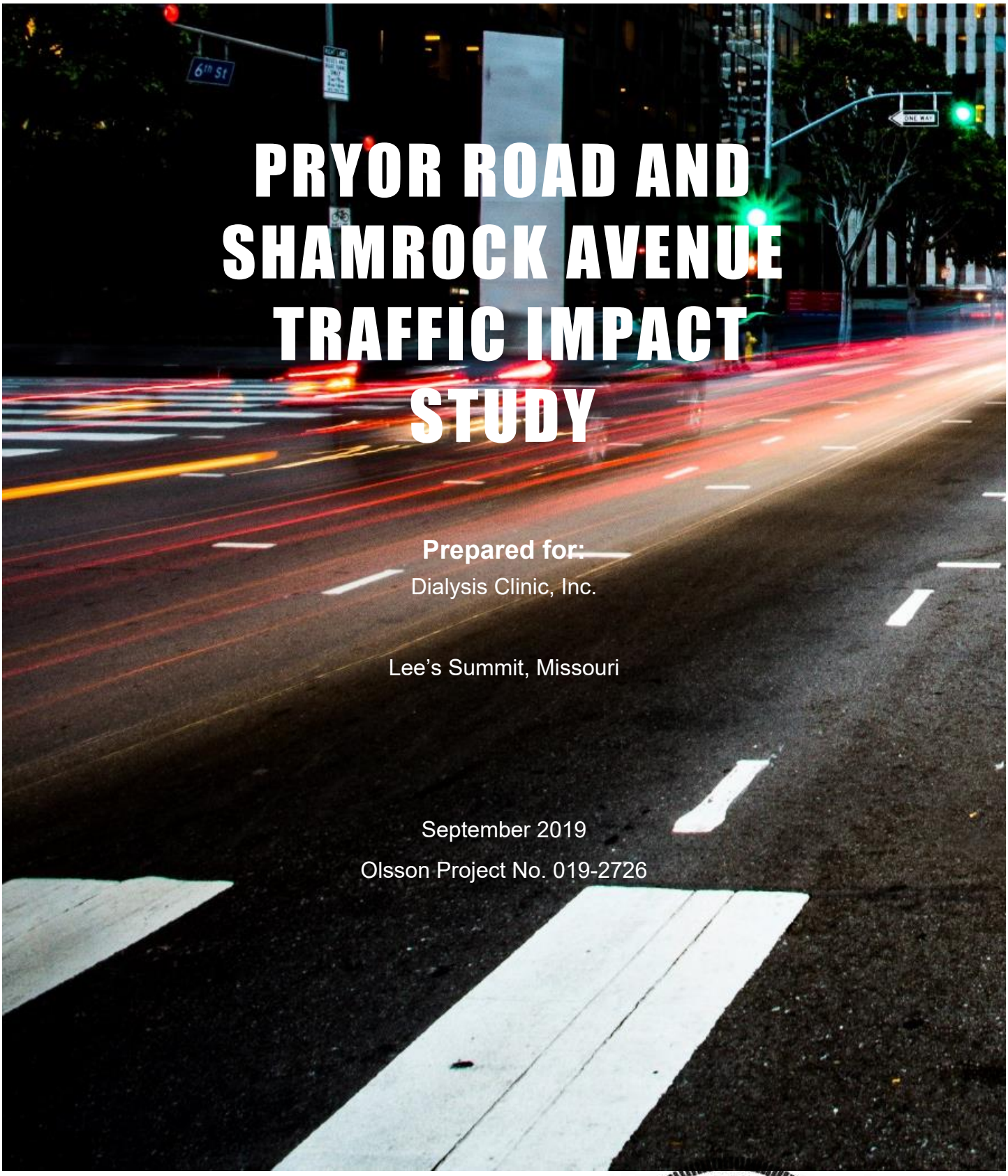

PRYOR ROAD AND SHAMROCK AVENUE TRAFFIC IMPACT STUDY

Prepared for:
Dialysis Clinic, Inc.

Lee's Summit, Missouri

September 2019

Olsson Project No. 019-2726

olsson

STATE OF MISSOURI
SHANNON L JEFFRIES
NUMBER PE-2008000069
PROFESSIONAL ENGINEER
09.10.2019

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1. INTRODUCTION

This report studies traffic impacts associated with a proposed dialysis clinic located in the southwest corner of the intersection of Pryor Road and Shamrock Avenue in Lee's Summit, Missouri.

This report will review the impacts of the proposed development on the existing roadway network and will recommend additional turn lanes, storage bays, and intersection control methods per the City of Lee's Summit *Access Management Code (AMC)* and Missouri Department of Transportation's (MoDOT's) Engineering Policy Guide (EPG), as appropriate, for the following study intersection:

- Pryor Road and Shamrock Avenue
- Shamrock Avenue and Private Drive (access as presented in approved reference traffic impact study)

Access to the dialysis clinic is proposed along a private drive internal to the site. Trip generation and access geometrics will be reviewed, but operational analysis will not be conducted for the drive locations due to location along an internal drive.

For this study, the following scenarios were analyzed:

- Existing Plus Approved Development Conditions
    - Considers the approved Woodside Ridge development and Fire Station #3
- Existing Plus Approved Plus Proposed Development Conditions

The approximate location of the proposed development is shown on the vicinity map in **Figure 1**.

FIGURE 1

Vicinity Map

Dialysis Clinic
Lee's Summit, MO

Source: Google Maps

LEGEND

Site

2. DATA COLLECTION

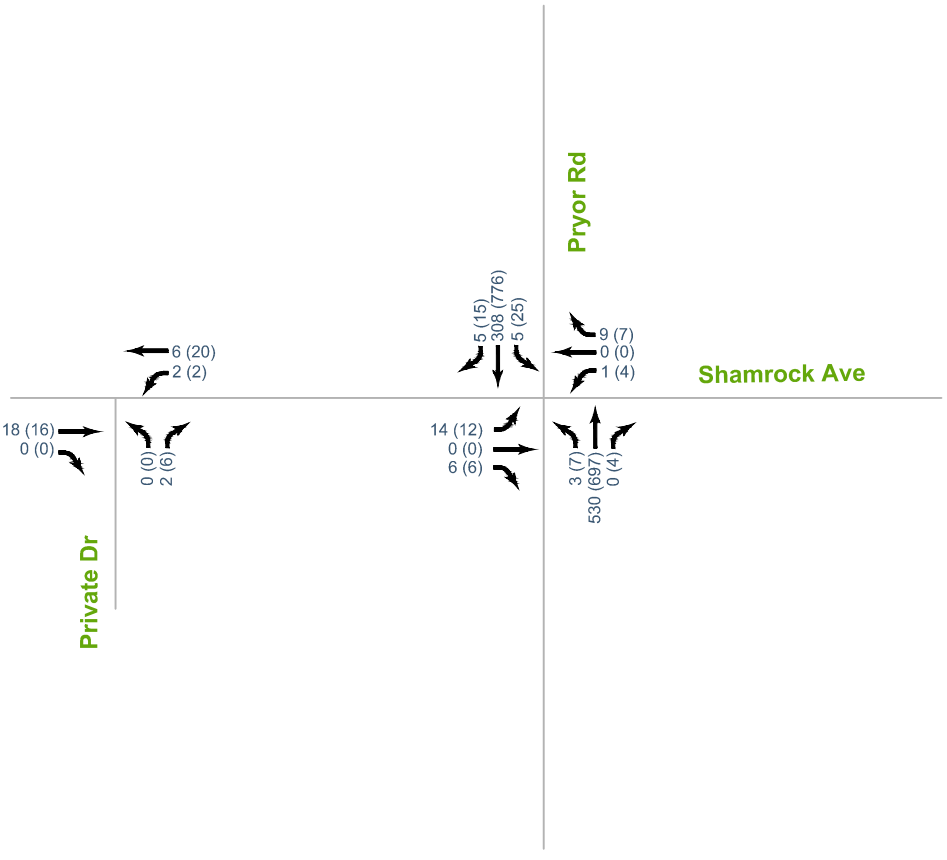
The data collection effort included acquiring AM and PM peak hour turning movement counts and documentation of current roadway geometrics. Traffic counts were obtained from the *West Village* traffic impact study, prepared by the City of Lee's Summit, dated September 2018. Based on information provided in the reference study, intersection turning movement counts were collected during the AM and PM peak hour periods on Tuesday, May 22nd, 2018 at the study intersection of Pryor Road and Shamrock Avenue. Based on the data provided, the peak hour periods for the study area were determined to be 7:00-8:00 AM and 5:00-6:00 PM.

The existing peak hour volumes are illustrated in **Figure 2**. Count data for this study can be found in **Appendix A**.

FIGURE 2

Existing Plus Approved Conditions
Peak Hour Volumes

Dialysis Clinic
Lee's Summit, MO



LEGEND

AM (PM) *Peak Hour Volume*

3. EXISTING PLUS APPROVED DEVELOPMENT CONDITIONS

Existing plus approved development traffic conditions were evaluated to identify any existing deficiencies and to provide a baseline for comparative purposes. This analysis considers the approved Woodside Ridge residential development located on the west side of Pryor Road (generally northwest of the proposed site) and an approved Fire Station #3 located directly west of the proposed site.

3.1. Network Characteristics

Two roadways within the study area were considered during analysis: Pryor Road and Shamrock Avenue. Referencing the City's *Existing Functional Classification Map,* current network characteristics are summarized in **Table 1**. The intersection of Pryor Road with Shamrock Avenue operates under two-way stop control for east/west movements.

Table 1. Existing Network Summary.

Roadway	Functional Classification	Typical Section	Median Type	Posted Speed
Pryor Road	Major Arterial	4-Lane	Raised	35 mph
Shamrock Avenue	Local	2-Lane	None	25 mph

The intersection of Pryor Road and Shamrock Avenue is unsignalized with stop-control provided for the minor street approaches (east/west on Shamrock Avenue). The west leg is currently under construction and is expected to be built prior to the completion of the dialysis clinic. A southbound left-turn lane is currently provided on Pryor Road at Shamrock Avenue. Based on information provided by the City of Lee's Summit, northbound and eastbound left-turn lanes will be constructed with the approved projects. A sidewalk will be provided on the south side of Shamrock Avenue with the approved development. A shared use path is currently provided on the west side of Pryor Road. Marked crosswalks are not provided at the intersection of Pryor Road and Shamrock Avenue.

The intersection of Shamrock Avenue and a private drive located west of Pryor Road was approved in the reference traffic impact study. This access point is expected to serve the approved fire station. The drive is expected to provide stop control for the northbound movement. Dedicated turn lanes are not proposed for the drive location.

3.2. Existing Plus Approved Development Warrant Analysis

Signal Warrants

A traffic signal may be justified if traffic conditions meet any of the applicable nine signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at any intersection.

For this study, the Peak Hour Signal Warrant (Warrant 3) was reviewed under existing plus approved development conditions to determine if alternative traffic control measures are warranted for the currently unsignalized intersection of Pryor Road and Shamrock Avenue. Based on data provided, the intersection of Pryor Road and Shamrock Avenue does not meet the necessary criteria to warrant a traffic signal.

Turn Lane Warrants

The City of Lee's Summit *Access Management Code* (AMC) was used to determine if any additional turn lanes may be required. The access management code provides direction on when turn lanes should be provided based on intersection control, roadway classification and/or traffic volumes. In addition to the turn lane warrant, vehicular queuing, vehicular delay, as well as volume of turning vehicles were reviewed when considering the need for a turn lane.

As stated in **Section 3.1**, based on information provided by the City of Lee's Summit, dedicated left-turn lanes are expected to be constructed for the northbound and eastbound movements at the intersection of Pryor Road and Shamrock Avenue.

Referencing the Lee's Summit AMC, at the intersection with any local street, left turn lanes shall be provided where the left-turn volume is at least 20 vehicles in any hour. Right turn lanes shall be provided on major arterial streets where right-turn volume is projected to be at least 30 vehicles in any hour. Turn lane standards were reviewed for the westbound left-turn, northbound right-turn, and southbound right-turn movements. No additional left or right-turn lanes are warranted considering the existing plus approved development volumes at the intersection of Pryor Road and Shamrock Avenue.

Existing plus approved development conditions lane configurations and traffic control for the study intersections are illustrated in **Figure 3**. Signal warrant analysis sheets can be found in **Appendix B**.

3.3. Existing Plus Approved Development Capacity Analysis

Capacity analysis was performed for the study intersection utilizing the existing lane configurations and traffic control. Analysis was conducted using Synchro, Version 10, based on the Highway Capacity Manual (HCM) delay methodologies. For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 2** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively.

Table 2. Intersection LOS Criteria.

Level of Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
Highway Capacity Manual (HCM 6th Edition)		

Queuing analysis was conducted using the 95th-percentile queue length. This represents the queue length that has a 5 percent probability of being exceeded during the peak hour period.

Results of the analysis indicate that all movements at the unsignalized study intersection of Pryor Road and Shamrock Avenue are expected to operate at LOS D or better with acceptable queues during both the AM and PM peak hour periods with the following exceptions:

PM Peak Hour

- Pryor Road and Shamrock Avenue
    - The eastbound left-turn movement is expected to operate at LOS F with a 95th-percentile queue length of 45 feet, which is contained within the available storage.

Referencing Section 20.7 of the HCM for Two-Way Stop-Controlled Intersections, minor street approaches with movements operating at a lower level of service during peak hour periods are not uncommon at an unsignalized intersection. This is more prevalent for stop-controlled left-turn movements in urban areas, as higher volumes on the main road are accommodated. The HCM suggests that performance measures in addition to delay, such as volume-to-capacity (v/c) ratios for individual movements and queue lengths, should also be considered when

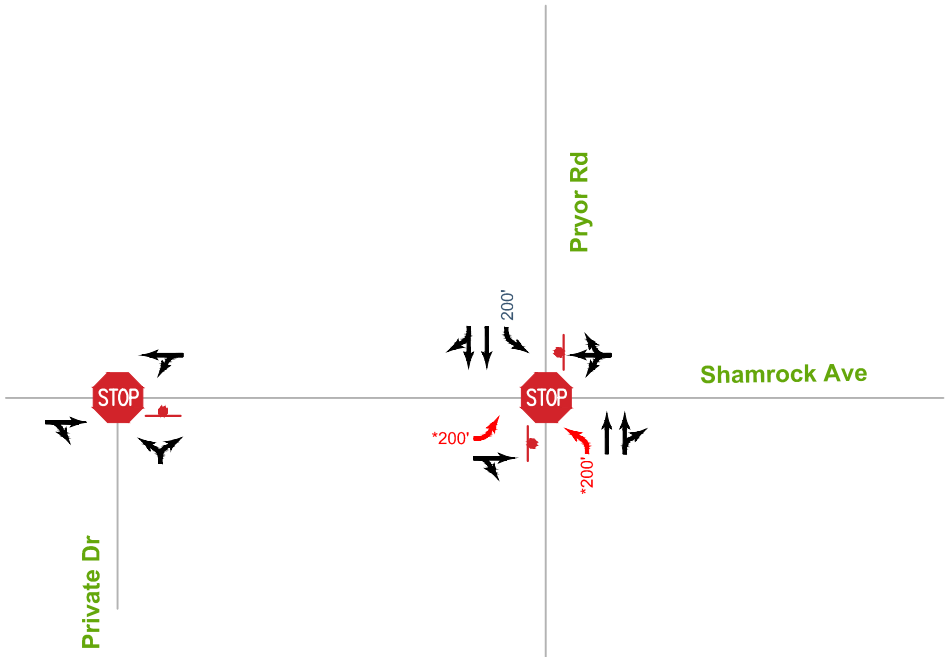
evaluating the overall performance at two-way stop-controlled intersections. At the unsignalized minor street approach listed above, the v/c ratios and 95th-percentile queues are expected to be acceptable during the peak hour periods.

The existing capacity analysis summary is illustrated in **Figure 4**. Detailed results may be found in **Appendix B**.

FIGURE 3

Existing Plus Approved Conditions
Lane Configuration and Traffic Control

Dialysis Clinic
Lee's Summit, MO



LEGEND

XX' → Proposed Lane Configuration

XX' → Lane Configuration & Storage Length

STOP Stop Controlled Intersection

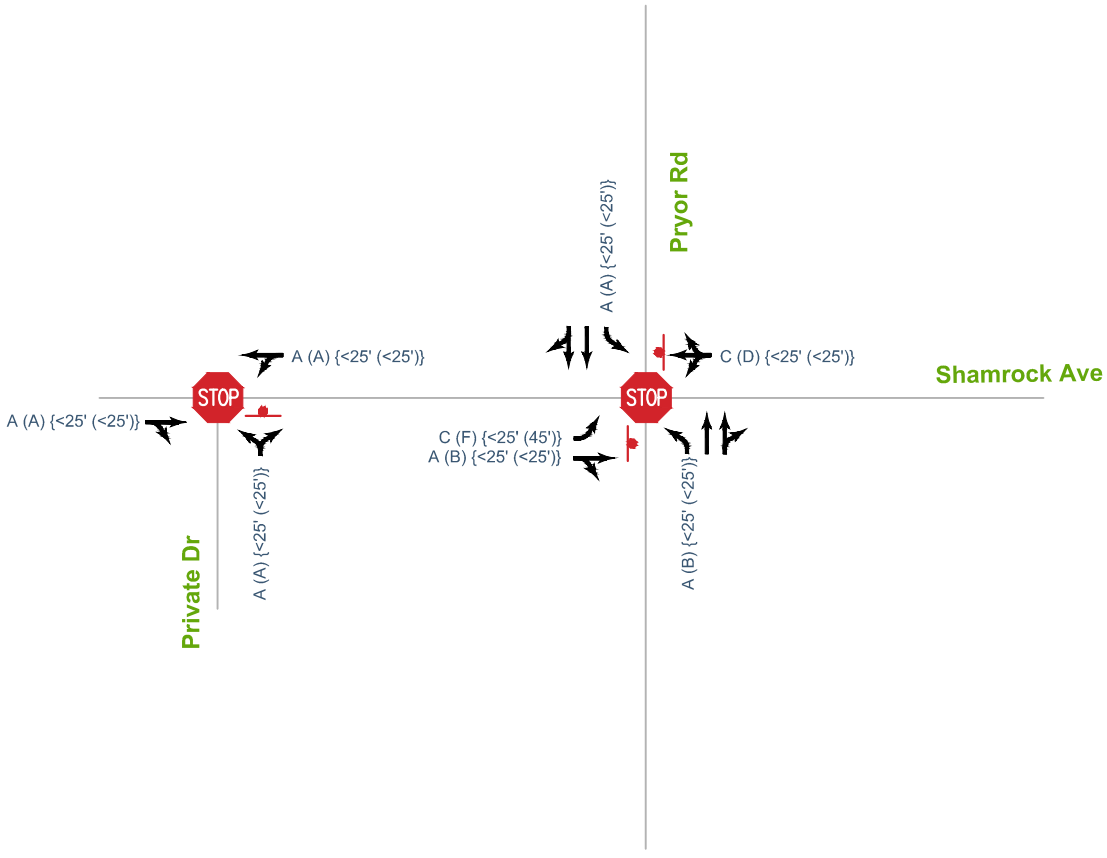
Stop Sign

*Improvements are proposed with approved development

FIGURE 4

Existing Plus Approved Conditions
Capacity Analysis

Dialysis Clinic
Lee's Summit, MO



LEGEND

AM (PM) {AM' (PM')} Movement LOS & {95th Percentile Queue}

Lane Geometry

STOP Stop Controlled Intersection

Stop Sign

4. EXISTING PLUS APPROVED PLUS PROPOSED DEVELOPMENT CONDITIONS

This scenario considers a proposed dialysis clinic located in the southwest quadrant of Pryor Road and Shamrock Avenue. The proposed development is located southeast of the approved residential development and east of the approved Fire Station #3. The proposed development consists of a 10,274 square foot medical office building. The site plan associated with this proposed development is illustrated in **Figure 5**.

The approved study considered a general office use for the proposed site. Trip generation and distribution for the site has been revised to reflect the proposed land use.

4.1. Proposed Development Trip Generation and Distribution

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the Trip Generation Manual (10th Edition). The land use that most resembles that which is planned for this site is Land Use Code 720 (Medical-Dental Office Building).

Based on the *ITE Trip Generation Manual*, trip generation characteristics were developed for the proposed site. Trip generation characteristics expected for the site are shown in **Table 3**. Detailed ITE trip generation information can be found in **Appendix C.**

Table 3. Proposed Development Trip Generation.

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Medical-Dental Office Building	10,274 SF	308	30	23	7	37	10	27

Trips were distributed based on the directional trip distribution percentages presented in the referenced *West Village* traffic impact study. Directional trip distribution percentages expected for the site are illustrated in **Table 4**.

Table 4. Proposed Development Trip Distribution.

Direction	Trip Distribution
Pryor Road (North)	70%
Pryor Road (South)	30%
TOTAL	**100%**

The expected trip distribution for the proposed development is shown in **Figure 6**. The resulting existing plus approved plus proposed development volumes are illustrated in **Figure 7**.

4.2. Access Characteristics

Proposed Access

A private drive is proposed to extend south from Shamrock Avenue with the construction of approved development. This private drive is proposed to be constructed with the approved Fire Station #3 and will provide access to the proposed development. Proposed access to the site includes two driveways located along the east side of the private drive. An illustration of the proposed access is provided on the site plan (**Figure 5**). Due to the location of the proposed access along a private drive, geometrics will be reviewed, and guidance provided regarding minimum requirements. However, operational analysis will not be conducted for drive access located internally to the site.

Access Spacing

Drive 1 is located approximately 81 feet south of Shamrock Avenue, center to center, on the east side of the private drive. Drive 2 is located approximately 202 feet, center to center, south of Drive 1. **Table 5** provides proposed drive characteristics.

Table 5. Access Characteristics

Proposed Access	Public Roadway Intersected	Access Type	Proposed Throat Length	Proposed Width	Median Divided
Drive 1	Private Drive	Full Access	35 feet	27 feet	No
Drive 2	Private Drive	Full Access	90 feet	27 feet	No

The location and geometrics of the private drive were approved with the reference traffic impact study. To ensure adequate throat length is provided from Shamrock Avenue to the first proposed access (Drive 1), throat length of the private drive was reviewed. According to the Lee's Summit AMC, driveways servicing between 10-50 vehicles per hour (vph) during the peak hour period should have a minimum throat length of 50 feet adjacent to a local roadway for two-way access. The private drive meets City standards considering approved and proposed development.

Drive 1: Lee's Summit driveway width criteria is based on projected peak hour and daily traffic volumes. Trip generation completed in **Section 4.1** of this report projects that Drive 1 will service 30 vehicles during the highest peak hour period. Drive 1 has a proposed driveway width of 27 feet. Referencing *Table 18-1* of the AMC, driveways servicing less than 150 vehicles per hour (vph) during the peak hour period should have a driveway width between 28 feet and 42 feet for two-way access. The proposed width of Drive 1 does not meet City standards, however is expected to be acceptable for the proposed development.

Throat length standards for a proposed access is based on projected peak hour volumes, per the City of Lee's Summit AMC. Drive 1 has a proposed driveway throat length of 35 feet. Referencing *Table 18-2* of the AMC, driveways servicing between 10 to 50 vph during the peak hour period should have a minimum throat length of 50 feet adjacent to a local roadway. Standards are not provided for access along a private drive. Due to the expected low volumes, the provided driveway throat is expected to be adequate.

Drive 2: Trip generation completed in **Section 4.1** of this report projects that Drive 2 will service less than 10 vehicles during the highest peak hour period. Drive 2 has a proposed driveway width of 27 feet. Referencing *Table 18-1* of the AMC, driveways servicing less than 150 vph during the peak hour period should have a driveway width between 28 feet and 42 feet for two-way access. The proposed width of Drive 2 does not meet City standards, however is expected to be acceptable for the proposed development.

Drive 2 has a proposed driveway throat length of 90 feet. Referencing *Table 18-2* of the AMC, driveways servicing less than10 vph during the peak hour period should have a minimum throat length of 30 feet adjacent to a local roadway. Standards are not provided for access along a private drive. Due to the expected low volumes, the provided driveway throat is expected to be adequate.

FIGURE 5

Site Plan

Dialysis Clinic
Lee's Summit, MO

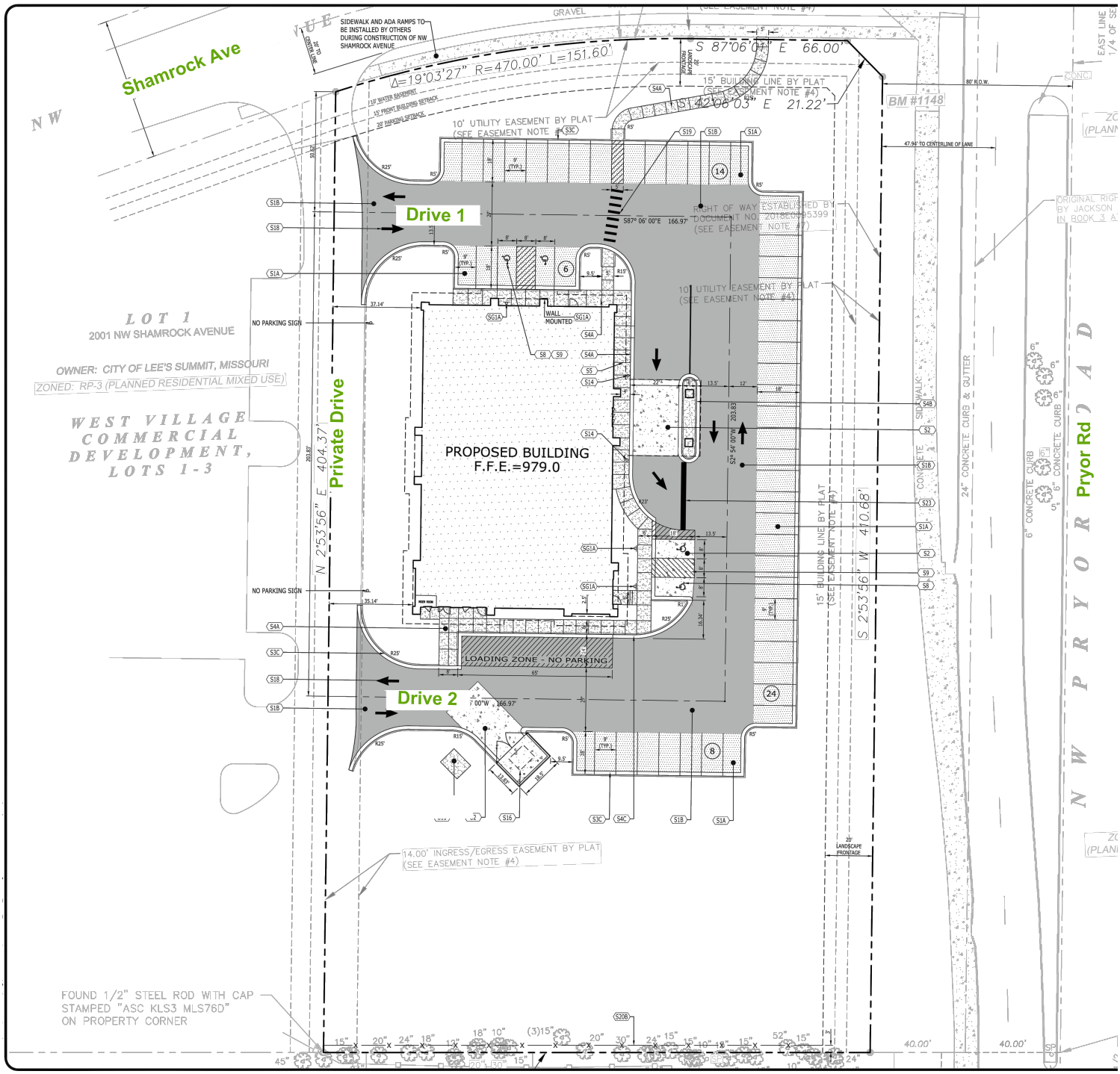
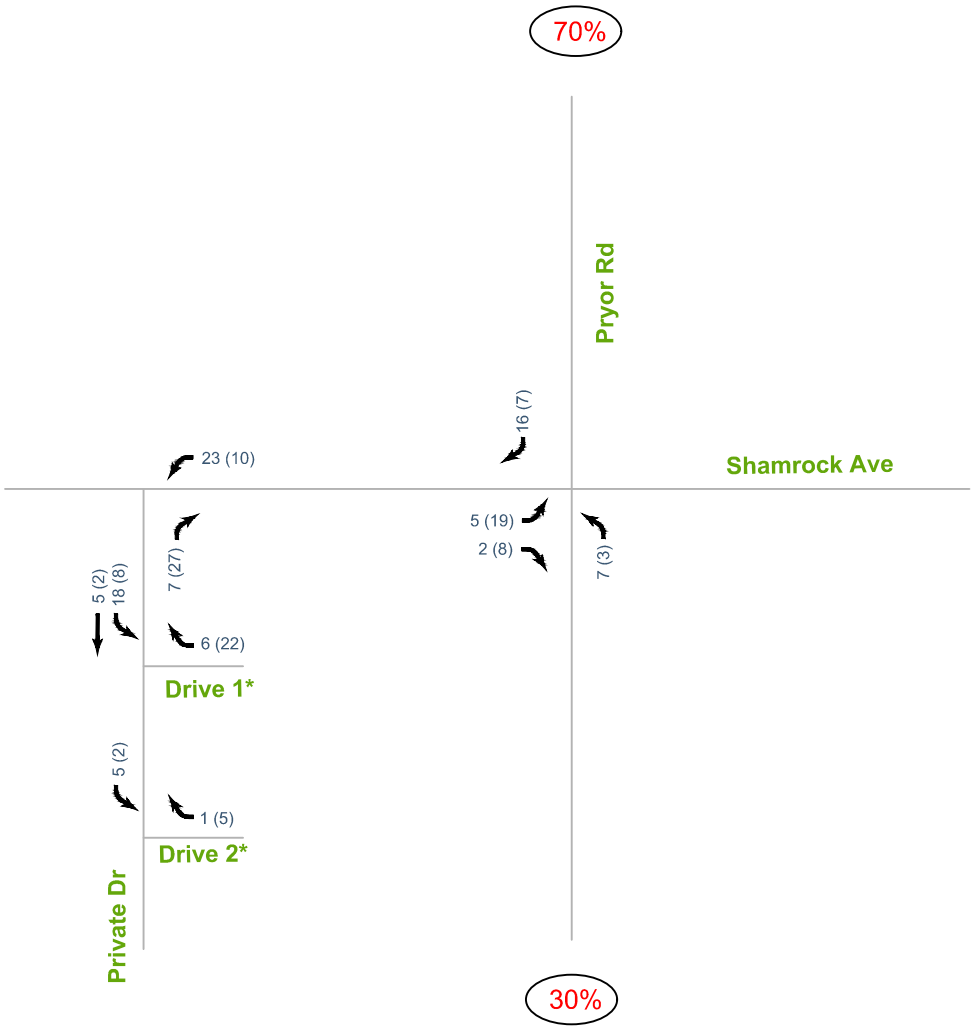


FIGURE 6

Proposed Development
Trip Distribution

Dialysis Clinic
Lee's Summit, MO



LEGEND

AM (PM) — *AM (PM) Peak Hour*

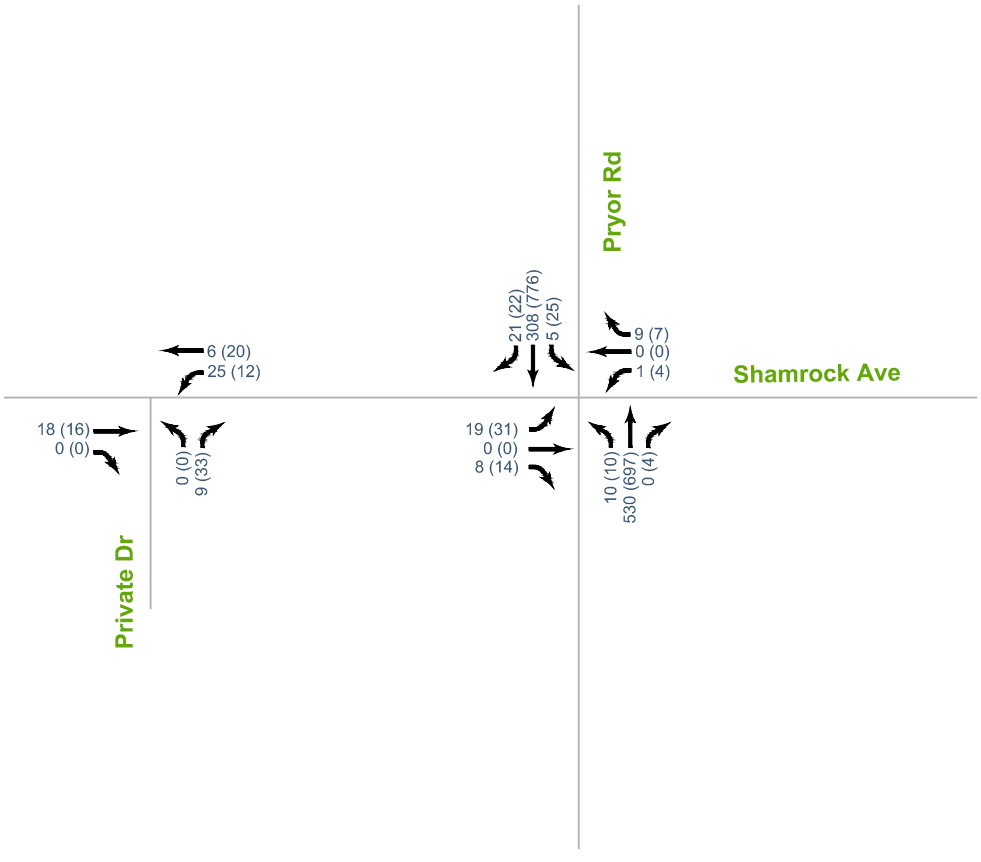
XX% — *To/From Trip Distribution Percentages*

**Not a study intersection*

FIGURE 7

Existing Plus Approved Plus Proposed Development
Conditions
Peak Hour Volumes

Dialysis Clinic
Lee's Summit, MO



LEGEND

AM (PM) Peak Hour Volume

4.3. Existing Plus Approved Plus Proposed Development Conditions

Existing Plus Approved Plus Proposed Development Signal Warrants:

Considering existing plus approved plus proposed development volumes, the intersection of Pryor Road with Shamrock Avenue is not expected to meet the criteria for signalization during either peak hour period based on Warrant 3 (peak hour warrant). Signal warrant analysis sheets can be found in **Appendix C**.

Existing Plus Approved Plus Proposed Development Turn Lane Warrants:

Turn lane warrants were reviewed per the City's AMC, as stated in **Section 3.2**. Turn lane standards were reviewed for westbound left-turn, northbound right-turn, and southbound right-turn movements. Based on existing plus approved plus proposed development traffic volumes, no additional turn lanes are warranted. Capacity analysis will be reviewed to determine if a turn lane is needed based on operations.

Existing plus approved plus proposed development conditions lane configurations and traffic control for the study network are illustrated in **Figure 8**.

4.4. Existing Plus Approved Plus Proposed Development Capacity Analysis

Capacity analysis was performed under existing plus approved plus proposed development conditions using the methodologies described in **Section 3.3**. The peak hour factors observed under existing plus approved development conditions were utilized for this scenario except for movements which experienced an increase in traffic after the proposed development. At these locations, the peak hour factors were conservatively adjusted considering the synchro suggested values and expected traffic conditions after development.

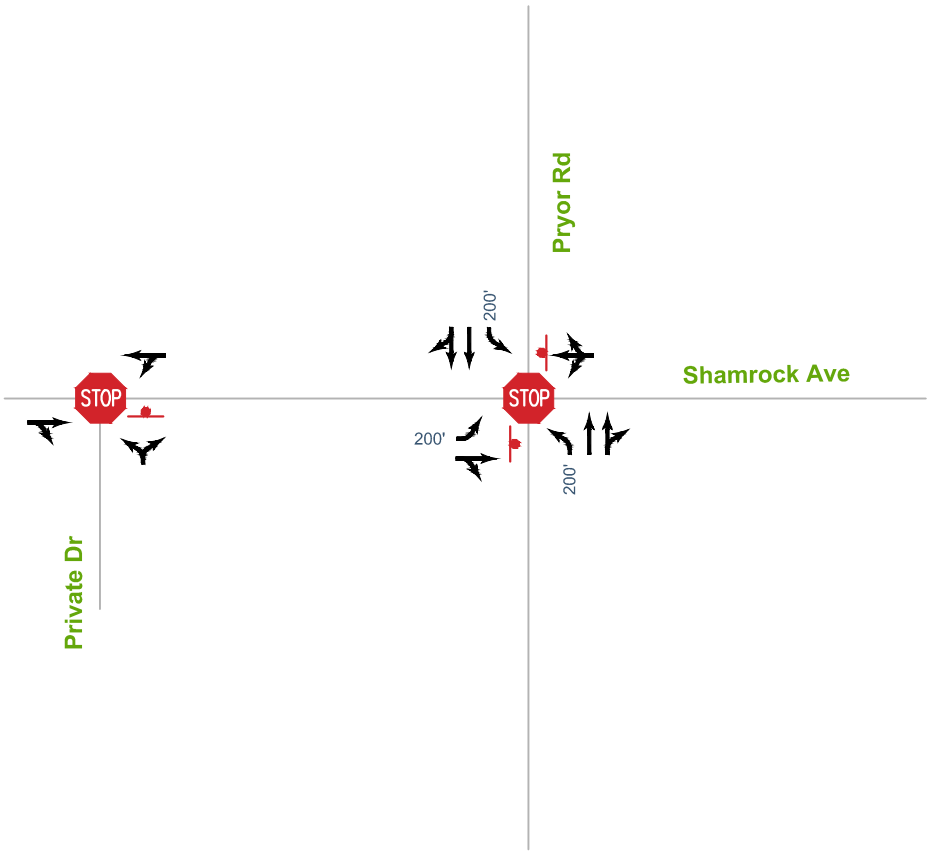
Results of the capacity analysis indicate similar operations to existing plus approved development conditions. At the intersection of the private drive with Shamrock Avenue, all movements are expected to continue operating at a LOS A during AM and PM peak hour periods. At the intersection of Pryor Road with Shamrock Avenue, the eastbound left-turn movement is expected to continue operating at a LOS F during the PM peak hour period with a slight increase of the 95th-percentile queue length of approximately two vehicles. As discussed in **Section 3.3**, minor street approaches with movements operating at a lower level of service during peak hour periods are not uncommon at an unsignalized intersection. At the unsignalized minor street approach listed above, the v/c ratios and 95th-percentile queues are expected to be acceptable during the peak hour periods.

The existing plus approved plus proposed development conditions capacity analysis summary is illustrated in **Figure 9**. Detailed results may be found in **Appendix C**.

FIGURE 8

Existing Plus Approved Plus Proposed Development Conditions
Lane Configuration and Traffic Control

Dialysis Clinic
Lee's Summit, MO



LEGEND

XX' Lane Configuration

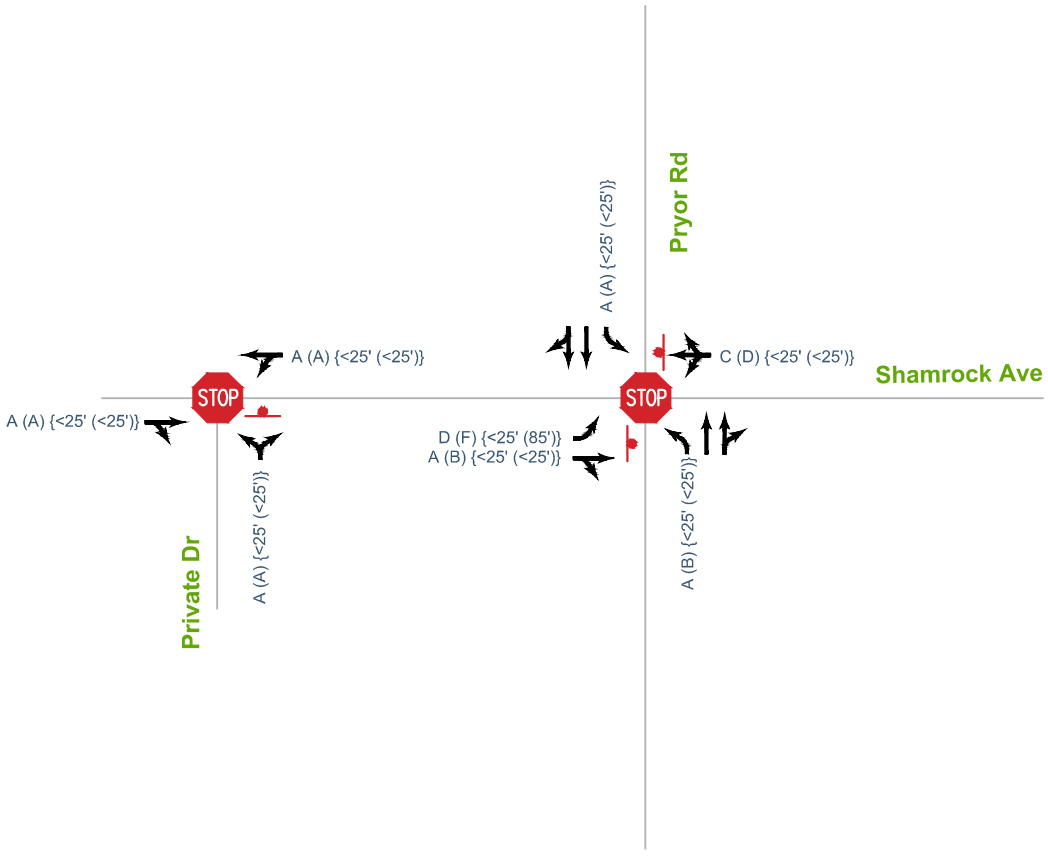
STOP Stop Controlled Intersection

Stop Sign

FIGURE 9

Existing Plus Approved Plus Proposed Development
Conditions Capacity Analysis

Dialysis Clinic
Lee's Summit, MO



LEGEND

AM (PM) {AM' (PM')} *Movement LOS & {95th Percentile Queue}*

Lane Geometry

STOP *Stop Controlled Intersection*

Stop Sign

5. SUMMARY

The purpose of this study was to summarize traffic impacts regarding a proposed dialysis clinic located in the southwest quadrant of the intersection of Pryor Road and Shamrock Avenue in Lee's Summit, Missouri.

5.1. Conclusions

The general findings of note for the traffic impact study include the following:

1. In general, traffic operations are not expected to be significantly impacted by the proposed development.
2. The intersection of Pryor Road and Shamrock Avenue is not expected to require signalization or additional turn lanes with the proposed development in place.
3. The proposed accesses associated with the development are located along a private drive proposed with approved development. Drive geometrics are expected to be adequate for the proposed development.

5.2. Recommendations

There are no recommended improvements associated with the approved or proposed development conditions analysis conducted for this study.

APPENDIX A

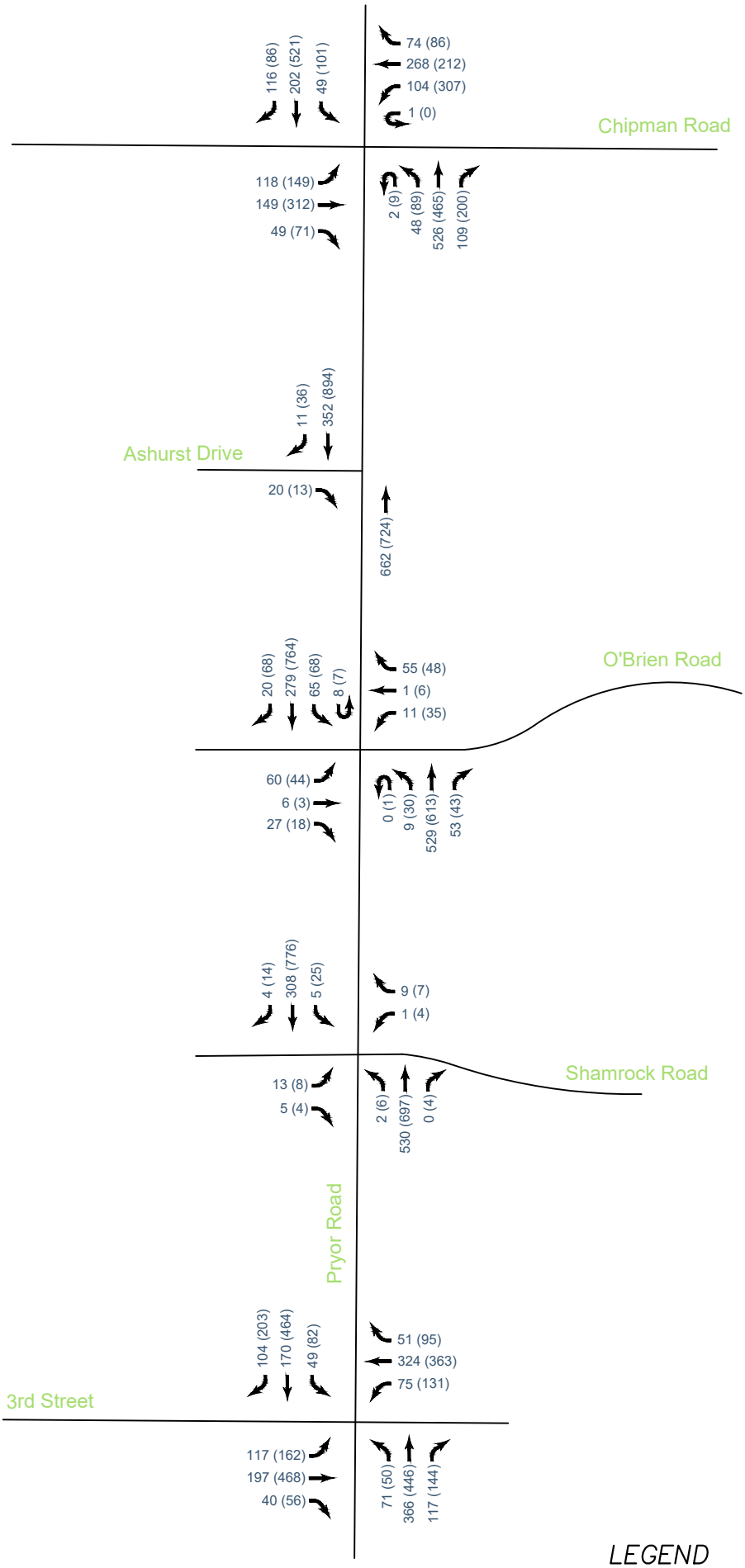
Data Collection

Count Data

FIGURE 7

Existing + Development
Peak Hour Volumes

Woodside Ridge
Lee's Summit, MO



Pryor Road & Shamrock Road Traffic Counts

Study Name	NW Shamrock Ave & NW Pryor Rd
Start Date	Tuesday, May 22, 2018 7:00 AM
End Date	Tuesday, May 22, 2018 6:00 PM
Site Code	

Road Volumes

TMV	Movemε												
	Southbound			Southbound Ti	Westbound			Westbound Tc	Northbound			Northbound Ti	Grand Total
Interval	T	L	U		L	U	R		T	U	R		
5/22/2018 7:00	71	0	0	71	1	0	3	4	118	0	0	118	193
Lights	70	0	0	70	1	0	3	4	118	0	0	118	192
Mediums	1	0	0	1	0	0	0	0	0	0	0	0	1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 7:15	32	1	0	33	0	0	1	1	49	0	0	49	83
Lights	32	1	0	33	0	0	1	1	49	0	0	49	83
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 7:30	38	2	0	40	0	0	0	0	91	0	0	91	131
Lights	37	2	0	39	0	0	0	0	91	0	0	91	130
Mediums	1	0	0	1	0	0	0	0	0	0	0	0	1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 7:45	54	1	0	55	0	0	3	3	171	0	0	171	229
Lights	53	1	0	54	0	0	3	3	169	0	0	169	226
Mediums	1	0	0	1	0	0	0	0	2	0	0	2	3
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 8:00	74	1	0	75	1	0	5	6	121	0	2	123	204
Lights	70	0	0	70	1	0	5	6	118	0	2	120	196
Mediums	4	1	0	5	0	0	0	0	3	0	0	3	8
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 8:15	61	1	0	62	0	0	5	5	138	0	0	138	205
Lights	60	1	0	61	0	0	4	4	135	0	0	135	200
Mediums	1	0	0	1	0	0	1	1	3	0	0	3	5
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 8:30	55	0	0	55	1	0	4	5	122	0	0	122	182
Lights	53	0	0	53	1	0	3	4	121	0	0	121	178
Mediums	2	0	0	2	0	0	1	1	1	0	0	1	4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 8:45	66	0	0	66	1	0	2	3	117	0	0	117	186
Lights	64	0	0	64	1	0	2	3	115	0	0	115	182
Mediums	2	0	0	2	0	0	0	0	2	0	0	2	4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 16:00	180	3	1	184	0	0	4	4	128	0	0	128	316
Lights	180	3	1	184	0	0	3	3	127	0	0	127	314
Mediums	0	0	0	0	0	0	1	1	1	0	0	1	2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 16:15	167	1	0	168	0	0	3	3	124	0	0	124	295
Lights	166	1	0	167	0	0	1	1	122	0	0	122	290
Mediums	1	0	0	1	0	0	2	2	2	0	0	2	5
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 16:30	169	1	0	170	0	0	3	3	165	0	1	166	339
Lights	168	1	0	169	0	0	3	3	164	0	1	165	337
Mediums	1	0	0	1	0	0	0	0	1	0	0	1	2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 16:45	179	3	1	183	1	0	5	6	144	0	2	146	335
Lights	179	3	1	183	1	0	5	6	142	0	2	144	333
Mediums	0	0	0	0	0	0	0	0	2	0	0	2	2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 17:00	212	10	0	222	1	0	1	2	152	0	1	153	377
Lights	211	10	0	221	1	0	1	2	151	0	1	152	375
Mediums	0	0	0	0	0	0	0	0	1	0	0	1	1
Articulated Trucks	1	0	0	1	0	0	0	0	0	0	0	0	1
5/22/2018 17:15	216	10	0	226	2	0	2	4	186	0	2	188	418
Lights	214	10	0	224	2	0	2	4	184	0	2	186	414
Mediums	2	0	0	2	0	0	0	0	2	0	0	2	4
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 17:30	180	3	0	183	0	0	2	2	162	0	0	162	347
Lights	180	3	0	183	0	0	2	2	161	0	0	161	346
Mediums	0	0	0	0	0	0	0	0	1	0	0	1	1
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
5/22/2018 17:45	160	2	0	162	1	0	2	3	175	0	1	176	341
Lights	159	2	0	161	1	0	2	3	174	0	1	175	339
Mediums	1	0	0	1	0	0	0	0	1	0	0	1	2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1914	39	2	1955	9	0	45	54	2163	0	9	2172	4181

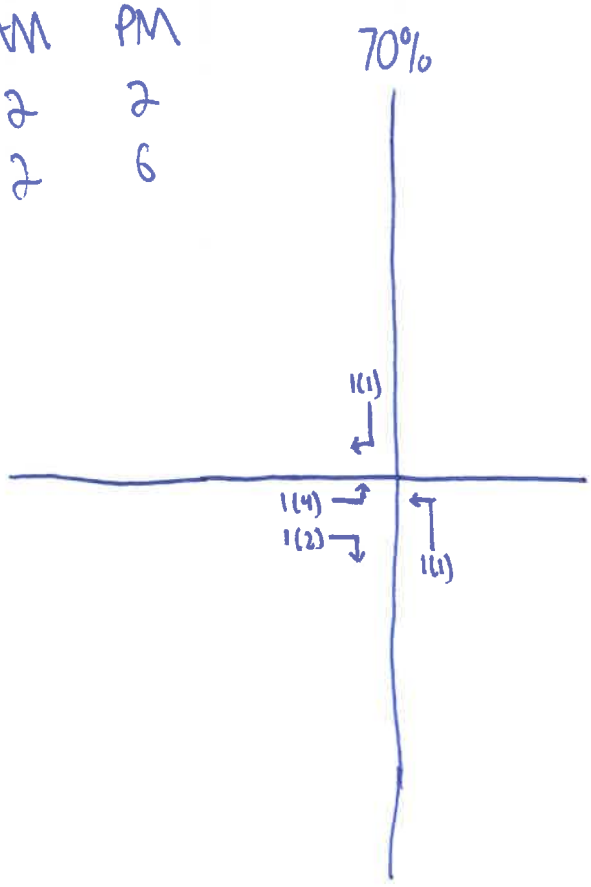
APPENDIX B

Existing plus Approved Development Conditions

Approved Development Trip Distribution

Approved Fire Station Trip Gen/Distribution

	AM	PM
Enter:	2	2
Exit:	2	6



North

Pryor NB	45%
Chipman EB	15%
Chipman WB	5%
O'Brien EB	5%

South

Pryor SB	10%
3rd St. EB	10%
3rd St. WB	10%

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PROJECT: Lee's Summit Dialysis Clinic

project no.: 019-2726
drawn by: NAP
date: 8/8/19
page of

4.1 Proposed Development Trip Generation and Distribution

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the Trip Generation Manual (10th Edition). The land use that most resembles that which is planned for this site is Land Use Code 210 (Single-Family Detached Housing).

Based on the *ITE Trip Generation Manual*, trip generation characteristics were developed for the proposed site. Trip generation characteristics expected for the site are shown in **Table 3**. Detailed ITE trip generation information can be found in **Appendix C.**

Table 3: Proposed Development Trip Generation

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Single-Family Detached Housing	206 DU	2,022	152	38	114	204	129	75

Trips were distributed based on the anticipated land use, discussions with City staff, as well as a review of existing traffic behavior within the study area. **Table 4** illustrates general trip distribution for the site.

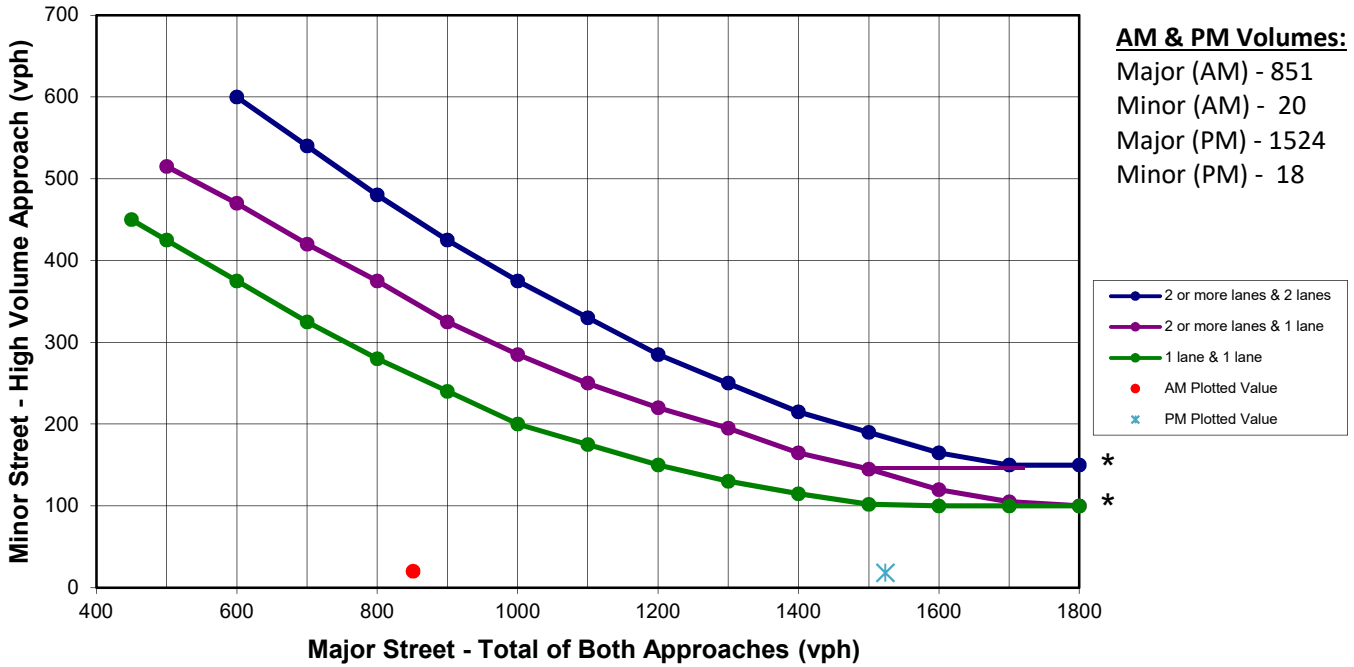
Table 4: Proposed Development Trip Distribution

Route	Percent Distribution
Pryor Road (north)	45%
Pryor Road (south)	10%
Chipman Road (east)	15%
Chipman Road (west)	5%
3rd Street (west)	10%
3rd Street (east)	10%
O'Brien Road (east)	5%

The proposed development will provide access to existing residential roadways; thus, it is expected that the new roadways will provide a more optimal route for some of the existing homes in the area. After reviewing the surrounding existing residential development, approximately 35 homes northwest of the proposed site currently utilize Highcliffe Drive as their main access, and 60 homes located southwest of the proposed site primarily utilize Sterling Drive. To account for the possibility of existing development using the proposed roadways, a portion of the estimated existing trips were redistributed to the proposed roadway extensions. Additional information regarding the redistribution of trips is provided in **Appendix C.** The trip distribution for the proposed development, as well as the redistributed existing trips, are shown in **Figure 6**. Existing plus development volumes are illustrated in **Figure 7.**

Signal Warrant Analysis

Peak Hour Volume Warrant (Existing+Approved)
Pryor Road and Shamrock Avenue



AM & PM Volumes:

Major (AM) - 851
Minor (AM) - 20
Major (PM) - 1524
Minor (PM) - 18

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	0	6	1	0	9	3	530	0	5	308	5
Future Vol, veh/h	14	0	6	1	0	9	3	530	0	5	308	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	40	92	30	25	92	58	30	63	100	50	69	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	0	20	4	0	16	10	841	0	10	446	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	912	1332	228	1104	1337	421	456	0	0	841	0	0
Stage 1	471	471	-	861	861	-	-	-	-	-	-	-
Stage 2	441	861	-	243	476	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	229	153	775	166	152	581	1101	-	-	790	-	-
Stage 1	542	558	-	317	371	-	-	-	-	-	-	-
Stage 2	565	371	-	739	555	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	219	150	775	159	149	581	1101	-	-	790	-	-
Mov Cap-2 Maneuver	219	150	-	159	149	-	-	-	-	-	-	-
Stage 1	537	551	-	314	368	-	-	-	-	-	-	-
Stage 2	545	368	-	711	548	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.2	15.1	0.1	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1101	-	-	219	775	376	790	-	-
HCM Lane V/C Ratio	0.009	-	-	0.16	0.026	0.052	0.013	-	-
HCM Control Delay (s)	8.3	-	-	24.5	9.8	15.1	9.6	-	-
HCM Lane LOS	A	-	-	C	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	0	2	6	0	2
Future Vol, veh/h	18	0	2	6	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	0	2	7	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	20	0	31	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	11	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1596	-	983	1058
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	1012	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1596	-	982	1058
Mov Cap-2 Maneuver	-	-	-	-	982	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	1011	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1058	-	-	1596	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	0	6	4	0	7	7	697	4	25	776	15
Future Vol, veh/h	12	0	6	4	0	7	7	697	4	25	776	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	30	92	30	50	92	88	30	91	50	63	89	35
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	0	20	8	0	8	23	766	8	40	872	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1403	1794	458	1332	1811	387	915	0	0	774	0	0
Stage 1	974	974	-	816	816	-	-	-	-	-	-	-
Stage 2	429	820	-	516	995	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	100	80	550	112	78	611	741	-	-	837	-	-
Stage 1	270	328	-	337	389	-	-	-	-	-	-	-
Stage 2	574	387	-	510	321	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	93	74	550	102	72	611	741	-	-	837	-	-
Mov Cap-2 Maneuver	93	74	-	102	72	-	-	-	-	-	-	-
Stage 1	262	312	-	327	377	-	-	-	-	-	-	-
Stage 2	549	375	-	468	306	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	50.7	27.8	0.3	0.4
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	741	-	-	93	550	174	837	-	-
HCM Lane V/C Ratio	0.031	-	-	0.43	0.036	0.092	0.047	-	-
HCM Control Delay (s)	10	-	-	70.2	11.8	27.8	9.5	-	-
HCM Lane LOS	B	-	-	F	B	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.8	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	16	0	2	20	0	2
Future Vol, veh/h	16	0	2	20	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	0	2	22	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	17	0	43	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	26	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1600	-	968	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	997	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1600	-	967	1062
Mov Cap-2 Maneuver	-	-	-	-	967	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	996	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1062	-	-	1600	-
HCM Lane V/C Ratio	0.002	-	-	0.001	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

APPENDIX C

Existing plus Approved plus Proposed Development Conditions

ITE Sheets

Land Use: 720
Medical-Dental Office Building

Description

A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility. Clinic (Land Use 630) is a related use.

Additional Data

Time-of-day distribution data for this land use for a weekday, Saturday, and Sunday are presented in Appendix A. For the 19 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 9:30 and 10:30 a.m. and 2:15 and 3:15 p.m., respectively.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Connecticut, Kentucky, Maryland, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, South Dakota, Texas, Virginia, Washington, and Wisconsin.

Source Numbers

104, 109, 120, 157, 184, 209, 211, 253, 287, 294, 295, 304, 357, 384, 404, 407, 423, 444, 509, 601, 715, 867, 879, 901, 902, 908, 959, 972

Medical-Dental Office Building
(720)

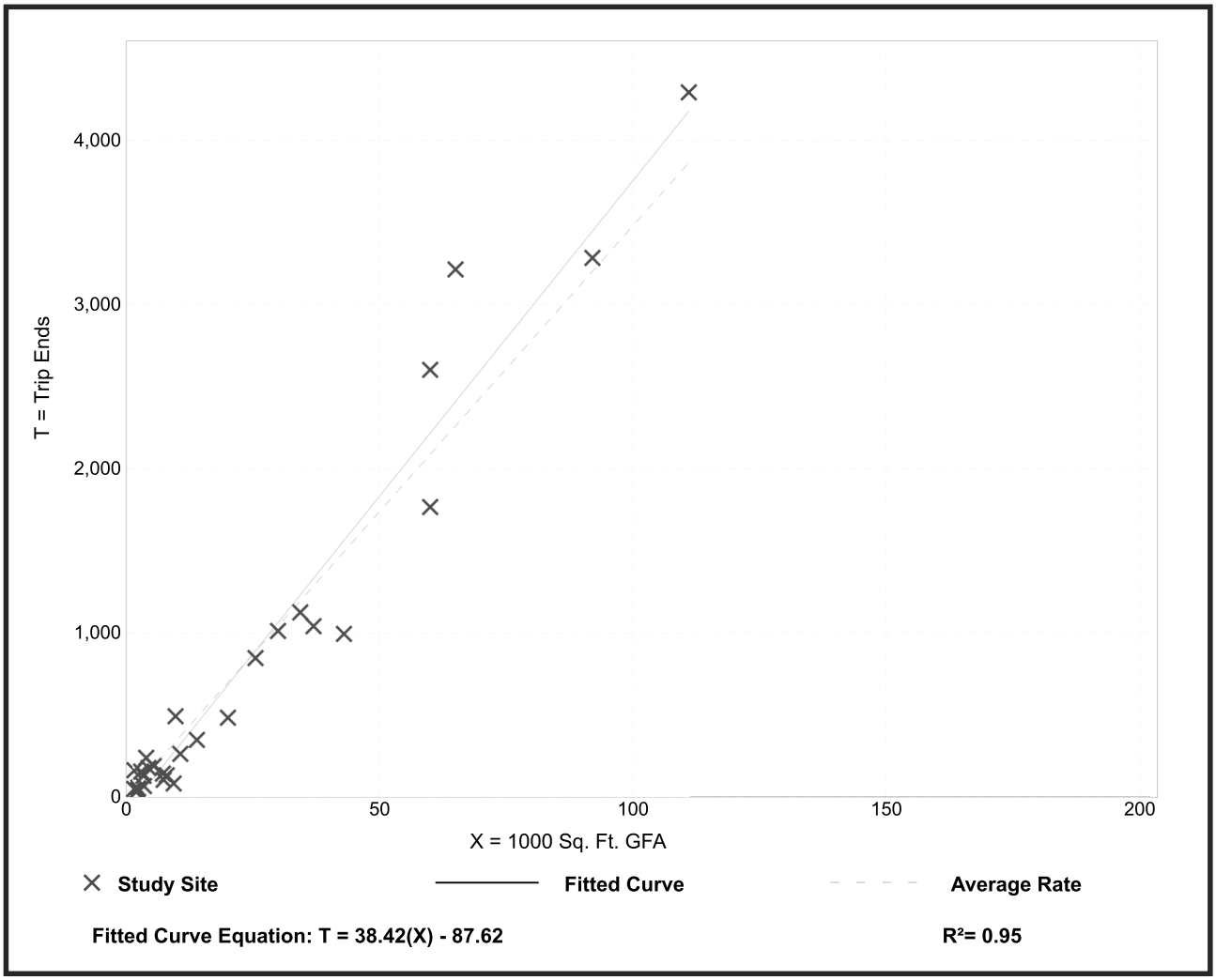
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 28
Avg. 1000 Sq. Ft. GFA: 24
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
34.80	9.14 - 100.75	9.79

Data Plot and Equation



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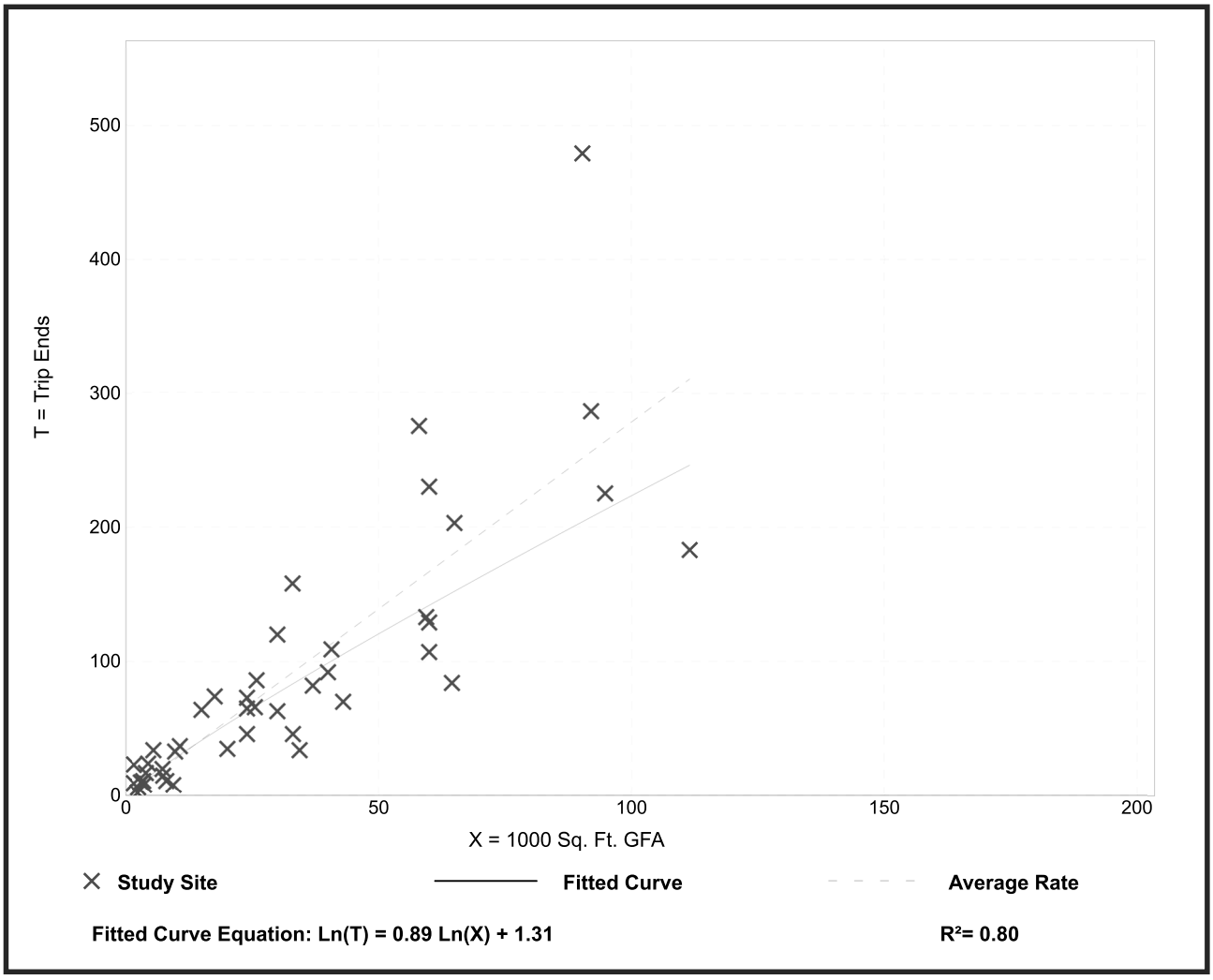
Medical-Dental Office Building
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 44
Avg. 1000 Sq. Ft. GFA: 32
Directional Distribution: 78% entering, 22% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.78	0.85 - 14.30	1.28

Data Plot and Equation



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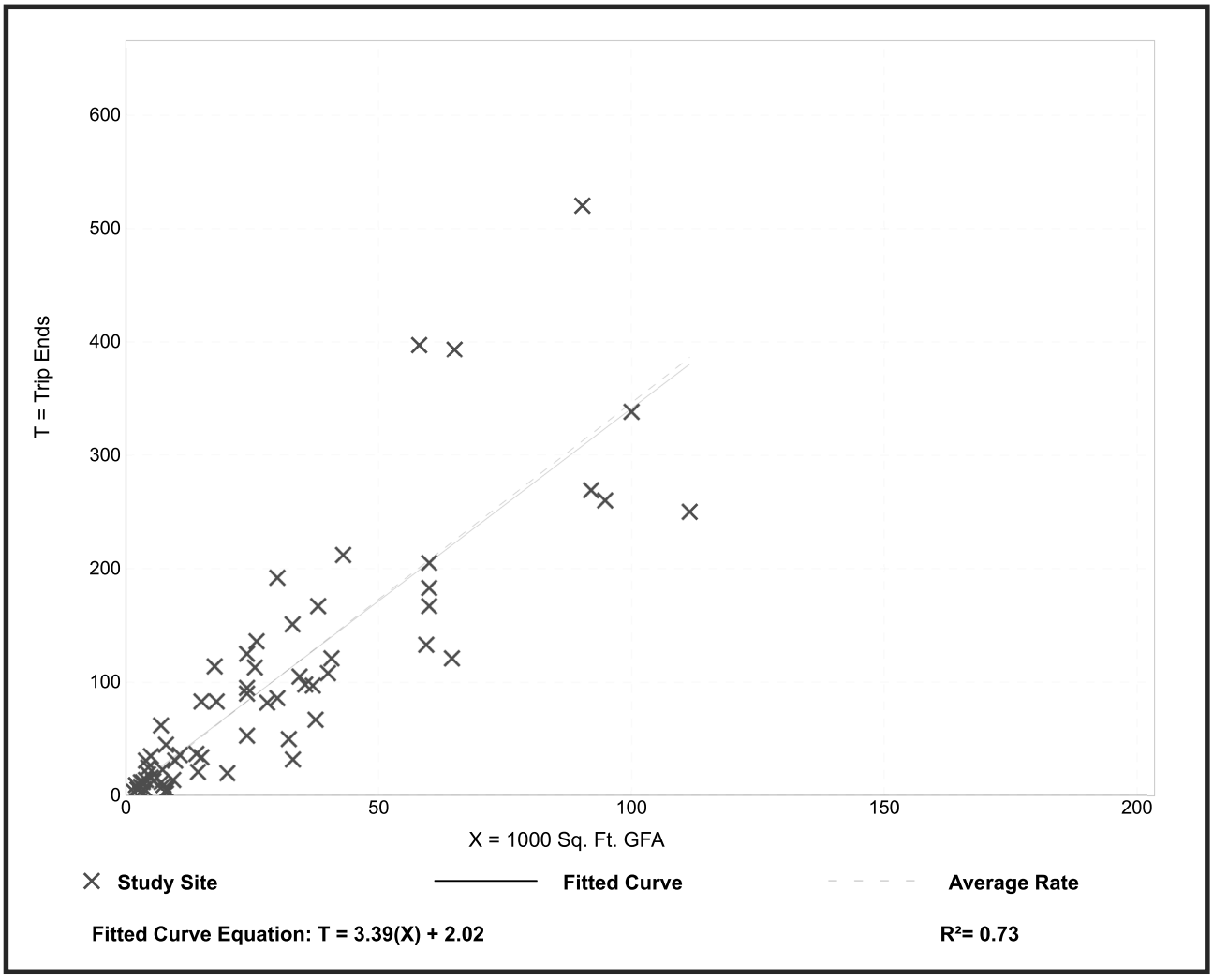
Medical-Dental Office Building
(720)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 65
Avg. 1000 Sq. Ft. GFA: 28
Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.46	0.25 - 8.86	1.58

Data Plot and Equation



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Trip Generation and Distribution

Daily Trip Generation

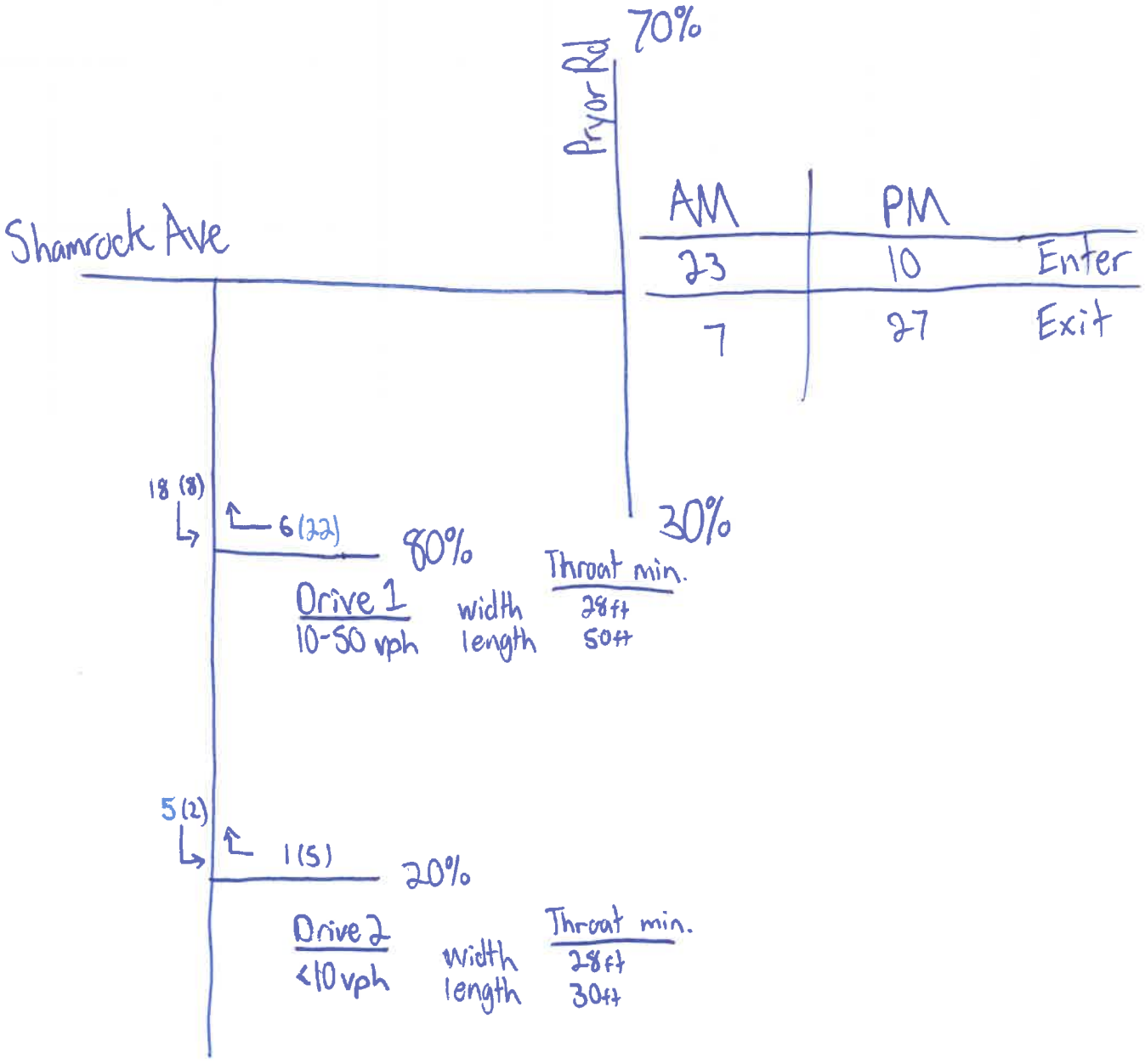
ITE Code	Land Use	Size		Trip Gen. Avg. Rate/Eq.	Daily Trips	Trip Distribution Enter	Trip Distribution Exit	Daily Trips Enter	Daily Trips Exit
720	Medical-Dental Office Building	10,274	Sq. Ft.	Equation	308	50%	50%	154	154
Total					**308**			**154**	**154**

AM Peak Hour Trip Generation

ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	AM Peak Hour Trips	Trip Distribution Enter	Trip Distribution Exit	AM Peak Hour Trips Enter	AM Peak Hour Trips Exit
720	Medical-Dental Office Building	10,274	Sq. Ft.	Equation	30	78%	22%	23	7
Total					**30**			**23**	**7**

PM Peak Hour Trip Generation

ITE Code/Page	Land Use	Size		Trip Gen. Avg. Rate/Eq.	PM Peak Hour Trips	Trip Distribution Enter	Trip Distribution Exit	PM Peak Hour Trips Enter	PM Peak Hour Trips Exit
720	Medical-Dental Office Building	10,274	Sq. Ft.	Equation	37	28%	72%	10	27
Total					**37**			**10**	**27**

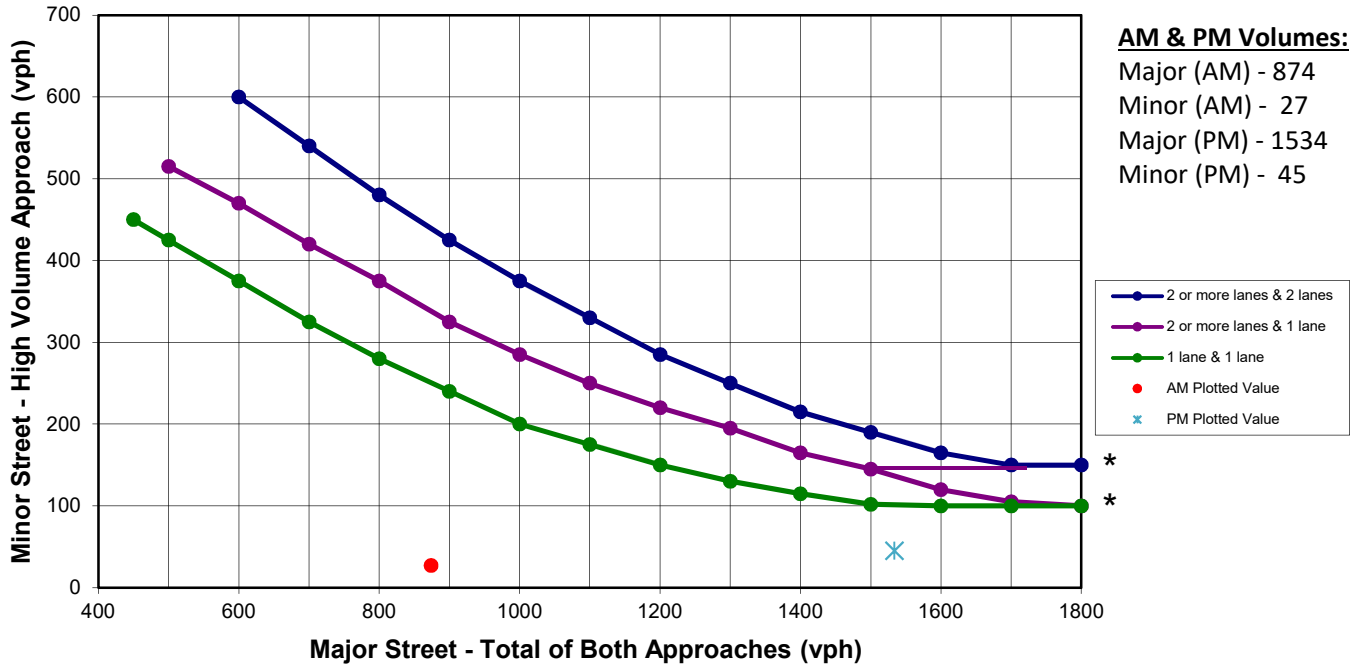


olsson

PROJECT: Dialysis Parking Lot Trip Distribution
project no.: 019-2726
drawn by: NAP
date: 8/27/19
page of

Signal Warrant Analysis

Peak Hour Volume Warrant (Existing+Approved+Proposed)
Pryor Road and Shamrock Avenue



AM & PM Volumes:

Major (AM) - 874
Minor (AM) - 27
Major (PM) - 1534
Minor (PM) - 45

*Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approach with one lane.

Capacity Analysis

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	0	8	1	0	9	10	530	0	5	308	21
Future Vol, veh/h	19	0	8	1	0	9	10	530	0	5	308	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	40	92	30	25	92	58	35	63	100	50	69	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	0	27	4	0	16	29	841	0	10	446	42

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	966	1386	244	1142	1407	421	488	0	0	841	0	0
Stage 1	487	487	-	899	899	-	-	-	-	-	-	-
Stage 2	479	899	-	243	508	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	209	142	757	155	138	581	1071	-	-	790	-	-
Stage 1	531	549	-	300	356	-	-	-	-	-	-	-
Stage 2	537	356	-	739	537	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	136	757	145	132	581	1071	-	-	790	-	-
Mov Cap-2 Maneuver	197	136	-	145	132	-	-	-	-	-	-	-
Stage 1	517	542	-	292	346	-	-	-	-	-	-	-
Stage 2	509	346	-	704	530	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.1	15.6	0.3	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1071	-	-	197	757	359	790	-	-
HCM Lane V/C Ratio	0.027	-	-	0.241	0.035	0.054	0.013	-	-
HCM Control Delay (s)	8.5	-	-	29	9.9	15.6	9.6	-	-
HCM Lane LOS	A	-	-	D	A	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	0	25	6	0	9
Future Vol, veh/h	18	0	25	6	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	0	27	7	0	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	20	0	81	20
Stage 1	-	-	-	-	20	-
Stage 2	-	-	-	-	61	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1596	-	921	1058
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	962	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1596	-	905	1058
Mov Cap-2 Maneuver	-	-	-	-	905	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	946	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1058	-	-	1596	-
HCM Lane V/C Ratio	0.009	-	-	0.017	-
HCM Control Delay (s)	8.4	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	0	14	4	0	7	10	697	4	25	776	22
Future Vol, veh/h	31	0	14	4	0	7	10	697	4	25	776	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	92	40	50	92	88	35	91	50	63	89	35
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	0	35	8	0	8	29	766	8	40	872	63

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1425	1816	468	1344	1843	387	935	0	0	774	0	0
Stage 1	984	984	-	828	828	-	-	-	-	-	-	-
Stage 2	441	832	-	516	1015	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	96	77	542	110	74	611	728	-	-	837	-	-
Stage 1	267	325	-	332	384	-	-	-	-	-	-	-
Stage 2	565	382	-	510	314	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	89	70	542	96	68	611	728	-	-	837	-	-
Mov Cap-2 Maneuver	89	70	-	96	68	-	-	-	-	-	-	-
Stage 1	256	309	-	319	369	-	-	-	-	-	-	-
Stage 2	535	367	-	454	299	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	74	29	0.4	0.4
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	728	-	-	89	542	166	837	-	-
HCM Lane V/C Ratio	0.039	-	-	0.697	0.065	0.096	0.047	-	-
HCM Control Delay (s)	10.1	-	-	108.9	12.1	29	9.5	-	-
HCM Lane LOS	B	-	-	F	B	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	3.4	0.2	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	16	0	12	20	0	33
Future Vol, veh/h	16	0	12	20	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	0	13	22	0	36

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	17	0	65	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	48	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1600	-	941	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1600	-	933	1062
Mov Cap-2 Maneuver	-	-	-	-	933	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	966	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1062	-	-	1600	-
HCM Lane V/C Ratio	0.034	-	-	0.008	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-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Lee's Summit, Missouri – 2019

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