MEMORANDUM

TO: Mr. Lars Unhjem
Villebridge
1150 Great Plain Avenue, # 920056
Needham, MA 02492

FROM: Mr. Jeffrey S. Dirk, P.E.*, PTOE, FITE
Managing Partner
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
**Professional Engineer in CT, MA, ME, NH, RI and VA*

DATE: November 22, 2025

RE: 9301

SUBJECT: Transportation Impact Evaluation
Middleton Corner – 49 South Main Street (Route 114) & 10 and 18 Boston Street (Route 62)
Middleton, Massachusetts

Vanasse & Associates, Inc. (VAI) has prepared a Transportation Impact Evaluation (TIE) in order to determine the traffic characteristics and potential impacts on the transportation infrastructure associated with the proposed modifications to the approved development program for the commercial component of the Middle Corner mixed-use development to be located at 49 South Main Street (Route 114) & 10 and 18 Boston Street (Route 62) in Middleton, Massachusetts (hereafter referred to as the "Project"). Specifically, this assessment compares the traffic characteristics of the current development program to those of the development program that was the subject of the February 2024 *Transportation Impact Assessment* (the "February 2024 TIA") that was prepared by VAI in support of the Project.[1]

Based on this assessment, we have determined that the current development program for the Project will result in a significant reduction in traffic over the development program that was assessed in the February 2024 TIA on both an average weekday (45%) and during the peak hours (up to 73%) and, as such, will also be less impactful on the transportation infrastructure

The following details our evaluation of the traffic characteristics and associated impact of the Project on the transportation system.

PROJECT DESCRIPTION

As currently proposed, the Project will entail the construction of a 60-unit multifamily residential building that will front along Boston Street and 20,000± square feet (sf) of commercial space that will be situated on the southwest corner of the intersection of Boston Street at South Main Street in Middleton, Massachusetts. The commercial component of the Project will be phased, with Phase 1 to include the construction of a 15,500± sf building in the northern portion of the Project site that will include a 10,130± sf day care and a 5,370± sf sit-down restaurant. Phase 2 will entail the construction of a 4,500± sf building

[1] *Transportation Impact Assessment*, Middleton Corner, 49 South Main Street (Route 114), 10 Boston Street (Route 62) and 18 Boston Street, Middleton, Massachusetts; VAI; February 2024.

in the southern portion of the Project site that is currently envisioned to be a retail use. No changes are proposed to the residential component of the Project (60-unit multifamily residential building). The development program that was assessed in the February 2024 TIA included the 60-unit multifamily residential building and 18,796± sf of commercial space that was to include a 2,430± sf coffee shop with a drive-through window; 2,966± sf of fast casual restaurant space; a 4,060± sf high-turnover (sit-down) restaurant; and 9,340± sf of retail space.

No changes are proposed to the access configuration for the Project, which include a full access driveway that will intersect the south side of Boston Street to serve the multifamily residential building and a full access driveway that will intersect the west side of South Main Street that will serve the commercial component, with a gated connection between the residential and commercial components for emergency vehicle access only.

PROJECT-GENERATED TRAFFIC

In order to develop the traffic characteristics of the current development program for the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[2] for similar land uses as those proposed were used. ITE Land Use Codes (LUCs) ITE Land Use Codes (LUCs) 220, *Multifamily Housing (Low-Rise)*; 565, *Day Care Center*; 822, *Strip Retail Plaza (<40k)*; and 932, *High-Turnover (Sit-Down) Restaurant*; were used to develop the base trip-generation characteristics for the Project. The detailed trip-generation calculations are attached.

Table 1 summarizes the traffic characteristics of the current development program for the Project and compares the predicted traffic volumes to those of the development program for the Project as assessed in the February 2024 TIA. For the purpose of this comparison, the traffic volumes are as measured at the driveways to the Project site and include pass-by trips.

[2] *Trip Generation*, 12th Edition; Institute of Transportation Engineers; Washington, DC; August 2025.

Table 1
TRIP GENERATION SUMMARY AND COMPARISON

Time Period/Direction	Vehicle Trips[a] (A) Current Development Program[a]	(B) February 2024 TIA[b]	(A – B) Difference
Average Weekday:			
Entering	830	1,496	
Exiting	830	1,496	
Total	1,660	2,992	-1,332
Weekday Morning Peak-Hour:			
Entering	102	152	
Exiting	108	163	
Total	210	315	-105
Weekday Evening Peak-Hour:			
Entering	125	157	
Exiting	113	133	
Total	238	290	-52
Saturday Midday Peak-Hour:			
Entering	56	226	
Exiting	63	216	
Total	119	442	-323

[a]Based on ITE LUCs 220, *Multifamily Housing (Low-Rise) (60 units)*; 565, *Day Care Center* (10,130 sf); 822, *Strip Retail Plaza (<40k)* (4,500sf); and 932, *High-Turnover (Sit-Down) Restaurant* (5,370 sf).
[b]Obtained from Table 5 of the February 2024 TIA.

Project-Generated Traffic-Volume Summary

As can be seen in Table 1, the current development program for the Project is expected to generate approximately 1,660 vehicle trips on an average weekday (two-way, 24-hour volume, or 830 vehicles entering and 830 exiting), with 210 vehicle trips (102 vehicles entering and 108 exiting) expected during the weekday morning peak-hour, 238 vehicle trips (125 vehicles entering and 113 exiting) expected during the weekday evening peak-hour and 119 vehicle trips (56 vehicles entering and 633 exiting) expected during the Saturday midday peak-hour.

In comparison to the development program that was assessed in the February 2024 TIA, the current development program for the Project was shown to generate 1,332 *fewer* total vehicle trips on an average weekday (a 45% reduction), with 105 *fewer* total vehicle trips expected during the weekday morning peak-hour (a 33% reduction), 52 *fewer* total vehicle trips expected during the weekday evening peak-hour (an 18% reduction) and 323 *fewer* total vehicle trips during the Saturday midday peak-hour (a 73% reduction).

Based on this comparative assessment it is clear that the current development program for the Project will result in a significant reduction in traffic over the development program that was assessed in the February 2024 TIA on both an average weekday (45%) and during the peak hours (up to 73%) and, as such, will also be less impactful on the transportation infrastructure.

SUMMARY

VAI has prepared a TIE in order to determine the traffic characteristics and potential impacts on the transportation infrastructure associated with the proposed modifications to the approved development program for the commercial component of the Middle Corner mixed-use development to be located at 49 South Main Street (Route 114) & 10 and 18 Boston Street (Route 62) in Middleton, Massachusetts. Specifically, this assessment has compared the traffic characteristics of the current development program to those of the development program that was the subject of the February 2024 TIA that was prepared by VAI in support of the Project.

Based on this assessment, we have determined that the current development program for the Project will result in a significant reduction in traffic over the development program that was assessed in the February 2024 TIA on both an average weekday (45%) and during the peak hours (up to 73%) and, as such, will also be less impactful on the transportation infrastructure

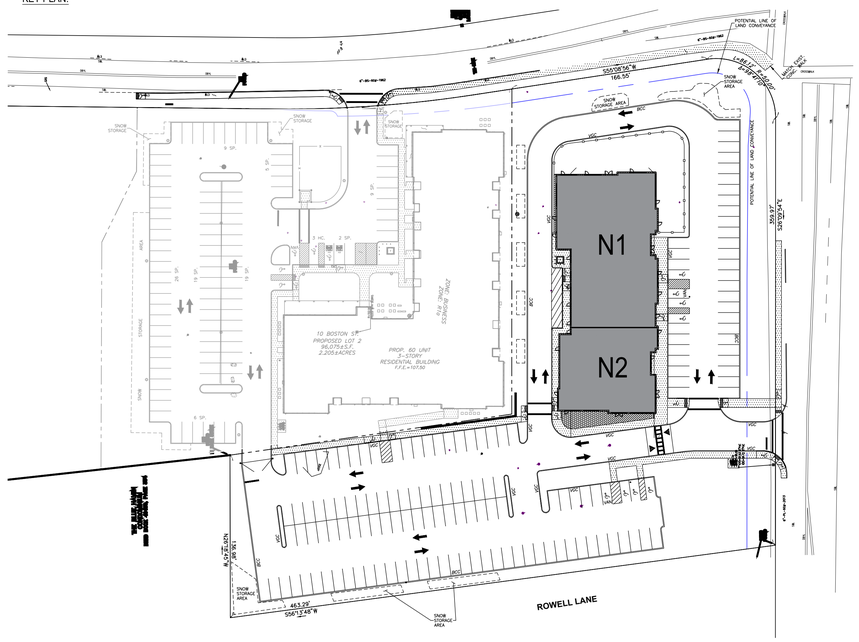
Attachments: Trip-Generation Calculations

ATTACHMENTS

SITE PLAN
FEBRUARY 2024 TIA TABLE 5
TRIP-GENERATION CALCULATIONS

SITE PLAN

KEY PLAN:



BUILDING FLOOR AREA AND HEIGHT SUMMARY- PHASE I:

Commercial Gross Leasable Area

Building	N1	N2	Total GSF
North Retail	10,130	5,370	15,500
TOTAL	**10,130**	**5,370**	15,500

NORTH BUILDING

HEIGHT (Feet)[1] 28
HEIGHT (Stories)[2] 1
BUILDING FOOTPRINT (SF) 15,500

Notes

1. Building Height: pursuant to the Zoning Bylaws of the Town of Middleton, Massachusett, Building Height shall be measured as the vertical distance from the average elevation of the finished lot grade adjoining such building to the highest point of the roof in the case of a flat roof, and to the mean height between the plate and the ridge in the case of a pitched roof.

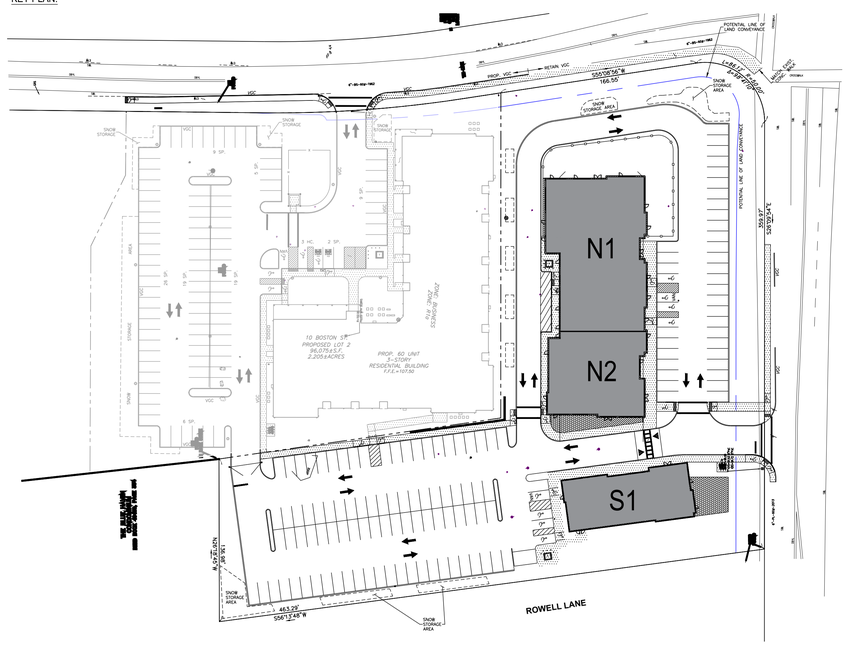
2. Story: pursuant to the Zoning Bylaws of the Town of Middleton, Massachusett, each story of a building shall be deemed to be the portion of a building between the upper surface of any floor and the upper surface of the floor next above. A basement having more than 1/2 of its height above the average elevation of the finished grade adjoining the building shall be considered to be a story for the purposes of this definition. Any part of a building between the top floor and the roof shall be deemed a half story.

3. Commercial Gross Leasable Area is measured from the centerline of partitions that separate adjacent occupants, from the exterior surface of exterior walls, exterior surface of the glass at exterior storefronts, from the lease line at common areas, and includes the full thickness of all other enclosing walls. No deduction is made for columns, any structural elements or occupant voids within the gross leasable area.

DRAWING INDEX:

DWG #	DRAWING TITLE	DRAWING DATES: February 27, 2024	July 15, 2024	January 28, 2025	November 18, 2025
TITLE SHEETS					
T0.01	PROJECT COVER	■	■	■	■
T0.02	DRAWING INDEX, PROJECT INFORMATION & ARCHITECTURAL SITE PLAN	■	■	■	■
SURVEY					
SHEET 1 OF 3	EXISTING CONDITIONS PLAN OF LAND	■			
SHEET 2 OF 3	EXISTING CONDITIONS PLAN OF LAND	■			
SHEET 3 OF 3	EXISTING CONDITIONS PLAN OF LAND	■			
CIVIL DRAWINGS					
C-1	COVER SHEET	■	■	■	
C-2	LOCUS PLAN	■			
C-3	LAYOUT & MATERIALS PLAN	■	■	■	
C-3.1	LAYOUT & MATERIALS PLAN - PHASE I				■
C-3.2	LAYOUT & MATERIALS PLAN - PHASE II				■
C-4	GRADING & DRAINAGE PLAN	■	■	■	
C-5	UTILITY PLAN	■	■	■	
C-6	PAVEMENT MARKING & SIGNAGE PLAN	■	■	■	
C-7	SITE PREP & DEMOLITION PLAN	■	■	■	
C-8	IMPERVIOUS SURFACE AREA COMPARISON	■	■		
C-9	DETAILS - 1	■	■		
C-10	DETAILS - 2	■	■		
C-11	DETAILS - 3	■	■		
LANDSCAPE DRAWINGS					
L.0	COVER PAGE	■		■	
L1.1	PLANTING PLAN	■	■	■	
L1.1.1	PLANTING PLAN - PHASE I				■
L1.1.2	PLANTING PLAN - PHASE II				■
L2.1	LIGHTING PLAN	■	■	■	
L2.1.1	LIGHTING PLAN - PHASE I				■
L2.1.2	LIGHTING PLAN - PHASE II				■
L2.2	LIGHTING SPECIFICATIONS	■		■	■
LD1	PLANTING SPECIFICATIONS	■		■	■
LD2	PLANTING DETAILS	■		■	■
ARCHITECTURAL DRAWINGS					
A1.01	NORTH & SOUTH RETAIL - FLOOR PLANS - PHASE I & II	■	■	■	■
A4.01	EXTERIOR ELEVATIONS - PHASE I & II	■	■	■	
A4.02	ILLUSTRATIVE IMAGES	■	■	■	
A4.02.1	ILLUSTRATIVE IMAGES - PHASE I				■
A4.02.2	ILLUSTRATIVE IMAGES - PHASE II				■
A4.03	SITE PHOTOGRAPHS	■			

KEY PLAN:



BUILDING FLOOR AREA AND HEIGHT SUMMARY - PHASE II:

Commercial Gross Leasable Area

Building	N1	N2	S1	Total GSF
North Retail	10,130	5,370	0	15,500
South Retail	0	0	4,500	4,500
TOTAL	10,130	**5,370**	**4,500**	**20,000**

NORTH BUILDING

HEIGHT (Feet)[1] 28
HEIGHT (Stories)[2] 1
BUILDING FOOTPRINT (SF) 15,500

SOUTH BUILDING

HEIGHT (Feet)[1] 28
HEIGHT (Stories)[2] 1
BUILDING FOOTPRINT (SF) 4,500

Notes

1. Building Height: pursuant to the Zoning Bylaws of the Town of Middleton, Massachusett, Building Height shall be measured as the vertical distance from the average elevation of the finished lot grade adjoining such building to the highest point of the roof in the case of a flat roof, and to the mean height between the plate and the ridge in the case of a pitched roof.

2. Story: pursuant to the Zoning Bylaws of the Town of Middleton, Massachusett, each story of a building shall be deemed to be the portion of a building between the upper surface of any floor and the upper surface of the floor next above. A basement having more than 1/2 of its height above the average elevation of the finished grade adjoining the building shall be considered to be a story for the purposes of this definition. Any part of a building between the top floor and the roof shall be deemed a half story.

3. Commercial Gross Leasable Area is measured from the centerline of partitions that separate adjacent occupants, from the exterior surface of exterior walls, exterior surface of the glass at exterior storefronts, from the lease line at common areas, and includes the full thickness of all other enclosing walls. No deduction is made for columns, any structural elements or occupant voids within the gross leasable area. Common utility rooms are not included in the gross leasable area.

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F 617.884.4329
architecturalteam.com

Consultant:

Revision:
1 - July 16, 2024
2 - January 28, 2025
3 - November 18, 2025

Architect of Record:

REGISTERED ARCHITECT EDWARD R. BRADFORD No. 9498 MELROSE, MASS. COMMONWEALTH OF MASSACHUSETTS

Drawn: J.Z.
Checked: E.B.
Scale: NOT TO SCALE
Key Plan:

Project Name:
Middleton Corner

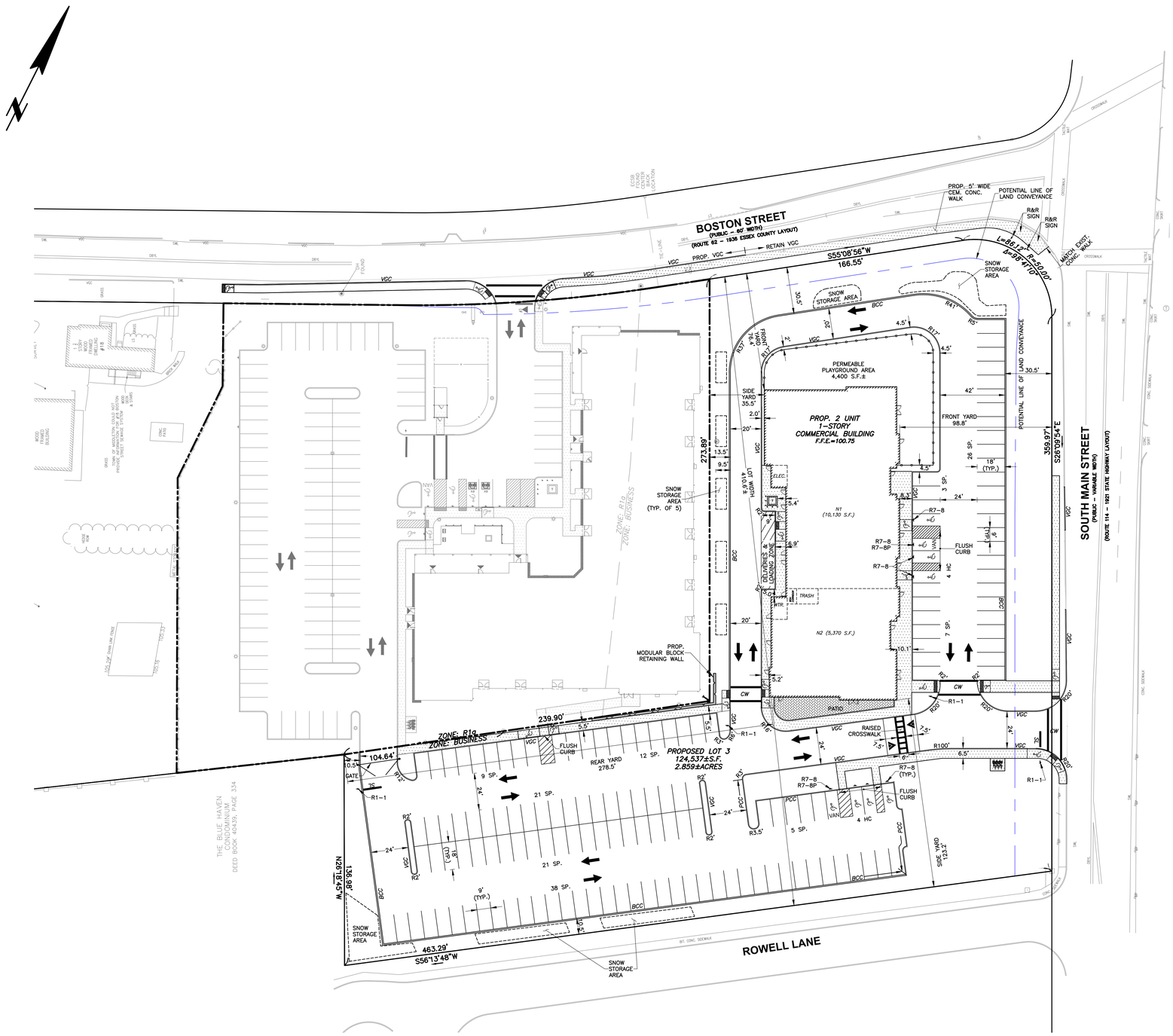
Middleton, MA

Sheet Name:
PHASE I & II
DRAWINGS INDEX,
PROJECT INFORMATION

Project Number:
24018

Issue Date:
February 27, 2024

Sheet Number:
T0.02



30 0 15 30 60

HORIZONTAL GRAPHIC SCALE IN FEET

ZONING TABLE

CURRENT ZONE B – BUSINESS
MIDDLETON ZONING BYLAWS

	REQUIRED	LOT 3 PROPOSED
MIN. LOT AREA	40,000 S.F.	124,537 S.F.
MIN. LOT WIDTH	100 FT.	410.6± FT.
MIN. LOT FRONTAGE	100 FT.	612.6± FT. (COMBINED)
MAX. LOT COVERAGE BY BUILDINGS	35 %	12.9± %
MAXIMUM BUILDING HEIGHT	35 FT.	28± FT.
MAX. BUILDING HEIGHT (STORIES)	3	1
MIN. FRONT SETBACK	30 FT.	76.4± FT. (BOSTON ST.) 98.8± FT. (S. MAIN ST.)
MIN. SIDE YARD	25 FT.*	35.5 FT.
MIN. REAR YARD	25 FT.*	278.5± FT.
MIN. OPEN SPACE	25 %	31.4± %

* (35 FT IF YARD ABUTS R DISTRICT)

PARKING SUMMARY

REQUIREMENTS

PER MIDDLETON
2025-02-05 DIVISION 3 ZONING BYLAWS
CHAPTER 235 ZONING
SECTION 5.0 GENERAL REGULATIONS
5.1.2 TABLE OF PARKING REQUIREMENTS

ALL OTHER USES: 1 SPACE PER 200 SF OF GROSS FLOOR AREA BUT NO FEWER THAN 5 SPACES PER SEPARATE ENTERPRISE

RESTAURANT: (CONVENTIONAL) 1 SPACE PER 250 SF OF GROSS FLOOR AREA

PROVIDED

SUITE	GROSS FLOOR AREA	USE	PARKING SPACE CALCULATION	MIN. REQUIRED
N1	10,130 S.F.	DAY CARE	$(\frac{1}{200})(10,130)=50.7$	51 SPACES
N2	5,370 S.F.	RESTAURANT	$(\frac{1}{250})(5,370)=21.5$	22 SPACES
			TOTAL MINIMUM REQUIRED SPACES	73 SPACES

TOTAL PROVIDED PARKING SPACES = 150 SPACES

ADA PARKING REQUIREMENTS

TOTAL # SPACES PROVIDED:	150
REQUIRED MIN. # OF ACCESSIBLE SPACES: (PER 28 CFR PART 36)	5
# ACCESSIBLE SPACES PROPOSED:	8

IMPERVIOUS SURFACE AREA COMPARISON

ZBA APPROVED SITE PLAN (JANUARY 28, 2025):	91,933 S.F.± IMPERVIOUS AREA
PROPOSED MODIFICATION (NOVEMBER 18, 2025):	85,455 S.F.± IMPERVIOUS AREA
REDUCTION IN IMPERVIOUS AREA:	6,478 S.F.±

MIDDLETON CORNER

49 South Main Street
Middleton, Massachusetts 01949

PREPARED FOR:

VILLEBRIDGE ACQUISITIONS LLC.

1150 Great Plain Avenue # 920056
Needham, Massachusetts 02492

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

121 E. BERKELEY ST., 4TH FL., BOSTON, MA 02118
VOICE (617) 357-8145, FAX (617) 357-9495
WWW.HANCOCKASSOCIATES.COM

PROP. LEGEND

- PROPOSED PROPERTY LINE
- CW – PROPOSED CROSS WALK
- RAISED CROSSWALK
- BCC (BITUMINOUS CONC. CURB)
- VGC (VERTICAL GRANITE CURB)
- PAINTED ISLAND
- DIRECTION OF TRAVEL
- CEMENT CONC. PAD/WALK (ASPHALT WALK OPTION)
- TRAFFIC SIGNS MOUNTED ON A P-5 POST
- T – TRANSFORMER WITH PROTECTIVE BOLLARDS
- SL – STOP LINE
- RETAINING WALL
- BIKE RACK
- 104 – CONTOUR
- 100.71 – SPOT GRADE
- FENCE

NO.	BY	APP	DATE	ISSUE/REVISION DESCRIPTION
1	DW/FAK	JP	5/16/24	PEER REVIEW COMMENTS
2	CMK/FAK	JP	7/16/24	NORTH & SOUTH RETAIL BLDGS
3	CMK/FAK	JP	1/28/25	RETAIL BLDGS & PARKING LOT
4	CMK/FAK	JP	2/12/25	CURB TYPE & LEGEND
5	CMK/FAK	JP	11/18/25	RETAIL BLDGS & PARKING LOT

DATE:	2/27/24	SCALE:	1"=30'
DRAWN BY:	CMK	DESIGNED BY:	FAK
CHECKED BY:	DTW	APPROVED BY:	JP

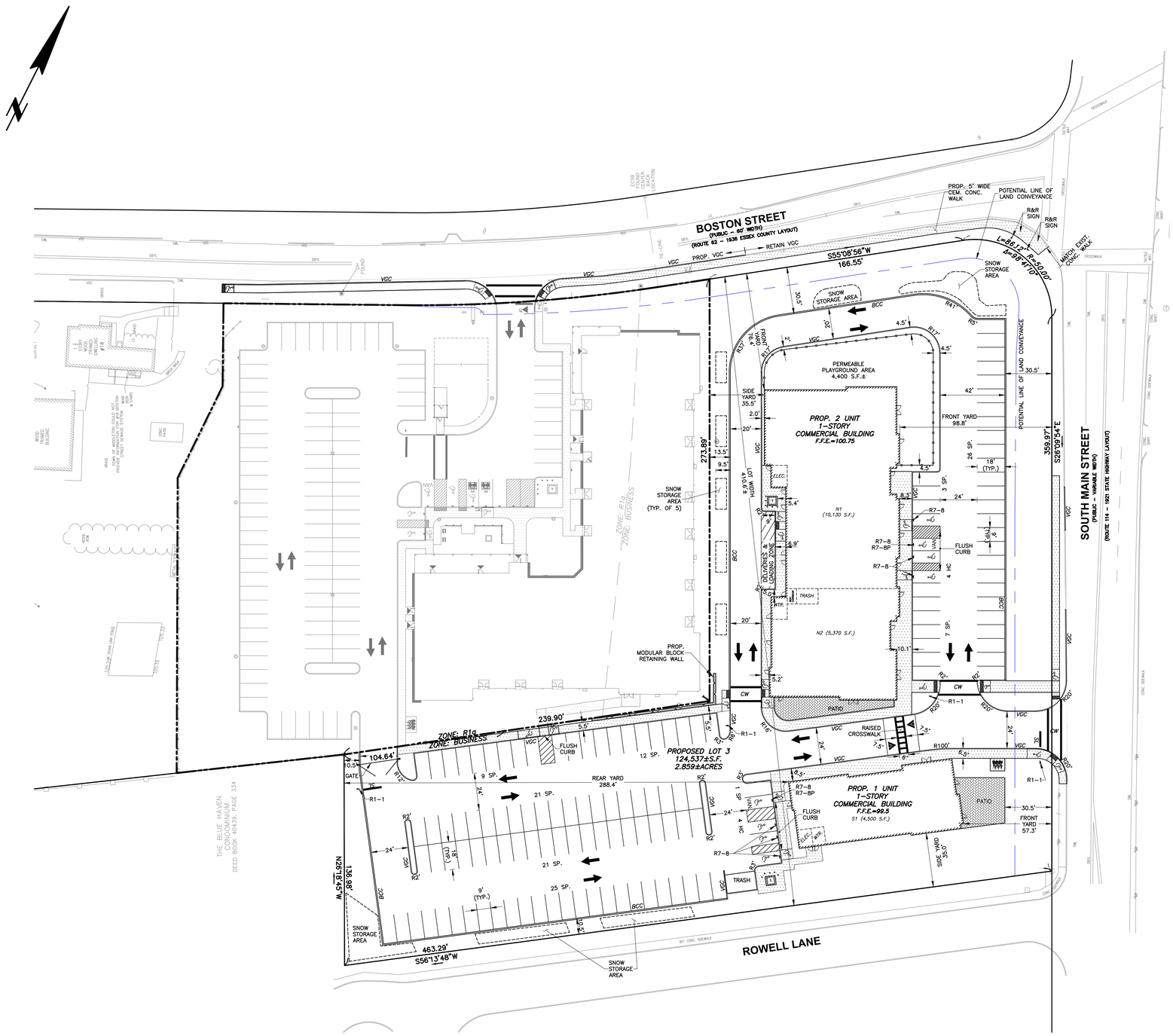
COMMONWEALTH OF MASSACHUSETTS
JOSEPH D. PEZNIOLA
CIVIL
No. 38117
REGISTERED PROFESSIONAL ENGINEER

PHASE I LAYOUT & MATERIALS PLAN

PLOT DATE: Nov 18, 2025 8:49 am
\\han-abosdc01\CAD-2\Civil 3D Projects\25912 – Lars – Middleton\Eng\DWG\

DWG: 25912sp100PH1 daycare layout for hawk.dwg
LAYOUT: C-3 Layout (R)
SHEET: C-3
PROJECT NO.: 25912

File Name: \\han-abosdc01\CAD-2\Civil 3D Projects\25912 - Lars - Middleton\Eng\DWG\25912sp100PH1 daycare layout for hawk.dwg Saved:11/14/2025 1:55 PM Plotted: Nov 18, 2025 8:49:16am
Tab: C-3 Layout (R) Plot Style: 1050C.ctb Plotted By: Chi M. Kwan



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MAX. BUILDING HEIGHT (STORIES)	3	1
MIN. FRONT SETBACK	30 FT.	76.4± FT. (BOSTON ST.) 57.3± FT. (S. MAIN ST.)
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MIN. REAR YARD	25 FT.*	288.4± FT.
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* (35 FT IF YARD ABUTS R DISTRICT)

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PER MIDDLETON
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ALL OTHER USES: (DAYCARE) — 1 SPACE PER 200 SF OF GROSS FLOOR AREA BUT NO FEWER THAN 5 SPACES PER SEPARATE ENTERPRISE

RESTAURANT: (CONVENTIONAL) — 1 SPACE PER 250 SF OF GROSS FLOOR AREA

RETAIL SALES/SERVICE: — 1 SPACE PER 200 SF OF GROSS FLOOR AREA BUT NO FEWER THAN 5 SPACES PER SEPARATE ENTERPRISE

PROVIDED

SUITE	GROSS FLOOR AREA	USE	PARKING SPACE CALCULATION	MIN. REQUIRED
N1	10,130 S.F.	DAY CARE	$(\frac{1}{200})(10,130)=50.7$	51 SPACES
N2	5,370 S.F.	RESTAURANT	$(\frac{1}{250})(5,370)=21.5$	22 SPACES
S1	4,500 S.F.	RETAIL	$(\frac{1}{200})(4,500)=22.5$	23 SPACES
			TOTAL MINIMUM REQUIRED SPACES	96 SPACES

TOTAL PROVIDED PARKING SPACES = 133 SPACES

ADA PARKING REQUIREMENTS

TOTAL # SPACES PROVIDED:	133
REQUIRED MIN. # OF ACCESSIBLE SPACES: (PER 28 CFR PART 36)	5
# ACCESSIBLE SPACES PROPOSED:	8

IMPERVIOUS SURFACE AREA COMPARISON

ZBA APPROVED SITE PLAN (JANUARY 28, 2025):	91,933 S.F.± IMPERVIOUS AREA
PROPOSED MODIFICATION (NOVEMBER 18, 2025):	87,392 S.F.± IMPERVIOUS AREA
REDUCTION IN IMPERVIOUS AREA:	4,541 S.F.±

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PHASE II LAYOUT & MATERIALS PLAN

COMMONWEALTH OF MASSACHUSETTS
JOSEPH D. PEZNOLA
CIVIL
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REGISTERED PROFESSIONAL ENGINEER

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Tab: C-3 Layout (R) Plot Style: 1050C.ctb Plotted By: Chi M. Kwan

FEBRUARY 2024 TIA TABLE 5

Table 5
TRIP-GENERATION SUMMARY

Time Period/Direction	Residential Component	Retail Component			Restaurant Component										
	(A) Proposed Multifamily Residential Development (60 units)[a]	(B) Proposed Retail Space (9,340 sf) [b]	(C) Pass-By Trips (40%)	*(D=B-C) New Trips*	(E) Proposed Fast Casual Restaurant (2,966 sf)[c]	(F) Proposed Sit-Down Restaurant (4,060 sf)[d]	(G=E+F) Subtotal	(H) Pass-By Trips (43%)	*(I=G-H) New Trips*	(J) Proposed Coffee Shop with Drive-Through Window (2,430 sf) [e]	(K) Pass-By Trips (55%)	*(L=J-K) New Trips*	*(M=C+H+K) Total Pass-By Trips*	*(N=A+D+I+L) Total New Trips*	***(O=M+N) Total Trips***
Average Weekday Daily:															
Entering	230	255	102	*153*	144	218	362	156	*206*	649	357	*292*	*615*	*881*	***1,496***
Exiting	230	255	102	*153*	144	218	362	156	*206*	649	357	*292*	*615*	*881*	***1,496***
Total	460	510	204	*306*	288	436	724	312	*412*	1,298	714	*584*	*1,230*	*1,762*	***2,992***
Weekday Morning Peak-Hour:															
Entering	10	13	4	*9*	2	21	23	9	*14*	106	57	*49*	*70*	*82*	***152***
Exiting	31	9	4	*5*	2	18	20	9	*11*	103	57	*46*	*70*	*93*	***163***
Total	41	22	8	*14*	4	39	43	18	*25*	209	114	*95*	*140*	*175*	***315***
Weekday Evening Peak-Hour:															
Entering	29	37	15	*22*	21	22	43	16	*27*	48	26	*22*	*57*	*100*	***157***
Exiting	17	37	15	*22*	16	15	31	16	*15*	48	26	*22*	*57*	*76*	***133***
Total	46	74	30	*44*	37	37	74	32	*42*	96	52	*44*	*114*	*176*	***290***
Saturday Midday Peak-Hour:															
Entering	12	31	12	*19*	53	23	76	30	*46*	107	59	*48*	*101*	*125*	***226***
Exiting	13	30	12	*18*	44	22	66	30	*36*	107	59	*48*	*101*	*115*	***216***
Total	25	61	24	*37*	97	45	142	60	*82*	214	118	*96*	*202*	*240*	***442***

[a]Based on ITE LUC 220, *Multifamily Housing (Low-Rise)*.
[b]Based on ITE LUC 822, *Strip Retail Plaza (<40k)*.
[c]Based on ITE LUC 930, *Fast Casual Restaurant*.
[d]Based on ITE LUC 932, *High-Turnover (Sit-Down) Restaurant*.
[e]Based on ITE LUC 937, *Coffee/Donut Shop with Drive-Through Window*.

TRIP-GENERATION CALCULATIONS

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

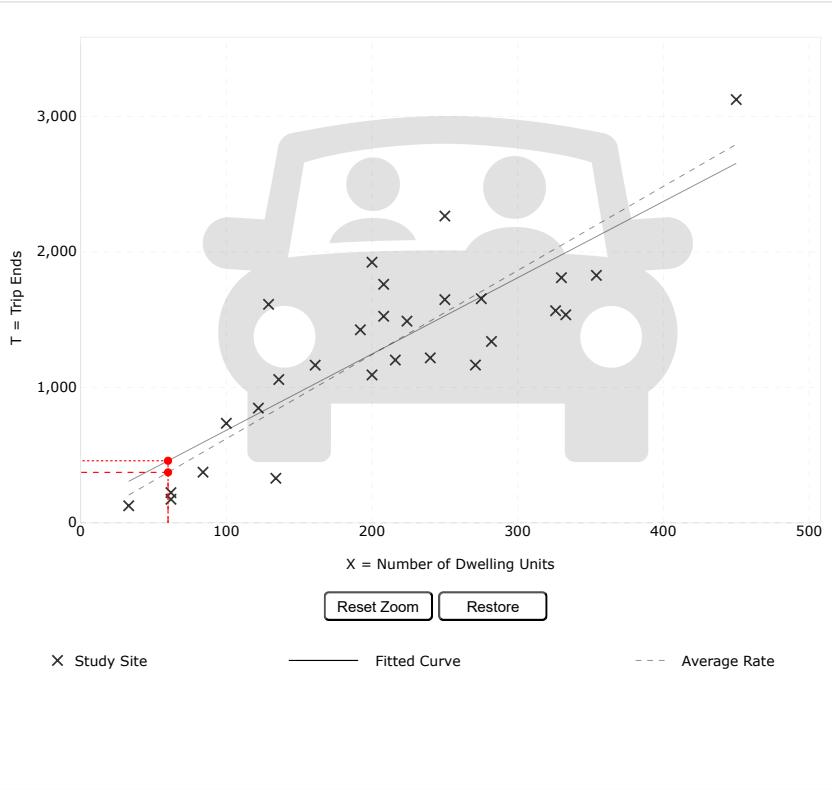
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
60 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
28

Avg. Num. of Dwelling Units:
208

Average Rate:
6.21

Range of Rates:
2.46 - 12.50

Standard Deviation:
1.87

Fitted Curve Equation:
T = 5.63(X) + 120.45

R^2:
0.70

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 373 (Total), 186 (Entry), 187 (Exit)
Fitted Curve: 458 (Total), 229 (Entry), 229 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

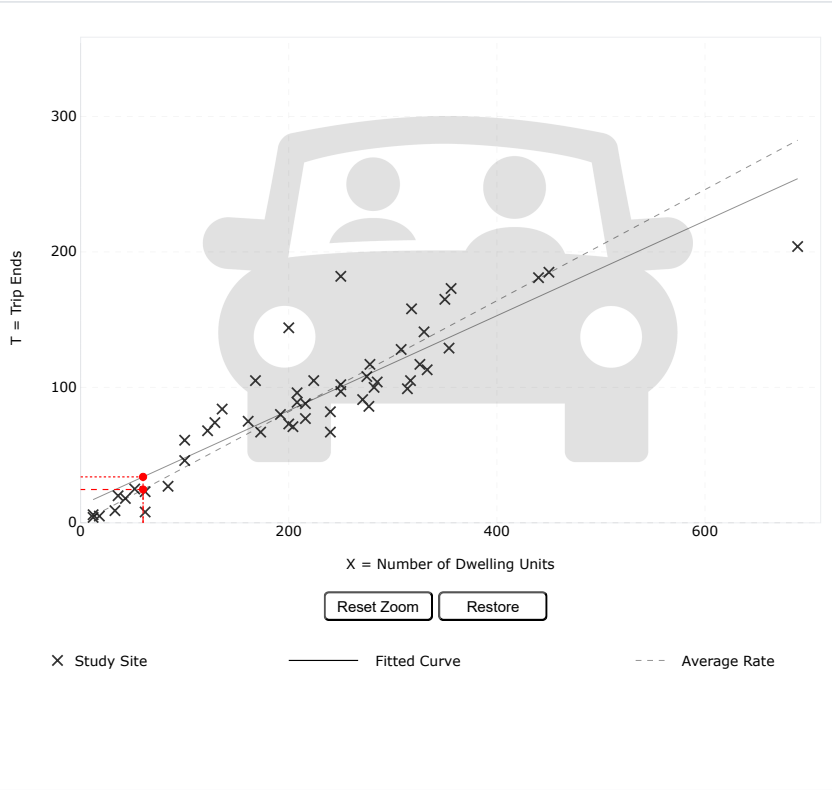
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
60 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
51

Avg. Num. of Dwelling Units:
219

Average Rate:
0.41

Range of Rates:
0.13 - 0.73

Standard Deviation:
0.10

Fitted Curve Equation:
T = 0.35(X) + 12.93

R^2:
0.81

Directional Distribution:
24% entering, 76% exiting

Calculated Trip Ends:
Average Rate: 25 (Total), 6 (Entry), 19 (Exit)
Fitted Curve: 34 (Total), 8 (Entry), 26 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

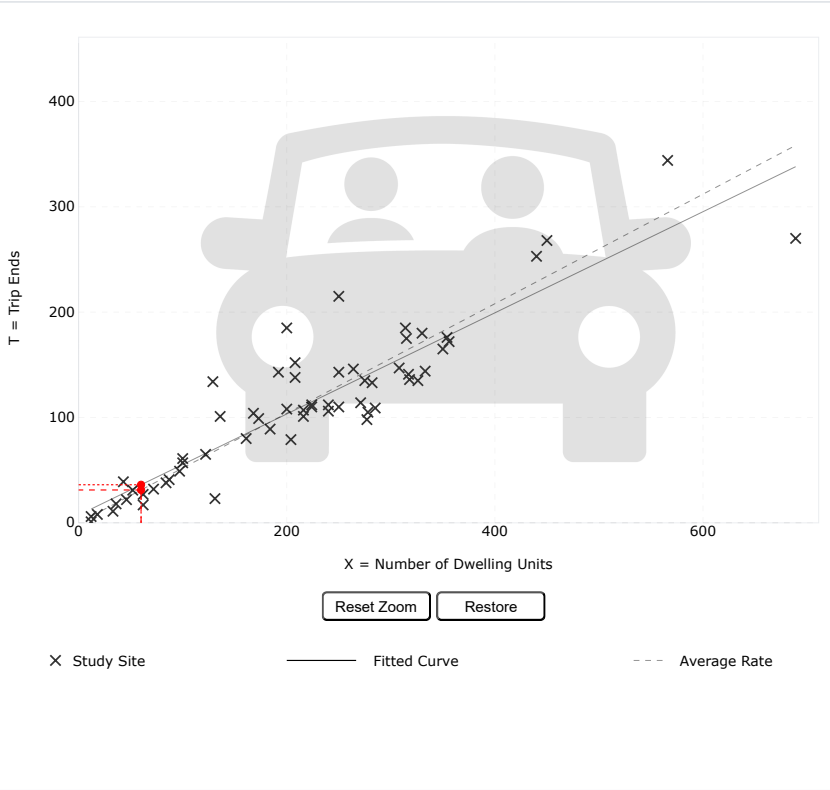
INDEPENDENT VARIABLE (IV):
Dwelling Units

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
60 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
61

Avg. Num. of Dwelling Units:
215

Average Rate:
0.52

Range of Rates:
0.08 - 1.04

Standard Deviation:
0.13

Fitted Curve Equation:
T = 0.48(X) + 7.35

R^2:
0.83

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 31 (Total), 19 (Entry), 12 (Exit)
Fitted Curve: 36 (Total), 22 (Entry), 14 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
220

LAND USE GROUP:
(200-299) Residential

LAND USE :
220 - Multifamily Housing (Low-Rise)

LAND USE SUBCATEGORY:
Not Close to Rail Transit

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
Dwelling Units

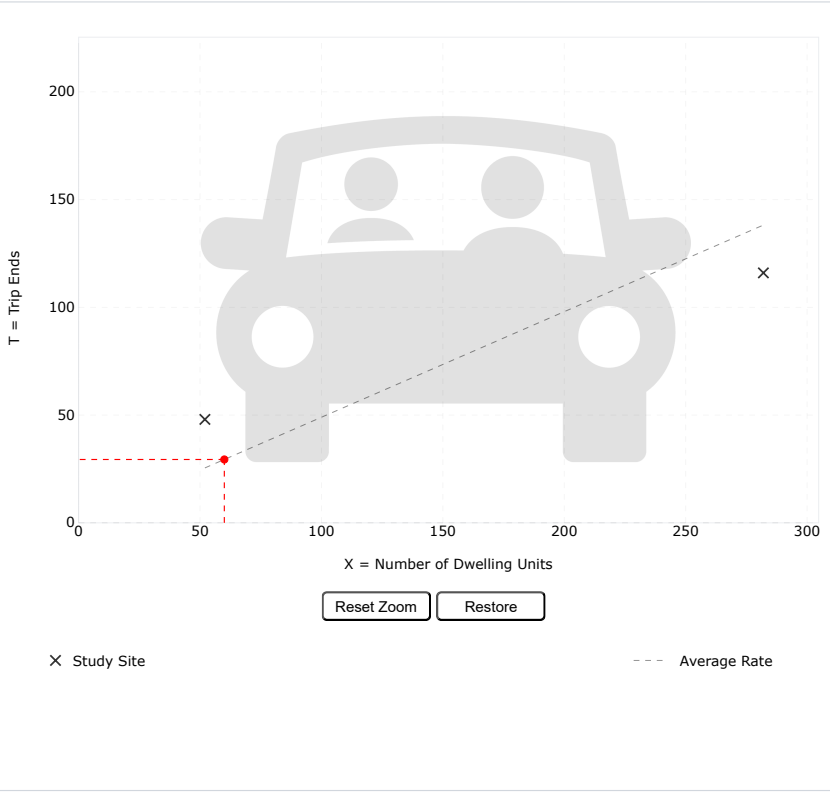
TIME PERIOD:
Saturday, Peak Hour of Generator

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
60 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220) Click for Description and Data Plots

Independent Variable:
Dwelling Units

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
2

Avg. Num. of Dwelling Units:
167

Average Rate:
0.49

Range of Rates:
0.41 - 0.92

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
38% entering, 62% exiting

Calculated Trip Ends:
Average Rate: 29 (Total), 11 (Entry), 18 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

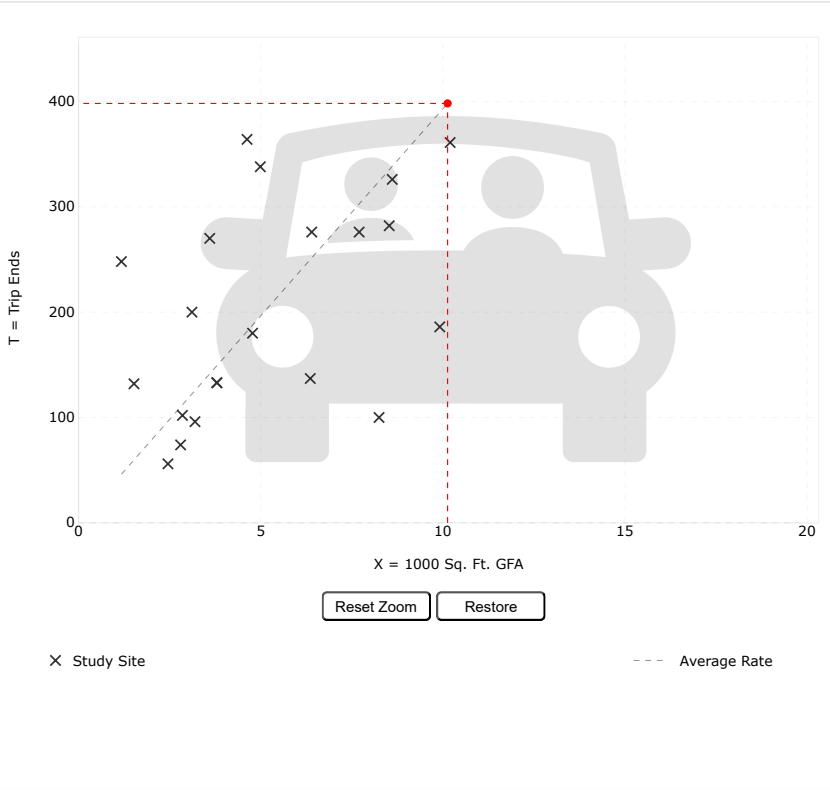
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10.13 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
21

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
39.30

Range of Rates:
12.12 - 211.06

Standard Deviation:
26.09

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 398 (Total), 199 (Entry), 199 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

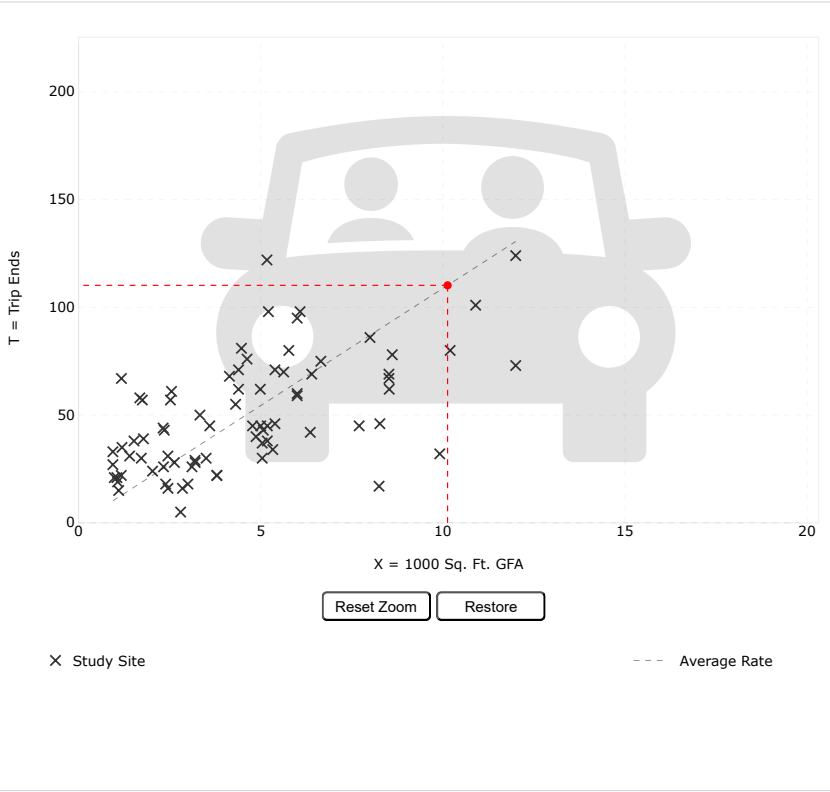
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10.13 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
78

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
10.88

Range of Rates:
1.79 - 57.02

Standard Deviation:
6.27

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
53% entering, 47% exiting

Calculated Trip Ends:
Average Rate: 110 (Total), 58 (Entry), 52 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
565

LAND USE GROUP:
(500-599) Institutional

LAND USE :
565 - Day Care Center

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

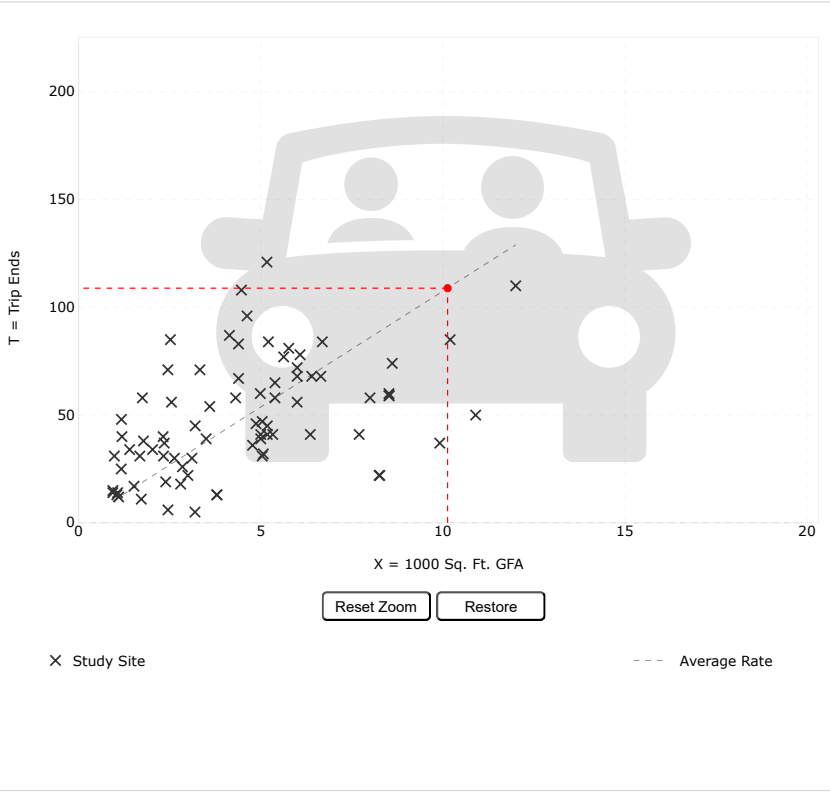
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
10.13 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Day Care Center (565) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
79

Avg. 1000 Sq. Ft. GFA:
4

Average Rate:
10.75

Range of Rates:
1.56 - 40.85

Standard Deviation:
6.46

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
47% entering, 53% exiting

Calculated Trip Ends:
Average Rate: 109 (Total), 51 (Entry), 58 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

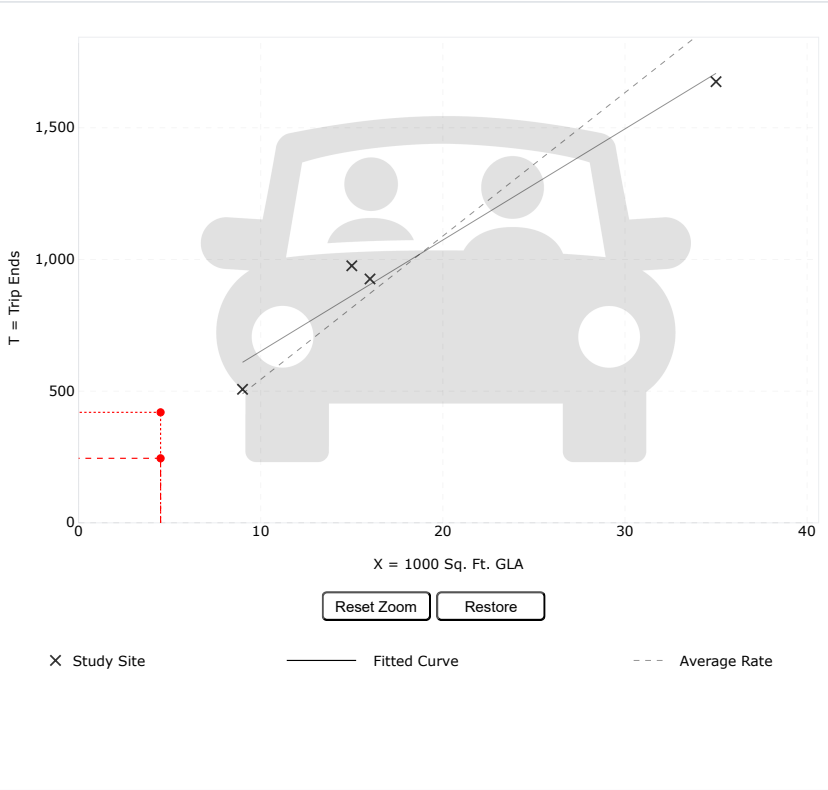
TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
4.5 Calculate

Data Plot and Equation

Caution – Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
4

Avg. 1000 Sq. Ft. GLA:
19

Average Rate:
54.45

Range of Rates:
47.86 - 65.07

Standard Deviation:
7.81

Fitted Curve Equation:
T = 42.20(X) + 229.68

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 245 (Total), 123 (Entry), 122 (Exit)
Fitted Curve: 420 (Total), 210 (Entry), 210 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

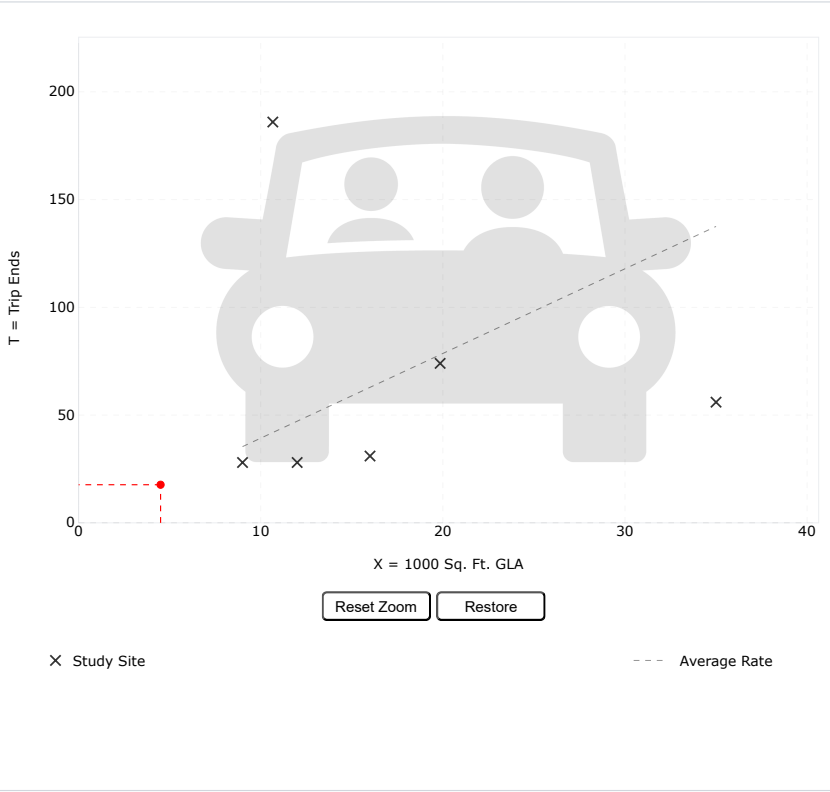
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
4.5 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
6

Avg. 1000 Sq. Ft. GLA:
17

Average Rate:
3.93

Range of Rates:
1.60 - 17.44

Standard Deviation:
5.12

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 18 (Total), 10 (Entry), 8 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

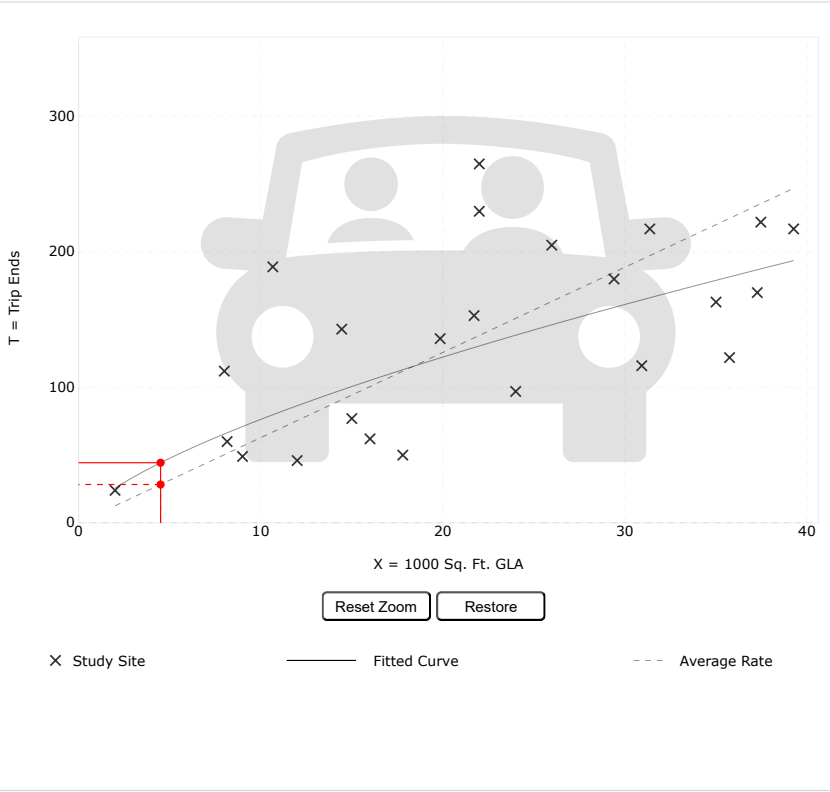
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
4.5 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
24

Avg. 1000 Sq. Ft. GLA:
22

Average Rate:
6.29

Range of Rates:
2.81 - 17.72

Standard Deviation:
3.02

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 2.77

R^2:
0.54

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 28 (Total), 14 (Entry), 14 (Exit)
Fitted Curve: 44 (Total), 22 (Entry), 22 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
822

LAND USE GROUP:
(800-899) Retail

LAND USE :
822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

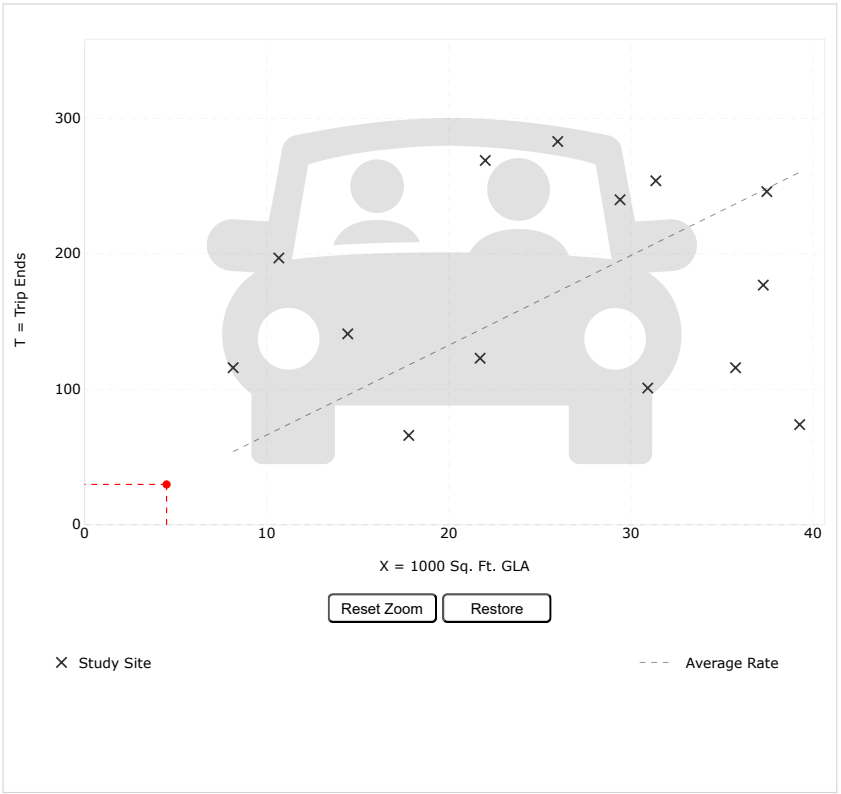
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GLA

TIME PERIOD:
Saturday, Peak Hour of Generator

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
4.5 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Strip Retail Plaza (<40k) (822) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
14

Avg. 1000 Sq. Ft. GLA:
26

Average Rate:
6.63

Range of Rates:
1.88 - 18.48

Standard Deviation:
3.99

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 30 (Total), 15 (Entry), 15 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
932

LAND USE GROUP:
(900-999) Services

LAND USE :
932 - High-Turnover (Sit-Down) Resta

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

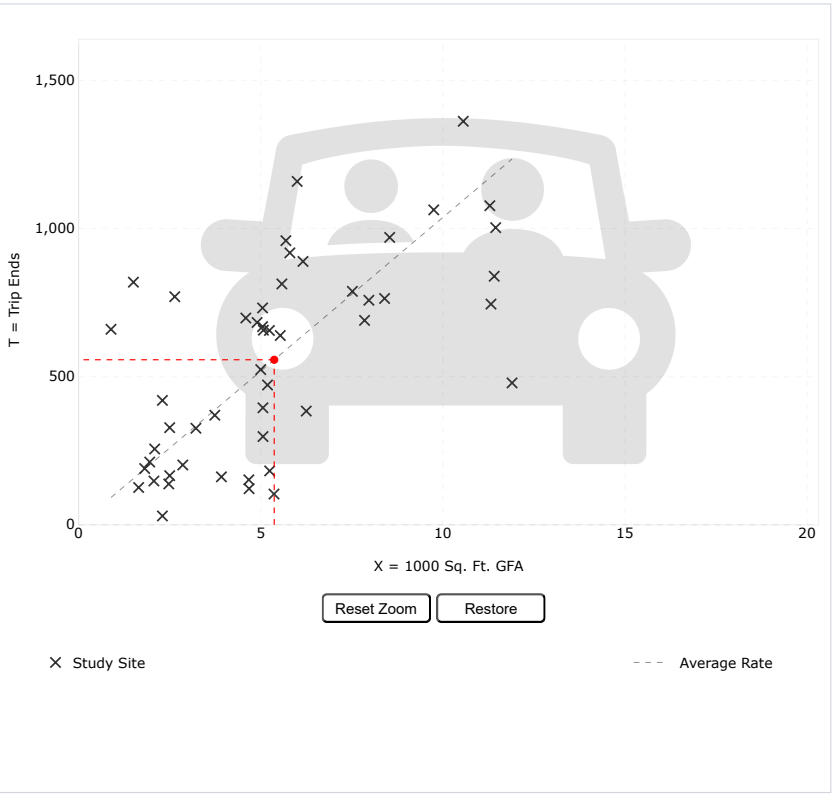
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
5.37 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
High-Turnover (Sit-Down) Restaurant (932) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
50

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
103.75

Range of Rates:
13.04 - 742.41

Standard Deviation:
67.15

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 557 (Total), 279 (Entry), 278 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
932

LAND USE GROUP:
(900-999) Services

LAND USE :
932 - High-Turnover (Sit-Down) Resta

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

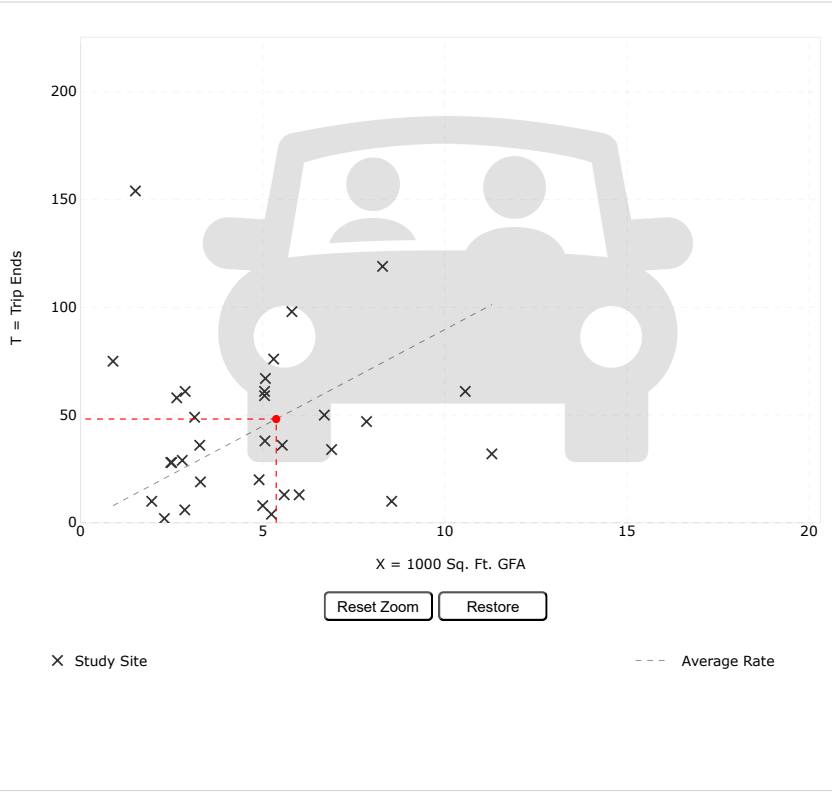
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
5.37 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
High-Turnover (Sit-Down) Restaurant (932) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
32

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
8.97

Range of Rates:
0.76 - 102.39

Standard Deviation:
12.35

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 48 (Total), 26 (Entry), 22 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
932

LAND USE GROUP:
(900-999) Services

LAND USE :
932 - High-Turnover (Sit-Down) Resta

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

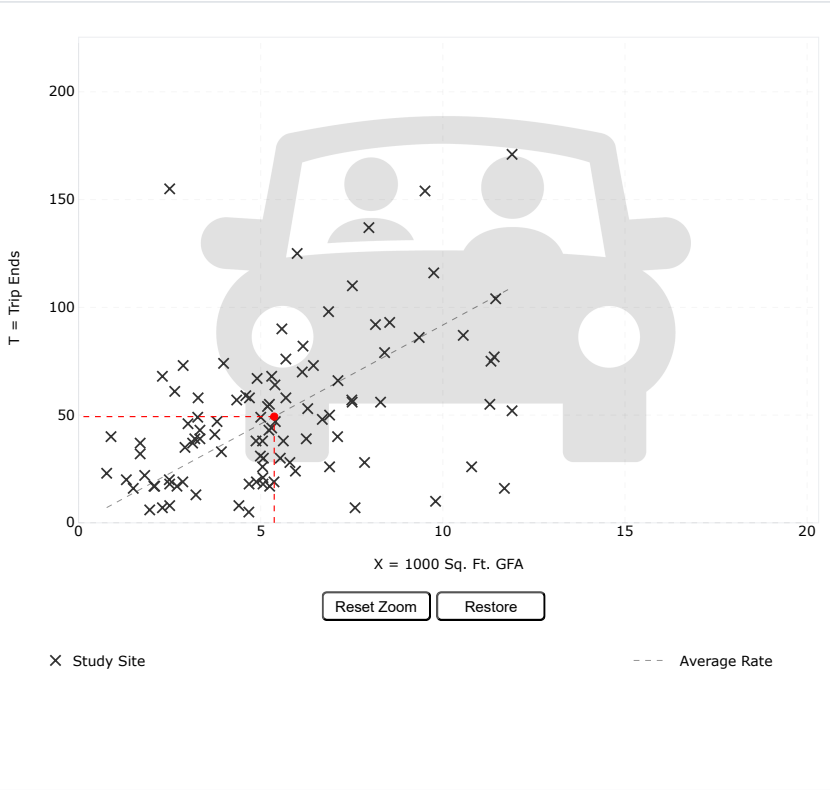
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Weekday, Peak Hour of Adjacent Stree

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
5.37 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
High-Turnover (Sit-Down) Restaurant (932) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
100

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
9.18

Range of Rates:
0.92 - 62.00

Standard Deviation:
6.36

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
61% entering, 39% exiting

Calculated Trip Ends:
Average Rate: 49 (Total), 30 (Entry), 19 (Exit)

Graph Look Up

Query | Filter

DATA SOURCE:
Trip Generation Manual, 12th Ed

SEARCH BY LAND USE CODE:
932

LAND USE GROUP:
(900-999) Services

LAND USE :
932 - High-Turnover (Sit-Down) Resta

LAND USE SUBCATEGORY:
All Sites

SETTING/LOCATION:
General Urban/Suburban

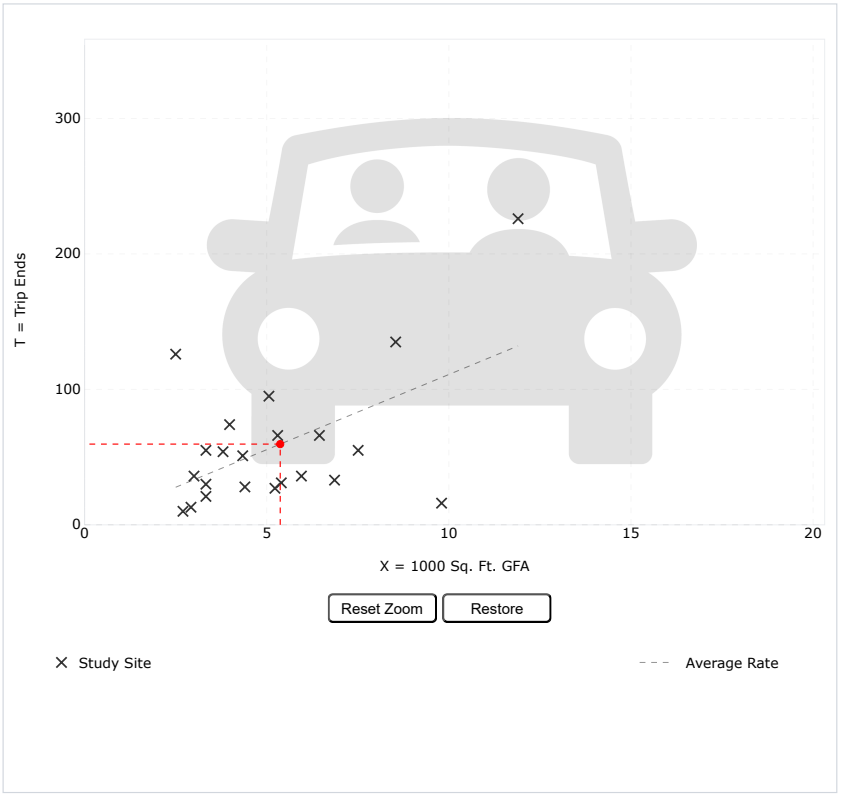
INDEPENDENT VARIABLE (IV):
1000 Sq. Ft. GFA

TIME PERIOD:
Saturday, Peak Hour of Generator

TRIP TYPE:
Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:
5.37 Calculate

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
High-Turnover (Sit-Down) Restaurant (932) Click for Description and Data Plots

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Saturday
Peak Hour of Generator

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
22

Avg. 1000 Sq. Ft. GFA:
5

Average Rate:
11.10

Range of Rates:
1.63 - 50.40

Standard Deviation:
8.34

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 60 (Total), 30 (Entry), 30 (Exit)