

TRAFFIC IMPACT STUDY FOR:

Kohler Golf Course

Town of Wilson, WI
Excel Job No: 1402630

DATE: July 7, 2015



PREPARED BY:

Excel Engineering, Inc.
100 Camelot Drive
Fond du Lac, Wisconsin, 54935
Phone: 920-926-9800
Fax: 920-926-9801
Contact Person: Eric Drazkowski, P.E.

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CHAPTER 1 – EXECUTIVE SUMMARY

PART A – PURPOSE OF REPORT AND STUDY OBJECTIVES

The proposed development is an 18 hole golf course on approximately 247 acres of woodlands along the Lake Michigan shores. It will also include a practice facility and clubhouse. The development is located in the Town of Wilson, east of South 12th Street/CTH ‘V’, north of Kohler-Andrae State Park, and West of Lake Michigan. For the purpose of this report, the east/west portion of CTH ‘V’ will be referred to as CTH ‘V’ and the north/south portion will be referred to as South 12th Street.

The route evaluated in this study considers the main entrance/exit to the golf course constructed onto Beach Park Lane east of the Black River (See Figure #1). This access road will share the same entrance onto CTH ‘V’, alignment, and bridge crossing with the existing Kohler-Andrae State Park entrance/exit.

The traffic impact study was conducted to determine the peak hour impact at the intersection of CTH ‘V’, Beach Park Road, and South 12th Street. The intersection of the new driveway and Beach Park Lane was also analyzed to determine how well it will operate during peak hour operating conditions. For the purposes of this study, the peak hour was assumed to occur on Friday afternoon for beach visitors leaving, campers arriving, and associated golf course traffic. These study area intersection locations are shown in Exhibit 2. Expected peak hour operating conditions and recommendations are provided for the year 2018. Existing AADT (Annual Average Daily Trip) data was obtained from the WI DOT. These counts were from 2011 and a 2% growth applied to the applicable studied year. Existing Peak Hourly Volume was extrapolated from this data. The *ITE Trip Generation Manual, 9th Edition* was also used to add expected golf course, camping, and beach trips to the intersections.

This report documents the procedures, findings, and conclusions of the traffic impact study. The study identifies any impacts based on intersection geometrics, base traffic volumes, and additional traffic expected to be generated by the proposed development.

PART B – RECOMMENDATIONS

Year 2018 Weekday Total Traffic Operating Conditions

South 12th Street / CTH ‘V’/ Beach Park Road Intersection: No improvements are expected to be necessary for the Year 2018 weekday total traffic operating conditions for this existing intersection. The intersection is expected to exceed acceptable AASHTO Levels of Service requirements for each approach.

Beach Park Lane / Private Golf Course Drive: Based on two way stop modeling, no improvements are expected to be necessary for the Year 2018 weekday total traffic operating conditions for this existing intersection. The intersection is expected to exceed acceptable AASHTO Levels of Service requirements for each approach. Estimated

queue lengths for each lane group will not exceed queuing storage available. In addition, a roundabout may be used in place of the two way stop intersection. This option has not been modeled as it would be a more efficient design and provide a better level of service.

PART C – CONCLUSION

The existing and proposed intersections studied are expected to have safe and efficient traffic operating conditions with the addition of the proposed development when built out in 2018. Level of Service (LOS) is a quantitative measure that refers to the overall quality of traffic flow at an intersection. Acceptable LOS for all minor movements at the two-way stop controlled intersections will be maintained. If a roundabout option is being considered it would be a more efficient design and provide a better LOS than the two-way stop controlled intersection. Acceptable LOS for each lane group at the all-way stop intersection will be maintained.

CHAPTER 2 – ANALYSIS OF EXISTING CONDITIONS

PART A – PHYSICAL CHARACTERISTICS

CTH ‘V’ is a two lane undivided rural county highway that runs east from I-43. The posted speed limit is 55 mph. There is no upstream traffic signal located within 0.25 miles of the existing 3 way stop intersection to be studied. WI DOT average daily count for this segment of roadway is anticipated to match the South 12th Street counts at the studied intersection, 1,600 AADT in 2011. Adding an inflation rate of 2% per year the AADT in 2014 is expected to be 1,698. See Exhibits 2 and 3 for the intersection geometrics and traffic numbers.

South 12th Street (CTH ‘V’ north/south) is a two lane undivided rural county roadway in the area of the proposed intersection with the new driveway to the development. Parking is allowed on the west side of this roadway. The posted speed limit is 45 mph. There is an upstream traffic signal located at Stahl Road which is more than 0.25 miles from the proposed driveway. WI DOT average daily count for this segment of roadway is 1,600 AADT in 2011. Adding an inflation rate of 2% per year the AADT in 2014 is expected to be 1,698. See Exhibits 2 and 3 for the intersection geometrics and traffic numbers.

Beach Park Road is a two lane undivided local roadway that extends to the studied intersection. This roadway leads to the Kohler-Andrae State Park and has bike lanes on the north and south side of the road. The posted speed limit is 25 mph. This has an existing 32 foot wide bridge with 11 foot lanes. *ITE Trip Generation Manual, 9th Edition*, was used to generate vehicle trips entering and exiting the existing park. Beach and Camping uses were utilized to generate 73 total trips during the PM peak hour. See Exhibit 2 and 3 for the intersection geometrics and traffic numbers.

PART B – TRAFFIC VOLUMES

To determine the study area's intersections the existing peak hour traffic volumes were derived from an extrapolation from the AADT counts provided by the WI DOT traffic maps. Per AASHTO guidelines the Peak Hour traffic volume is typically 15% of ADT. Accounting for increased volume and data fluctuation the study uses 20% of ADT to generate existing peak hour traffic at the studied intersections. It is assumed that 2% of these traffic counts consist of truck traffic. Because the study is expected to be a Friday PM Peak, it is assumed that 50% of traffic will be traveling to the City and an additional 50% of traffic will be leaving the City to I-43. For the purposes of this study, the ADT is split in half for east/northbound and west/southbound traffic. The traffic counts for AADT can be seen in Appendix A and the calculations for inflation and peak hour volume can be seen on Exhibit 3.

The *ITE Trip Generation Manual, 9th Edition*, was used to generate average vehicle trips entering and exiting the existing campground and beach at the Kohler-Andrae State Park. These trips were distributed to the existing intersection and roadway to model the existing Weekday PM Peak Hour. These generated trips are also used in the proposed development because the parks use is assumed to remain the same. ITE trip generator inputs/outputs can be seen in Appendix B. The existing traffic volumes at all study area intersections are shown in Exhibit 3.

**Table 1:
Beach and Campground Trip Generation
Weekday PM Peak Hour of Generator**

ITE CODE	Land Use	Peak Hour		
		IN	OUT	TOTAL
415	Beach Park (36 Acres)	7	15	22
416	Campground Park (125 Occupied Sites)	32	19	51
Total Trips (Driveway Trips)		39	34	73

Trips have been dispersed as 20% entering/exiting from the north (City) and 80% entering/exiting from the west (I-43).

PART C – CAPACITY/LEVEL OF SERVICE

The existing study area intersection was analyzed based on procedures set forth in the *2010 Highway Capacity Manual (HCM)*. Level of Service is a quantitative measure that refers to the overall quality of traffic flow at an intersection. The Level of Service rating ranges from LOS A (very good) to LOS F (very poor). Per AASHTO, design standards

have set LOS D and above as the acceptable LOS for existing peak hour operating conditions for a level, rural, local roadway. Therefore, for the purpose of this analysis, LOS D will be used to define acceptable existing weekday peak hour operating conditions.

The existing study area intersection was analyzed to determine Level of Service. The existing intersection with South 12th Street, CTH ‘V’, and Beach Park Road was analyzed as an all-way stop-controlled intersection. LOS for an all-way stop controlled intersection is determined by the computed delay for each lane movement. Table 2 shows the existing traffic weekday peak hour operating conditions for each direction of the all-way stop-controlled intersection. Highway Capacity Software inputs/outputs can be seen in Appendix C.

**Table 2:
2014 Weekday Existing Traffic Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control**

Intersection	Traffic Control	Level of Service per Movement by Approach											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
CTH 'V', South 12th St., Beach Park Road	All-Way Stop	B	B	-	-	A	A	-	-	-	A	-	A

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

(na) indicates a non minor movement.

As shown in Table 2, all lane groups at the existing study area intersections currently operate at LOS B or better during the weekday peak hour for the Year 2014 existing traffic conditions.

PART D – SOURCES OF DATA

All ADT and traffic count data was collected from the WI DOT traffic counts and *ITE Trip Generation Manual, 9th Edition*.

CHAPTER 3 – PROPOSED DEVELOPMENT

PART A – STUDY AREA

The existing and proposed study area intersections for the proposed golf course development, as shown in Exhibits 5, 6, and 7 include a new driveway access onto Beach Park Lane and the existing CTH ‘V’/South 12th Street intersection. Existing ADT data and trip generation data was used for baseline counts as previously discussed and will also be the basis of analysis for the proposed driveway intersection.

PART B – ON-SITE DEVELOPMENT

The proposed development is an 18 hole golf course with practice facility and clubhouse on approximately 247 acres along the Lake Michigan shores. It is located in the Town of Wilson, east of South 12th Street, north of Kohler-Andrae State Park, and West of Lake Michigan.

Access to the golf course is proposed onto Beach Park Lane east of the Black River (See Figure #1). Beach Park Lane at the bridge is approximately 32 feet wide at the bridge with 24 feet of roadway and (2) – 4 foot wide bike lanes. The driveway will provide customer, employee and delivery access to the site. This entry road will be constructed as a two way stop intersection or as a roundabout. The overall plan for this development is shown in Figure 1. Exhibits 6 and 7 show the geometrics of the connection point.

The ITE *Trip Generation Manual, 9th Edition*, was used to generate average vehicle trips entering and exiting the proposed development for the peak weekday pm. Trip generations were based on the course acreage. The proposed 247 acre golf course is expected to generate 96 total trips during the typical P.M. weekday peak hour (41 entering and 55 exiting). Proposed trips will be used to generate total traffic volumes for build out Year 2018. ITE trip generator inputs/outputs can be seen in Appendix B.

PART C – SITE ACCESSIBILITY

The proposed development will have one driveway access point described below:

Beach Park Lane/Proposed Driveway was modeled as a two way stop controlled intersection with Beach Park Lane being the major legs of the intersection (westbound and eastbound). See Exhibit 6. The new driveway to the proposed development will make up the southbound minor leg of the intersection. Beach Park Lane is not divided at the location of the new driveway and the eastbound approach consists of one shared thru/left turn lane. Westbound approach is a thru lane. The grade for both approaches is relatively flat. The new driveway will make up the southbound approach and will consist of one shared right turn/thru lane. For the purposes of this analysis all traffic leaving the golf course is expected to turn right to exit out of the park. The approach grade will be at 5% maximum. A roundabout is also considered for this intersection, see Exhibit 7. This option has not been modeled as this layout will operate more efficiently and therefore the Level of Service as a two way stop controlled intersection is conservative.

CHAPTER 4 – PROJECTED TRAFFIC

PART A – BASE TRAFFIC FORECASTING

The Year 2014 existing traffic volumes at the studied intersections were projected out using an annual growth rate of two percent. This annual growth percentage was used as a conservative estimate. The growth rate was utilized for all studied roadways and intersections.

Using the percentage as stated, the Year 2014 existing traffic volumes were projected out to determine the build out 2018 base peak hour traffic volumes. Because the existing beach park and campground trips were calculated utilizing ITE *Trip Generation Manual, 9th Edition*, these trips were kept constant.

PART B – PROPOSED DEVELOPMENT TRAFFIC FORECASTING

On-Site Trip Generation

To address any potential traffic impacts at the study area intersection, it is necessary to identify the peak hour volume of traffic generated by the proposed development. The expected traffic volumes generated by the development are based on the size and type of proposed use along with trip rates as published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Ninth Edition, 2012*. Table 3 documents the expected development trips at full build out. All ITE rates represent 100 percent automobile usage. ITE trip generator inputs/outputs can be seen in Appendix B.

Table 3:

Golf Course Development Trip Generation

ITE CODE	Land Use	Peak Hour		
		IN	OUT	TOTAL
430	Golf Course (247 Acres)	41	55	96

Trip Distribution

The trip distribution for the proposed development is based on anticipated traffic patterns and percentages. Because the campground and golf course will be mostly destination trips the expected trip distribution is going to be 20% of trips from the north (City of Sheboygan) and 80% from the west (I-43).

The proposed trip distributions for the build out year 2018 can be seen in Exhibit 4.

PART C – TOTAL TRAFFIC

Year 2018 Total Traffic

The proposed traffic distribution at the CTH ‘V’ and South 12th Street intersection has been updated to reflect the change in Exhibit 5. At this intersection the proposed golf course traffic volume has been added to the anticipated traffic volume for the 2018 build out year. This updated traffic volume has been modeled in the HCS 2010 software as an all way stop condition. The golf course drive entrance onto the existing Beach Park Lane has been modeled as a two way stop intersection. Exhibit 6 shows the anticipated traffic volume for each movement at the proposed drive intersection. Both of these analyses assume all employee and guests use this access. A roundabout is also considered for this

intersection, see Exhibit 7. This option has not been modeled as this layout will operate more efficiently and therefore the Level of Service as a two way stop controlled intersection is conservative.

CHAPTER 5 – TRAFFIC ANALYSIS

PART A – CAPACITY/LEVEL OF SERVICE ANALYSIS FOR STUDY AREA INTERSECTIONS

The study area intersections were analyzed based on the procedures set forth in the *2010 Highway Capacity Manual (HCM)*. Level of Service is a quantitative measure that refers to the overall quality of flow at an intersection. The Level of Service rating ranges from LOS A (very good) to LOS F (very poor). Per AASHTO Guidelines, design standards have set LOS D as an acceptable LOS for Year 2018 weekday peak hour operating conditions.

County Highway ‘V’ / South 12th Street and Golf Course Drive / Beach Park Lane Intersections:

The study area intersections were analyzed to determine Level of Service (LOS). The proposed driveway intersection with Beach Park Lane LOS for a two-way stop controlled intersection is determined by the computed control delay and is defined for each minor movement. A roundabout is also considered for this intersection and has not been modeled as this layout will operate more efficiently and therefore the Level of Service as a two way stop controlled intersection is conservative. The intersection of South 12th St and CTH ‘V’ was analyzed as an all-way stop intersection. LOS for an all-way stop intersection is determined by the computed average delay per vehicle and is defined for each movement.

Year 2018 Total Traffic Operating Conditions

Table 4 shows the Year 2018 weekday total traffic (Year 2018 existing traffic plus proposed new trips) peak hour operating conditions for the study area intersections using the roadway as employee and guest access. The Year 2018 weekday total peak hour traffic volumes, as shown in Exhibits 5 and 6, were analyzed using the existing geometrics as shown in Exhibits 2 and 6. Highway Capacity Software inputs/outputs can be seen in Appendix D.

**Table 4:
2018 Weekday Total Peak Hour Operating Conditions
With Existing Geometrics & Traffic Control**

Intersection	Traffic Control	Level of Service per Movement by Approach											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Private Drive/ Beach Park Lane (Unimproved Two-Way Stop)	Two-Way Stop	A	na	-	-	na	-	-	-	-	-	na	A
CTH 'V', South 12th St., Beach Park Road	All-Way Stop	B	B	-	-	A	A	-	-	-	A	-	A

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

(na) indicates a non minor movement.

As shown in Table 4, all movements at the study area intersections are expected to operate at LOS B or better during the weekday peak hour for the Year 2018 total traffic conditions.

PART B – QUEUING ANALYSIS

Queuing table is provided showing the 95th percentile maximum queue lengths that need to be accommodated for the minor movements at the two-way stop intersection. This is done to determine if adequate queuing storage exists.

The estimated 95th percentile maximum queue lengths for the Beach Park Lane / Private Golf Course Drive is shown in table 5.

**Table 5:
Beach Park Lane / Private Golf Course Drive 95th PERCENTILE
BACK OF QUEUE FOR EACH MINOR MOVEMENT**

Intersection		LENGTH IN FEET				
		Westbound		Eastbound		Southbound
		TH	L/TH	TH	R	
TRAFFIC 2018	BOQ	na	3	na	6	
	AVAILABLE	160	90	90	100+	

(na) indicates a non-minor movement.

As shown in Table 5, all queuing lengths at the study area intersection will be accommodated.

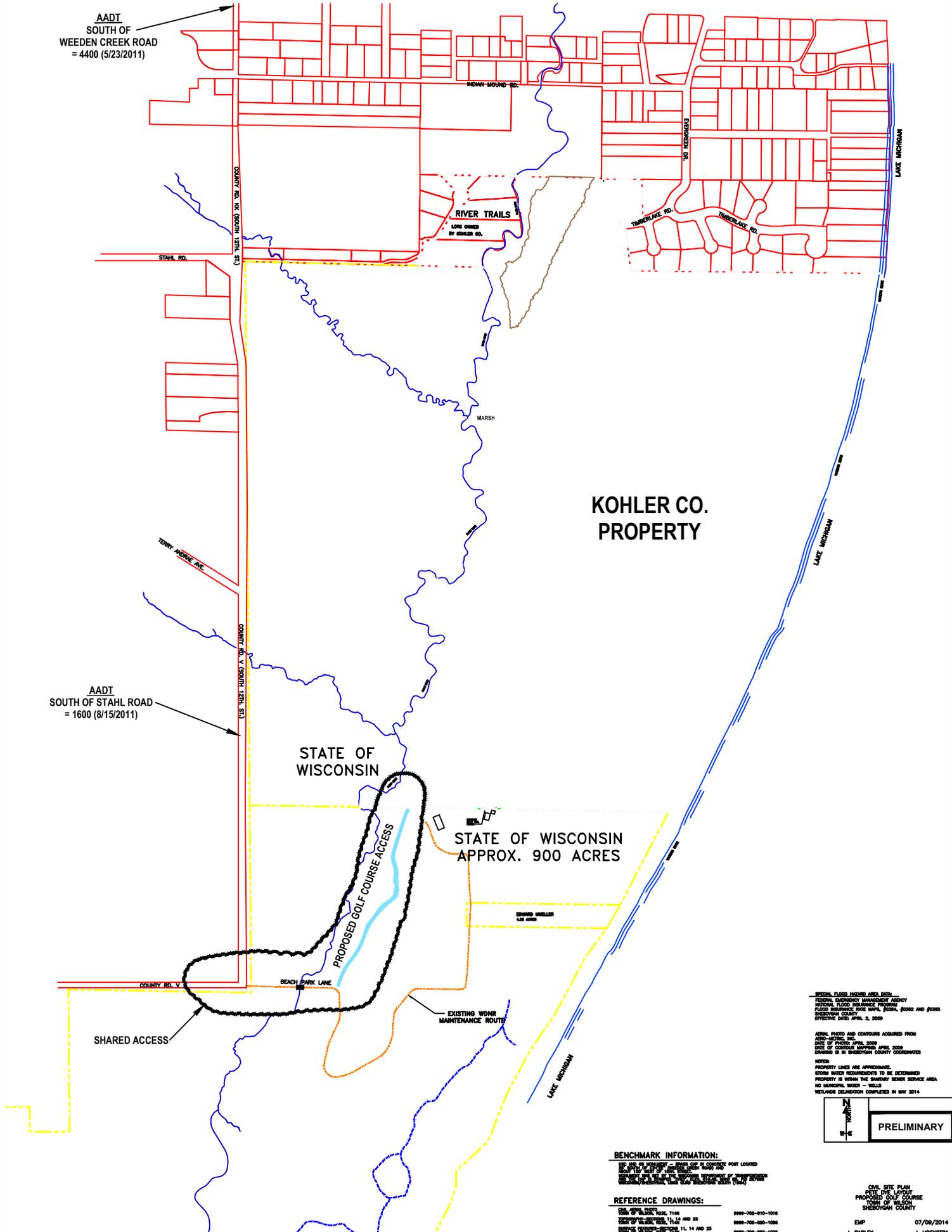
PART C – CONCLUSION

In summary, the CTH ‘V’ and South 12th Street intersection and Beach Park Lane and Private Drive intersection will operate at an acceptable level of service with the added golf course employee and guest traffic. The private drive intersection will operate at an acceptable level of service if it is constructed as a two-way stop controlled intersection. A roundabout is also considered for this intersection and has not been modeled as this layout will operate more efficiently and therefore the Level of Service as a two way stop controlled intersection is conservative, see Exhibit 7 for layout. The existing bridge currently handles multiple trips by larger vehicles (motorhomes, campers, trailers, etc.) The bridge is 32 feet wide and the roadway is striped 22 feet wide which is typical. Based on the existing use of the bridge and existing striping widths it is anticipated that the bridge can handle the proposed traffic flow. Signage will also need to be added on Beach Park Lane to clearly direct state park and golf course traffic into their desired lane.

Figure 1

AAIT
SOUTH OF
WEEDEN CREEK ROAD
= 4400 (5/23/2011)

AAIT
SOUTH OF STAHL ROAD
= 1600 (8/15/2011)



**KOHLER CO.
PROPERTY**

STATE OF WISCONSIN

STATE OF WISCONSIN
APPROX. 900 ACRES

PROPOSED GOLF COURSE ACCESS

SHARED ACCESS

EXISTING WDRR
MAINTENANCE ROUTE

— SPECIAL FLOOD HAZARD AREA BATH —
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAPS, FIRMAS, FEMA AND FEMA
SHEBOYGAN COUNTY
EFFECTIVE DATE: APRIL 2, 2009

AERIAL PHOTO AND CONTOURS ACQUIRED FROM
AERIAL PHOTO, INC.
DATE OF PHOTO: APRIL 2009
DATE OF CONTOUR SURVEY: APRIL 2009
DRAWING IS IN SHEBOYGAN COUNTY COORDINATES

NOTE:
PROPERTY LINES ARE APPROXIMATE.
STORM WATER REQUIREMENTS TO BE DETERMINED
PROPERTY IS WITHIN THE SANITARY SEWER SERVICE AREA
NO SURFICIAL WATER — WELLS
WETLANDS DELINEATION COMPLETED IN MAY 2014

PRELIMINARY

BENCHMARK INFORMATION:
NEP AND PL PLANNING — SHEBOYGAN COUNTY PORT LOCATED
FOR THE TOWN OF WILSON
PROPERTY IS IN THE TOWN OF WILSON, SHEBOYGAN COUNTY
DATE OF SURVEY: APRIL 2014

REFERENCE DRAWINGS:

2014-03-0011	9999-702-010-1018
2014-03-0011	9999-702-020-1088
2014-03-0011	9999-702-030-1032

CIVIL SITE PLAN
PETE DYE LAYOUT
PROPOSED GOLF COURSE
TOWN OF WILSON
SHEBOYGAN COUNTY

EMP 07/09/2014
J. BARILEY J. HOKSTRA

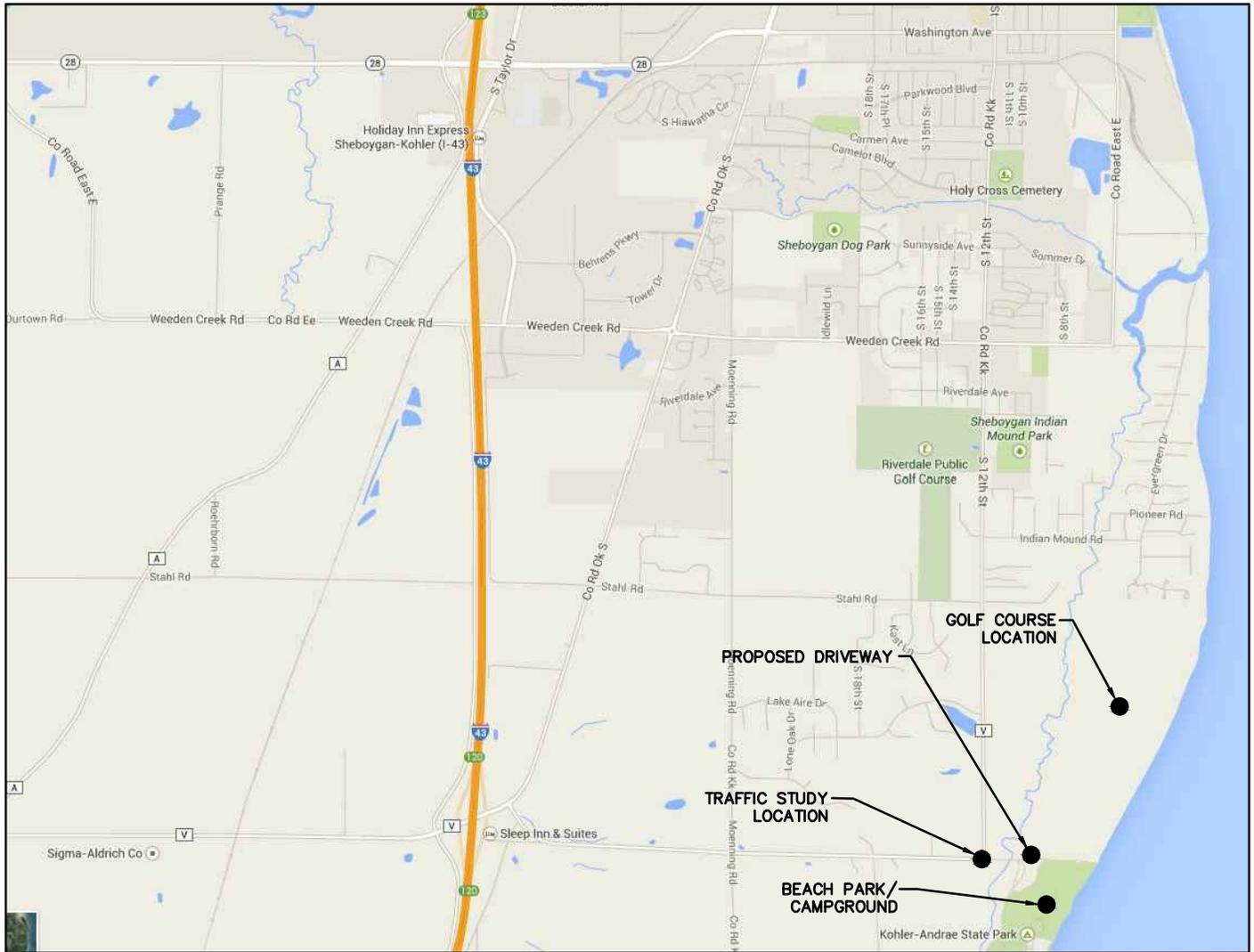
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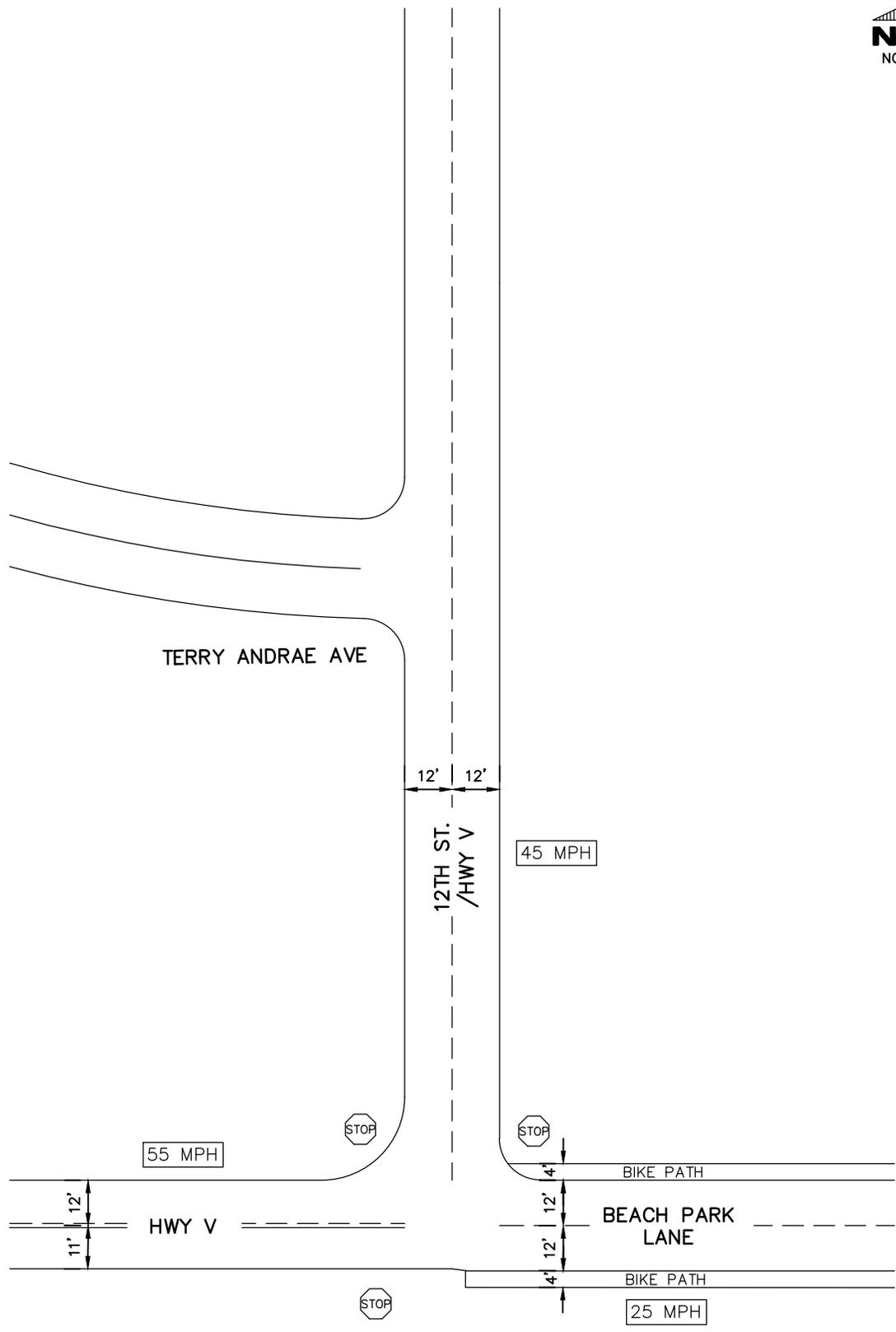
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Exhibits



**EXCEL**
ENGINEERING Inc.
Always a Better Plan
100 CAMELOT DRIVE
FOND DU LAC, WI 54935
PHONE: (920) 926-9800
FAX: (920) 926-9801
PROJECT NO. 1402630

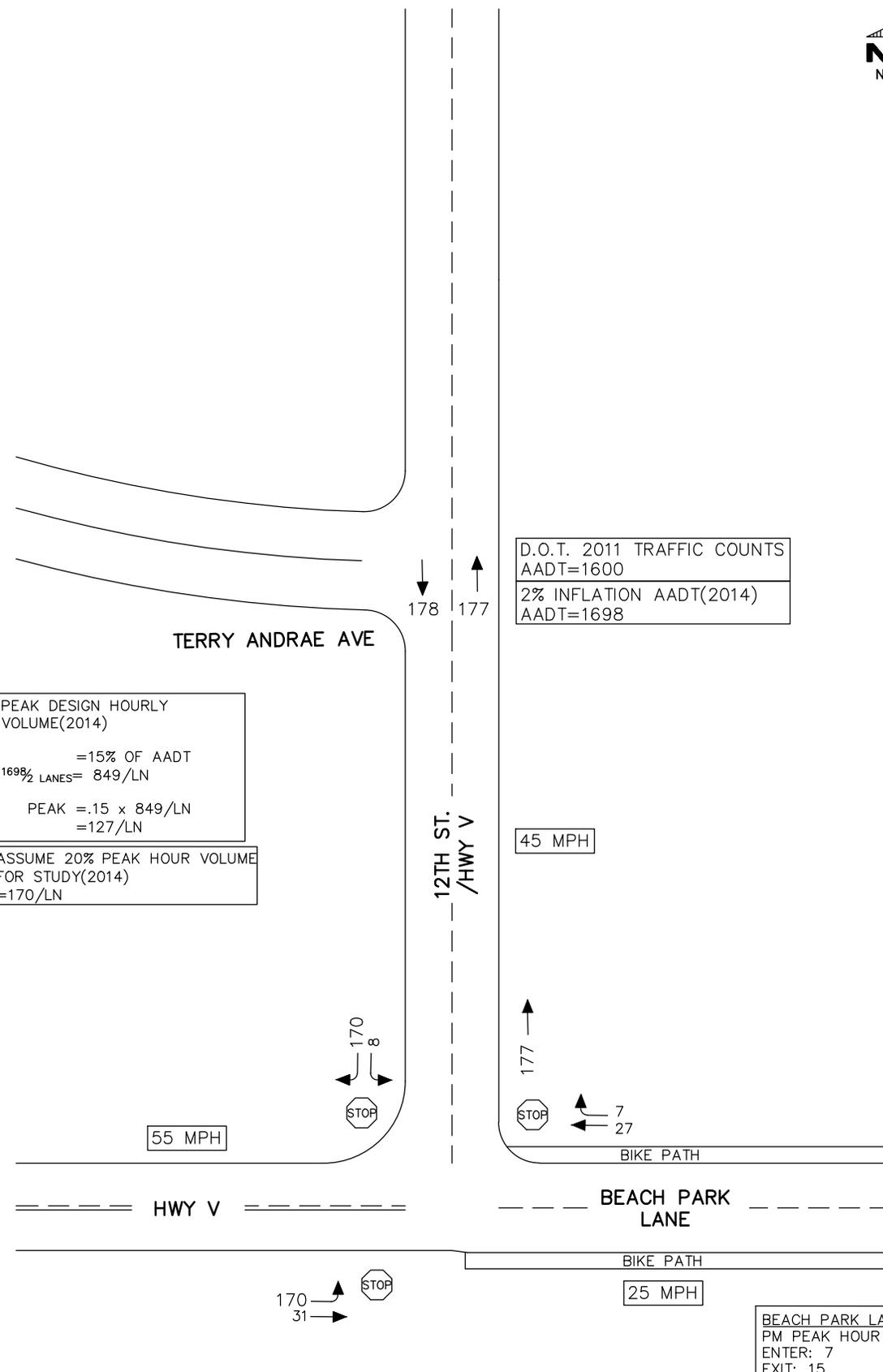
EXHIBIT 1
LOCATION MAP
KOHLER-TOWN OF WILSON GOLF COURSE
WILSON, WISCONSIN



Excel
ENGINEERING Inc.
PROJECT NO. 1402630

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PHONE: (920) 926-9800
FAX: (920) 926-9801

EXHIBIT 2
EXISTING GEOMETRY
KOHLEK-TOWN OF WILSON GOLF COURSE
WILSON, WISCONSIN



D.O.T. 2011 TRAFFIC COUNTS
 AADT=1600
 2% INFLATION AADT(2014)
 AADT=1698

PEAK DESIGN HOURLY VOLUME(2014)
 =15% OF AADT
 $1698 \times \frac{1}{2} \text{ LANES} = 849/\text{LN}$
 PEAK $= .15 \times 849/\text{LN}$
 $= 127/\text{LN}$

ASSUME 20% PEAK HOUR VOLUME FOR STUDY(2014)
 $= 170/\text{LN}$

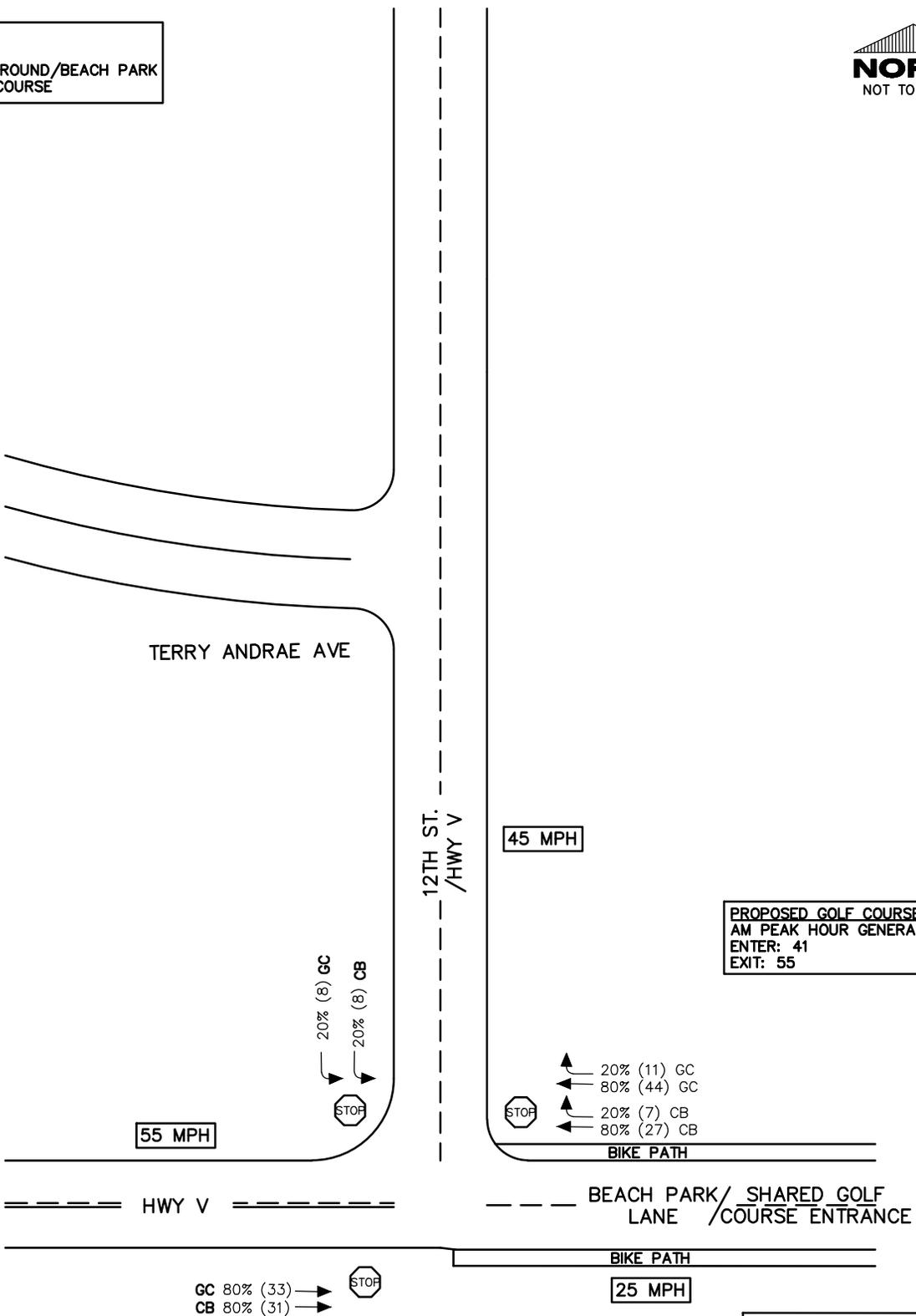
BEACH PARK LANE(36 ACRES):
 PM PEAK HOUR GENERATION
 ENTER: 7
 EXIT: 15

CAMPGROUND(125 CAMPSITES):
 PM PEAK HOUR GENERATION
 ENTER: 32
 EXIT: 19

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**EXHIBIT 3
 EXISTING PEAK PM TRAFFIC VOLUME(2014)
 KOHLER-TOWN OF WILSON GOLF COURSE
 WILSON, WISCONSIN**

LEGEND:
 CB CAMPGROUND/BEACH PARK
 GC GOLF COURSE



PROPOSED GOLF COURSE:
 AM PEAK HOUR GENERATION
 ENTER: 41
 EXIT: 55

20% (11) GC
 80% (44) GC
 20% (7) CB
 80% (27) CB

GC 80% (33) →
 CB 80% (31) →

BEACH PARK LANE(36 ACRES):
 PM PEAK HOUR GENERATION
 ENTER: 7
 EXIT: 15

CAMPGROUND(125 CAMPSITES):
 PM PEAK HOUR GENERATION
 ENTER: 32
 EXIT: 19

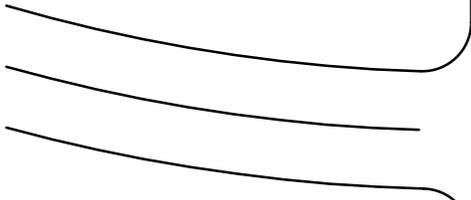
EXCEL ENGINEERING Inc.
 Always a Better Plan
 100 CAMELOT DRIVE
 FOND DU LAC, WI 54935
 PHONE: (920) 926-9800
 FAX: (920) 926-9801
 PROJECT NO. 1402630

EXHIBIT 4
 PEAK PM TRAFFIC DISTRIBUTION(2018)
 SHARED STATE PARK ACCESS
 KOHLER-TOWN OF WILSON GOLF COURSE
 WILSON, WISCONSIN

LEGEND:
 CB CAMPGROUND/BEACH PARK
 GC GOLF COURSE



200 GC/CB/BASE



TERRY ANDRAE AVE

PEAK DESIGN HOURLY VOLUME(2018)
 =15% OF AADT
 $\frac{1838}{2 \text{ LANES}} = 919/\text{LN}$
 PEAK = .15 x 919/LN
 =138/LN
 ASSUME 20% PEAK HOUR VOLUME FOR STUDY(2018)
 =184/LN

184 BASE
 16 GC/CB

55 MPH

12TH ST.
 /HWY V

2% INFLATION AADT(2018)
 AADT=1838

45 MPH

PROPOSED GOLF COURSE:
 AM PEAK HOUR GENERATION
 ENTER: 41
 EXIT: 55

STOP 18
 71

BIKE PATH

HWY V

BEACH PARK / SHARED GOLF LANE / COURSE ENTRANCE

BIKE PATH

25 MPH

BASE 184
 GC/CB 64

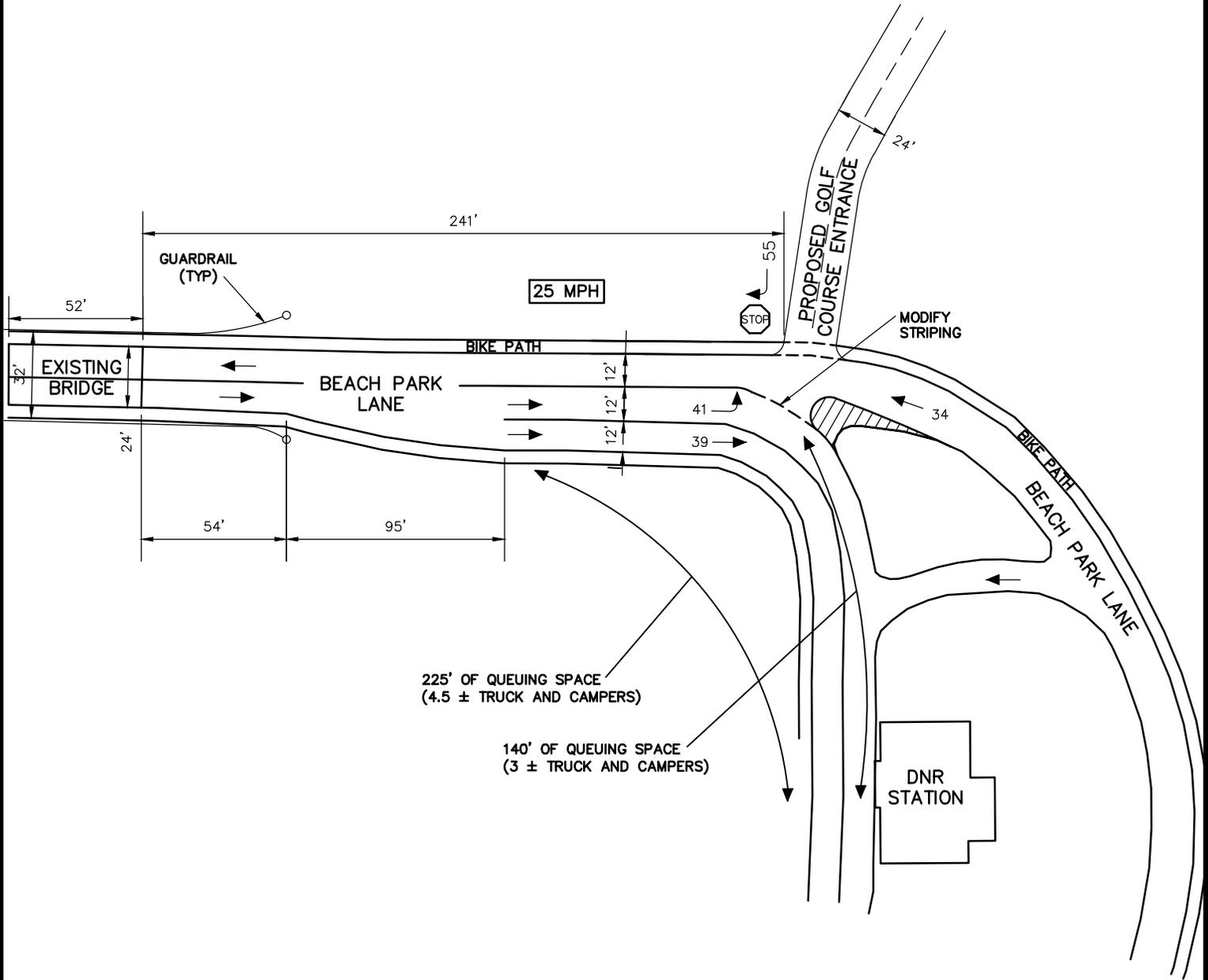
BEACH PARK LANE(36 ACRES):
 PM PEAK HOUR GENERATION
 ENTER: 7
 EXIT: 15

CAMPGROUND(125 CAMPSITES):
 PM PEAK HOUR GENERATION
 ENTER: 32
 EXIT: 19

EXHIBIT 5
 TOTAL PROPOSED PEAK PM TRAFFIC VOLUME(2018)
 SHARED STATE PARK ACCESS
 KOHLER-TOWN OF WILSON GOLF COURSE
 WILSON, WISCONSIN

LEGEND:

CB CAMPGROUND/BEACH PARK
GC GOLF COURSE



BEACH PARK LANE(36 ACRES):
PM PEAK HOUR GENERATION
ENTER: 7
EXIT: 15

CAMPGROUND(125 CAMPSITES):
PM PEAK HOUR GENERATION
ENTER: 32
EXIT: 19

EXHIBIT 6
PROPOSED PEAK PM TRAFFIC VOLUME(2018)
GOLF COURSE DRIVE ENTRANCE
AS TWO WAY STOP INTERSECTION
KOHLER-TOWN OF WILSON GOLF COURSE
WILSON, WISCONSIN

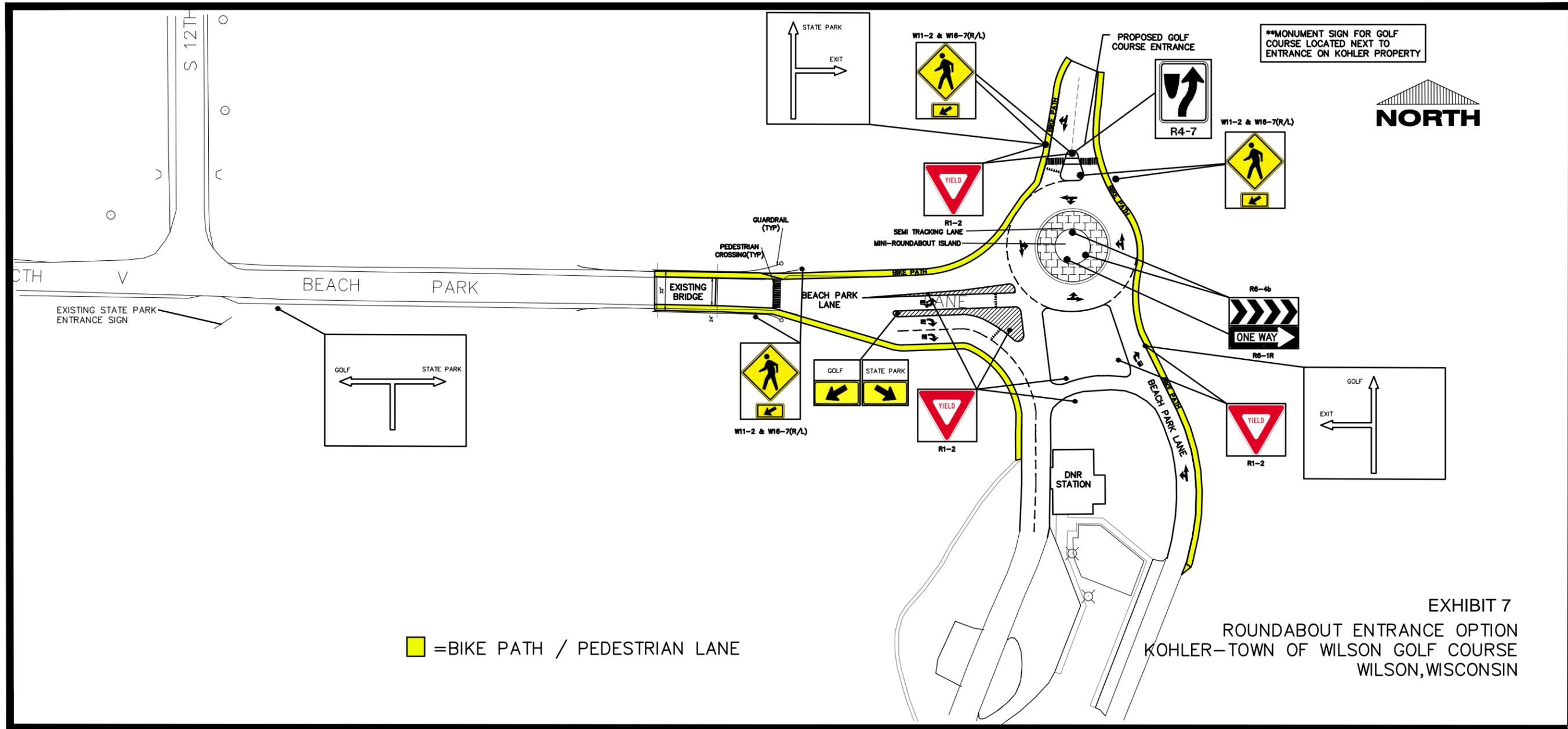
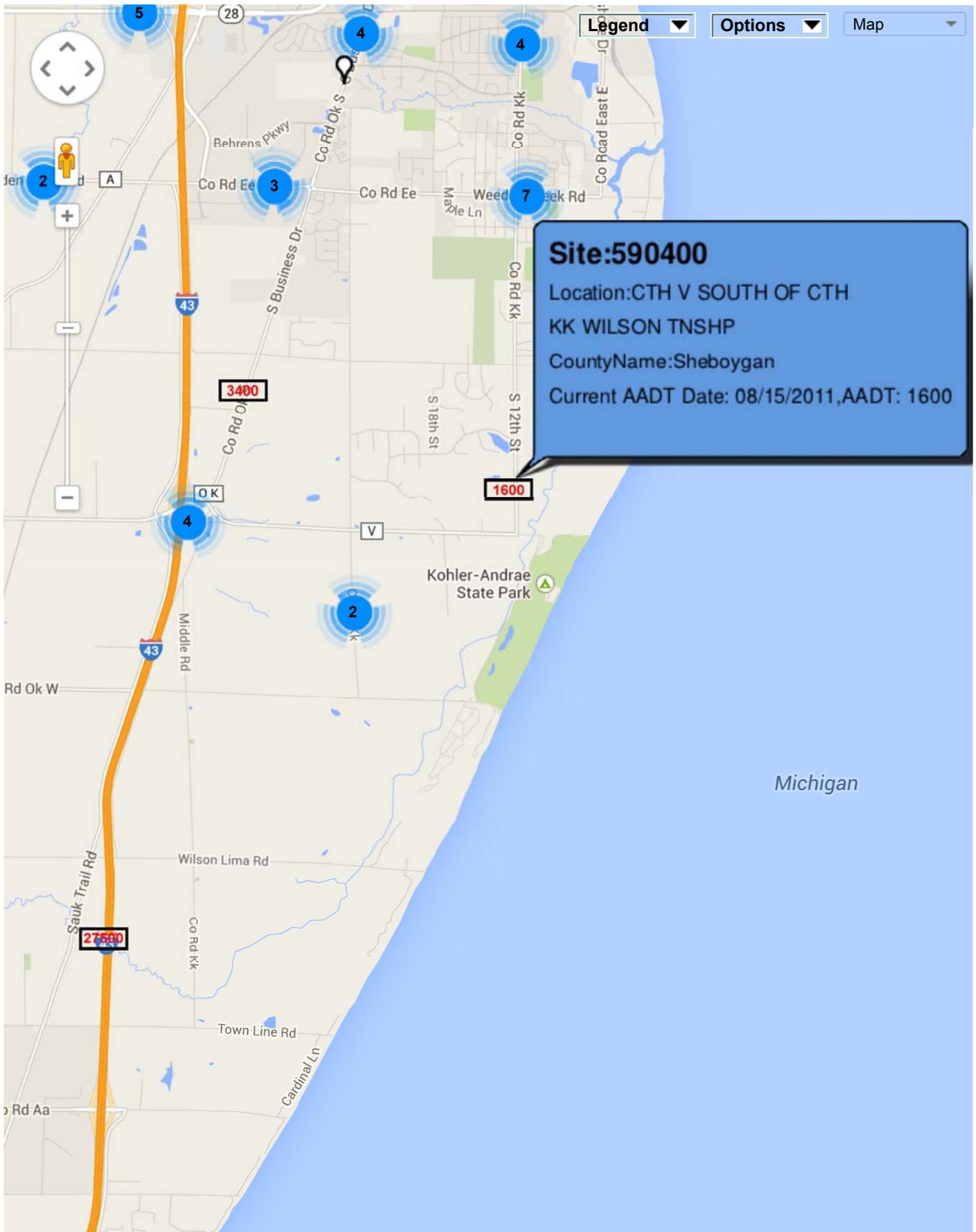


EXHIBIT 7
 ROUNDABOUT ENTRANCE OPTION
 KOHLER-TOWN OF WILSON GOLF COURSE
 WILSON, WISCONSIN

Appendix A



Appendix B

Phase Time Period Trip Generation
Weekday PM Peak Hour of Generator

Project: New Project
Alternative: Alternative 1
Phase: Phase 1

Open Date: 3/6/2014
Analysis Date: 3/6/2014

ITE	Land Use	Enter	Exit	Total
415	PARKBEACH 1 36 Acres	7	15	22
416	PARKCAMP 1 125 Occupied Camp Sites	32	19	51
Unadjusted Driveway Volume		39	34	73
Unadjusted Pass-By Trips		0	0	0
Internal Vehicle Trips		0	0	0
Adjusted Driveway Volume		39	34	73
Adjusted Pass-By Trips		0	0	0
Adjusted Total Volume Added to Adjacent Streets		39	34	73

Phase Time Period Trip Generation
Weekday PM Peak Hour of Generator

Project : New Project
Alternative : Alternative 1
Phase : Phase 2

Open Date : 3/6/2014
Analysis Date : 3/6/2014

ITE	Land Use	Enter	Exit	Total
430	GOLF 1 247 Acres	41	55	96
Unadjusted Driveway Volume		41	55	96
Unadjusted Pass-By Trips		0	0	0
Internal Vehicle Trips		0	0	0
Adjusted Driveway Volume		41	55	96
Adjusted Pass-By Trips		0	0	0
Adjusted Total Volume Added to Adjacent Streets		41	55	96

Appendix C

HCS+: Unsignalized Intersections Release 5.6

Phone:
E-Mail:

Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Eric D
 Agency/Co.: Excel Engineering
 Date Performed: 5/30/2014
 Analysis Time Period: PM Peak
 Intersection: S. 12th St. & CTH V (Existing)
 Jurisdiction: Sheboygan County
 Units: U. S. Customary
 Analysis Year: 2014
 Project ID: 1402630
 East/West Street: CTH V
 North/South Street: S. 12th St.

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	170	31	0	0	27	7	0	0	0	8	0	170
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		TR				LR	
PHF	0.75		0.75				0.75	
Flow Rate	267		45				236	
% Heavy Veh	2		25				2	
No. Lanes	1		1				1	
Opposing-Lanes	1		1				0	
Conflicting-lanes	1		1				1	
Geometry group	1		1				1	
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	267		45				236	
Left-Turn	226		0				10	
Right-Turn	0		9				226	
Prop. Left-Turns	0.8		0.0				0.0	
Prop. Right-Turns	0.0		0.2				1.0	
Prop. Heavy Vehicle	0.0		0.3				0.0	
Geometry Group	1		1				1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2				0.2	

hRT-adj	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7
hadj, computed	0.2	0.3	-0.5

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	267		45				236	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.24		0.04				0.21	
hd, final value	4.70		5.07				4.14	
x, final value	0.35		0.06				0.27	
Move-up time, m		2.0		2.0				2.0
Service Time	2.7		3.1				2.1	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	267		45				236	
Service Time	2.7		3.1				2.1	
Utilization, x	0.35		0.06				0.27	
Dep. headway, hd	4.70		5.07				4.14	
Capacity	517		295				486	
Delay	10.19		8.41				8.68	
LOS	B		A				A	
Approach:								
Delay		10.19		8.41				8.68
LOS		B		A				A
Intersection Delay	9.39							
								Intersection LOS A

Appendix D

HCS+: Unsignalized Intersections Release 5.6

Phone:
E-Mail:

Fax:

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: Eric D
 Agency/Co.: Excel Engineering
 Date Performed: 3/25/2015
 Analysis Time Period: PM Peak
 Intersection: S. 12th St. & CTH V (Shared)
 Jurisdiction: Sheboygan County
 Units: U. S. Customary
 Analysis Year: 2018
 Project ID: 1402630
 East/West Street: CTH V
 North/South Street: S. 12th St.

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	184	64	0	0	71	18	0	0	0	16	0	184
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LT		TR				LR	
PHF	0.75		0.75				0.75	
Flow Rate	330		118				266	
% Heavy Veh	2		25				2	
No. Lanes		1		1				1
Opposing-Lanes		1		1				0
Conflicting-lanes		1		1				1
Geometry group		1		1				1
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	330		118				266	
Left-Turn	245		0				21	
Right-Turn	0		24				245	
Prop. Left-Turns	0.7		0.0				0.1	
Prop. Right-Turns	0.0		0.2				0.9	
Prop. Heavy Vehicle	0.0		0.3				0.0	
Geometry Group	1		1				1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2		0.2				0.2	

hRT-adj	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7
hadj, computed	0.2	0.3	-0.5

-----Worksheet 4 - Departure Headway and Service Time-----

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	330		118				266	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.29		0.10				0.24	
hd, final value	4.91		5.30				4.54	
x, final value	0.45		0.17				0.34	
Move-up time, m	2.0		2.0				2.0	
Service Time	2.9		3.3				2.5	

-----Worksheet 5 - Capacity and Level of Service-----

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	330		118				266	
Service Time	2.9		3.3				2.5	
Utilization, x	0.45		0.17				0.34	
Dep. headway, hd	4.91		5.30				4.54	
Capacity	580		368				516	
Delay	11.87		9.42				9.82	
LOS	B		A				A	
Approach:								
Delay	11.87		9.42				9.82	
LOS	B		A				A	
Intersection Delay	10.70						Intersection LOS B	

