



April 23, 2015

Ms. Letty Schamp, PE
Transportation Engineer
City of Hilliard
3800 Municipal Way
Hilliard, OH 43026

Subject: Carr Farms Traffic Impact Study
Hilliard, Ohio

Dear Ms. Schamp,

This letter serves to summarize traffic analysis methodologies and results associated with the development of the above referenced site, located on Leppert Road just north of Davidson Road in Hilliard, Ohio. This analysis focuses on the proposed access driveways and current intersections of Leppert Road & Davidson Road and Leppert Road & Hayden Run Road. The approved Memorandum of Understanding dated February 12, 2015 is attached for reference.

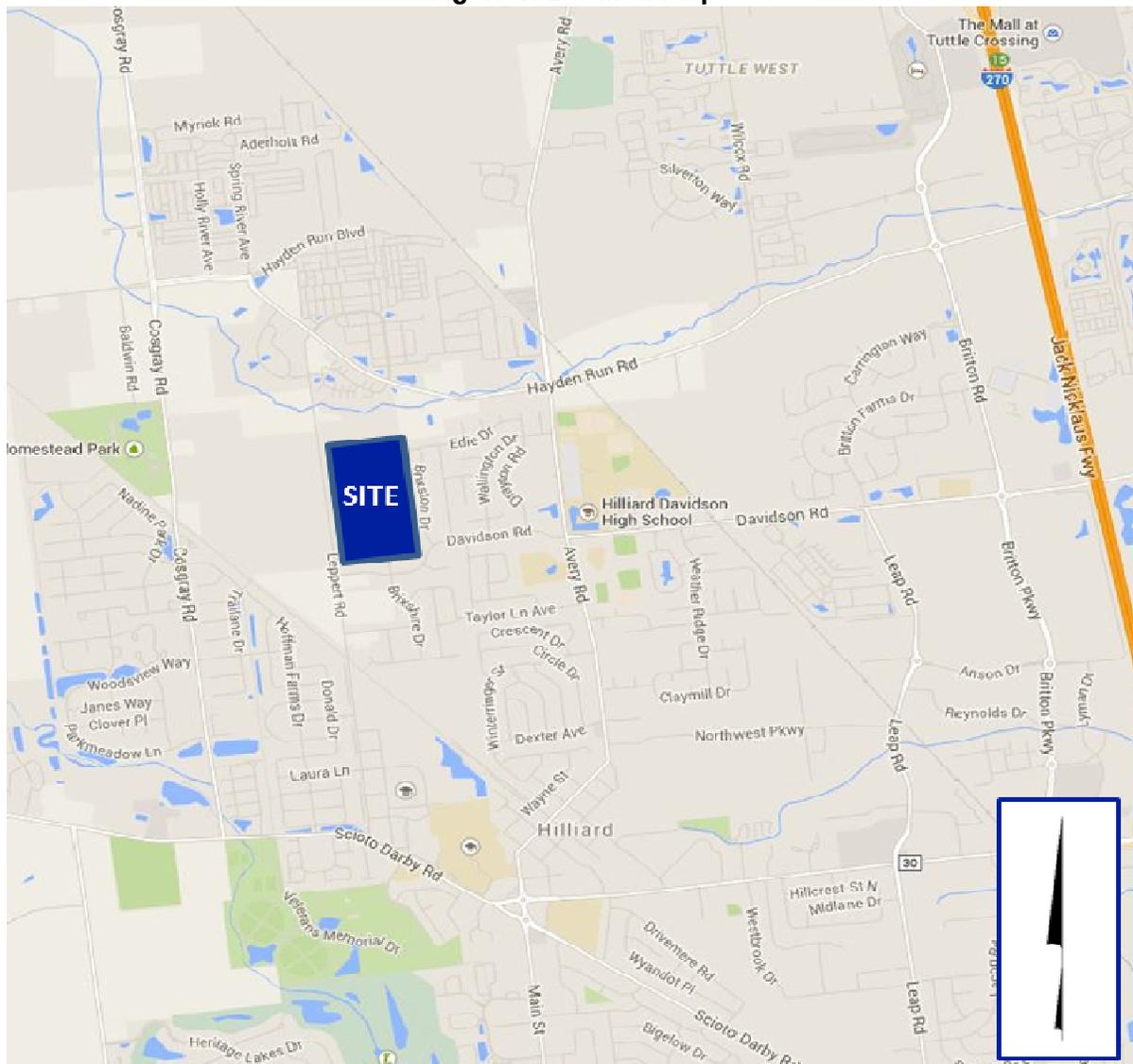
Proposed Development

Carr Farms is currently undeveloped land that is proposed to be developed with up to 160 single family homes on the site. The site is located on the east side of Leppert Road just north of Davidson Road in Hilliard, Ohio. Subdivision streets adjacent to this site currently terminate at the east and south property lines, including Edie Drive and Brixshire Drive. Two full-movement driveways are proposed to serve the site, both accessing Leppert Road north of the Davidson Road intersection, with the south drive potentially aligning with a future driveway across Leppert Road that will serve a potential school and major soccer complex there. The site location is shown in **Figure 1**.

Existing Conditions

Leppert Road is a two-lane, collector roadway with a straight, north-south alignment and flat profile along the site frontage that is currently signed at 45 miles per hour. Hayden Run Road is an east-west arterial roadway that is signed at 45 miles per hour. At the Leppert Road & Hayden Run Road intersection, there are dedicated left turn lanes on all approaches and an eastbound right-turn only lane, with traffic signal control. Davidson Road is an east-west collector street immediately south of the site that becomes an arterial roadway farther east of Avery Road. South of the site, Davidson Road is signed at 25 mph and serves as a subdivision street with sidewalks present along the north side of the street east of Leppert Road, where stop sign control for Davidson Road only is present. The undeveloped land west of Leppert Road across from Carr Farms is likely to be developed with a soccer complex and with a school site on that land.

Figure 1: Location Map



Data Collection

Peak hour manual turning movement counts were conducted from 7-9 AM and from 4-6 PM at the Leppert Road/Davidson Road and Leppert Road/Hayden Run Road intersections to identify current peak hour traffic levels there. The counts were completed on an average weekday in late February and early March, 2015. No operational concerns were noted during peak hour observations. Traffic count data is attached for reference.

Traffic Volume Projections

Estimated site generated traffic was added to background traffic to determine Opening Year and Horizon Year traffic conditions for use in traffic analyses as part of this study. Traffic volumes were projected for morning and afternoon weekday peak hour conditions. Volume plates illustrating total traffic volumes for AM and PM peak hour conditions are attached for reference.

Background Traffic Volumes

Peak hour manual traffic count data at the Leppert Road/Davidson Road and Leppert Road/Hayden Run Road intersections was used to determine peak hour traffic levels there. To project opening and horizon year background traffic for this study, the count data was increased based on the growth rates provided by MORPC to estimate 2016 and 2026 No Build traffic levels. The 2016 and 2026 No Build traffic assignment worksheets are attached for reference.

Site Generated Traffic Volumes

New trips were calculated for up to 160 single family homes based on trip generation rates published in the *ITE Trip Generation* manual, 9th Edition (2012). Morning and afternoon weekday peak hour trips for the site were assigned to Leppert Road and surrounding street network, including adjacent subdivision street connections, based on the distribution of existing traffic combined with engineering judgment related to the proximity of the site to adjacent schools and the best routes for work trips. Trip generation calculations are summarized in **Table 1** below:

Table 1: Projected trip generation using ITE rates

Land Use	Square Feet or Units	ITE Code	Time Period	ITE Formula	Total Trips	Trips	
						Entering	Exiting
Single Family - Detached	160 units	210	ADT	$\ln(T)=0.92\ln(x)+2.72$	1,618	809	809
			AM Peak	$T=0.70(x)+9.74$	122	31	91
			PM Peak	$\ln(T)=0.90\ln(x)+0.51$	160	101	59

Site-generated trip ends were agreed to be distributed to the street network, as follows:

- 10% to/from the west on Hayden Run Road
- 25% to/from the east on Hayden Run Road
- 25% to/from the east on Davidson Road
- 15% to/from the east via Edie Drive
- 25% to/from the south on Leppert Road

New site generated traffic for the 160 single family homes was assigned to the adjacent street network via existing subdivision street connections and the two planned site driveways to Leppert Road. Subdivision street connections including Edie Drive and Brixshire Drive were assumed to take some site traffic away from the two driveway connections to Leppert Road. Site traffic assignments and 2016/2026 total traffic volume plates are attached for reference.

Soccer/Other Development Traffic

Traffic impacts for the 122-acre space on the west side of Leppert Road opposite Carr Farms were estimated by assuming the land there develops entirely as soccer fields even though a school site is also anticipated there. Traffic estimated for both the soccer complex and school site was accounted for by assigning half of land as soccer uses and associated traffic in the Opening Year and the land fully built out as a soccer complex in the Horizon Year analyses. The west side of Leppert Road is then assumed to generate traffic as follows: 92 external trips in the 2016 Opening Year afternoon peak hour (69

entering, 23 exiting) and 184 external trips in the 2026 Horizon Year afternoon peak hour (138 entering, 46 exiting). No morning peak traffic was assigned for the soccer trip generation. Soccer trip generation data is attached for reference.

For the potential trip generation likely to materialize at the Leppert Road/Hayden Run Road intersection, future development was estimated by assuming up to 3 acres of retail at 10,000 sf./acre on the south side of Hayden Run Road (both sides of Leppert) and two acres on the north side of Hayden Run Road (east side of Leppert). A total of 50,000 square feet of retail space was used to generate other development traffic for the land surrounding this intersection. This future 'other development' traffic was assumed as present only in the 2026 horizon analyses and is illustrated in **Table 2** below. Volume plates that illustrate the soccer and 'other development' traffic assignment are attached for reference.

Table 2: Projected retail trip generation at Leppert Road/Haden Run Road

Land Use	Square Feet or Units	ITE Code	Time Period	ITE Formula	Total Trips	Trips Entering	Trips Exiting
Shopping Center	50,000 sf	820	ADT	$\ln(T)=0.65\ln(x)+5.83$	4,328	2,164	2,164
			AM Peak	$\ln(T)=0.61\ln(x)+2.24$	102	See Below	
			PM Peak	$\ln(T)=0.67\ln(x)+3.31$	377	See Below	
			62%	AM Primary Trips	62	38	24
			38%	AM Pass-By Trips	40	20	20
			52%	PM Primary Trips	195	94	101
			48%	PM Pass-By Trips	182	91	91

Traffic Analyses

Synchro, HCS, and Sidra software were used to evaluate operational characteristics of study area intersections. Traffic analysis consisted of AM and PM peak capacity analysis for Opening Year No Build and Build conditions. A minimum intersection level of service (LOS) of D, minimum approach LOS of D and minimum individual movement LOS E was considered acceptable.

Results indicated that all movements are predicted to operate at LOS D or better in year 2026 with site and off site traffic volumes added during AM and PM Peak Hours. However, the Leppert Road/South Drive is predicted to operate poorly during weekend tournament play with two-way stop control at this intersection. If a single-lane roundabout were provided at the Leppert Road/South Drive/Park Drive intersection in lieu of turn lanes, the intersection is predicted to operate at acceptable levels during tournament conditions. **Table 3** below illustrates the results of the capacity analyses which indicate acceptable level of service is expected for 2026 Build conditions at each intersection during weekday peak hours. Capacity analysis printouts are attached for reference.

Table 3: Capacity Analysis Results

Time Period	Year	Scenario	Conditions	EBLT	EBTH	EBRT	WBTL	WBTH	WBRT	NBLT	NBTH	NBRT	SBLT	SBTH	SBRT	TOTAL
Leppert Road/Davidson Road																
AM Peak Hour	2026	Full Build	Two-way stop- Existing lane	-	-	-	B/14.6	-	B/14.6	-	-	-	A/8.1	-	-	-
			+NBRT & SBLT	-	-	-	B/13.3	-	B/13.3	-	-	-	-	A/8.1	-	-
PM Peak Hour	2026	Full Build	Two-way stop- Existing lane	-	-	-	D/33.1	-	D/33.1	-	-	-	A/8.2	-	-	-
			+NBRT & SBLT	-	-	-	D/27.2	-	D/27.2	-	-	-	-	A/8.2	-	-
Leppert Road/South Drive																
AM Peak Hour	2026	Full Build	Two-way stop- Existing lane	B/11.7	B/11.7	B/11.7	B/10.8	B/10.8	B/10.8	A/7.7	A/7.7	A/7.7	A/7.7	A/7.7	A/7.7	-
			+NBLT, SBLT, & SBRT	B/11.7	B/11.7	B/11.7	B/10.8	B/10.8	B/10.8	A/7.7	-	-	A/7.7	-	-	-
			Roundabout	A/4.1	A/4.1	A/4.1	A/4.7	A/4.7	A/4.7	A/5.3						
PM Peak Hour	2026	Full Build	Two-way stop- Existing lane	C/19.9	C/19.9	C/19.9	C/16.6	C/16.6	C/16.6	A/8.4	A/8.4	A/8.4	A/7.9	A/7.9	A/7.9	-
			+NBLT, SBLT, & SBRT	C/18.8	C/18.8	C/18.8	C/16.3	C/16.3	C/16.3	A/8.4	-	-	A/7.9	-	-	-
			Roundabout	A/5.9	A/5.9	A/5.9	A/5.4	A/5.4	A/5.4	A/6.8	A/6.8	A/6.8	A/9.7	A/9.7	A/9.7	A/8.2
Tournament			+NBLT, SBLT, & SBRT	F/50.0	F/50.0	F/50.0	E/42.8	E/42.8	E/42.8	A/9.2	-	-	A/7.9	-	-	-
			Roundabout	A/6.7	A/6.7	A/6.7	A/6.8	A/6.8	A/6.8	A/8.5	A/8.5	A/8.5	C/16.8	C/16.8	C/16.8	B/12.3
Leppert Road/North Drive																
AM Peak Hour	2026	Full Build	Existing Conditions	-	-	-	B/10.4	-	B/10.4	-	-	-	A/7.8	A/7.8	-	-
PM Peak Hour	2026	Full Build	Existing Conditions	-	-	-	B/12.7	-	B/12.7	-	-	-	A/7.9	A/7.9	-	-
Leppert Road/Hayden Run Road																
AM Peak Hour	2026	Full Build	Existing Conditions	A/9.5	C/21.7	B/10.2	B/12.0	A/6.6	A/6.6	B/15.9	B/19.0	B/19.0	C/25.6	B/14.4	B/14.4	B/17.5
PM Peak Hour	2026	Full Build	Existing Conditions	C/20.2	B/13.6	B/11.9	A/8.9	B/14.5	B/14.5	B/18.0	B/17.5	B/17.5	B/18.9	B/15.3	B/15.3	B/14.2

X/X = Overall LOS / Average Delay Per Vehicle

Turn Lane Warrants

Turn lane warrants were evaluated at all unsignalized intersections pursuant to the requirements set forth in the Location and Design Manual, Volume 1 (Ohio Department of Transportation, 2012). The graphs for two-lane roadways with posted speed limits greater than 40 miles per hour were consulted. Results indicate that a southbound left turn lane is warranted at the planned South Drive intersection on Leppert Road when the site is built out. Additionally, a northbound left turn lane is warranted at the same intersection to serve ‘other development’ traffic at the soccer complex. The calculated turn lane length is 175 feet with a 50-foot diverging taper included for the southbound left turn lane and 225 feet for the northbound left turn lane there. **Table 4** illustrates the results of turn lane warrants at the two locations. Turn lane warrant graphs are attached for reference.

Table 4: Turn Lane Warrant Analysis Results

Intersection	Turn lane	Lengths (feet)*	Year	Scenario
Leppert Road/South Drive	SBRT	275	2026	No-Build
	SBLT	175	2026	Build
	NBLT	225	2026	No-Build
Leppert Road/Davidson Road	NBRT	225	2016	No-Build
	SBLT	175	2026	No-Build

* A 50-foot diverging taper is included.

Roundabout Analysis at Leppert Road/South Drive/Soccer Complex Entrance

A potential traffic control option at the planned South Drive intersection with Leppert Road is the installation of a modern, single lane roundabout to better facilitate daily and peak hour traffic at that location. A roundabout is perceived to better handle peak soccer tournament traffic entering the planned soccer complex on the west side of Leppert Road there and could also benefit pedestrians and bicyclists traversing Leppert Road between the Carr Farms subdivision to/from the soccer complex, as well as those trying to reach the Heritage Trail from areas east of Carr Farms. This analysis evaluated the benefit of providing a single lane roundabout in lieu of traditional turn lane widening on Leppert Road to provide left turn lanes there. Turn lane warrants and lane sizing for peak soccer tournament times indicated that the northbound left turn lane should be 225 feet and even the southbound left turn lane would need to be 175 feet to enter Carr Farms.

A roundabout at this location would require more right of way compared to traditional turn lane widening that would typically be constructed at this location. Analyses indicate a single lane roundabout would operate at an efficient LOS A or better during the average AM Peak Hour PM Peak Hour and overall LOS B when soccer tournaments occur. Based on these results, a single lane roundabout seems like a favorable traffic control option in lieu of providing warranted left turn lanes at the Leppert Road/South Drive intersection. The roundabout option with pedestrian and bicycle paths with appropriate signage should be considered at the South Drive intersection in lieu of turn lane widening on Leppert Road.

Pedestrian Path Treatment

The City of Hilliard requested this study include an evaluation of the likelihood for pedestrian activity between the existing subdivisions to the east, proposed Carr Farms patrons, and the planned soccer complex directly across Leppert Road. In addition, close proximity to Homestead Park and the Heritage Trail farther west of Carr Farms caused us to review planned pedestrian path treatments through and within the Carr Farms site. It should be noted, however, that no traffic signal along Leppert Road has been anticipated as part of this study to provide for a signalized pedestrian crossing of Leppert Road. The potential South Drive location appears to be a logical location for a marked/signed pedestrian crossing since that location generally aligns with the anticipated main entrance to the soccer complex across Leppert Road. Pedestrian paths/treatments within Carr Farms should ultimately funnel pedestrian traffic from subdivisions east of Carr Farms to this point to encourage a consolidated crossing location near the planned South Drive. Pedestrian treatments here could also be adjusted to incorporate within a roundabout if preferred by the City.

Planned paths within the site do provide connectivity for Carr Farms residents and some minor modification to the site plan could incorporate pedestrian connectivity for adjacent subdivision residents. A focus to direct pedestrians to the planned South Drive intersection at Leppert Road is a logical manner to facilitate future connections farther west to the Heritage Trail and Homestead Park. Once the traffic control treatment at Leppert Road/South Drive/Park Drive is determined, a mid-block crossing should be planned at this location.

Conclusions and Recommendations

Turn lane warrants indicate a southbound left turn lane is warranted on Leppert Road at the planned South Drive intersection with a required length of 175 feet that includes the 50-foot taper. To address the potential development on the west side of Leppert Road, a 225-foot northbound left turn lane and 275-foot southbound right turn lane should be constructed by others to address the future soccer complex development there. In lieu of turn lane widening at the South Drive for the proposed development and the soccer complex, a single lane roundabout could be provided which would result in better level of service during peak soccer tournament times and a slight improvement during weekday peak hour conditions.

Provision of a marked pedestrian crossing on Leppert Road at the South Drive intersection with appropriate signage should be planned at that location to link Carr Farms and subdivisions to the east with the soccer complex, the Heritage Trail and Homestead Park farther west. Pedestrian treatments and paths within the subdivision should funnel pedestrian traffic to this crossing location at the South Drive which is the preferred location to cross Leppert Road.

If you have questions during your review, please contact me directly at (614) 775-4650 at your convenience.

Sincerely,

A handwritten signature in blue ink that reads "Douglas A. Bender". The signature is fluid and cursive, with the first name being the most prominent.

Douglas A. Bender, PE, PTOE
Senior Traffic Engineer

Attachments

Copies: Brent Welch, Franklin County Engineers Office (w/att)
Jim Lipnos, Homewood Corporation (w/att)
Linda Menery, EMH&T (w/at)



February 12, 2015

Ms. Letty Schamp, PE
Transportation Engineer
City of Hilliard
3800 Municipal Way
Hilliard, OH 43026

Subject: Carr Farms Traffic Impact Study
Memorandum of Understanding

Dear Ms. Schamp,

This Memorandum of Understanding (MOU) is submitted to document the scope of the above captioned traffic study as we discussed with you and Franklin County Engineer personnel in the kickoff meeting on Jan. 22th, 2015 at your office. Following your concurrence, EMH&T will prepare a traffic study in accordance with the methodologies and assumptions described below.

Proposed Development & Site Access Plan

The Carr Farms site is currently undeveloped land that is proposed to be developed with single family lots that connect to existing subdivisions adjacent to the site. It is located east of Leppert Road, north of Davidson Road in Hilliard, Ohio. The attached site plan illustrates the potential to add up to 160 single-family units using two access points along Leppert Road and three connections to adjacent subdivision streets. A 122-acre open space on the west side of Leppert Road is expected to develop with an elementary school site and a large soccer complex with multiple fields covering the remaining acreage.

Intersections to Analyze

Analyses will be completed for AM and PM Peak Hour conditions at the following intersections:

- Leppert Road/Davidson Road
- Leppert Road/Hayden Run Road
- Leppert Road/Site Drives (south drive as intersection and/or roundabout)

Data Collection

Peak hour manual turning movement counts will be conducted from 7-9 AM and from 4-6 PM at the Leppert Road/Davidson Road and Leppert Road/Hayden Run Road intersections to identify current peak hour traffic levels there. Current conditions along Leppert Road, including number of lanes, speed limit, lane widths, etc. will be documented.

Trip Generation

Site generated trip ends will be forecast using data and methodology contained in Trip Generation, 9th Edition (Institute of Transportation Engineers, 2012) and from soccer trip data supplied by the Franklin County Engineers Office. Morning and afternoon peak hour traffic volumes will be estimated using trip generation rates published for the ITE land use code 210

2016.
2026.

(Single Family Homes). The proposed development will consist of up to 160 units and is expected to generate 122 external trips in the morning peak hour (31 entering, 91 exiting) and 160 external trips in the afternoon peak hour (101 entering, 59 exiting). Traffic impacts for the 122-acre space on the west side of Leppert Road will be estimated by assuming the space develops entirely as soccer fields, and will be included with half of it in the Opening Year and all of it in the Horizon Year analyses. The west side of Leppert Road is then assumed to generate traffic as follows: 92 external trips in the Opening Year afternoon peak hour (69⁷⁸ entering, 23 exiting) and 184 external trips in the Horizon Year afternoon peak hour (138 entering, 46 exiting). Soccer trip generation data is attached for reference. Future development at Leppert/Hayden Run Road will be assumed as retail at 10,000 sf./acre for five acres there to be included in the 2026 analyses.

Trip Distribution

Site generated traffic volumes will be assigned to the existing street system based on an assumed gateway distribution that factors in roadway access and connections beyond the site to available jobs and commercial developments in the area, as well as arterial and freeway access. These assumptions will be compared to traffic count data performed for this study and include:

- 10% to/from the west on Hayden Run Road
- 25% to/from the east on Hayden Run Road
- 25% to/from the east on Davidson Road
- 15% to/from the east via Edie Drive
- 25% to/from the south on Leppert Road

Traffic Projections

Site generated traffic volumes will be combined with existing traffic volumes at each study intersection to provide total traffic volumes for analysis. Traffic volumes generated by the proposed development will be combined with background traffic volumes to establish opening day (2016) full build traffic volumes for use in traffic analyses. Traffic projected for the planned soccer fields and elementary school site on the west side of Leppert Road were estimated using soccer trip generation provided by Franklin County to be conservative since Elementary peak hours don't coincide with typical roadway peak hours. Trip projections for the west side of Leppert were estimated using only half the land/acreage developed as soccer fields in the 2016 Opening Year and the rest of the acreage built out and assumed as all soccer fields by the 2026 Horizon Year. Observed 2015 traffic volumes will be increased annually by an assumed 2.0% increase to estimate anticipated background traffic growth until MORPC growth rate data can be obtained for the study area based off the traffic count data collected for this study.

Traffic Analyses

Intersection Capacity Analyses

Synchro or HCS software will be used to evaluate operational characteristics of study area intersections. Traffic analysis will consist of AM and PM peak capacity analysis for Opening Year Build and No Build conditions. A minimum intersection level of service (LOS) of D, minimum approach LOS of D and minimum individual movement LOS E will be considered acceptable. If an intersection for any scenario is below these criteria, reasonable and cost-effective improvements will be explored for both the Build and No Build scenarios until these criteria are met. The No Build condition will be analyzed first to determine the improvements needed to reach these criteria, then the Build condition will be analyzed to determine the improvements needed to reach the same criteria. Finally, the No Build and Build improvement sets will be compared to determine the mitigation needed. Analysis at the South Drive intersection serving Carr Farms and the west side of Leppert Road will include stop control and roundabout analysis for comparison.

February 12, 2015

Turn Lane Warrants

Turn lane warrant analysis will be prepared at the two planned access driveways on Leppert Road based on 2026 full build conditions. If needed, turn lane lengths will be determined using storage calculations provided in the I&D Manual § 401 (Ohio Department of Transportation, 2010). Warrants at the South Drive will use soccer touney rates to calculate max length for northbound left turn lane.

Multi-Use Path Connections

The planned layout for the Carr Farms site includes path connections to adjacent subdivisions and provision of paths throughout the site layout that will connect through to the east edge of Leppert Road. The study will review the potential pedestrian connections through the Carr Farms site. For crossing Leppert Road, the study will discuss the potential to cross utilizing the roundabout or a raised median concept at the South Drive location.

A detailed report including applicable figures and tables will be prepared to summarize study methodologies, analysis, findings and recommendations. The report will be submitted to the City of Hilliard, City of Columbus and Franklin County Engineers Office for review. Please signify your concurrence with the scope of work outlined herein by signing and returning this Memorandum of Understanding to me. Should questions or comments arise during your review of this memorandum or if I may be of further assistance in this matter, please contact me directly at (614) 775-4650.

Sincerely,



Douglas A. Bender, PE, PTOE
Senior Traffic Engineer

* PLEASE NOTE THAT IF
THE INTERSECTION OF LEPPERT RD
AND DAVIDSON ROAD SHOULD REQUIRE
SIGNALIZATION, FCEO WOULD REQUIRE
A LOS C.

Attachments

- Copies: Fritz Crosier, Franklin County Engineers Office
- Dan Blechschmidt, City of Columbus
- Jim Lipnos, Homewood Corporation

BJW
2/17/15

ACCEPTANCE AND APPROVAL OF MEMORANDUM OF UNDERSTANDING

By: *Letty Schamp*
City of Hilliard

Date: 2-16-2015

By: *[Signature]*
Franklin County Engineers Office

Date: 2/17/15

By: *Daniel M. Blechschmidt*
City of Columbus

Date: 2/13/15

Park Trip Generation

From the Darree Fields Park count information, it was determined that the "normal operation" PM peak hour volumes averaged from the two Friday counts (5-6 PM) were appropriate to calculate the peak hour trip rate to apply to Bevelhymer Park:

Friday June 9-175 in + 47 out = 222 VPH total

Friday June 2- 94 in + 43 out = 137 VPH total

Average = 180 VPH total

Normal Trip Rate = 180 trips / 119 acres = 1.51 trips/acre

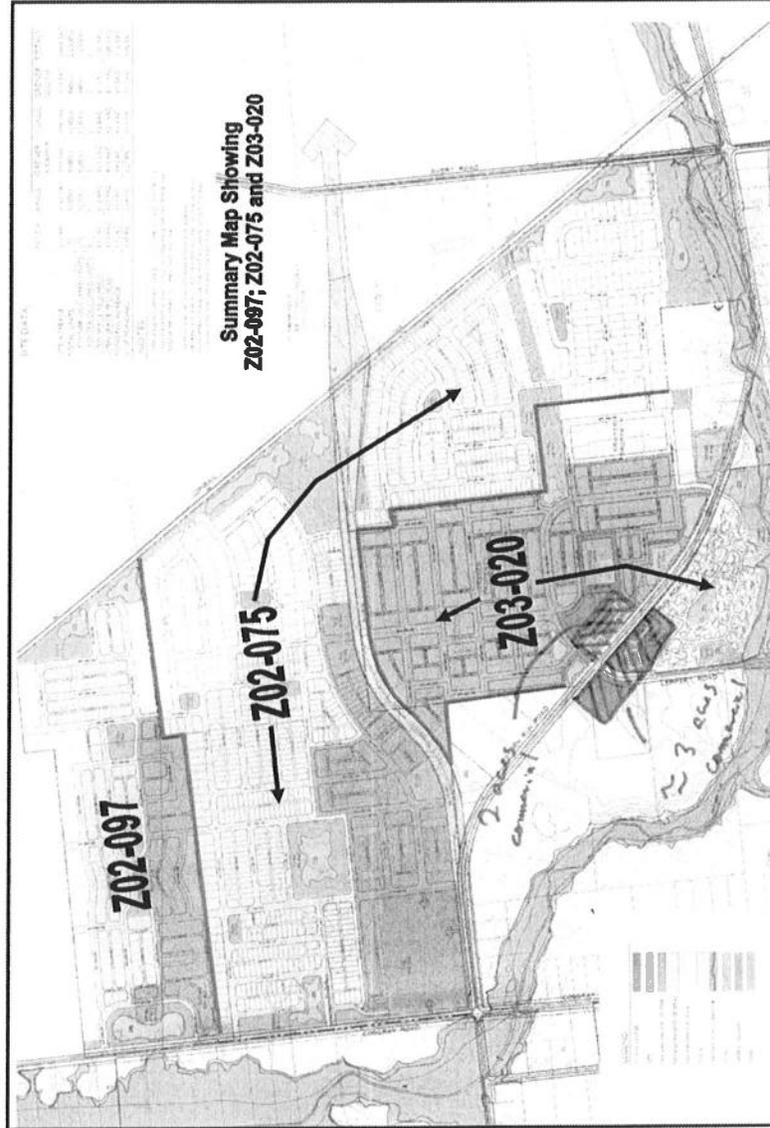
From Figure 2 the average peak hour trips (all 5-6 PM) was 401 VPH during "tournament operation".

Tournament trip rate = 401 trips / 119 acres = 3.74 trips/acre

In applying the Darree Park trip rates to Bevelhymer Park, the "normal" and "tournament" rates were multiplied by each of the five tributary access areas, and then split into "enter" and "exit" volumes using the average percentage of enter and exit volumes from Darree Park.

Peak Hour Park Trip Generation (veh/hour)

Area	Acres	Normal Operation			Tournament Operation		
		Total Rate	% Enter	% Exit	Total Rate	% Enter	% Exit
		1.51	75% ✓	25% ✓	3.37	80%	20%
A	40.8	62	46	16	138	110	28
B	32.3	49	37	12	109	87	22
C	14.1	22	17	6	48	38	10
D	18.9	29	22	7	64	51	13
E	25.5	39	29	10	87	70	17
	131.6	201			446		



Wu, Charles

From: Chandra Parasa <cparasa@morpc.org>
Sent: Thursday, March 19, 2015 11:09 AM
To: Wu, Charles; Bender, Douglas
Cc: Zhuojun Jiang; Hwashik Jang; Nick Gill
Subject: RE: Request traffic growth rate for Carr Farms

Charles,
We have completed processing growth rates for the Carr Farms study area.
Please use the following linear annual growth rates as tabulated here:

Location	Linear annual Growth rate
Davidson Rd, e/o Leppert Rd	2.0%
Leppert Rd, n/o Davidson Rd	3.0%
Leppert Rd, s/o Davidson Rd	2.5%
Hayden Run Rd, e/o Leppert Rd	2.5%
Hayden Run Rd, w/o Leppert Rd	2.0%
Leppert Rd, n/o Hayden Run Rd	1.0%
Leppert Rd, s/o Hayden Run Rd	3.0%

Thanks,
Chad

From: Bender, Douglas [mailto:dbender@emht.com]
Sent: Wednesday, March 11, 2015 10:57 AM
To: Chandra Parasa
Cc: Wu, Charles; Zhuojun Jiang
Subject: RE: Request traffic growth rate for Carr Farms

Chad,

That potential connection was not discussed by anyone on the City side during our TIS kickoff meeting and was not assumed in the MOU as a connection for analysis purposes. We are not planning on that assumption/connection in our traffic assignment.

Sincerely,
Doug

From: Chandra Parasa [mailto:cparasa@morpc.org]
Sent: Wednesday, March 11, 2015 10:46 AM
To: Bender, Douglas
Cc: Wu, Charles; Zhuojun Jiang
Subject: RE: Request traffic growth rate for Carr Farms

EMH&T

5500 New Albany Road

Columbus, OH 43054

emht.com

File Name : Hayden Run - Leppert

Site Code : 00000000

Start Date : 2/26/2015

Page No : 1

Groups Printed- Cars - Trucks

Start Time	LEPPERT RD Southbound					HAYDEN RUN Westbound					LEPPERT RD Northbound					HAYDEN RUN Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:00 AM	35	6	4	0	45	17	29	0	0	46	9	1	27	0	37	1	99	21	0	121	249
07:15 AM	29	10	6	0	45	19	45	1	0	65	9	2	30	0	41	1	142	18	0	161	312
07:30 AM	34	5	3	0	42	13	43	0	0	56	14	1	44	0	59	0	133	17	0	150	307
07:45 AM	29	12	8	0	49	22	45	2	0	69	8	1	30	0	39	1	124	17	0	142	299
Total	127	33	21	0	181	71	162	3	0	236	40	5	131	0	176	3	498	73	0	574	1167
08:00 AM	13	4	9	0	26	13	38	3	0	54	8	3	16	0	27	1	121	16	0	138	245
08:15 AM	24	3	5	0	32	21	31	1	0	53	4	1	18	0	23	0	120	20	0	140	248
08:30 AM	24	8	3	0	35	19	41	3	0	63	4	0	33	0	37	2	105	8	0	115	250
08:45 AM	17	4	4	0	25	6	49	5	0	60	10	2	34	0	46	2	79	10	0	91	222
Total	78	19	21	0	118	59	159	12	0	230	26	6	101	0	133	5	425	54	0	484	965
*** BREAK ***																					
04:00 PM	5	2	4	0	11	25	92	8	0	125	12	4	17	0	33	1	58	6	0	65	234
04:15 PM	9	2	2	0	13	16	100	9	0	125	10	9	14	0	33	3	52	14	0	69	240
04:30 PM	8	2	3	0	13	25	106	8	0	139	13	5	17	0	35	3	69	11	0	83	270
04:45 PM	7	2	1	0	10	31	137	7	0	175	21	5	15	0	41	2	52	13	0	67	293
Total	29	8	10	0	47	97	435	32	0	564	56	23	63	0	142	9	231	44	0	284	1037
05:00 PM	8	2	2	0	12	51	143	14	1	209	9	5	12	0	26	6	65	24	0	95	342
05:15 PM	12	6	2	0	20	31	146	11	0	188	23	3	10	0	36	10	68	22	0	100	344
05:30 PM	9	3	2	0	14	32	155	11	0	198	19	4	9	0	32	5	64	20	0	89	333
05:45 PM	9	1	3	1	14	24	119	16	0	159	12	10	10	0	32	5	52	10	1	68	273
Total	38	12	9	1	60	138	563	52	1	754	63	22	41	0	126	26	249	76	1	352	1292
Grand Total	272	72	61	1	406	365	1319	99	1	1784	185	56	336	0	577	43	1403	247	1	1694	4461
Apprch %	67	17.7	15	0.2		20.5	73.9	5.5	0.1		32.1	9.7	58.2	0		2.5	82.8	14.6	0.1		
Total %	6.1	1.6	1.4	0	9.1	8.2	29.6	2.2	0	40	4.1	1.3	7.5	0	12.9	1	31.5	5.5	0	38	
Cars	271	72	59	1	403	364	1305	99	1	1769	183	56	334	0	573	43	1377	244	1	1665	4410
% Cars	99.6	100	96.7	100	99.3	99.7	98.9	100	100	99.2	98.9	100	99.4	0	99.3	100	98.1	98.8	100	98.3	98.9
Trucks	1	0	2	0	3	1	14	0	0	15	2	0	2	0	4	0	26	3	0	29	51
% Trucks	0.4	0	3.3	0	0.7	0.3	1.1	0	0	0.8	1.1	0	0.6	0	0.7	0	1.9	1.2	0	1.7	1.1

EMH&T

5500 New Albany Road

Columbus, OH 43054

emht.com

File Name : Hayden Run - Leppert

Site Code : 00000000

Start Date : 2/26/2015

Page No : 2

Start Time	LEPPERT RD Southbound					HAYDEN RUN Westbound					LEPPERT RD Northbound					HAYDEN RUN Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	35	6	4	0	45	17	29	0	0	46	9	1	27	0	37	1	99	21	0	121	249
07:15 AM	29	10	6	0	45	19	45	1	0	65	9	2	30	0	41	1	142	18	0	161	312
07:30 AM	34	5	3	0	42	13	43	0	0	56	14	1	44	0	59	0	133	17	0	150	307
07:45 AM	29	12	8	0	49	22	45	2	0	69	8	1	30	0	39	1	124	17	0	142	299
Total Volume	127	33	21	0	181	71	162	3	0	236	40	5	131	0	176	3	498	73	0	574	1167
% App. Total	70.2	18.2	11.6	0		30.1	68.6	1.3	0		22.7	2.8	74.4	0		0.5	86.8	12.7	0		
PHF	.907	.688	.656	.000	.923	.807	.900	.375	.000	.855	.714	.625	.744	.000	.746	.750	.877	.869	.000	.891	.935

EMH&T

5500 New Albany Road

Columbus, OH 43054

emht.com

File Name : Hayden Run - Leppert

Site Code : 00000000

Start Date : 2/26/2015

Page No : 3

Start Time	LEPPERT RD Southbound					HAYDEN RUN Westbound					LEPPERT RD Northbound					HAYDEN RUN Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	7	2	1	0	10	31	137	7	0	175	21	5	15	0	41	2	52	13	0	67	293
05:00 PM	8	2	2	0	12	51	143	14	1	209	9	5	12	0	26	6	65	24	0	95	342
05:15 PM	12	6	2	0	20	31	146	11	0	188	23	3	10	0	36	10	68	22	0	100	344
05:30 PM	9	3	2	0	14	32	155	11	0	198	19	4	9	0	32	5	64	20	0	89	333
Total Volume	36	13	7	0	56	145	581	43	1	770	72	17	46	0	135	23	249	79	0	351	1312
% App. Total	64.3	23.2	12.5	0		18.8	75.5	5.6	0.1		53.3	12.6	34.1	0		6.6	70.9	22.5	0		
PHF	.750	.542	.875	.000	.700	.711	.937	.768	.250	.921	.783	.850	.767	.000	.823	.575	.915	.823	.000	.878	.953

EMH&T

5500 New Albany Road

Columbus, OH 43054

emht.com

File Name : davidson - leppert

Site Code : 00000000

Start Date : 3/3/2015

Page No : 1

Groups Printed- Cars - Trucks

Start Time	LEPPERT Southbound					DAVIDSON Westbound					LEPPERT Northbound					DAVIDSON Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
04:00 PM	3	24	0	0	27	29	0	6	0	35	0	26	19	0	45	0	0	0	0	0	0	107
04:15 PM	6	42	0	0	48	24	0	9	0	33	0	18	17	0	35	0	0	0	0	0	0	116
04:30 PM	1	48	0	0	49	29	0	2	0	31	0	29	16	0	45	0	0	0	0	0	0	125
04:45 PM	0	44	0	0	44	19	0	4	0	23	0	31	20	0	51	0	0	0	0	0	0	118
Total	10	158	0	0	168	101	0	21	0	122	0	104	72	0	176	0	0	0	0	0	0	466
05:00 PM	3	62	0	0	65	23	0	5	0	28	0	35	24	0	59	0	0	0	0	0	0	152
05:15 PM	7	61	0	0	68	38	0	10	0	48	0	29	16	0	45	0	0	0	0	0	0	161
05:30 PM	5	41	0	0	46	47	0	3	0	50	0	28	18	0	46	0	0	0	0	0	0	142
05:45 PM	3	54	0	0	57	46	0	2	0	48	0	27	24	0	51	0	0	0	0	0	0	156
Total	18	218	0	0	236	154	0	20	0	174	0	119	82	0	201	0	0	0	0	0	0	611
*** BREAK ***																						
07:00 AM	2	38	0	0	40	27	0	3	0	30	0	26	32	0	58	0	0	0	0	0	0	128
07:15 AM	5	45	0	0	50	23	0	4	0	27	0	32	38	0	70	0	0	0	0	0	0	147
07:30 AM	5	40	0	0	45	17	0	3	0	20	0	37	27	0	64	0	0	0	0	0	0	129
07:45 AM	12	36	0	0	48	18	0	6	0	24	0	28	36	0	64	0	0	0	0	0	0	136
Total	24	159	0	0	183	85	0	16	0	101	0	123	133	0	256	0	0	0	0	0	0	540
08:00 AM	3	34	0	0	37	21	0	2	0	23	0	24	36	0	60	0	0	0	0	0	0	120
08:15 AM	4	38	0	0	42	21	0	2	0	23	0	34	24	0	58	0	0	0	0	0	0	123
08:30 AM	2	36	0	0	38	22	0	8	0	30	0	38	25	0	63	0	0	0	0	0	0	131
08:45 AM	3	22	0	0	25	21	0	2	0	23	0	36	24	0	60	0	0	0	0	0	0	108
Total	12	130	0	0	142	85	0	14	0	99	0	132	109	0	241	0	0	0	0	0	0	482
Grand Total	64	665	0	0	729	425	0	71	0	496	0	478	396	0	874	0	0	0	0	0	0	2099
Apprch %	8.8	91.2	0	0		85.7	0	14.3	0		0	54.7	45.3	0		0	0	0	0	0	0	
Total %	3	31.7	0	0	34.7	20.2	0	3.4	0	23.6	0	22.8	18.9	0	41.6	0	0	0	0	0	0	
Cars	64	663	0	0	727	413	0	71	0	484	0	473	360	0	833	0	0	0	0	0	0	2044
% Cars	100	99.7	0	0	99.7	97.2	0	100	0	97.6	0	99	90.9	0	95.3	0	0	0	0	0	0	97.4
Trucks	0	2	0	0	2	12	0	0	0	12	0	5	36	0	41	0	0	0	0	0	0	55
% Trucks	0	0.3	0	0	0.3	2.8	0	0	0	2.4	0	1	9.1	0	4.7	0	0	0	0	0	0	2.6

Carr Farms
 Traffic Impact Study
Trip Generation Calculations
Institute of Transportation Engineers, 9th Edition
 Year 2016

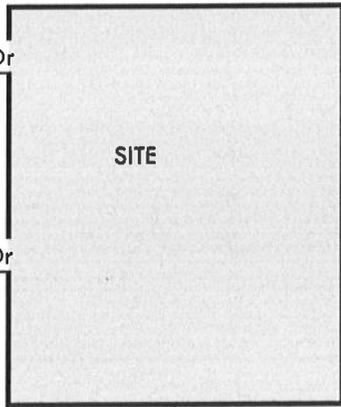
Land Use	Square Feet or Units	ITE Code	Time Period	ITE Formula	Total Trips	Trips Entering	Trips Exiting
<u>Single Family - Detached</u> Site	160 units	210	ADT	$\ln(T)=0.92\ln(x)+2.72$	1,618	809	809
			AM Peak	$T=0.70(x)+9.74$	122	31	91
			PM Peak	$\ln(T)=0.90\ln(x)+0.51$	160	101	59
<u>Soccer Field</u> Non-Site B Location: West of Leppert Rd	61 AC		PM Peak	Normal average rate= 1.51	92	69	23
				Tournament trip rate=3.74	228	182	46

Year 2026

Land Use	Square Feet or Units	ITE Code	Time Period	ITE Formula	Total Trips	Trips Entering	Trips Exiting
<u>Single Family - Detached</u> Site	160 units	210	ADT	$\ln(T)=0.92\ln(x)+2.72$	0	0	0
			AM Peak	$T=0.70(x)+9.74$	122	31	91
			PM Peak	$\ln(T)=0.90\ln(x)+0.51$	160	101	59
<u>Shopping Center</u> Non-Site A Location: Hayden Run Rd/Leppert Rd	50,000 sf	820	ADT	$\ln(T)=0.65\ln(x)+5.83$	4,328	2,164	2,164
			AM Peak	$\ln(T)=0.61\ln(x)+2.24$	102	See Below	
			PM Peak	$\ln(T)=0.67\ln(x)+3.31$	377	See Below	
			62%	AM Primary Trips	62	38	24
			38%	AM Pass-By Trips	40	20	20
			52%	PM Primary Trips	195	94	101
<u>Soccer Field</u> Non-Site B Location: West of Leppert Rd	122 AC		PM Peak	Average rate= 1.51	184	138	46
				Tournament trip rate=3.74	456	365	91

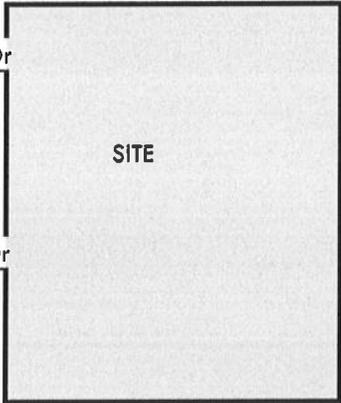
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2015 Counted Traffic Volumes (7:00 - 8:00)										AM Peak Hour a	
			Falls Blvd								
			TH	LT	0	RT					
			181	0	0	LT	C1				
					11	0					
					TH	RT					
					3	RT					
			RT	TH	LT	162	TH				
			21	33	127	71	LT	Hayden Run			
Hayden Run			LT	3	40	5	131				
			TH	498	LT	TH	RT				
			RT	73							
					0	RT					
			RT	TH	LT	0	TH				
C2	0	142	0	0	0	LT	C3				
			LT	0	0	146	0				
			TH	0	LT	TH	RT				
			RT	0							
			TH	LT	0	RT					
			142	0	0	LT	North Dr				
					146	0					
					TH	RT					
					0	RT					
			RT	TH	LT	0	TH				
C2	0	142	0	0	0	LT	South Dr				
Soccer Field			LT	0	0	146	0				
			TH	0	LT	TH	RT				
			RT	0							
			TH	LT	14	RT			RT	LT	
			130	12	85	LT	Davidso		0	0	
					132	109			99	TH	
					TH	RT			LT	0	
			Leppert						TH	121	



Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2016 Background Volumes (7:00 - 8:00)						AM Peak Hour b	
1.01			Falls Blvd				
	TH	LT		0	RT		
	183	0		0	LT	C1	
				11	0		
				TH	RT		
				3	RT		
	RT	TH	LT	166	TH		
1.02	21	33	128	73	LT	Hayden Run	
Hayden Run		LT	3	41	5	135	1.025
		TH	508	LT	TH	RT	
		RT	74				
				0	RT		
	RT	TH	LT	0	TH		
C2	0	146	0	0	LT	C3	
		LT	0	0	150	0	
		TH	0	LT	TH	RT	
		RT	0				
				1.03			
	TH	LT		0	RT		
	146	0		0	LT	North Dr	
				150	0		
				TH	RT		
				0	RT		
	RT	TH	LT	0	TH		
0	146	0		0	LT	South Dr	
Soccer Field		LT	0	0	150	0	
		TH	0	LT	TH	RT	
		RT	0				
				14	RT	RT	LT
	134	12		87	LT	Davidson	101
				135	112	LT	1.02
				TH	RT	TH	124
		Leppert		1.025			

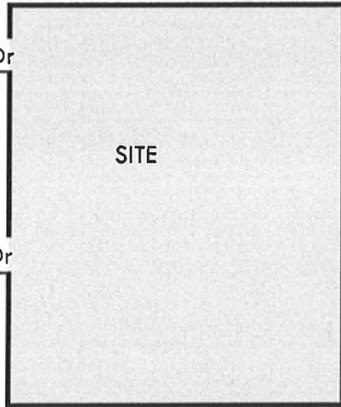


Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Background Volumes (7:00 - 8:00)										AM Peak Hour							
			1.10 Falls Blvd														
			TH	LT	0	RT											
			201	0	0	LT	C1										
					12	0											
					TH	RT											
					4	RT											
					208	TH											
			RT	TH	LT												
1.20			23	36	141	91	LT	Hayden Run									
Hayden Run					LT	4	53	7	176	1.25							
					TH	610	LT	TH	RT								
					RT	89											
							0	RT									
			RT	TH	LT			0	TH								
C2			0	190	0	0	LT	C3									
					LT	0	0	195	0								
					TH	0	LT	TH	RT								
					RT	0											
							0	RT									
					TH	LT											
					190	0	0	LT	North Dr								
							195	0									
							TH	RT									
							0	RT									
			RT	TH	LT			0	TH								
C2			0	190	0	0	LT	South Dr									
Soccer Field					LT	0	0	195	0								
					TH	0	LT	TH	RT								
					RT	0											
							17	RT	RT	LT							
					TH	LT	174	16	Davidson		121	TH	1.20				
							169	140			LT						
							TH	RT			TH	156					
							1.25										

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Traffic Impact Study
Traffic Volume Calculations

2016 Non-Site B (Soccer field) Traffic Volumes										AM Peak Hour	
(7:00 - 8:00)											
			15% Falls Blvd								
			TH	LT	0	RT					
			0	0	0	LT	C1				
						0	0				
						TH	RT				
									RT		
			RT	TH	LT	0	LT	Hayden Run			
			0							20%	
Hayden Run			LT				0	0	0		
			10%	TH				LT	TH	RT	
						RT	0				
									0	RT	
			RT	TH	LT	0	TH				
C2			0	0	0	0	LT	C3			
			LT	0				0	0	0	
			TH	0				LT	TH	RT	
			RT	0							
						TH	LT	0	RT		
			0	0				0	LT	North Dr	
						0	0				
In						0	0				
Out						0	0				
			TH	LT				0	RT		
			0	0				0	LT	Edie Dr	
						0	0				
						TH	RT				
						0	0				
						0	RT				
			RT	TH	LT	0	TH	15% South Dr			
Soccer Field			LT	0				0	0		
			TH	0				LT	TH	RT	
			RT	0							
						TH	LT	0	RT	20% Davidson	
			0	0							
									RT	LT	
									0	TH	
						0	RT				
						TH	RT				
						20%				LT	0
									TH		



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Traffic Impact Study
Traffic Volume Calculations

2016/2026 Site Traffic Volumes										AM Peak Hour						
(7:00 - 8:00)																
			Falls Blvd													
			TH	LT	0	RT										
			0	0	0	LT	C1									
						0										
			TH				RT									
						RT										
			RT	TH	LT	TH	25%									
						8	LT	Hayden Run								
Hayden Run			LT				9	23								
			10%	TH				LT	TH	RT						
						RT	3									
									RT							
			RT	TH	LT	0	TH									
C2			0	11	0	0	LT	C3								
						0	32	0								
			TH				0	TH								
			RT				0	RT								
						TH	LT	2	RT							
						10	1	1	LT	North Dr			5	Edie Dr		
						30	0				14					
						TH				RT						
						30	RT									
			RT	TH	LT	TH										
			1	10				15	LT	South Dr						
Soccer Field			LT				0	6								
			TH				LT	TH	RT							
			RT													
						TH	LT	2	RT	25%	RT	LT	6	RT		
						11	5	11	LT	Davidson			11	18		
						4				LT				2	TH	
						TH				RT				4		
						25%				TH				5		
			Leppert													

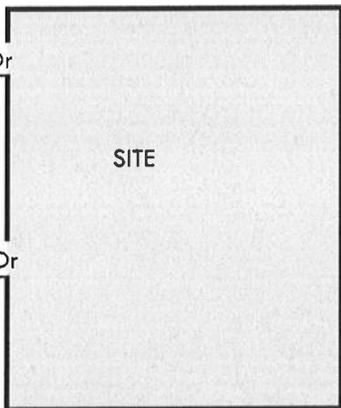
SITE

in **31**

out **91**

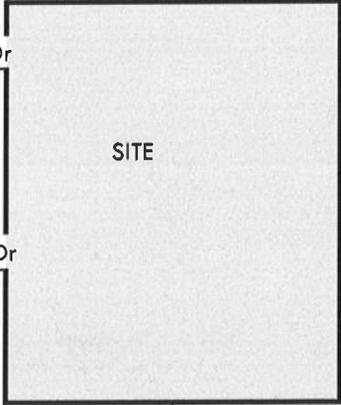
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Primary Trip Traffic Volumes- inbound										AM Peak Hour	
(7:00 - 8:00)										h	
			15% Falls Blvd								
			TH	LT				RT			
			4	2				LT			
						C1 2 ac			in 38		
									40%		
						TH	RT				
						3	RT				
									20%		
			RT	TH	LT						
			4			5	LT		Hayden Run		
Hayden Run			LT 2				0 8 0				
									10%		
			TH				LT				
			RT 2				TH				
			RT				TH				
			6				7 8 7				
1.5 ac C2			30%				LT		1.5 ac C3 30%		
			TH				TH				
			LT				RT				
			0				0				
			TH				RT				
			LT				LT		North Dr		
			0				22 0				
			TH				TH				
			RT				RT				
			6				0				
			TH				TH				
			LT				LT		15% South Dr		
Soccer Field			0				0 16 0				
			TH				LT				
			RT				TH				
			0				8				
			TH				RT		20%		
			LT				LT		Davidson		
			8				0				
			TH				RT				
			RT				LT				
			8				8				
			TH				TH				
			20%				TH				



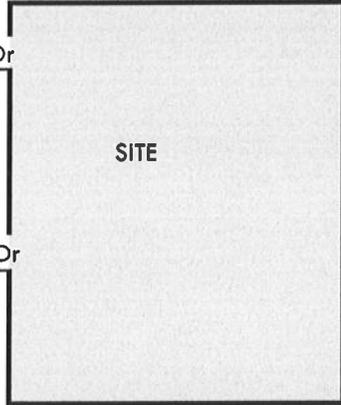
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Primary Trip Traffic Volumes- outbound										AM Peak Hour (7:00 - 8:00)	
			15% Falls Blvd								
			TH	LT	1	RT					
					8	LT	C1	2 ac			
					2	RT	40%		out	24	
					TH	RT					
							RT				
			RT	TH	LT	TH	20%				
			1	5	2	LT	Hayden Run				
Hayden Run			LT			1	2	3			
			10%		TH	LT	TH	RT			
							RT				
			RT	TH	LT	3	RT				
1.5 ac			C2		6	LT	4	LT	C3	1.5 ac	
			30%				30%				
			LT	3			LT	TH	RT		
			TH	0			TH				
			RT	4							
					TH	LT	0	RT			
					14	0	North Dr				
							0	LT			
							TH	RT			
							RT				
			RT	TH	LT	0	TH	15%		South Dr	
Soccer Field			LT	0			0	LT			
			TH	0			0				
			RT	0			LT	TH	RT		
					TH	LT	20%		RT	LT	
					5	5	Davidson				
							0	LT			
					TH	RT	20%		TH	5	
			Leppert						RT	TH	



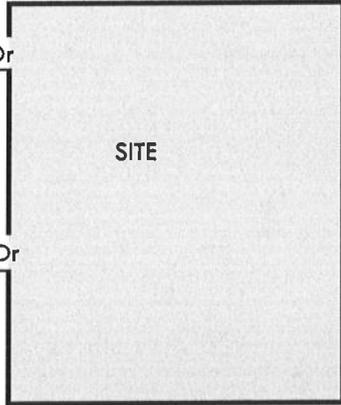
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Pass-By Trip Traffic Volumes										AM Peak Hour (7:00 - 8:00)	
			Falls Blvd								
			TH	LT	4	RT					
			-4	4	4	LT	C1	2 ac	in	20	
						-4	4	40%	out	20	
					TH	RT					
							RT				
			RT	TH	LT			TH			
							LT	Hayden Run			
Hayden Run					LT			LT	TH	RT	
					TH						
					RT						
							3	RT			
			RT	TH	LT			TH			
1.5 ac	C2	3	-6	3	3	LT	C3	1.5 ac			
30%							3	-6	3	30%	
					TH			LT			
					RT			TH			
					TH	LT			0	RT	
							0	LT	North Dr		
									0		
					TH			RT			
									RT		
			RT	TH	LT			0	TH		
							0	LT	South Dr		
Soccer Field					0			0			
					LT	TH			RT		
					RT						
					TH	LT			RT	LT	
							Davidson				
									RT		
									LT		
					TH	RT			TH		
			Leppert								



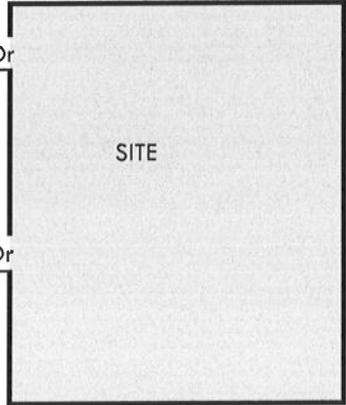
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Total Traffic Volumes (7:00 - 8:00)										AM Peak Hour k=h+i+j	
			Falls Blvd								
			TH	LT	5			RT			
			0	6	12			LT	C1	2 ac	
					-2			17			
					TH			RT			
					3			RT			
			RT	TH	LT	0			TH		
			1	9	2	5			LT	Hayden Run	
Hayden Run			LT	2			1	10	3		
			TH	0			LT	TH	RT		
			RT	2							
					6			RT			
			RT	TH	LT	0			TH		
1.5 ac C2			9	0	8	7			LT	C3	
					10	2			10		
			LT	6			LT	TH	RT		
			TH	0							
			RT	7							
					0			RT			
			TH	LT			0			LT	
			14	0					North Dr		
					22			0			
					TH			RT			
					6			RT			
			RT	TH	LT	0			TH		
			0	10	4	0			LT	South Dr	
Soccer Field			LT	0			0	16	0		
			TH	0			LT	TH	RT		
			RT	0							
					8			RT	LT		
			TH	LT			0			RT	
			5	5					8	TH	
					8			0			
					TH			RT	LT		
							8			5	
									Davidson		
							0			0	
							LT			0	
							TH			5	
			Leppert								



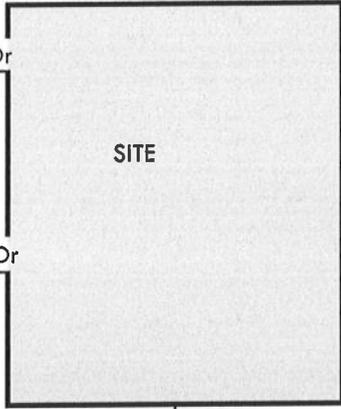
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Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site B (Soccer field) Traffic Volumes										AM Peak Hour			
(7:00 - 8:00)													
			15% Falls Blvd										
			TH	LT	0	RT							
			0	0	0	LT	C1						
					0	0							
					TH	RT							
							RT						
			RT	TH	LT	0	TH	20%					
							LT	Hayden Run					
Hayden Run			LT			0	0	0					
			10%		TH			LT	TH	RT			
					RT	0							
							0	RT					
					0	TH							
C2			RT	TH	LT	0	LT	C3					
					0	0	0						
			LT	0			0	0	0				
			TH	0			LT	TH	RT				
			RT	0									
					TH	LT	0	RT					
					0	0	North Dr						
					0	0							
In					0	0	TH	RT					
Out					0	0							
							0	RT					
					0	TH							
					0	LT	15% South Dr						
Soccer Field			LT	0			0	0					
			TH	0			LT	TH	RT				
			RT	0									
					TH	LT	0	RT	20%		RT	LT	
					0	0	Davidson				0	TH	
							0	LT					
					TH	RT			TH	0			
			Leppert				20%						



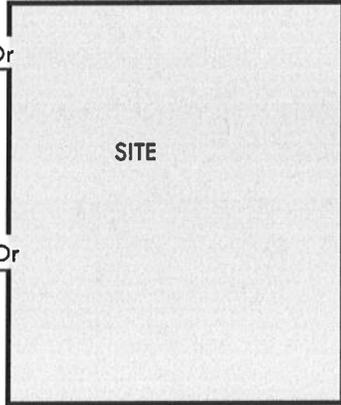
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Total Non-Site Traffic Volumes (7:00 - 8:00)										AM Peak Hour m=k+l			
			Falls Blvd										
			TH	LT	5	RT							
			0	6	12	LT	C1 2 ac						
						-2	17						
						TH	RT						
						3	RT						
			RT	TH	LT	0	TH						
			1	9	2	5	LT	Hayden Run					
Hayden Run			LT	2	1	10	3						
			TH	0	LT	TH	RT						
			RT	2									
						6	RT						
			RT	TH	LT	0	TH						
1.5 ac C2			9	0	8	7	LT	C3 1.5 ac					
			LT	6	10	2	10						
			TH	0	LT	TH	RT						
			RT	7									
						0	RT						
			TH	LT	0	LT	North Dr						
			14	0	22	0							
						TH	RT						
						6	RT						
			RT	TH	LT	0	TH						
			0	10	4	0	LT	South Dr					
Soccer Field			LT	0	0	16	0						
			TH	0	LT	TH	RT						
			RT	0									
						8	RT						
			TH	LT	8	LT	Davidson			RT	LT		
			5	5	0	0				8	TH		
						8	0						
						TH	RT				TH	5	
			Leppert										



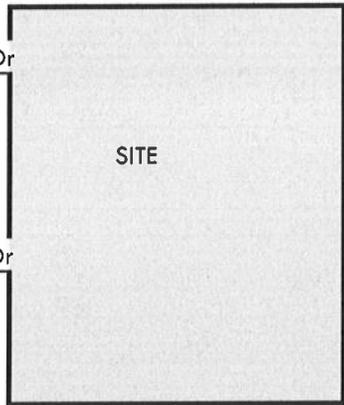
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Traffic Impact Study
Traffic Volume Calculations

2026 Background plus Non-Site Traffic Volumes (7:00 - 8:00)										AM Peak Hour n=c+m		
			Falls Blvd									
			TH	LT				5	RT			
			201	6				12	LT	C1	2 ac	
						10	17					
						TH	RT					
						7	RT					
			RT	TH	LT	208	TH					
			24	45	143	96	LT	Hayden Run				
Hayden Run			LT	6				54	17	179		
			TH	610				LT	TH	RT		
			RT	91								
						6	RT					
			RT	TH	LT	0	TH					
1.5 ac			C2	9	190	8	7	LT	C3	1.5 ac		
						10	197	10				
						LT	TH	RT				
						TH	RT					
			204	0				0	LT	North Dr		
						217	0					
						TH	RT					
						6	RT					
			RT	TH	LT	0	TH					
			0	200	4	0	LT	South Dr				
Soccer Field			LT	0				0	211	0		
			TH	0				LT	TH	RT		
			RT	0								
						25	RT	RT	LT	0	RT	
			179	21				104	LT	Davidsoi		
						177	140	LT	0	129	TH	
						TH	RT	TH	161			
			Leppert									



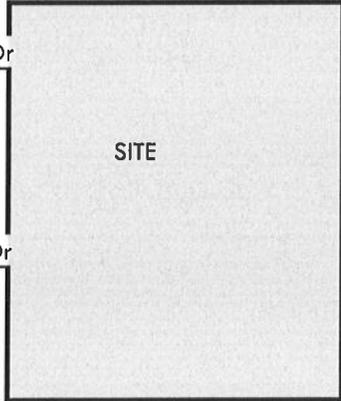
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Traffic Impact Study
Traffic Volume Calculations

2015 Counted Traffic Volumes (5:00 - 6:00)										PM Peak Hour a				
			Falls Blvd											
			TH	LT	0	RT								
			59	0	0	LT	C1							
						100	0							
						TH	RT							
						52	RT							
			RT	TH	LT	563	TH							
			9	12	38	138	LT	Hayden Run						
Hayden Run			LT	26	63	22	41							
			TH	249	LT	TH	RT							
			RT	76										
						0	RT							
			RT	TH	LT	0	TH							
C2			0	236	0	0	LT	C3						
			LT	0	0	139	0							
			TH	0	LT	TH	RT							
			RT	0										
			TH	LT	0	RT								
			236	0	0	LT	North Dr							
						139	0							
						TH	RT							
						0	RT							
			RT	TH	LT	0	TH							
Soccer Field			0	236	0	0	LT	South Dr						
			LT	0	0	139	0							
			TH	0	LT	TH	RT							
			RT	0										
			TH	LT	20	RT				RT	LT	0	RT	
			218	18	154	LT	Davidso			0	0	174	TH	
						119	82				LT	0		
						TH	RT				TH	100		
			Leppert											



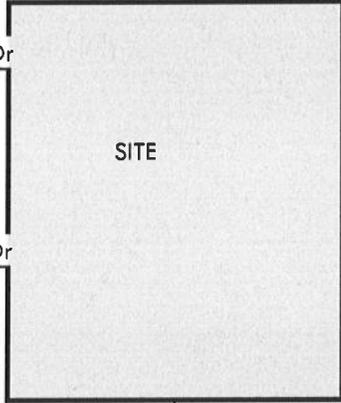
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2016 Background Volumes (5:00 - 6:00)										PM Peak Hour b			
			1.01 Falls Blvd										
			TH	LT	0	RT							
			60	0	0	LT	C1						
					101	0							
					TH	RT							
					53	RT							
					577	TH							
			RT	TH	LT								
1.02			9	12	38	141	LT	Hayden Run					
Hayden Run					LT	27	65	23	42	1.025			
					TH	254	LT	TH	RT				
					RT	78							
							0	RT					
			RT	TH	LT			0	TH				
C2			0	243	0	0	LT	C3					
					LT	0	0	143	0				
					TH	0	LT	TH	RT				
					RT	0							
							0	RT					
					TH	LT							
					243	0	0	LT	North Dr				
							143	0					
					TH	RT							
							0	RT					
			RT	TH	LT			0	TH				
C2			0	243	0	0	LT	South Dr					
Soccer Field					LT	0	0	143	0				
					TH	0	LT	TH	RT				
					RT	0							
							0	RT					
			TH	LT			20	RT	RT	LT			
			225	19			157	LT	Davidson		177	TH	
							122	84					
							TH	RT			LT		
									TH	103			
											1.025		
											1.02		



Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Background Volumes (5:00 - 6:00)						PM Peak Hour	
			1.10 Falls Blvd				
	TH	LT	0	RT			
	66	0	0	LT	C1		
			111	0			
			TH	RT			
			66	RT			
	RT	TH	LT	721	TH		
1.20	10	13	42	176	LT	Hayden Run	
Hayden Run		LT	32	85	30	55	1.25
		TH	305	LT	TH	RT	
		RT	94				
			0	RT			
	RT	TH	LT	0	TH		
C2	0	316	0	0	LT	C3	
			LT	0	186	0	
			TH	0	LT	TH	RT
			RT	0			
			1.30				
	TH	LT	0	RT			
	316	0	0	LT	North Dr		
			186	0			
			TH	RT			
			0	RT			
	RT	TH	LT	0	TH		
	0	316	0	0	LT	South Dr	
Soccer Field		LT	0	0	186	0	
		TH	0	LT	TH	RT	
		RT	0				
			TH	LT	RT	LT	1.20
	293	25	188	LT	Davidson		212
			153	105	LT		
			TH	RT	TH	130	
			1.25				

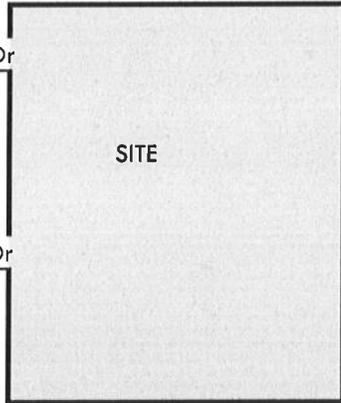


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Traffic Impact Study
Traffic Volume Calculations

2016 Non-Site B (Soccer field) Traffic Volumes										PM Peak Hour	
										d	
										15%	
										Falls Blvd	
										TH	
										LT	
										0	
										RT	
										0	
										LT	
										3	
										0	
										TH	
										RT	
										0	
										RT	
										TH	
										20%	
										LT	
										14	
										Hayden Run	
										2	
										3	
										5	
										RT	
										TH	
										LT	
										10%	
										TH	
										RT	
										7	
										0	
										RT	
										0	
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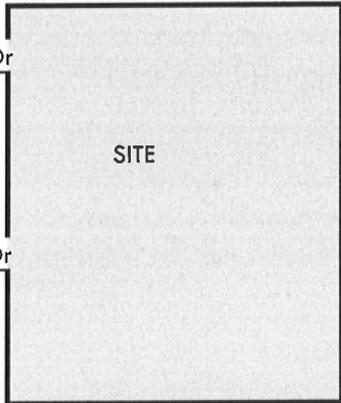
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Traffic Impact Study
Traffic Volume Calculations

2016 Background plus Non-Site Volumes										PM Peak Hour	
(5:00 - 6:00)										f=b+d	
			Falls Blvd								
			TH	LT	0	RT					
			70	0	0	LT		C1			
						104	0				
						TH	RT				
						53	RT				
						577	TH				
			RT	TH	LT	155		LT		Hayden Run	
			9	22	38	67		26	47		
Hayden Run						LT		TH		RT	
						27		254		85	
						TH		RT		85	
						RT		0		RT	
						0		TH		0	
						0		LT		C3	
C2						0		153		0	
						LT		TH		RT	
						0		0		0	
						TH		LT		North Dr	
						274		0		153	
						TH		RT		0	
						0		0		0	
						153		0		0	
						TH		RT		0	
						0		10		TH	
						RT		0		LT	
						31		243		0	
Soccer Field						LT		28		143	
						TH		3		0	
						RT		10		RT	
						TH		34		RT	
						230		157		LT	
						TH		136		84	
						RT		0		0	
						TH		191		TH	
						LT		0		0	
						TH		108		108	
			Leppert			TH		RT		108	



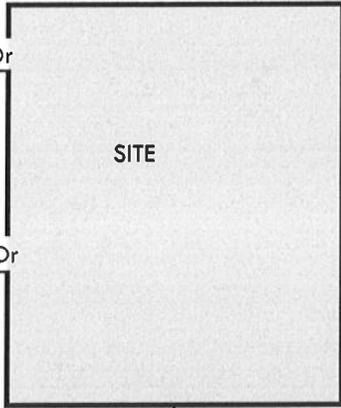
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Traffic Impact Study
Traffic Volume Calculations

2016 Total Traffic Volumes (5:00 - 6:00)						PM Peak Hour g=e+f
			Falls Blvd			
		TH	LT	0	RT	
		70	0	0	LT	C1
				104	0	
				TH	RT	
				53	RT	
	RT	TH	LT	577	TH	
	9	22	38	180	LT	Hayden Run
Hayden Run		LT	27	73	26	62
		TH	254	LT	TH	RT
		RT	95			
				0	RT	
	RT	TH	LT	0	TH	
C2	0	309	0	0	LT	C3
		LT	0	0	174	0
		TH	0	LT	TH	RT
		RT	0			
		TH	LT	1	RT	
		307	2	1	LT	North Dr
				173	1	
				TH	RT	
				20	RT	
	RT	TH	LT	10	TH	
	31	244	33	9	LT	South Dr
Soccer Field		LT	10	28	144	17
		TH	3	LT	TH	RT
		RT	10			
		TH	LT	39	RT	
		237	27	164	LT	Davidso
				149	97	RT
			Leppert	TH	RT	
						RT
						LT
						20
						RT
						196
						TH
						13
						111
						TH



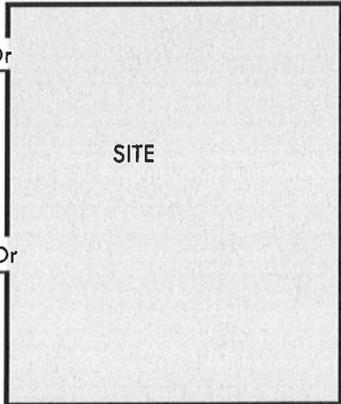
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Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Primary Trip Traffic Volumes- inbound										PM Peak Hour
(5:00 - 6:00)										h
			15% Falls Blvd							
			TH	LT			RT			
			8	6			LT	C1	2 ac	in
							32	40%		94
					TH	RT				
					8	RT				
			RT	TH	LT	TH	20%			
					8	11	LT	Hayden Run		
Hayden Run			LT	4	0	20	0			
			10%	TH	LT	TH	RT			
					RT	5				
							RT			
			RT	TH	LT	0	TH			
1.5 ac			C2	12	12	LT	C3	1.5 ac		
					0	16	20	16		30%
			TH	0	LT	TH	RT			
					RT					
			TH	LT	0	RT				
					0	0	LT	North Dr		Edie Dr
					52	0				
					TH	RT				
					14	RT				
			RT	TH	LT	0	TH			
					0	0	LT	15% South Dr		
Soccer Field			LT	0	0	38	0			
			TH	0	LT	TH	RT			
					RT	0				
			TH	LT	19	RT	20%		RT	LT
					0	LT	Davidson		19	TH
					19	0		LT		
					TH	RT			TH	
			Leppert		20%					



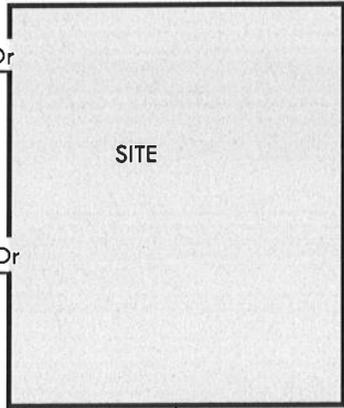
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Primary Trip Traffic Volumes- outbound										PM Peak Hour
										i
										(5:00 - 6:00)
			15%	Falls Blvd						
			TH	LT	6	RT				
					34	LT	C1	2 ac		
					10			40%	out	101
					TH	RT				
							RT			
			RT	TH	LT	TH	20%			
			4	22	8	LT	Hayden Run			
Hayden Run					6	10	12			
			10%	TH			LT	TH	RT	
							RT			
					14	RT				
			RT	TH	LT	0	TH			
1.5 ac C2					17	LT	C3	1.5 ac		
					30%			30%		
			LT	14			LT	TH	RT	
							TH			
							RT			
			TH	LT	0	RT				
					0	LT	North Dr			
							0			
					TH	RT				
							RT			
			RT	TH	LT	0	TH			
Soccer Field					0	LT	15%	South Dr		
							0			
							0			
			TH	LT			RT	20%	RT	LT
							LT	Davidson		
							0			
							LT			
			TH	LT			TH	20		
							TH			
							RT			
							20%			
			Leppert							



Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site A (commercial) Total Traffic Volumes										PM Peak Hour		
(5:00 - 6:00)										k=h+i+j		
			Falls Blvd									
			TH	LT	24	RT						
			-10	24	52	LT	C1			2 ac		
						-8	50					
						TH	RT					
						8	RT					
			RT	TH	LT	0	TH					
			4	30	8	11	LT	Hayden Run				
Hayden Run			LT	4	6	30	12					
			TH	0	LT	TH	RT					
			RT	5								
						28	RT					
			RT	TH	LT	0	TH					
1.5 ac			C2	26	-7	26	31	LT	C3			1.5 ac
			LT	28	30	-8	30					
			TH	0	LT	TH	RT					
			RT	31								
			TH	LT	0	RT						
			55	0	0	LT	North Dr					
						52	0					
						TH	RT					
						14	RT					
			RT	TH	LT	0	TH					
			0	40	15	0	LT	South Dr				
Soccer Field			LT	0	0	38	0					
			TH	0	LT	TH	RT					
			RT	0								
			TH	LT	19	RT						
			20	20	0	LT	Davidso					
						19	0	RT	LT	0	RT	
						TH	RT	0	0	19	TH	
									LT	0		
									TH	20		
			Leppert									



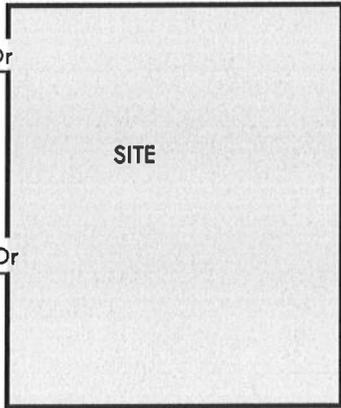
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site B (Soccer field) Traffic Volumes										PM Peak Hour	
										(5:00 - 6:00)	
			15% Falls Blvd								
			TH	LT	0	RT					
			21	0	0	LT	C1				
						7	0				
						TH	RT				
									RT		
			RT	TH	LT	28	TH	20%			
						5	7	Hayden Run		9	
Hayden Run				LT				LT	TH	RT	
			10%								
									14		
									0	RT	
			RT	TH	LT	0	TH				
C2				0				0	LT	C3	
						0	21	0			
						LT	TH	RT			
						TH	LT				
						63	0	North Dr			
									21	0	
						TH	RT				
									0	RT	
			RT	TH	LT	21	TH	15% South Dr			
						0	LT	0			
Soccer Field				LT				56	0		
						TH	7	RT			
						RT	18				
									28	RT	
			TH	LT				20%		RT	
						9	9	Davidson		LT	
									28	TH	
									28	RT	
									LT	9	
									20%		
									Leppert		

SITE

Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Total Non-Site Traffic Volumes (5:00 - 6:00)										PM Peak Hour m=k+l		
			Falls Blvd									
			TH	LT	24	RT						
			11	24	52	LT	C1		2 ac			
					-1	50						
					TH	RT						
					8	RT						
			RT	TH	0	TH						
			4	51	8	39	LT	Hayden Run				
Hayden Run			LT	4	11	37	21					
			TH	0	LT	TH	RT					
			RT	19								
					28	RT						
			RT	TH	0	TH						
1.5 ac			C2	26	56	26	31	LT	C3		1.5 ac	
			LT	28	30	13	30					
			TH	0	LT	TH	RT					
			RT	31								
			TH	LT	0	RT						
			118	0	0	LT	North Dr					
					73	0						
					TH	RT						
					14	RT						
			RT	TH	21	TH						
			63	40	0	LT	South Dr					
Soccer Field			LT	21	56	38	0					
			TH	7	LT	TH	RT					
			RT	18								
			TH	LT	47	RT			RT	LT	0	RT
			29	29	0	LT	Davidsoi		0	0	47	TH
					47	0			LT	0		
					TH	RT			TH	29		

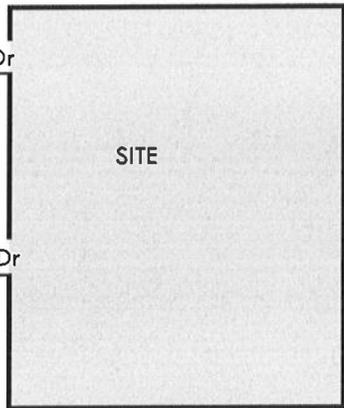


Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Background plus Non-Site Traffic Volumes (5:00 - 6:00)										PM Peak Hour n=c+m	
			Falls Blvd								
			TH	LT	24	RT					
			77	24	52	LT		C1		2 ac	
					110	50					
					TH	RT					
					74	RT					
			RT	TH	LT	721	TH				
			14	64	50	215	LT		Hayden Run		
Hayden Run					LT	36	96	67	76		
					TH	305		LT		TH	
					RT	113		RT			
					28		RT				
			RT	TH	LT	0	TH				
1.5 ac			C2	26	372	26	31	LT		C3	
					30	199		30		1.5 ac	
					TH	0		LT		TH	
					RT	31		RT			
					0		RT				
			TH	LT	0	LT		North Dr		Edie Dr	
					434	0		TH			
					259		0				
					TH	RT					
					14	RT					
			RT	TH	LT	21	TH				
			63	356	15	0	LT		South Dr		
Soccer Field					LT	21	56	224	0		
					TH	7		TH		RT	
					RT	18					
					TH	LT	71	RT		RT	
			322	54	188	LT		Davidson		LT	
					200		105		0		
					TH	RT		TH		159	
			Leppert				0		RT		
					259		TH				

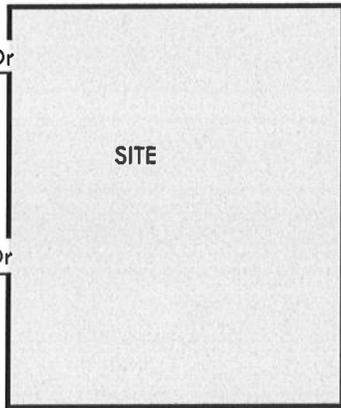
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Total Traffic Volumes (5:00 - 6:00)										PM Peak Hour o=e+n				
			Falls Blvd											
			TH	LT	24	RT								
			77	24	52	LT	C1			2 ac				
						110	50							
						TH	RT							
						74	RT							
			RT	TH	LT	721	TH							
			14	64	50	240	LT	Hayden Run						
Hayden Run			LT	36	102	67	91							
			TH	305	LT	TH	RT							
			RT	123										
						28	RT							
			RT	TH	LT	0	TH							
1.5 ac			C2	26	407	26	31	LT	C3			1.5 ac		
			LT	28	30	220	30							
			TH	0	LT	TH	RT							
			RT	31										
			TH	LT	1	RT								
			467	2	1	LT	North Dr							
						279	1							
						TH	RT							
						34	RT							
			RT	TH	LT	21	TH							
			63	357	48	9	LT	South Dr						
Soccer Field			LT	21	56	225	17							
			TH	7	LT	TH	RT							
			RT	18										
			TH	LT	76	RT				RT	LT	20	RT	
			329	57	195	LT	Davidsoi			7	12	264	TH	
						213	118				LT	13		
						TH	RT				TH	162		
			Leppert											



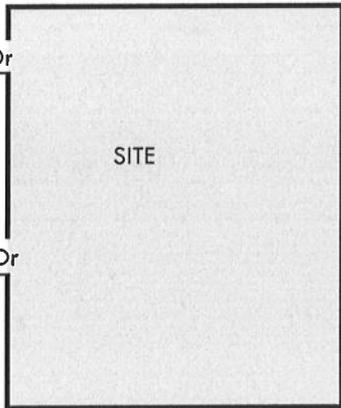
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Non-Site B (Soccer field) Traffic Volumes										PM Peak Hour		
(5:00 - 6:00)										11		
During tournament												
			15% Falls Blvd									
			TH	LT	0	RT						
			55	0	0	LT	C1					
					14	0						
					TH	RT						
							RT					
			RT	TH	LT	TH	20%					
					55	73	LT	Hayden Run				
Hayden Run			LT			9	14	18				
			10%		TH	LT	TH	RT				
					RT	37						
							0	RT				
			RT	TH	LT	0	TH					
C2			0	165	0	0	LT	C3				
					LT	0	41	0				
					TH	0	LT	TH	RT			
					RT	0						
					TH	LT	0	RT				
					165	0	0	LT	North Dr			
							41	0				
					TH	RT						
In					0	RT						
Out					55	TH						
					0	LT	15% South Dr					
			RT	TH	LT	0	LT					
Soccer Field			165			0	0					
					LT	41	0					
					TH	14	LT	TH	RT			
					RT	36						
							73	RT	20%		RT	LT
					18	18	Davidson				73	TH
							73	LT				
					TH	RT			TH	18		
					20%							



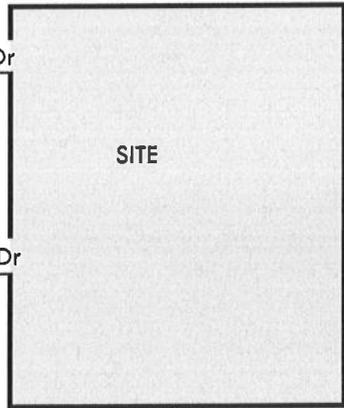
Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Total Non-Site Traffic Volumes (5:00 - 6:00)										PM Peak Hour m1=k+11	
During tournament											
			Falls Blvd								
			TH	LT	24	RT					
			45	24	52	LT	C1			2 ac	
						6	50				
						TH	RT				
						8	RT				
			RT	TH	LT	0	TH				
			4	85	8	84	LT	Hayden Run			
Hayden Run			LT	4	15	44	30				
			TH	0	LT	TH	RT				
			RT	42							
						28	RT				
			RT	TH	LT	0	TH				
1.5 ac	C2	26	158	26	31	LT	C3	1.5 ac			
			LT	28	30	33	30				
			TH	0	LT	TH	RT				
			RT	31							
			TH	LT	0	RT					
			220	0	0	LT	North Dr				
						93	0				
						TH	RT				
						14	RT				
			RT	TH	LT	55	TH				
			165	40	15	0	LT	South Dr			
Soccer Field			LT	41	146	38	0				
			TH	14	LT	TH	RT				
			RT	36							
			TH	LT	92	RT					
			38	38	0	LT	Davidson				
						92	0	RT	LT	0	0
						TH	RT	TH	38	92	TH
			Leppert								



Carr Farms
Traffic Impact Study
Traffic Volume Calculations

2026 Background plus Non-Site Traffic Volumes (5:00 - 6:00)										PM Peak Hour n1=c+m1	
										During tournament	
			Falls Blvd								
			TH	LT			24	RT			
			111	24			52	LT	C1	2 ac	
							117	50			
							TH	RT			
							74	RT			
			RT	TH	LT			721	TH		
			14	98	50			260	LT	Hayden Run	
Hayden Run			LT	36			100	74	85		
			TH	305			LT	TH	RT		
			RT	136							
							28	RT			
			RT	TH	LT			0	TH		
1.5 ac	C2	26	474	26			31	LT	C3	1.5 ac	
			LT	28			30	219	30		
			TH	0			LT	TH	RT		
			RT	31							
			TH	LT			0	RT			
			536	0			0	LT	North Dr		
							279	0			
							TH	RT			
							14	RT			
			RT	TH	LT			55	TH		
			165	356	15			0	LT	South Dr	
Soccer Field			LT	41			146	224	0		
			TH	14			LT	TH	RT		
			RT	36							
			TH	LT			116	RT	RT	LT	
			331	63			188	LT	Davidso		0
							245	105	LT	0	
							TH	RT	TH	168	
			Leppert								



TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	CW	Intersection						
Agency/Co.	EMH&T	Jurisdiction						
Date Performed	3/24/2015	Analysis Year						
Analysis Time Period	2026 AM Peak, Total Volumes							
Project Description Carr Farms, 20150261 , Existing lane								
East/West Street: Davidson Road				North/South Street: Leppert Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		181	144	26	190			
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00		
Hourly Flow Rate, HFR (veh/h)	0	196	156	28	206	0		
Percent Heavy Vehicles	0	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				115		27		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	124	0	29		
Percent Heavy Vehicles	0	0	0	2	0	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		28		153				
C (m) (veh/h)		1207		529				
v/c		0.02		0.29				
95% queue length		0.07		1.19				
Control Delay (s/veh)		8.1		14.6				
LOS		A		B				
Approach Delay (s/veh)	--	--		14.6				
Approach LOS	--	--		B				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CW	Intersection	
Agency/Co.	EMH&T	Jurisdiction	
Date Performed	3/24/2015	Analysis Year	
Analysis Time Period	2026 PM Peak, Total Volumes		

Project Description Carr Farms, 20150261, Existing lane

East/West Street: Davidson Road

North/South Street: Leppert Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)		213	118	57	329	
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	231	128	61	357	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street Movement	Eastbound			Westbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)				195		76
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	211	0	82
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Movement								
Lane Configuration		LT		LR				
v (veh/h)		61		293				
C (m) (veh/h)		1200		409				
v/c		0.05		0.72				
95% queue length		0.16		5.50				
Control Delay (s/veh)		8.2		33.1				
LOS		A		D				
Approach Delay (s/veh)	--	--		33.1				
Approach LOS	--	--		D				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	CW	Intersection						
Agency/Co.	EMH&T	Jurisdiction						
Date Performed	3/24/2015	Analysis Year						
Analysis Time Period	2026 AM Peak, Total Volumes							
Project Description Carr Farms, 20150261								
East/West Street: Davidson Road			North/South Street: Leppert Road					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		181	144	26	190			
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00		
Hourly Flow Rate, HFR (veh/h)	0	196	156	28	206	0		
Percent Heavy Vehicles	0	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				115		27		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	124	0	29		
Percent Heavy Vehicles	0	0	0	2	0	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		28		153				
C (m) (veh/h)		1207		587				
v/c		0.02		0.26				
95% queue length		0.07		1.04				
Control Delay (s/veh)		8.1		13.3				
LOS		A		B				
Approach Delay (s/veh)	--	--		13.3				
Approach LOS	--	--		B				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CW	Intersection	
Agency/Co.	EMH&T	Jurisdiction	
Date Performed	3/24/2015	Analysis Year	
Analysis Time Period	2026 PM Peak, Total Volumes		

Project Description Carr Farms, 20150261

East/West Street: Davidson Road

North/South Street: Leppert Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
	1	2	3	4	5	6
Movement	L	T	R	L	T	R
Volume (veh/h)		213	118	57	329	
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	231	128	61	357	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	1	1	0
Configuration		T	R	L	T	
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
	7	8	9	10	11	12
Movement	L	T	R	L	T	R
Volume (veh/h)				195		76
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	211	0	82
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
	1	4	7	8	9	10	11	12
Movement								
Lane Configuration		L		LR				
v (veh/h)		61		293				
C (m) (veh/h)		1200		446				
v/c		0.05		0.66				
95% queue length		0.16		4.63				
Control Delay (s/veh)		8.2		27.2				
LOS		A		D				
Approach Delay (s/veh)	--	--		27.2				
Approach LOS	--	--		D				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	CW	Intersection						
Agency/Co.	EMH&T	Jurisdiction						
Date Performed	3/24/2015	Analysis Year						
Analysis Time Period	2026 AM Peak, Total Volumes							
Project Description Carr Farms, 20150261 , Existing /ml								
East/West Street: South Drive			North/South Street: Leppert Road					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	1	211	6	14	201	1		
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00		
Hourly Flow Rate, HFR (veh/h)	1	229	6	15	218	1		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	1	1	1	15	1	36		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	1	1	1	16	1	39		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	1	15	56			3		
C (m) (veh/h)	1350	1332	672			542		
v/c	0.00	0.01	0.08			0.01		
95% queue length	0.00	0.03	0.27			0.02		
Control Delay (s/veh)	7.7	7.7	10.8			11.7		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	10.8			11.7		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CW	Intersection	
Agency/Co.	EMH&T	Jurisdiction	
Date Performed	3/24/2015	Analysis Year	
Analysis Time Period	2026 PM Peak, Total Volumes		

Project Description Carr Farms, 20150261 , Existing lane	
East/West Street: South Drive	North/South Street: Leppert Road
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movement	Northbound			Southbound		
	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	56	225	17	48	357	63
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	56	244	18	52	388	63
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street Movement	Eastbound			Westbound		
	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	21	7	18	9	21	34
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	22	7	19	9	22	36
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
			7	8	9	10	11	12
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	56	52		67			48	
C (m) (veh/h)	1109	1302		378			290	
v/c	0.05	0.04		0.18			0.17	
95% queue length	0.16	0.12		0.64			0.58	
Control Delay (s/veh)	8.4	7.9		16.6			19.9	
LOS	A	A		C			C	
Approach Delay (s/veh)	--	--		16.6			19.9	
Approach LOS	--	--		C			C	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CW	Intersection	
Agency/Co.	EMH&T	Jurisdiction	
Date Performed	3/24/2015	Analysis Year	
Analysis Time Period	2026 AM Peak, Total Volumes		

Project Description Carr Farms, 20150261, add warranted turn lanes

East/West Street: South Drive

North/South Street: Leppert Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
	1	2	3	4	5	6
Movement	L	T	R	L	T	R
Volume (veh/h)	1	211	6	14	201	1
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	1	229	6	15	218	1
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	1	0	1	1	1
Configuration	L		TR	L	T	R
Upstream Signal		0			0	
Minor Street	Eastbound			Westbound		
	7	8	9	10	11	12
Movement	L	T	R	L	T	R
Volume (veh/h)	1	1	1	15	1	36
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	1	1	1	16	1	39
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach	N			N		
Storage	0			0		
RT Channelized	0			0		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
			7	8	9	10	11	12
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	1	15	56			3		
C (m) (veh/h)	1350	1332	672			543		
v/c	0.00	0.01	0.08			0.01		
95% queue length	0.00	0.03	0.27			0.02		
Control Delay (s/veh)	7.7	7.7	10.8			11.7		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	10.8			11.7		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY

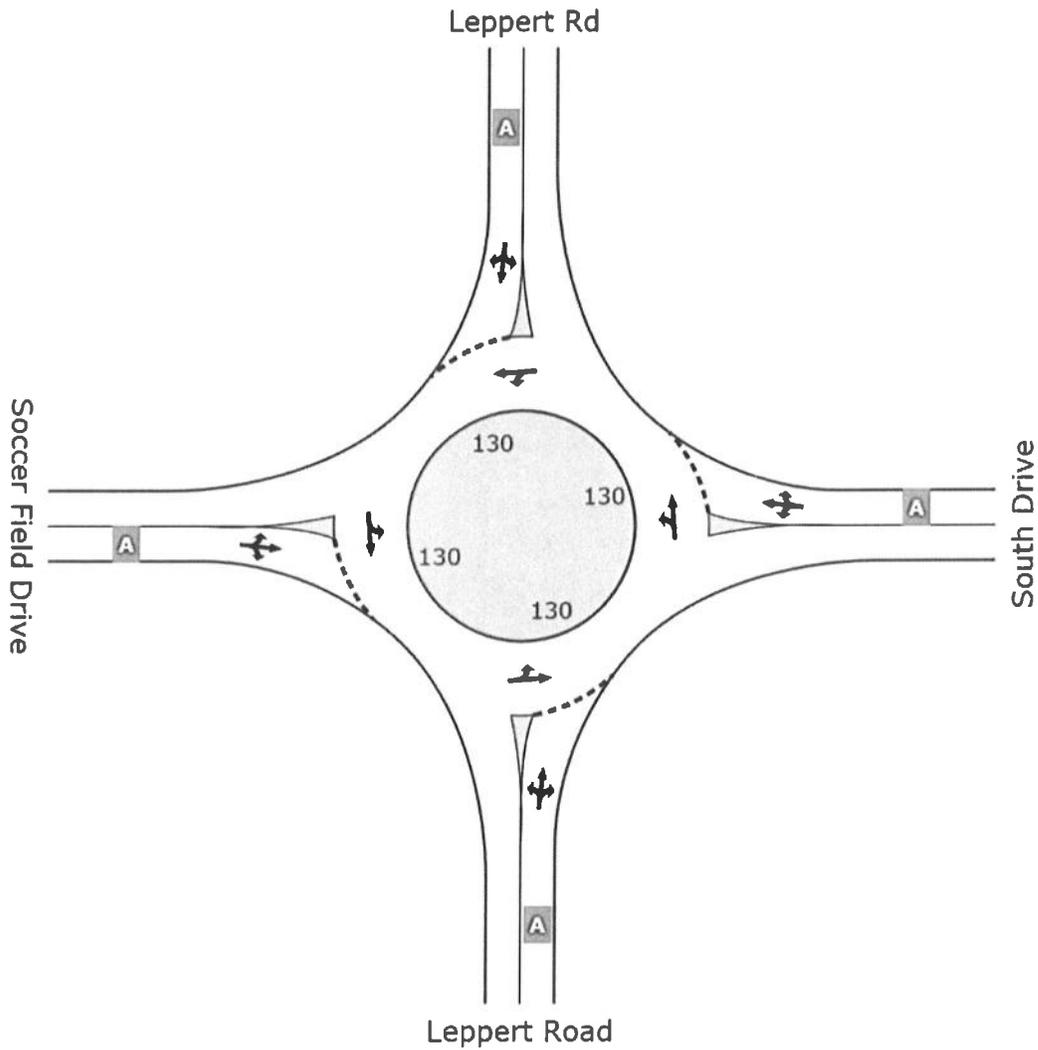
General Information		Site Information						
Analyst	CW	Intersection						
Agency/Co.	EMH&T	Jurisdiction						
Date Performed	3/24/2015	Analysis Year						
Analysis Time Period	2026 PM Peak, Total Volumes							
Project Description Carr Farms, 20150261, add warranted turn lanes								
East/West Street: South Drive				North/South Street: Leppert Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	56	225	17	48	357	63		
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00		
Hourly Flow Rate, HFR (veh/h)	56	244	18	52	388	63		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	21	7	18	9	21	34		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	22	7	19	9	22	36		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	56	52	67			48		
C (m) (veh/h)	1109	1302	385			309		
v/c	0.05	0.04	0.17			0.16		
95% queue length	0.16	0.12	0.62			0.54		
Control Delay (s/veh)	8.4	7.9	16.3			18.8		
LOS	A	A	C			C		
Approach Delay (s/veh)	--	--	16.3			18.8		
Approach LOS	--	--	C			C		

LEVEL OF SERVICE SUMMARY

Site: Rou 4-way 1-Lane US

Carr Farms, 2015-0261
 Leppert Road/Soccer field Drive
 2026 AM Peak Hour, Full Build

Roundabout



	South	East	North	West	Intersection
LOS	A	A	A	A	A

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Rou 4-way 1-Lane US

Carr Farms, 2015-0261
 Leppert Road/South Drive/Soccer field Drive
 2026 AM Peak Hour, Full Build

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leppert Road											
3	L	1	2.0	0.218	5.3	LOS A	0.9	23.1	0.09	1.06	27.4
8	T	229	2.0	0.218	5.3	LOS A	0.9	23.1	0.09	0.34	31.6
18	R	7	2.0	0.218	5.3	LOS A	0.9	23.1	0.09	0.53	30.4
Approach		237	2.0	0.218	5.3	LOS A	0.9	23.1	0.09	0.35	31.5
East: South Drive											
1	L	16	2.0	0.065	4.7	LOS A	0.2	5.6	0.34	0.78	27.7
6	T	1	2.0	0.065	4.7	LOS A	0.2	5.6	0.34	0.42	31.5
16	R	39	2.0	0.065	4.7	LOS A	0.2	5.6	0.34	0.53	30.6
Approach		57	2.0	0.065	4.7	LOS A	0.2	5.6	0.34	0.60	29.7
North: Leppert Rd											
7	L	15	2.0	0.216	5.3	LOS A	0.9	22.9	0.09	1.03	27.4
4	T	218	2.0	0.216	5.3	LOS A	0.9	22.9	0.09	0.33	31.6
14	R	1	2.0	0.216	5.3	LOS A	0.9	22.9	0.09	0.52	30.4
Approach		235	2.0	0.216	5.3	LOS A	0.9	22.9	0.09	0.38	31.2
West: Soccer Field Drive											
5	L	1	2.0	0.004	4.1	LOS A	0.0	0.3	0.33	0.77	28.1
2	T	1	2.0	0.004	4.1	LOS A	0.0	0.3	0.33	0.37	32.0
12	R	1	2.0	0.004	4.1	LOS A	0.0	0.3	0.33	0.49	31.1
Approach		3	2.0	0.004	4.1	LOS A	0.0	0.3	0.33	0.54	30.2
All Vehicles		532	2.0	0.218	5.2	LOS A	0.9	23.1	0.12	0.39	31.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

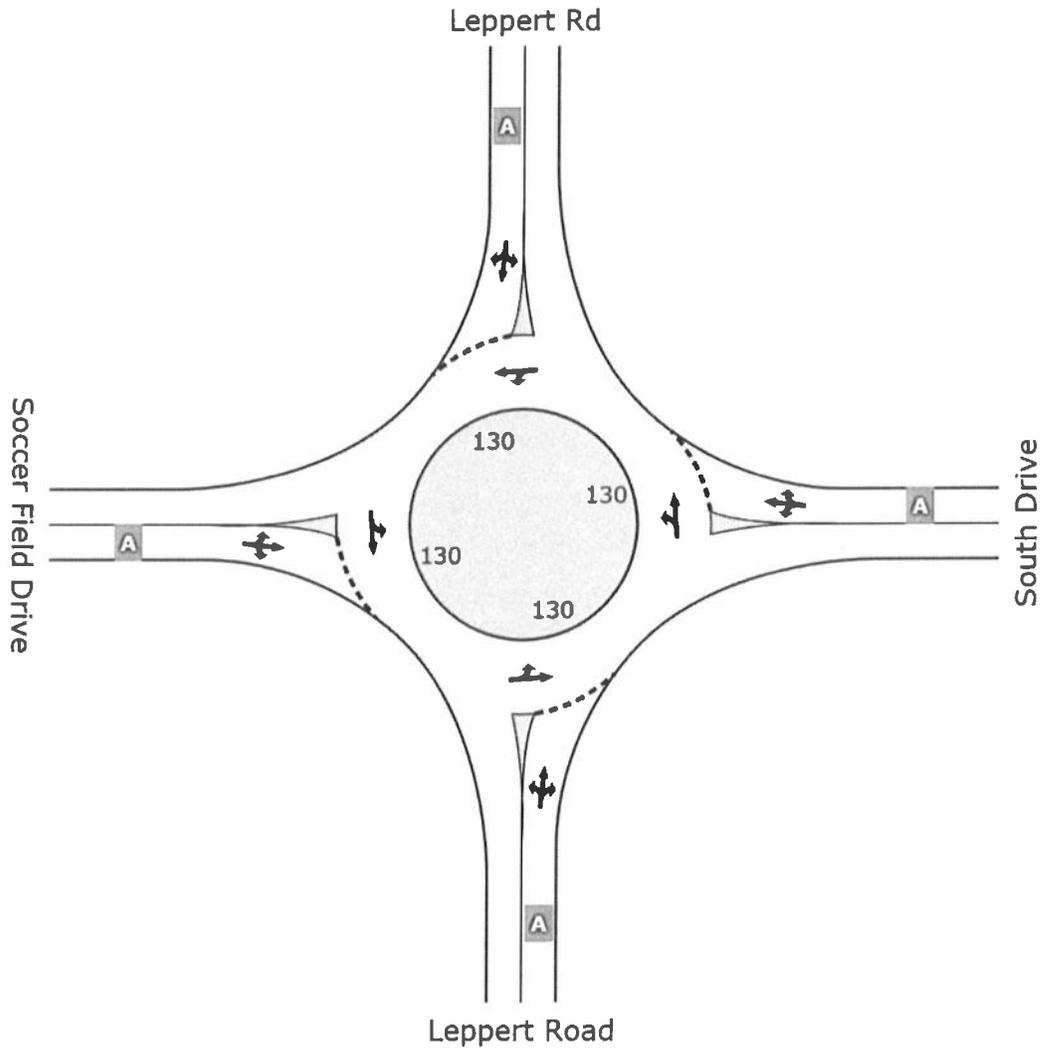
HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: 2026 PM Total

Carr Farms, 2015-0261
 Leppert Road/South Drive/Soccer field Drive
 2026 PM Peak Hour, Full Build

Roundabout



	South	East	North	West	Intersection
LOS	A	A	A	A	A

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2026 PM Total

Carr Farms, 2015-0261
 Leppert Road/South Drive/Soccer field Drive
 2026 PM Peak Hour, Full Build

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leppert Road											
3	L	61	2.0	0.318	6.8	LOS A	1.5	37.2	0.25	0.90	26.8
8	T	245	2.0	0.318	6.8	LOS A	1.5	37.2	0.25	0.38	30.4
18	R	18	2.0	0.318	6.8	LOS A	1.5	37.2	0.25	0.52	29.5
Approach		324	2.0	0.318	6.8	LOS A	1.5	37.2	0.25	0.48	29.6
East: South Drive											
1	L	10	2.0	0.088	5.4	LOS A	0.3	7.7	0.41	0.88	27.6
6	T	23	2.0	0.088	5.4	LOS A	0.3	7.7	0.41	0.50	31.1
16	R	37	2.0	0.088	5.4	LOS A	0.3	7.7	0.41	0.61	30.3
Approach		70	2.0	0.088	5.4	LOS A	0.3	7.7	0.41	0.61	30.1
North: Leppert Rd											
7	L	52	2.0	0.505	9.7	LOS A	3.0	76.6	0.35	0.89	25.6
4	T	388	2.0	0.505	9.7	LOS A	3.0	76.6	0.35	0.42	28.6
14	R	68	2.0	0.505	9.7	LOS A	3.0	76.6	0.35	0.55	27.8
Approach		509	2.0	0.505	9.7	LOS A	3.0	76.6	0.35	0.48	28.1
West: Soccer Field Drive											
5	L	23	2.0	0.071	5.9	LOS A	0.2	6.1	0.46	0.84	27.2
2	T	8	2.0	0.071	5.9	LOS A	0.2	6.1	0.46	0.55	30.5
12	R	20	2.0	0.071	5.9	LOS A	0.2	6.1	0.46	0.64	29.7
Approach		50	2.0	0.071	5.9	LOS A	0.2	6.1	0.46	0.72	28.6
All Vehicles		952	2.0	0.505	8.2	LOS A	3.0	76.6	0.33	0.51	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Model used. Geometric Delay not included.

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information					
Analyst	CW		Intersection					
Agency/Co.	EMH&T		Jurisdiction					
Date Performed	3/24/2015		Analysis Year					
Analysis Time Period	2026 Tournament, Total Vol							
Project Description Carr Farms, 20150261, add warranted lane								
East/West Street: South Drive			North/South Street: Leppert Road					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	146	225	17	48	357	165		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	158	244	18	52	388	179		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	41	14	36	9	55	34		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	44	15	39	9	59	36		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	158	52	104			98		
C (m) (veh/h)	1005	1302	195			173		
v/c	0.16	0.04	0.53			0.57		
95% queue length	0.56	0.12	2.76			2.98		
Control Delay (s/veh)	9.2	7.9	42.8			50.0		
LOS	A	A	E			F		
Approach Delay (s/veh)	--	--	42.8			50.0		
Approach LOS	--	--	E			F		

MOVEMENT SUMMARY

Site: 2026 tournament Total

Carr Farms, 2015-0261
 Leppert Road/South Drive/Soccer field Drive
 2026 Tournament Hour, Full Build

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Leppert Road											
3	L	159	2.0	0.427	8.5	LOSA	2.2	56.7	0.34	0.83	26.0
8	T	245	2.0	0.427	8.5	LOSA	2.2	56.7	0.34	0.41	29.2
18	R	18	2.0	0.427	8.5	LOSA	2.2	56.7	0.34	0.53	28.4
Approach		422	2.0	0.427	8.5	LOSA	2.2	56.7	0.34	0.58	27.8
East: South Drive											
1	L	10	2.0	0.152	6.8	LOSA	0.5	13.6	0.49	0.96	27.1
6	T	60	2.0	0.152	6.8	LOSA	0.5	13.6	0.49	0.61	30.2
16	R	37	2.0	0.152	6.8	LOSA	0.5	13.6	0.49	0.71	29.5
Approach		107	2.0	0.152	6.8	LOSA	0.5	13.6	0.49	0.68	29.7
North: Leppert Rd											
7	L	52	2.0	0.706	16.8	LOS C	6.3	160.6	0.70	0.95	23.1
4	T	388	2.0	0.706	16.8	LOS C	6.3	160.6	0.70	0.74	24.7
14	R	179	2.0	0.706	16.8	LOS C	6.3	160.6	0.70	0.80	24.4
Approach		620	2.0	0.706	16.8	LOS C	6.3	160.6	0.70	0.78	24.5
West: Soccer Field Drive											
5	L	45	2.0	0.141	6.7	LOSA	0.5	12.5	0.49	0.87	26.8
2	T	15	2.0	0.141	6.7	LOSA	0.5	12.5	0.49	0.59	29.9
12	R	39	2.0	0.141	6.7	LOSA	0.5	12.5	0.49	0.68	29.2
Approach		99	2.0	0.141	6.7	LOSA	0.5	12.5	0.49	0.75	28.1
All Vehicles		1247	2.0	0.706	12.3	LOS B	6.3	160.6	0.54	0.70	26.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

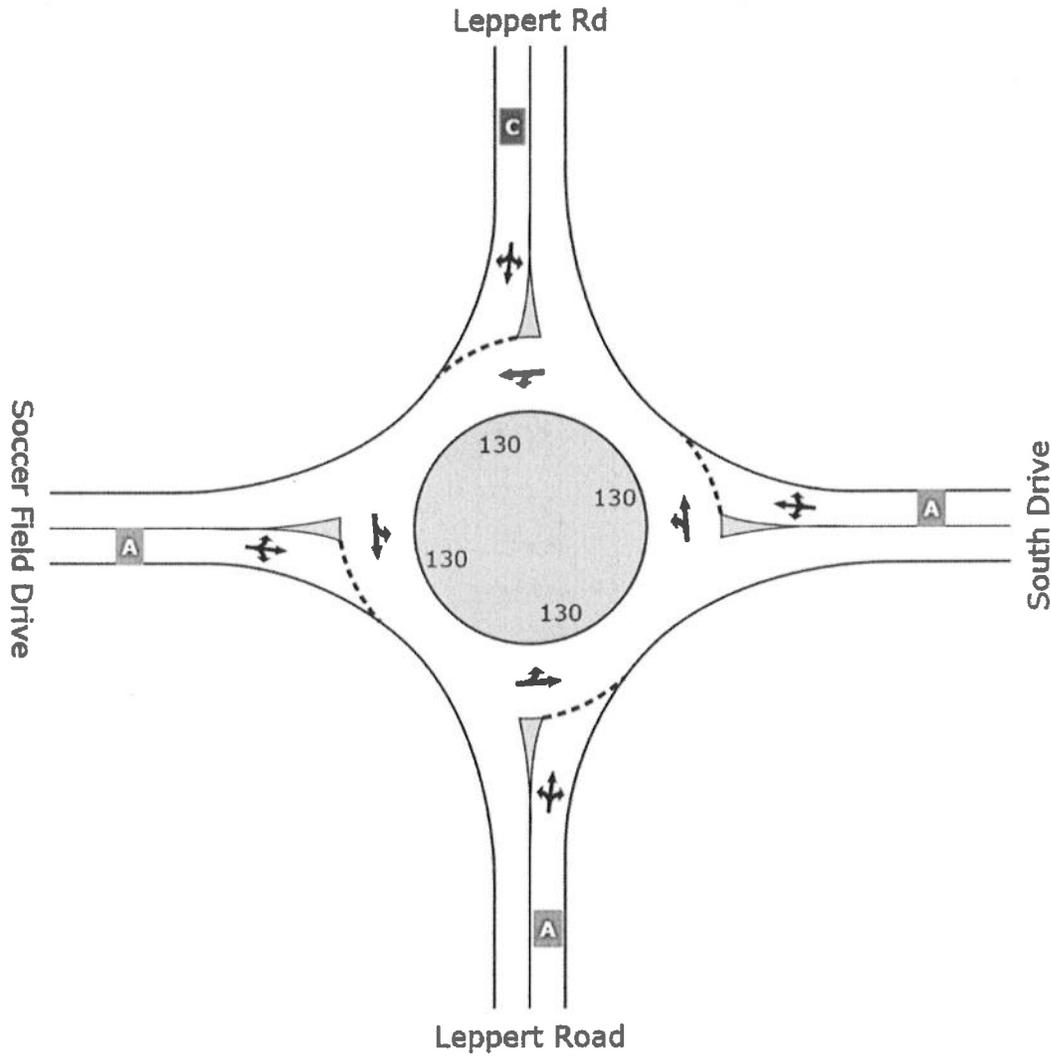
HCM Delay Model used. Geometric Delay not included.

LEVEL OF SERVICE SUMMARY

Site: 2026 tournament Total

Carr Farms, 2015-0261
 Leppert Road/South Drive/Soccer field Drive
 2026 Tournament Hour, Full Build

Roundabout



	South	East	North	West	Intersection
LOS	A	A	C	A	B

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).

HCM Delay Model used. Geometric Delay not included.

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information				
Analyst	CW		Intersection				
Agency/Co.	EMH&T		Jurisdiction				
Date Performed	3/24/2015		Analysis Year				
Analysis Time Period	2026 AM Peak, Total Volumes						
Project Description Carr Farms, 20150261							
East/West Street: North Drive			North/South Street: Leppert Road				
Intersection Orientation: North-South			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)		247	1	1	214		
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00	
Hourly Flow Rate, HFR (veh/h)	0	268	1	1	232	0	
Percent Heavy Vehicles	0	--	--	2	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)				1		2	
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0	1	0	2	
Percent Heavy Vehicles	0	0	0	2	0	2	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration					LR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		1		3			
C (m) (veh/h)		1295		669			
v/c		0.00		0.00			
95% queue length		0.00		0.01			
Control Delay (s/veh)		7.8		10.4			
LOS		A		B			
Approach Delay (s/veh)	--	--		10.4			
Approach LOS	--	--		B			

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	CW	Intersection	
Agency/Co.	EMH&T	Jurisdiction	
Date Performed	3/24/2015	Analysis Year	
Analysis Time Period	2026 PM Peak, Total Volumes		

Project Description Carr Farms, 20150261

East/West Street: North Drive

North/South Street: Leppert Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume (veh/h)		279	1	2	467	
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.92	0.92	1.00
Hourly Flow Rate, HFR (veh/h)	0	303	1	2	507	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	
Minor Street Movement	Eastbound			Westbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume (veh/h)				1		1
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.92	1.00	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	1	0	1
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
			7	8	9	10	11	12
Movement	1	4						
Lane Configuration		LT		LR				
v (veh/h)		2		2				
C (m) (veh/h)		1257		471				
v/c		0.00		0.00				
95% queue length		0.00		0.01				
Control Delay (s/veh)		7.9		12.7				
LOS		A		B				
Approach Delay (s/veh)	--	--		12.7				
Approach LOS	--	--		B				

HCM 2010 Signalized Intersection Summary
 3: Leppert Rd/Bow Falls Blvd & Hayden Run

4/2/2015

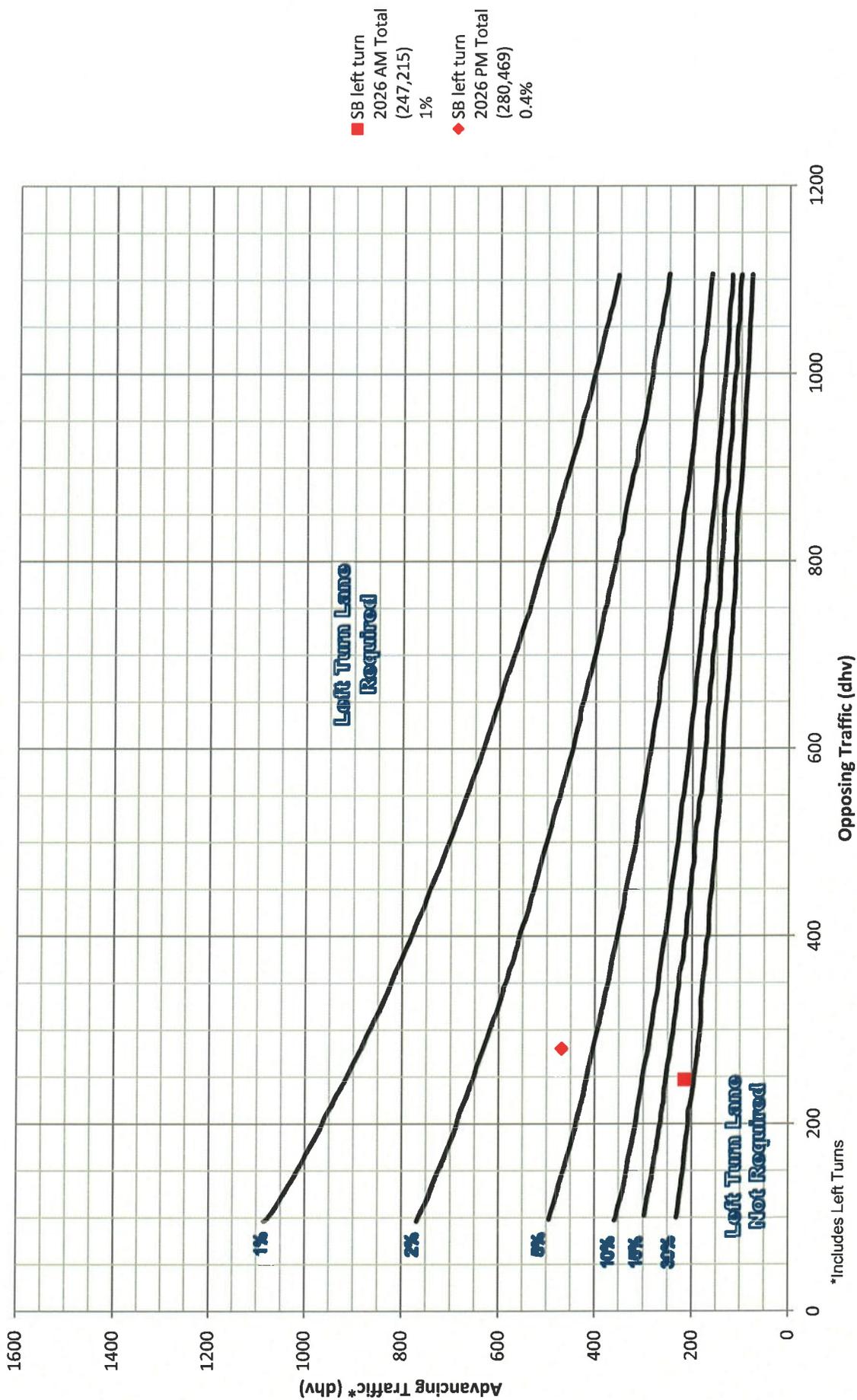
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	610	94	104	208	7	63	17	202	143	45	24
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	7	663	102	113	226	8	68	18	220	155	49	26
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	606	777	660	302	981	35	494	37	454	341	352	187
Arrive On Green	0.42	0.42	0.42	0.06	0.55	0.55	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	1142	1863	1583	1774	1788	63	1319	121	1480	1138	1147	609
Grp Volume(v), veh/h	7	663	102	113	0	234	68	0	238	155	0	75
Grp Sat Flow(s),veh/h/ln	1142	1863	1583	1774	0	1852	1319	0	1602	1138	0	1755
Q Serve(g_s), s	0.2	17.8	2.2	1.8	0.0	3.6	2.2	0.0	6.7	7.1	0.0	1.7
Cycle Q Clear(g_c), s	0.2	17.8	2.2	1.8	0.0	3.6	3.9	0.0	6.7	13.8	0.0	1.7
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.92	1.00		0.35
Lane Grp Cap(c), veh/h	606	777	660	302	0	1016	494	0	491	341	0	539
V/C Ratio(X)	0.01	0.85	0.15	0.37	0.00	0.23	0.14	0.00	0.48	0.45	0.00	0.14
Avail Cap(c_a), veh/h	686	908	772	324	0	1170	494	0	491	341	0	539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.5	14.6	10.1	11.3	0.0	6.5	15.3	0.0	15.6	21.3	0.0	13.9
Incr Delay (d2), s/veh	0.0	7.0	0.1	0.8	0.0	0.1	0.6	0.0	3.4	4.3	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	10.5	1.0	0.9	0.0	1.9	0.9	0.0	3.4	2.6	0.0	0.9
LnGrp Delay(d),s/veh	9.5	21.7	10.2	12.0	0.0	6.6	15.9	0.0	19.0	25.6	0.0	14.4
LnGrp LOS	A	C	B	B		A	B		B	C		B
Approach Vol, veh/h		772			347			306			230	
Approach Delay, s/veh		20.0			8.4			18.3			21.9	
Approach LOS		C			A			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		21.0	7.3	27.1		21.0		34.4				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0		4.0				
Max Green Setting (Gmax), s		17.0	4.0	27.0		17.0		35.0				
Max Q Clear Time (g_c+I1), s		8.7	3.8	19.8		15.8		5.6				
Green Ext Time (p_c), s		1.8	0.0	3.2		0.4		6.4				
Intersection Summary												
HCM 2010 Ctrl Delay			17.5									
HCM 2010 LOS			B									

HCM 2010 Signalized Intersection Summary
 3: Leppert Rd/Bow Falls Blvd & Hayden Run

4/2/2015

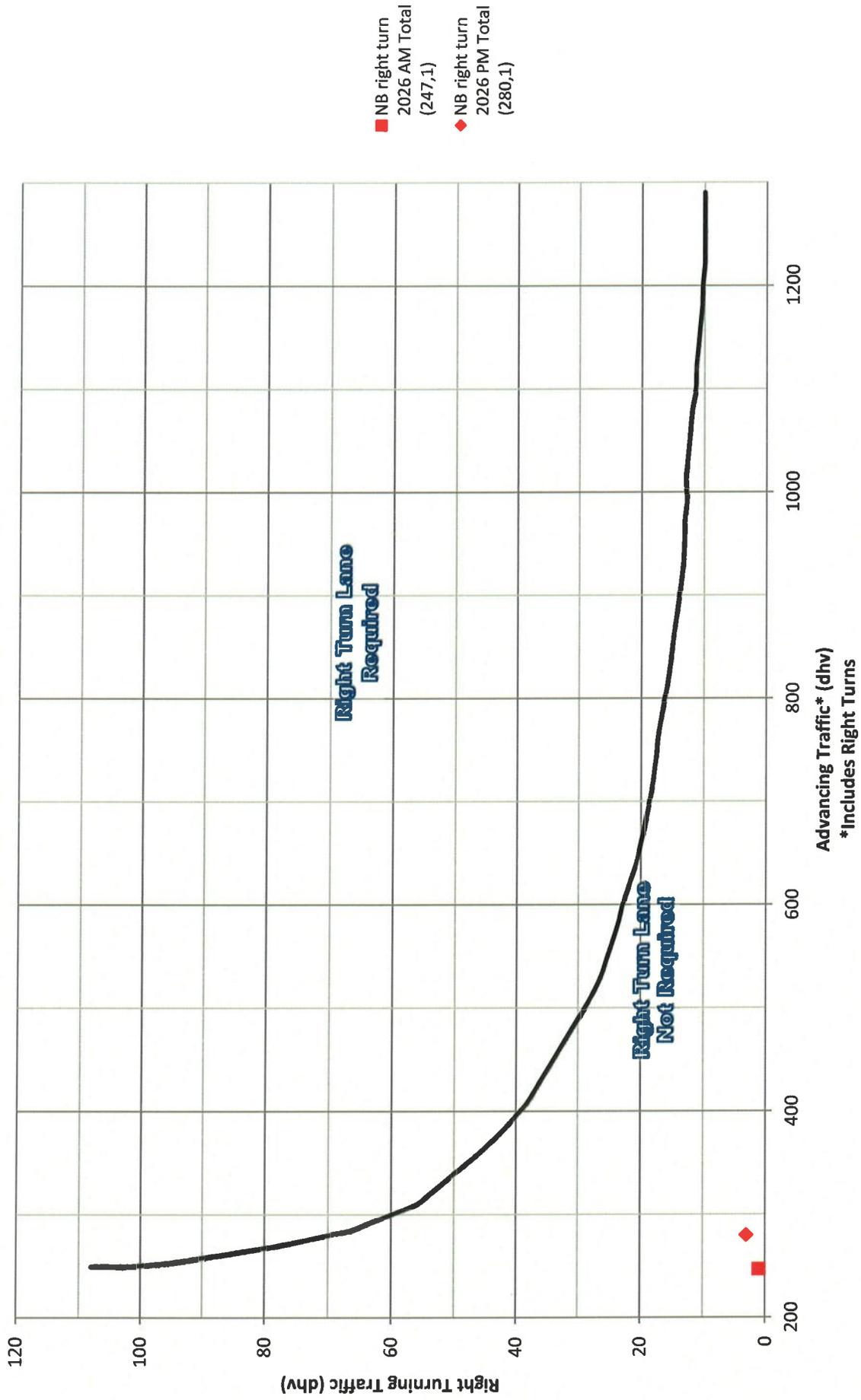
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	305	123	240	721	74	102	67	91	50	64	14
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	39	332	134	261	784	80	111	73	99	54	70	15
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	701	596	561	941	96	463	208	282	383	431	92
Arrive On Green	0.38	0.38	0.38	0.12	0.57	0.57	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	638	1863	1583	1774	1663	170	1307	718	973	1208	1488	319
Grp Volume(v), veh/h	39	332	134	261	0	864	111	0	172	54	0	85
Grp Sat Flow(s),veh/h/ln	638	1863	1583	1774	0	1833	1307	0	1691	1208	0	1806
Q Serve(g_s), s	3.0	7.5	3.2	4.5	0.0	21.4	3.8	0.0	4.4	2.0	0.0	1.9
Cycle Q Clear(g_c), s	13.9	7.5	3.2	4.5	0.0	21.4	5.8	0.0	4.4	6.5	0.0	1.9
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.58	1.00		0.18
Lane Grp Cap(c), veh/h	244	701	596	561	0	1037	463	0	489	383	0	523
V/C Ratio(X)	0.16	0.47	0.22	0.47	0.00	0.83	0.24	0.00	0.35	0.14	0.00	0.16
Avail Cap(c_a), veh/h	281	809	687	609	0	1194	463	0	489	383	0	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	13.1	11.8	8.3	0.0	9.9	16.8	0.0	15.5	18.1	0.0	14.6
Incr Delay (d2), s/veh	0.3	0.5	0.2	0.6	0.0	4.6	1.2	0.0	2.0	0.8	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.9	1.4	2.3	0.0	11.9	1.5	0.0	2.3	0.8	0.0	1.1
LnGrp Delay(d),s/veh	20.2	13.6	11.9	8.9	0.0	14.5	18.0	0.0	17.5	18.9	0.0	15.3
LnGrp LOS	C	B	B	A		B	B		B	B		B
Approach Vol, veh/h		505			1125			283			139	
Approach Delay, s/veh		13.7			13.2			17.7			16.7	
Approach LOS		B			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		20.0	10.5	24.8		20.0		35.3				
Change Period (Y+Rc), s		4.0	4.0	4.0		4.0		4.0				
Max Green Setting (Gmax), s		16.0	8.0	24.0		16.0		36.0				
Max Q Clear Time (g_c+I1), s		7.8	6.5	15.9		8.5		23.4				
Green Ext Time (p_c), s		1.3	0.1	4.9		1.2		6.7				
Intersection Summary												
HCM 2010 Ctrl Delay			14.2									
HCM 2010 LOS			B									

Leppert Road @ North Drive
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed

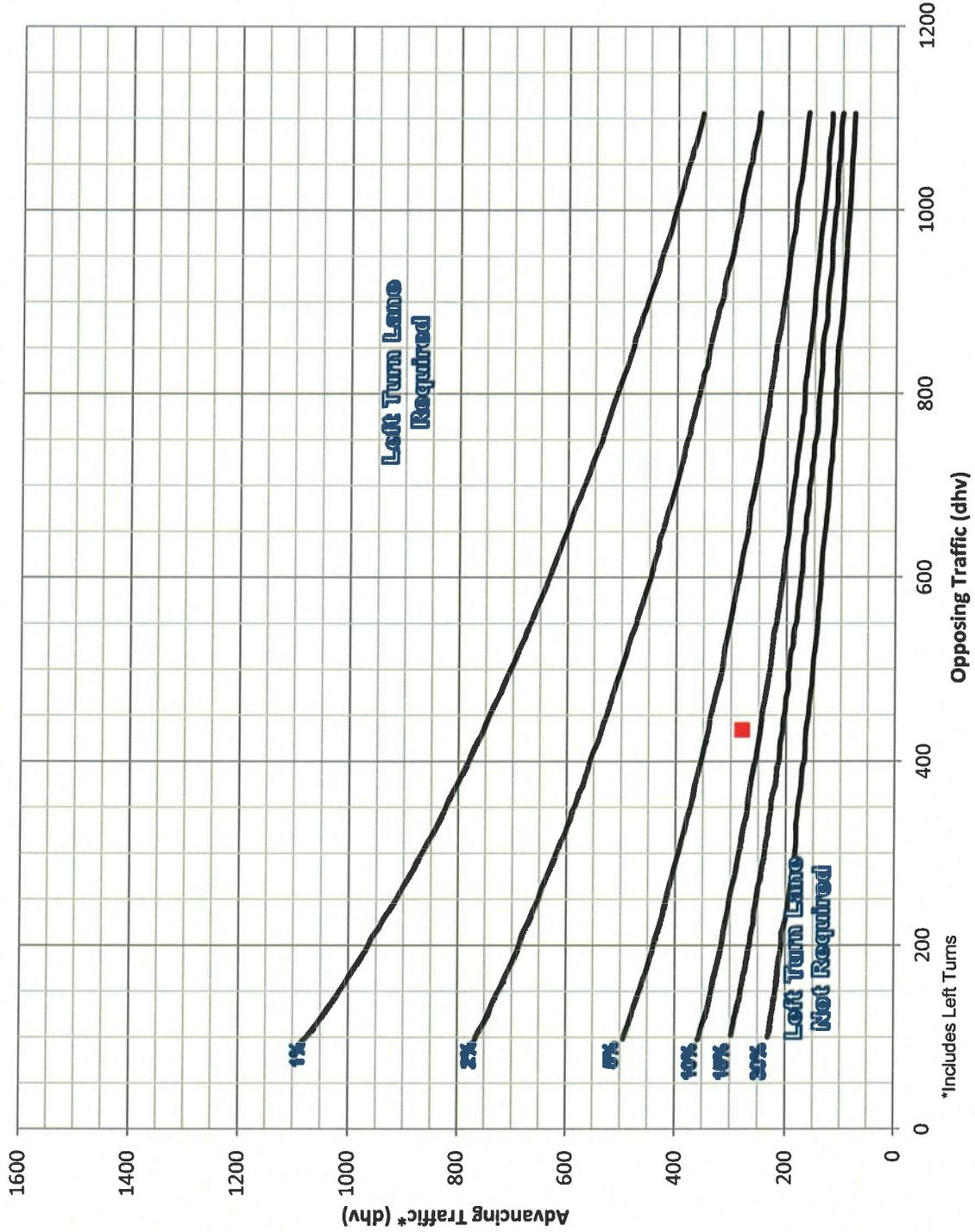


*Includes Left Turns

Leppert Road @ North Drive
2-Lane Highway Right Turn Lane Warrant
 >40 mph or 70 kph Posted Speed



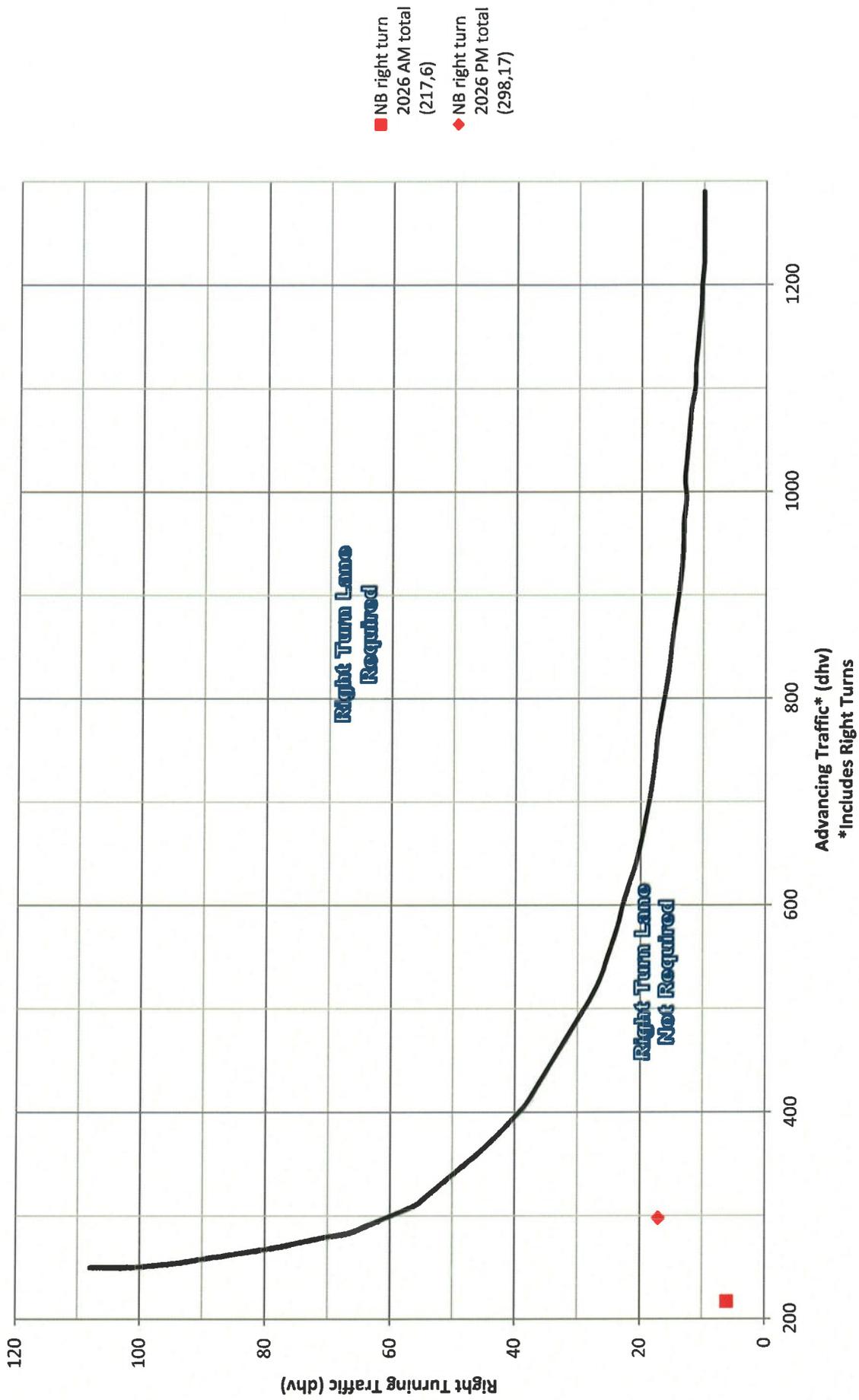
Leppert Road @ South Drive
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed



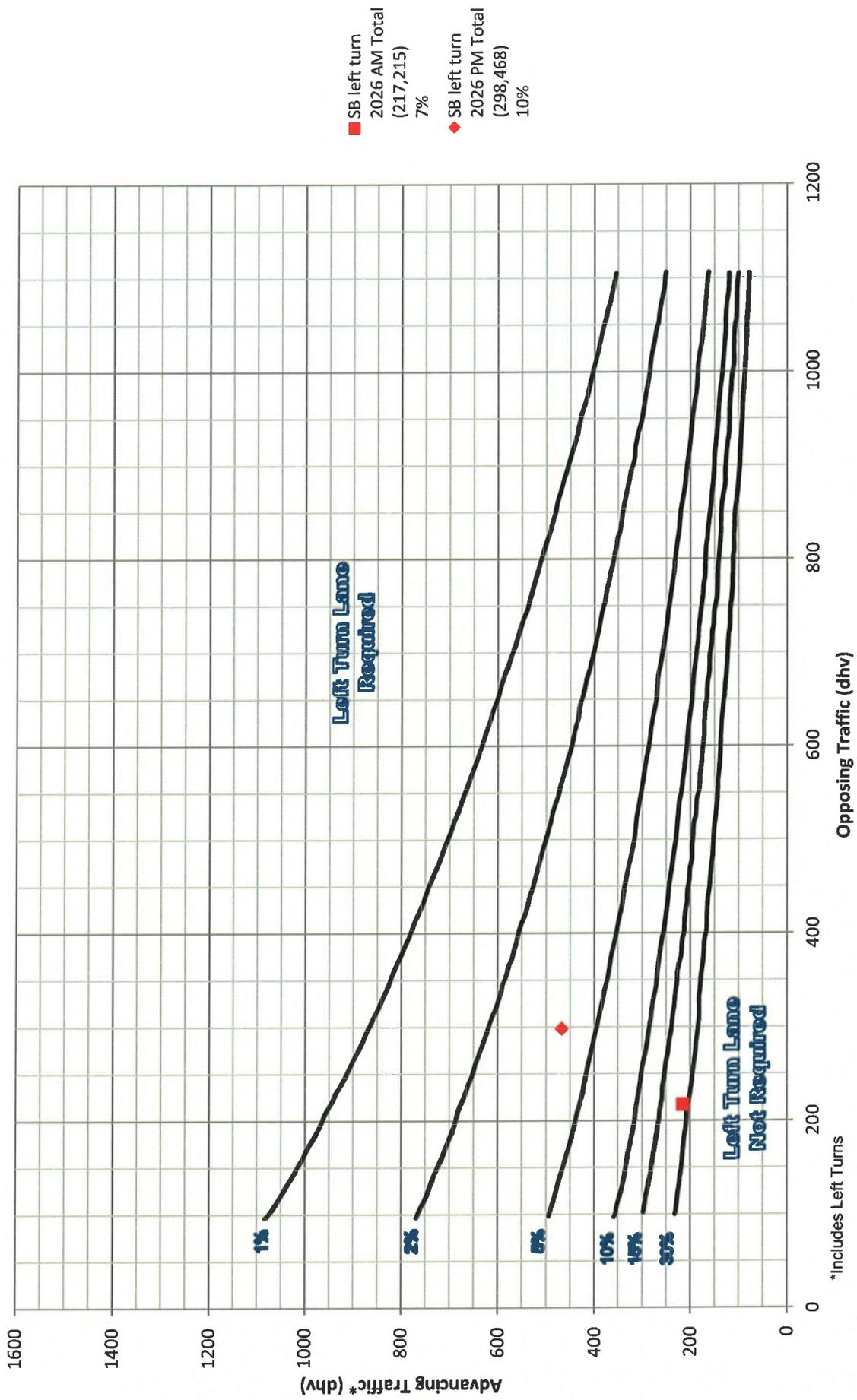
■ NB left turn
 2026 PM background plus non-site
 (434,280)
 20%

*Includes Left Turns

Leppert Road @ South Drive
2-Lane Highway Right Turn Lane Warrant
 >40 mph or 70 kph Posted Speed

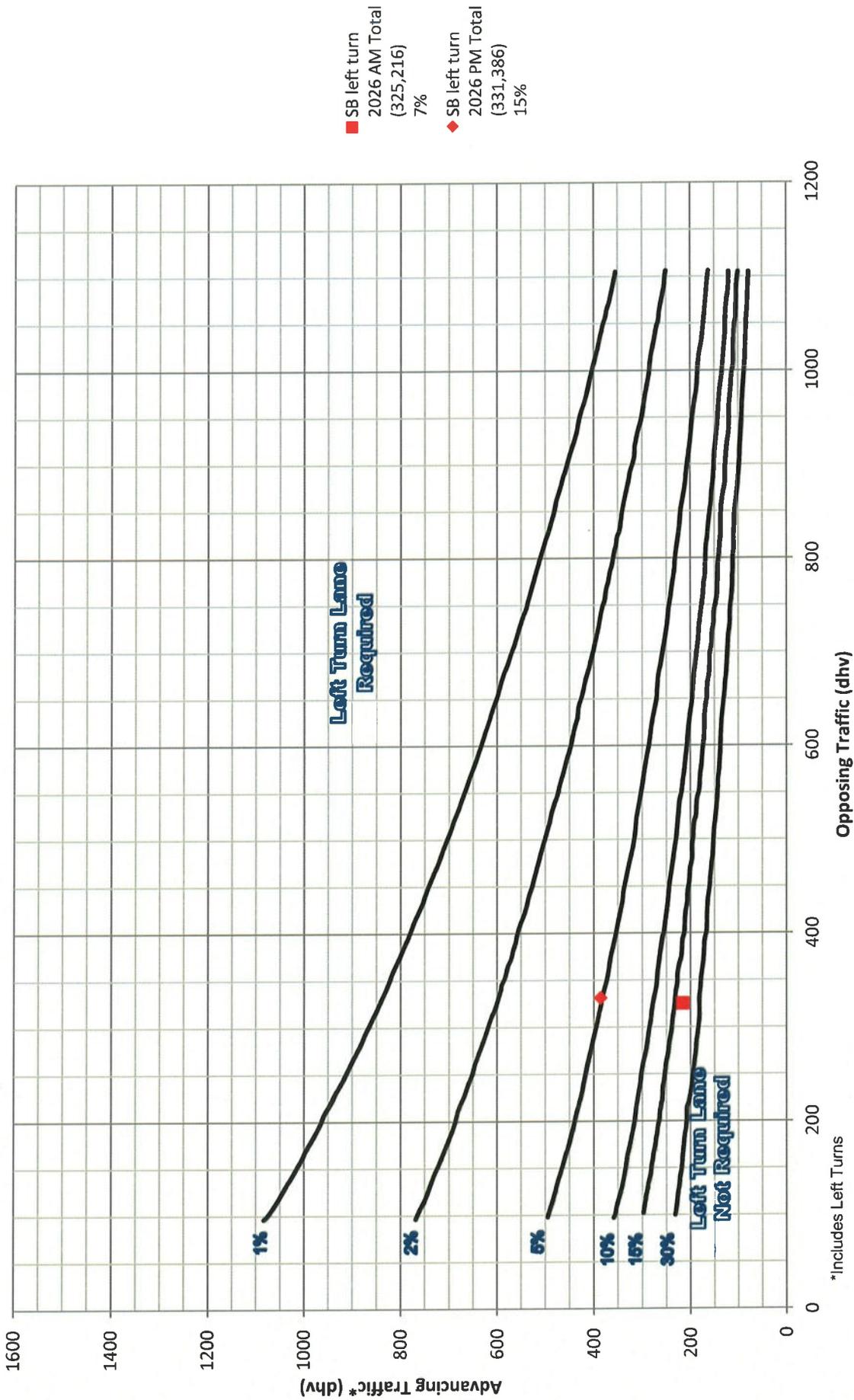


Leppert Road @ South Drive
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed



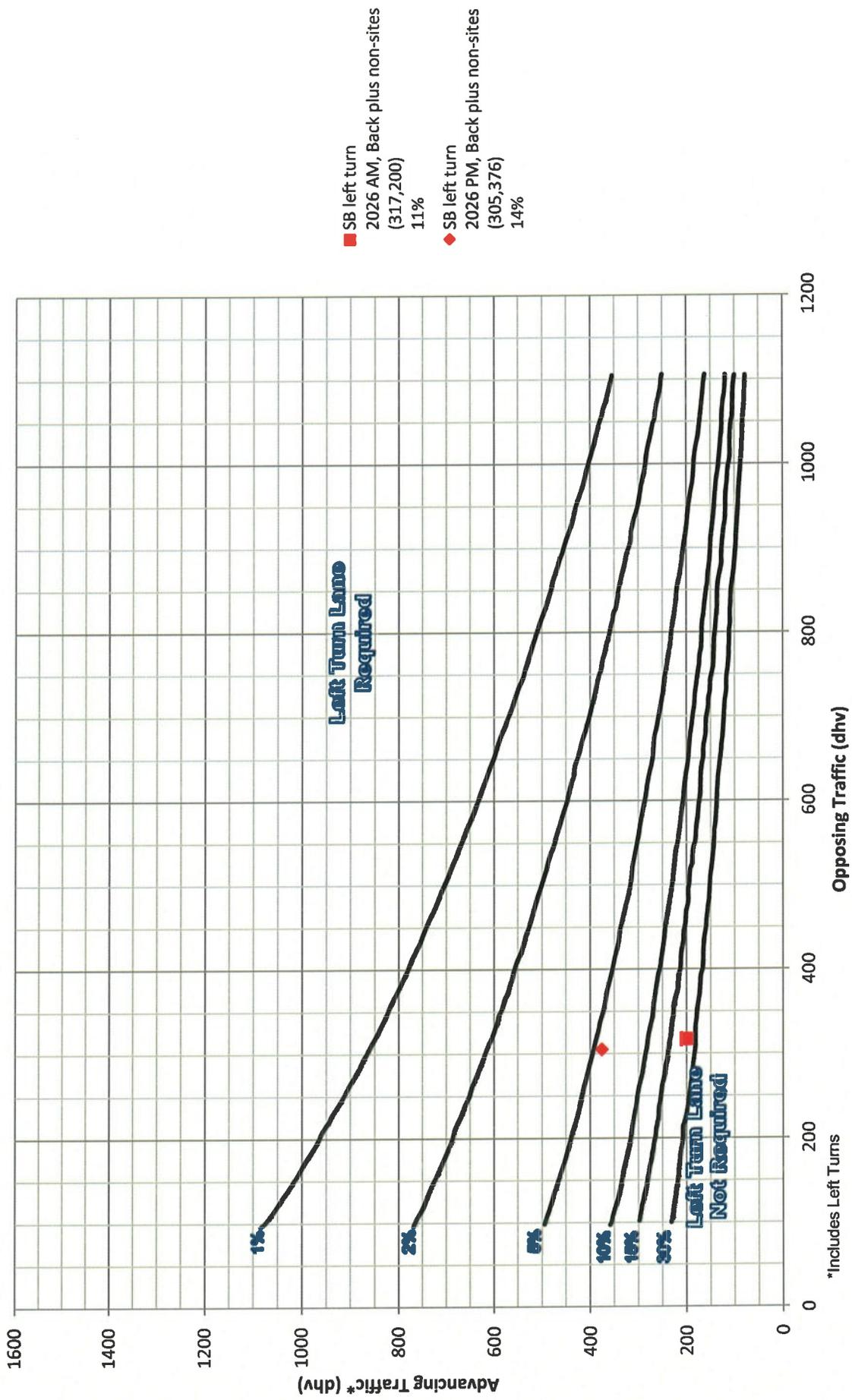
*Includes Left Turns

Leppert Road @ Davidson Road
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed

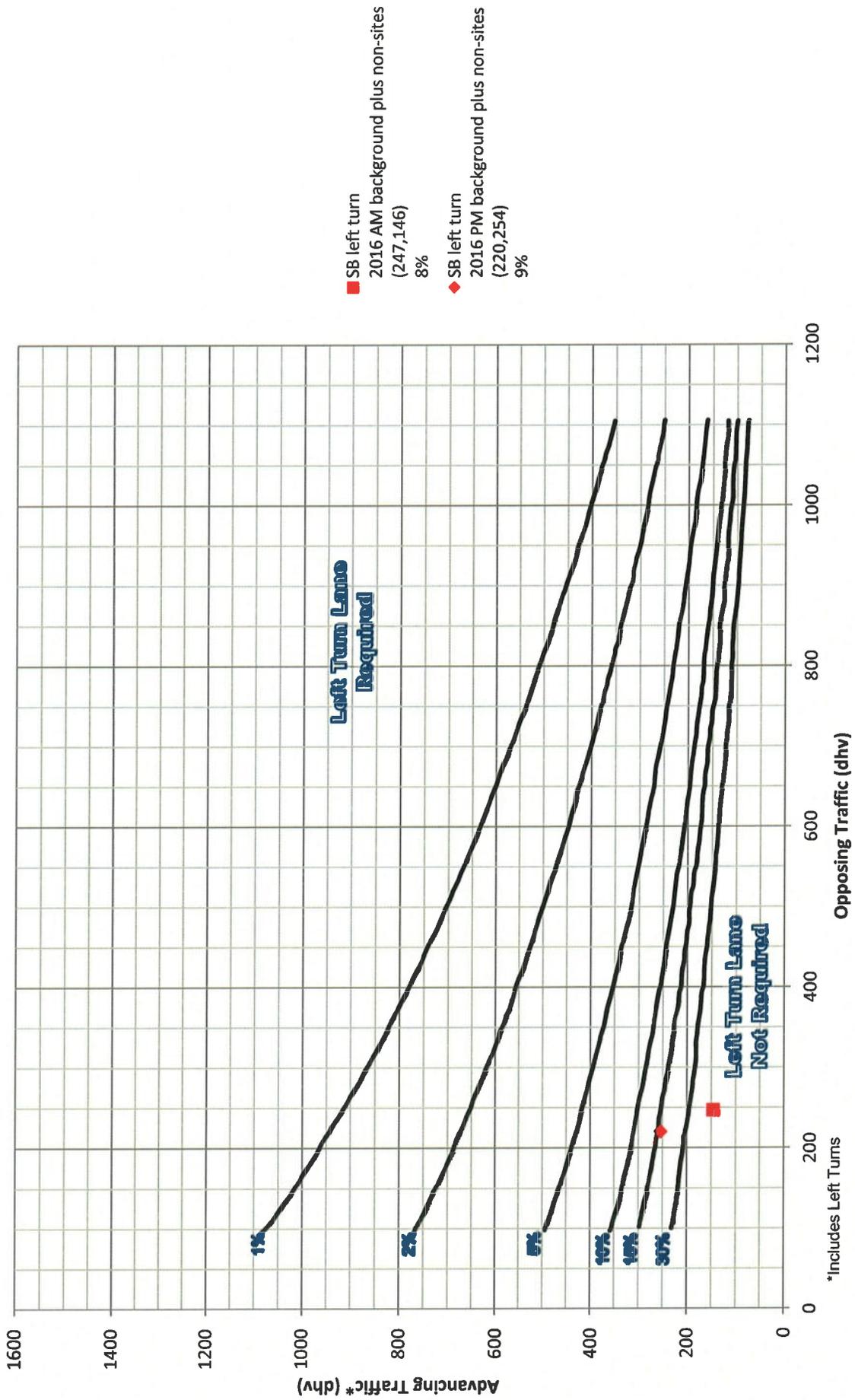


*Includes Left Turns

Leppert Road @ Davidson Road
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed



Leppert Road @ Davidson Road
2-Lane Highway Left Turn Lane Warrant
 >40 mph or 70 kph Posted Speed



*Includes Left Turns

Carr Farms
Traffic Impact Study
Turn Lane Length Calculations

AM Peak Hour		
2026 Background plus non-sites		
Leppert Road & Davidson Road		
Movement	NBRT	
Design Speed	45	mph
Cycle Length	60	seconds
Control (Stop or Signal)	Stop	
Through Volume	170	vph
Number of Through Lanes	1	
Turning Volume	133	vph
Number of Turning Lanes	1	
Design Condition	C	A, B, or C
Turning Percentage	44%	
Vehicles Per Cycle	2.2	
Storage Length	100	feet
Deceleration/Taper	125	feet
Calculated Turn Lane Length	225	feet
No Block Distance	N.A.	feet
No Block Turn Lane Length	N.A.	feet

PM Peak Hour		
2026 Background plus non-sites		
Leppert Road & Davidson Road		
Movement	NBRT	
Design Speed	45	mph
Cycle Length	60	seconds
Control (Stop or Signal)	Stop	
Through Volume	192	vph
Number of Through Lanes	1	
Turning Volume	101	vph
Number of Turning Lanes	1	
Design Condition	C	A, B, or C
Turning Percentage	34%	
Vehicles Per Cycle	1.7	
Storage Length	100	feet
Deceleration/Taper	125	feet
Calculated Turn Lane Length	225	feet
No Block Distance	N.A.	feet
No Block Turn Lane Length	N.A.	feet

AM Peak Hour		
2026 Total		
Leppert Road & Davidson Road		
Movement	NBRT	
Design Speed	45	mph
Cycle Length	60	seconds
Control (Stop or Signal)	Stop	
Through Volume	174	vph
Number of Through Lanes	1	
Turning Volume	137	vph
Number of Turning Lanes	1	
Design Condition	C	A, B, or C
Turning Percentage	44%	
Vehicles Per Cycle	2.3	
Storage Length	100	feet
Deceleration/Taper	125	feet
Calculated Turn Lane Length	225	feet
No Block Distance	N.A.	feet
No Block Turn Lane Length	N.A.	feet

PM Peak Hour		
2026 Total		
Leppert Road & Davidson Road		
Movement	NBRT	
Design Speed	45	mph
Cycle Length	60	seconds
Control (Stop or Signal)	Stop	
Through Volume	205	vph
Number of Through Lanes	1	
Turning Volume	114	vph
Number of Turning Lanes	1	
Design Condition	C	A, B, or C
Turning Percentage	36%	
Vehicles Per Cycle	1.9	
Storage Length	100	feet
Deceleration/Taper	125	feet
Calculated Turn Lane Length	225	feet
No Block Distance	N.A.	feet
No Block Turn Lane Length	N.A.	feet

Carr Farms
Traffic Impact Study
Turn Lane Length Calculations

AM Peak Hour			
2026 Background plus non-sites			
Leppert Road & Davidson Road			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	165	vph	
Number of Through Lanes	1		
Turning Volume	19	vph	
Number of Turning Lanes	1		
Design Condition	B	A, B, or C	
Turning Percentage	10%		
Vehicles Per Cycle	0.3		
Storage Length	50	feet	
Deceleration/Taper	175	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

PM Peak Hour			
2026 Background plus non-sites			
Leppert Road & Davidson Road			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	295	vph	
Number of Through Lanes	1		
Turning Volume	51	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	15%		
Vehicles Per Cycle	0.9		
Storage Length	50	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

AM Peak Hour			
2026 Total			
Leppert Road & Davidson Road			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	176	vph	
Number of Through Lanes	1		
Turning Volume	24	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	12%		
Vehicles Per Cycle	0.4		
Storage Length	50	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

PM Peak Hour			
2026 Total			
Leppert Road & Davidson Road			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	302	vph	
Number of Through Lanes	1		
Turning Volume	54	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	15%		
Vehicles Per Cycle	0.9		
Storage Length	50	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

Carr Farms
Traffic Impact Study
Turn Lane Length Calculations

PM Peak Hour (during tournament)			
2026 Background plus non-sites			
Leppert Road & South Drive			
Movement	NBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	208	vph	
Number of Through Lanes	1		
Turning Volume	146	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	41%		
Vehicles Per Cycle	2.4		
Storage Length	100	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	225	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

PM Peak Hour (during tournament)			
2026 Background plus non-sites			
Leppert Road & South Drive			
Movement	SBRT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	329	vph	
Number of Through Lanes	1		
Turning Volume	165	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	33%		
Vehicles Per Cycle	2.8		
Storage Length	150	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	275	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

AM Peak Hour			
2026 Total			
Leppert Road & South Drive			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	185	vph	
Number of Through Lanes	1		
Turning Volume	14	vph	
Number of Turning Lanes	1		
Design Condition	B	A, B, or C	
Turning Percentage	7%		
Vehicles Per Cycle	0.2		
Storage Length	50	feet	
Deceleration/Taper	175	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	

PM Peak Hour			
2026 Total			
Leppert Road & South Drive			
Movement	SBLT		
Design Speed	45	mph	
Cycle Length	60	seconds	
Control (Stop or Signal)	Stop		
Through Volume	330	vph	
Number of Through Lanes	1		
Turning Volume	48	vph	
Number of Turning Lanes	1		
Design Condition	C	A, B, or C	
Turning Percentage	13%		
Vehicles Per Cycle	0.8		
Storage Length	50	feet	
Deceleration/Taper	125	feet	
Calculated Turn Lane Length	175	feet	
No Block Distance	N.A.	feet	
No Block Turn Lane Length	N.A.	feet	