

# Traffic Impact Study

## The Alton Apartments

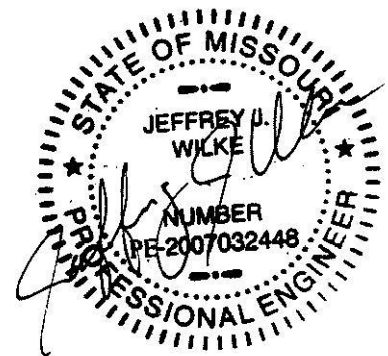


INDEPENDENCE, MISSOURI

MAY 2023

Prepared By:

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05/04/2023

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- EXHIBIT 1: PROJECT SITE LOCATION AND STUDY AREA
- EXHIBIT 2: EXISTING YEAR (2023) PEAK HOUR TRAFFIC VOLUMES
- EXHIBIT 3: EXISTING GEOMETRY AND INTERSECTION CONTROL
- EXHIBIT 4: SITE TRIP DISTRIBUTION
- EXHIBIT 5: PROJECT TRAFFIC
- EXHIBIT 6: EXISTING PLUS DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES
- EXHIBIT 7: FUTURE YEAR (2043) PEAK HOUR TRAFFIC VOLUMES



## 1.0 INTRODUCTION

This report serves as the traffic impact study for the Alton Apartments development, generally located near the northeast corner of 39<sup>th</sup> Street & Crackerneck Road intersection in Independence, Missouri. The location of the development is shown on **Exhibit 1** in **Appendix A**.

### 1.1 REPORT PURPOSE AND OBJECTIVES

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic impact study was prepared based on criteria set forth by the City of Independence staff. The following information is provided:

- A description and map of the existing and proposed street network to be affected by the proposed development. This information includes existing and proposed roadway characteristics and existing year (2023) traffic volumes.
- Trip generation calculations based on the Institute of Traffic Engineers (ITE) *Trip Generation Manual*, 11<sup>th</sup> Edition, for the proposed development. In addition, projected trip distributions onto the street network are provided.
- Analysis of impacts of the traffic generated by the proposed development on the street network, including analysis of peak period levels of service (LOS), delay times, and queuing at study area intersections.

In summary, the study is to determine the trip generation of the Alton Apartments development, assign new development trips to the street network, analyze various scenarios to determine the impacts of proposed site traffic, and identify potential mitigation measures, if necessary, to achieve acceptable operations at the study intersections.

## 2.0 EXISTING CONDITIONS

### 2.1 STUDY AREA

The proposed development site is in the south-eastern portion of Independence, Missouri, and consists of several parcels located along the east side of Crackerneck Road within the Bolger Square shopping center. The northern portion of the site includes a 110,000 square foot JC Penney's department store building that has been vacant for several years. The building is allocated on the east end of a strip mall. A private street separates the vacant retail building from the southern portion of the site, which consists of a large surface parking lot.

Directly east of the proposed development site are retail uses and another large surface parking lot. To the west across Crackerneck Road, there is a Genesis Health Club along with several other strip retail uses. Across Bolger Road to the north is a multifamily building and a single-family neighborhood. To the south, there is a gas station, a restaurant use, and several retail pad sites along 39<sup>th</sup> Street.

Through discussion with City staff, the following intersections were included within the study area for the traffic analysis. The list provides the existing intersection control for each of the study intersections.

- 39<sup>th</sup> Street & Crackerneck Road (Signalized)
- 39<sup>th</sup> Street & Bolger Square Driveway (Signalized)

### 2.2 STREET NETWORK

The existing street network within the study area includes 39<sup>th</sup> Street, Crackerneck Road, and the main driveway to the Bolger Square shopping center. The following provides a summary of the existing street network within the study area:

**39<sup>th</sup> Street** is an east-west roadway located south of the proposed development site. Through the study network, 39<sup>th</sup> Street is a four-lane divided roadway with 12-foot travel lanes, a raised concrete median, sidewalks on both sides, and curb and gutter facilities. According to the Imagine Independence Comprehensive Plan, 39<sup>th</sup> Street is classified as a Major Arterial. 39<sup>th</sup> Street provides a connection to the regional highway system at a partial cloverleaf interchange with MO-291 approximately a quarter of a mile east of the intersection at 39<sup>th</sup> Street & Bolger Square Driveway. The speed limit is posted at 35 miles per hour (mph).

**Crackerneck Road** is a north-south roadway that bounds the west side of the proposed development. North of 39<sup>th</sup> Street, Crackerneck Road is classified as a Collector according to the Imagine Independence Comprehensive Plan. Crackerneck Road is a two-lane, undivided roadway with 16-foot travel lanes and curb and gutter facilities. Sidewalks are provided on both sides of the roadway. The speed limit is 25 mph through the study network.

**Bolger Square Driveway** is four-lane, divided access drive with a wide landscaped median that extends north from 39<sup>th</sup> Street, to the east of the proposed development site. Bolger Square Driveway has 10-foot travel lanes, sidewalks on the west side, curbs and gutters, and no posted speed limit. This private street serves as the main entrance to the shopping center.

## 2.3 TRAFFIC DATA COLLECTION

Turning Movement Counts (TMCs) were collected Thursday, March 23<sup>rd</sup>, 2023, for the 39<sup>th</sup> Street & Crackerneck Road intersection, and Thursday, March 30<sup>th</sup>, 2023, for the 39<sup>th</sup> Street & Bolger Square Driveway intersection. The turning movement count data collected is included in **Appendix B**. The AM peak hour occurred between 8:00 AM and 9:00 AM, and the PM peak hour occurred between 4:45 PM and 5:45 PM. The Existing Conditions peak hour turning movement volumes are shown on **Exhibit 2**. The existing geometry with lane configurations and intersection control at the study intersections is shown on **Exhibit 3**.

## 3.0 PROPOSED DEVELOPMENT

### 3.1 SITE DESCRIPTION

The proposed Alton Apartments development consists of three four-story buildings. There are two buildings located in the northern portion of the proposed development site. Building A has a total of 56 units. Directly north of Building A, there are 5 enclosed garages. A sidewalk separates Building A from Building B, which wraps around a small courtyard area. Building B has a total of 98 units. At the northeast corner of the site, there is a fenced-in dog park area and a pickleball court. There is one building located in the southern portion of the site. Building C wraps around a courtyard area with an outdoor pool and includes 194 units. The total number of units included in the proposed development is 348.

The proposed site plan is included in **Appendix C** for reference.

### 3.2 SITE CIRCULATION

The proposed development will utilize the eight existing site accesses that currently provide access to the existing strip mall and out parcel lots along 39<sup>th</sup> Street. Three accesses are located on Crackerneck Road, two accesses are located on 39<sup>th</sup> Street, and three accesses are located on Bolger Road. Within the existing shopping center site, there are three east-west access roads that run from Crackerneck Road to Bolger Road. These connections are proposed to be maintained with the proposed development.

Drive aisles with surface parking surround each proposed building. At the east edge of the site, the drive aisle will tie into the existing surface parking lot that will remain for the property to the east. The site access along Crackerneck Road near the center of the site is to have a raised median that will extend through the adjacent internal drive aisle. The median will limit turning movements and reduce potential conflicts since the throat length of the access is relatively short.

### 3.3 TRIP GENERATION

Trip generation estimates were prepared using the *ITE Trip Generation Manual*, 11th Edition. **Table 1** shows the expected trips to be generated by the proposed development. The total trip generation is anticipated to be 1,613 daily trips, 142 trips during the AM peak hour (33 entering and 109 exiting), and 136 trips during the PM peak hour (83 entering and 53 exiting).

**TABLE 1: TRIP GENERATION**

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Multifamily – Mid Rise	221	348 Dwelling Units	1,613	33	109	142	83	53	136

For comparison purposes, trip generation estimates were also prepared for the previous retail land use that occupied the site. **Table 2** shows the projected trips generated by the previous development.

**TABLE 2: PREVIOUS SITE TRIP GENERATION**

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Retail	821	110,000 Square Feet	7,427	118	72	190	280	291	571

The results in **Tables 1** and **2** show that the proposed land use is projected to generate significantly less trips than the previous land use. **Appendix D** provides the data from the *ITE Trip Generation Manual* that were used to determine the trip generation of the proposed development and the previous land use.

### 3.4 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The estimated trips generated by the proposed development were assigned to the street network based on the trip distributions summarized in **Table 3**. This distribution is based on existing traffic patterns, the surrounding street network, and engineering judgement.

**TABLE 3: TRIP DISTRIBUTION**

Direction To/From	Percentage
East on 39 <sup>th</sup> Street	60%
West on 39 <sup>th</sup> Street	40%
Total	100%

More traffic was distributed to the east on 39<sup>th</sup> Street due to the proximity of the interchange with MO-291 Highway. The detailed distribution patterns through the study intersections are shown in **Exhibit 4**. While there are a number of access points to the site, all development traffic was distributed through the two study intersections for a conservative analysis of operations at the intersections. Based on the site plan, it is anticipated that most site traffic will use the north and middle accesses along Crackerneck Road and the Bolger Square driveway on 39<sup>th</sup> Street to access the site.

**Exhibit 5** shows the development trip assignment. The proposed development trip assignments were added to the Existing Conditions traffic volumes. **Exhibit 6** illustrates the Existing plus Development peak hour traffic volumes.

## 4.0 FUTURE TRAFFIC FORECASTING

For the future year, background traffic growth was added to the existing traffic volumes and the proposed development site trips. To estimate background traffic growth, the existing traffic volumes at the study intersections were assumed to increase at a rate of 0.5% per year for a 20-year planning horizon. The annual growth rate of 0.5% is indicative of the mature development in the surrounding area.

**Exhibit 7** provides the Future Year (2043) peak hour traffic volumes.

## 5.0 INTERSECTION CAPACITY ANALYSIS

### 5.1 LEVEL OF SERVICE OVERVIEW

Intersection capacity analysis was performed at the study intersections for the following three scenarios:

- Existing Conditions (Year 2023)
- Existing plus Development Conditions
- Future Conditions (Year 2043)

The capacity analysis was performed for the weekday AM and PM peak hours using Synchro traffic modeling software to determine intersection delay and level of service (LOS). Calculations were performed based on the methodologies outlined in the *Highway Capacity Manual (HCM)*, 6th Edition, which is published by the Transportation Research Board.

LOS is a quantitative measure used by traffic engineers to describe the operations of an intersection. It ranges from A to F, with A being the best and F being the worst level of operation. LOS A conditions are characterized by minimal vehicle delay and free-flow conditions, while LOS F is characterized by long vehicle delay – usually when demand exceeds available roadway capacity. Although LOS E is defined as at-capacity, LOS D is generally considered the minimum acceptable level of operation at an intersection.

**Table 4** shows the definition of LOS for unsignalized and signalized intersections.

**TABLE 4: LEVELS OF SERVICE**

Level of Service	Average Control Delay (seconds/vehicle) at:	
	Unsignalized Intersections	Signalized Intersections
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

Levels of service are evaluated based on the movement groupings which are required to yield to other traffic. Typically, these are left turns off the major street and the side street approaches for two-way stop-controlled intersections. For signalized intersections each movement grouping is evaluated, and LOS is evaluated for the intersection as a whole.

For the purposes of this study, LOS D is considered the minimum acceptable level of service for intersections. At signalized intersections, LOS E is considered acceptable for low traffic volume left turn or minor street movements where the signal timing prioritizes the major, high-volume movements. This leads to less delay for the entire intersection.

The volume-to-capacity (v/c) ratio is a secondary measure of intersection performance. The v/c ratio represents the sufficiency of an intersection to accommodate the vehicular demand. A v/c ratio less than 0.85 generally indicates that adequate capacity is available, and vehicles are not expected to experience significant queues and delays. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur. Once the demand exceeds the capacity (a v/c ratio greater than 1.0), traffic flow is unstable and excessive delay and queuing is expected.

Traffic queues were also evaluated as part of the analyses. Long traffic queues which extend beyond the amount of storage available, either between intersections or within turn lanes, can have significant impacts on operations. The 95th percentile vehicular queues were analyzed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes. The 95th percentile queue represents the queue length that has only a 5% chance of being exceeded during the analysis period.



## 5.2 EXISTING (YEAR 2023) ANALYSIS

Capacity analysis was conducted for existing traffic conditions at the study intersections to determine baseline conditions for the existing analysis year and to calibrate the models. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown in **Exhibits 2** and **3**. Existing signal timings and coordination plans for 39<sup>th</sup> Street & Crackerneck Road and 39<sup>th</sup> Street & Bolger Square Driveway were obtained from Operation Green Light, which is the agency responsible for maintaining signal operations along the corridor. The Synchro reports are provided in **Appendix E**.

**Table 5** provides a summary of the capacity analysis at the study intersections.

**TABLE 5: EXISTING (YEAR 2023) PEAK HOUR CONDITIONS**

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
39 <sup>th</sup> Street & Crackerneck Road	Signalized	EBL	3.4	A	< 50'	0.10	5.2	A	< 50'	0.29
		EBT/R	5.7	A	73'	0.20	8.4	A	198'	0.35
		WBL	2.9	A	< 50'	0.02	4.9	A	< 50'	0.07
		WBT/R	4.7	A	< 50'	0.22	6.4	A	65'	0.39
		NB	31.2	C	< 50'	0.15	45.1	D	71'	0.26
		SBL	33.9	C	54'	0.45	57.0	E	154'	0.69
		SBT/R	30.4	C	< 50'	0.05	43.7	D	60'	0.12
		Overall	9.1	A	--	0.24	13.9	B	--	0.43
39 <sup>th</sup> Street & Bolger Square Driveway	Signalized	EBL	3.6	A	< 50'	0.04	2.6	A	< 50'	0.12
		EBT/R	4.6	A	69'	0.24	3.7	A	98'	0.34
		WBL	5.3	A	< 50'	0.01	5.0	A	< 50'	0.01
		WBT	6.9	A	98'	0.23	7.3	A	206'	0.35
		WBR	5.7	A	< 50'	0.01	5.4	A	< 50'	0.02
		NB	38.3	D	< 50'	0.13	59.8	E	< 50'	0.15
		SBT/L	38.2	D	< 50'	0.13	55.1	E	< 50'	0.17
		SBR	36.3	D	< 50'	0.01	53.7	D	< 50'	0.02
Overall	6.1	A	--	0.24	6.7	A	--	0.33		

Based on the analysis, both study intersections currently operate at an overall acceptable level of service. During the PM peak hour, the southbound left-turn movement at the 39<sup>th</sup> Street & Crackerneck Road intersection operates at an LOS E and has a 95<sup>th</sup> percentile queue length of 154 feet. This queue length exceeds the 130-foot storage length of the turn lane. There are several movements at the 39<sup>th</sup> Street & Bolger Square Driveway that operate at a LOS E during the PM peak hour. However, these movements are projected to have a queue length of less than 50 feet and are shown to operate under capacity.

## 5.3 EXISTING PLUS DEVELOPMENT ANALYSIS

Capacity analysis was conducted for Existing plus Development Conditions at the study intersections to determine the impact of site generated traffic from the proposed development. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes shown on **Exhibit 6**. For this analysis, the signal timings and intersection geometry were kept consistent with existing conditions. The Synchro reports are provided in **Appendix E**.

**Table 6** provides a summary of the capacity analysis at the study intersections.

**TABLE 6: EXISTING PLUS DEVELOPMENT PEAK HOUR CONDITIONS**

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
39 <sup>th</sup> Street & Crackerneck Road	Signalized	EBL	3.6	A	< 50'	0.13	5.6	A	57'	0.36
		EBT/R	5.9	A	74'	0.20	8.6	A	199'	0.35
		WBL	2.8	A	< 50'	0.02	5.1	A	< 50'	0.07
		WBT/R	2.8	A	< 50'	0.23	6.2	A	65'	0.40
		NB	30.7	C	< 50'	0.15	45.2	D	72'	0.28
		SBL	34.7	C	63'	0.52	58.0	E	160'	0.70
		SBT/R	30.2	C	< 50'	0.09	43.5	D	64'	0.14
		Overall	9.4	A	--	0.26	14.2	B	--	0.45
39 <sup>th</sup> Street & Bolger Square Driveway	Signalized	EBL	5.2	A	< 50'	0.05	3.2	A	< 50'	0.13
		EBT/R	6.8	A	73'	0.28	4.6	A	101'	0.36
		WBL	7.5	A	< 50'	0.01	5.9	A	< 50'	0.01
		WBT	9.7	A	103'	0.26	8.6	A	225'	0.36
		WBR	8.2	A	< 50'	0.02	6.5	A	< 50'	0.05
		NB	38.3	D	< 50'	0.13	59.8	E	< 50'	0.15
		SBT/L	34.7	C	62'	0.46	54.3	D	62'	0.37
		SBR	31.3	C	< 50'	0.01	51.1	D	< 50'	0.02
		Overall	10.0	A	--	0.30	8.4	A	--	0.36

With the addition of site generated trips from the proposed development, the study intersections are projected to continue to operate acceptably overall. The 95<sup>th</sup> percentile queue length for the southbound left movement at the 39<sup>th</sup> Street & Crackerneck Road is projected to continue exceeding the available storage length during the PM peak hour. To provide additional queue storage for the southbound left-turn movement the pavement markings on the southbound approach to the 39<sup>th</sup> Street & Crackerneck Road intersection should be modified to provide at least 200 feet of storage for the southbound left-turn movement. The existing street is wide enough in this area to accommodate one through lane in each direction and a left-turn lane.

The northbound approach at the 39<sup>th</sup> Street & Bolger Square Driveway intersection is projected to continue to operate at LOS E as it does in the existing conditions scenario. Queue lengths are projected to be short and the approach is projected to operate well under capacity.

## 5.4 FUTURE (YEAR 2043) ANALYSIS

Capacity analysis was conducted for future traffic conditions at the study intersections to determine the need for capacity improvements within the study network in the future. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes shown on **Exhibit 7**. Signal timings and intersection geometry were kept consistent with existing conditions. The Synchro reports are provided in **Appendix E**.

**Table 7** provides a summary of the capacity analysis at the study intersections.

**TABLE 7: FUTURE (YEAR 2043) PEAK HOUR CONDITIONS**

Intersection	Control	Movement	Operational Analysis Results							
			AM Peak Hour				PM Peak Hour			
			Delay (sec/veh)	LOS	95% Queue	V/C Ratio	Delay (sec/veh)	LOS	95% Queue	V/C Ratio
39 <sup>th</sup> Street & Crackerneck Road	Signalized	EBL	3.6	A	< 50'	0.14	6.8	A	63'	0.43
		EBT/R	6.2	A	82'	0.22	9.4	A	226'	0.40
		WBL	2.8	A	< 50'	0.03	5.4	A	< 50'	0.08
		WBT/R	3.0	A	< 50'	0.25	6.9	A	72'	0.45
		NB	30.7	C	< 50'	0.17	45.0	D	82'	0.33
		SBL	35.8	D	68'	0.56	61.4	E	177'	0.75
		SBT/R	30.1	C	< 50'	0.10	42.7	D	66'	0.15
		Overall	9.6	A	--	0.29	15.0	B	--	0.50
39 <sup>th</sup> Street & Bolger Square Driveway	Signalized	EBL	5.2	A	< 50'	0.05	3.3	A	< 50'	0.16
		EBT/R	6.8	A	80'	0.30	4.7	A	110'	0.39
		WBL	7.5	A	< 50'	0.01	6.0	A	< 50'	0.01
		WBT	9.9	A	114'	0.28	9.0	A	257'	0.40
		WBR	8.2	A	< 50'	0.02	6.6	A	< 50'	0.05
		NB	38.3	D	< 50'	0.13	60.7	E	< 50'	0.19
		SBT/L	34.7	D	62'	0.55	54.4	D	64'	0.37
		SBR	31.3	C	< 50'	0.01	51.1	D	< 50'	0.03
Overall	10.0	A	--	0.32	8.6	A	--	0.39		

The analysis results in **Table 7** indicate that overall, both study intersections are projected to operate acceptably in the future. Most individual movements are projected to continue to operate acceptably, however, the northbound approach at the 39<sup>th</sup> Street & Bolger Square Driveway intersection is projected to operate at LOS E during the PM peak hour. It should be noted that while this is a lower level of service, the 95<sup>th</sup> percentile queue length is projected to be short and the movement is projected to operate under capacity, which is consistent with existing conditions. The southbound left-turn movement at the 39<sup>th</sup> Street & Crackerneck Road intersection is projected to operate at a LOS E during the PM peak hour. The 95<sup>th</sup> percentile queue length is projected to increase to 177 feet during the PM peak hour. This queue can be contained within the restriped left-turn lane length that was previously identified.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

A traffic impact study for the Alton Apartments development has been prepared by Kimley-Horn. The proposed site is generally located near the northeast corner of the 39<sup>th</sup> Street & Crackerneck Road intersection in Independence, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The following provides a summary of the analysis.

Intersection capacity analysis was performed at the study intersections for the following three scenarios:

- Existing Conditions (Year 2023)
- Existing plus Development Conditions
- Future Conditions (Year 2043)

Based on the Existing Conditions analysis, both study intersections currently operate at an overall acceptable level of service. During the PM peak hour, the southbound left movement at the 39<sup>th</sup> Street & Crackerneck Road intersection operates at a LOS E and has a 95<sup>th</sup> percentile queue length of 154 feet. This queue length exceeds the short 130-foot storage length of the turn lane.

The proposed multifamily development has 348 dwelling units is projected to generate 1,613 daily trips, with 142 trips in the AM peak hour and 136 trips in the PM peak hour. It should be noted that the proposed development is anticipated to generate significantly less traffic than the previous department store that occupied the site.

The site trips from the proposed development were added to the street network and both study intersections are projected to continue to operate at the same intersection levels of service as existing conditions. Several individual movements are shown to operate at a LOS E during the PM peak hour. However, these operations are consistent with Existing Conditions. To provide additional queue storage for the southbound left-turn movement the pavement markings on the southbound approach to the 39<sup>th</sup> Street & Crackerneck Road intersection should be modified to provide at least 200 feet of storage.

The future conditions scenario includes site trips and an annual 0.5% background growth rate applied over 20 years. Both study intersections are projected to continue to operate at the same intersection levels of service as existing conditions.

## APPENDIX

Appendix A: EXHIBITS

Appendix B: TURNING MOVEMENT COUNTS

Appendix C: SITE PLAN

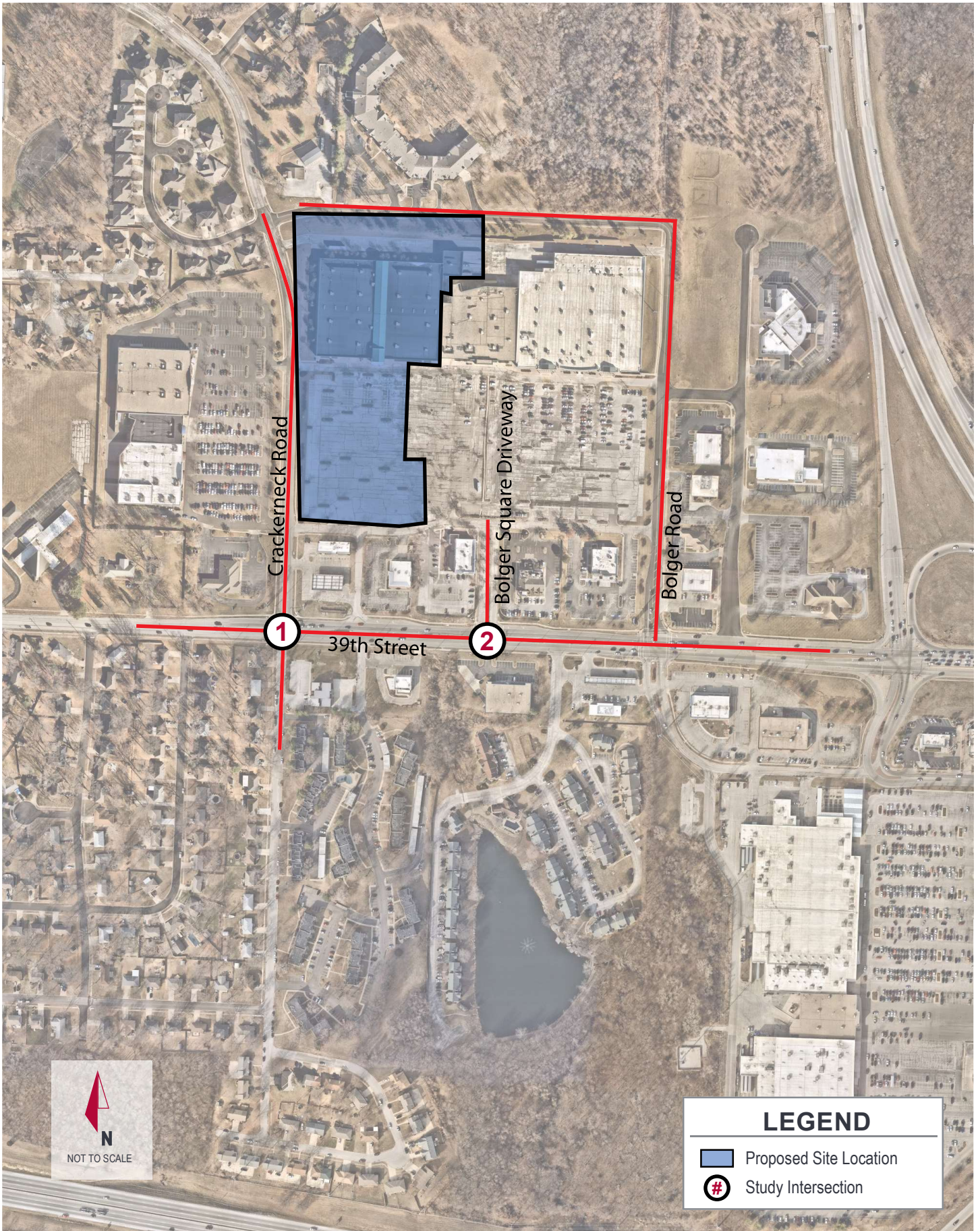
Appendix D: ITE TRIP GENERATION MANUAL SHEETS

Appendix E: SYNCHRO REPORTS

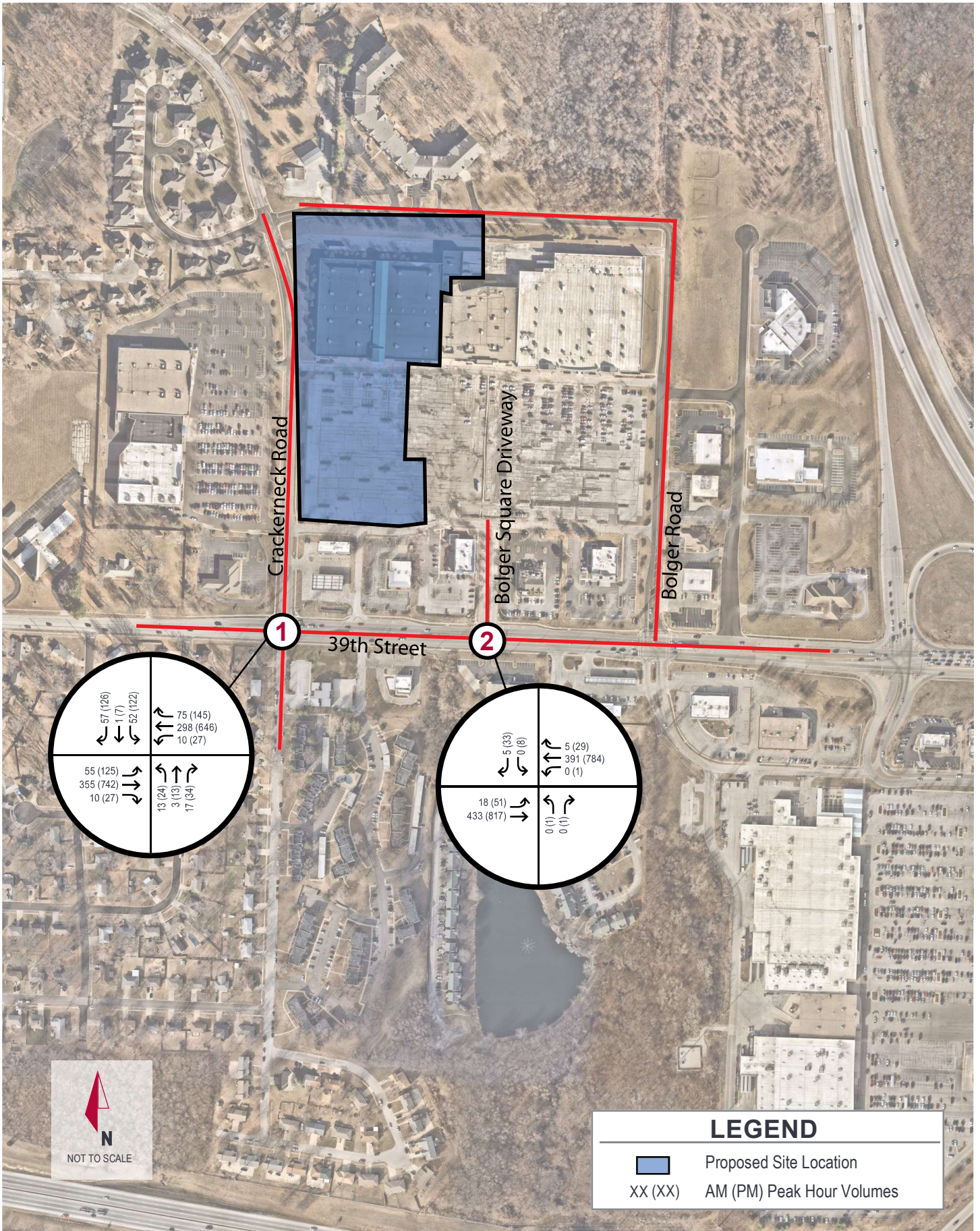
# Appendix A: Exhibits



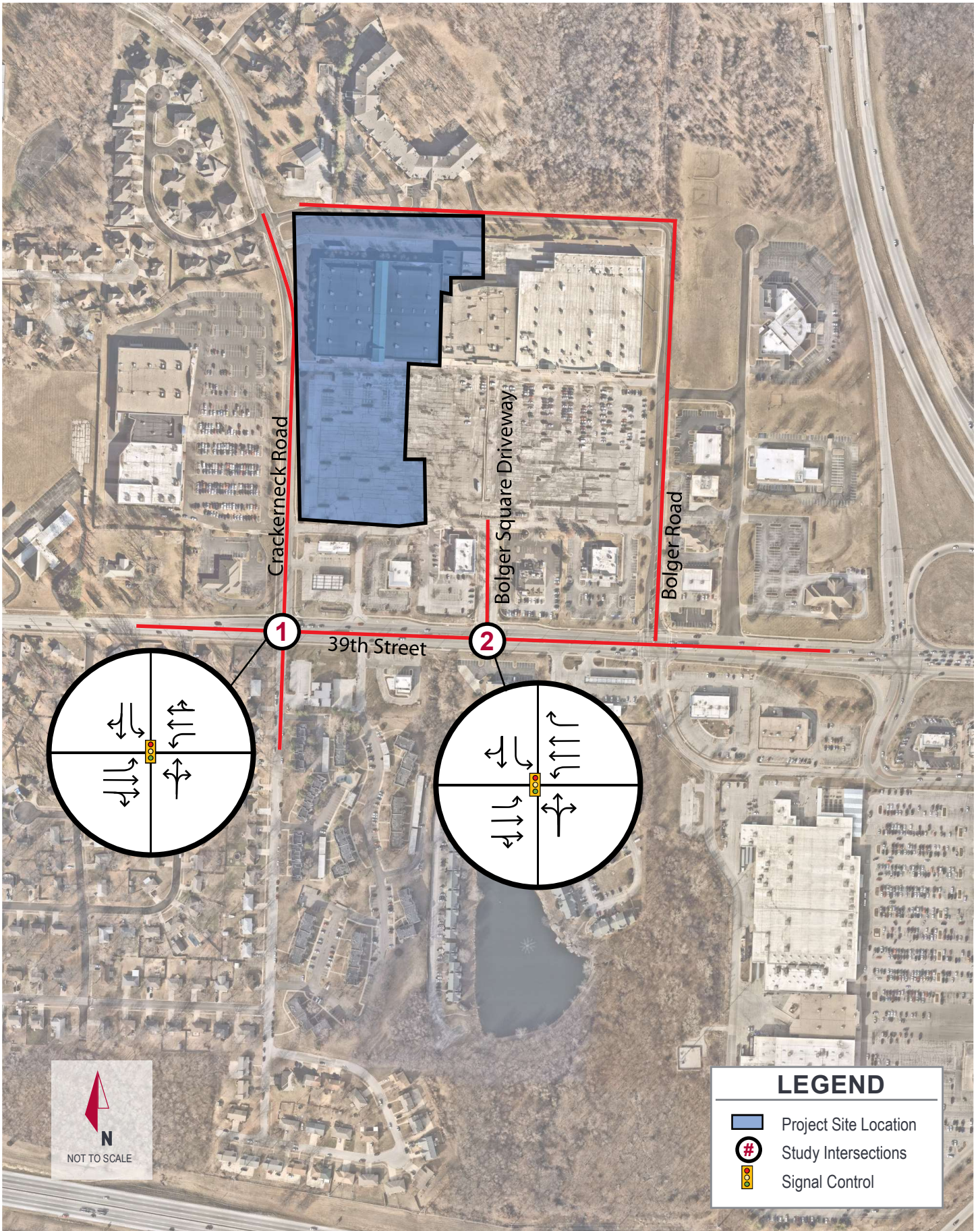




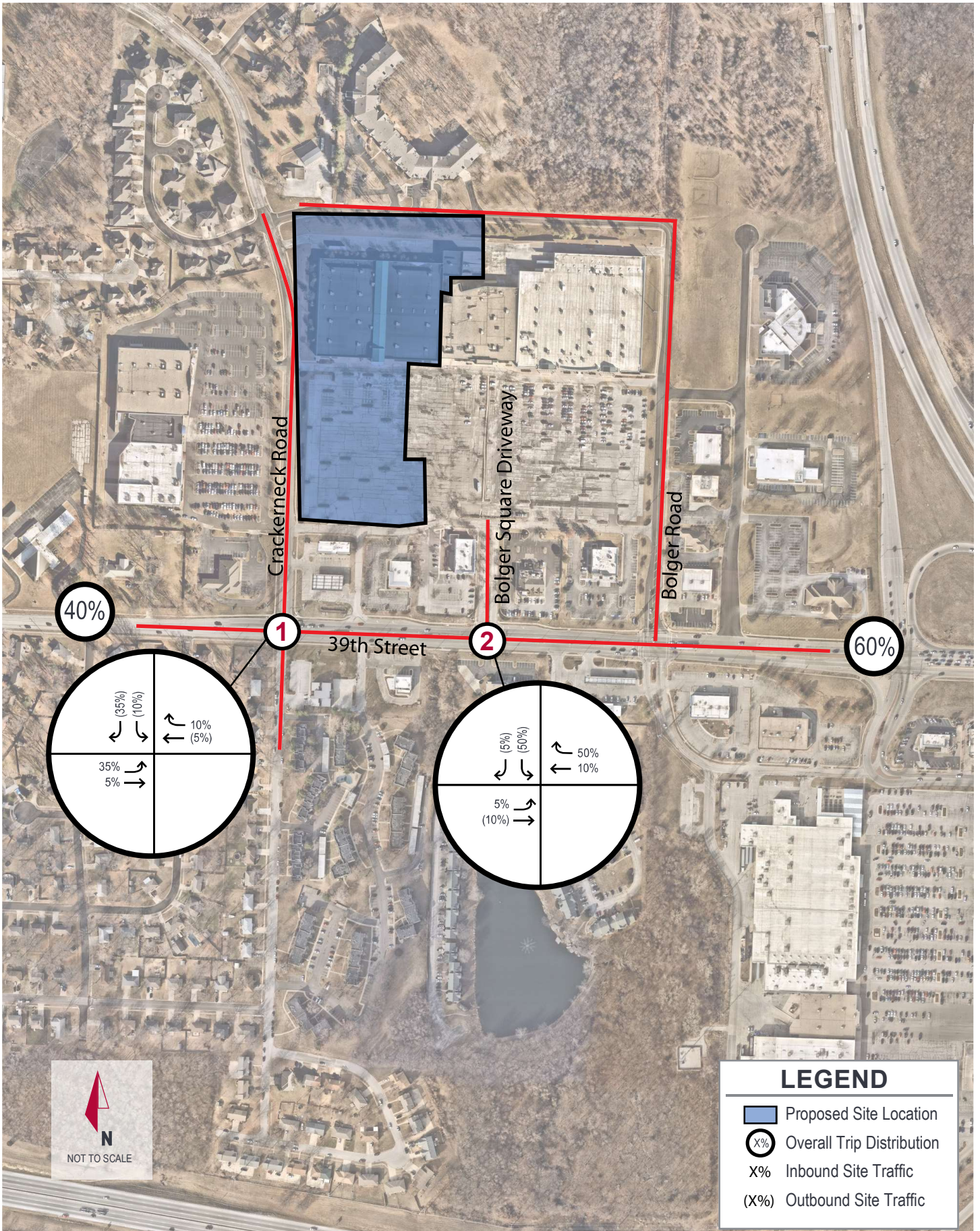




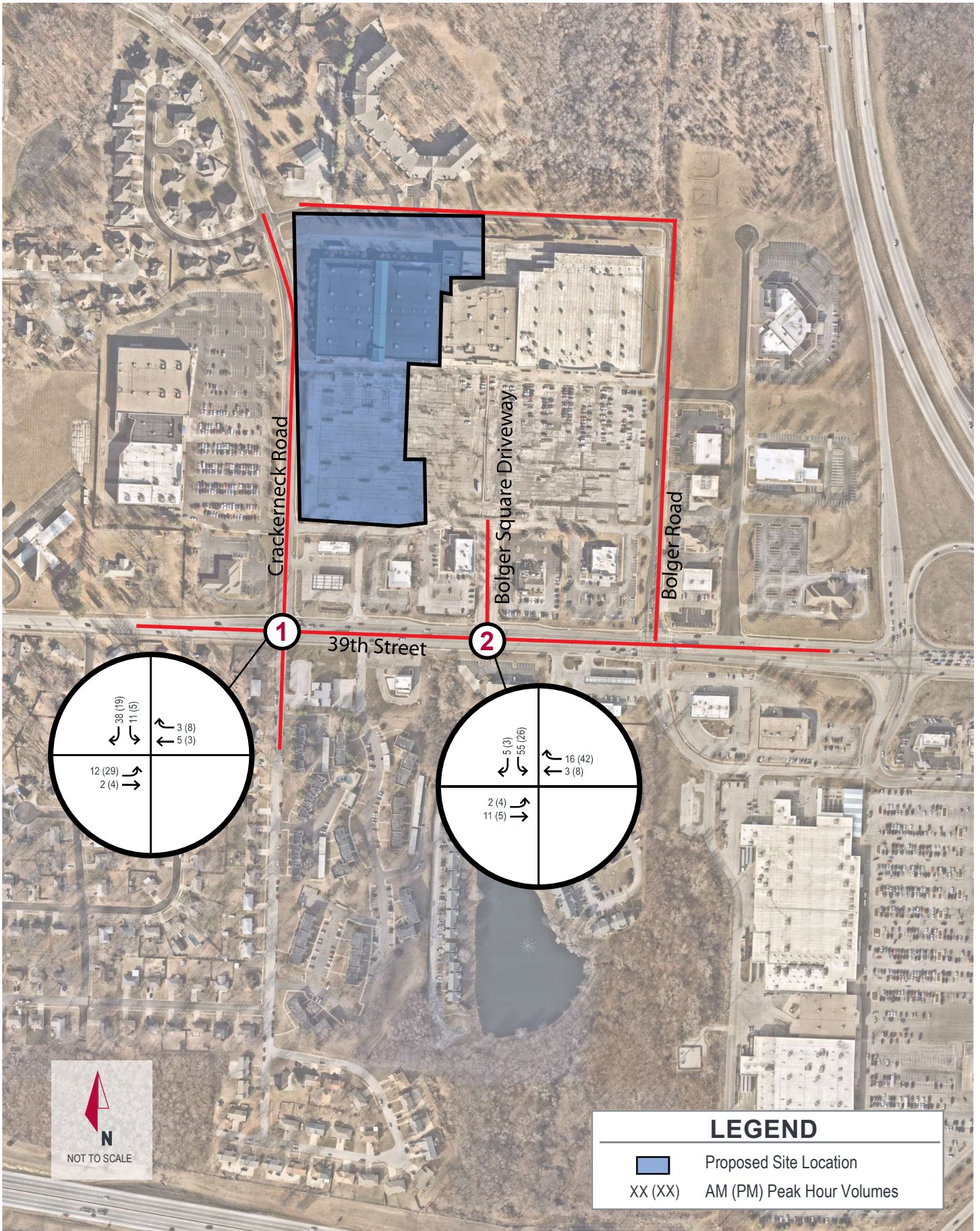




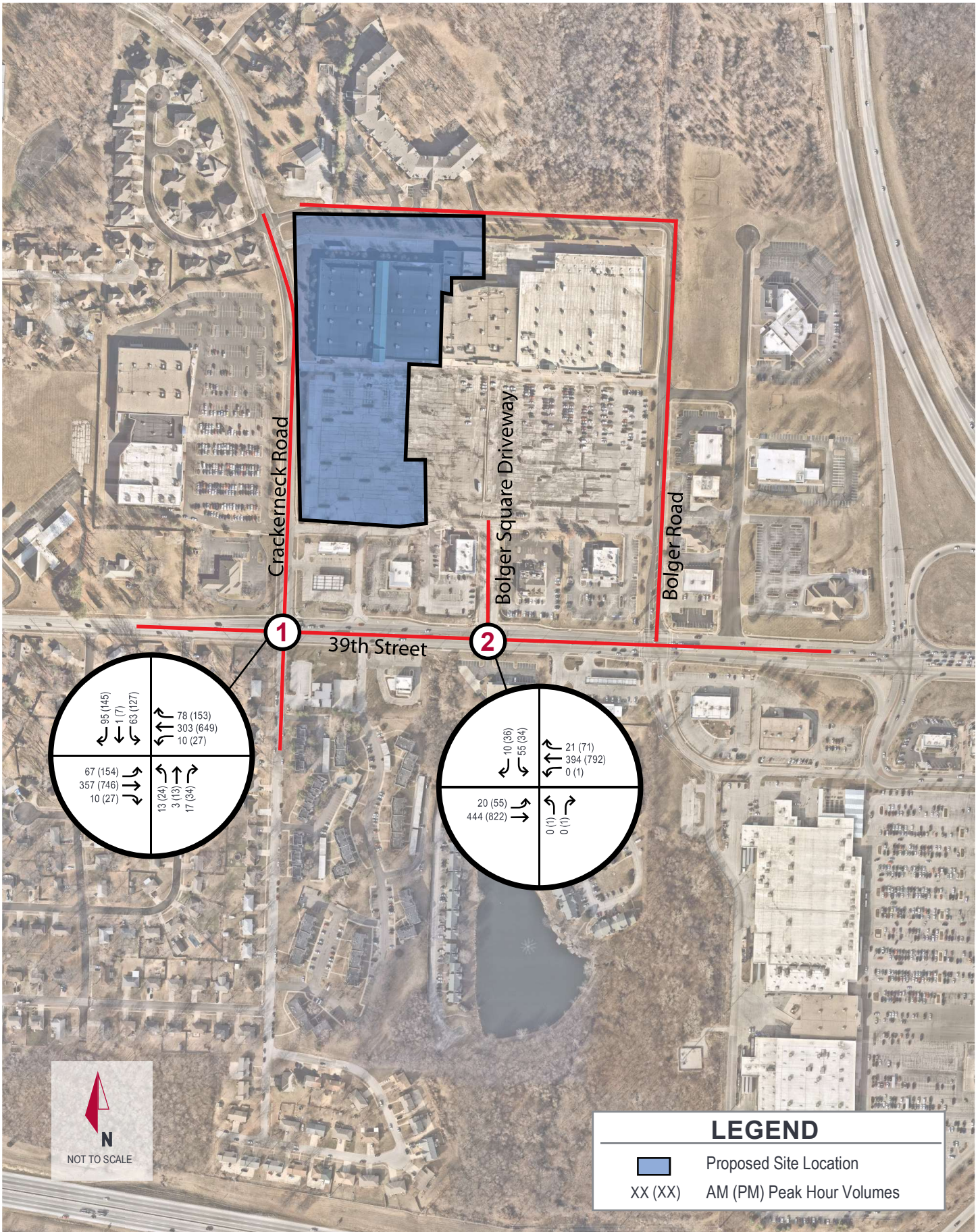




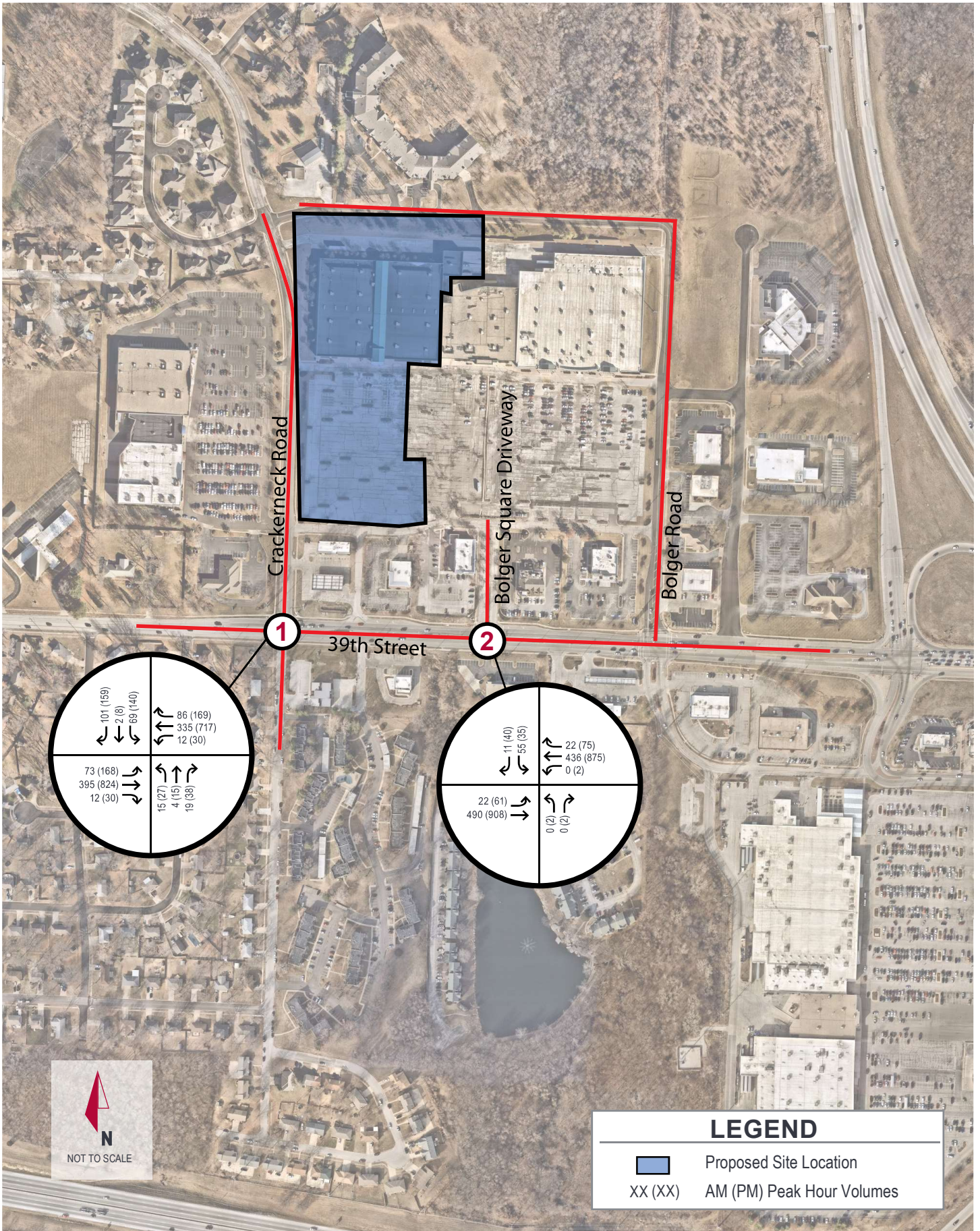












# Appendix B: Turning Movement Counts





39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	39th St Eastbound					39th St Westbound					Crackerneck Rd Northbound					Crackerneck Rd Southbound					Int
	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	
2023-03-23 7:00AM	6	66	2	0	74	2	56	14	0	72	2	0	5	0	7	20	0	20	0	40	193
7:15AM	6	71	2	0	79	1	56	12	0	69	1	0	4	0	5	11	1	11	0	23	176
7:30AM	11	69	3	1	84	3	80	10	0	93	3	0	6	0	9	19	0	12	0	31	217
7:45AM	12	91	3	0	106	4	77	11	0	92	5	2	4	0	11	27	1	7	0	35	244
Hourly Total	35	297	10	1	343	10	269	47	0	326	11	2	19	0	32	77	2	50	0	129	830
8:00AM	11	75	0	0	86	3	70	18	0	91	1	0	3	0	4	17	0	13	0	30	211
8:15AM	9	77	5	0	91	1	77	11	0	89	1	0	4	0	5	16	0	15	0	31	216
8:30AM	16	85	2	0	103	2	68	22	0	92	5	1	5	0	11	11	1	18	0	30	236
8:45AM	19	118	3	0	140	4	83	24	0	111	6	2	5	0	13	8	0	11	0	19	283
Hourly Total	55	355	10	0	420	10	298	75	0	383	13	3	17	0	33	52	1	57	0	110	946
4:00PM	32	153	7	0	192	4	171	35	0	210	3	1	4	0	8	42	0	25	0	67	477
4:15PM	35	196	1	0	232	5	167	34	0	206	4	1	5	0	10	22	2	25	0	49	497
4:30PM	30	194	1	0	225	5	160	41	1	207	3	1	6	0	10	32	2	34	0	68	510
4:45PM	28	202	8	0	238	3	149	40	0	192	7	2	8	0	17	26	0	31	0	57	504
Hourly Total	125	745	17	0	887	17	647	150	1	815	17	5	23	0	45	122	4	115	0	241	1988
5:00PM	35	187	5	0	227	8	161	35	0	204	5	5	5	0	15	32	4	32	0	68	514
5:15PM	33	172	10	0	215	9	178	29	0	216	6	5	11	0	22	35	0	30	0	65	518
5:30PM	29	181	4	0	214	7	158	41	0	206	6	1	10	0	17	29	3	33	0	65	502
5:45PM	35	154	2	0	191	3	161	42	0	206	2	1	4	0	7	26	3	29	0	58	462
Hourly Total	132	694	21	0	847	27	658	147	0	832	19	12	30	0	61	122	10	124	0	256	1996
<b>Total</b>	<b>347</b>	<b>2091</b>	<b>58</b>	<b>1</b>	<b>2497</b>	<b>64</b>	<b>1872</b>	<b>419</b>	<b>1</b>	<b>2356</b>	<b>60</b>	<b>22</b>	<b>89</b>	<b>0</b>	<b>171</b>	<b>373</b>	<b>17</b>	<b>346</b>	<b>0</b>	<b>736</b>	<b>5760</b>
<b>% Approach</b>	13.9%	83.7%	2.3%	0%	-	2.7%	79.5%	17.8%	0%	-	35.1%	12.9%	52.0%	0%	-	50.7%	2.3%	47.0%	0%	-	-
<b>% Total</b>	6.0%	36.3%	1.0%	0%	<b>43.4%</b>	1.1%	32.5%	7.3%	0%	<b>40.9%</b>	1.0%	0.4%	1.5%	0%	<b>3.0%</b>	6.5%	0.3%	6.0%	0%	<b>12.8%</b>	-
<b>Lights</b>	338	2062	56	1	<b>2457</b>	62	1851	415	1	<b>2329</b>	58	20	85	0	<b>163</b>	369	13	333	0	<b>715</b>	5664
<b>% Lights</b>	97.4%	98.6%	96.6%	100%	<b>98.4%</b>	96.9%	98.9%	99.0%	100%	<b>98.9%</b>	96.7%	90.9%	95.5%	0%	<b>95.3%</b>	98.9%	76.5%	96.2%	0%	<b>97.1%</b>	98.3%
<b>Articulated Trucks</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	1	0	0	0	<b>1</b>	1	0	0	0	<b>1</b>	2
<b>% Articulated Trucks</b>	0%	0%	0%	0%	<b>0%</b>	0%	0%	0%	0%	<b>0%</b>	1.7%	0%	0%	0%	<b>0.6%</b>	0.3%	0%	0%	0%	<b>0.1%</b>	0%
<b>Buses and Single-Unit Trucks</b>	9	29	2	0	<b>40</b>	2	21	4	0	<b>27</b>	1	2	4	0	<b>7</b>	3	4	13	0	<b>20</b>	94
<b>% Buses and Single-Unit Trucks</b>	2.6%	1.4%	3.4%	0%	<b>1.6%</b>	3.1%	1.1%	1.0%	0%	<b>1.1%</b>	1.7%	9.1%	4.5%	0%	<b>4.1%</b>	0.8%	23.5%	3.8%	0%	<b>2.7%</b>	1.6%

\*L: Left, R: Right, T: Thru, U: U-Turn

39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



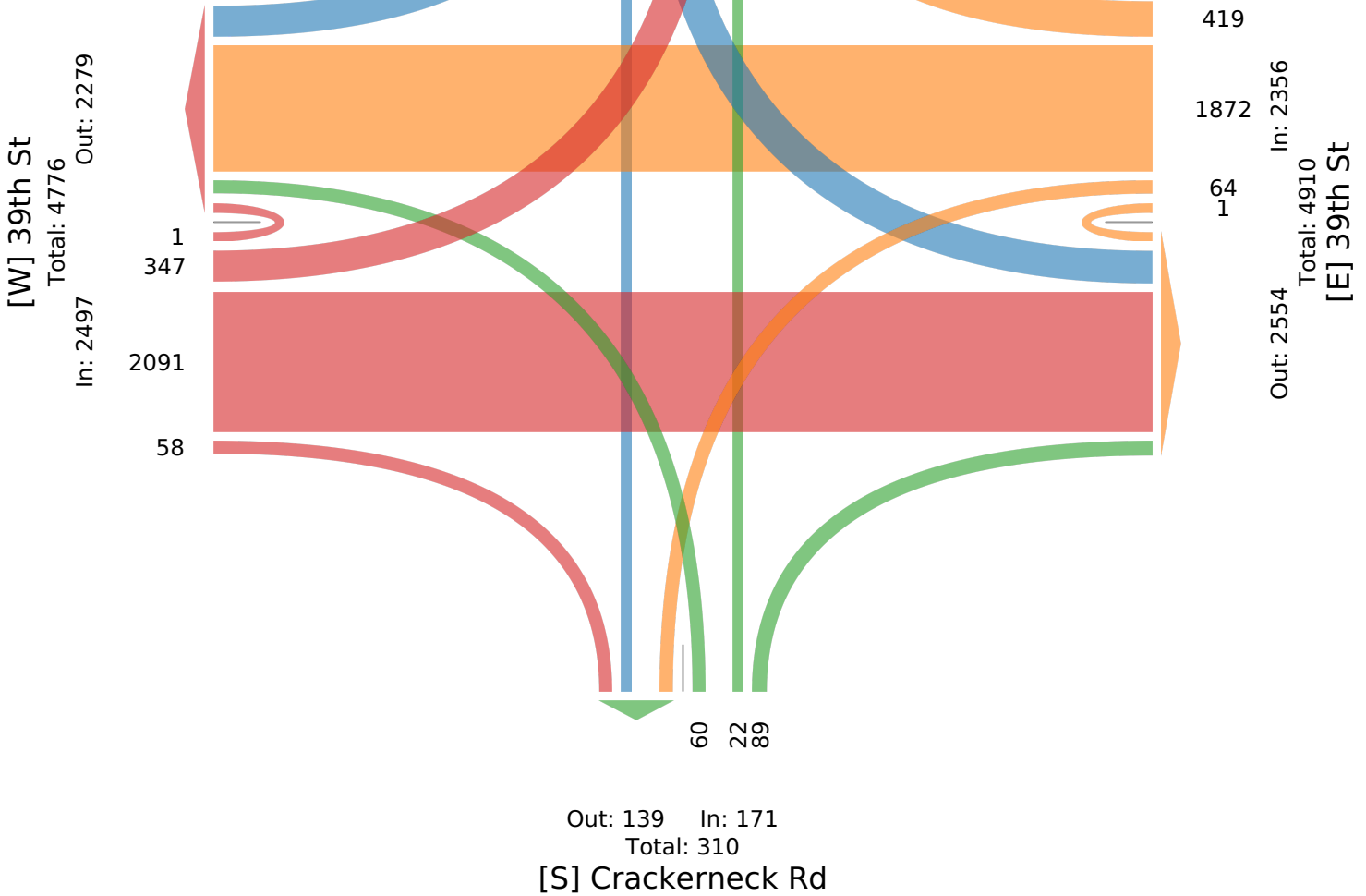
Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Crackerneck Rd

Total: 1524

In: 736 Out: 788

346  
17  
373





39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	39th St Eastbound					39th St Westbound					Crackerneck Rd Northbound					Crackerneck Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-03-23 8:00AM	11	75	0	0	86	3	70	18	0	91	1	0	3	0	4	17	0	13	0	30	211
8:15AM	9	77	5	0	91	1	77	11	0	89	1	0	4	0	5	16	0	15	0	31	216
8:30AM	16	85	2	0	103	2	68	22	0	92	5	1	5	0	11	11	1	18	0	30	236
8:45AM	19	118	3	0	140	4	83	24	0	111	6	2	5	0	13	8	0	11	0	19	283
<b>Total</b>	55	355	10	0	420	10	298	75	0	383	13	3	17	0	33	52	1	57	0	110	946
<b>% Approach</b>	13.1%	84.5%	2.4%	0%	-	2.6%	77.8%	19.6%	0%	-	39.4%	9.1%	51.5%	0%	-	47.3%	0.9%	51.8%	0%	-	-
<b>% Total</b>	5.8%	37.5%	1.1%	0%	44.4%	1.1%	31.5%	7.9%	0%	40.5%	1.4%	0.3%	1.8%	0%	3.5%	5.5%	0.1%	6.0%	0%	11.6%	-
<b>PHF</b>	0.724	0.752	0.500	-	0.750	0.625	0.898	0.781	-	0.863	0.542	0.375	0.850	-	0.635	0.765	0.250	0.792	-	0.887	0.836
<b>Lights</b>	54	347	10	0	411	9	289	74	0	372	13	1	16	0	30	51	0	51	0	102	915
<b>% Lights</b>	98.2%	97.7%	100%	0%	97.9%	90.0%	97.0%	98.7%	0%	97.1%	100%	33.3%	94.1%	0%	90.9%	98.1%	0%	89.5%	0%	92.7%	96.7%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
<b>% Articulated Trucks</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1.9%	0%	0%	0%	0.9%	0.1%
<b>Buses and Single-Unit Trucks</b>	1	8	0	0	9	1	9	1	0	11	0	2	1	0	3	0	1	6	0	7	30
<b>% Buses and Single-Unit Trucks</b>	1.8%	2.3%	0%	0%	2.1%	10.0%	3.0%	1.3%	0%	2.9%	0%	66.7%	5.9%	0%	9.1%	0%	100%	10.5%	0%	6.4%	3.2%

\* L: Left, R: Right, T: Thru, U: U-Turn

39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



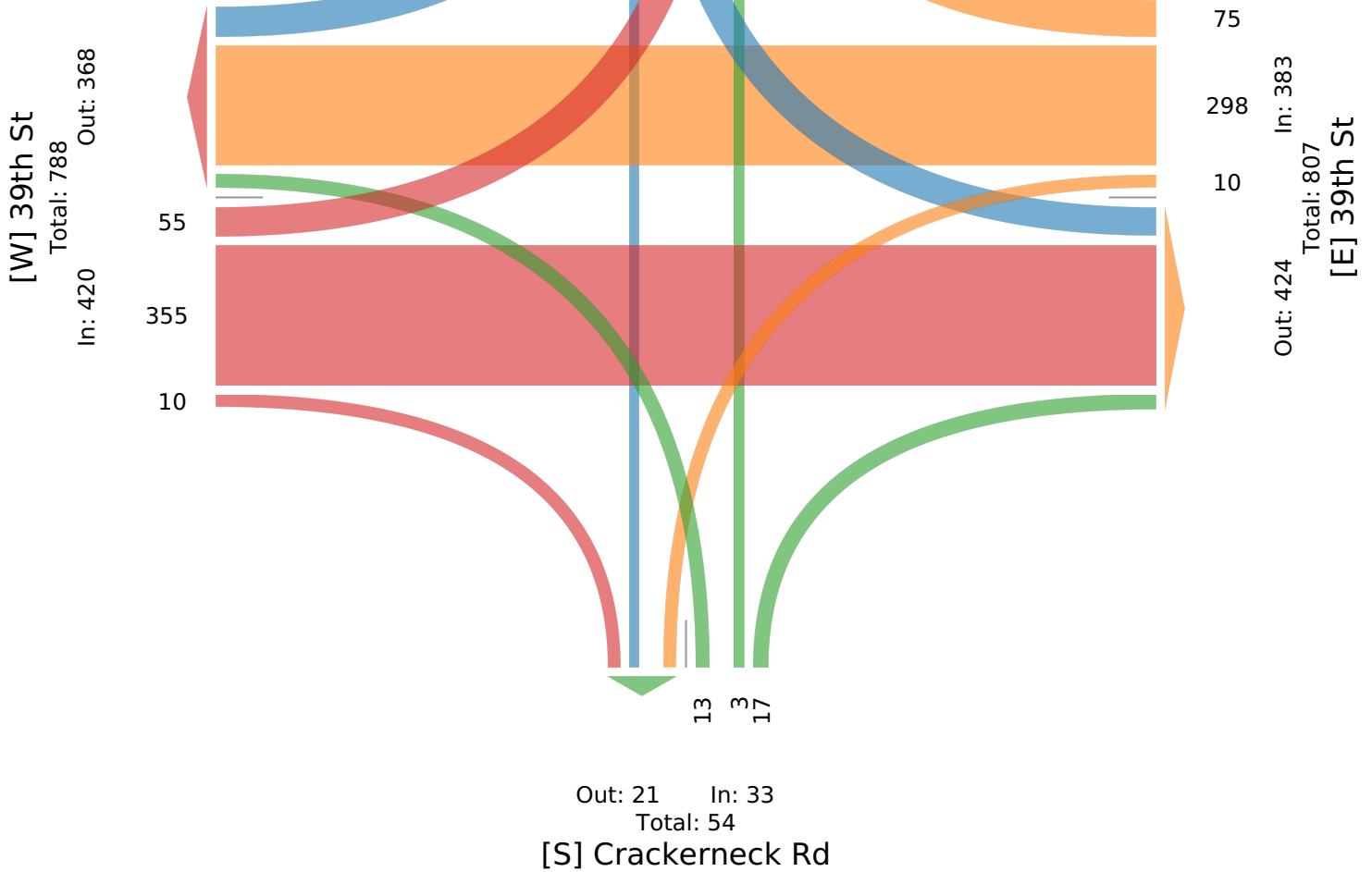
Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

[N] Crackerneck Rd

Total: 243

In: 110 Out: 133

57 1 52



39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	39th St Eastbound					39th St Westbound					Crackerneck Rd Northbound					Crackerneck Rd Southbound					
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int
2023-03-23 4:30PM	30	194	1	0	225	5	160	41	1	207	3	1	6	0	10	32	2	34	0	68	510
4:45PM	28	202	8	0	238	3	149	40	0	192	7	2	8	0	17	26	0	31	0	57	504
5:00PM	35	187	5	0	227	8	161	35	0	204	5	5	5	0	15	32	4	32	0	68	514
5:15PM	33	172	10	0	215	9	178	29	0	216	6	5	11	0	22	35	0	30	0	65	518
<b>Total</b>	126	755	24	0	905	25	648	145	1	819	21	13	30	0	64	125	6	127	0	258	2046
<b>% Approach</b>	13.9%	83.4%	2.7%	0%	-	3.1%	79.1%	17.7%	0.1%	-	32.8%	20.3%	46.9%	0%	-	48.4%	2.3%	49.2%	0%	-	-
<b>% Total</b>	6.2%	36.9%	1.2%	0%	44.2%	1.2%	31.7%	7.1%	0%	40.0%	1.0%	0.6%	1.5%	0%	3.1%	6.1%	0.3%	6.2%	0%	12.6%	-
<b>PHF</b>	0.900	0.934	0.600	-	0.951	0.694	0.910	0.884	0.250	0.948	0.750	0.650	0.682	-	0.727	0.893	0.375	0.934	-	0.949	0.987
<b>Lights</b>	124	750	23	0	897	25	647	143	1	816	21	13	28	0	62	123	5	127	0	255	2030
<b>% Lights</b>	98.4%	99.3%	95.8%	0%	99.1%	100%	99.8%	98.6%	100%	99.6%	100%	100%	93.3%	0%	96.9%	98.4%	83.3%	100%	0%	98.8%	99.2%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% Articulated Trucks</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Buses and Single-Unit Trucks</b>	2	5	1	0	8	0	1	2	0	3	0	0	2	0	2	2	1	0	0	3	16
<b>% Buses and Single-Unit Trucks</b>	1.6%	0.7%	4.2%	0%	0.9%	0%	0.2%	1.4%	0%	0.4%	0%	0%	6.7%	0%	3.1%	1.6%	16.7%	0%	0%	1.2%	0.8%

\* L: Left, R: Right, T: Thru, U: U-Turn

39th Street & Crackerneck Road - TMC

Thu Mar 23, 2023

PM Peak (4:30 PM - 5:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1047005, Location: 39.048473, -94.372833



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

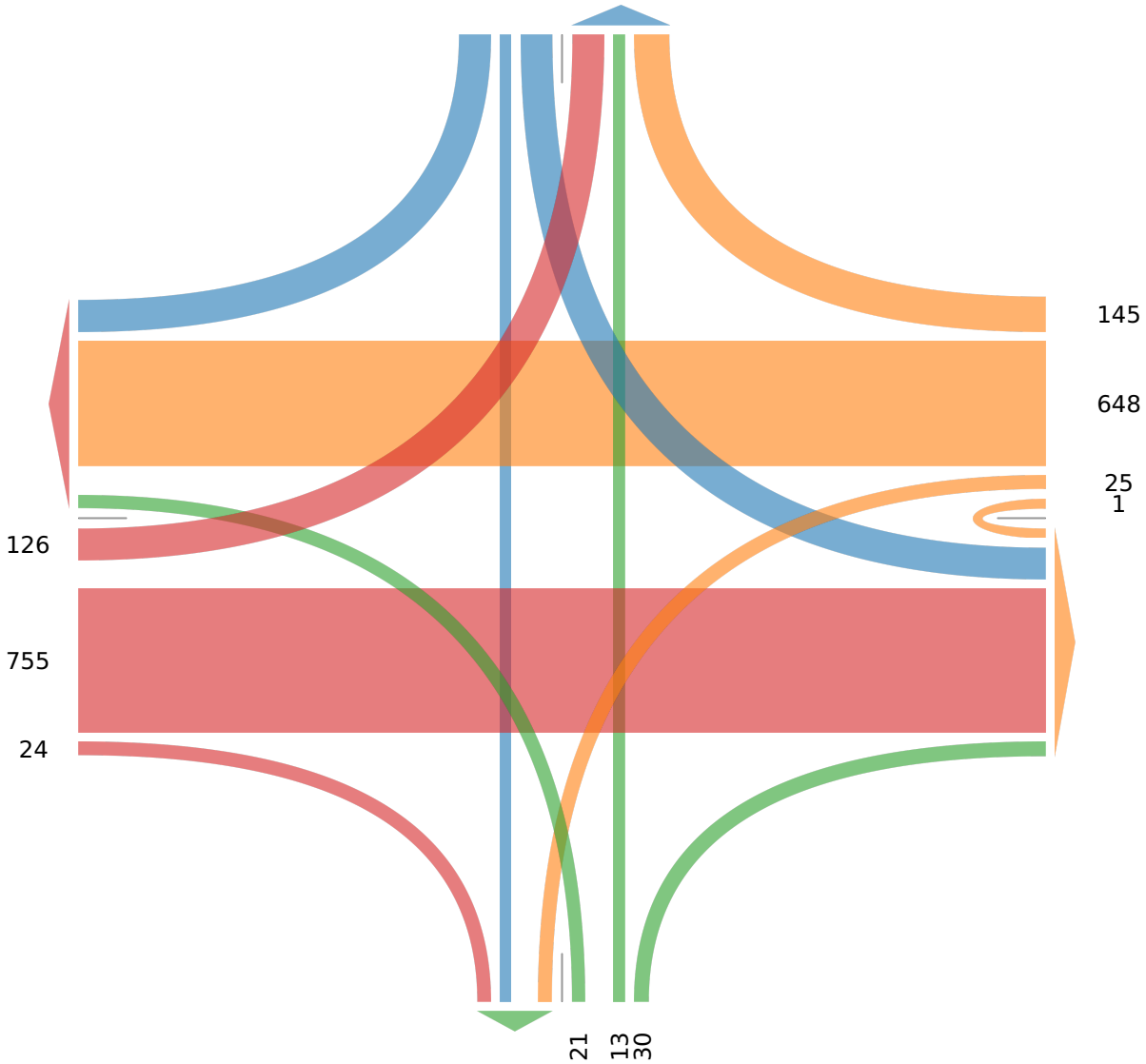
[N] Crackerneck Rd

Total: 542

In: 258 Out: 284

127  
6  
125

[W] 39th St  
Total: 1701  
In: 905  
Out: 796



In: 819  
Total: 1730  
Out: 911  
[E] 39th St

Out: 55 In: 64  
Total: 119  
[S] Crackerneck Rd

2 - 39th Street & Bolger Square Driveway - TMC

Thu Mar 30, 2023

Full Length (7 AM-9 AM, 4 PM-6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1052157, Location: 39.048396, -94.370571



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

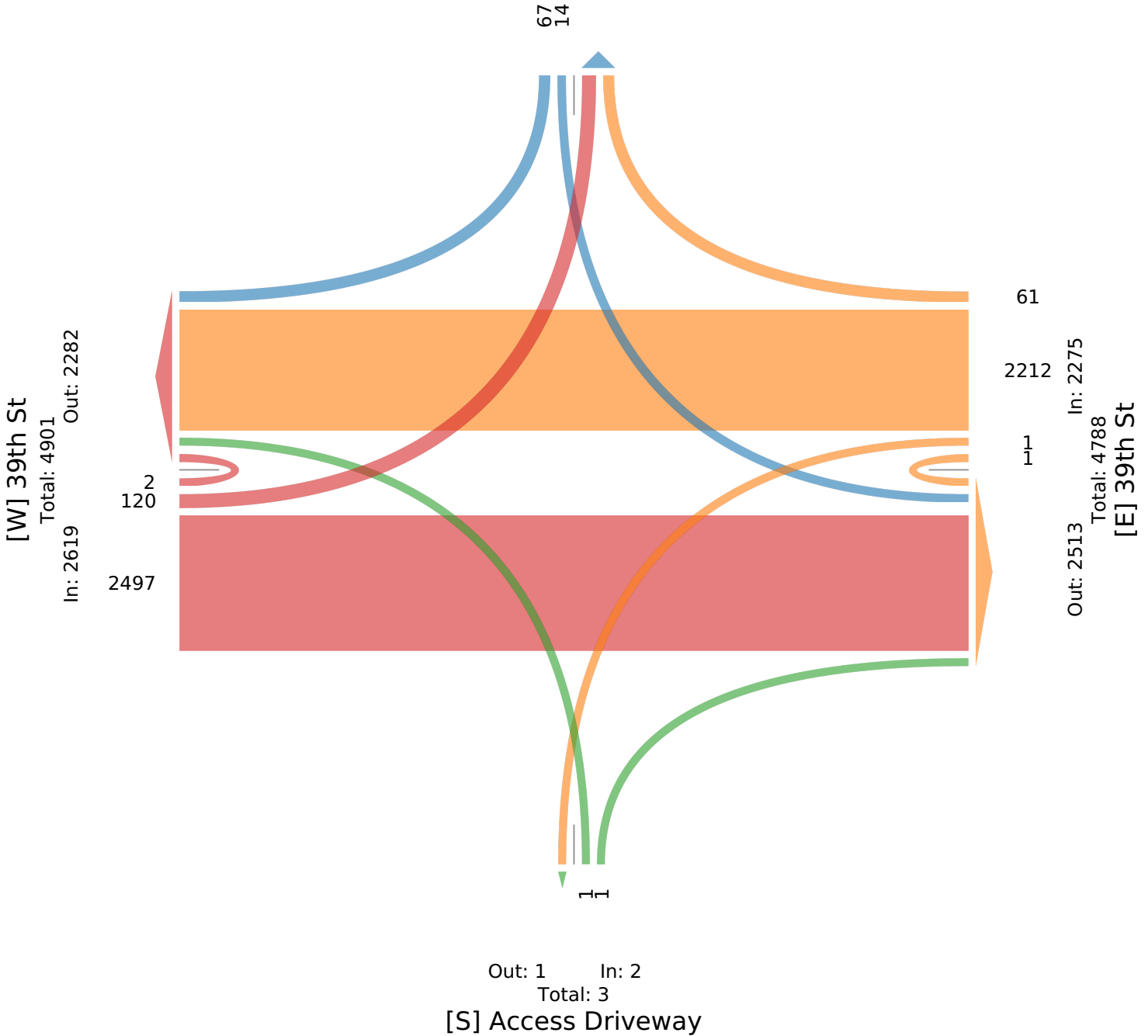
Leg Direction	39th St Eastbound					39th St Westbound					Access Driveway Northbound					Bolger Square Driveway Southbound					Int
	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	
2023-03-30 7:00AM	0	89	0	0	<b>89</b>	0	64	1	0	<b>65</b>	0	0	0	0	<b>0</b>	1	0	0	0	<b>1</b>	<b>155</b>
7:15AM	2	96	0	0	<b>98</b>	0	84	2	0	<b>86</b>	0	0	0	0	<b>0</b>	1	0	0	0	<b>1</b>	<b>185</b>
7:30AM	0	103	0	0	<b>103</b>	0	94	2	0	<b>96</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>199</b>
7:45AM	1	108	0	0	<b>109</b>	0	84	0	0	<b>84</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>193</b>
Hourly Total	3	396	0	0	<b>399</b>	0	326	5	0	<b>331</b>	0	0	0	0	<b>0</b>	2	0	0	0	<b>2</b>	<b>732</b>
8:00AM	3	88	0	0	<b>91</b>	0	75	0	0	<b>75</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>166</b>
8:15AM	3	99	0	0	<b>102</b>	0	99	2	0	<b>101</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	<b>203</b>
8:30AM	3	111	0	0	<b>114</b>	0	91	3	0	<b>94</b>	0	0	0	0	<b>0</b>	0	0	3	0	<b>3</b>	<b>211</b>
8:45AM	9	135	0	0	<b>144</b>	0	126	0	0	<b>126</b>	0	0	0	0	<b>0</b>	0	0	2	0	<b>2</b>	<b>272</b>
Hourly Total	18	433	0	0	<b>451</b>	0	391	5	0	<b>396</b>	0	0	0	0	<b>0</b>	0	0	5	0	<b>5</b>	<b>852</b>
4:00PM	11	207	0	0	<b>218</b>	0	189	5	0	<b>194</b>	0	0	0	0	<b>0</b>	1	0	7	0	<b>8</b>	<b>420</b>
4:15PM	14	222	0	0	<b>236</b>	0	168	7	0	<b>175</b>	0	0	0	0	<b>0</b>	1	0	5	0	<b>6</b>	<b>417</b>
4:30PM	9	226	0	0	<b>235</b>	0	183	4	0	<b>187</b>	0	0	0	0	<b>0</b>	0	0	6	0	<b>6</b>	<b>428</b>
4:45PM	14	193	0	0	<b>207</b>	0	195	6	1	<b>202</b>	0	0	0	0	<b>0</b>	1	0	7	0	<b>8</b>	<b>417</b>
Hourly Total	48	848	0	0	<b>896</b>	0	735	22	1	<b>758</b>	0	0	0	0	<b>0</b>	3	0	25	0	<b>28</b>	<b>1682</b>
5:00PM	8	197	0	1	<b>206</b>	0	185	6	0	<b>191</b>	0	0	1	0	<b>1</b>	4	0	7	0	<b>11</b>	<b>409</b>
5:15PM	18	198	0	1	<b>217</b>	1	211	8	0	<b>220</b>	1	0	0	0	<b>1</b>	2	0	6	0	<b>8</b>	<b>446</b>
5:30PM	11	229	0	0	<b>240</b>	0	193	9	0	<b>202</b>	0	0	0	0	<b>0</b>	1	0	13	0	<b>14</b>	<b>456</b>
5:45PM	14	196	0	0	<b>210</b>	0	171	6	0	<b>177</b>	0	0	0	0	<b>0</b>	2	0	11	0	<b>13</b>	<b>400</b>
Hourly Total	51	820	0	2	<b>873</b>	1	760	29	0	<b>790</b>	1	0	1	0	<b>2</b>	9	0	37	0	<b>46</b>	<b>1711</b>
<b>Total</b>	120	2497	0	2	<b>2619</b>	1	2212	61	1	<b>2275</b>	1	0	1	0	<b>2</b>	14	0	67	0	<b>81</b>	<b>4977</b>
<b>% Approach</b>	4.6%	95.3%	0%	0.1%	-	0%	97.2%	2.7%	0%	-	50.0%	0%	50.0%	0%	-	17.3%	0%	82.7%	0%	-	-
<b>% Total</b>	2.4%	50.2%	0%	0%	<b>52.6%</b>	0%	44.4%	1.2%	0%	<b>45.7%</b>	0%	0%	0%	0%	<b>0%</b>	0.3%	0%	1.3%	0%	<b>1.6%</b>	-
<b>Lights</b>	119	2466	0	2	<b>2587</b>	1	2187	58	1	<b>2247</b>	1	0	1	0	<b>2</b>	14	0	67	0	<b>81</b>	4917
<b>% Lights</b>	99.2%	98.8%	0%	100%	<b>98.8%</b>	100%	98.9%	95.1%	100%	<b>98.8%</b>	100%	0%	100%	0%	<b>100%</b>	100%	0%	100%	0%	<b>100%</b>	98.8%
<b>Articulated Trucks</b>	1	1	0	0	<b>2</b>	0	3	0	0	<b>3</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	5
<b>% Articulated Trucks</b>	0.8%	0%	0%	0%	<b>0.1%</b>	0%	0.1%	0%	0%	<b>0.1%</b>	0%	0%	0%	0%	<b>0%</b>	0%	0%	0%	0%	<b>0%</b>	0.1%
<b>Buses and Single-Unit Trucks</b>	0	30	0	0	<b>30</b>	0	22	3	0	<b>25</b>	0	0	0	0	<b>0</b>	0	0	0	0	<b>0</b>	55
<b>% Buses and Single-Unit Trucks</b>	0%	1.2%	0%	0%	<b>1.1%</b>	0%	1.0%	4.9%	0%	<b>1.1%</b>	0%	0%	0%	0%	<b>0%</b>	0%	0%	0%	0%	<b>0%</b>	1.1%

\*L: Left, R: Right, T: Thru, U: U-Turn

2 - 39th Street & Bolger Square Driveway - TMC  
 Thu Mar 30, 2023  
 Full Length (7 AM-9 AM, 4 PM-6 PM)  
 All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)  
 All Movements  
 ID: 1052157, Location: 39.048396, -94.370571

[N] Bolger Square Driveway

Total: 262  
 In: 81 Out: 181



2 - 39th Street & Bolger Square Driveway - TMC

Thu Mar 30, 2023

AM Peak (8 AM - 9 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1052157, Location: 39.048396, -94.370571



Provided by: Gewalt Hamilton Associates Inc.

625 Forest Edge Drive, Vernon Hills, IL, 60061, US

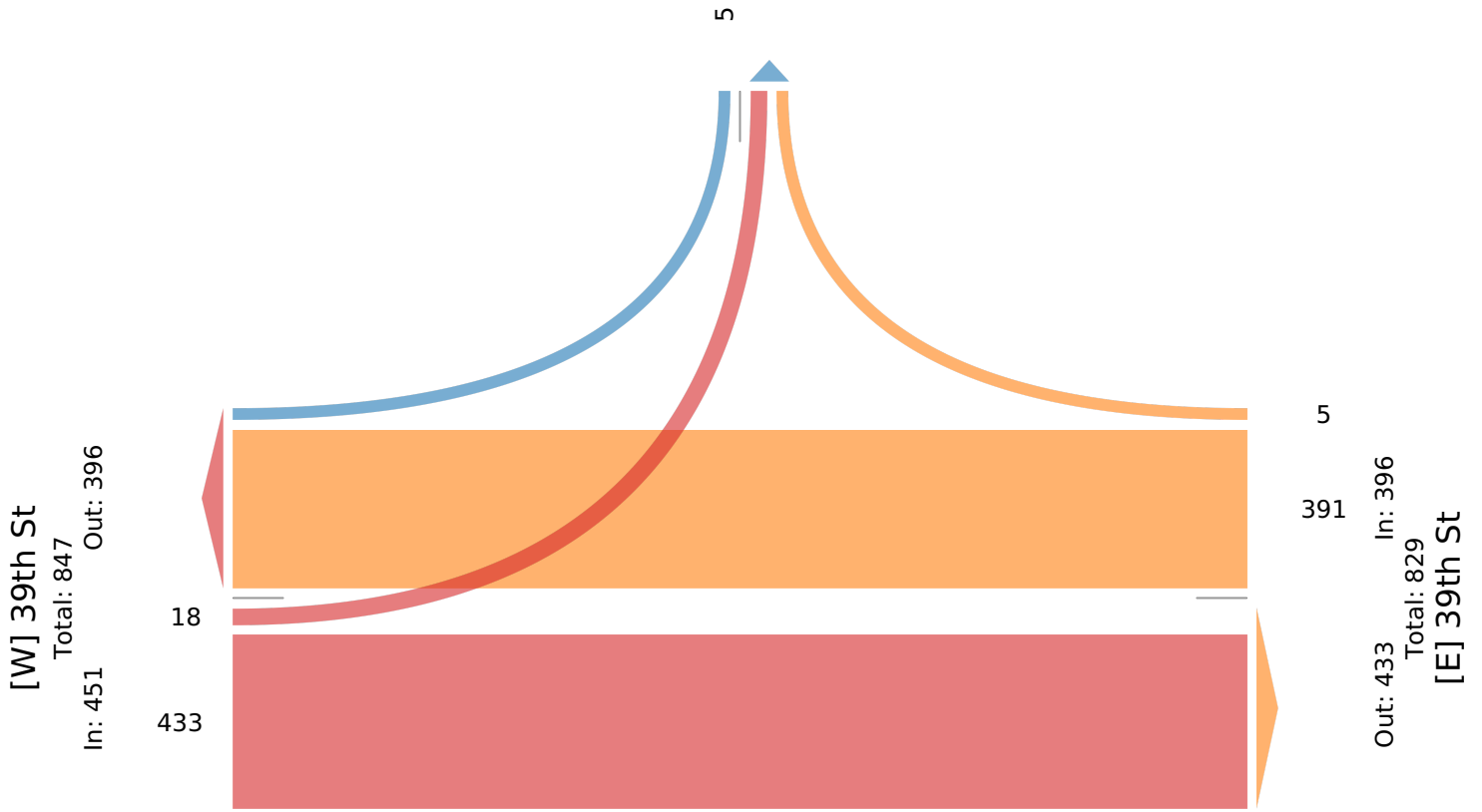
Leg Direction	39th St Eastbound					39th St Westbound					Access Driveway Northbound					Bolger Square Driveway Southbound						
Time	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	Int	
2023-03-30 8:00AM	3	88	0	0	91	0	75	0	0	75	0	0	0	0	0	0	0	0	0	0	0	166
8:15AM	3	99	0	0	102	0	99	2	0	101	0	0	0	0	0	0	0	0	0	0	0	203
8:30AM	3	111	0	0	114	0	91	3	0	94	0	0	0	0	0	0	0	3	0	0	3	211
8:45AM	9	135	0	0	144	0	126	0	0	126	0	0	0	0	0	0	0	2	0	0	2	272
<b>Total</b>	18	433	0	0	451	0	391	5	0	396	0	0	0	0	0	0	0	5	0	0	5	852
<b>% Approach</b>	4.0%	96.0%	0%	0%	-	0%	98.7%	1.3%	0%	-	0%	0%	0%	0%	-	0%	0%	100%	0%	-	-	-
<b>% Total</b>	2.1%	50.8%	0%	0%	52.9%	0%	45.9%	0.6%	0%	46.5%	0%	0%	0%	0%	0%	0%	0%	0.6%	0%	0.6%	-	-
<b>PHF</b>	0.500	0.802	-	-	0.783	-	0.776	0.417	-	0.786	-	-	-	-	-	-	-	0.417	-	0.417	0.783	0.783
<b>Lights</b>	17	420	0	0	437	0	376	4	0	380	0	0	0	0	0	0	0	5	0	0	5	822
<b>% Lights</b>	94.4%	97.0%	0%	0%	96.9%	0%	96.2%	80.0%	0%	96.0%	0%	0%	0%	0%	-	0%	0%	100%	0%	100%	96.5%	96.5%
<b>Articulated Trucks</b>	1	1	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
<b>% Articulated Trucks</b>	5.6%	0.2%	0%	0%	0.4%	0%	0.3%	0%	0%	0.3%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0.4%
<b>Buses and Single-Unit Trucks</b>	0	12	0	0	12	0	14	1	0	15	0	0	0	0	0	0	0	0	0	0	0	27
<b>% Buses and Single-Unit Trucks</b>	0%	2.8%	0%	0%	2.7%	0%	3.6%	20.0%	0%	3.8%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	3.2%

\* L: Left, R: Right, T: Thru, U: U-Turn

2 - 39th Street & Bolger Square Driveway - TMC  
 Thu Mar 30, 2023  
 AM Peak (8 AM - 9 AM)  
 All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)  
 All Movements  
 ID: 1052157, Location: 39.048396, -94.370571

[N] Bolger Square Driveway

Total: 28  
 In: 5 Out: 23





2 - 39th Street & Bolger Square Driveway - TMC

Thu Mar 30, 2023

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)

All Movements

ID: 1052157, Location: 39.048396, -94.370571



Provided by: Gewalt Hamilton Associates Inc.  
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

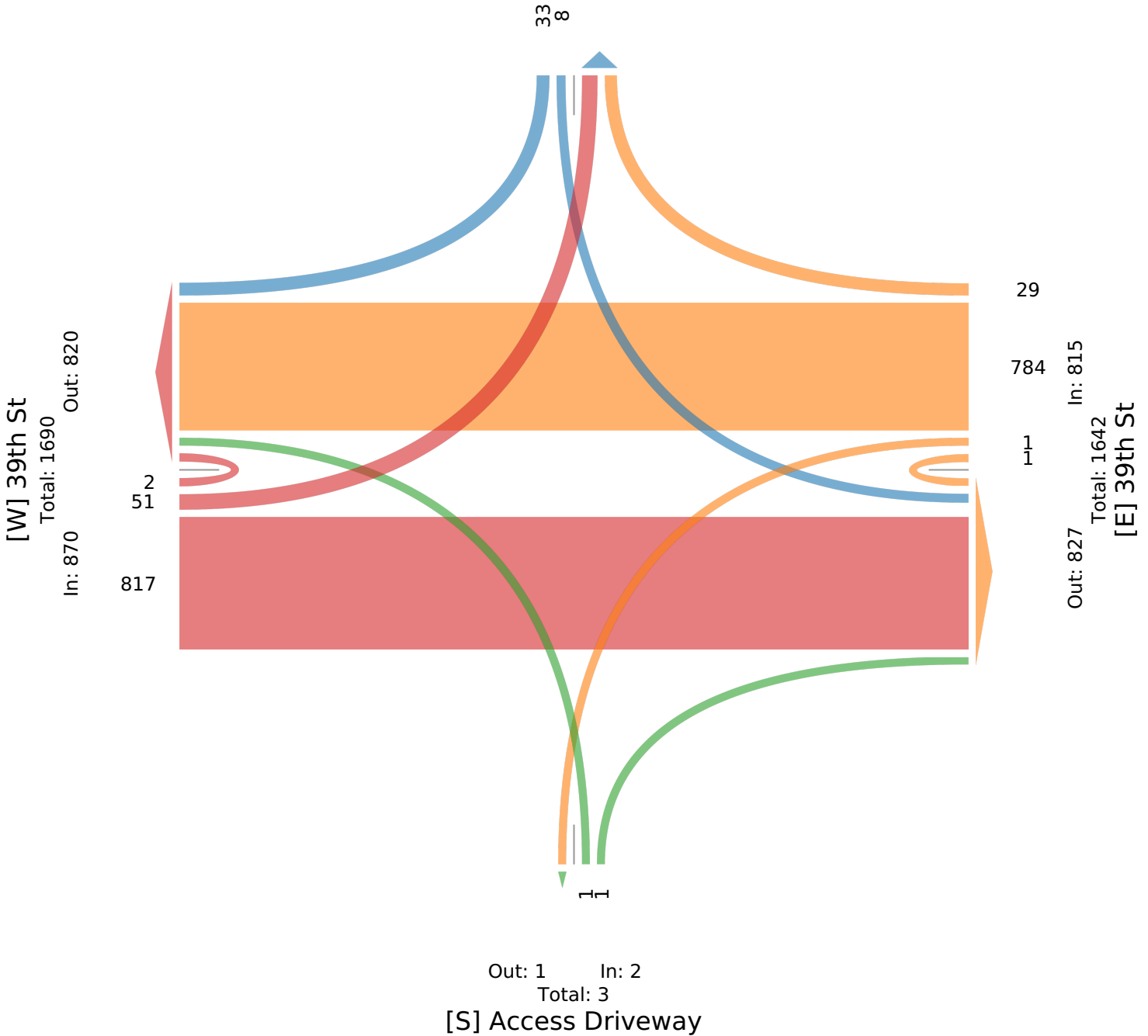
Leg Direction	39th St Eastbound					39th St Westbound					Access Driveway Northbound					Bolger Square Driveway Southbound					Int
	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	L	T	R	U	App	
2023-03-30 4:45PM	14	193	0	0	207	0	195	6	1	202	0	0	0	0	0	1	0	7	0	8	417
5:00PM	8	197	0	1	206	0	185	6	0	191	0	0	1	0	1	4	0	7	0	11	409
5:15PM	18	198	0	1	217	1	211	8	0	220	1	0	0	0	1	2	0	6	0	8	446
5:30PM	11	229	0	0	240	0	193	9	0	202	0	0	0	0	0	1	0	13	0	14	456
<b>Total</b>	51	817	0	2	870	1	784	29	1	815	1	0	1	0	2	8	0	33	0	41	1728
<b>% Approach</b>	5.9%	93.9%	0%	0.2%	-	0.1%	96.2%	3.6%	0.1%	-	50.0%	0%	50.0%	0%	-	19.5%	0%	80.5%	0%	-	-
<b>% Total</b>	3.0%	47.3%	0%	0.1%	50.3%	0.1%	45.4%	1.7%	0.1%	47.2%	0.1%	0%	0.1%	0%	0.1%	0.5%	0%	1.9%	0%	2.4%	-
<b>PHF</b>	0.708	0.892	-	0.500	0.906	0.250	0.929	0.806	0.250	0.926	0.250	-	0.250	-	0.500	0.500	-	0.635	-	0.732	0.947
<b>Lights</b>	51	817	0	2	870	1	783	29	1	814	1	0	1	0	2	8	0	33	0	41	1727
<b>% Lights</b>	100%	100%	0%	100%	100%	100%	99.9%	100%	100%	99.9%	100%	0%	100%	0%	100%	100%	0%	100%	0%	100%	99.9%
<b>Articulated Trucks</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>% Articulated Trucks</b>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Buses and Single-Unit Trucks</b>	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<b>% Buses and Single-Unit Trucks</b>	0%	0%	0%	0%	0%	0%	0.1%	0%	0%	0.1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.1%

\* L: Left, R: Right, T: Thru, U: U-Turn

2 - 39th Street & Bolger Square Driveway - TMC  
 Thu Mar 30, 2023  
 PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour  
 All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)  
 All Movements  
 ID: 1052157, Location: 39.048396, -94.370571

**[N] Bolger Square Driveway**

Total: 121  
 In: 41 Out: 80



# Appendix C: Site Plan

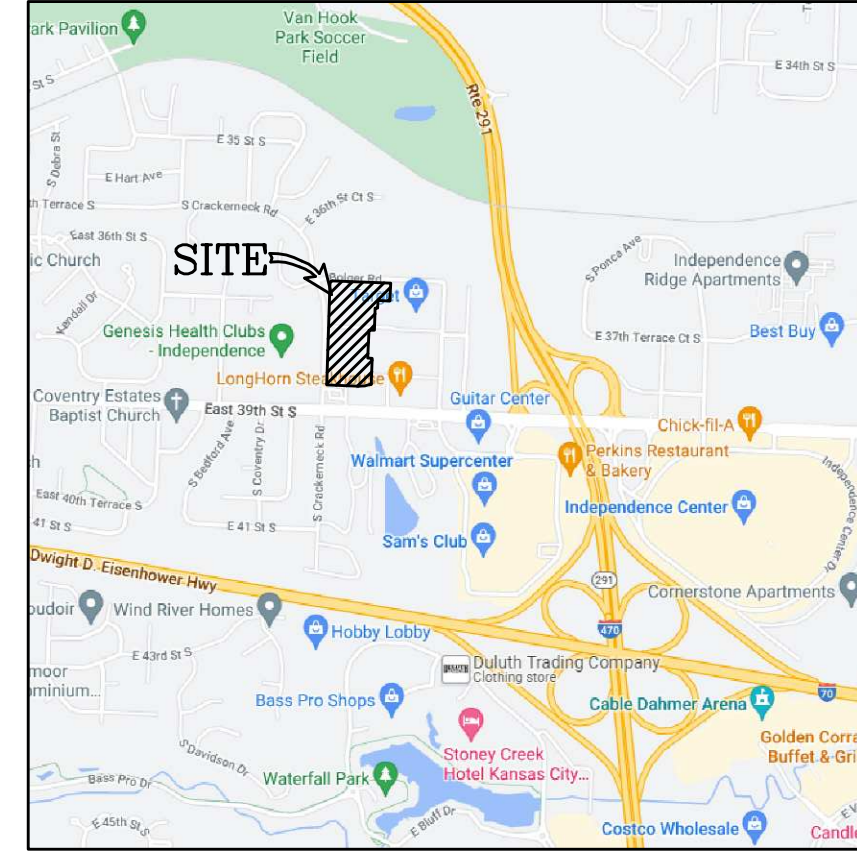




# PRELIMINARY DEVELOPMENT PLAN FOR THE ALTON

## INDEPENDENCE, JACKSON COUNTY, MISSOURI

DEVELOPER/OWNER:  
**RW BOLGER SQUAR LLC**  
 353 WEST LANCASTER AVE,  
 WAYNE PA 19087  
 PHONE: 610-715-2399



LOCATION MAP

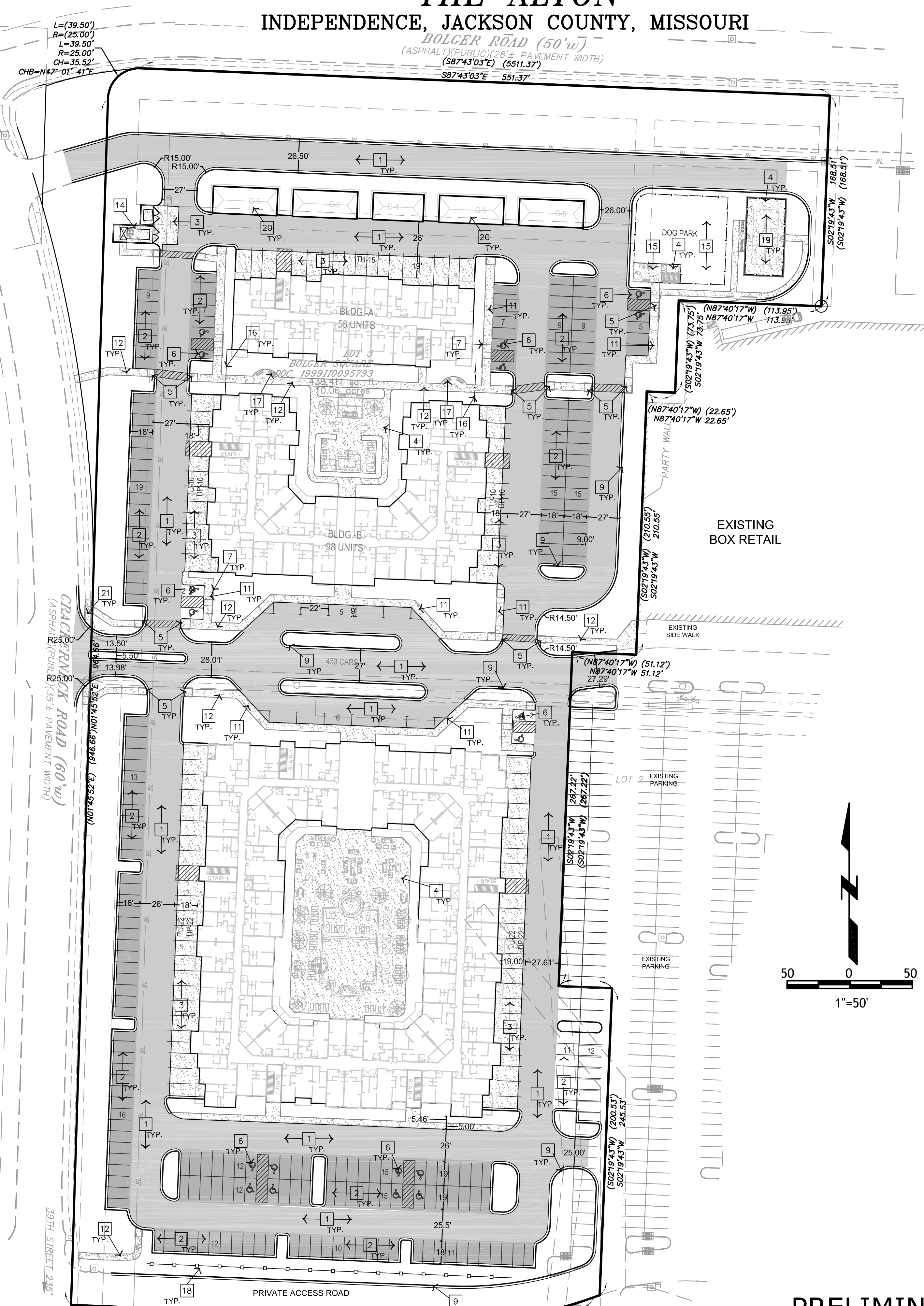


SYMBOL LEGEND

PROPOSED	EXISTING
MH	MH
CI	CI
JB	JB
FI	FI
FES	FES
FH	FH
BO	BO
WV	WV
WM	WM
	Straddle
	Utility Pole
	Guy Wire
	Electric Transformer
	Telephone Pedestal
	Cable Pedestal
CO	CO
	Clean Out

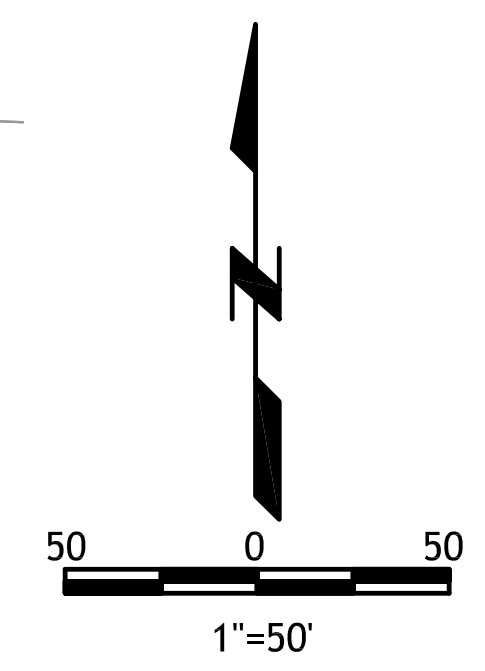
LINE LEGEND

PROPOSED	EXISTING
ST	ST
SN	SN
WR	WR
BL	BL
ES	ES
4"	4"
2"	2"
840	840
	Tree Line
X	X
G	G
	Overhead Telephone Line
	Underground Telephone Line
	Overhead Electrical Line
	Underground Electrical Line



- PLAN NOTES:
- HEAVY ASPHALT PAVEMENT RE: SEE SHEET C210
  - LIGHT ASPHALT PAVEMENT RE: SEE SHEET C210
  - HEAVY CONCRETE PAVEMENT RE: SEE SHEET C210
  - LIGHT CONCRETE PAVEMENT RE: SEE SHEET C210
  - ACCESSIBILITY RAMP RE: SEE SHEET C210
  - PAINT ACCESSIBLE PARKING SYMBOLS ACCORDING TO APWA PAVEMENT MARKING STANDARDS. RE: SEE SHEET C210
  - INSTALL ACCESSIBLE PARKING SIGN "TYPE B" RE: SEE SHEET C210
  - STRIPING PAVING WITH 4" WIDE STRIPE & PAINT ACCORDING TO APWA PAVEMENT MARKING STANDARDS.
  - STRAIGHT BACK CURB & GUTTER (WET) RE: SEE SHEET C210
  - STRAIGHT BACK CURB & GUTTER (DRY) RE: SEE SHEET C210
  - CURB WALK RE: SEE SHEET C210
  - SITE SIDEWALK RE: SEE SHEET C210
  - RETAINING WALL RE: SEE SHEET C210
  - TRASH COMPACTOR AND ENCLOSURE RE: SEE ARCHITECTURAL PLANS
  - DOG PARK AREA W/FENCE RE: SEE ARCHITECTURAL PLANS
  - DECORATIVE FENCE RE: SEE ARCHITECTURAL PLANS
  - BENCH RE: SEE ARCHITECTURAL PLANS
  - DECORATIVE SCREENING FENCE RE: SEE ARCHITECTURAL PLANS
  - PICKLE BALL COURT RE: SEE ARCHITECTURAL PLANS
  - ENCLOSED GARAGES RE: SEE ARCHITECTURAL PLANS
  - CITY ADA RAMP RE: SEE CITY DETAILS
  - 5' CITY SIDEWALK RE: SEE CITY DETAILS
  - 5' CITY SIDEWALK RE: SEE CITY DETAILS

- UTILITY NOTES:
- SANITARY SEWER MAIN SHALL BE BUILT TO CITY STANDARDS AND DEDICATED TO THE CITY ALONG WITH A 15' UTILITY EASEMENT.
  - WATER MAIN SHALL BE BUILT TO CITY STANDARDS AND DEDICATED TO THE CITY ALONG WITH A 15' UTILITY EASEMENT.



# PRELIMINARY DEVELOPMENT PLAN

**THE ALTON**  
 INDEPENDENCE, JACKSON COUNTY, MISSOURI

**Quist Engineering, Inc**  
 Civil Engineering for Residential & Commercial Site Development  
 821 NE Columbus St.  
 Lee's Summit, Missouri 64063  
 Phone: (816) 550-5675  
 email: rwalquist@quistengineering.com

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1ST ISSUE 4-27-23
REVISIONS
SHEET NO. <b>C200</b>
JOB NO. E22-328

PROJECT CONTACTS: ROBERT WALQUIST, P.E.  
 821 NE COLUMBUS ST  
 LEE'S SUMMIT, MISSOURI 64063  
 Phone: (816) 550-5675



# Appendix D: ITE Trip Generation Manual Data



# Land Use: 221

## Multifamily Housing (Mid-Rise)

---

### Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

### Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

### Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

***It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).***

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

### Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

# Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

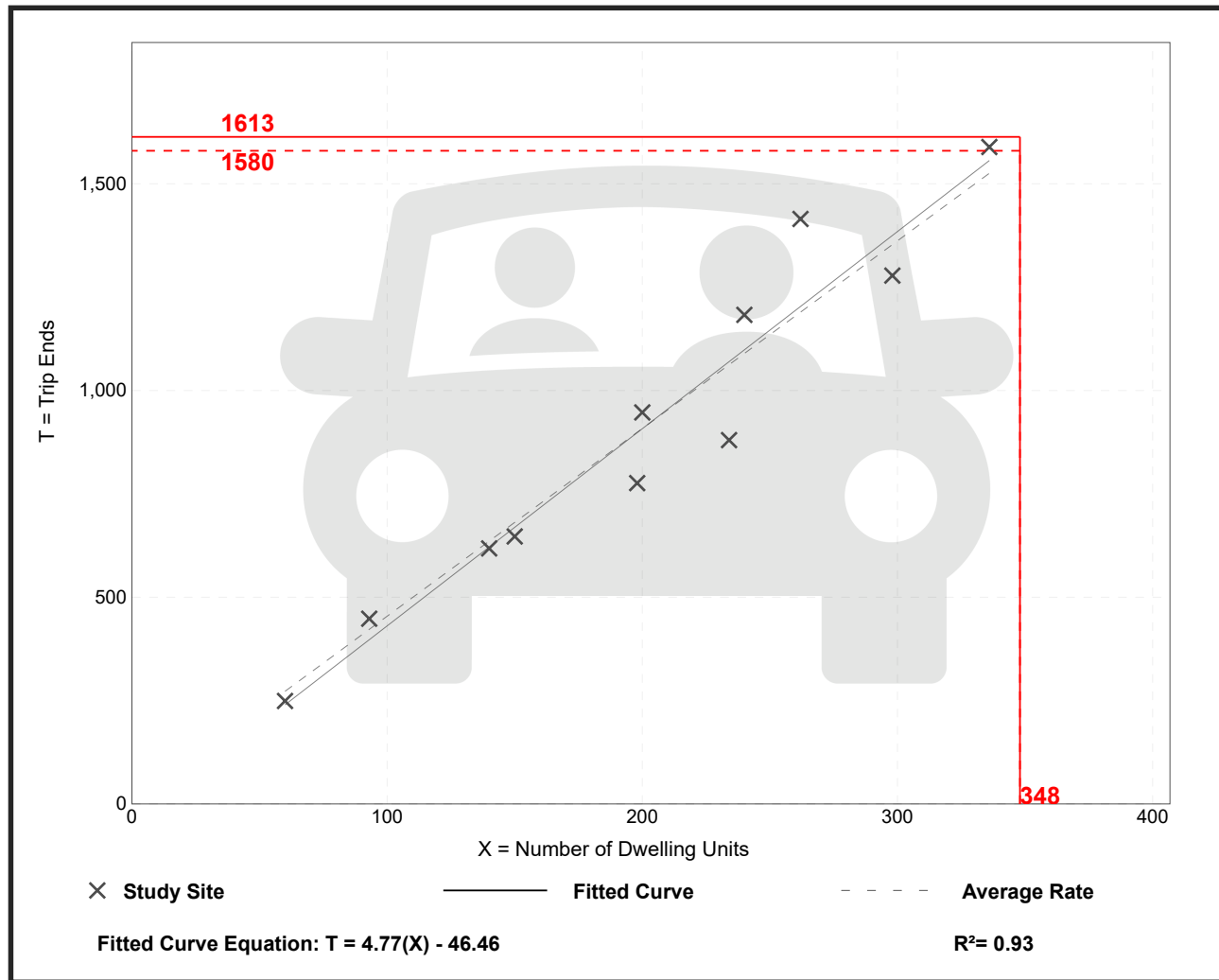
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 11  
Avg. Num. of Dwelling Units: 201  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.54	3.76 - 5.40	0.51

## Data Plot and Equation



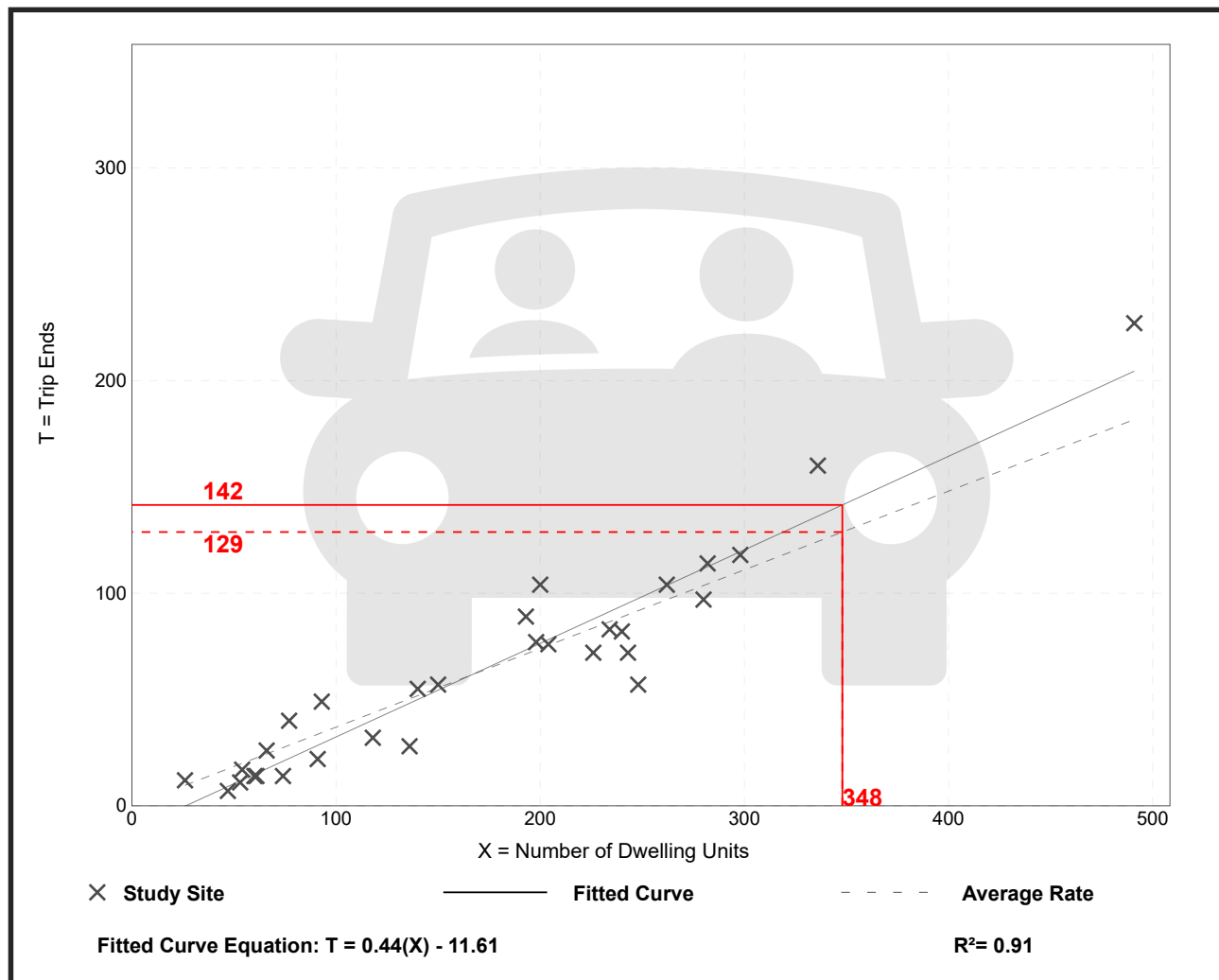
# Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

**Vehicle Trip Ends vs: Dwelling Units**  
**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: 30  
 Avg. Num. of Dwelling Units: 173  
 Directional Distribution: 23% entering, 77% exiting

## Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

## Data Plot and Equation



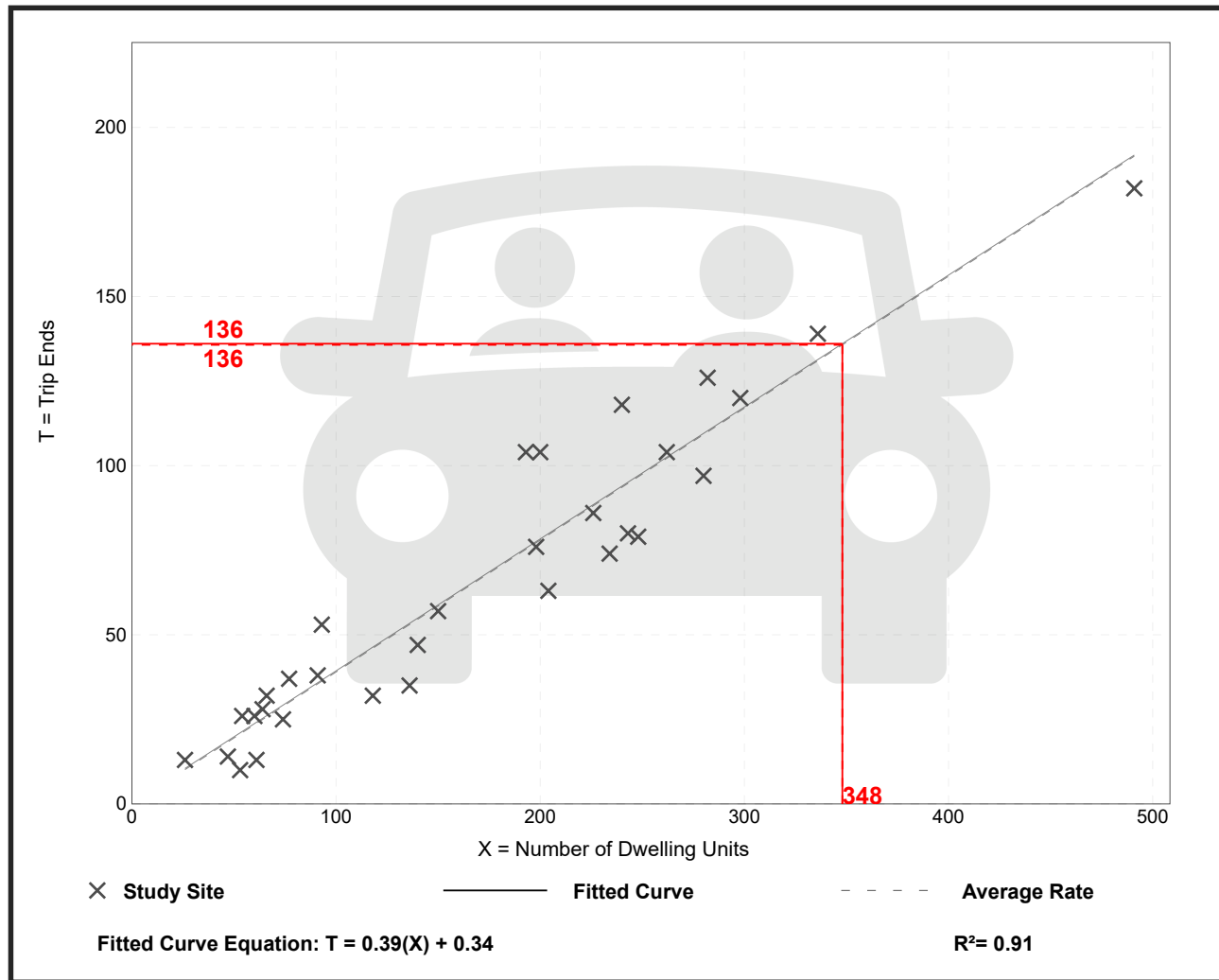
## Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

**Vehicle Trip Ends vs: Dwelling Units**  
**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: 31  
 Avg. Num. of Dwelling Units: 169  
 Directional Distribution: 61% entering, 39% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

### Data Plot and Equation



# Land Use: 821

## Shopping Plaza (40-150k)

---

### Description

A shopping plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has between 40,000 and 150,000 square feet of gross leasable area (GLA). The term “plaza” in the land use name rather than “center” is simply a means of distinction between the different shopping center size ranges. Various other names are commonly used to categorize a shopping plaza within this size range, depending on its specific size and tenants, such as neighborhood center, community center, and fashion center.

Its major tenant is often a supermarket but many sites are anchored by home improvement, discount, or other stores. A shopping plaza typically contains more than retail merchandising facilities. Office space, a movie theater, restaurants, a post office, banks, a health club, and recreational facilities are common tenants. A shopping plaza is almost always open-air and the GLA is the same as the gross floor area of the building.

The 150,000 square feet GLA threshold value between shopping plaza and shopping center (Land Use 820) is based on an examination of trip generation data. For a shopping plaza that is smaller than the threshold value, the presence or absence of a supermarket within the plaza has a measurable effect on site trip generation. For a shopping center that is larger than the threshold value, the trips generated by its other major tenants mask any effects of the presence or absence of an on-site supermarket.

The 40,000 square feet GFA threshold between shopping plaza and strip retail plaza (Land Use 822) was selected based on an examination of the overall shopping center/plaza database. No shopping plaza with a supermarket as its anchor is smaller than 40,000 square feet GLA.

Shopping center (>150k) (Land Use 820), strip retail plaza (<40k) (Land Use 822), and factory outlet center (Land Use 823) are related uses.

### Land Use Subcategory

The presence or absence of a supermarket in a shopping plaza has been determined to have a measurable effect on site trip generation. Therefore, data are presented for two subcategories for this land use: sites with a supermarket anchor and sites without a supermarket.

### Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Nevada, New Jersey, New York, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.

### **Source Numbers**

105, 110, 156, 159, 186, 198, 204, 211, 213, 239, 259, 260, 295, 301, 304, 305, 307, 317, 319, 358, 376, 390, 400, 404, 437, 444, 446, 507, 580, 598, 658, 728, 908, 926, 944, 946, 960, 973, 974, 1004, 1009, 1025, 1069



# Shopping Plaza (40-150k) - Supermarket - No (821)

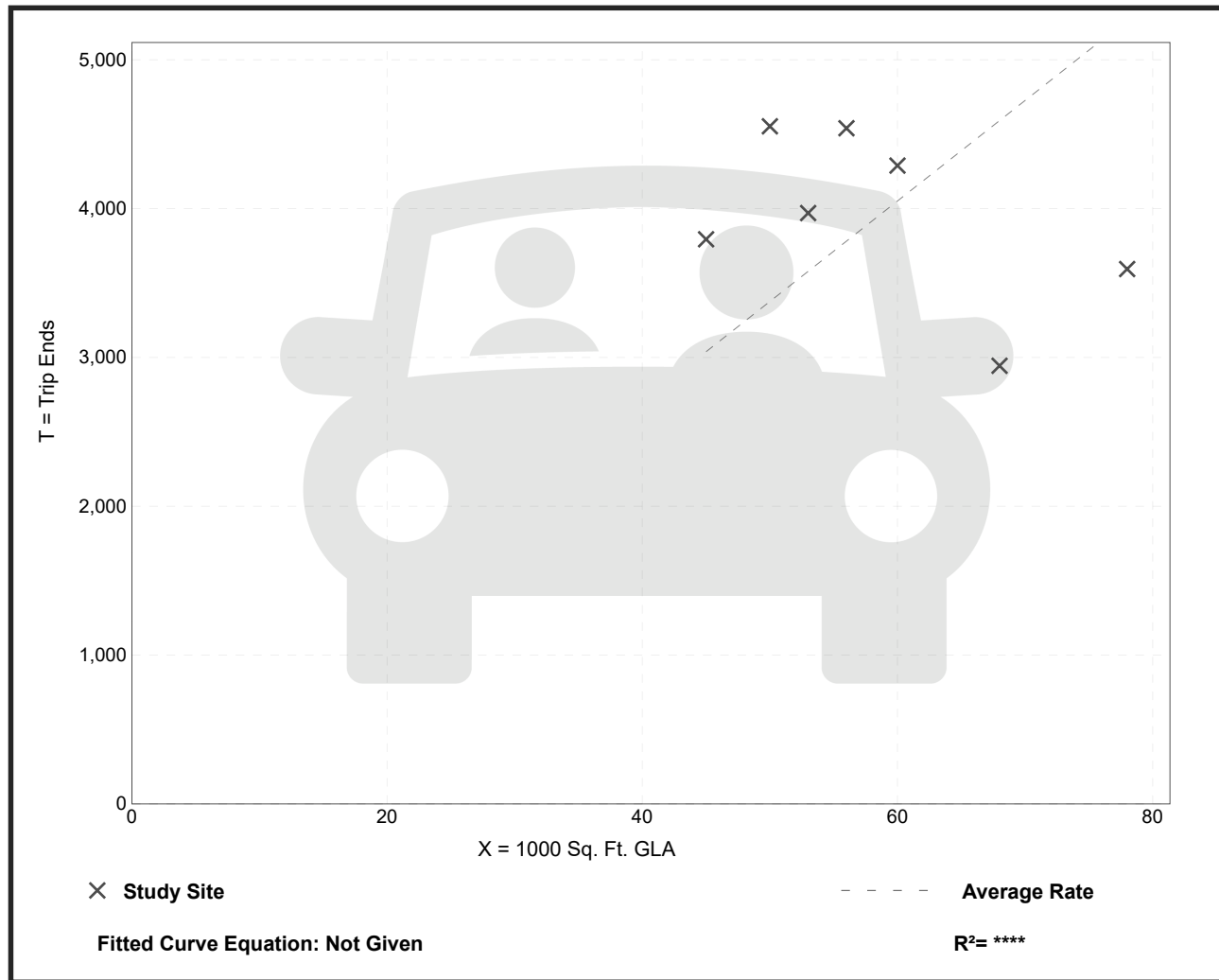
**Vehicle Trip Ends vs: 1000 Sq. Ft. GLA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 7  
Avg. 1000 Sq. Ft. GLA: 59  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
67.52	43.29 - 91.06	19.25

## Data Plot and Equation



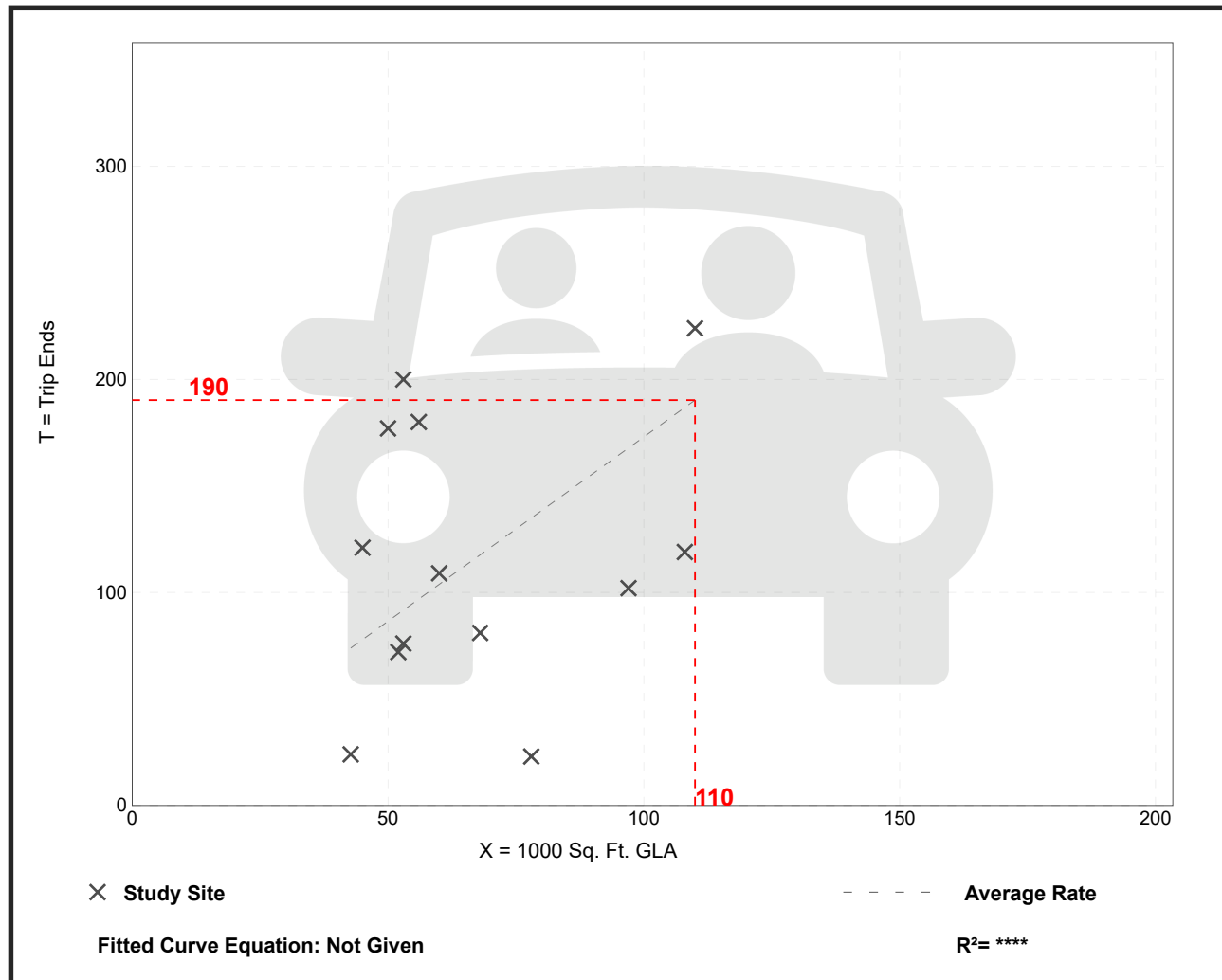
# Shopping Plaza (40-150k) - Supermarket - No (821)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GLA**  
**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: 13  
 Avg. 1000 Sq. Ft. GLA: 67  
 Directional Distribution: 62% entering, 38% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
1.73	0.29 - 3.77	1.06

## Data Plot and Equation



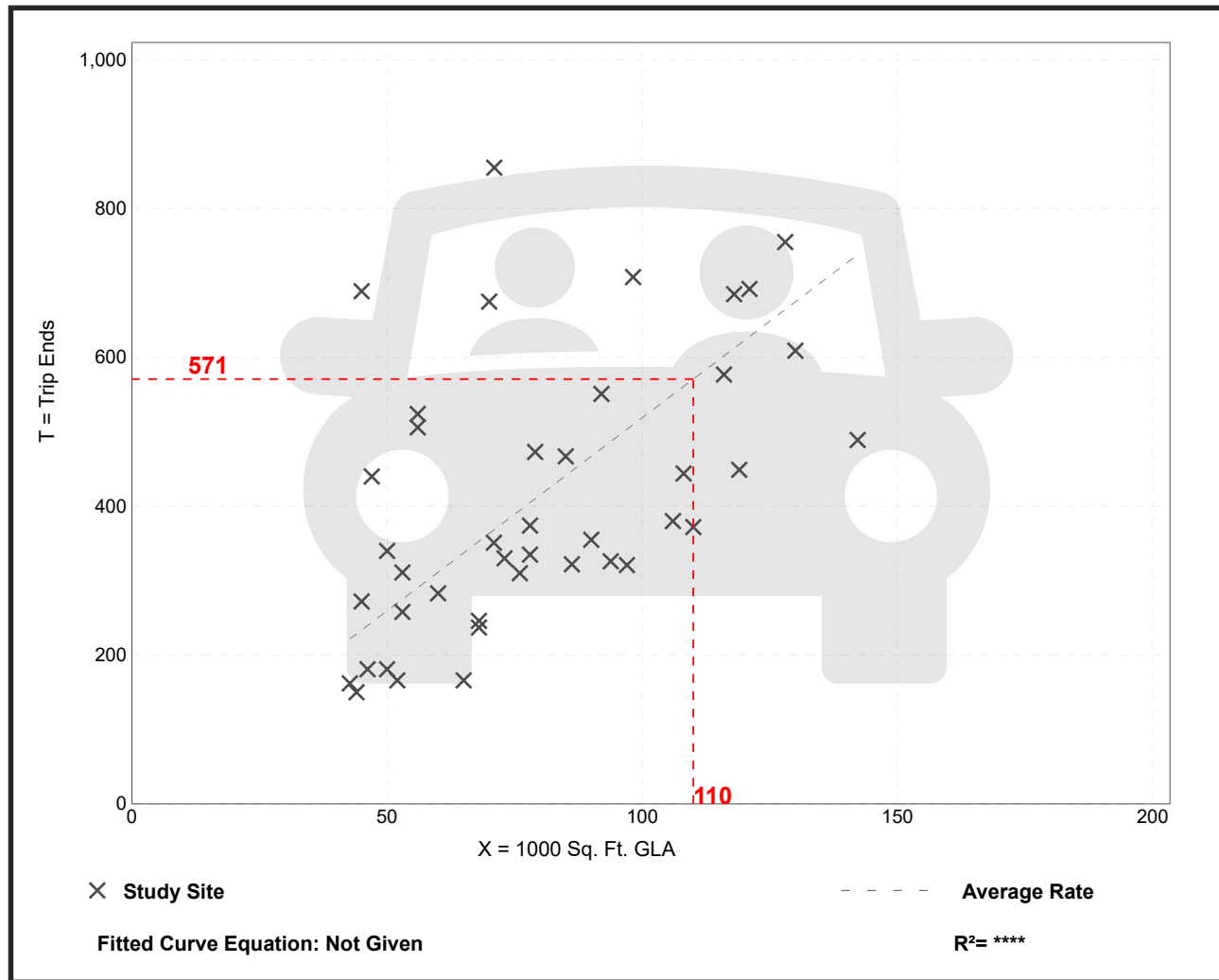
# Shopping Plaza (40-150k) - Supermarket - No (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA  
 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: 42  
 Avg. 1000 Sq. Ft. GLA: 79  
 Directional Distribution: 49% entering, 51% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
5.19	2.55 - 15.31	2.28

## Data Plot and Equation





# Appendix E: Synchro Reports

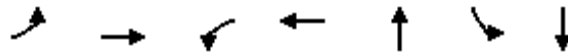


## Queues

## Existing (2023) Traffic Volumes

## 1: Crackerneck Road &amp; 39th Street

AM Peak Hour

























Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	68	450	12	461	41	64	71
v/c Ratio	0.10	0.17	0.02	0.21	0.22	0.40	0.30
Control Delay	4.0	5.2	2.1	4.7	20.7	37.0	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	5.2	2.1	4.7	20.7	37.0	11.8
Queue Length 50th (ft)	7	27	1	45	9	28	0
Queue Length 95th (ft)	18	73	2	0	29	54	27
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	742	2595	664	2180	249	226	301
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.17	0.02	0.21	0.16	0.28	0.24

## Intersection Summary

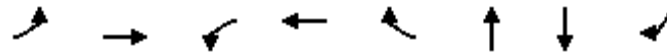
HCM Signalized Intersection Capacity Analysis  
1: Crackerneck Road & 39th Street

Existing (2023) Traffic Volumes  
AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			 					
Traffic Volume (vph)	55	355	10	10	298	75	13	3	17	52	1	57	
Future Volume (vph)	55	355	10	10	298	75	13	3	17	52	1	57	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00		
Frt	1.00	1.00		1.00	0.97			0.93		1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00		
Satd. Flow (prot)	1770	3525		1641	3405			1640		1770	1457		
Flt Permitted	0.45	1.00		0.49	1.00			0.84		0.73	1.00		
Satd. Flow (perm)	837	3525		850	3405			1406		1360	1457		
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
Adj. Flow (vph)	68	438	12	12	368	93	16	4	21	64	1	70	
RTOR Reduction (vph)	0	2	0	0	23	0	0	19	0	0	63	0	
Lane Group Flow (vph)	68	448	0	12	438	0	0	22	0	64	8	0	
Heavy Vehicles (%)	2%	2%	2%	10%	3%	2%	2%	20%	6%	2%	20%	11%	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			8				4	
Permitted Phases	6			2			8			4			
Actuated Green, G (s)	53.4	48.1		45.2	44.0			7.7		7.8		7.8	
Effective Green, g (s)	53.4	48.1		45.2	44.0			7.7		7.8		7.8	
Actuated g/C Ratio	0.71	0.64		0.60	0.59			0.10		0.10		0.10	
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5		6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0		3.0	
Lane Grp Cap (vph)	661	2260		524	1997			144		141		151	
v/s Ratio Prot	c0.01	c0.13		0.00	c0.13							0.01	
v/s Ratio Perm	0.07			0.01				0.02		c0.05			
v/c Ratio	0.10	0.20		0.02	0.22			0.15		0.45		0.05	
Uniform Delay, d1	3.3	5.5		6.0	7.4			30.7		31.6		30.3	
Progression Factor	1.00	1.00		0.49	0.60			1.00		1.00		1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.3			0.5		2.3		0.2	
Delay (s)	3.4	5.7		2.9	4.7			31.2		33.9		30.4	
Level of Service	A	A		A	A			C		C		C	
Approach Delay (s)		5.4			4.6			31.2				32.1	
Approach LOS		A			A			C				C	
<b>Intersection Summary</b>													
HCM 2000 Control Delay			9.1									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.24										
Actuated Cycle Length (s)			75.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			38.4%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Queues  
2: Bolger Square Driveway & 39th Street

Existing (2023) Traffic Volumes  
AM Peak Hour























Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	22	537	2	483	6	6	4	6
v/c Ratio	0.03	0.17	0.00	0.17	0.01	0.04	0.03	0.02
Control Delay	2.9	3.1	4.5	5.1	0.0	28.6	32.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.9	3.1	4.5	5.1	0.0	28.6	32.3	0.2
Queue Length 50th (ft)	1	0	0	0	0	2	2	0
Queue Length 95th (ft)	8	69	3	98	0	12	10	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	789	3101	790	2910	1165	153	181	353
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.17	0.00	0.17	0.01	0.04	0.02	0.02
<b>Intersection Summary</b>								



# HCM Signalized Intersection Capacity Analysis

## 2: Bolger Square Driveway & 39th Street

Existing (2023) Traffic Volumes  
AM Peak Hour

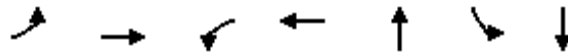
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	433	2	2	391	5	2	2	2	2	2	5
Future Volume (vph)	18	433	2	2	391	5	2	2	2	2	2	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	1.00
Satd. Flow (prot)	1703	3503		1770	3471	1346		1750			1817	1583
Flt Permitted	0.46	1.00		0.45	1.00	1.00		0.98			0.98	1.00
Satd. Flow (perm)	832	3503		842	3471	1346		1750			1817	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	22	535	2	2	483	6	2	2	2	2	2	6
RTOR Reduction (vph)	0	0	0	0	0	2	0	2	0	0	0	6
Lane Group Flow (vph)	22	537	0	2	483	4	0	4	0	0	4	0
Heavy Vehicles (%)	6%	3%	2%	2%	4%	20%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	49.4	47.0		46.8	45.7	45.7		1.3			1.3	1.3
Effective Green, g (s)	49.4	47.0		46.8	45.7	45.7		1.3			1.3	1.3
Actuated g/C Ratio	0.66	0.63		0.62	0.61	0.61		0.02			0.02	0.02
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	575	2195		539	2114	820		30			31	27
v/s Ratio Prot	c0.00	c0.15		0.00	0.14			c0.00			c0.00	
v/s Ratio Perm	0.02			0.00		0.00						0.00
v/c Ratio	0.04	0.24		0.00	0.23	0.00		0.13			0.13	0.00
Uniform Delay, d1	4.4	6.2		5.3	6.6	5.7		36.3			36.3	36.2
Progression Factor	0.81	0.71		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.0	0.3		0.0	0.3	0.0		2.0			1.9	0.1
Delay (s)	3.6	4.6		5.3	6.9	5.7		38.3			38.2	36.3
Level of Service	A	A		A	A	A		D			D	D
Approach Delay (s)		4.6			6.9			38.3			37.0	
Approach LOS		A			A			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			6.1	HCM 2000 Level of Service				A				
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			75.0	Sum of lost time (s)				24.3				
Intersection Capacity Utilization			34.7%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

## Queues

## Existing (2023) Traffic Volumes

## 1: Crackerneck Road &amp; 39th Street

PM Peak Hour

























Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	136	836	29	860	77	133	145
v/c Ratio	0.29	0.34	0.06	0.39	0.37	0.69	0.43
Control Delay	5.9	8.7	3.9	6.6	30.0	64.7	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	8.7	3.9	6.6	30.0	64.7	12.2
Queue Length 50th (ft)	23	135	4	54	27	95	5
Queue Length 95th (ft)	48	198	9	65	71	154	60
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	615	2447	479	2202	270	261	407
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.34	0.06	0.39	0.29	0.51	0.36

## Intersection Summary

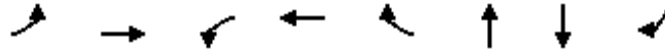
HCM Signalized Intersection Capacity Analysis  
 1: Crackerneck Road & 39th Street

Existing (2023) Traffic Volumes  
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	125	742	27	27	646	145	24	13	34	122	7	126
Future Volume (vph)	125	742	27	27	646	145	24	13	34	122	7	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97			0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1770	3518		1770	3442			1674		1770	1586	
Flt Permitted	0.28	1.00		0.32	1.00			0.76		0.75	1.00	
Satd. Flow (perm)	518	3518		605	3442			1299		1398	1586	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	807	29	29	702	158	26	14	37	133	8	137
RTOR Reduction (vph)	0	2	0	0	12	0	0	31	0	0	118	0
Lane Group Flow (vph)	136	834	0	29	848	0	0	46	0	133	27	0
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	7%	2%	17%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8				4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	85.5	77.5		76.9	73.2			15.8		15.9	15.9	
Effective Green, g (s)	85.5	77.5		76.9	73.2			15.8		15.9	15.9	
Actuated g/C Ratio	0.74	0.67		0.67	0.64			0.14		0.14	0.14	
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	472	2370		442	2190			178		193	219	
v/s Ratio Prot	c0.02	c0.24		0.00	c0.25						0.02	
v/s Ratio Perm	0.19			0.04				0.04		c0.10		
v/c Ratio	0.29	0.35		0.07	0.39			0.26		0.69	0.12	
Uniform Delay, d1	4.9	8.0		6.5	10.1			44.4		47.2	43.4	
Progression Factor	1.00	1.00		0.75	0.58			1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.1	0.5			0.8		9.8	0.3	
Delay (s)	5.2	8.4		4.9	6.4			45.1		57.0	43.7	
Level of Service	A	A		A	A			D		E	D	
Approach Delay (s)		8.0			6.3			45.1			50.1	
Approach LOS		A			A			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			62.2%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Bolger Square Driveway & 39th Street

Existing (2023) Traffic Volumes  
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	55	890	1	852	32	4	11	36
v/c Ratio	0.10	0.29	0.00	0.31	0.03	0.04	0.11	0.16
Control Delay	2.4	2.6	4.0	6.1	0.0	47.8	53.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	2.6	4.0	6.1	0.0	47.8	53.7	1.6
Queue Length 50th (ft)	3	32	0	97	0	2	8	0
Queue Length 95th (ft)	m18	98	2	206	0	14	27	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	579	3039	572	2778	1274	116	147	260
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.29	0.00	0.31	0.03	0.03	0.07	0.14

Intersection Summary

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



# HCM Signalized Intersection Capacity Analysis

## 2: Bolger Square Driveway & 39th Street

Existing (2023) Traffic Volumes  
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗		↕			↖	↗
Traffic Volume (vph)	51	817	2	1	784	29	1	2	1	8	2	33
Future Volume (vph)	51	817	2	1	784	29	1	2	1	8	2	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.96	1.00
Satd. Flow (prot)	1770	3538		1770	3539	1583		1778			1790	1583
Flt Permitted	0.29	1.00		0.31	1.00	1.00		0.99			0.96	1.00
Satd. Flow (perm)	547	3538		586	3539	1583		1778			1790	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	888	2	1	852	32	1	2	1	9	2	36
RTOR Reduction (vph)	0	0	0	0	0	10	0	1	0	0	0	35
Lane Group Flow (vph)	55	890	0	1	852	22	0	3	0	0	11	1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	89.3	84.2		81.3	80.2	80.2		1.3			4.1	4.1
Effective Green, g (s)	89.3	84.2		81.3	80.2	80.2		1.3			4.1	4.1
Actuated g/C Ratio	0.78	0.73		0.71	0.70	0.70		0.01			0.04	0.04
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	478	2590		425	2468	1103		20			63	56
v/s Ratio Prot	c0.01	c0.25		0.00	0.24			c0.00			c0.01	
v/s Ratio Perm	0.08			0.00		0.01						0.00
v/c Ratio	0.12	0.34		0.00	0.35	0.02		0.15			0.17	0.02
Uniform Delay, d1	3.4	5.5		4.9	6.9	5.3		56.3			53.8	53.5
Progression Factor	0.73	0.60		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.3		0.0	0.4	0.0		3.5			1.3	0.2
Delay (s)	2.6	3.7		5.0	7.3	5.4		59.8			55.1	53.7
Level of Service	A	A		A	A	A		E			E	D
Approach Delay (s)		3.6			7.2			59.8			54.0	
Approach LOS		A			A			E			D	

### Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	24.3
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

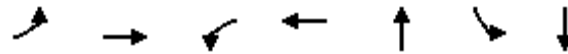
c Critical Lane Group

Queues

Existing plus Development Traffic Volumes

1: Crackerneck Road & 39th Street

AM Peak Hour






















Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	83	453	12	470	41	78	118
v/c Ratio	0.12	0.18	0.02	0.22	0.22	0.46	0.42
Control Delay	4.2	5.4	2.0	2.8	20.4	38.5	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.2	5.4	2.0	2.8	20.4	38.5	11.0
Queue Length 50th (ft)	9	29	0	47	8	34	0
Queue Length 95th (ft)	21	74	2	0	29	64	33
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	730	2574	656	2149	244	226	340
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.02	0.22	0.17	0.35	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis  
1: Crackerneck Road & 39th Street

Existing plus Development Traffic Volumes

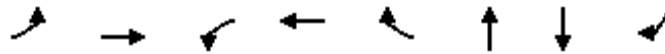
AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	67	357	10	10	303	78	13	3	17	63	1	95	
Future Volume (vph)	67	357	10	10	303	78	13	3	17	63	1	95	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00		
Frt	1.00	1.00		1.00	0.97			0.93		1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00		
Satd. Flow (prot)	1770	3525		1641	3404			1640		1770	1456		
Flt Permitted	0.44	1.00		0.49	1.00			0.82		0.73	1.00		
Satd. Flow (perm)	825	3525		847	3404			1372		1360	1456		
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
Adj. Flow (vph)	83	441	12	12	374	96	16	4	21	78	1	117	
RTOR Reduction (vph)	0	2	0	0	24	0	0	19	0	0	104	0	
Lane Group Flow (vph)	83	451	0	12	446	0	0	22	0	78	14	0	
Heavy Vehicles (%)	2%	2%	2%	10%	3%	2%	2%	20%	6%	2%	20%	11%	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			8				4	
Permitted Phases	6			2			8			4			
Actuated Green, G (s)	53.1	47.6		44.5	43.3			8.2		8.3	8.3		
Effective Green, g (s)	53.1	47.6		44.5	43.3			8.2		8.3	8.3		
Actuated g/C Ratio	0.71	0.63		0.59	0.58			0.11		0.11	0.11		
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		
Lane Grp Cap (vph)	653	2237		515	1965			150		150	161		
v/s Ratio Prot	c0.01	c0.13		0.00	c0.13						0.01		
v/s Ratio Perm	0.08			0.01				0.02		c0.06			
v/c Ratio	0.13	0.20		0.02	0.23			0.15		0.52	0.09		
Uniform Delay, d1	3.5	5.7		6.2	7.7			30.2		31.5	29.9		
Progression Factor	1.00	1.00		0.44	0.32			1.00		1.00	1.00		
Incremental Delay, d2	0.1	0.2		0.0	0.3			0.5		3.2	0.2		
Delay (s)	3.6	5.9		2.8	2.8			30.7		34.7	30.2		
Level of Service	A	A		A	A			C		C	C		
Approach Delay (s)		5.6			2.8			30.7			32.0		
Approach LOS		A			A			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			9.4									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.26										
Actuated Cycle Length (s)			75.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			38.6%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Queues  
2: Bolger Square Driveway & 39th Street

Existing plus Development Traffic Volumes

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	25	550	2	486	26	6	70	12
v/c Ratio	0.04	0.22	0.00	0.20	0.03	0.04	0.39	0.03
Control Delay	4.3	5.0	6.0	8.1	0.0	28.6	37.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	5.0	6.0	8.1	0.0	28.6	37.9	0.2
Queue Length 50th (ft)	2	28	0	30	0	2	31	0
Queue Length 95th (ft)	10	73	3	103	0	12	62	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	682	2519	680	2376	993	153	190	363
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.22	0.00	0.20	0.03	0.04	0.37	0.03
<b>Intersection Summary</b>								




























# HCM Signalized Intersection Capacity Analysis

## 2: Bolger Square Driveway & 39th Street

Existing plus Development Traffic Volumes

AM Peak Hour

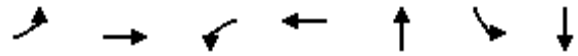
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	 
Traffic Volume (vph)	20	444	2	2	394	21	2	2	2	55	2	10
Future Volume (vph)	20	444	2	2	394	21	2	2	2	55	2	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1703	3503		1770	3471	1346		1750			1776	1583
Flt Permitted	0.46	1.00		0.45	1.00	1.00		0.98			0.95	1.00
Satd. Flow (perm)	822	3503		831	3471	1346		1750			1776	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	25	548	2	2	486	26	2	2	2	68	2	12
RTOR Reduction (vph)	0	0	0	0	0	12	0	2	0	0	0	11
Lane Group Flow (vph)	25	550	0	2	486	14	0	4	0	0	70	1
Heavy Vehicles (%)	6%	3%	2%	2%	4%	20%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	44.4	41.8		41.4	40.3	40.3		1.3			6.5	6.5
Effective Green, g (s)	44.4	41.8		41.4	40.3	40.3		1.3			6.5	6.5
Actuated g/C Ratio	0.59	0.56		0.55	0.54	0.54		0.02			0.09	0.09
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	517	1952		472	1865	723		30			153	137
v/s Ratio Prot	c0.00	c0.16		0.00	0.14			c0.00			c0.04	
v/s Ratio Perm	0.03			0.00		0.01						0.00
v/c Ratio	0.05	0.28		0.00	0.26	0.02		0.13			0.46	0.01
Uniform Delay, d1	6.3	8.7		7.5	9.3	8.1		36.3			32.6	31.3
Progression Factor	0.81	0.74		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.0	0.4		0.0	0.3	0.0		2.0			2.2	0.0
Delay (s)	5.2	6.8		7.5	9.7	8.2		38.3			34.7	31.3
Level of Service	A	A		A	A	A		D			C	C
Approach Delay (s)		6.7			9.6			38.3			34.2	
Approach LOS		A			A			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)			24.3		
Intersection Capacity Utilization			34.8%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

## Queues

## Existing plus Development Traffic Volumes

## 1: Crackerneck Road &amp; 39th Street

PM Peak Hour

























Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	167	840	29	871	77	138	166
v/c Ratio	0.36	0.34	0.06	0.40	0.39	0.70	0.46
Control Delay	6.6	8.9	3.9	6.4	30.9	65.4	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	8.9	3.9	6.4	30.9	65.4	11.9
Queue Length 50th (ft)	29	137	4	54	27	98	5
Queue Length 95th (ft)	57	199	9	65	72	160	64
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	605	2438	474	2173	250	261	424
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.34	0.06	0.40	0.31	0.53	0.39

## Intersection Summary

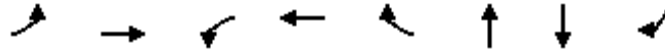
HCM Signalized Intersection Capacity Analysis  
 1: Crackerneck Road & 39th Street

Existing plus Development Traffic Volumes  
 PM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			 					
Traffic Volume (vph)	154	746	27	27	649	153	24	13	34	127	7	145	
Future Volume (vph)	154	746	27	27	649	153	24	13	34	127	7	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00		
Frt	1.00	0.99		1.00	0.97			0.94		1.00	0.86		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00		
Satd. Flow (prot)	1770	3519		1770	3438			1674		1770	1586		
Flt Permitted	0.27	1.00		0.33	1.00			0.70		0.75	1.00		
Satd. Flow (perm)	503	3519		606	3438			1186		1398	1586		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	167	811	29	29	705	166	26	14	37	138	8	158	
RTOR Reduction (vph)	0	2	0	0	13	0	0	31	0	0	136	0	
Lane Group Flow (vph)	167	838	0	29	858	0	0	46	0	138	30	0	
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	7%	2%	17%	2%	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			8			4		
Permitted Phases	6			2			8			4			
Actuated Green, G (s)	85.8	77.2		76.0	72.3			16.1		16.2	16.2		
Effective Green, g (s)	85.8	77.2		76.0	72.3			16.1		16.2	16.2		
Actuated g/C Ratio	0.75	0.67		0.66	0.63			0.14		0.14	0.14		
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		
Lane Grp Cap (vph)	470	2362		437	2161			166		196	223		
v/s Ratio Prot	c0.03	0.24		0.00	c0.25						0.02		
v/s Ratio Perm	0.24			0.04				0.04		c0.10			
v/c Ratio	0.36	0.35		0.07	0.40			0.28		0.70	0.14		
Uniform Delay, d1	5.1	8.2		6.7	10.6			44.2		47.1	43.3		
Progression Factor	1.00	1.00		0.74	0.54			1.00		1.00	1.00		
Incremental Delay, d2	0.5	0.4		0.1	0.5			0.9		10.9	0.3		
Delay (s)	5.6	8.6		5.1	6.2			45.2		58.0	43.5		
Level of Service	A	A		A	A			D		E	D		
Approach Delay (s)		8.1			6.2			45.2			50.1		
Approach LOS		A			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			14.2									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.45										
Actuated Cycle Length (s)			115.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			65.3%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

Queues  
2: Bolger Square Driveway & 39th Street

Existing plus Development Traffic Volumes  
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	60	895	1	861	77	4	39	39
v/c Ratio	0.12	0.31	0.00	0.33	0.06	0.04	0.32	0.16
Control Delay	3.0	3.4	4.0	7.6	0.1	47.8	57.1	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.4	4.0	7.6	0.1	47.8	57.1	1.4
Queue Length 50th (ft)	4	51	0	107	0	2	28	0
Queue Length 95th (ft)	m21	101	2	225	0	14	62	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	547	2881	544	2647	1221	116	149	262
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.31	0.00	0.33	0.06	0.03	0.26	0.15

Intersection Summary





















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



HCM Signalized Intersection Capacity Analysis  
2: Bolger Square Driveway & 39th Street

Existing plus Development Traffic Volumes

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	822	2	1	792	71	1	2	1	34	2	36
Future Volume (vph)	55	822	2	1	792	71	1	2	1	34	2	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.95	1.00
Satd. Flow (prot)	1770	3538		1770	3539	1583		1778			1778	1583
Flt Permitted	0.28	1.00		0.31	1.00	1.00		0.99			0.95	1.00
Satd. Flow (perm)	529	3538		576	3539	1583		1778			1778	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	893	2	1	861	77	1	2	1	37	2	39
RTOR Reduction (vph)	0	0	0	0	0	25	0	1	0	0	0	37
Lane Group Flow (vph)	60	895	0	1	861	52	0	3	0	0	39	2
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	86.8	81.5		78.4	77.3	77.3		1.3			6.8	6.8
Effective Green, g (s)	86.8	81.5		78.4	77.3	77.3		1.3			6.8	6.8
Actuated g/C Ratio	0.75	0.71		0.68	0.67	0.67		0.01			0.06	0.06
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	456	2507		404	2378	1064		20			105	93
v/s Ratio Prot	c0.01	c0.25		0.00	0.24			c0.00			c0.02	
v/s Ratio Perm	0.09			0.00		0.03						0.00
v/c Ratio	0.13	0.36		0.00	0.36	0.05		0.15			0.37	0.02
Uniform Delay, d1	4.2	6.5		5.8	8.2	6.4		56.3			52.0	51.0
Progression Factor	0.74	0.64		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.1	0.4		0.0	0.4	0.1		3.5			2.2	0.1
Delay (s)	3.2	4.6		5.9	8.6	6.5		59.8			54.3	51.1
Level of Service	A	A		A	A	A		E			D	D
Approach Delay (s)		4.5			8.4			59.8			52.7	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	24.3
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

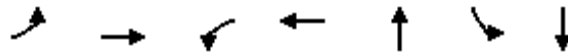
c Critical Lane Group

## Queues

## Future Traffic Volumes

## 1: Crackerneck Road &amp; 39th Street

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	90	503	15	520	47	85	127
v/c Ratio	0.14	0.20	0.02	0.24	0.24	0.49	0.43
Control Delay	4.3	5.5	2.0	3.0	20.7	39.4	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	5.5	2.0	3.0	20.7	39.4	11.0
Queue Length 50th (ft)	11	33	1	55	10	37	1
Queue Length 95th (ft)	23	82	2	0	33	68	34
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	702	2562	628	2134	244	225	347
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.20	0.02	0.24	0.19	0.38	0.37























## Intersection Summary

# HCM Signalized Intersection Capacity Analysis

# Future Traffic Volumes

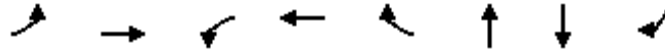
## 1: Crackerneck Road & 39th Street

AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			 					
Traffic Volume (vph)	73	395	12	12	335	86	15	4	19	69	2	101	
Future Volume (vph)	73	395	12	12	335	86	15	4	19	69	2	101	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00		
Frt	1.00	1.00		1.00	0.97			0.93		1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00		
Satd. Flow (prot)	1770	3523		1641	3404			1643		1770	1457		
Flt Permitted	0.42	1.00		0.47	1.00			0.81		0.73	1.00		
Satd. Flow (perm)	784	3523		807	3404			1360		1353	1457		
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
Adj. Flow (vph)	90	488	15	15	414	106	19	5	23	85	2	125	
RTOR Reduction (vph)	0	2	0	0	24	0	0	20	0	0	111	0	
Lane Group Flow (vph)	90	501	0	15	496	0	0	27	0	85	16	0	
Heavy Vehicles (%)	2%	2%	2%	10%	3%	2%	2%	20%	6%	2%	20%	11%	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			8				4	
Permitted Phases	6			2			8			4			
Actuated Green, G (s)	53.0	47.4		44.2	43.0			8.4		8.5	8.5		
Effective Green, g (s)	53.0	47.4		44.2	43.0			8.4		8.5	8.5		
Actuated g/C Ratio	0.71	0.63		0.59	0.57			0.11		0.11	0.11		
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0		
Lane Grp Cap (vph)	627	2226		488	1951			152		153	165		
v/s Ratio Prot	c0.01	c0.14		0.00	c0.15						0.01		
v/s Ratio Perm	0.09			0.02				0.02		c0.06			
v/c Ratio	0.14	0.22		0.03	0.25			0.17		0.56	0.10		
Uniform Delay, d1	3.5	5.9		6.4	8.0			30.2		31.5	29.8		
Progression Factor	1.00	1.00		0.44	0.33			1.00		1.00	1.00		
Incremental Delay, d2	0.1	0.2		0.0	0.3			0.6		4.3	0.3		
Delay (s)	3.6	6.2		2.8	3.0			30.7		35.8	30.1		
Level of Service	A	A		A	A			C		D	C		
Approach Delay (s)		5.8			2.9			30.7			32.4		
Approach LOS		A			A			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			9.6									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.29										
Actuated Cycle Length (s)			75.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			40.0%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Queues  
2: Bolger Square Driveway & 39th Street

Future Traffic Volumes  
AM Peak Hour




























Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	27	607	2	538	27	6	70	14
v/c Ratio	0.04	0.24	0.00	0.23	0.03	0.04	0.39	0.04
Control Delay	4.3	5.0	6.0	8.2	0.0	28.6	37.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	5.0	6.0	8.2	0.0	28.6	37.9	0.2
Queue Length 50th (ft)	2	31	0	33	0	2	31	0
Queue Length 95th (ft)	10	80	3	114	0	12	62	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	648	2521	651	2376	993	153	190	363
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.24	0.00	0.23	0.03	0.04	0.37	0.04
<b>Intersection Summary</b>								



# HCM Signalized Intersection Capacity Analysis

## 2: Bolger Square Driveway & 39th Street

Future Traffic Volumes  
AM Peak Hour

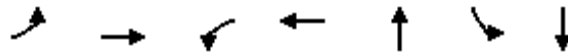
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	 
Traffic Volume (vph)	22	490	2	2	436	22	2	2	2	55	2	11
Future Volume (vph)	22	490	2	2	436	22	2	2	2	55	2	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1703	3503		1770	3471	1346		1750			1776	1583
Flt Permitted	0.43	1.00		0.42	1.00	1.00		0.98			0.95	1.00
Satd. Flow (perm)	767	3503		783	3471	1346		1750			1776	1583
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	27	605	2	2	538	27	2	2	2	68	2	14
RTOR Reduction (vph)	0	0	0	0	0	12	0	2	0	0	0	13
Lane Group Flow (vph)	27	607	0	2	538	15	0	4	0	0	70	1
Heavy Vehicles (%)	6%	3%	2%	2%	4%	20%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	44.4	41.8		41.4	40.3	40.3		1.3			6.5	6.5
Effective Green, g (s)	44.4	41.8		41.4	40.3	40.3		1.3			6.5	6.5
Actuated g/C Ratio	0.59	0.56		0.55	0.54	0.54		0.02			0.09	0.09
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	486	1952		446	1865	723		30			153	137
v/s Ratio Prot	c0.00	c0.17		0.00	0.15			c0.00			c0.04	
v/s Ratio Perm	0.03			0.00		0.01						0.00
v/c Ratio	0.06	0.31		0.00	0.29	0.02		0.13			0.46	0.01
Uniform Delay, d1	6.4	8.9		7.5	9.5	8.1		36.3			32.6	31.3
Progression Factor	0.81	0.72		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.0	0.4		0.0	0.4	0.1		2.0			2.2	0.0
Delay (s)	5.2	6.8		7.5	9.9	8.2		38.3			34.7	31.3
Level of Service	A	A		A	A	A		D			C	C
Approach Delay (s)		6.8			9.8			38.3			34.2	
Approach LOS		A			A			D			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			10.0									B
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			75.0							24.3		
Intersection Capacity Utilization			36.0%									A
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Future Traffic Volumes

1: Crackerneck Road & 39th Street

PM Peak Hour

























Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	183	929	33	963	86	152	182
v/c Ratio	0.43	0.39	0.08	0.45	0.44	0.75	0.47
Control Delay	7.9	9.7	4.1	7.2	33.7	68.5	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	9.7	4.1	7.2	33.7	68.5	11.5
Queue Length 50th (ft)	34	164	4	61	34	108	6
Queue Length 95th (ft)	63	226	10	72	82	177	66
Internal Link Dist (ft)		947		564	394		504
Turn Bay Length (ft)	85		70			130	
Base Capacity (vph)	562	2402	427	2127	237	252	436
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.39	0.08	0.45	0.36	0.60	0.42

Intersection Summary

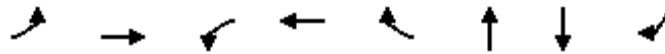
HCM Signalized Intersection Capacity Analysis  
1: Crackerneck Road & 39th Street

Future Traffic Volumes  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Traffic Volume (vph)	168	824	30	30	717	169	27	15	38	140	8	159
Future Volume (vph)	168	824	30	30	717	169	27	15	38	140	8	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97			0.94		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1770	3518		1770	3438			1675		1770	1586	
Flt Permitted	0.23	1.00		0.29	1.00			0.66		0.72	1.00	
Satd. Flow (perm)	435	3518		540	3438			1124		1349	1586	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	896	33	33	779	184	29	16	41	152	9	173
RTOR Reduction (vph)	0	2	0	0	13	0	0	30	0	0	147	0
Lane Group Flow (vph)	183	927	0	33	950	0	0	56	0	152	35	0
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	7%	2%	17%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8				4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	85.1	76.1		74.5	70.8			17.2		17.3	17.3	
Effective Green, g (s)	85.1	76.1		74.5	70.8			17.2		17.3	17.3	
Actuated g/C Ratio	0.74	0.66		0.65	0.62			0.15		0.15	0.15	
Clearance Time (s)	5.5	5.5		5.9	5.9			6.6		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	426	2327		389	2116			168		202	238	
v/s Ratio Prot	c0.03	0.26		0.00	c0.28						0.02	
v/s Ratio Perm	0.28			0.05				0.05		c0.11		
v/c Ratio	0.43	0.40		0.08	0.45			0.33		0.75	0.15	
Uniform Delay, d1	6.1	8.9		7.3	11.7			43.8		46.8	42.4	
Progression Factor	1.00	1.00		0.73	0.53			1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.5		0.1	0.7			1.2		14.6	0.3	
Delay (s)	6.8	9.4		5.4	6.9			45.0		61.4	42.7	
Level of Service	A	A		A	A			D		E	D	
Approach Delay (s)		9.0			6.9			45.0			51.2	
Approach LOS		A			A			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			15.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			115.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			69.8%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Bolger Square Driveway & 39th Street

Future Traffic Volumes  
PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	66	989	2	951	82	6	40	43
v/c Ratio	0.14	0.34	0.00	0.36	0.07	0.07	0.33	0.18
Control Delay	3.0	3.5	4.5	8.0	0.1	45.7	57.5	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.5	4.5	8.0	0.1	45.7	57.5	1.6
Queue Length 50th (ft)	4	56	0	123	0	3	29	0
Queue Length 95th (ft)	m21	110	3	257	0	17	64	0
Internal Link Dist (ft)		564		445		185	274	
Turn Bay Length (ft)	110		75		95			
Base Capacity (vph)	502	2878	497	2643	1220	116	148	261
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.34	0.00	0.36	0.07	0.05	0.27	0.16

Intersection Summary





















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



# HCM Signalized Intersection Capacity Analysis

## 2: Bolger Square Driveway & 39th Street

Future Traffic Volumes  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	908	2	2	875	75	2	2	2	35	2	40
Future Volume (vph)	61	908	2	2	875	75	2	2	2	35	2	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1770	3538		1770	3539	1583		1750			1778	1583
Flt Permitted	0.25	1.00		0.28	1.00	1.00		0.98			0.95	1.00
Satd. Flow (perm)	470	3538		513	3539	1583		1750			1778	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	66	987	2	2	951	82	2	2	2	38	2	43
RTOR Reduction (vph)	0	0	0	0	0	27	0	2	0	0	0	40
Lane Group Flow (vph)	66	989	0	2	951	55	0	4	0	0	40	3
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6		6						3
Actuated Green, G (s)	86.8	81.4		78.2	77.1	77.1		1.4			6.8	6.8
Effective Green, g (s)	86.8	81.4		78.2	77.1	77.1		1.4			6.8	6.8
Actuated g/C Ratio	0.75	0.71		0.68	0.67	0.67		0.01			0.06	0.06
Clearance Time (s)	5.6	5.6		5.7	5.7	5.7		6.5			6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	415	2504		360	2372	1061		21			105	93
v/s Ratio Prot	c0.01	c0.28		0.00	0.27			c0.00			c0.02	
v/s Ratio Perm	0.11			0.00		0.03						0.00
v/c Ratio	0.16	0.39		0.01	0.40	0.05		0.19			0.38	0.03
Uniform Delay, d1	4.4	6.8		6.0	8.5	6.5		56.2			52.1	51.0
Progression Factor	0.71	0.62		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	0.2	0.4		0.0	0.5	0.1		4.4			2.3	0.1
Delay (s)	3.3	4.7		6.0	9.0	6.6		60.7			54.4	51.1
Level of Service	A	A		A	A	A		E			D	D
Approach Delay (s)		4.6			8.8			60.7			52.7	
Approach LOS		A			A			E			D	

### Intersection Summary

HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	24.3
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group