CASEY'S REDEVELOPMENT

Traffic Impact Study

St. Charles, Illinois

October 2021

Prepared for:

Casey's Retail Company

Kimley»Horn

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EXECUTIVE SUMMARY

Kimley-Horn and Associates, Inc. (Kimley-Horn) was retained by Casey's Retail Company to perform a traffic impact study for the proposed Casey's General Store in St. Charles, Illinois. Access to the site will be provided by two full-movement driveways along Fieldgate Drive (Access A-B), as well as two internal driveways connecting the site to the surrounding shopping center.

As part of the traffic impact study, existing and future traffic conditions were evaluated for the unsignalized intersection of IL 64 and Fieldgate Drive. In addition, the proposed access points were evaluated for future build traffic conditions.

Based on a review of future traffic conditions, it is anticipated that the background traffic growth and the site-generated traffic would not materially impact the IL 64 corridor. The southbound approach at the intersection of IL 64 and Fieldgate Drive is projected to operate at LOS F under the Future Year 2027 Build traffic conditions in the PM and Saturday peak hours with 95th percentile queues of up to four vehicles. Low levels-of-service for side-street approaches are not uncommon, as vehicles may experience delays turning onto a major roadway. Additionally, there are many alternate route opportunities through the connectivity of the site to the surrounding shopping center and to adjacent signalized intersections on Foxfield Road accessible via Fieldgate Drive. This analysis may be conservative since outbound site traffic is likely to make an alternate route choice to avoid visible queues when exiting the site.

Limited delay and queues are anticipated at the site driveways in the future conditions. To facilitate site access and onsite circulation, minor-leg stop control should be posted for the outbound traffic at Access A and Access B. For the analysis of future traffic conditions, turn lane warrants were evaluated for the study intersections and the proposed site access driveways using guidelines in the IDOT *BDE Manual*. Based on the IDOT *BDE Manual* volume guidance provided for unsignalized intersections on two-lane facilities, projected future traffic volumes do not meet warrant criteria for a southbound left-turn lane or a northbound right-turn lane on Fieldgate Drive at Access A or a southbound left-turn lane at Access B. A northbound right-turn lane is warranted at Access B based on the *BDE Manual*. Per coordination with the City of St. Charles, Fieldgate Drive should be restriped to provide a northbound right-turn lane as its cross section is wide enough for two (2) lanes.

These study results are discussed in more detail in the *Recommendations & Conclusion* section of this report.

1. INTRODUCTION

Kimley-Horn and Associates, Inc., (Kimley-Horn) was retained by Casey's to perform a traffic impact study for a proposed Casey's General Store on the northeast corner of IL 64 and Fieldgate Drive in St. Charles, Illinois. The development is proposed to include 16 fueling positions and approximately 5,000 SF of convenience store space. The proposed site for the redevelopment was formerly used as a commercial development.

Access to the site will be provided by two full-movement driveways along Fieldgate Drive (Access A-B), as well as two internal access points connecting the site to the surrounding shopping center. An aerial view of the study location and surrounding roadway network is presented in **Exhibit 1**.

As part of this study, the existing roadway network was analyzed to determine the current operations at the study intersections. In order to assess the site's potential impact on the area roadway network, site generated trips were established and added to the background traffic volumes. Consistent with the Illinois Department of Transportation (IDOT) requirements, future traffic conditions were evaluated for Future Year 2027. This report presents and documents Kimley-Horn's data collection, summarizes the evaluation of existing and projected future traffic conditions on the surrounding roadways, and identifies recommendations to address the potential impact of site-generated traffic on the adjacent roadway network for the Future Year 2027 traffic conditions.

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EXHIBIT 1

SITE LOCATION MAP

2. EXISTING CONDITIONS

Based on aerial imagery as well as a site visit, Kimley-Horn conducted a review of the subject site including existing land uses in the surrounding area, the adjacent street system, current traffic volumes and operating conditions, lane configurations and traffic controls at nearby intersections, and other key roadway characteristics. This section of the report details information on the existing conditions.

Area Land Uses & Connectivity

Located on the northeast quadrant of the IL 64 and Fieldgate Drive intersection, the subject site is currently developed as a commercial site. The site is bound by IL 64 to the south, Fieldgate Drive to the west, and commercial properties to the north and east. Located in St. Charles, Illinois, the site is surrounded by residential and commercial land uses.

IL 64 provides regional connectivity to the east and west and Kirk Road provides regional connectivity to the north and south approximately 1,500 feet east of the project site.

Existing Roadway Characteristics

A field investigation was conducted within the study area. As a result of this visit, the following information was obtained about the existing roadway network.

IL 64 is an east-west roadway that runs along the southern frontage of the subject site. The Illinois Department of Transportation classifies IL 64 as a Principal Arterial. Through the study area, two travel lanes are provided in each direction, and dedicated left and right-turn lanes are provided at key intersections. At its unsignalized, minor-leg stop-controlled intersection with Fieldgate Drive, IL 64 provides two through lanes and a two-way left-turn lane (TWLTL) on both the east and west legs and a dedicated right-turn lane on the east leg of the intersection. There are several driveways serving existing commercial developments along the south side of IL 64 in the vicinity of its study intersection with Fieldgate Drive. A crosswalk is provided on the north leg of the intersection. IDOT classifies IL 64 as a Strategic Regional Arterial (SRA) roadway. The SRA system was established by IDOT to promote mobility on key routes throughout the Chicago area by applying various strategies, such as access control and limited signalization. A speed limit of 35 miles per hour (MPH) is posted on IL 64 through the study area. IL 64 is under IDOT jurisdiction.

Fieldgate Drive is a north-south roadway that runs along the western frontage of the subject site. Through the study area, Fieldgate Drive provides one travel lane in each direction. At its minor-leg stop-controlled intersection with IL 64, Fieldgate Drive provides dedicated left and right-turn lanes. At its minor-leg stop-controlled intersection with Access B, Fieldgate Drive provides one shared through/right-turn lane on the south leg and one shared left-turn/though lane on the north leg. A crosswalk is provided at the north leg of the intersection with IL 64. A speed limit of 25 MPH is posted on Fieldgate Drive through the study area. Fieldgate Drive is under the jurisdiction of the City of St. Charles.

Access B is an existing private driveway located approximately 100 feet north of the intersection of IL 64 and Fieldgate Drive. At its minor-leg stop-controlled intersection with Fieldgate Drive, Access B provides two inbound lanes and one dedicated left-turn lane and one dedicated right-turn lane outbound on the east leg.

Traffic Count Data

Turning movement count data was collected in March 2021 at the study intersection of IL 64 and Fieldgate Drive. The counts were conducted on a typical weekday from 7:00 to 9:00AM, and 4:00 to 6:00PM. Additionally, counts were conducted on a typical Saturday from 11:00AM to 1:00PM. These count periods were selected in order to capture peak travel periods in the area. The traffic count data indicates that peak traffic volumes occur within the study area from 7:15 to 8:15AM and 4:45 to 5:45PM on weekdays, and from 12:00PM to 1:00PM on Saturdays.

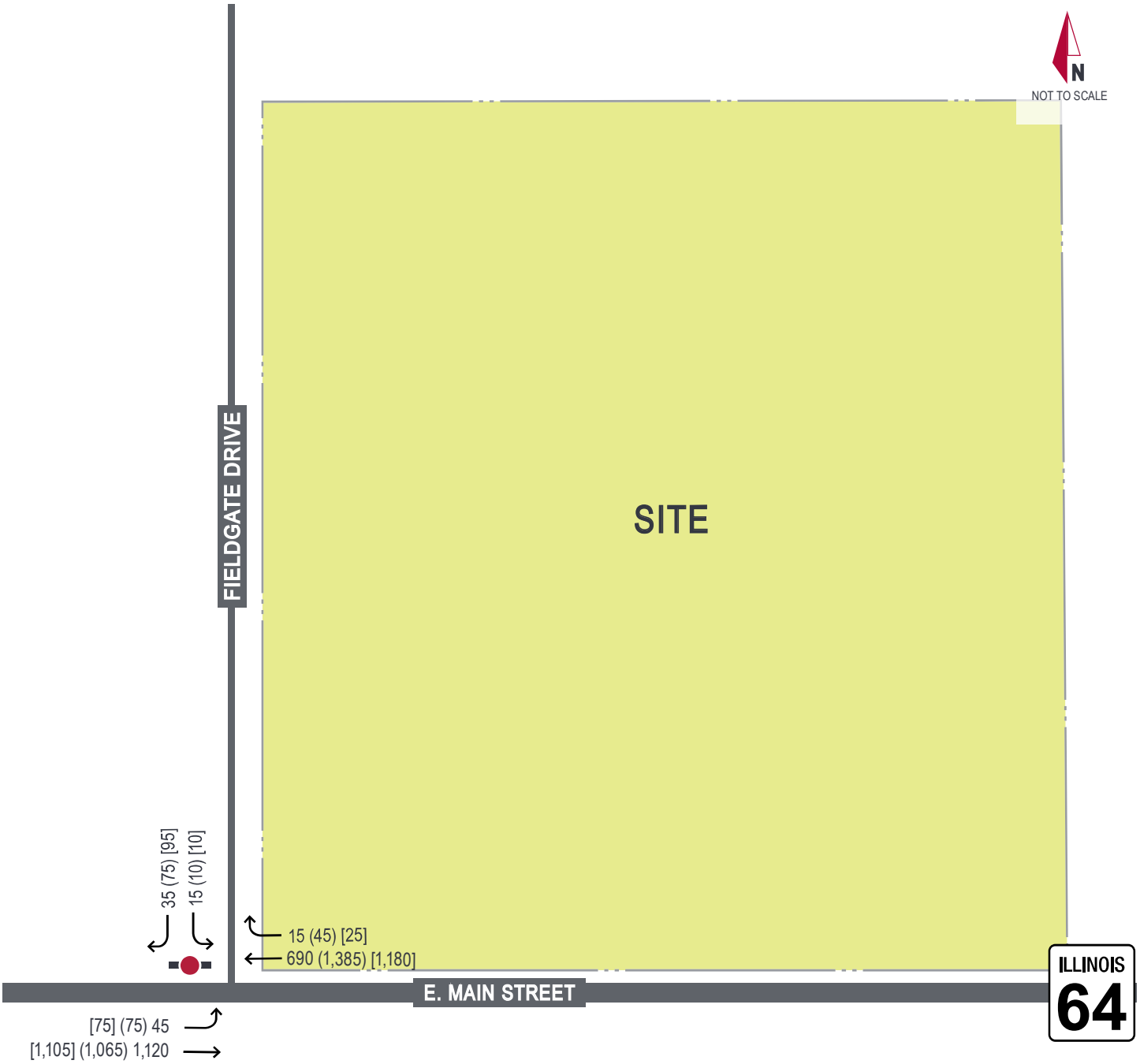
24-hour counts were additionally collected for the study intersection on Thursday, March 25, 2021. The 24-hour traffic counts for the study intersection were compared to historical IDOT count data in order to determine if there was an impact on the traffic patterns in the study area due to COVID-19. The collected March 2021 data was greater than the available 2019 IDOT data along IL 64. Based on the volume comparison, no adjustments were made to the existing 2021 traffic counts.

The peak hour vehicle traffic volumes were rounded to the nearest multiple of five. The existing traffic volumes are presented in **Exhibit 2**. A summary of the traffic count data is provided in the appendix.

Existing Capacity Analysis

Capacity analysis for the existing and future conditions was performed using Synchro Version 10. The capacity of an intersection quantifies its ability to accommodate traffic volumes and is expressed in terms of level of service (LOS), measured in average delay per vehicle. LOS grades range from A to F, with LOS A as the highest (best traffic flow and least delay), LOS E as saturated or at-capacity conditions, and LOS F as the lowest (oversaturated conditions). The lowest LOS grade typically accepted by jurisdictional transportation agencies in Northeastern Illinois is LOS D, and a minimum LOS C is required for through movements on SRA routes such as IL 64.

The LOS grades shown below, which are provided in the Transportation Research Board's Highway Capacity Manual (HCM), quantify and categorize the driver's discomfort, frustration, fuel consumption, and travel times experienced as a result of intersection control and the resulting traffic queuing. A detailed description of each LOS rating can be found in **Table 2.1**.



LEGEND

xx	Weekday AM Peak (7:15 – 8:15am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
	Existing Stop Sign
—	Less than Five Vehicles

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EXHIBIT 2

EXISTING (2021) TRAFFIC VOLUMES

Table 2.1 Level of Service Grading Descriptions[1]

Level of Service	Description
A	Minimal control delay; traffic operates at primarily free-flow conditions; unimpeded movement within traffic stream.
B	Minor control delay at signalized intersections; traffic operates at a fairly unimpeded level with slightly restricted movement within traffic stream.
C	Moderate control delay; movement within traffic stream more restricted than at LOS B; formation of queues contributes to lower average travel speeds.
D	Considerable control delay that may be substantially increased by small increases in flow; average travel speeds continue to decrease.
E	High control delay; average travel speed no more than 33 percent of free flow speed.
F	Extremely high control delay; extensive queuing and high volumes create exceedingly restricted traffic flow.

[1]Highway Capacity Manual, 6th Edition.

The range of control delay for each rating (as detailed in the HCM) is shown in **Table 2.2**. Because signalized intersections are expected to carry a larger volume of vehicles and stopping is required during red time, note that higher delays are tolerated for the corresponding LOS ratings.

Table 2.2 Level of Service Grading Criteria[1]

Level of Service	Average Control Delay (s/veh) 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[2]	> 50	> 80

[1]Highway Capacity Manual, 6th Edition

[2]All movements with a Volume to Capacity (v/C) ratio greater than 1 receive a rating of LOS F.

Based on these standards, capacity results were identified for the study intersections under existing conditions. The results of capacity analysis for existing conditions are summarized in **Table 2.3**. In this table, operation on each approach is quantified according to the average delay per vehicle and the corresponding level of service. The results are based on Synchro's HCM 6th Edition reports. Copies of the Synchro reports are provided in the appendix.

Table 2.3 Existing (2021) Levels of Service

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday Peak	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
IL 64 / Fieldgate Drive △						
Southbound						
Left-Turn	20	C	41	E	32	D
Right-Turn	11	B	18	C	16	C
Approach	*14*	*B*	*20*	*C*	*18*	*C*
Eastbound						
Left-Turn	9	A	15+	C	13	B

△- Minor-Leg Stop-Controlled Intersection

At the minor-leg stop-controlled intersection of IL 64 and Fieldgate Drive, all approaches currently operate acceptably at LOS C or better for each of the AM, PM, and Saturday peak hours. For this study intersection, the 95th percentile queues estimates are approximately one vehicle (approximately 25 feet) or less for all approaches in each peak hour.

3. DEVELOPMENT CHARACTERISTICS

This section of the report outlines the proposed site plan, summarizes site-specific traffic characteristics, defines future roadway improvements, and develops future traffic projections for analysis.

Development Characteristics

The proposed development would include an approximately 5,000 SF convenience store with sixteen (16) vehicle fueling positions. The proposed site would include two full access driveways on Fieldgate Drive (Access A and Access B). Proposed Access A is located approximately 275 feet north of the intersection of IL 64 and Fieldgate Drive and would provide one inbound lane and two outbound lanes including one dedicated left-turn lane and one dedicated right-turn lane. Access A is necessary on the site to facilitate fuel truck operations. Access B is an existing private driveway to the commercial development on the project site located approximately 100 feet north of the intersection of IL 64 and Fieldgate Drive. Access B provides two inbound and two outbound lanes.

In addition to Access A and Access B, the proposed development includes two access points to the surrounding commercial developments via internal connections. The internal accesses were not analyzed in this traffic study. A conceptual site plan is provided in the appendix.

Trip Generation

In order to calculate trips generated by the proposed site, data was referenced from the Institute of Transportation Engineers (ITE) manual titled Trip Generation, Tenth Edition. Trip generation rates for the ITE Land Use Code (LUC) corresponding to the proposed use are shown in **Table 3.1**. A copy of the ITE data are provided in the appendix.

Table 3.1 ITE Trip Generation Data

ITE Land Use	Unit	Weekday			Saturday
		Daily	AM Peak Hour	PM Peak Hour	Midday Peak Hour
Super Convenience Store/Gas Station (LUC) 960	Per vehicle fueling positions	230.52X 50% in/50% out	28.08X 50% in/50% out	22.96X 50% in/50% out	23.26X 50% in/50% out

X = Vehicle Fueling Positions

For the purpose of this study, site generated trips are expected to exhibit multiple routing patterns when traveling to and from the subject site, as described below:

- **Internal Trips** – The proposed redevelopment will be internally connected to the existing adjacent shopping center. It is likely that some patrons that visit the shopping center will also stop at the Casey's General Store. To reflect these internal trips, a 5 percent reduction was assumed to account for the trips between the existing shopping center and the proposed gas station/convenience store.
- **Pass-by** – Pass-by traffic reflects the travel patterns of motorists who are already traveling on the adjacent study roadways and stop at the site en route to another destination. Data in the ITE Trip Generation Handbook, Third Edition, reveals that roughly 62 percent of vehicles at a Convenience Market with a Gas Station are pass-by trips in the weekday morning peak hour and 56 percent of vehicles are pass-by trips during the weekday evening peak hour. ITE data

is not provided for daily and Saturday midday pass-by trips; therefore, the weekday evening pass-by percentage was applied (56 percent).

- **Primary Trips** – Vehicles that travel to the subject development and then return directly to their place of origin are called "primary trips." Primary trips reflect new traffic volumes generated by the proposed development that would approach and depart on the same route. Trips to/from the site that are not pass-by trips are expected to be primary trips.

No existing traffic was removed from the network. **Table 3.2** shows the site generated traffic projections.

Table 3.2 Site-Generated Traffic Projections[1]

Land Use	Size	Daily	Weekday						Saturday		
			AM Peak Hour			PM Peak Hour			Midday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Super Convenience Market / Gas Station (LUC 960)	16 Fueling Positions	3,690	225	225	450	185	185	370	185	185	370
Internal Shopping Center Trips		-180	-10	-10	-20	-10	-10	-20	-10	-10	-20
Total Driveway Trips		3,510	215	215	430	175	175	350	175	175	350
Pass-By Trips[2]		-1,960	-135	-135	-270	-100	-100	-200	-100	-100	-200
Net New Site Trips		1,550	80	80	160	75	75	150	75	75	150

[1]In/Out volumes are rounded to the nearest multiple of five.

[2]Based upon the ITE Trip Generation Handbook, Third Edition, pass-by trips for the site are assumed to be 62 percent during the weekday morning, 56 percent during the weekday evening. ITE data is not provided for Saturday midday and daily pass-by trips; therefore, the weekday evening pass-by percentage was applied.

Based on the connectivity of the proposed site to the surrounding commercial shopping center, the internal shopping center trips referenced in **Table 3.2** represent approximately 5% of the proposed site traffic which was assumed to interact directly with the adjacent shopping center. The internal shopping center trips were assumed to be completely contained by roadways internal to the development and shopping center and therefore do not create new trips at Access A-B.

Directional Distribution

The estimated distribution of site-generated traffic on the surrounding roadway network as it approaches and departs the site is a function of several variables, such as the nature of surrounding land uses, prevailing traffic volumes/patterns, characteristics of the street system, and the ease with which motorists can travel over various sections of that system. The anticipated directional distributions estimated for the primary trips and pass-by trips are outlined in **Table 3.3**.

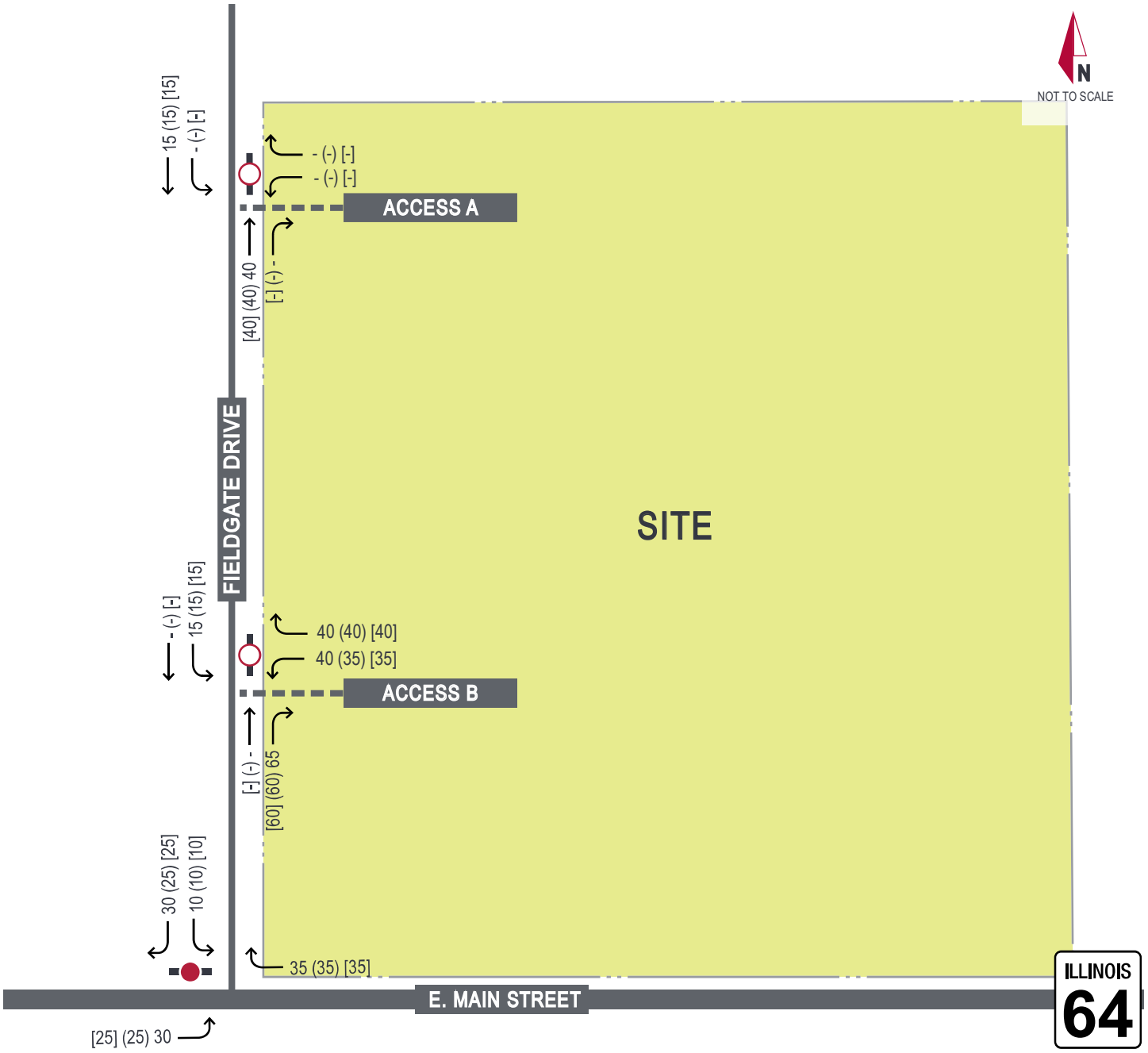
Table 3.3 Estimated Trip Distribution

Traveling to/from	Estimated Trip Distribution	
	Primary Trips	Pass-By Trips[1]
Roadway Direction	%	%
East on IL 64	40%	90%
West on IL 64	40%	10%
North on Fieldgate Drive	20%	-
Total	100%	100%

[1]Pass-by trips are categorized by the trip's origin.

As noted, Access A is necessary on the site to facilitate fuel truck operations. Fueling occurs from the passenger side of the vehicle. Therefore, the fuel truck would enter at Access A, dispense fuel into the underground storage tanks, and then exit Access B. Fueling operations are expected to occur outside of peak hours and therefore no trips at Access A were included in the study.

Based on these assumptions, the site trip assignment for primary trips and pass-by trips are illustrated on **Exhibit 3** and **Exhibit 4**, respectively. The total site-generated trips are depicted in **Exhibit 5**.



LEGEND

xx	Weekday AM Peak (7:15 – 8:15 am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
●-	Existing Stop Sign
○-	Proposed Stop Sign
—	Less than Five Vehicles

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EXHIBIT 3

SITE TRIP ASSIGNMENT - PRIMARY TRIPS

LEGEND

xx	Weekday AM Peak (7:15 – 8:15 am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
●-	Existing Stop Sign
○-	Proposed Stop Sign
—	Less than Five Vehicles

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EXHIBIT 4

SITE TRIP ASSIGNMENT - PASS-BY TRIPS

LEGEND

xx	Weekday AM Peak (7:15 – 8:15 am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
●-	Existing Stop Sign
○-	Proposed Stop Sign
—	Less than Five Vehicles

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EXHIBIT 5

SITE TRIP ASSIGNMENT - TOTAL TRIPS

4. FUTURE CONDITIONS

This section of the report outlines the proposed site plan, summarizes site-specific traffic characteristics, and develops future traffic projections for analysis.

Future Background Traffic Projections

Background traffic volumes were estimated using data from the Chicago Metropolitan Agency for Planning (CMAP). Based on information received from CMAP, traffic growth on IL 64 is projected at a compounded rate of roughly 0.64 percent annually through Year 2050. To be conservative for the analysis, the 0.64 percent was applied to Fieldgate Drive to account for background traffic growth. An official letter from CMAP documenting the projected Year 2050 traffic volume on the study roadways is included in the appendix. The future background traffic volumes for Year 2027 are presented in **Exhibit 6**.

Future No-Build Capacity Analysis

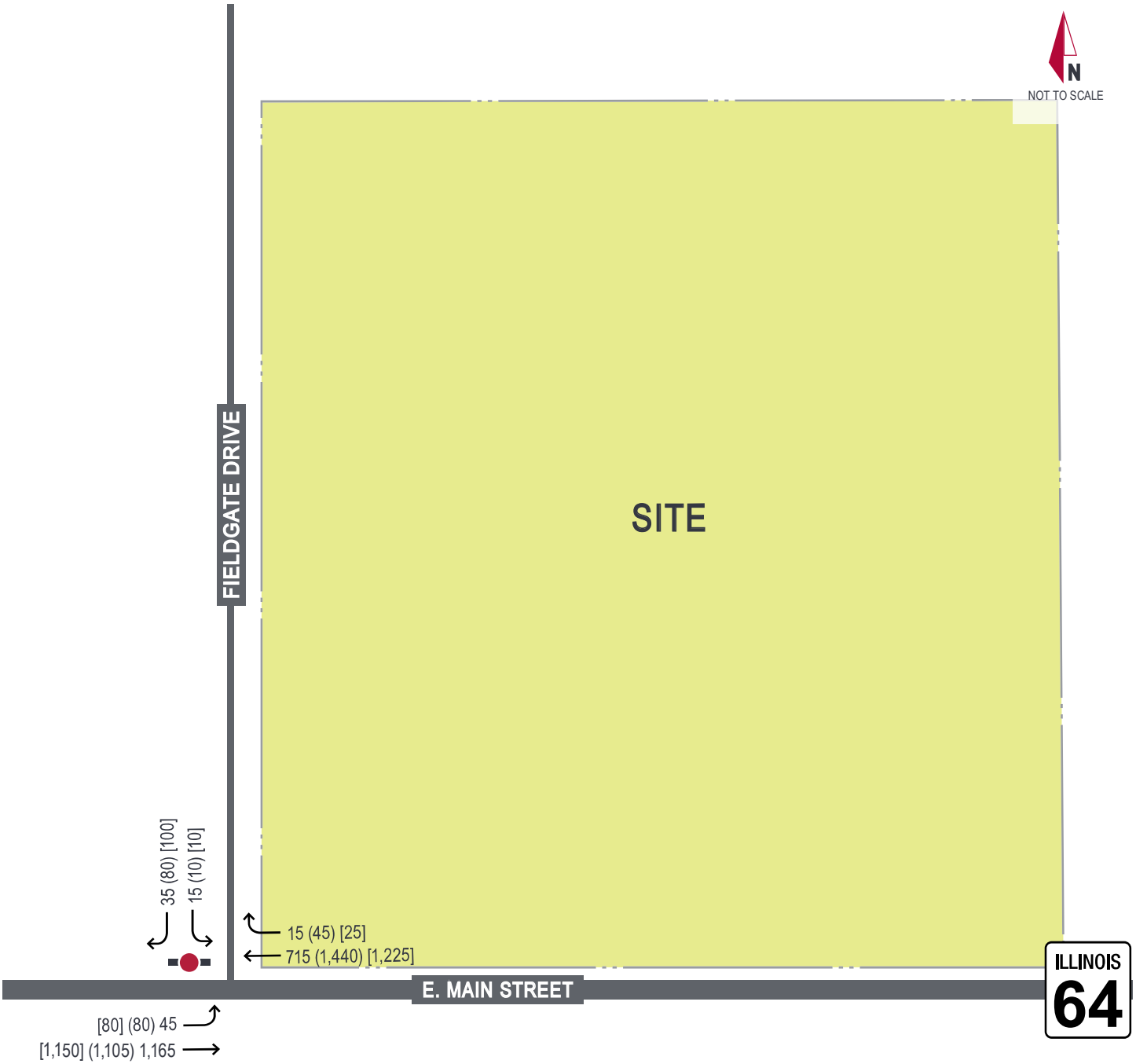
Based on these volume projections, capacity results were identified for the study intersections under future (2027) no-build conditions. The results of capacity analysis are summarized in **Table 4.1** Consistent with the existing conditions analysis, the results are based on Synchro's HCM 6th Edition reports, copies of which are included in the appendix.

Table 4.1 Future No-Build Levels of Service

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday Peak	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
IL 64 / Fieldgate Drive △						
Southbound						
Left-Turn	21	C	44	E	35	D
Right-Turn	11	B	19	C	17	C
Approach	*14*	*B*	*21*	*C*	*18*	*C*
Eastbound						
Left-Turn	10-	A	16	C	13	B

△- Minor-Leg Stop-Controlled Intersection

At the minor-leg stop-controlled intersection of IL 64 and Fieldgate Drive, all approaches are projected to continue to operate acceptably for each of the AM, PM, and Saturday peak hours. Under the Future 2027 No-Build traffic conditions, all approaches are anticipated to remain at the same LOS grades compared to the Existing 2021 traffic conditions. For this study intersection, the 95th percentile queues estimates are approximately one vehicle (approximately 25 feet) or less for all approaches in each peak hour.



LEGEND

xx	Weekday AM Peak (7:15 – 8:15am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
	Existing Stop Sign
—	Less than Five Vehicles

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EXHIBIT 6

FUTURE NO-BUILD (2027) TRAFFIC PROJECTIONS

Future Geometry

Turn Lane Analysis

Total traffic projections for Year 2027 were calculated by adding the site-generated trips (**Exhibit 5**) to future no-build traffic projections (**Exhibit 6**). Traffic projections for the future (2027) build scenario are illustrated in **Exhibit 7**. For the analysis of future traffic conditions, the existing intersection geometrics and control was assumed as there are no planned improvements in the area. A review of turn lane warrants was completed based on criteria outlined in the IDOT guidelines provided in the IDOT *Bureau of Design and Environment (BDE) Manual.*

For the analysis of future traffic conditions, turn lane warrants were evaluated for the study intersections and the proposed site access driveways using guidelines in the IDOT *BDE Manual*. Based on the IDOT *BDE Manual* volume guidance provided for unsignalized intersections on two-lane facilities, projected future traffic volumes do not meet warrant criteria for a southbound left-turn lane or a northbound right-turn lane on Fieldgate Drive at Access A or a southbound left-turn lane at Access B. A northbound right-turn lane is warranted at Access B based on the *BDE Manual*. Per coordination with the City of St. Charles, Fieldgate Drive should be restriped to provide a northbound right-turn lane as its cross section is wide enough for two (2) lanes. Therefore, a northbound right-turn lane was included in the analysis of future build conditions.

Signal Warrant Analysis

In addition to the turn lane warrants, a signal warrant analysis was performed according to criteria set by the *Manual on Uniform Traffic Control Devices* (MUTCD) for future traffic projections at the intersection of IL 64 and Fieldgate Drive.

A signal warrant analysis was performed according to criteria set for Warrant 1 (Eight-Hour Warrant), Condition A (Minimum Vehicular Volume) and Condition B (Interruption of Continuous Traffic). Warrant 1 can be satisfied by meeting any one of three conditions: Condition A (Minimum Vehicular Volume), Condition B (Interruption of Continuous Traffic), or a combined Condition A & B that has reduced volume thresholds that must be met for both conditions in order to warrant a signal. This warrant is typically evaluated with at least eight hours of traffic count data for an intersection. Because only peak hour projections can be formulated for the proposed development, typical IDOT practice allows a signal warrant to instead be evaluated by reducing peak hour volumes to 55 percent of their projected total to represent the minimum volume during a given eight-hour period. Minor-street right-turning volumes were also reduced at the study intersections in accordance with Pagone's Theorem, per IDOT requirements. These reduced volumes were compared to MUTCD criteria for signal warrant analysis.

Table 4.2 reports the signal warrant analysis conducted for Year 2027 Build traffic conditions.

LEGEND

xx	Weekday AM Peak (7:15 – 8:15 am)
(xx)	Weekday PM Peak (4:45 – 5:45pm)
[xx]	Saturday Peak (12:00 – 1:00pm)
●	Existing Stop Sign
○	Proposed Stop Sign
—	Less than Five Vehicles

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EXHIBIT 7

FUTURE BUILD (2027) TRAFFIC PROJECTIONS

Table 4.2 Summary of Signal Warrant Analyses

Intersection / Scenario	Major Street	Higher-Volume Minor-Leg Approach	Meets Warrant?
MUTCD Criteria for four-lane Major Street with four-lane Minor Street (35 MPH, SRA)			
Warrant 1A	600	200	--
Warrant 1B	900	150	--
Combination[1]			--
Warrant 1A	--	--	--
Warrant 1B	--	--	--
IL 64 / Fieldgate Drive	1,502	59	No

[1]To satisfy warrant criteria for the combined Conditions A & B, the minimum volume thresholds for both conditions must be met.

As shown in **Table 4.2**, a signal warrant is not met at the study intersection. For the Future (2027) Build traffic conditions, minor-leg stop control is recommended for outbound traffic at each study intersection.

Access A was assumed to provide one inbound lane, one outbound left-turn lane, and one outbound right-turn lane with minor-leg stop-control. Access A is necessary on the site to facilitate fuel truck operations. Fueling occurs from the passenger side of the vehicle. Therefore, the fuel truck would enter at Access A, dispense fuel into the underground storage tanks, and then exit Access B. Fueling operations are expected to occur outside of peak hours and therefore no trips at Access A were included in the study.

Access B was assumed to provide two inbound lanes, one outbound left-turn lane, and one outbound right-turn lane with minor-leg stop-control, the same as existing conditions.

Future Build Capacity Analysis

Based on the volume projections presented in **Exhibit 7**, capacity results were identified for the study intersections under Future Year 2027 Build conditions. The results of capacity analysis are summarized in **Table 4.3.**

Table 4.3 Future Build Level of Service

Intersection	Weekday AM Peak		Weekday PM Peak		Saturday Midday Peak	
	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
IL 64 / Fieldgate Drive △						
Southbound						
Left-Turn	23	C	>120	F	>120	F
Right-Turn	13	B	36	D	22	D
Approach	*14*	*B*	*89*	*F*	*51*	*F*
Eastbound						
Left-Turn	10-	A	18	C	14	B
Fieldgate Drive / Access A △						
Southbound						
Left-Turn	7	A	8	A	8	A
Westbound						
Left-Turn	9	A	10+	B	10+	B
Right-Turn	9	A	9	A	9	A
Approach	*9*	*A*	*10-*	*A*	*10-*	*A*
Fieldgate Drive / Access B △						
Southbound						
Left-Turn	8	A	8	A	8	A
Westbound						
Left-Turn	11	B	11	B	11	B
Right-Turn	9	A	9	A	9	A
Approach	11	B	12	B	12	B

△ - Minor-Leg Stop-Controlled Intersection

At the minor-leg stop-controlled intersection of IL 64 and Fieldgate Drive, all approaches are projected to continue to operate acceptably at LOS B or better for the AM peak hour. Under the Future 2027 Build traffic conditions, the southbound approach is anticipated to increase from LOS C to LOS F in the PM and Saturday peak hours compared to the Future Year 2027 No-Build traffic conditions. Low levels-of-service for side-street approaches are not uncommon, as vehicles may experience significant delays turning onto a major roadway. The eastbound left-turn at the study intersection is anticipated to operate similarly to the Future Year 2027 No-Build traffic conditions with no changes to LOS grades in any of the peak hours.

For this study intersection, the 95th percentile queues estimates are 1 vehicle or less (<25 feet) for the eastbound left-turn approach in each peak hour. As noted in the trip generation and distribution sections of this report, traffic volumes at this intersection may be conservatively high, resulting in 95th percentile estimated queues of up to 4 vehicles (100 feet) in the PM peak hour, 3 vehicles (75 feet) in the Saturday peak hour, and 1 vehicle (25 feet) in the AM peak hour at the southbound approach.

Additionally, there are many alternate route opportunities through the connectivity of the site to the surrounding shopping center and to adjacent signalized intersections on Foxfield Road accessible via Fieldgate Drive. This analysis may be conservative since outbound site traffic is likely to make an alternate route choice to avoid visible queues when exiting the site.

At the unsignalized intersections of Fieldgate Drive and Access A and Fieldgate Drive and Access B, all approaches are anticipated to operate at LOS B or better under the Future Year 2027 Build traffic conditions for each peak hour. During each peak hour, the 95th percentile queues estimated at the intersection are less than one vehicle (<25 feet).

5. RECOMMENDATIONS & CONCLUSIONS

Based on Kimley-Horn's review of the proposed site plan and evaluation of existing and future traffic conditions, the study intersections are projected to adequately accommodate the proposed development with the implementation of the following improvements:

- **Fieldgate Drive / Access A**
  - Provide a single inbound lane and one outbound left-turn lane and one outbound right-turn lane
  - Minor-leg stop control should be posted for outbound traffic
- **Fieldgate Drive / Access B**
  - Restripe Fieldgate Drive to provide a dedicated northbound right-turn lane
  - Provide two inbound lanes and one outbound left-turn lane and one outbound right-turn lane (existing conditions)
  - Minor-leg stop control should be posted for outbound traffic

No improvements are recommended for the existing minor-leg stop-controlled intersection of IL 64 and Fieldgate Drive. The study intersection does not warrant a signal or additional turn-lanes based on the future build traffic conditions presented in this analysis.

Regardless of the final configuration of the intersection geometrics, several additional items should be taken into consideration when preparing site and roadway improvement plans for the subject development. As the site design progresses, care should be taken with landscaping, signage, and monumentation at the site access locations to ensure that adequate horizontal sight distance is provided from the new stop bars. If alterations to the site plan or land use should occur, changes to the analysis provided within this traffic impact study may be needed.

APPENDIX

Conceptual Site Plan

Traffic Count Data

CMAP Year 2050 Projections

Existing (2021) Capacity Reports

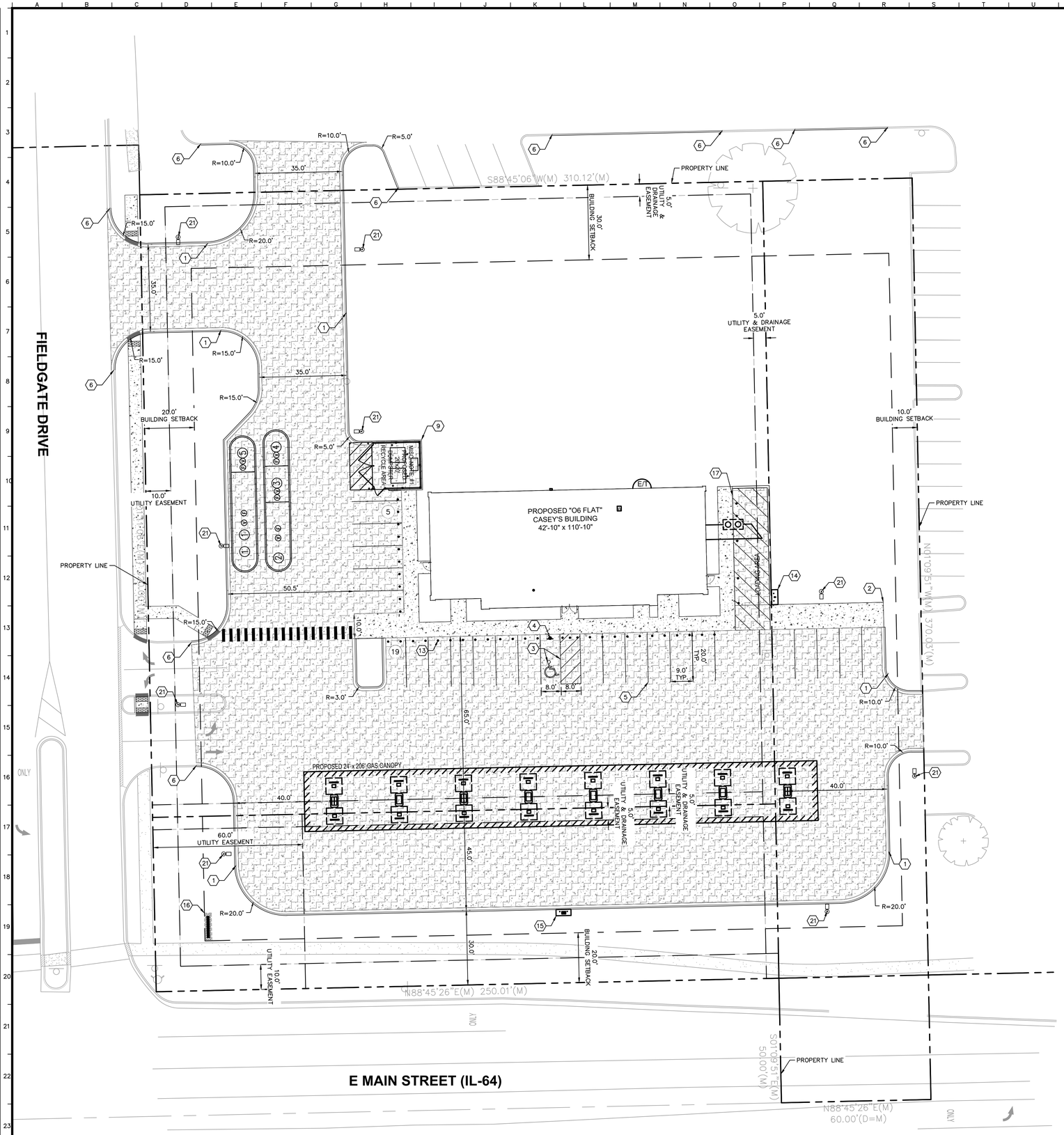
Data from the ITE Manual Trip Generation, Tenth Edition

Data from the ITE Trip Generation Handbook, Third Edition

Future (2027) No-Build Capacity Reports

Future (2027) Build Capacity Reports

CONCEPTUAL SITE PLAN



CITY OF ST CHARLES NOTES

1. DURING CONSTRUCTION, ALL ROADS SHALL BE HARD SURFACED (TEMPORARY OR PERMANENT) AND IN PLACE, CAPABLE OF SUPPORTING VEHICLE LOADING UNDER ALL WEATHER CONDITIONS, PURSUANT TO THE 2015 INTERNATIONAL FIRE CODE, CHAPTER 5, CHAPTER 33, AND APPENDIX D. THE BINDER COAT SHALL BE AN ACCEPTABLE MATERIAL. ACCESS FOR FIRE DEPARTMENT VEHICLES SHALL BE MAINTAINED AT ALL TIMES.

STRIPING REQUIREMENTS

1. PARKING LOT STRIPING SHALL NOT BE APPLIED WITHIN 24 HOURS OF ASPHALT INSTALLATION.
2. PARKING LOT STRIPING SHALL BE TWO COATS OF PAINT. SECOND COAT OF PAINT SHALL BE APPLIED A MINIMUM OF 24 HOURS AFTER THE FIRST COAT.

NORTH

Call Before You Dig
JULIE
1-800-892-0123

GRAPHIC SCALE IN FEET
0 10 20 40

KEY NOTES

1. B6.12 CONCRETE CURB AND GUTTER, TYP. (SEE DETAILS)
2. CONCRETE SIDEWALK, TYP. (SEE DETAILS)
3. ACCESSIBLE PAVEMENT MARKINGS, TYP. (SEE DETAILS)
4. ACCESSIBLE PARKING SIGN, TYP. (MUTCD R7-8, SEE DETAILS)
5. 4" WIDE PAINTED SOLID LINE, TYP.
6. CONNECT TO EXISTING PAVEMENT, SIDEWALK, CURB, TYP.
7. 24" WIDE STOP BAR, TYP. (SEE DETAILS)
8. STOP SIGN, TYP. (MUTCD R1-1, SEE DETAILS)
9. TRASH ENCLOSURE (SEE ARCHITECTURAL PLANS FOR DETAILS)
10. DEPRESSED CURB AND GUTTER
11. ACCESSIBLE RAMP (SEE DETAILS)
12. DETECTABLE WARNINGS
13. BOLLARD, TYP. (SEE DETAILS)
14. AIR COMPRESSOR BOX
15. EMERGENCY SHUT-OFF SWITCH
16. MONUMENT OR PYLON SIGN (SEE ARCHITECTURAL PLANS FOR DETAILS)
17. PAVEMENT STRIPING
18. RIGHT IN ONLY SIGN, TYP. (MUTCD R1-1, SEE DETAILS)
19. DO NOT ENTER SIGN
20. APPROXIMATE LOCATION OF SOIL BORING (SEE GEOTECHNICAL REPORT FOR DETAILS)
21. LIGHT POLE (SEE PHOTOMETRIC PLAN FOR DETAILS)

PAVING AND CURB LEGEND

- CONCRETE SIDEWALK — SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION
- CONCRETE PAVEMENT — SEE CONSTRUCTION DETAILS FOR PAVEMENT SECTION
- STANDARD PITCH CONCRETE CURB AND GUTTER
- REVERSE PITCH CONCRETE CURB AND GUTTER
- CONCRETE DEPRESSED CURB AND GUTTER

SITE DATA TABLE

PROJECT DESCRIPTION:	NEW CONSTRUCTION OF CASEYS FUEL CENTER
LOCATION:	SECTION 25, TOWNSHIP 40N, RANGE 8E
ADDRESS:	2600 E. MAIN ST. ST. CHARLES, IL 60172
PLANNING DISTRICT:	COMMUNITY BUSINESS (BC) PUD
EXISTING LAND USE:	COMMERCIAL – OFFICE
PROPOSED LAND USE:	COMMERCIAL – FUEL STATION
SURROUNDING LAND USE:	NORTH: BC PUD SOUTH: BC PUD & BC EAST: BC PUD WEST: BC PUD
FLOOD ZONE:	N/A
SITE AREA:	2.35 AC (102,226 SF)
NET DEVELOPED AREA:	2.35 AC
MAX BUILDING HEIGHT:	21 FT
FLOOR AREA RATIO:	0.046
LOT COVERAGE:	
BUILDING AREA:	4,747 SF
IMPERVIOUS AREA:	52,400 SF
PERVIOUS AREA:	46,855 SF
BUILDING SETBACKS:	FRONT: 30 FT, INTERIOR SIDE: 15 FT, EXTERIOR SIDE: 32 FT, REAR: 100 FT
LANDSCAPE BUFFERS (PER PUD):	N/A
PARKING REQUIREMENTS:	
STANDARD PARKING SPACES PROVIDED:	23 SPACES
ACCESSIBLE PARKING SPACES REQUIRED:	1 SPACE
ACCESSIBLE PARKING SPACES PROVIDED:	1 SPACE
TOTAL PARKING SPACES PROVIDED:	24 SPACES

No.	REVISIONS	DATE	BY

Kimley»Horn

4201 WINFIELD ROAD, SUITE 600
WARRENVILLE, IL 60555
PHONE: 630-487-5550
WWW.KIMLEY-HORN.COM

SCALE: AS NOTED
DESIGNED BY: EJT
DRAWN BY: LAD
CHECKED BY: EJT

SITE PLAN

CASEY'S ST. CHARLES
2600 E. MAIN STREET
ST. CHARLES, IL 60174

ORIGINAL ISSUE: 07/09/2021
KHA PROJECT NO. 168865004
SHEET NUMBER
C-101

TRAFFIC COUNT DATA

Study Name 01 East Main Street & Fieldgate Drive
Start Date Thursday, March 25, 2021

Report Summary

		Southbound					Westbound					Eastbound							Crosswalk		
Time Period	Class.	R	L	U	I	O	R	T	U	I	O	T	L	U	I	O	Total		Bicycles	Pedestrians	Total
AM Peak Hour	Lights	31	16	0	47	61	15	642	0	657	1057	1041	46	0	1087	673	1791	N	1	0	1
Specified Period	%	94%	100%	0%	96%	95%	88%	93%	0%	93%	93%	93%	98%	0%	93%	93%	93%		100%	0%	
7:15 AM - 8:15 AM	Mediums	2	0	0	2	3	2	26	0	28	44	44	1	0	45	28	75	E	0	0	0
One Hour Peak	%	6%	0%	0%	4%	5%	12%	4%	0%	4%	4%	4%	2%	0%	4%	4%	4%		0%	0%	
7:15 AM - 8:15 AM	Articulated Trucks	0	0	0	0	0	0	21	0	21	33	33	0	0	33	21	54	W	0	0	0
	%	0%	0%	0%	0%	0%	0%	3%	0%	3%	3%	3%	0%	0%	3%	3%	3%		0%	0%	
	Total	33	16	0	49	64	17	689	0	706	1134	1118	47	0	1165	722	1920		1	0	1
	PHF	0.82	0.67	0	0.82	0.84	0.71	0.86	0	0.86	0.9	0.89	0.84	0	0.9	0.86	0.95				
	HV %	6%	0%	0%	4%	5%	12%	7%	0%	7%	7%	7%	2%	0%	7%	7%	7%				
PM Peak Hour	Lights	75	10	0	85	116	46	1369	0	1415	1045	1035	70	1	1106	1445	2606	N	0	0	0
Specified Period	%	100%	100%	0%	100%	98%	100%	99%	0%	99%	97%	97%	97%	100%	97%	99%	98%		0%	0%	
4:45 PM - 5:45 PM	Mediums	0	0	0	0	2	0	5	0	5	19	19	2	0	21	5	26	E	0	0	0
One Hour Peak	%	0%	0%	0%	0%	2%	0%	0%	0%	0%	2%	2%	3%	0%	2%	0%	1%		0%	0%	
4:45 PM - 5:45 PM	Articulated Trucks	0	0	0	0	0	0	11	0	11	9	9	0	0	9	11	20	W	0	0	0
	%	0%	0%	0%	0%	0%	0%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%		0%	0%	
	Total	75	10	0	85	118	46	1385	0	1431	1073	1063	72	1	1136	1461	2652		0	0	0
	PHF	0.72	0.62	0	0.76	0.76	0.64	0.96	0	0.95	0.94	0.93	0.72	0.25	0.92	0.96	0.96				
	HV %	0%	0%	0%	0%	2%	0%	1%	0%	1%	3%	3%	3%	0%	3%	1%	2%				

Study Name	01 East Main Street & Fieldgate Drive
Start Date	Saturday, March 27, 2021

Report Summary

		Southbound					Westbound					Eastbound							Crosswalk		
Time Period	Class.	R	L	U	I	O	R	T	U	I	O	T	L	U	I	O	Total		Bicycles	Pedestrians	Total
Saturday Peak Period	Lights	93	10	0	103	99	25	1171	0	1196	1100	1090	74	0	1164	1264	2463	N	0	0	0
Specified Period	%	96%	100%	0%	96%	100%	100%	99%	0%	99%	99%	99%	100%	0%	99%	99%	99%		0%	0%	
12:00 PM - 1:00 PM	Mediums	4	0	0	4	0	0	8	0	8	7	7	0	0	7	12	19	E	0	0	0
One Hour Peak	%	4%	0%	0%	4%	0%	0%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%		0%	0%	
12:00 PM - 1:00 PM	Articulated Trucks	0	0	0	0	0	0	3	0	3	7	7	0	0	7	3	10	W	0	0	0
	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	1%	0%	0%		0%	0%	
	Total	97	10	0	107	99	25	1182	0	1207	1114	1104	74	0	1178	1279	2492		0	0	0
	PHF	0.9	0.83	0	0.92	0.73	0.89	0.89	0	0.9	0.94	0.94	0.69	0	0.92	0.89	0.93				
	HV %	4%	0%	0%	4%	0%	0%	1%	0%	1%	1%	1%	0%	0%	1%	1%	1%				

CMAP YEAR 2050 PROJECTIONS

TRAFFIC FORECAST RECORD

Record Number: ka-10-21

Type of Report: Projection

Year Sought: 2050

Analyst: JAR

Organization requesting forecast: Kimley-Horn

Contact: Danielle Kronowski, EIT

Email or Phone danielle.kronowski@kimley-horn.com

Sponsor: IDOT

Date request was received: March 31, 2021

Date that response was emailed: March 31, 2021

Facility Location: IL 64 from Fieldgate Drive to Kirk Rd

Municipality: St. Cjharles

Chicago Metropolitan Agency for Planning

433 West Van Buren Street
Suite 450
Chicago, IL 60607

312-454-0400
cmap.illinois.gov

March 31, 2021

Danielle Kronowski, EIT
Transportation Analyst
Kimley-Horn
1001 Warrenville Road
Suite 350
Lisle, IL 60532

Subject: IL 64 from Fieldgate Drive to Kirk Road
IDOT

Dear Ms. Kronowski:

In response to a request made on your behalf and dated March 31, 2021, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volume	Year 2050 ADT
IL 64 (E. Main St) from Fieldgate Dr to Kirk Rd	29,500	36,000

Traffic projections are developed using existing ADT data provided in the request letter and the results from the June 2020 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP
Senior Planner, Research & Analysis

cc: Quigley (IDOT)
2021_CY_TrafficForecast\St.Charles\ka-10-21\ka-10-21.docx

EXISTING (2021) CAPACITY REPORTS

Weekday Morning Peak Hour

Weekday Evening Peak Hour

Saturday Midday Peak Hour

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	1120	690	15	15	35
Future Vol, veh/h	45	1120	690	15	15	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	7	7	12	2	6
Mvmt Flow	47	1179	726	16	16	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	742	0	-	0	1410	363
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	684	-
Critical Hdwy	4.14	-	-	-	6.84	7.02
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.36
Pot Cap-1 Maneuver	861	-	-	-	129	622
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	462	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	861	-	-	-	122	622
Mov Cap-2 Maneuver	-	-	-	-	255	-
Stage 1	-	-	-	-	416	-
Stage 2	-	-	-	-	462	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	861	-	-	-	255	622
HCM Lane V/C Ratio	0.055	-	-	-	0.062	0.059
HCM Control Delay (s)	9.4	-	-	-	20	11.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	1065	1385	45	10	75
Future Vol, veh/h	75	1065	1385	45	10	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	2	2	2	2
Mvmt Flow	79	1121	1458	47	11	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1505	0	-	0	2177	729
Stage 1	-	-	-	-	1458	-
Stage 2	-	-	-	-	719	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	436	-	-	-	39	365
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	444	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	436	-	-	-	32	365
Mov Cap-2 Maneuver	-	-	-	-	111	-
Stage 1	-	-	-	-	147	-
Stage 2	-	-	-	-	444	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	20.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	436	-	-	-	111	365
HCM Lane V/C Ratio	0.181	-	-	-	0.095	0.216
HCM Control Delay (s)	15.1	-	-	-	40.8	17.6
HCM Lane LOS	C	-	-	-	E	C
HCM 95th %tile Q(veh)	0.7	-	-	-	0.3	0.8

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	1105	1180	25	10	95
Future Vol, veh/h	75	1105	1180	25	10	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	4
Mvmt Flow	79	1163	1242	26	11	100

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1268	0	-	0	1982	621
Stage 1	-	-	-	-	1242	-
Stage 2	-	-	-	-	740	-
Critical Hdwy	4.14	-	-	-	6.84	6.98
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.34
Pot Cap-1 Maneuver	544	-	-	-	54	425
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	433	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	544	-	-	-	46	425
Mov Cap-2 Maneuver	-	-	-	-	143	-
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	433	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	17.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	544	-	-	-	143	425
HCM Lane V/C Ratio	0.145	-	-	-	0.074	0.235
HCM Control Delay (s)	12.7	-	-	-	32.2	16.1
HCM Lane LOS	B	-	-	-	D	C
HCM 95th %tile Q(veh)	0.5	-	-	-	0.2	0.9

DATA FROM THE ITE MANUAL TRIP GENERATION, TENTH EDITION

Land Use: 960
Super Convenience Market/Gas Station

Description

This land use includes gasoline/service stations with convenience markets where there is significant business related to the sale of convenience items and the fueling of motor vehicles. Some commonly sold convenience items include newspapers, freshly brewed coffee, daily-made donuts, bakery items, hot and cold beverages, breakfast items, dairy items, fresh fruits, soups, light meals, ready-to-go and freshly made sandwiches and wraps, and ready-to-go salads. Stores typically also had automated teller machines (ATMs), and public restrooms. The sites included in this land use category have the following two specific characteristics:

- The gross floor area of the convenience market is at least 3,000 gross square feet
- The number of vehicle fueling positions is at least 10

Convenience market with gasoline pumps (Land Use 853) and gasoline/service station with convenience market (Land Use 945) are related uses.

Additional Data

To reflect changing characteristics of the convenience market component of this land use, only data from the past two decades have been included in this land use.

The independent variable, vehicle fueling positions, is defined as the maximum number of vehicles that can be fueled simultaneously. Gasoline/service stations in this land use include “pay-at-the-pump” and traditional fueling stations.

A multi-variable regression analysis based on both the convenience market gross floor area (GFA) and the number of vehicle fueling positions (VFP) produced a series of fitted curve equations. The equations are in the form of:

Vehicle Trips = [(VFP Factor) x (Number of VFP)] + [(GFA Factor) x (GFA)] + (Constant)

The values for the VFP factor, GFA factor, and constant are presented in the following table for each time period for which a fitted curve equation could produce an R^2 value of at least 0.50.

Time Period	VFP Factor	GFA Factor	Constant	R^2
Weekday, AM Peak Hour of Generator	10.3	105	-290	0.62
Weekday, PM Peak Hour of Generator	6.91	76.0	-133	0.68
Weekday, AM Peak Hour of Adjacent Street	16.1	135	-483	0.66
Weekday, PM Peak Hour of Adjacent Street	11.5	82.9	-226	0.51

The sites were surveyed in the late 1990’s, 2000s and the 2010s in Florida, Iowa, Maryland, Minnesota, New Hampshire, New Jersey, Pennsylvania, Texas, Utah, and Wisconsin.

Source Numbers

617, 813, 844, 850, 864, 865, 867, 869, 882, 888, 904, 938, 954, 960, 962

Super Convenience Market/Gas Station
(960)

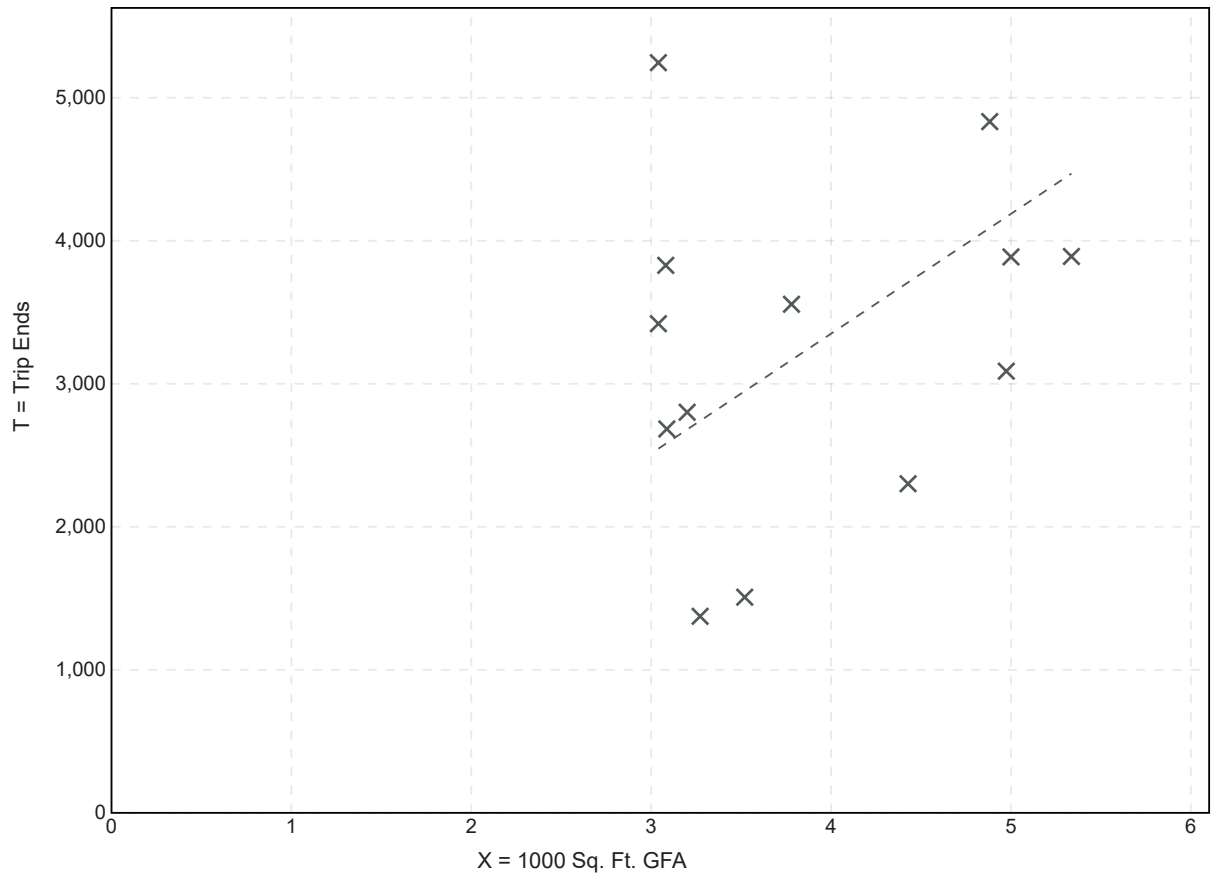
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 13
1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
837.58	419.93 - 1725.33	334.67

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

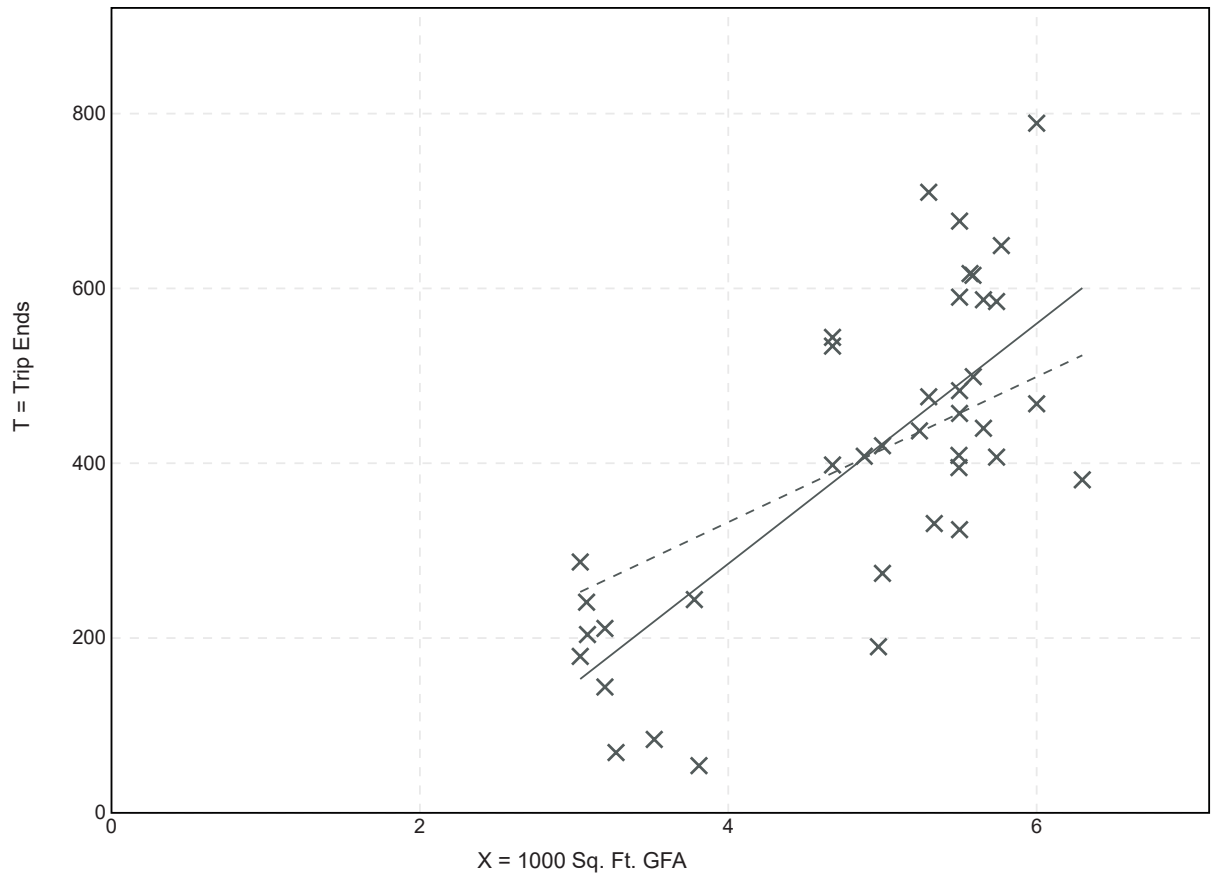
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	39
1000 Sq. Ft. GFA:	5
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
83.14	14.17 - 133.96	28.07

Data Plot and Equation



Fitted Curve Equation: T = 137.38(X) - 264.53

R^2= 0.56

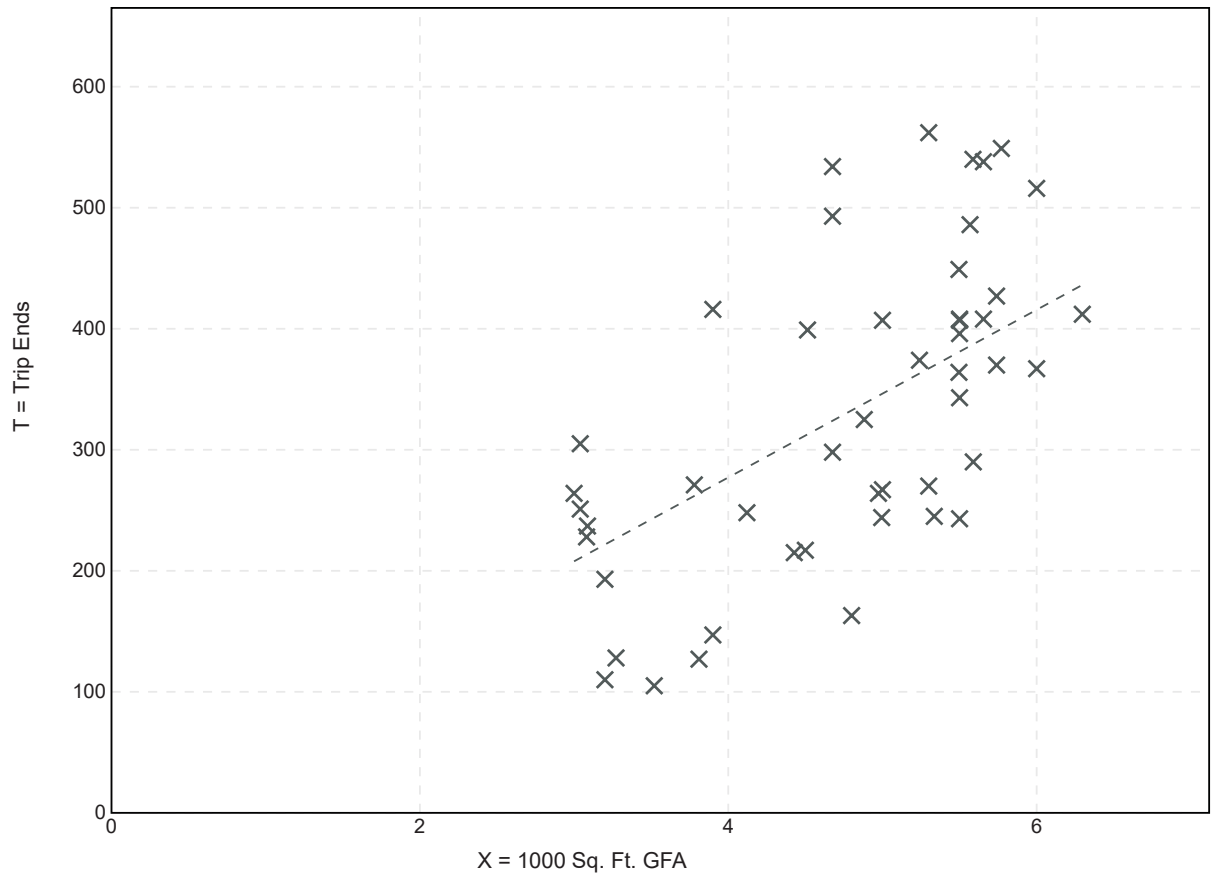
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	48
1000 Sq. Ft. GFA:	5
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
69.28	29.83 - 114.20	21.07

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

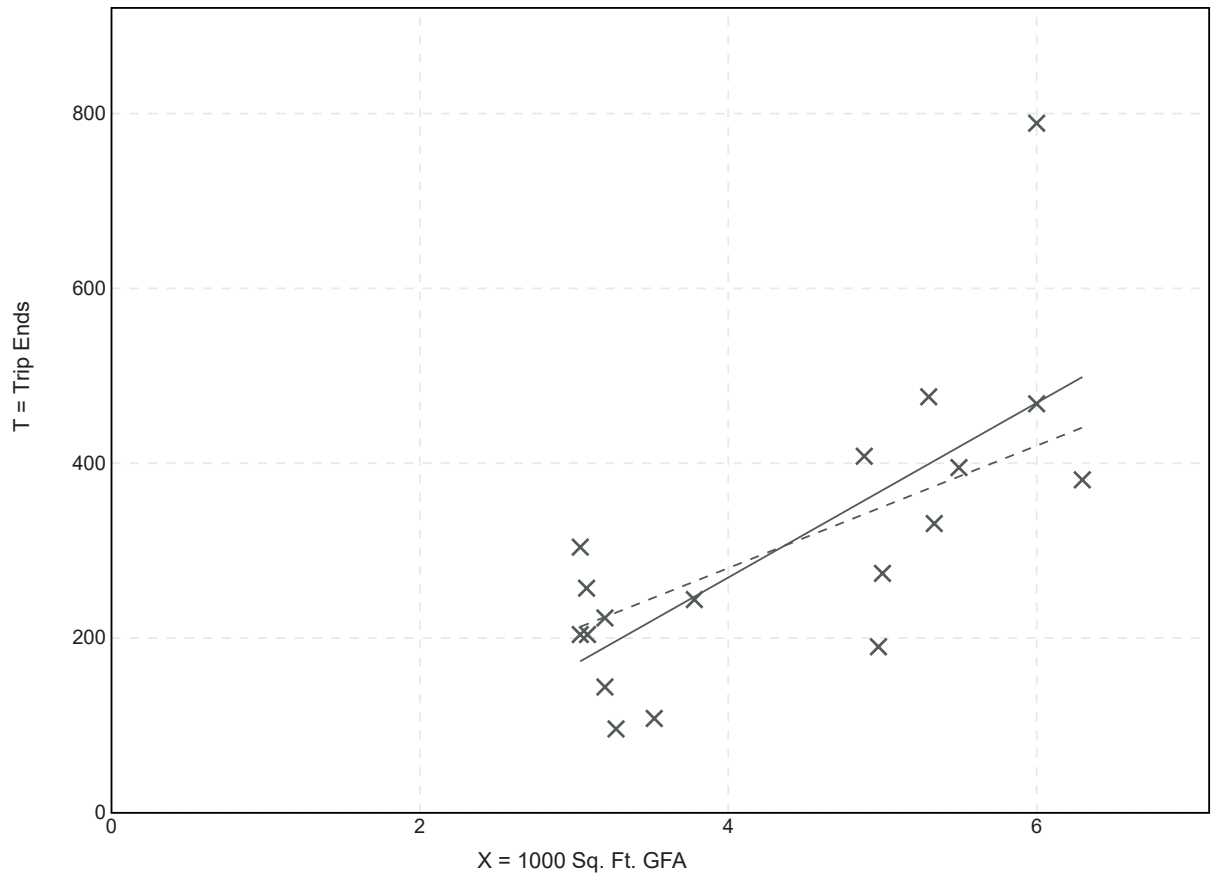
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
AM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 18
1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
70.01	29.34 - 131.50	25.84

Data Plot and Equation



× **Study Site** ——— **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: T = 99.90(X) - 130.36 **R^2= 0.53**

Super Convenience Market/Gas Station
(960)

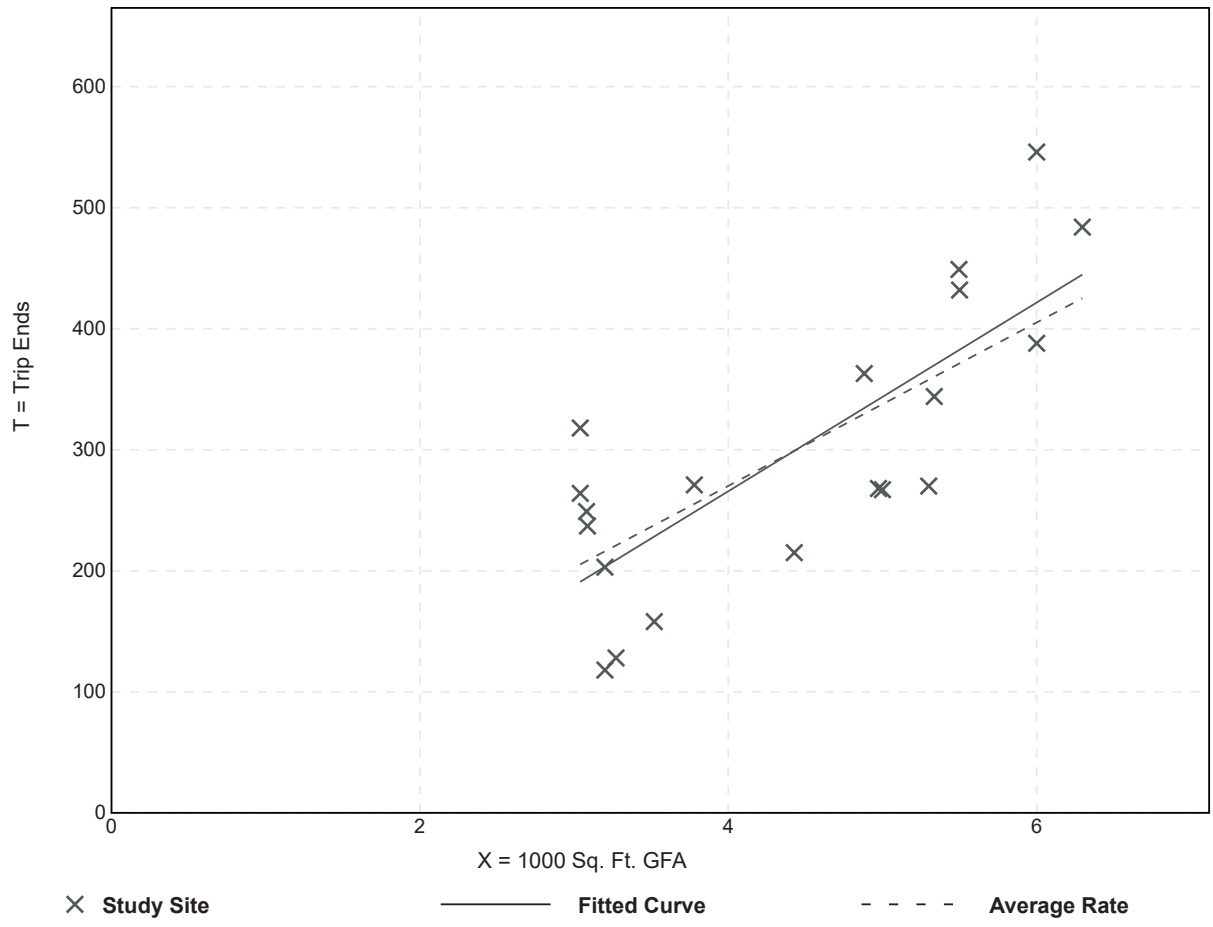
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 20
1000 Sq. Ft. GFA: 4
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
67.53	36.88 - 104.61	17.12

Data Plot and Equation



Fitted Curve Equation: T = 77.96(X) - 46.12

R^2= 0.61

Super Convenience Market/Gas Station
(960)

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

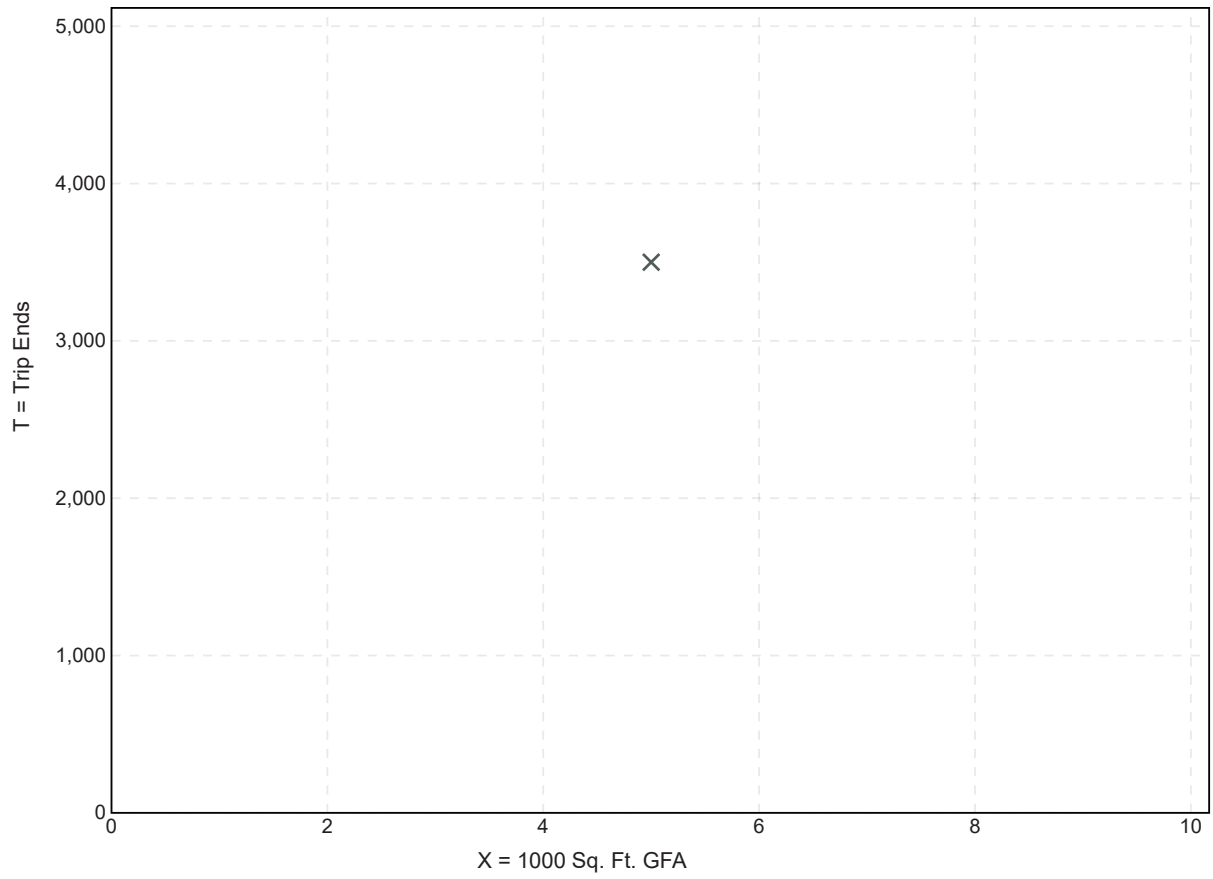
Setting/Location: General Urban/Suburban
Number of Studies: 1
1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
700.00	700.00 - 700.00	*

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

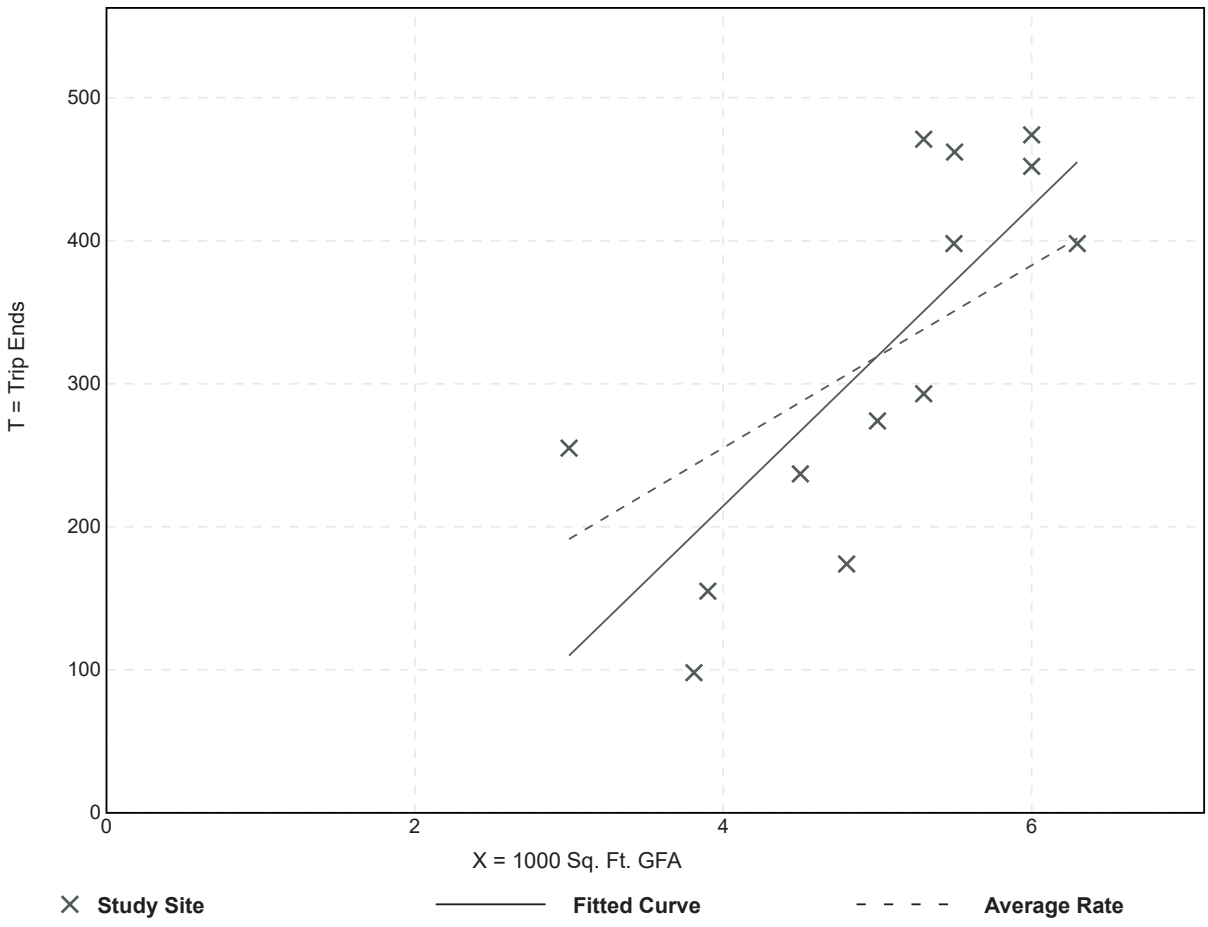
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 13
1000 Sq. Ft. GFA: 5
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
63.80	25.72 - 88.87	19.29

Data Plot and Equation



Fitted Curve Equation: T = 104.71(X) - 204.23

R^2= 0.59

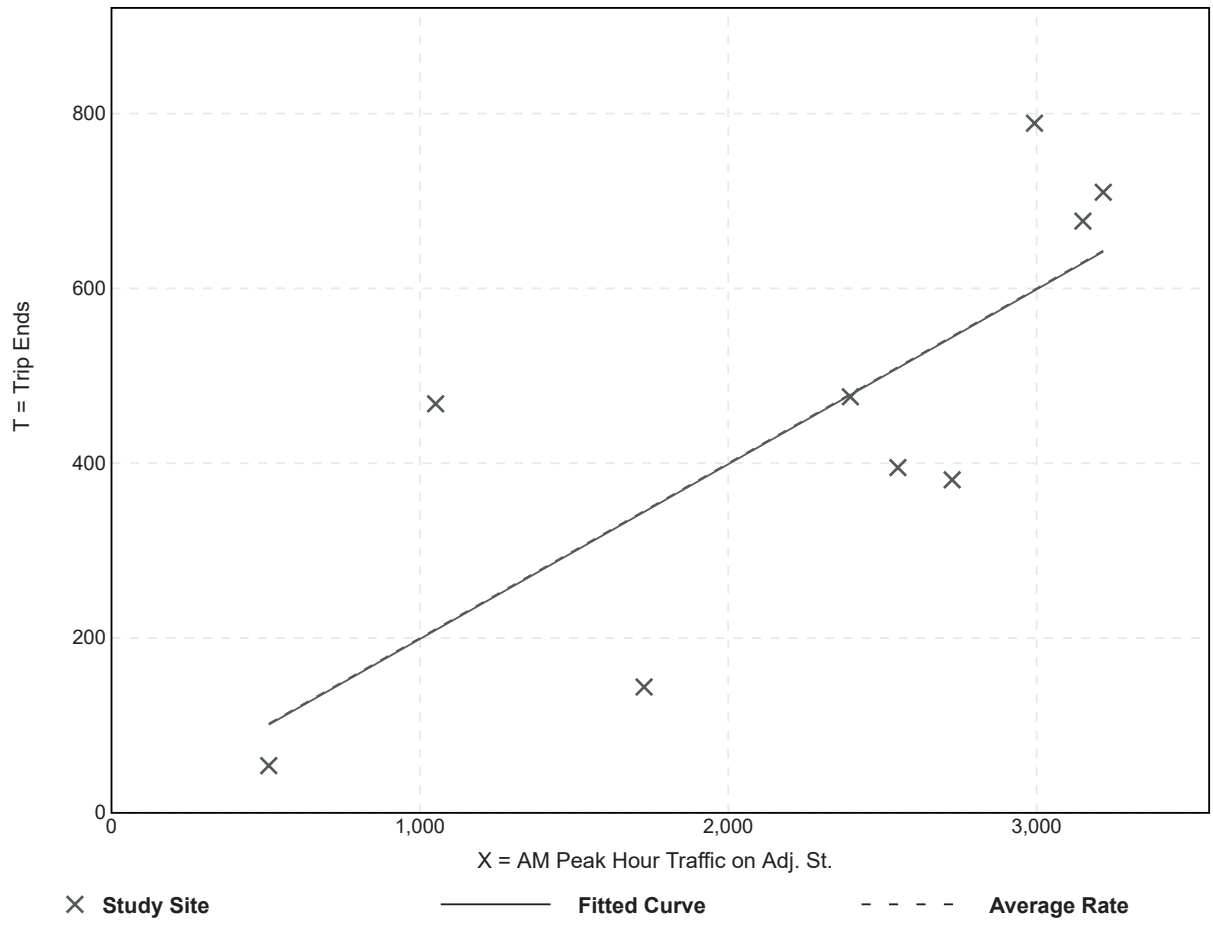
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**AM Peak Hour Traffic on Adj. St.**
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:	9
AM Peak Hour Traffic on Adj. St.:	2258
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per AM Peak Hour Traffic on Adj. St.

Average Rate	Range of Rates	Standard Deviation
0.20	0.08 - 0.45	0.08

Data Plot and Equation



Fitted Curve Equation: T = 0.20(X) - 1.14 **R^2= 0.61**

Super Convenience Market/Gas Station
(960)

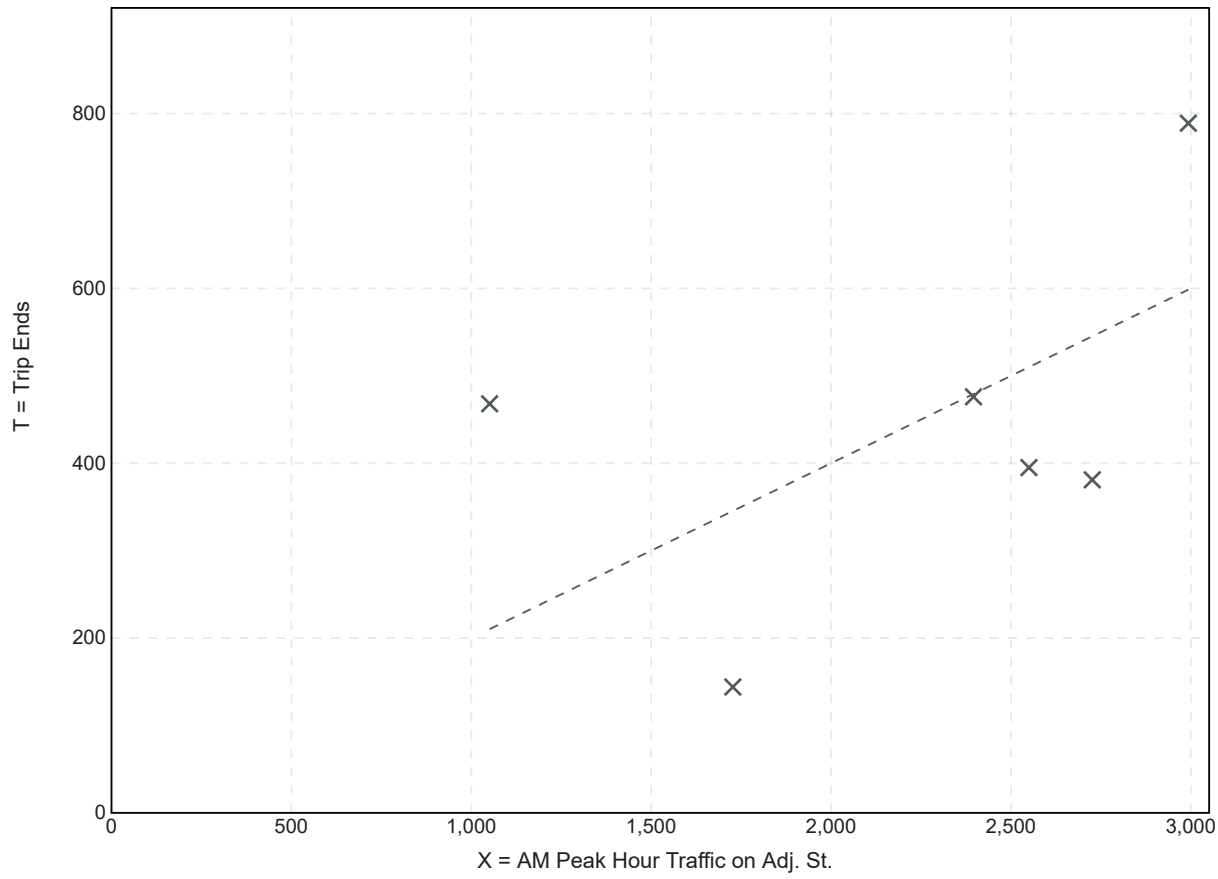
Vehicle Trip Ends vs: **AM Peak Hour Traffic on Adj. St.**
On a: **Weekday,**
AM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
AM Peak Hour Traffic on Adj. St.: 2241
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per AM Peak Hour Traffic on Adj. St.

Average Rate	Range of Rates	Standard Deviation
0.20	0.08 - 0.45	0.10

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

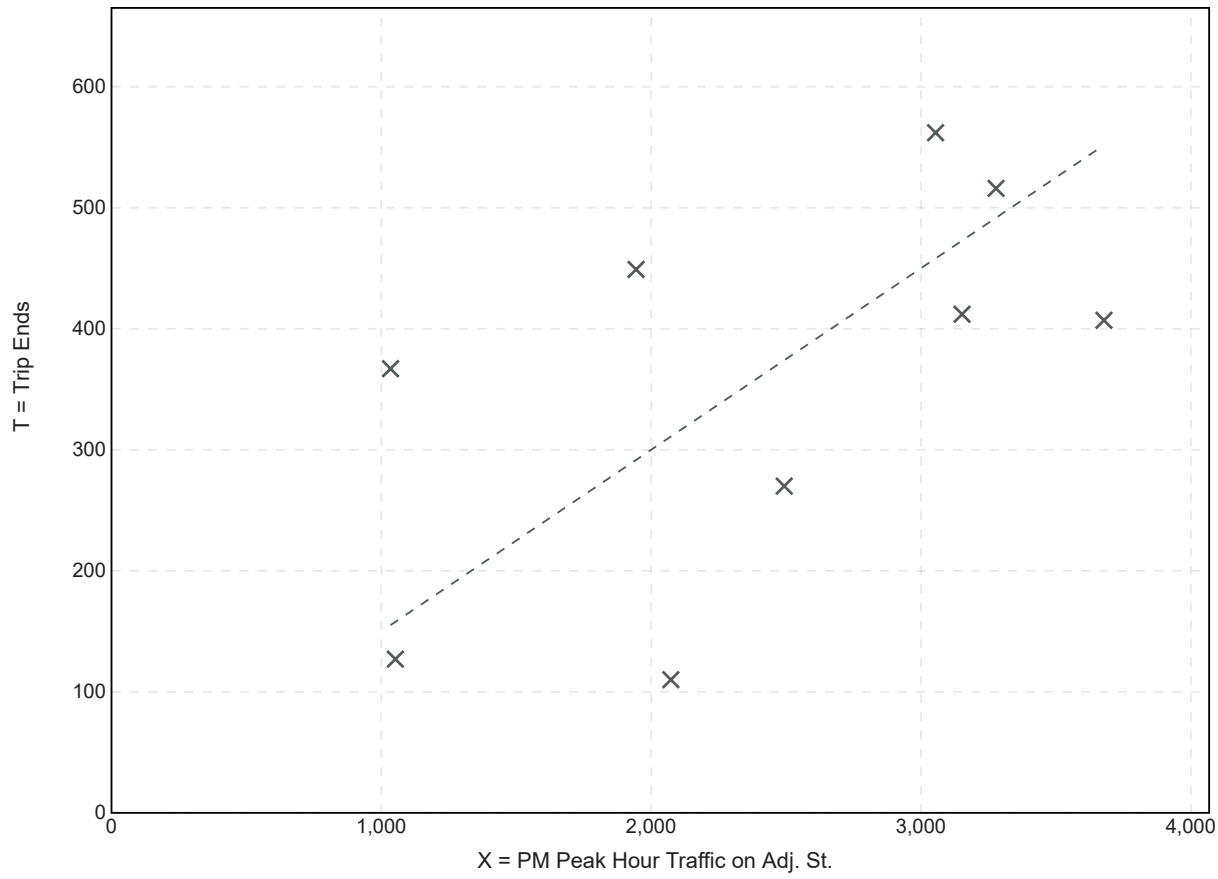
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**PM Peak Hour Traffic on Adj. St.**
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:	9
PM Peak Hour Traffic on Adj. St.:	2418
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per PM Peak Hour Traffic on Adj. St.

Average Rate	Range of Rates	Standard Deviation
0.15	0.05 - 0.35	0.07

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

Super Convenience Market/Gas Station
(960)

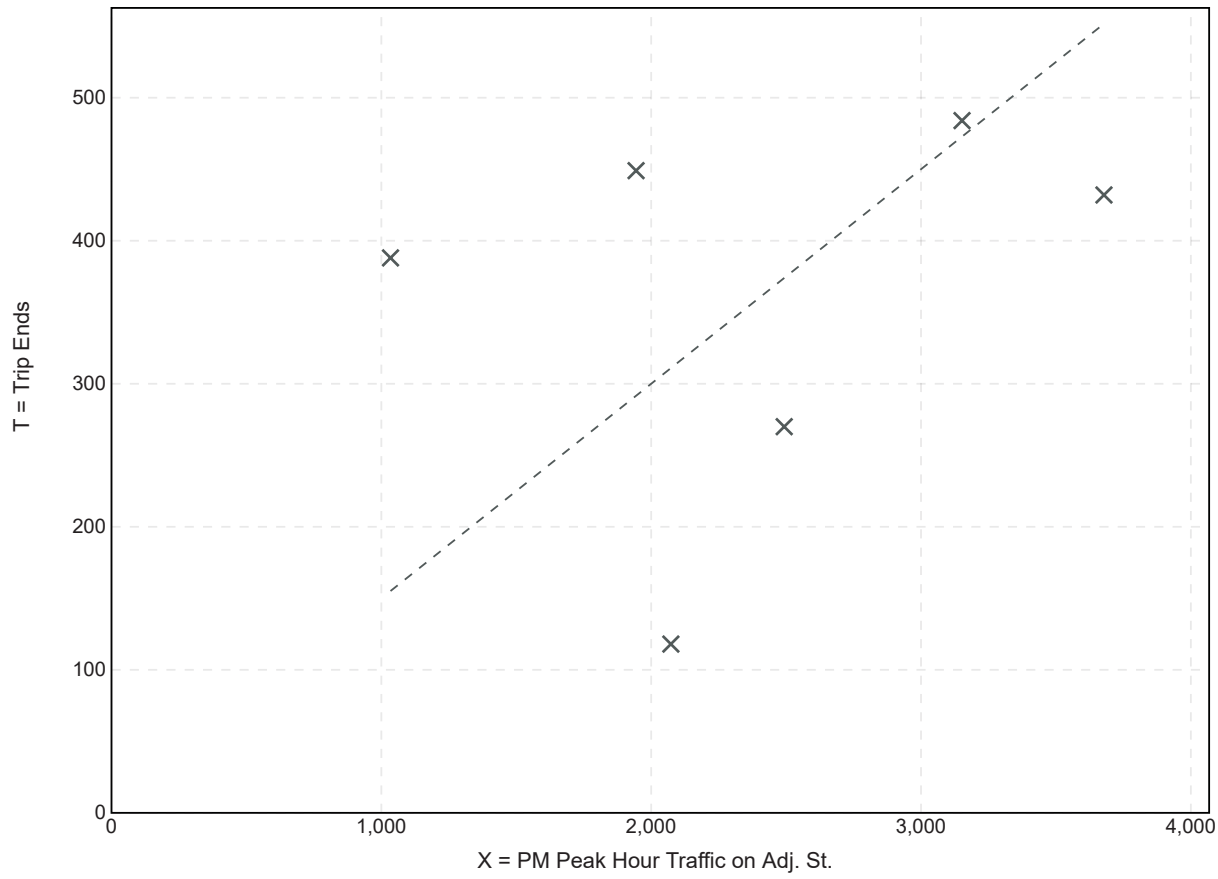
Vehicle Trip Ends vs: **PM Peak Hour Traffic on Adj. St.**
On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
PM Peak Hour Traffic on Adj. St.: 2396
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per PM Peak Hour Traffic on Adj. St.

Average Rate	Range of Rates	Standard Deviation
0.15	0.06 - 0.38	0.09

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: **Employees**
On a: **Weekday**

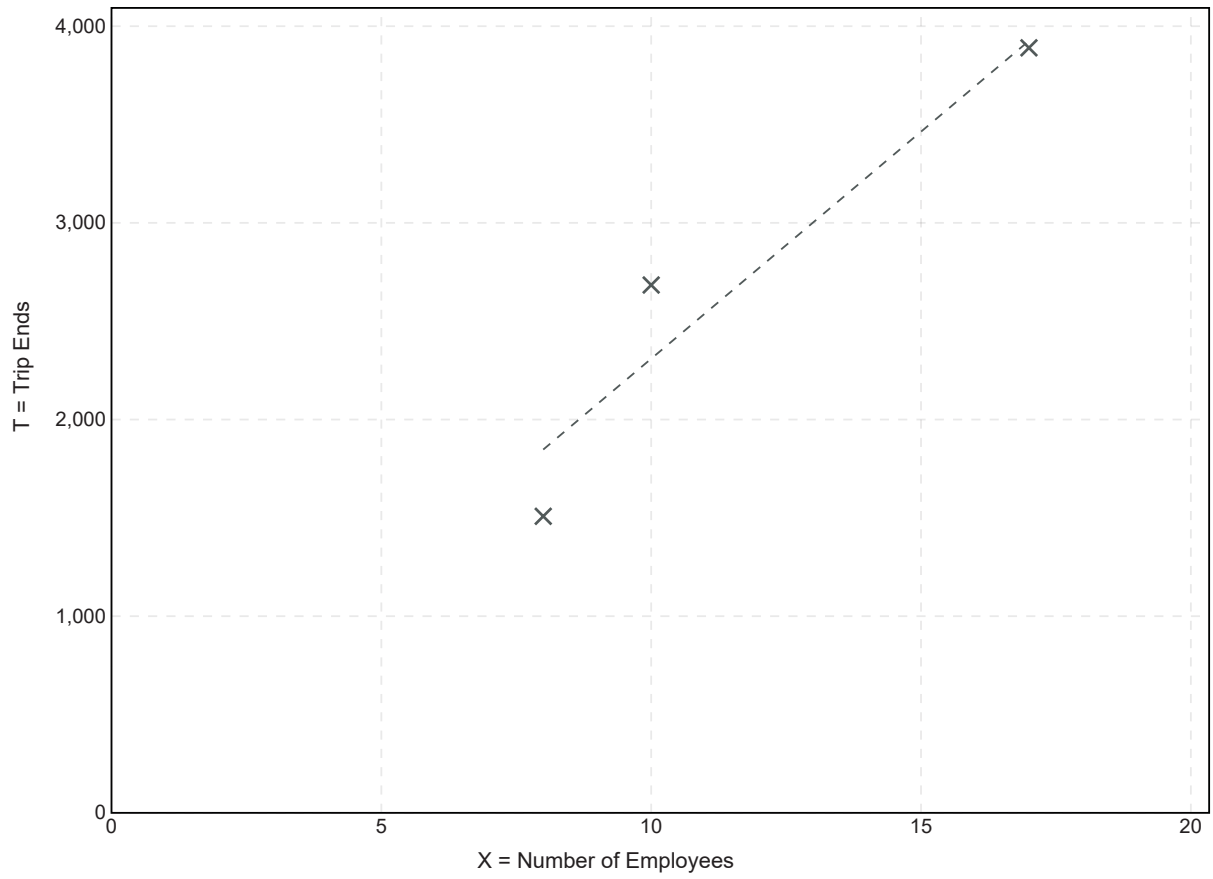
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. Num. of Employees: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
230.91	188.50 - 268.40	34.96

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

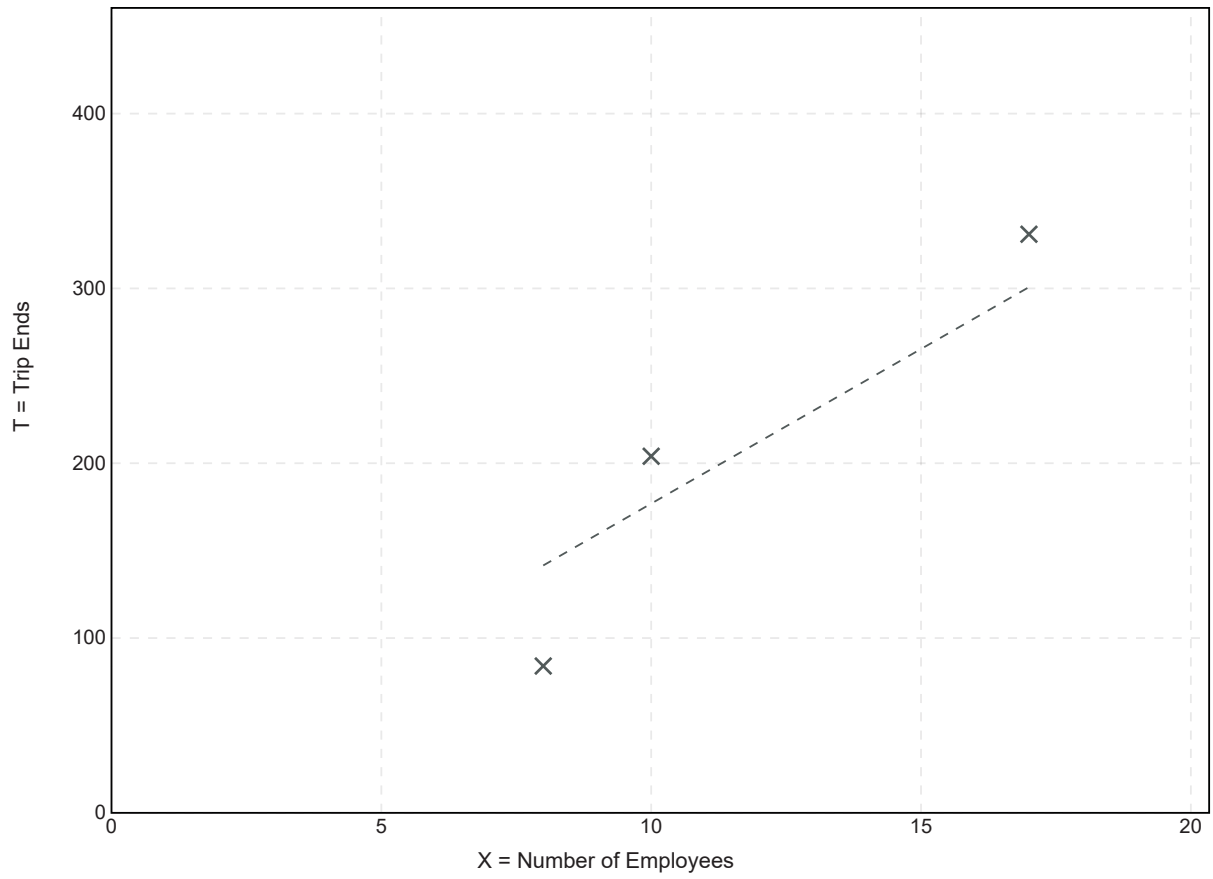
Vehicle Trip Ends vs:	**Employees**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	3
Avg. Num. of Employees:	12
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
17.69	10.50 - 20.40	4.81

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

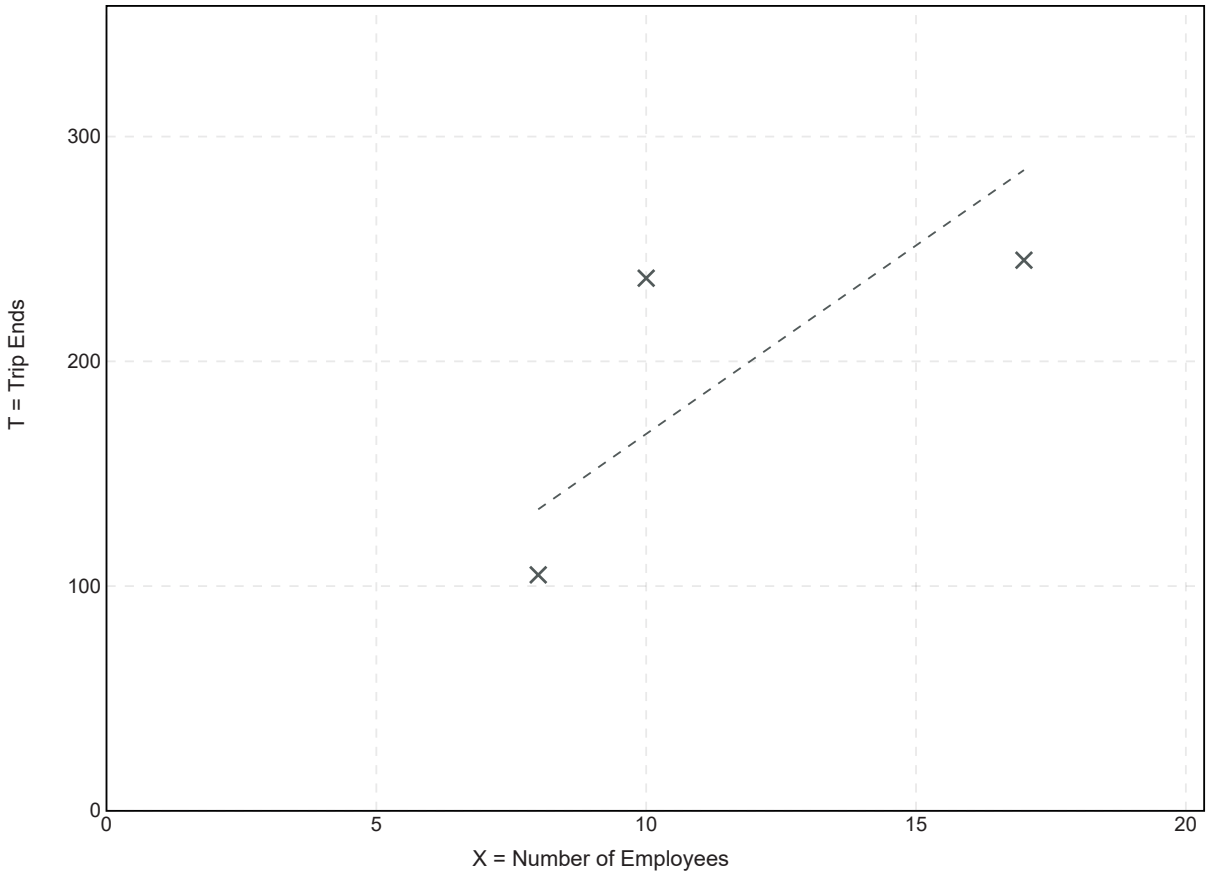
Vehicle Trip Ends vs:	**Employees**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	3
Avg. Num. of Employees:	12
Directional Distribution:	49% entering, 51% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
16.77	13.13 - 23.70	5.40

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: **Employees**
On a: **Weekday,**
AM Peak Hour of Generator

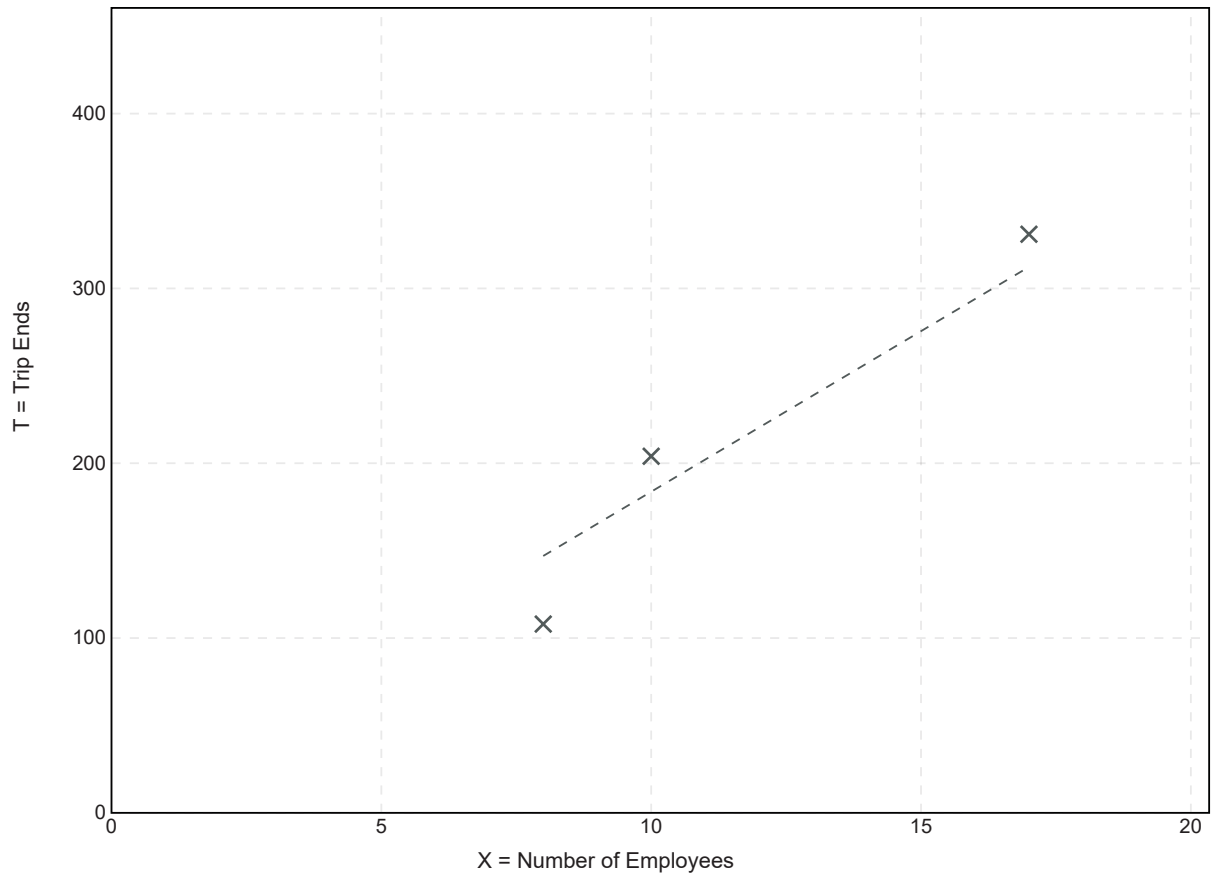
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. Num. of Employees: 12
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
18.37	13.50 - 20.40	3.28

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: **Employees**
On a: **Weekday,**
PM Peak Hour of Generator

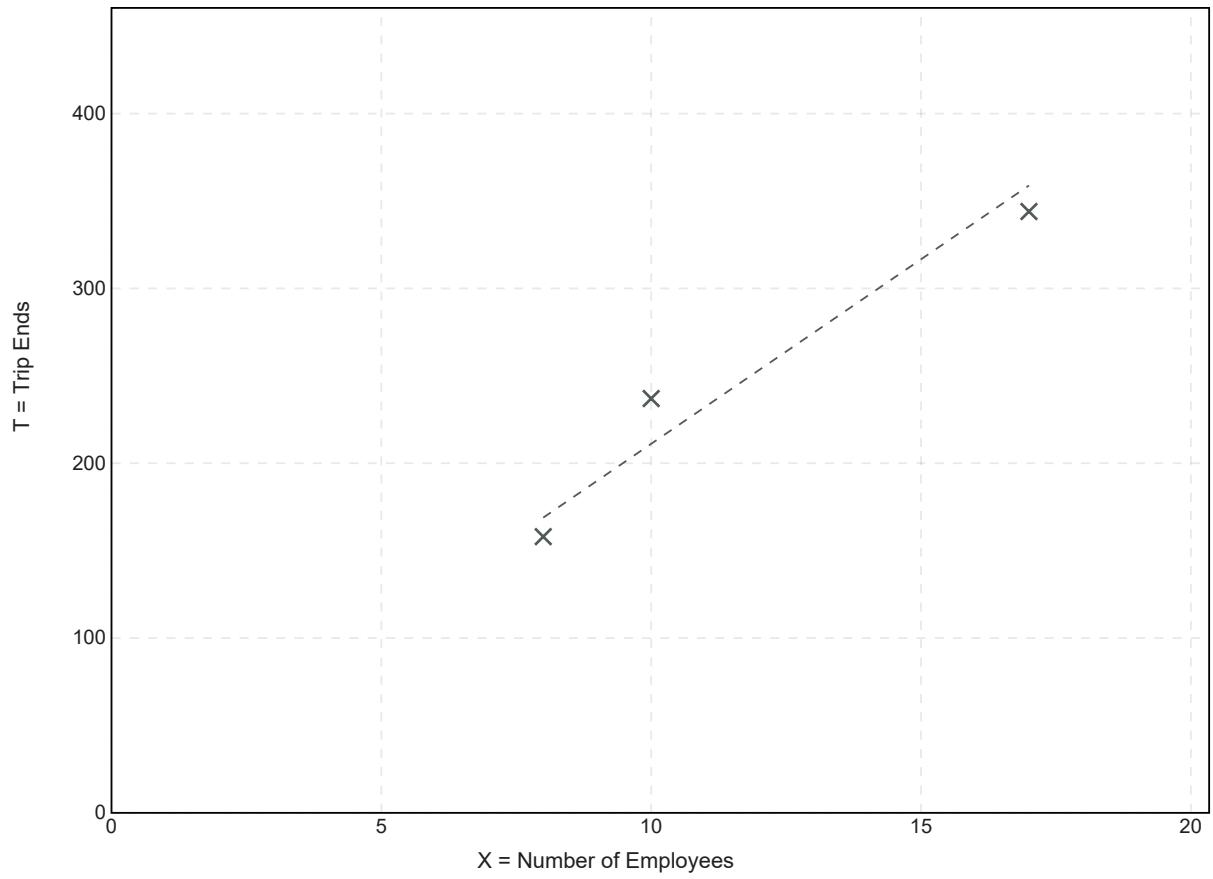
Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. Num. of Employees: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
21.11	19.75 - 23.70	2.02

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

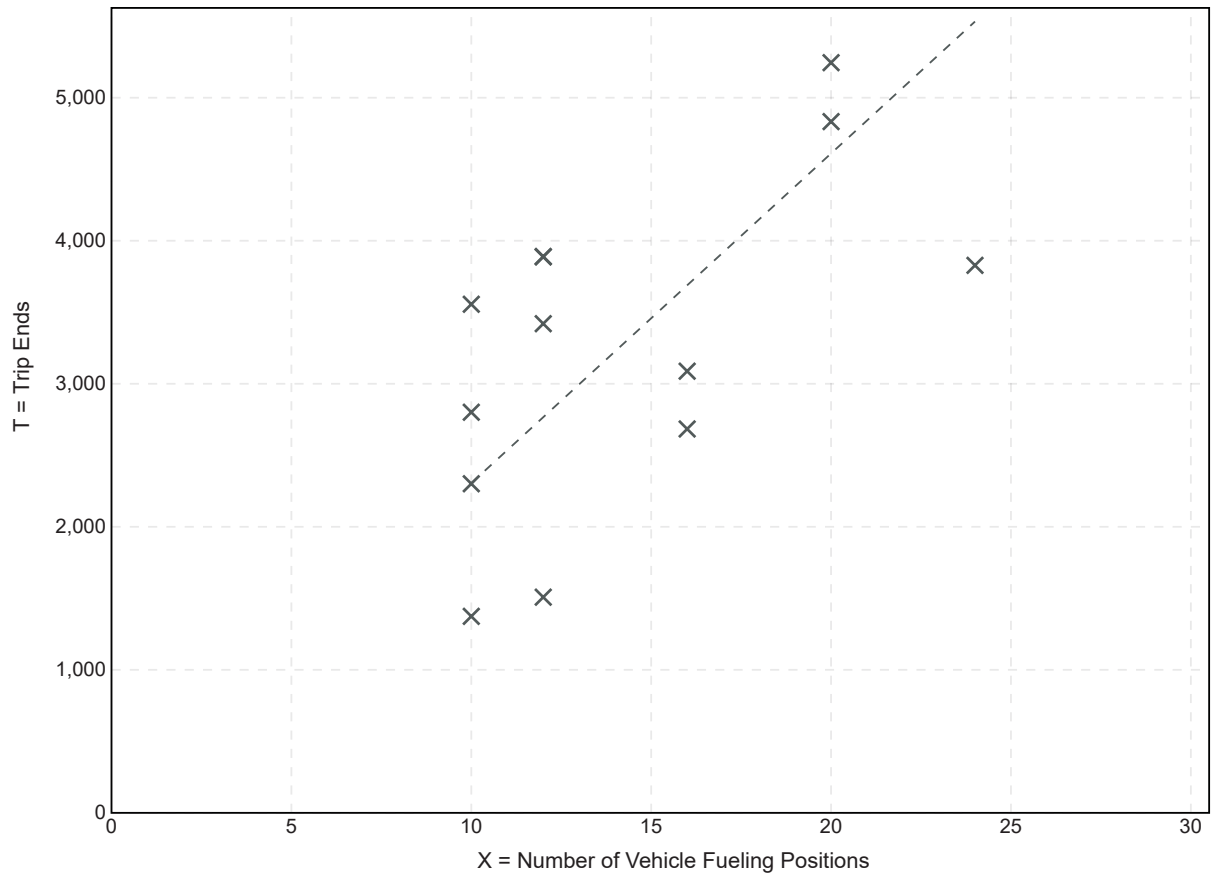
Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 13
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
230.52	125.67 - 355.60	71.75

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

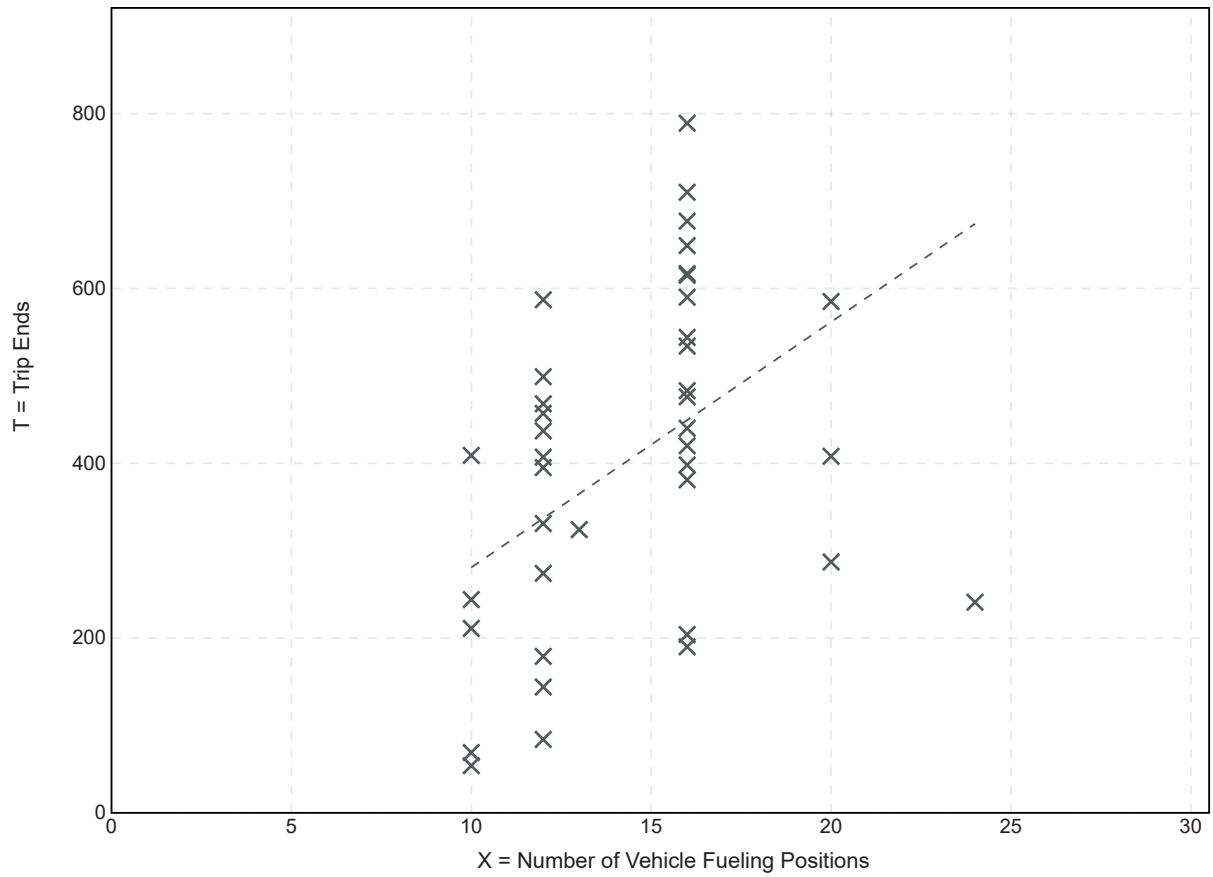
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**Vehicle Fueling Positions**
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:	39
Avg. Num. of Vehicle Fueling Positions:	14
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
28.08	5.40 - 49.31	11.98

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

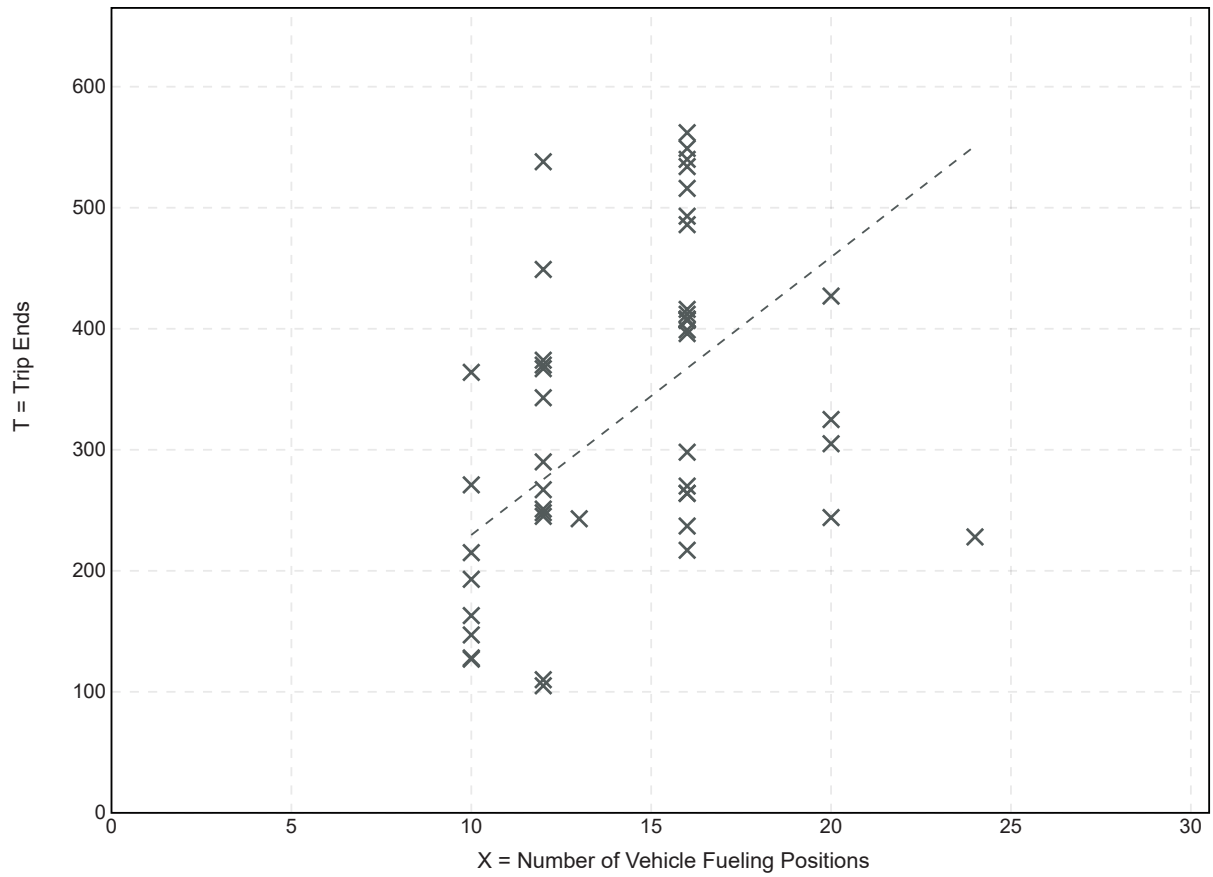
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**Vehicle Fueling Positions**
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:	48
Avg. Num. of Vehicle Fueling Positions:	14
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
22.96	8.75 - 44.83	8.34

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

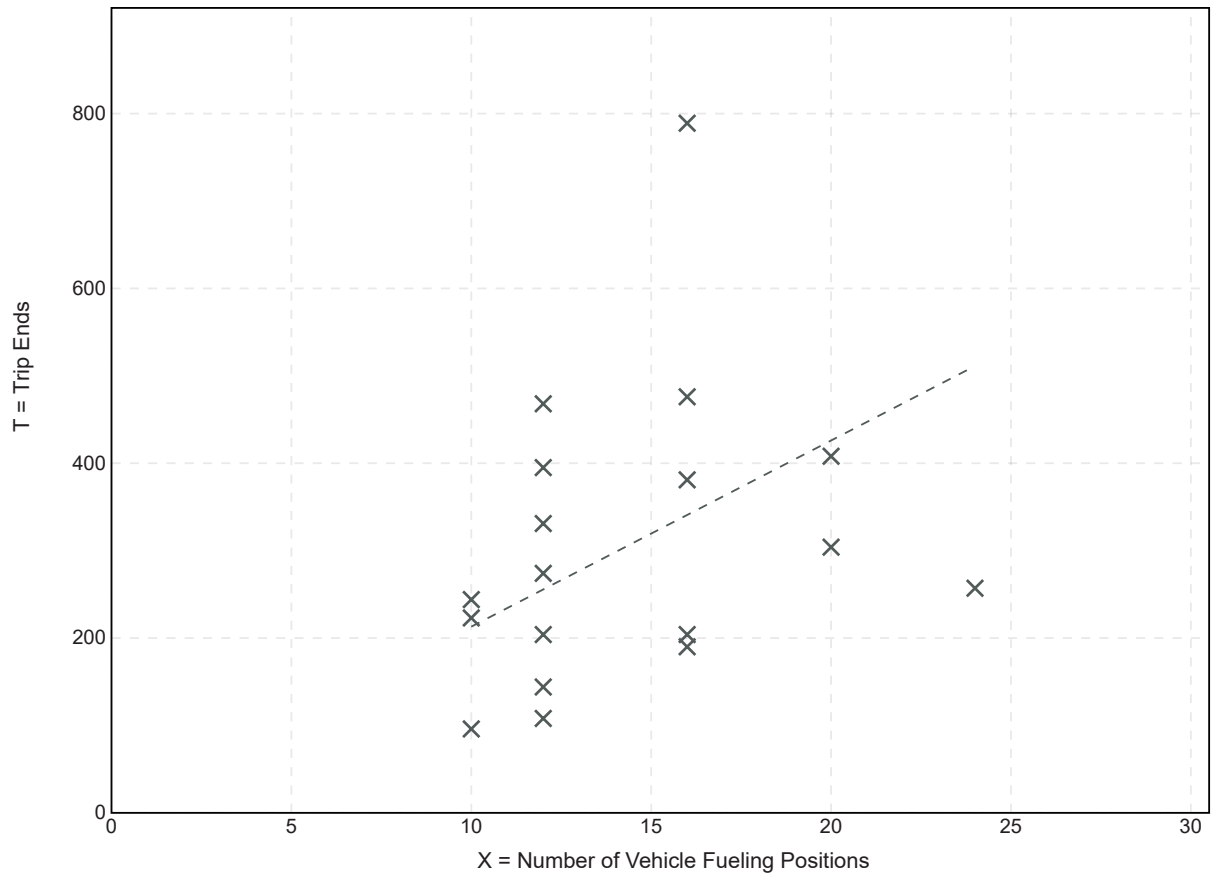
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**Vehicle Fueling Positions**
On a:	**Weekday,**
	AM Peak Hour of Generator
Setting/Location:	**General Urban/Suburban**
Number of Studies:	18
Avg. Num. of Vehicle Fueling Positions:	14
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
21.30	9.00 - 49.31	11.15

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

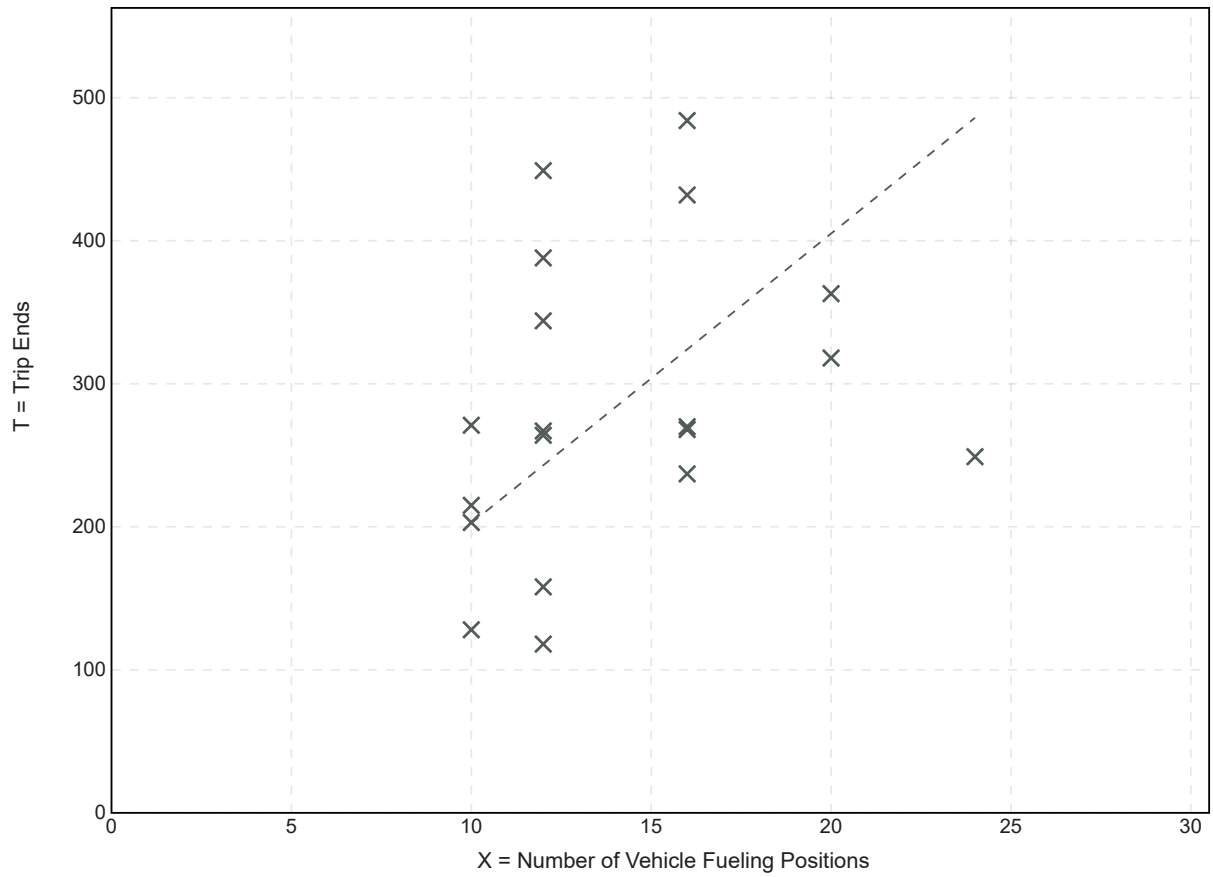
Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs:	**Vehicle Fueling Positions**
On a:	**Weekday,**
	PM Peak Hour of Generator
Setting/Location:	**General Urban/Suburban**
Number of Studies:	19
Avg. Num. of Vehicle Fueling Positions:	14
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
20.25	9.83 - 37.42	7.73

Data Plot and Equation



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Saturday

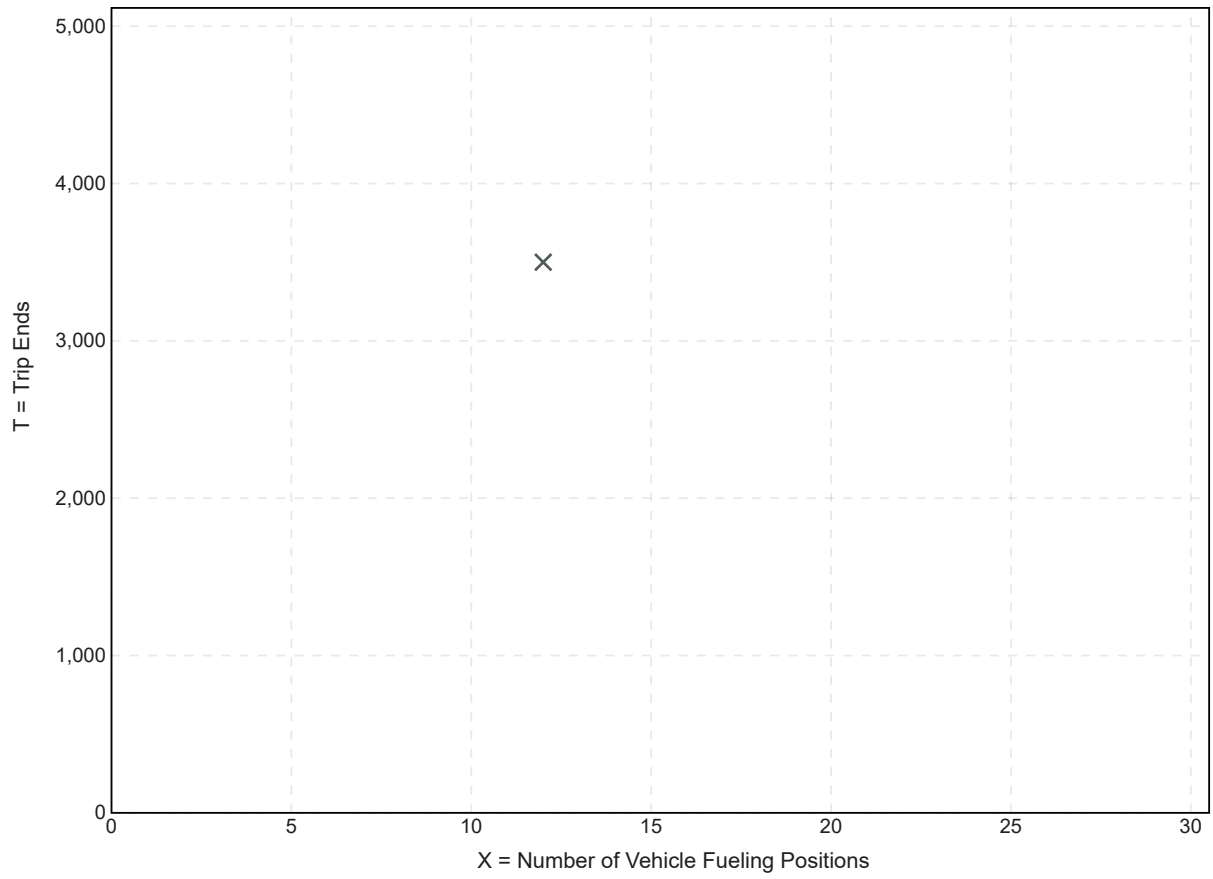
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Vehicle Fueling Positions: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
291.67	291.67 - 291.67	*

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Super Convenience Market/Gas Station
(960)

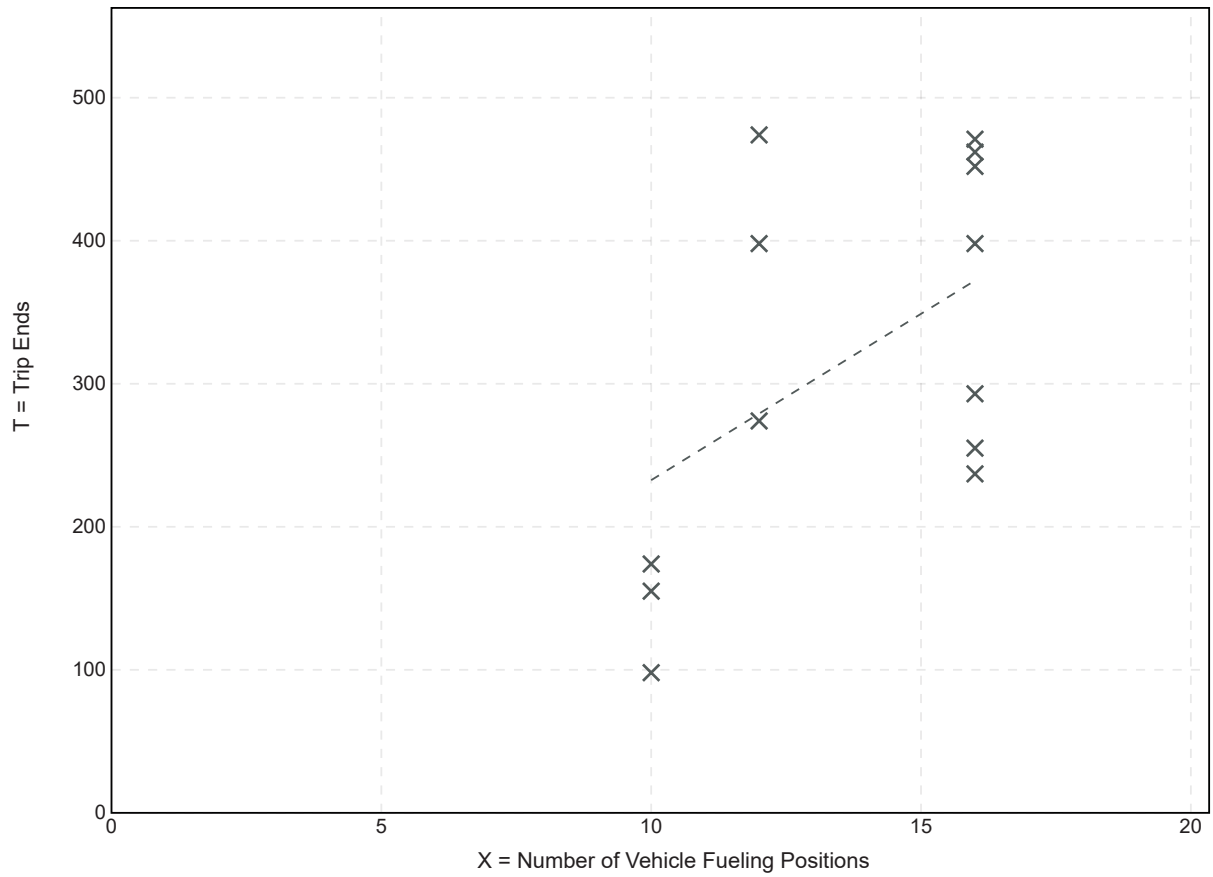
Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 13
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
23.26	9.80 - 39.50	8.20

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

DATA FROM THE ITE TRIP GENERATION HANDBOOK, THIRD EDITION

Table E.36 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 944—Gasoline/Service Station

SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
—	—	Chicago suburbs, IL	1987	48	3:00–7:00 p.m.	21	—	—	79	—	Kenig, O'Hara, Humes, Flock
—	—	Chicago suburbs, IL	1987	34	3:00–6:00 p.m.	25	—	—	75	—	Kenig, O'Hara, Humes, Flock
—	—	Chicago suburbs, IL	1987	42	3:00–6:00 p.m.	20	—	—	80	—	Kenig, O'Hara, Humes, Flock
2.3	6	Gaithersburg, MD	1992	55	4:00–6:00 p.m.	40	11	49	60	2,760	RBA
2.1	6	Bethesda, MD	1992	30	4:00–6:00 p.m.	53	20	27	47	1,060	RBA
1.7	6	Wheaton, MD	1992	18	4:00–6:00 p.m.	61	6	33	39	2,510	RBA
2.0	8	Gaithersburg, MD	1992	47	4:00–6:00 p.m.	62	23	15	38	2,635	RBA
1.2	6	Damascus, MD	1992	26	4:00–6:00 p.m.	58	11	31	42	1,020	RBA
0.3	12	Wheaton, MD	1992	52	4:00–6:00 p.m.	38	10	52	62	3,835	RBA

Average Pass-By Trip Percentage: 42
"—" means no data were provided

Table E.37 Pass-By and Non-Pass-By Trips Weekday, AM Peak Period Land Use Code 945—Gasoline/Service Station with Convenience Market

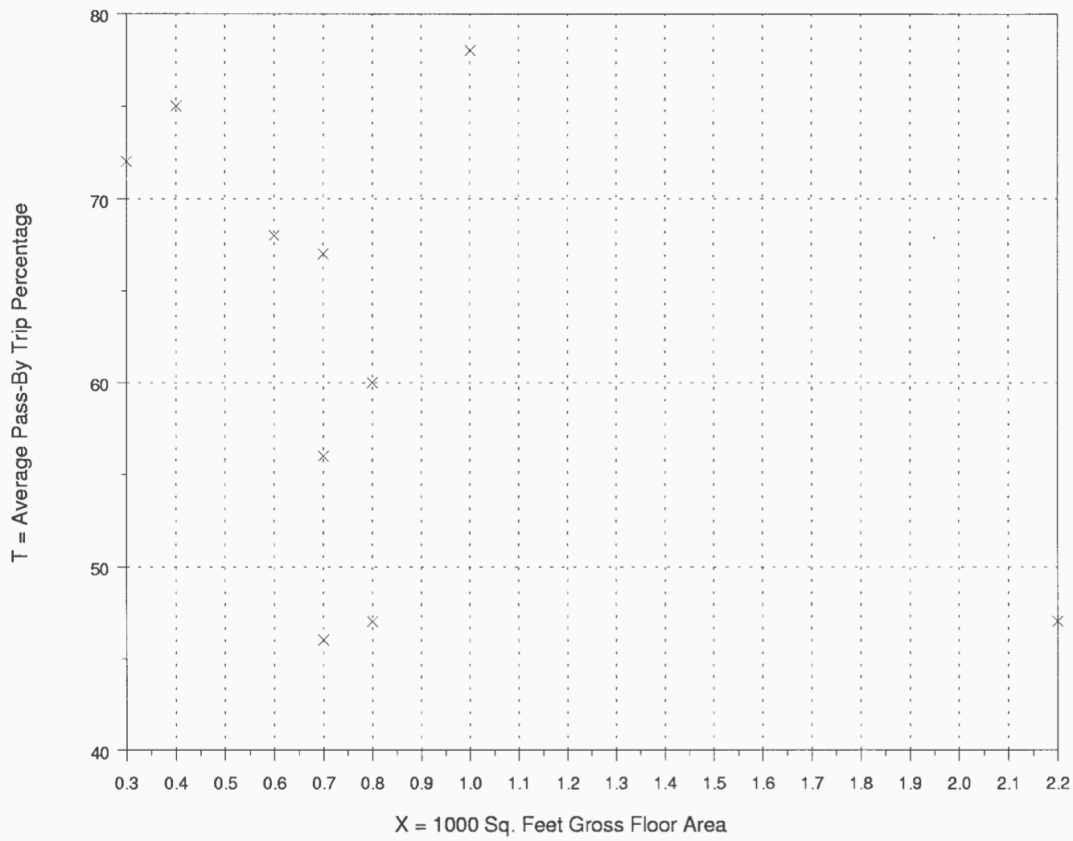
SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
0.8	8	Louisville area, KY	1993	61	7:00–9:00 a.m.	60	15	25	40	4,000	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	48	7:00–9:00 a.m.	68	13	19	32	1,307	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	47	7:00–9:00 a.m.	67	11	22	33	1,105	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	—	7:00–9:00 a.m.	56	22	22	44	1,211	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	—	7:00–9:00 a.m.	46	42	12	54	1,211	Barton-Aschman Assoc.
0.3	—	Louisville area, KY	1993	75	7:00–9:00 a.m.	72	15	13	28	—	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	7:00–9:00 a.m.	47	14	39	53	3,095	RBA
0.4	8	Derwood, MD	1992	46	7:00–9:00 a.m.	75	0	25	25	3,770	RBA
2.2	8	Kensington, MD	1992	31	7:00–9:00 a.m.	47	34	19	53	1,785	RBA
1	8	Silver Spring, MD	1992	35	7:00–9:00 a.m.	78	9	13	22	7,080	RBA

Average Pass-By Trip Percentage: 62
"—" means no data were provided

Figure E.18 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs:	**1,000 Sq. Ft. Gross Floor Area**
On a:	**Weekday, AM Peak Period**
Number of Studies:	10
Average 1,000 Sq. Ft. GFA:	0.8

Data Plot



Fitted Curve Equation: Not given R^2 = ****

Table E.38 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 945—Gasoline/Service Station with Convenience Market

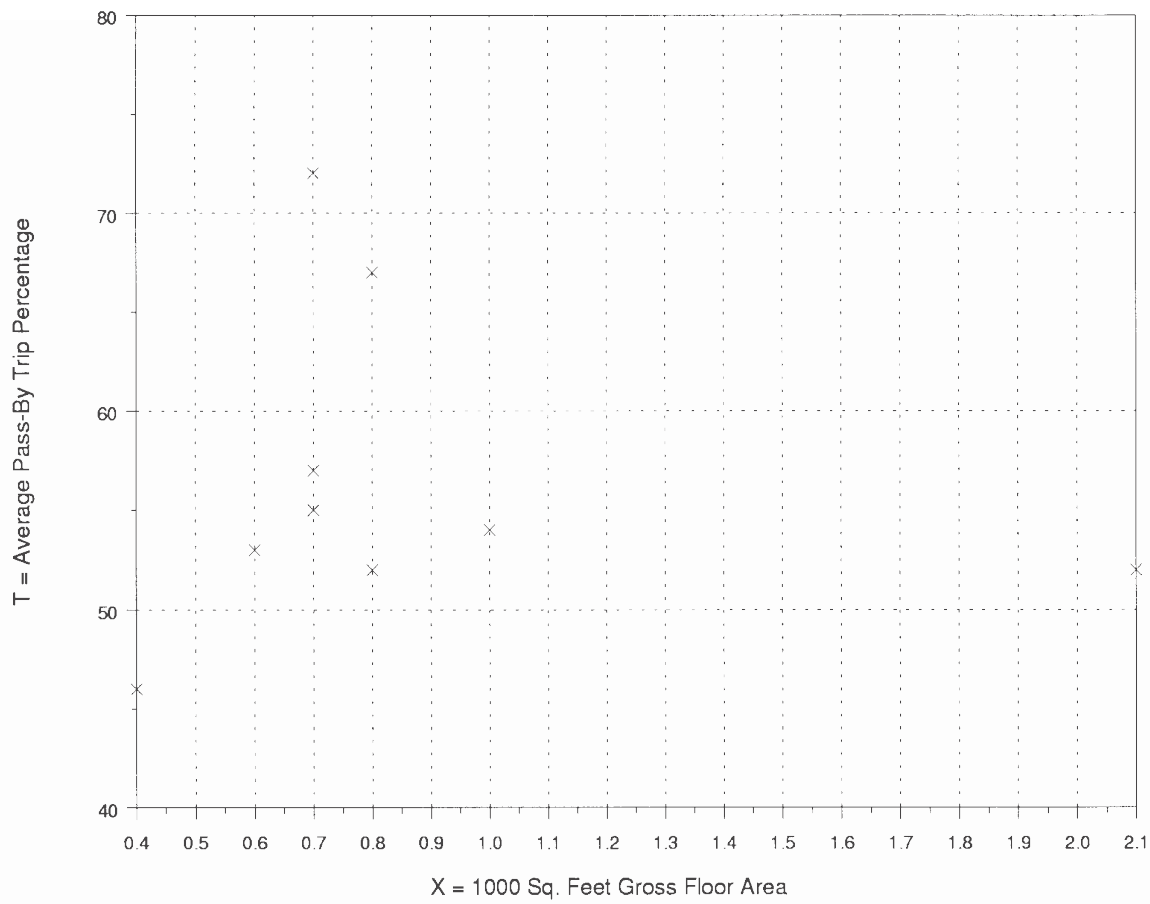
SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
0.8	8	Louisville area, KY	1993	83	4:00–6:00 p.m.	52	8	40	48	4,965	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	60	4:00–6:00 p.m.	53	20	27	47	1,491	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	—	4:00–6:00 p.m.	57	19	24	43	1,812	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	—	4:00–6:00 p.m.	72	7	21	28	2,657	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	—	4:00–6:00 p.m.	55	16	29	45	2,657	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	4:00–6:00 p.m.	67	14	19	33	3,095	RBA
0.4	8	Derwood, MD	1992	46	4:00–6:00 p.m.	46	11	43	54	3,770	RBA
2.1	8	Kensington, MD	1992	31	4:00–6:00 p.m.	52	13	35	48	1,785	RBA
1	8	Silver Spring, MD	1992	35	4:00–6:00 p.m.	54	3	43	46	7,080	RBA

Average Pass-By Trip Percentage: 56
"—" means no data were provided

Figure E.19 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs:	**1,000 Sq. Ft. Gross Floor Area**
On a:	**Weekday, PM Peak Period**
Number of Studies:	9
Average 1,000 Sq. Ft. GFA:	0.9

Data Plot



× **Actual Data Points**

Fitted Curve Equation: Not given R^2 = ****

FUTURE (2027) NO-BUILD CAPACITY REPORTS

Weekday Morning Peak Hour

Weekday Evening Peak Hour

Saturday Midday Peak Hour

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	1165	715	15	15	35
Future Vol, veh/h	45	1165	715	15	15	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	7	7	12	2	6
Mvmt Flow	47	1226	753	16	16	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	769	0	-	0	1460	377
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	707	-
Critical Hdwy	4.14	-	-	-	6.84	7.02
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.36
Pot Cap-1 Maneuver	841	-	-	-	120	609
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	450	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	841	-	-	-	113	609
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	450	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	841	-	-	-	245	609
HCM Lane V/C Ratio	0.056	-	-	-	0.064	0.06
HCM Control Delay (s)	9.5	-	-	-	20.7	11.3
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2	0.2

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	1105	1440	45	10	80
Future Vol, veh/h	80	1105	1440	45	10	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	2	2	2	2
Mvmt Flow	84	1163	1516	47	11	84

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1563	0	-	0	2266	758
Stage 1	-	-	-	-	1516	-
Stage 2	-	-	-	-	750	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	414	-	-	-	34	350
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	427	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	414	-	-	-	27	350
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	134	-
Stage 2	-	-	-	-	427	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	21.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	414	-	-	-	102	350
HCM Lane V/C Ratio	0.203	-	-	-	0.103	0.241
HCM Control Delay (s)	15.9	-	-	-	44.3	18.5
HCM Lane LOS	C	-	-	-	E	C
HCM 95th %tile Q(veh)	0.8	-	-	-	0.3	0.9

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	1150	1225	25	10	100
Future Vol, veh/h	80	1150	1225	25	10	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	4
Mvmt Flow	84	1211	1289	26	11	105

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1315	0	-	0	2063	645
Stage 1	-	-	-	-	1289	-
Stage 2	-	-	-	-	774	-
Critical Hdwy	4.14	-	-	-	6.84	6.98
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.34
Pot Cap-1 Maneuver	522	-	-	-	47	410
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	415	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	522	-	-	-	39	410
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	186	-
Stage 2	-	-	-	-	415	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	522	-	-	-	132	410
HCM Lane V/C Ratio	0.161	-	-	-	0.08	0.257
HCM Control Delay (s)	13.2	-	-	-	34.6	16.8
HCM Lane LOS	B	-	-	-	D	C
HCM 95th %tile Q(veh)	0.6	-	-	-	0.3	1

FUTURE (2027) BUILD CAPACITY REPORTS

Weekday Morning Peak Hour

Weekday Evening Peak Hour

Saturday Midday Peak Hour

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	1150	595	170	40	185
Future Vol, veh/h	90	1150	595	170	40	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	7	7	12	2	6
Mvmt Flow	95	1211	626	179	42	195

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	805	0	-	0	1422	313
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	796	-
Critical Hdwy	4.14	-	-	-	6.84	7.02
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.36
Pot Cap-1 Maneuver	815	-	-	-	127	671
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	405	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	815	-	-	-	112	671
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	405	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	14.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	815	-	-	-	243	671
HCM Lane V/C Ratio	0.116	-	-	-	0.173	0.29
HCM Control Delay (s)	10	-	-	-	22.9	12.5
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.6	1.2

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	100	1	1	65
Future Vol, veh/h	1	1	100	1	1	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	5	2	2	4
Mvmt Flow	1	1	105	1	1	68

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	176	106	0	0	106	0
Stage 1	106	-	-	-	-	-
Stage 2	70	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	814	948	-	-	1485	-
Stage 1	918	-	-	-	-	-
Stage 2	953	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	813	948	-	-	1485	-
Mov Cap-2 Maneuver	813	-	-	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	952	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	813	948	1485	-
HCM Lane V/C Ratio	-	-	0.001	0.001	0.001	-
HCM Control Delay (s)	-	-	9.4	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	4.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	175	40	60	200	15	50
Future Vol, veh/h	175	40	60	200	15	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	5	2	2	4
Mvmt Flow	184	42	63	211	16	53

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	148	63	0	0	274	0
Stage 1	63	-	-	-	-	-
Stage 2	85	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	844	1002	-	-	1289	-
Stage 1	960	-	-	-	-	-
Stage 2	938	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	833	1002	-	-	1289	-
Mov Cap-2 Maneuver	833	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	1.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	833	1002	1289	-
HCM Lane V/C Ratio	-	-	0.221	0.042	0.012	-
HCM Control Delay (s)	-	-	10.5	8.8	7.8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	0	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	1095	1350	170	30	195
Future Vol, veh/h	115	1095	1350	170	30	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	2	2	2	2
Mvmt Flow	121	1153	1421	179	32	205

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1600	0	-	0	2240	711
Stage 1	-	-	-	-	1421	-
Stage 2	-	-	-	-	819	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	401	-	-	-	36	375
Stage 1	-	-	-	-	189	-
Stage 2	-	-	-	-	394	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	401	-	-	-	~ 25	375
Mov Cap-2 Maneuver	-	-	-	-	~ 25	-
Stage 1	-	-	-	-	132	-
Stage 2	-	-	-	-	394	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	88.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	401	-	-	-	25	375
HCM Lane V/C Ratio	0.302	-	-	-	1.263	0.547
HCM Control Delay (s)	17.8	-	-	-	-$ 500.4	25.6
HCM Lane LOS	C	-	-	-	F	D
HCM 95th %tile Q(veh)	1.3	-	-	-	3.9	3.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	165	1	1	105
Future Vol, veh/h	1	1	165	1	1	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1	174	1	1	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	175	0	0	175	0
Stage 1	175	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	702	868	-	-	1401	-
Stage 1	855	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	701	868	-	-	1401	-
Mov Cap-2 Maneuver	701	-	-	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	911	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	701	868	1401	-
HCM Lane V/C Ratio	-	-	0.002	0.001	0.001	-
HCM Control Delay (s)	-	-	10.1	9.2	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	40	125	160	15	90
Future Vol, veh/h	135	40	125	160	15	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	142	42	132	168	16	95

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	259	132	0	0	300	0
Stage 1	132	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	730	917	-	-	1261	-
Stage 1	894	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	721	917	-	-	1261	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	721	917	1261	-
HCM Lane V/C Ratio	-	-	0.197	0.046	0.013	-
HCM Control Delay (s)	-	-	11.2	9.1	7.9	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	0	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	1140	1135	150	30	215
Future Vol, veh/h	115	1140	1135	150	30	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	120	-	-	140	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	4
Mvmt Flow	121	1200	1195	158	32	226

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1353	0	-	0	2037	598
Stage 1	-	-	-	-	1195	-
Stage 2	-	-	-	-	842	-
Critical Hdwy	4.14	-	-	-	6.84	6.98
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.34
Pot Cap-1 Maneuver	504	-	-	-	49	440
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	383	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	504	-	-	-	37	440
Mov Cap-2 Maneuver	-	-	-	-	37	-
Stage 1	-	-	-	-	190	-
Stage 2	-	-	-	-	383	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	51.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	504	-	-	-	37	440
HCM Lane V/C Ratio	0.24	-	-	-	0.853	0.514
HCM Control Delay (s)	14.4	-	-	-	265.4	21.5
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.9	-	-	-	3.1	2.9

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	145	1	1	125
Future Vol, veh/h	1	1	145	1	1	125
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	4
Mvmt Flow	1	1	153	1	1	132

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	288	154	0	0	154	0
Stage 1	154	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	702	892	-	-	1426	-
Stage 1	874	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	701	892	-	-	1426	-
Mov Cap-2 Maneuver	701	-	-	-	-	-
Stage 1	874	-	-	-	-	-
Stage 2	891	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	701	892	1426	-
HCM Lane V/C Ratio	-	-	0.002	0.001	0.001	-
HCM Control Delay (s)	-	-	10.1	9	7.5	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	40	105	160	15	110
Future Vol, veh/h	135	40	105	160	15	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	4
Mvmt Flow	142	42	111	168	16	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	259	111	0	0	279	0
Stage 1	111	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	730	942	-	-	1284	-
Stage 1	914	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	721	942	-	-	1284	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	721	942	1284	-
HCM Lane V/C Ratio	-	-	0.197	0.045	0.012	-
HCM Control Delay (s)	-	-	11.2	9	7.8	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	0	-

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