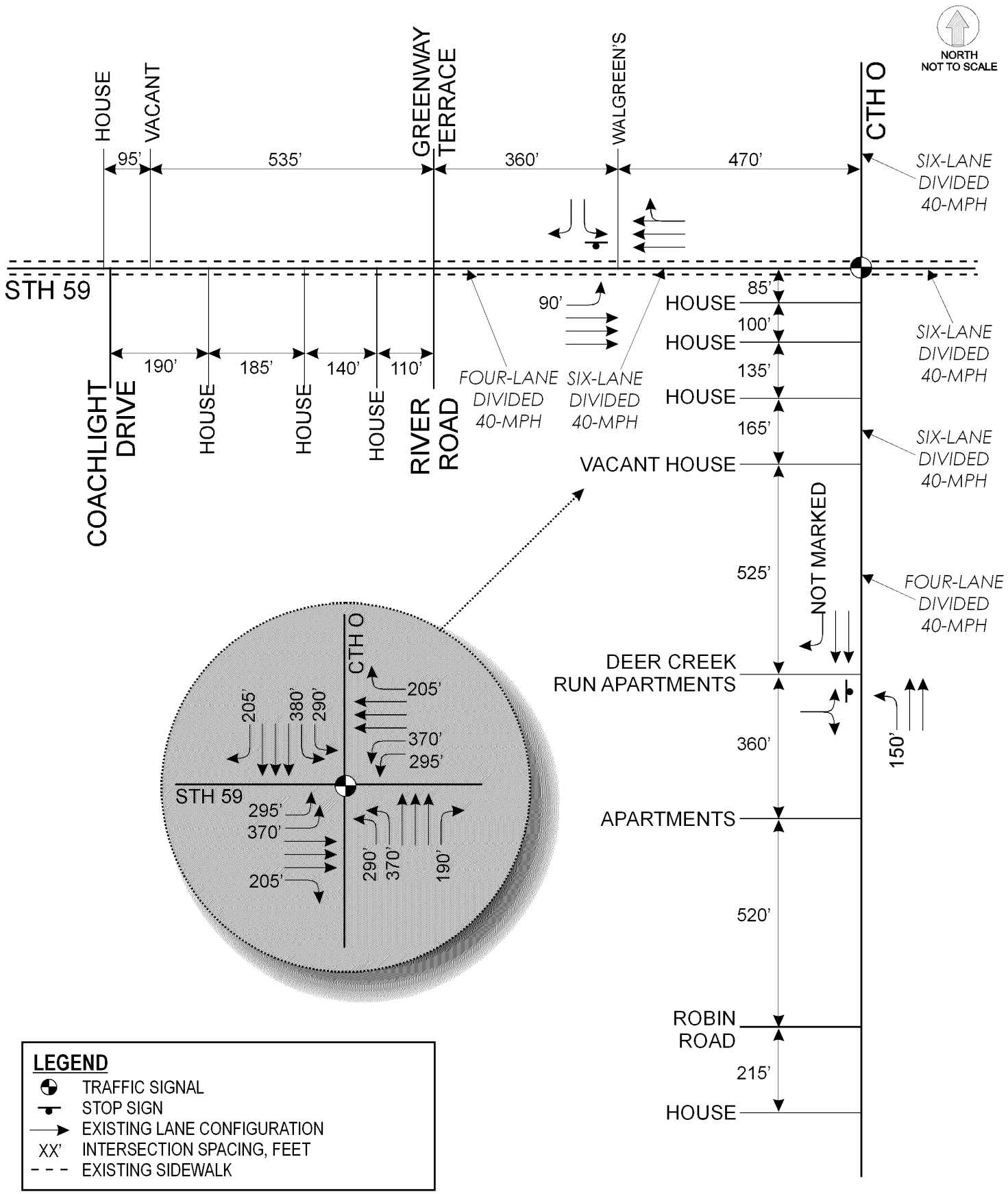
Table 2
CTH O & Deer Creek Run Apartments Driveway
Equivalent Gap Results

Peak Hour	Direction	Gaps between 6.5 and 16.6 seconds	Gaps between 16.6 and 26.7 seconds	Gaps greater than 26.7 seconds	Equivalent Gaps
AM	NB	59	7	1	76
	SB	54	13	21	143
Midday	NB	94	17	6	146
	SB	66	21	22	174
PM	NB	59	13	1	88
	SB	59	14	9	114

According to the HCM methodology, the majority of drivers (85%) feel a 6.5-second gap between vehicles is required to complete the first or second stage of a left-turn under conditions as they exist along CTH O. Two vehicles in queue can complete the maneuver with 16.6-seconds of gap time, and three or more vehicles can complete the maneuver with 26.7-seconds of gap time. Equivalent gaps (or capacity of gaps) are calculated by adding the number of gaps greater than 26.7-seconds multiplied by three, the number of gaps between 16.6-seconds and 26.7-seconds multiplied by two, and the number of gaps between 6.5-seconds and 16.6-seconds.

Based on the information summarized in Table 2, there are currently 76 northbound and 143 southbound equivalent gaps along CTH O during the weekday morning peak hour. During the weekday midday peak hour, there are currently 146 northbound and 174 southbound equivalent gaps. The weekday evening peak hour currently has 88 northbound and 114 southbound equivalent gaps in the CTH O traffic streams.

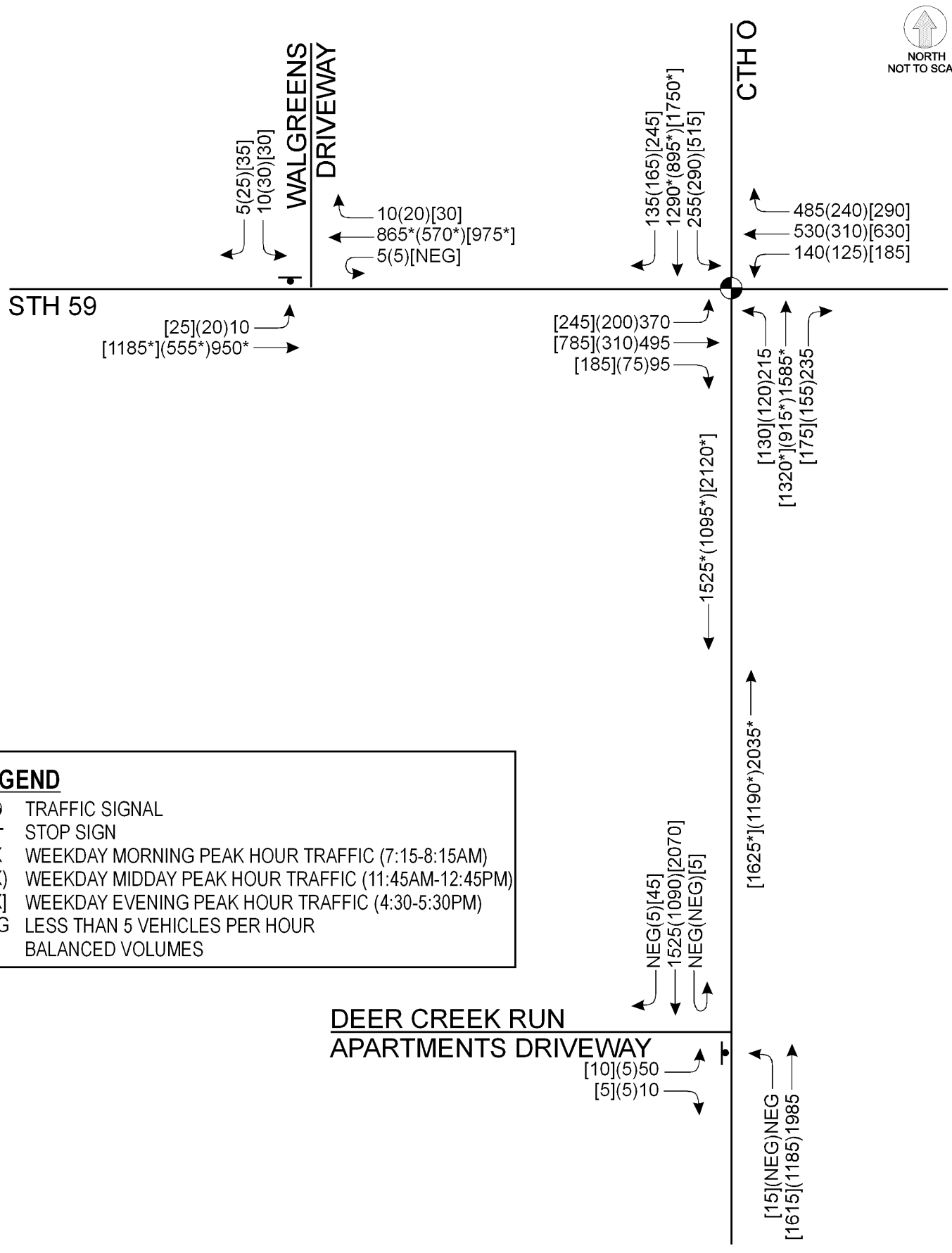
The results of the traffic gap counts indicate that surplus gaps exist to accommodate left-turn movements at the CTH O intersection with the Deer Creek Run Apartments driveway. Therefore, all movements at the CTH O intersection with the Deer Creek Run Apartments are expected to operate at LOS D or better conditions during the weekday morning, midday and evening peak hours under Year 2007 background traffic volumes.



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 3-1
EXISTING TRANSPORTATION DETAIL
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 3-2
YEAR 2007 BACKGROUND TRAFFIC
NEW BERLIN, WISCONSIN

CHAPTER IV – PROJECTED TRAFFIC

PART A – NON-SITE TRAFFIC FORECASTING

Based on recommendations from Waukesha County, a 1.30-percent annual growth rate along STH 59 and along CTH O were used to determine the Year 2017 background traffic volumes. The Year 2017 background traffic volumes are shown in Exhibits 4-1.

PART B – SITE TRAFFIC FORECASTING

B1. On-Site Development

To address any potential future traffic impacts along study area roadways and at the intersection adjacent to the development site, it is necessary to identify the hourly and daily volume of traffic generated by the proposed development. The traffic volumes expected to be generated by the development are based on the size and type of the proposed land uses, and on trip rates as published in the Institute of Transportation Engineer's (ITE) *Trip Generation Manual, 7th Edition, 2003*. The expected trip generation for the proposed Deer Creek Inn & Conference Center development is shown in Table 3.

Table 3
Deer Creek Inn & Conference Center Trip Generation

Land Use	ITE Code	Proposed Size	Weekday Daily	AM Peak			Midday Peak			PM Peak		
				In	Out	Total	In	Out	Total	In	Out	Total
Hotel[1]	310	405-suites	3,615 (8.92)	155 (58%)	115 (42%)	270 (0.67)	140 (48%)	150 (48%)	290 (0.71)	140 (49%)	145 (51%)	285 (0.70)
Specialty Retail[1 2]	820	12,000-sf	515 (42.94)	5 (61%)	5 (39%)	10 (1.03)	20 (48%)	20 (52%)	40 (3.41)	20 (48%)	25 (52%)	45 (3.75)
Sit-Down Restaurant[1]	932	18,000-sf	2,290 (127.15)	105 (52%)	100 (48%)	205 (11.52)	85 (48%)	95 (52%)	180 (10.10)	120 (61%)	75 (39%)	195 (10.92)
Total New Trips			**6420**	**265**	**220**	**485**	**245**	**265**	**510**	**280**	**245**	**525**
60% Linked Trips 820 & 932 (Minus)			*-1680*	*-65*	*-65*	*-130*	*-65*	*-70*	*-130*	*-85*	*-60*	*-145*
Total Driveway Trips			**4740**	**200**	**155**	**355**	**180**	**195**	**380**	**195**	**185**	**380**

Note: 1) Midday trip information for the Hotel, Specialty Retail, and Restaurants is not available in the ITE Trip Generation Manual for weekdays. The in/out percentage and average hourly rate of trip generation for each land use in this study was estimated based on information n Table 1 on page 1449 of the ITE Trip Generation Manual – 7th Edition. In Table 1, the in/out percentage and average hourly rate of trip generation are estimated for a shopping center during weekday midday hours. Based on the information provided in Table 1, it was estimated in this study that 7.95 percent of the weekday daily traffic would occur during the weekday midday peak hour and that 48 percent of that traffic would be entering the facility.

2) Based on past discussions with WisDOT, ITE 820 (Shopping Center) was used for the Specialty Retail land use.

As shown in Table 3, the proposed development is expected to generate 485 total new trips (265 entering and 220 exiting) during the weekday morning peak hour, 510 total new trips (245 entering and 265 exiting) during the weekday midday peak hour and 525 total trips (280 entering and 245 exiting) during the weekday evening peak hour. On a typical weekday (24-hour period), the proposed development is expected to generate 6,420 total trips (3,210 entering and 3,210 exiting).

B2. Trip Distribution

The trip distribution for the proposed site was determined based on the development land uses, traffic volumes on the adjacent roadway system, and the location of Interstate 94 north of the proposed site and I-43 south of the proposed site. The expected trip distribution, shown in Exhibit 4-2, is as follows:

- 45% to/from the north on CTH O.

- 25% to/from the south on CTH O.
- 15% to from the west on STH 59.
- 15% to/from the east on STH 59.

B3. Trip Assignment

On-Site Development

The expected weekday morning, midday and evening peak hour trips generated by the proposed Deer Creek Inn & Conference Center development were assigned to the adjacent roadway system based on the above trip distribution to determine additional turning movement traffic at the study area intersections. The new trips are shown in Exhibits 4-3.

PART C – TOTAL TRAFFIC

C1. Year 2017 Background Traffic

A 1.3 percent growth rate per year was applied to the Year 2007 background traffic volumes on STH 59 and CTH O to determine the Year 2017 background traffic volumes shown in Exhibit 4-1.

C2. Year 2007 Total Traffic

The Year 2007 total traffic volumes were determined by adding the Deer Creek Inn & Conference Center new trips (Exhibit 4-3) to the Year 2007 background traffic volumes (Exhibit 3-2). The Year 2007 total traffic volumes are shown in Exhibit 4-4.

C3. Year 2017 Total Traffic

The Year 2017 total traffic volumes were determined by adding the Deer Creek Inn & Conference Center new trips (Exhibit 4-3) to the Year 2017 background traffic volumes (Exhibit 4-1). The Year 2017 total traffic volumes are shown in Exhibit 4-5.

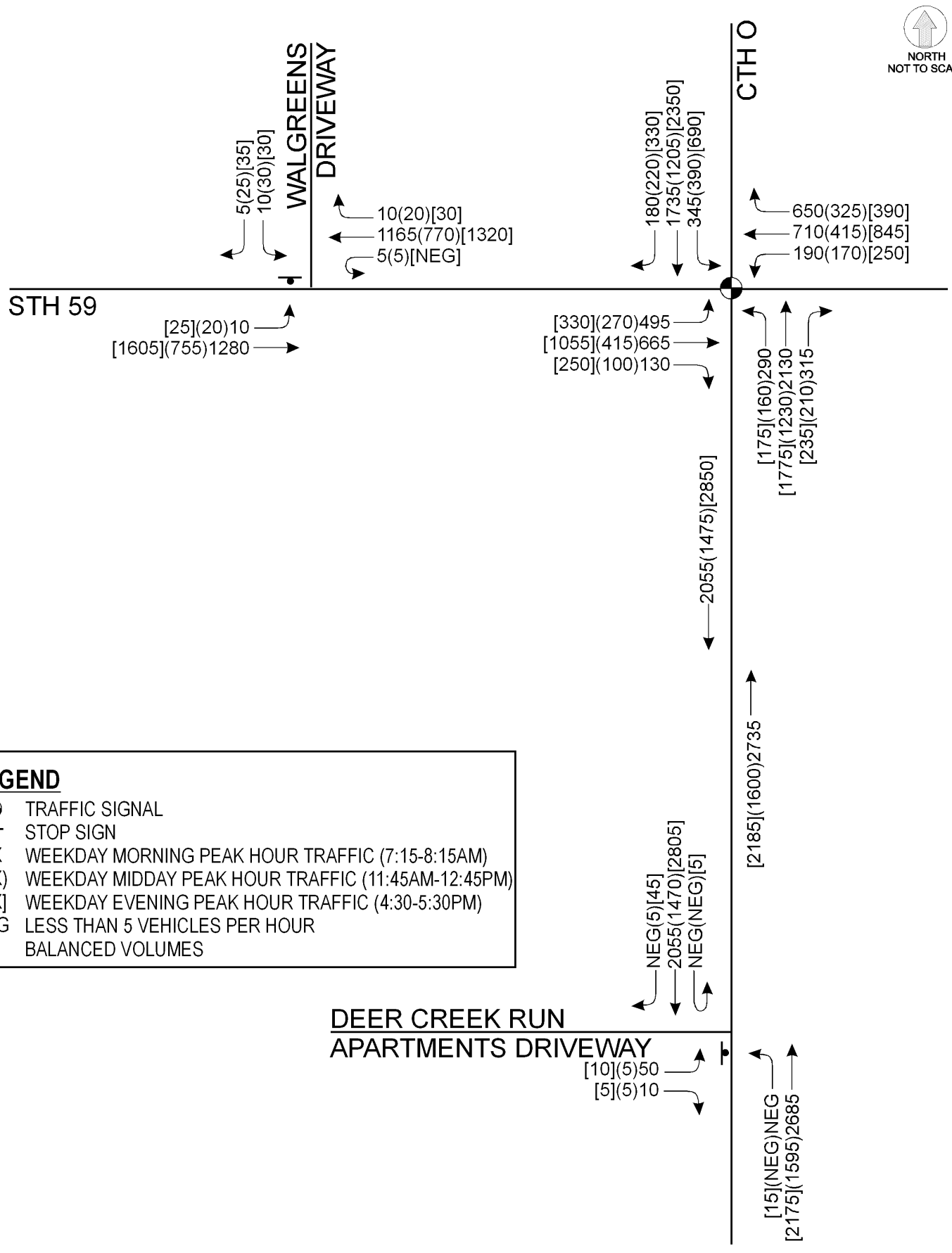


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EXHIBIT DATE: 01-29-07

EXHIBIT 4-1
YEAR 2017 BACKGROUND TRAFFIC
NEW BERLIN, WISCONSIN

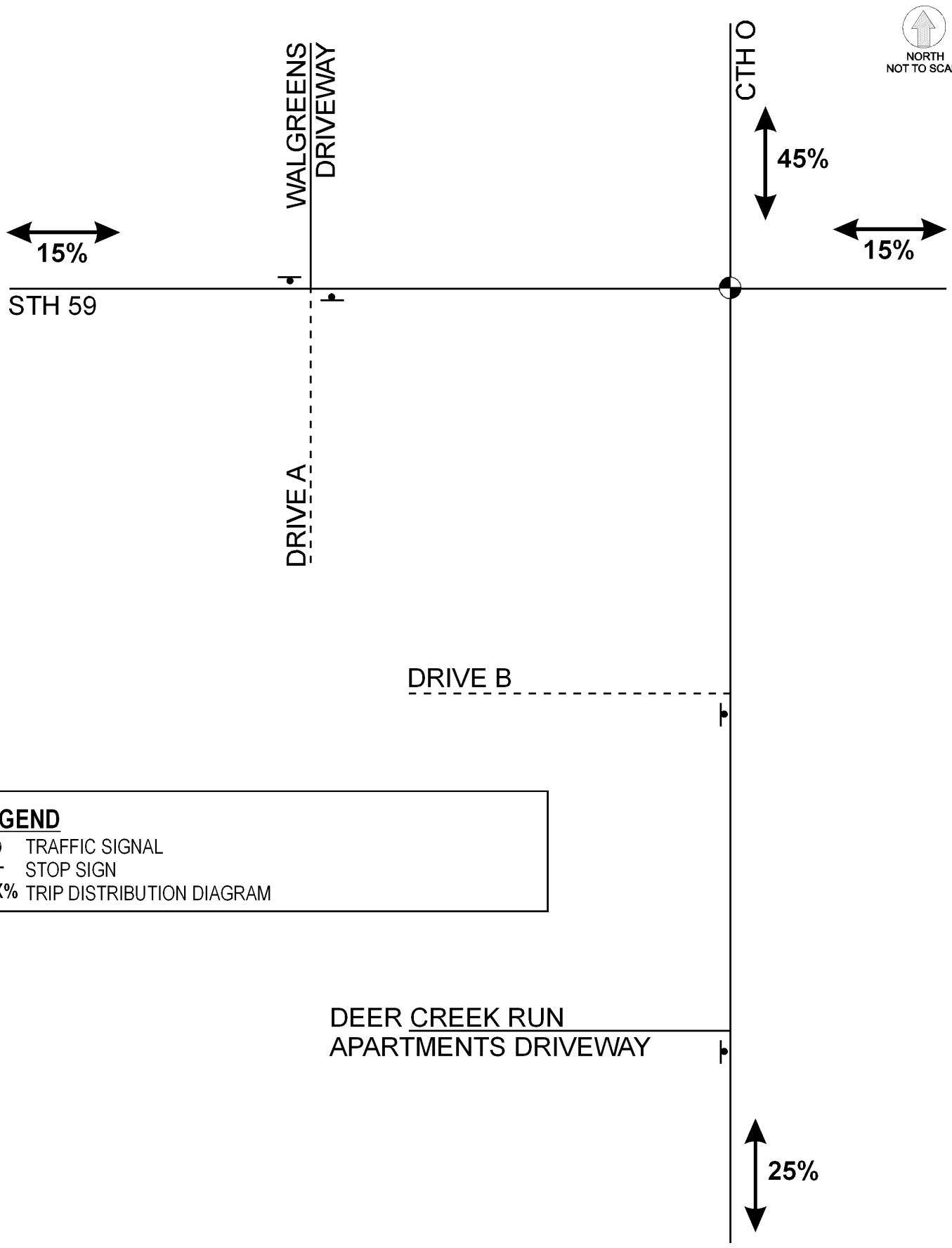

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EXHIBIT DATE: 01-29-07

EXHIBIT 4-2
TRIP DISTRIBUTION DIAGRAM
DEER CREEK INN & CONFERENCE CENTER DEVELOPMENT
NEW BERLIN, WISCONSIN

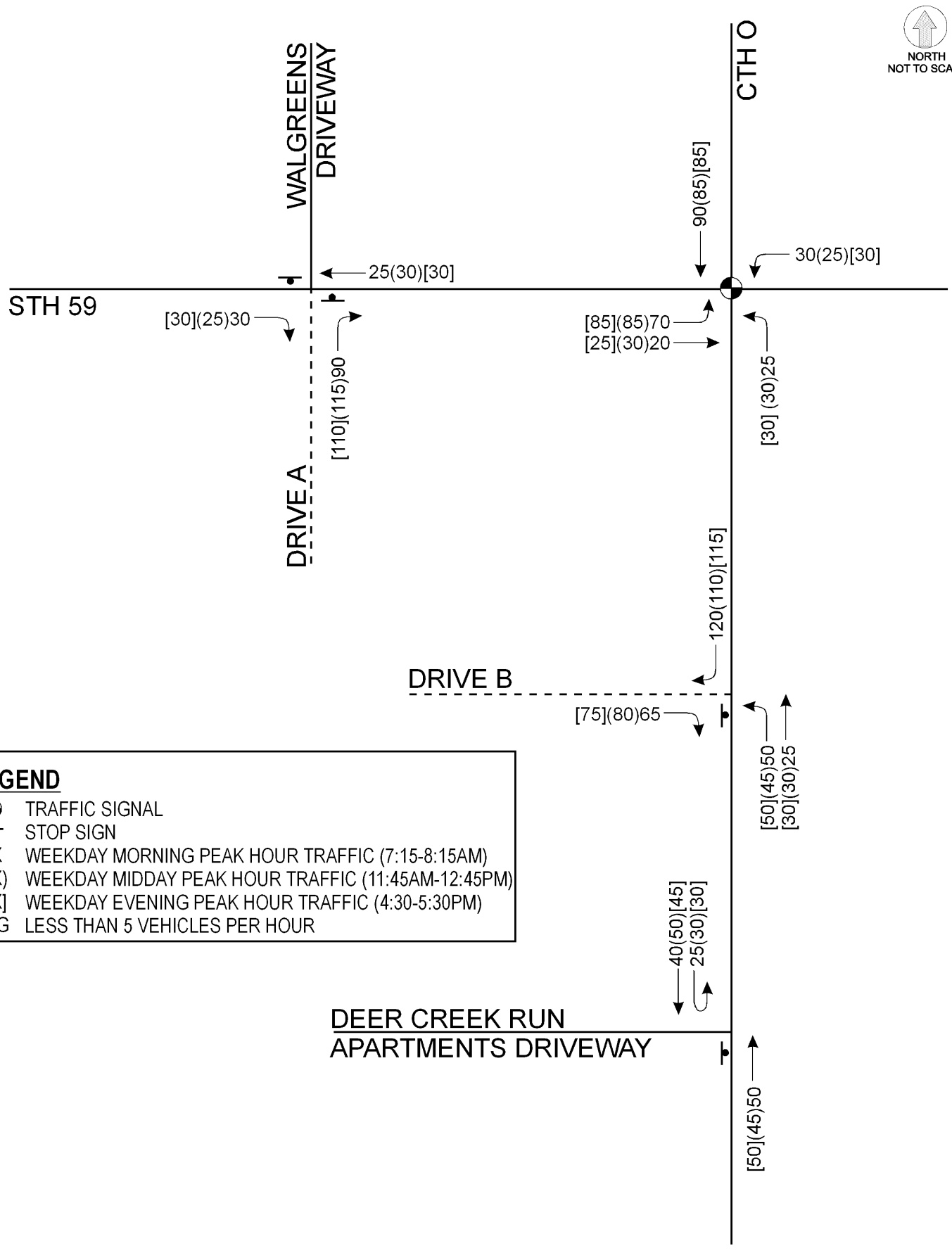

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EXHIBIT DATE: 01-29-07

EXHIBIT 4-3
NEW TRIPS
DEER CREEK INN AND CONFERENCE CENTER
NEW BERLIN, WISCONSIN

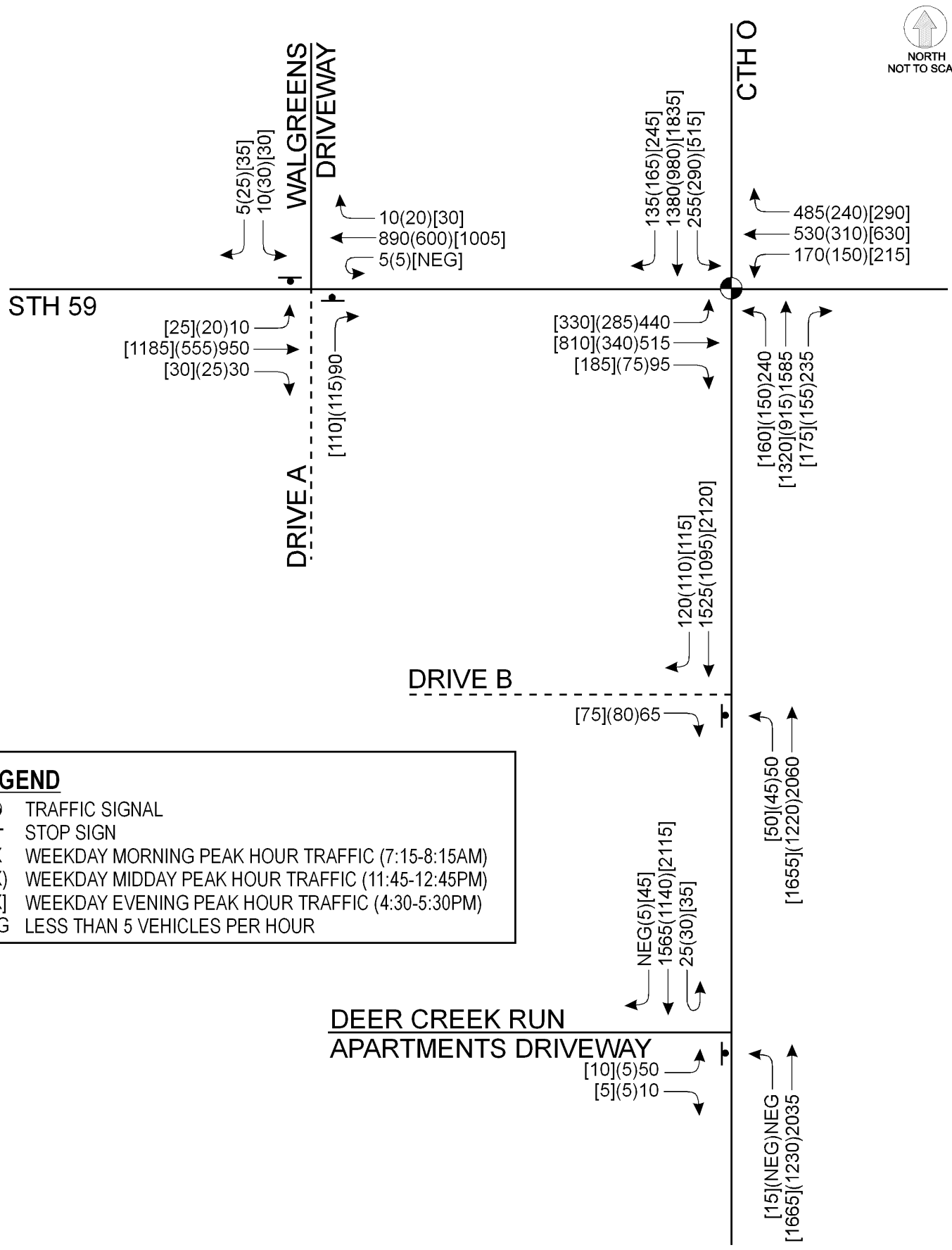

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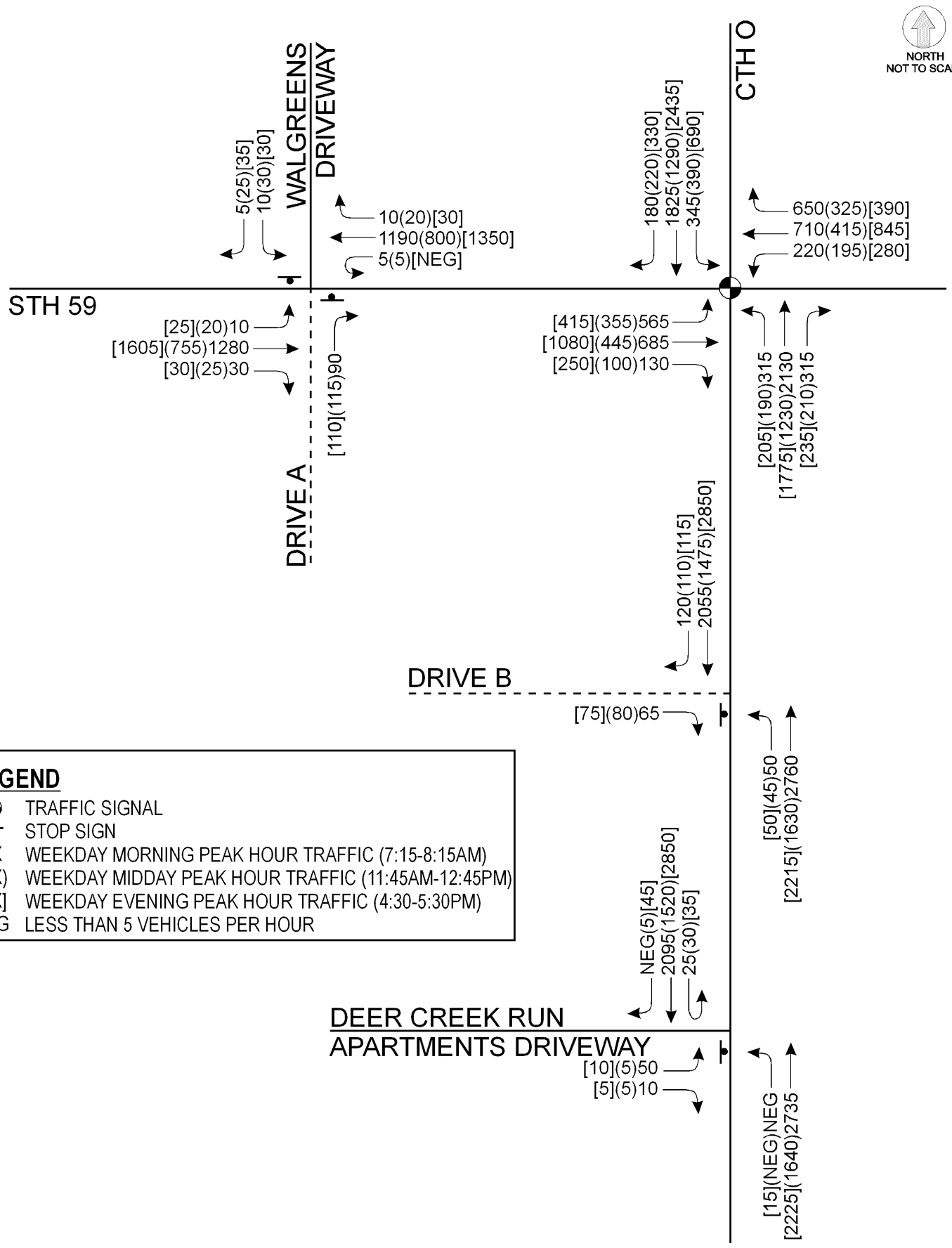
EXHIBIT DATE: 01-29-07

EXHIBIT 4-4
YEAR 2007 TOTAL TRAFFIC
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 4-5
YEAR 2017 TOTAL TRAFFIC
NEW BERLIN, WISCONSIN

CHAPTER V – TRAFFIC AND IMPROVEMENT ANALYSIS

PART A – FUTURE TRAFFIC CAPACITY LEVEL OF SERVICE

A1. Year 2017 Background Traffic Operating Conditions

The Year 2017 background traffic (1.3 percent background growth per year) peak hour operating conditions are shown in Table 4. The existing geometrics, shown in Exhibit 3-1, were used in the analysis.

Table 4
Year 2017 Background Traffic Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	**E**	C	**E**	**E**	**F**	**E**	**F**	C	**F**	D	D
		Midday	D	C	B	D	D	D	D	C	C	D	D	C
		PM	**F**	**F**	C	**E**	**E**	D	**E**	D	C	**E**	**F**	D
STH 59 & Walgreen's Driveway	One-Way Stop Sign	AM	C	-	A	-	A	A	-	-	-	A	A	-
		Midday	B	-	A	-	A	A	-	-	-	A	A	-
		PM	C	-	A	-	A	A	-	-	-	A	A	-
CTH O & Deer Creek Run Apartments Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	D	A	-	**F**	-	B
		Midday	-	A	A	-	-	-	B	A	-	E	-	A
		PM	-	A	A	-	-	-	**F**	A	-	**F**	-	B

NOTE: (-) indicates a movement that is not possible.

As shown in Table 4, several movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and weekday evening peak hours.

At the CTH O intersection with the Deer Creek Run Apartments driveway, the eastbound left-turn movement is expected to operate at LOS E/F conditions during the weekday morning and evening peak hours and the northbound left-turn movement is expected to operate at LOS F conditions in the evening peak hour.

Improvements to address these operational deficiencies are discussed in *Part B – Improvement Capacity Level of Service*. All other movements at the study area intersections are expected to operate at LOS D or better conditions during the Year 2017 background traffic morning, midday and evening peak hours.

A2. Year 2007 Total Traffic Operating Conditions

Table 5 shows the Year 2007 total traffic (existing plus development) peak hour operating conditions. The existing geometrics, shown in Exhibit 3-1, were used in the analysis.

Table 5
Year 2007 Total Traffic Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	D	C	**E**	D	**F**	**E**	D	C	**F**	D	D
		Midday	C	C	B	C	C	C	C	C	C	C	C	C
		PM	**E**	C	C	**E**	D	D	D	D	C	**E**	D	D
STH 59 & Walgreen's Driveway/(Right-In/Right-out) Development Driveway	Two-Way Stop Sign	AM	C	-	A	-	A	A	-	-	B	A	A	A
		Midday	C	-	A	-	A	A	-	-	B	A	A	A
		PM	C	-	A	-	A	A	-	-	B	A	A	A
CTH O & Right-In/Right-Out/Left-In Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	A	A	-	-	-	B
		Midday	-	A	A	-	-	-	A	A	-	-	-	A
		PM	-	A	A	-	-	-	C	A	-	-	-	B
CTH O & Deer Creek Run Apartments Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	B	A	-	D*	-	B
		Midday	-	A	A	-	-	-	B	A	-	D	-	A
		PM	-	A	A	-	-	-	C	A	-	D*	-	B

NOTE: (-) indicates a movement that is not possible.
* The HCM methodology often overestimates delay at two-way stop controlled intersection. Based on field observation and a traffic gap analysis, all movements at the CTH O intersection with the Deer Creek Run Apartments currently operate at LOS D or better conditions.

As shown in Table 5, select movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours.

According to the HCM methodology, the eastbound left-turn movement at the CTH O intersection with the Deer Creek Run Apartments driveway is expected to operate at LOS F during the weekday morning and evening peak hours. However, the HCM methodology often overestimates delay at two-way stop controlled intersections. Based on field observation and the traffic gap analysis summarized in *Chapter III – Analysis of Existing Conditions*, all movements at the CTH O intersection with the Deer Creek Run Apartments are expected to continue to operate at LOS D or better conditions.

Improvements to address these operational deficiencies are discussed in *Part B – Improvement Capacity Level of Service*. All other movements at the study area intersections are expected to operate at LOS D or better conditions during the weekday morning, midday and evening peak hours.

A3. Year 2017 Total Traffic Operating Conditions

The Year 2017 total traffic (with Deer Creek Inn & Conference Center) peak hour operating conditions are shown in Table 6. The existing geometrics, shown in Exhibit 3-1, were used in the analysis. Note that the Year 2017 total traffic analysis assumes a right-in/right-out access along STH 59 and a right-in/right-out/left-in access along CTH O.

Table 6
Year 2017 Total Traffic Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	**F**	C	**E**	**E**	**F**	**E**	F	C	**E**	**F**	C
		Midday	D	C	C	D	D	D	D	C	C	D	D	C
		PM	**F**	**F**	C	**E**	**E**	**E**	**E**	**E**	C	**E**	**F**	D
STH 59 & Walgreen's Driveway/(Right-In/Right-out) Development Driveway	Two-Way Stop Sign	AM	C	-	A	-	A	A	-	-	B	A	A	A
		Midday	C	-	A	-	A	A	-	-	B	A	A	A
		PM	D	-	A	-	A	A	-	-	C	A	A	A
CTH O & Right-In/Right-Out/Left-In Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	**E**	A	-	-	-	B
		Midday	-	A	A	-	-	-	A	A	-	-	-	A
		PM	-	A	A	-	-	-	**F**	A	-	-	-	C
CTH O & Deer Creek Run Apartments Driveway	One-Way Stop Sign	AM	-	A	A	-	-	-	D	A	-	**F**	-	B
		Midday	-	A	A	-	-	-	B	A	-	**E**	-	A
		PM	-	A	A	-	-	-	**F**	A	-	**F**	-	B

NOTE: (-) indicates a movement that is not possible.

As shown in Table 6, several movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours.

At the CTH O intersection with Deer Creek Inn & Conference Center driveway, the northbound left-turn movement is expected to operate at LOS E conditions in the morning peak hour and LOS F conditions in the evening peak hour.

At the CTH O intersection with the Deer Creek Run Apartments driveway, the eastbound left-turn movement is expected to operate at LOS E/F conditions during the weekday morning and evening peak hours and the northbound left-turn movement is expected to operate at LOS F conditions in the evening peak hour.

These operational deficiencies are discussed in the following section. All other movements at the study area intersections are expected to operate at LOS D or better conditions during the weekday morning, midday and evening peak hours under Year 2017 total traffic volumes.

PART B – IMPROVEMENT CAPACITY LEVEL OF SERVICE

B1. Year 2007 Background Traffic – *Recommended Improvements*

As shown in Table 1, select movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours. The following improvements are recommended at the STH 59 intersection with CTH O.

STH 59 & CTH O

- Provide dual westbound right-turn lanes.
- Install right-turn traffic signal heads to accommodate the westbound right-turn movement. Initiate the right-turn signals during all non-conflicting phases.

Table 7 shows the Year 2007 background traffic operating conditions with the recommended improvements at the STH 59 intersection with CTH O.

Table 7
Year 2007 Background Traffic Peak Hour Operating Conditions
With Recommended Improvements

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	C	C	D	D	C	D	D	C	**E**	D	C
		Midday	C	C	B	C	C	B	C	C	B	C	C	C
		PM	D	C	B	D	B	D	D	D	C	D	D	D

As shown in Table 7, with the recommended improvements for Year 2007 background traffic conditions, all but two movements at the intersection of STH 59 & CTH O are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn at the intersection of STH 59 and CTH O is expected to operate at LOS E with 58.6 seconds of average delay per vehicle and the southbound left-turn movement is expected to operate at LOS E with 60.9 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

B2. Year 2017 Background Traffic – *Recommended Improvements*

As shown in Table 4, select movements at the STH 59 intersection with CTH O and the CTH O intersection with the Deer Creek Run Apartments driveway are expected to operate at LOS E/F conditions under Year 2017 background traffic volumes (1.3 percent per year background growth). Table 8 shows the Year 2017 background traffic operating conditions with the Year 2017 background traffic recommended improvements. The following improvements are recommended to accommodate Year 2017 background traffic.

STH 59 & CTH O

- Extend the southbound dual left-turn lanes.
- Extend the westbound dual right-turn lanes.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a third northbound through lane.

Table 8
Year 2017 Background Traffic Peak Hour Operating Conditions
With Recommended Improvements

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**F**	D	C	**E**	**E**	**E**	**F**	**F**	C	**F**	D	D
		Midday	D	C	B	D	D	C	D	C	C	D	D	C
		PM	**F**	**E**	C	**F**	**E**	C	**E**	**F**	C	**F**	**E**	D

As shown in Table 8, with the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 background traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. Opening a third northbound through lane at this intersection is recommended to reduce the expected eastbound left-turn delay. A third northbound lane can be opened with pavement marking modifications to the 12 foot existing auxiliary lane. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

B3. Year 2007 Total Traffic – *Recommended Improvements*

As shown in Table 5, select movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours. The following improvements are recommended in addition to the Year 2007 background traffic recommended improvements.

STH 59 & Walgreen's/Deer Creek Inn & Conference Center Driveway (Drive A)

- Provide an exclusive right-turn lane on the northbound approach using proper channelization to prohibit the northbound left-turn movement. Install a "Right Turn Only" sign on the northbound approach.
- Provide an eastbound channelized right-turn lane. The channelized right-turn island will serve in prohibiting traffic from entering the Deer Creek Inn & Conference Center along STH 59 from the north and east. Place a "No Left Turn" sign in the STH 59 median facing to the east.

- It is recommended that any potential Deer Creek Inn & Conference Center signs placed in the corner of the STH 59 intersection with CTH O include text to encourage drivers to enter the site along CTH O.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a southbound right-turn lane.
- Provide a channelized northbound left-turn lane.
- Provide an exclusive right-turn lane on the eastbound approach using proper channelization to prohibit the eastbound left-turn movement. Install a "Right Turn Only" sign on the eastbound approach.

CTH O & Deer Creek Run Apartments Driveway

- Provide a southbound left-turn lane. Some of the traffic exiting the Deer Creek Inn & Conference Center is expected to make a u-turn from southbound to northbound at this intersection. A southbound left-turn lane would provide shelter from traffic heading southbound on CTH O.

Table 9 shows the Year 2007 total traffic operating conditions with the recommended improvements at the STH 59 intersection with CTH O.

Table 9
Year 2007 Total Traffic Peak Hour Operating Conditions
With Recommended Improvements

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**E**	C	C	D	D	C	**E**	D	C	**E**	D	C
		Midday	C	C	B	C	C	B	C	C	C	C	C	C
		PM	D	C	B	D	D	C	D	D	C	**E**	D	D

As shown in Table 9, with the recommended improvements, all but three movements at the study area intersections are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn, the southbound left-turn, and the northbound left-turn movement at the intersection of STH 59 and CTH O are expected to operate at LOS E with 60.7, 61.4, and 62.2 seconds of average delay per vehicle, respectively. In the evening peak hour the eastbound left-turn movement is expected to operate at LOS E with 55.1 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

B4. Year 2017 Total Traffic – *Recommended Improvements*

As shown in Table 6, select movements at the STH 59 intersection with CTH O and the CTH O intersection with the Deer Creek Run Apartments driveway are expected to operate at LOS E/F conditions under Year 2017 total traffic volumes (Year 2017 background traffic plus Deer Creek Inn & Conference Center development). Table 10 shows the Year 2017 total traffic operating conditions with the Year 2017 total traffic recommended improvements

STH 59 & CTH O

- Extend the westbound dual right-turn lanes.

Table 10
Year 2017 Total Traffic Peak Hour Operating Conditions
With Recommended Improvement

Intersection	Traffic Control	Peak Hour	Level of Service per Movement by Approach											
			Southbound			Westbound			Northbound			Eastbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
STH 59 & CTH O	Traffic Signal	AM	**F**	**E**	C	**E**	**F**	D	**F**	**F**	C	**F**	D	D
		Midday	D	C	B	D	D	C	D	C	C	D	D	C
		PM	**F**	**E**	C	**F**	**F**	C	**F**	**F**	C	**F**	**F**	D

As shown in Table 10, with the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 total traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

PART C – QUEUEING ANALYSIS

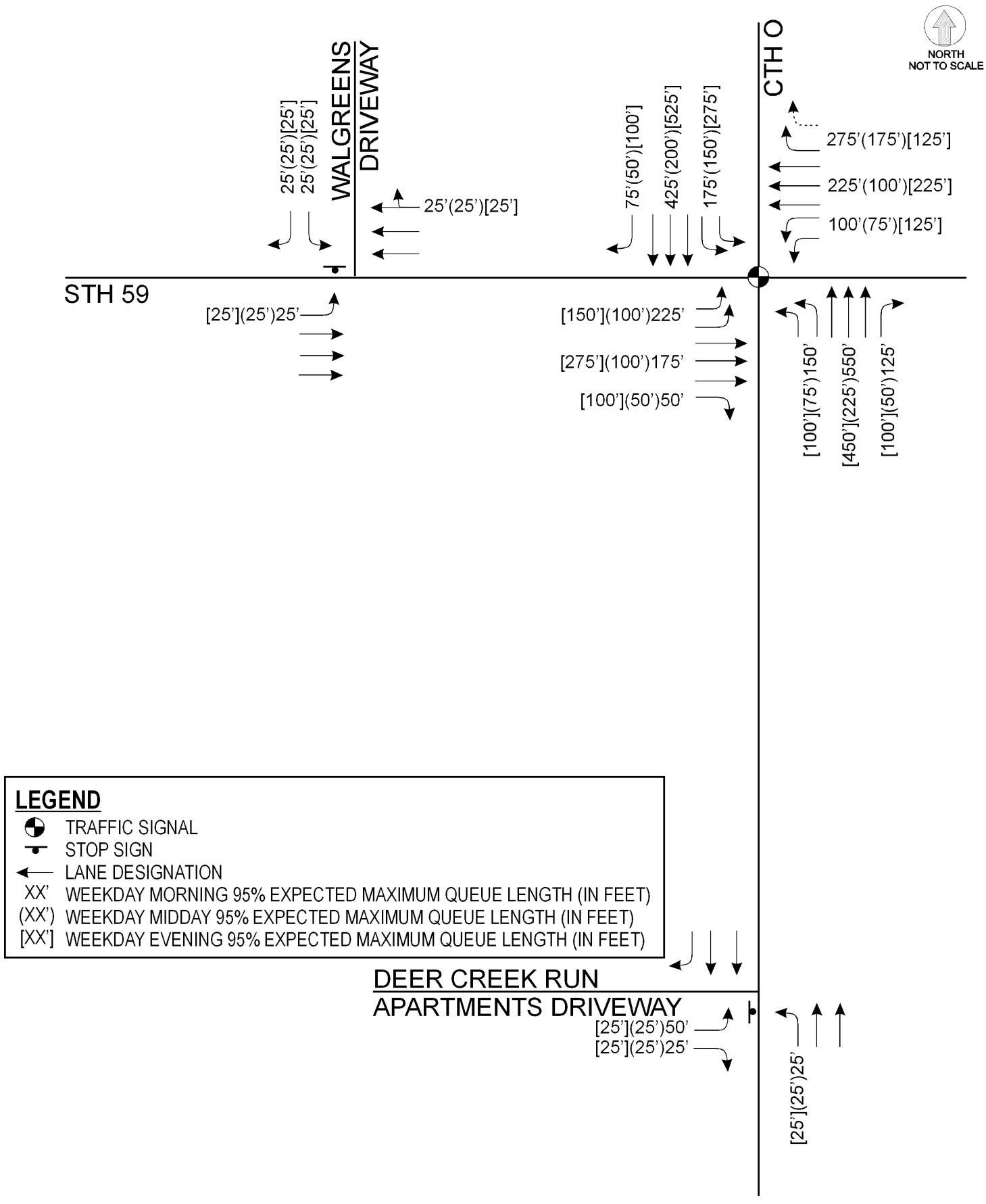
To estimate storage length requirements for turn bays at the study area intersections, a queuing analysis has been conducted. Note that a 95th percentile queue length was used for the recommended design of turn bays at intersections. The following is a list of where the results of the queuing analysis can be found.

- Year 2007 Background Traffic – Exhibit 5-1.
- Year 2017 Background Traffic – Exhibit 5-2.
- Year 2007 Total Traffic – Exhibit 5-3.
- Year 2017 Total Traffic – Exhibit 5-4.

PART D – TRAFFIC CONTROL NEED

To provide safe and efficient traffic operations at the STH 59 intersection with the Walgreen's/Deer Creek Inn & Conference Center driveway, it is recommended that proper channelization be installed to prohibit the northbound left-turn out and westbound left-turn in movements. It is recommended that a "Right Turn Only" sign be installed on the northbound approach and that a "No Left Turn" sign be installed in the STH 59 median facing eastward.

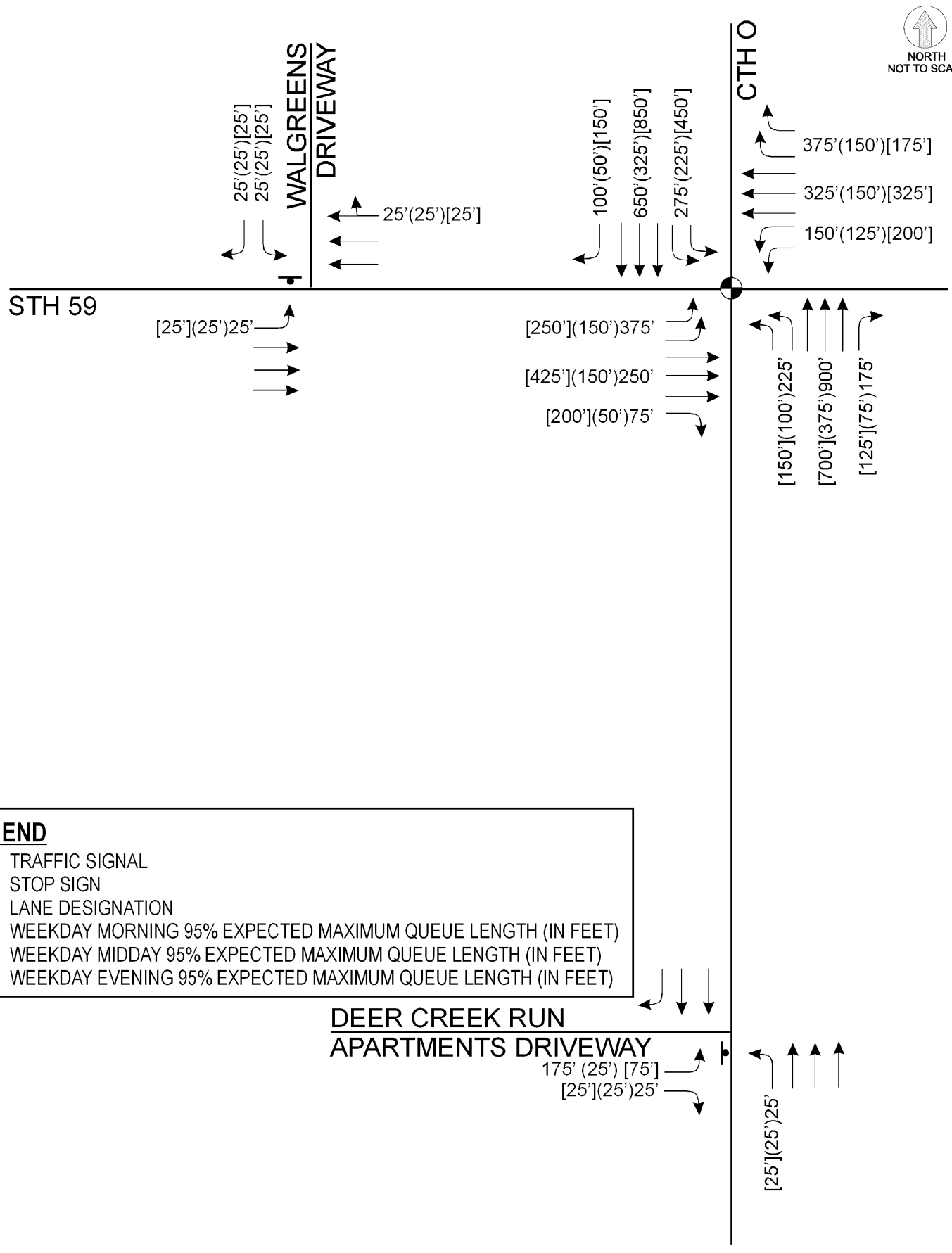
At the CTH O intersection with the Deer Creek Inn & Conference Center Driveway, it is recommended that proper channelization be installed to prohibit the eastbound left-turn out movement. It is recommended that a "Right Turn Only" sign be installed on the eastbound approach.



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

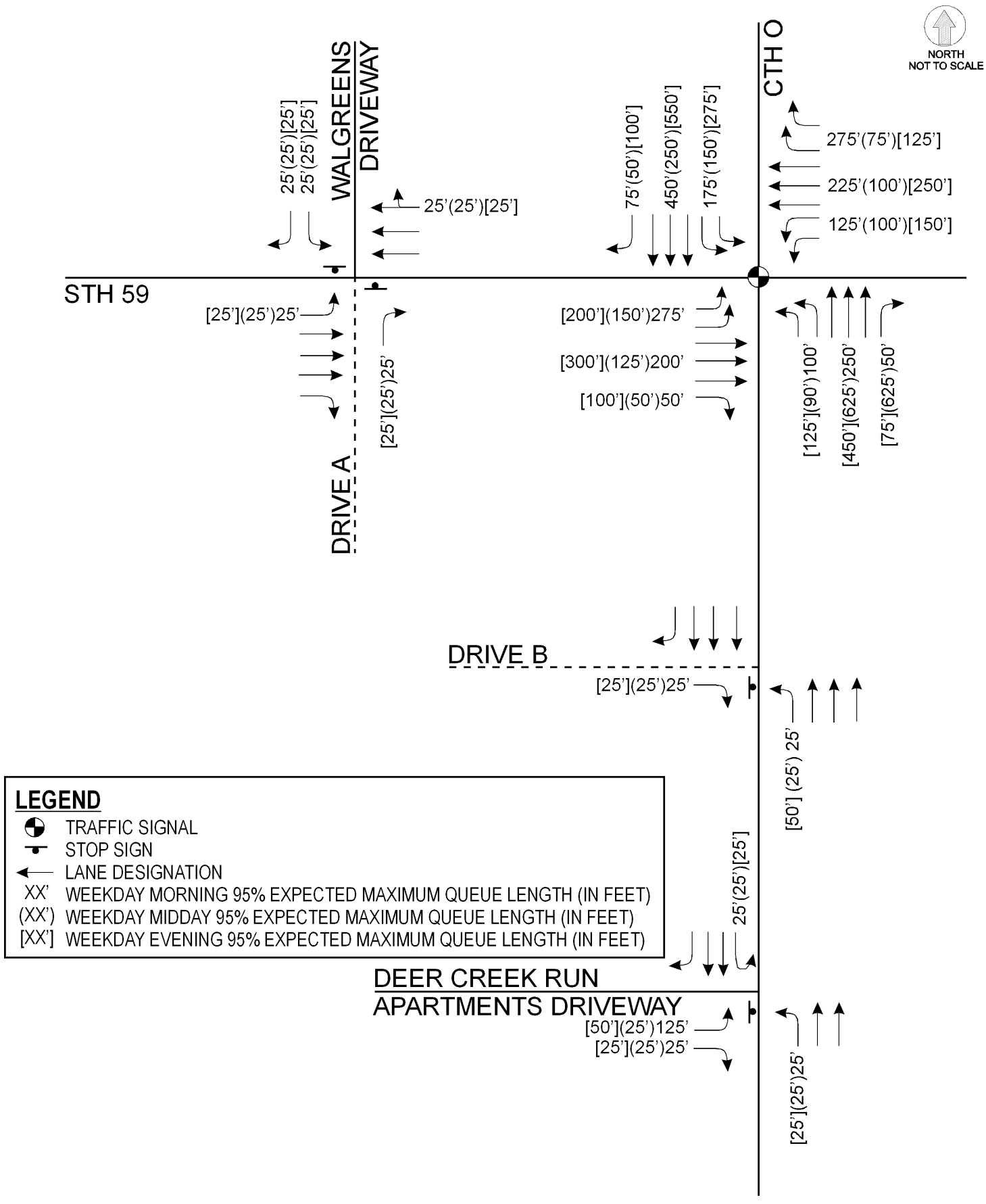
EXHIBIT 5-1
YEAR 2007 BACKGROUND TRAFFIC
EXPECTED MAXIMUM QUEUES
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

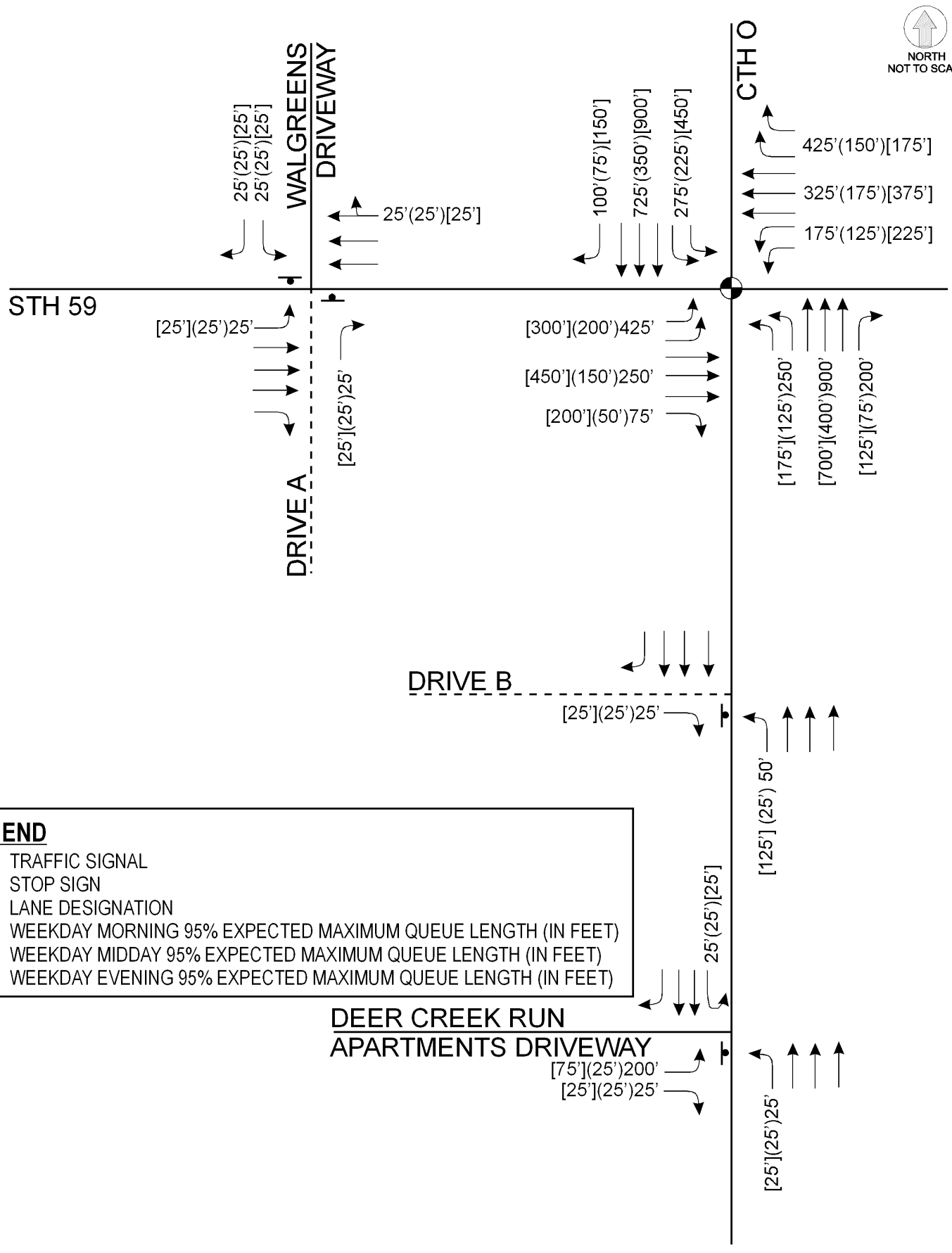
EXHIBIT 5-2
YEAR 2017 BACKGROUND TRAFFIC
EXPECTED MAXIMUM QUEUES
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 5-3
YEAR 2007 TOTAL TRAFFIC
EXPECTED MAXIMUM QUEUES
NEW BERLIN, WISCONSIN



TRAFFIC ANALYSIS & DESIGN, INC.

EXHIBIT DATE: 01-29-07

EXHIBIT 5-4
YEAR 2017 TOTAL TRAFFIC
EXPECTED MAXIMUM QUEUES
NEW BERLIN, WISCONSIN

CHAPTER VI—RECOMMENDATIONS AND CONCLUSION

PART A – RECOMMENDATIONS

The study area intersections were analyzed based on the procedures set forth in the *2000 Highway Capacity Manual* (HCM). For the purpose of this study, LOS D was used to define acceptable peak hour operating conditions.

A1. Year 2007 Background Traffic Recommended Improvements

Select movements at the STH 59 intersection with CTH O are expected to operate at LOS E/F conditions during the weekday morning and evening peak hours under Year 2007 background traffic volumes (without development). The following improvements are recommended to improve the operations at this intersection.

STH 59 & CTH O

- Provide dual westbound right-turn lanes.
- Install right-turn traffic signal heads to accommodate the westbound right-turn movement. Initiate the right-turn signals during all non-conflicting phases.

With the recommended improvements for Year 2007 background traffic conditions, all but two movements at the study area intersections are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn at the intersection of STH 59 and CTH O is expected to operate at LOS E with 58.6 seconds of average delay per vehicle and the southbound left-turn movement is expected to operate at LOS E with 60.9 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

A2. Year 2017 Background Traffic Recommended Improvements

Under Year 2017 background traffic volumes (background growth of 1.3 percent per year), select movements at the STH 59 intersection with CTH O and the CTH O intersection with the Deer Creek Run Apartments driveway are expected to operate at LOS E/F conditions. The following improvements are recommended in addition to the Year 2007 background traffic recommended improvements.

STH 59 & CTH O

- Extend the southbound dual left-turn lanes.
- Extend the westbound dual right-turn lanes.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a third northbound through lane.

With the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the

eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 background traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. Opening a third northbound through lane at this intersection is recommended to reduce the expected eastbound left-turn delay. A third northbound lane can be opened with pavement marking modifications to the 12 foot existing auxiliary lane. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

A3. Year 2007 Total Traffic Recommended Improvements

To accommodate the Year 2007 total traffic volumes (with the Deer Creek Inn & Conference Center development), the following improvements are recommended at the study area intersections. These improvements are in addition to the Year 2007 background traffic recommended improvements.

STH 59 & Walgreen's/Deer Creek Inn & Conference Center Driveway (Drive A)

- Provide an exclusive right-turn lane on the northbound approach using proper channelization to prohibit the northbound left-turn movement. Install a "Right Turn Only" sign on the northbound approach.
- Provide an eastbound channelized right-turn lane. The channelized right-turn island will serve in prohibiting traffic from entering the Deer Creek Inn & Conference Center along STH 59 from the north and east. Place a "No Left Turn" sign in the STH 59 median facing to the east.
- It is recommended that any potential Deer Creek Inn & Conference Center signs placed in the corner of the STH 59 intersection with CTH O include text to encourage drivers to enter the site along CTH O.

CTH O & Deer Creek Inn & Conference Center Driveway (Drive B)

- Provide a southbound right-turn lane.
- Provide a channelized northbound left-turn lane.

- Provide an exclusive right-turn lane on the eastbound approach using proper channelization to prohibit the eastbound left-turn movement. Install a "Right Turn Only" sign on the eastbound approach.

CTH O & Deer Creek Run Apartments Driveway

- Provide a southbound left-turn lane. Some of the traffic exiting the Deer Creek Inn & Conference Center is expected to make a u-turn from southbound to northbound at this intersection. A southbound left-turn lane would provide shelter from traffic heading southbound on CTH O.

With the recommended improvements, all but three movements at the study area intersections are expected to operate at LOS D or better conditions. In the morning peak hour, the eastbound left-turn, the southbound left-turn, and the northbound left-turn movement at the intersection of STH 59 and CTH O are expected to operate at LOS E with 60.7, 61.4, and 62.2 seconds of average delay per vehicle, respectively. In the evening peak hour the eastbound left-turn movement is expected to operate at LOS E with 55.1 seconds of average delay per vehicle. Because it is expected that the queue lengths for all turning movements are the study area's intersections will not exceed the recommended turn-bay storage lengths, no further improvements are recommended.

A4. Year 2017 Total Traffic Recommended Improvements

The following improvements are recommended to accommodate the Year 2017 total traffic volumes (2017 background traffic plus Deer Creek Inn & Conference Center). These improvements are in addition to the Year 2017 background and Year 2007 total traffic recommended improvements.

STH 59 & CTH O

- Extend the westbound dual right-turn lanes.

With the recommended improvements, select movements at the intersection of STH 59 and CTH O are expected to operate at LOS E/F conditions. Although select movements are expected to operate at LOS E/F conditions, the expected 95th percentile maximum queues for turning movements are not expected to exceed the recommended turn-bay storage lengths, except for the eastbound dual left-turn lane. Lengthening the eastbound left-turn lane would result in the closure of the median that provides access to Walgreens. At this point in time, extending the eastbound dual left-turn lane is not recommended. However, it is recommended that Waukesha County periodically monitor the maximum queue lengths in the eastbound dual left-turn lane to ensure safe and efficient operations are being provided.

To obtain LOS D or better conditions under Year 2017 total traffic volumes at the intersection of STH 59 & CTH O, it would become necessary to consider four or more through lanes and triple left-turn lanes at the intersection of STH 59 and CTH O. Four or more through lanes and triple left-turn lanes may not be feasible. Further, if a Calhoun Road interchange to Interstate 94 is constructed within the next 10-years, traffic volumes along Moorland Road would be expected to drop and eliminate the need for such improvements. Therefore, it is recommended that Waukesha County periodically monitor the traffic signal operations at the STH 59 intersection with CTH O to minimize delays for all movements until such time as further improvements can be made.

The eastbound left-turn movement from the Deer Creek Run Apartments driveway and the northbound left-turn movement are expected to operate at LOS E/F conditions during the select

peak hours. Due to a low volume of these movements at this intersection (50-eastbound left-turn vehicles during the morning peak, 10-eastbound left-turn vehicles during the evening peak, and 15-northbound left-turn vehicles during the evening peak hour), traffic signals will not be warranted. The gap study performed at this intersection for Year 2007 background traffic indicated that an adequate number of gaps currently exist at the intersection. If delays become excessive, residents of the Deer Creek Run Apartments may utilize the access to the Deer Creek Inn & Conference Center to access STH 59 and CTH O.

PART B – CONCLUSION

Except where noted above, acceptable traffic operations are expected at the study area intersections through the Year 2017 with the recommended improvements and full build-out of the Deer Creek Inn & Conference Center development.