

APPENDIX C
FOCUSED TRANSPORTATION ANALYSIS



8981 OSAGE AVENUE WAREHOUSE
FOCUSED TRANSPORTATION ANALYSIS
FINAL REPORT

DECEMBER 9, 2021

DRAFT

PREPARED FOR:

CITY OF SACRAMENTO



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TABLE OF CONTENTS

INTRODUCTION	1
PROJECT DESCRIPTION	1
ENVIRONMENTAL SETTING	3
ROADWAY SYSTEM.....	3
EXISTING PEDESTRIAN SYSTEM.....	4
EXISTING BICYCLE SYSTEM	4
TRANSIT SYSTEM	5
STUDY AREA.....	6
EXISTING INTERSECTION LANE CONFIGURATION	7
TRAFFIC DATA COLLECTION.....	7
VOLUME DATA.....	7
SPEED DATA.....	8
REGULATORY SETTING	8
CITY OF SACRAMENTO	8
SACRAMENTO COUNTY.....	11
LEVEL OF SERVICE ANALYSIS AND METHODOLOGY	12
RESULTS OF EXISTING CONDITION ANALYSIS	13
PROJECT TRAVEL CHARACTERISTICS	14
TRIP GENERATION	14
VEHICULAR TRIP GENERATION ESTIMATES.....	14
TRUCK TRIP GENERATION ESTIMATES.....	14
RECOMMENDED TRIP GENERATION ESTIMATES.....	14
HOURLY TRIP GENERATION ESTIMATES	14
TRIP DISTRIBUTION	18
THRESHOLDS OF SIGNIFICANCE	18
INTERSECTIONS – CITY OF SACRAMENTO	18
INTERSECTIONS – SACRAMENTO COUNTY.....	19
TRANSIT – CITY OF SACRAMENTO.....	20
TRANSIT – SACRAMENTO COUNTY.....	20
BICYCLE FACILITIES – CITY OF SACRAMENTO	20
PEDESTRIAN CIRCULATION – CITY OF SACRAMENTO.....	20
BICYCLE AND PEDESTRIAN FACILITIES – SACRAMENTO COUNTY	20
CONSTRUCTION-RELATED TRAFFIC IMPACTS – CITY OF SACRAMENTO	20
SUBSTANDARD RURAL ROADWAY FUNCTIONALITY – SACRAMENTO COUNTY	21
SAFETY – SACRAMENTO COUNTY	21

EXISTING PLUS PROJECT TRAFFIC CONDITIONS	21
EXISTING PLUS PROJECT INTERSECTION LANE CONFIGURATION	21
EXISTING PLUS PROJECT TRAFFIC VOLUMES	22
RESULTS OF EXISTING PLUS PROJECT CONDITION ANALYSIS	22
TRAFFIC SIGNAL WARRANT ANALYSIS.....	23
Warrant 1: Eight-Hour Vehicular Volume	23
Warrant 2: Four-Hour Vehicular Volume	24
Warrant 3: Peak Hour Vehicular Volume.....	24
IMPACTS AND MITIGATION MEASURES.....	24
ON-SITE OPERATIONS REVIEW AND QUEUING	27
INTERSECTION AND DRIVEWAY SPACING	27
DRIVEWAY THROAT LENGTHS AND INTERSECTION QUEUING	27

LIST OF FIGURES

FIGURE 1. SITE LOCATION	2
FIGURE 2. SITE PLAN	3
FIGURE 3. BIKEWAYS.....	5
FIGURE 4. REGIONAL TRANSIT ROUTES	6
FIGURE 5. EXISTING INTERSECTION LANE CONFIGURATION	7
FIGURE 6. ADJUSTED EXISTING 2021 PEAK HOUR VOLUMES	8
FIGURE 7. VEHICLE LEVEL OF SERVICE EXCEPTION AREAS.....	10
FIGURE 8. SACRAMENTO COUNTY URBAN SERVICES BOUNDARY MAP.....	12
FIGURE 9. ESTIMATED TRIP DISTRIBUTION.....	19
FIGURE 10. EXISTING PLUS PROJECT INTERSECTION LANE CONFIGURATION	21
FIGURE 11. EXISTING PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES	22

LIST OF TABLES

TABLE 1. INTERSECTION LEVEL OF SERVICE	13
TABLE 2. EXISTING INTERSECTION OPERATION ANALYSIS	13
TABLE 3. VEHICULAR TRIP GENERATION ESTIMATES.....	15
TABLE 4. TRUCK TRIP GENERATION ESTIMATES.....	16
TABLE 5. RECOMMENDED VEHICULAR TRIP GENERATION ESTIMATES.....	16
TABLE 6. HOURLY TRIP GENERATION ESTIMATES	17
TABLE 7. EXISTING PLUS PROJECT INTERSECTION OPERATION ANALYSIS	23

INTRODUCTION

This transportation analysis addresses transportation and circulation conditions associated with a proposed development project at 8981 Osage Avenue in the City of Sacramento. The analysis focuses on the project's relationship to the City and County street system, including an adjacent intersection, the proposed access points, and on-site circulation. The analysis includes consideration of motorized vehicle traffic impacts on roadway capacity, construction impacts, and potential impacts to transit service, bicyclists, and pedestrians. Quantitative transportation analyses have been conducted for the following scenarios:

- Existing Conditions (2021)
- Existing Plus Project Conditions

PROJECT DESCRIPTION

As illustrated in **Figure 1**, the 9.51-acre project site is located at 8981 Osage Avenue, in the northeast quadrant of the intersection of Osage Avenue and South Watt Avenue. The site is currently vacant. As shown in the figure, the site is located on the City boundary. The project site is located within a heavy industrial M-2(S)-R zone.

Figure 2 illustrates the project site plan. The project proposes a warehouse of 136,720 square feet. Two vehicular access points are proposed along Osage Avenue, with no direct access to South Watt Avenue. Nearby parcels west of South Watt Avenue serve commercial and industrial uses. Opposite the site along the south side of Osage Avenue are three residences. East of the site, a mix of residential, agricultural, and commercial uses are located along both sides of Osage Avenue.

FIGURE 1. SITE LOCATION

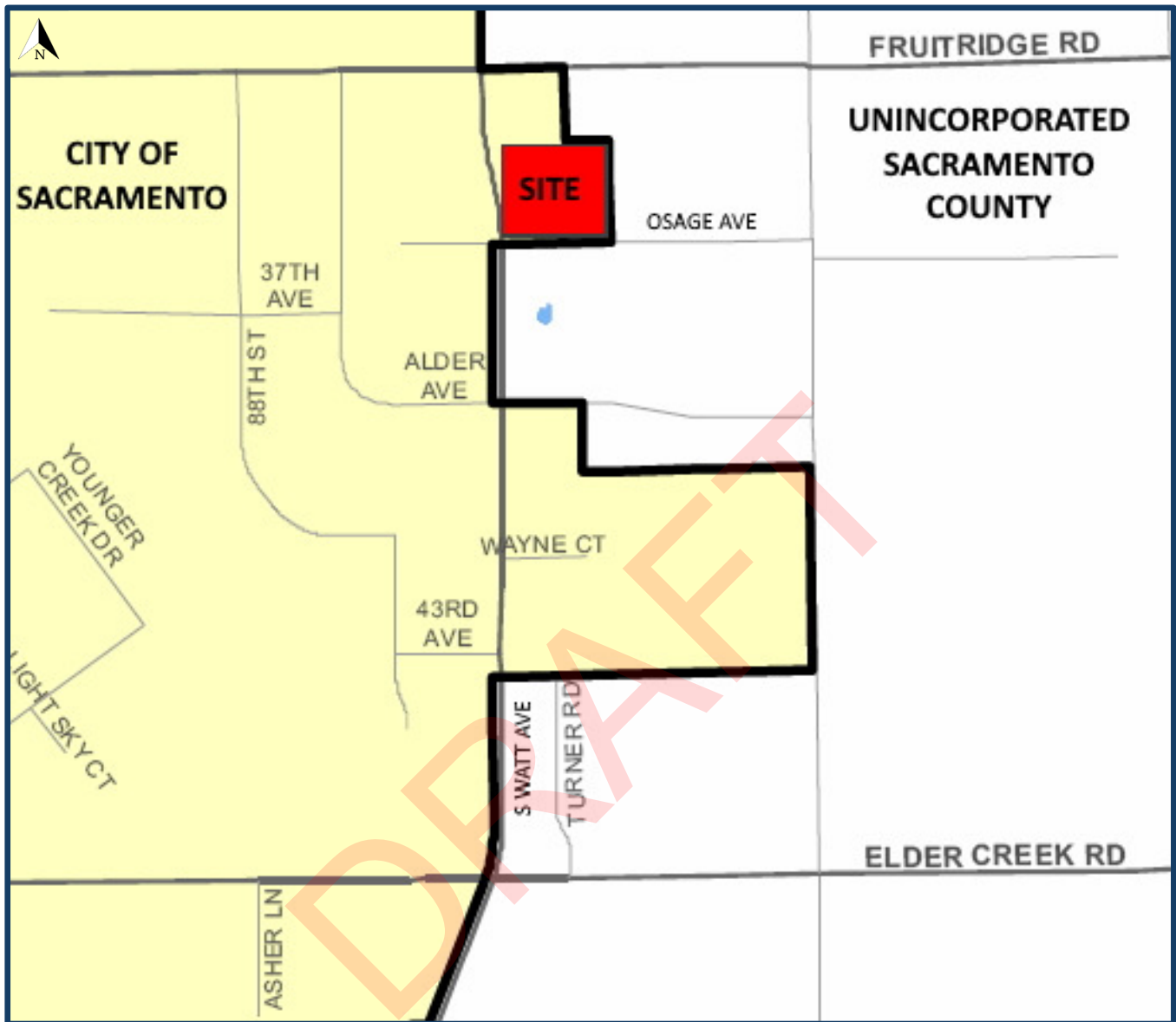
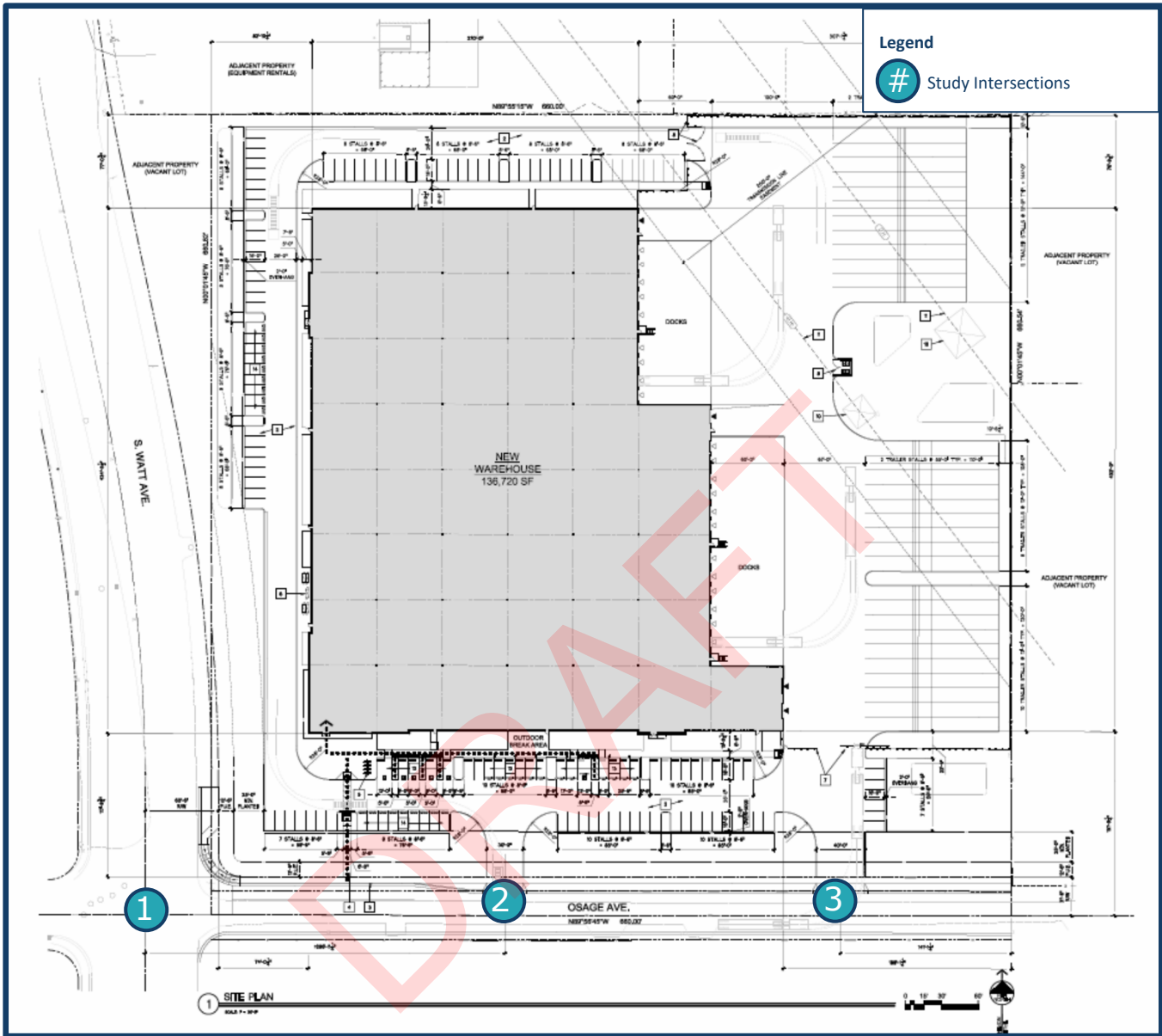


FIGURE 2. SITE PLAN



Source: Panattoni, New Warehouse, Sheet 1.01, July 22, 2021.

ENVIRONMENTAL SETTING

The roadway, transit, bicycle, and pedestrian transportation systems within the study area are described below.

ROADWAY SYSTEM

The roadway system near the proposed project is described below.

South Watt Avenue is a north-south arterial that extends to Folsom Boulevard to the north, where it becomes Watt Avenue. Watt Avenue provides access to US 50 and extends northerly across the American River. To the north, it provides access through northern Sacramento County to I-80 and into Placer County. To the south, South Watt Avenue extends to Florin Road, where it becomes Elk Grove Florin Road. Elk Grove Florin Road extends to Stockton Boulevard in the City of Elk Grove. South Watt Avenue has two to six through lanes. It is a two-lane roadway at its unsignalized intersection with Osage Avenue.

Osage Avenue is an east-west local street. It begins about 600 feet west of South Watt Avenue at a gated entry to an industrial / commercial complex. To the east, it extends about 2,000 feet east of South Watt Avenue to a T-intersection at Hedge Avenue. Osage Avenue is stop-sign controlled at South Watt Avenue and at Hedge Avenue.

West of South Watt Avenue, Osage Avenue has been improved with 40 feet of pavement and sidewalks on both sides. East of South Watt Avenue, Osage Avenue is typically 16 to 20 feet wide, without shoulders or sidewalks. The pavement east of Osage Avenue is in poor to fair condition, exhibiting alligator cracking in several areas.

Fruitridge Road is an east-west arterial located about 1,100 feet north of the Osage Avenue. To the west, the roadway provides access to SR 99 and extends to South Land Park Drive. To the east, Fruitridge Road extends to Mayhew Road. Fruitridge Road has two to four through lanes.

Elder Creek Road is an east-west arterial located about 4,100 feet south of Osage Avenue. To the west, Elder Creek Road extends to Stockton Boulevard, where it becomes 47th Avenue. 47th Avenue provides access to SR 99. To the east, Elder Creek Road extends to Excelsior Road. Elder Creek Road has two to four through lanes.

EXISTING PEDESTRIAN SYSTEM

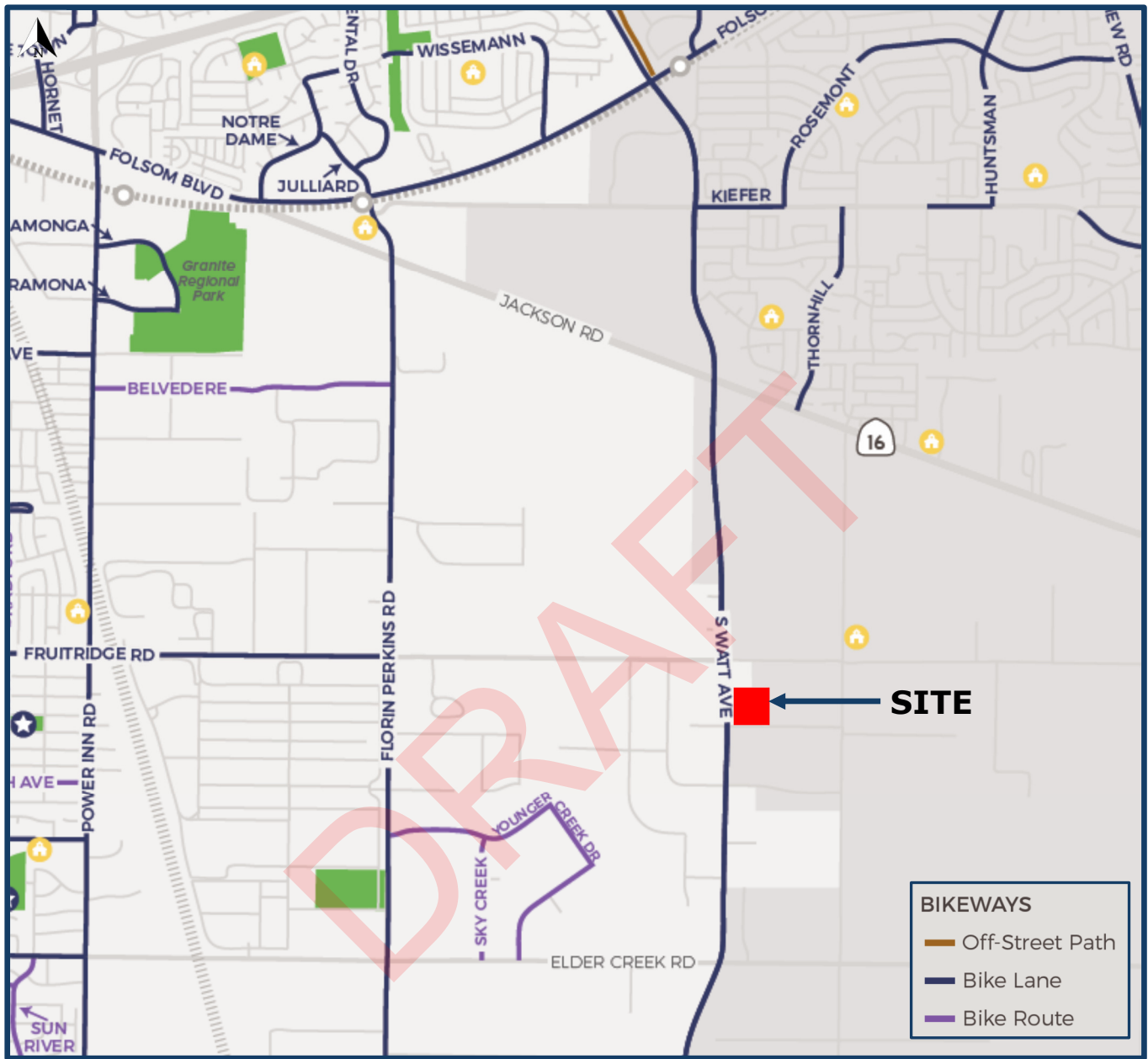
The existing pedestrian system is limited in the site vicinity.

- Osage Avenue west of South Watt Avenue – sidewalks on both sides.
- Osage Avenue east of South Watt Avenue – no sidewalks or shoulders.
- South Watt Avenue – Sidewalk on the west side of the street only from approximately 370 feet south of Osage Avenue to approximately 1,300 feet north of Fruitridge Road. A variable width shoulder is provided on both sides of South Watt Avenue in the project vicinity.

EXISTING BICYCLE SYSTEM

Figure 3 illustrates the existing bicycle system in the site vicinity. Bike lanes currently exist on both sides of South Watt Avenue. They extend to the north providing access to light rail at Folsom Boulevard. They extend to the south to Gerber Road.

FIGURE 3. BIKEWAYS



Source: City of Sacramento Bikeway User Map, Bicycle Master Plan amended on Aug 14, 2018.

TRANSIT SYSTEM

Regional Transit (RT) service in the site vicinity is illustrated in **Figure 4**.

There is no transit service in the vicinity of the project site. RT's Gold Line Light Rail service is located about 2.2 miles north of the site. Bus Route 61 (Fruitridge) operates along Fruitridge Road and Florin Perkins Road about 1.4 miles northwest of the project site.

FIGURE 4. REGIONAL TRANSIT ROUTES



Source: Sacramento Regional Transit Bus & Light Rail System Map

STUDY AREA

The following intersections are included in the study area and shown in **Figure 2**:

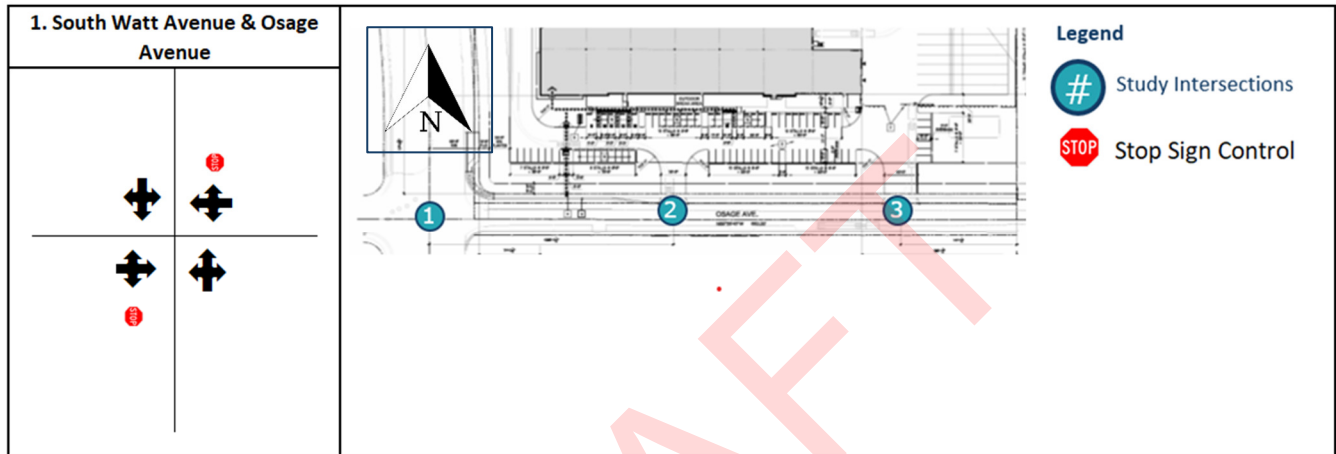
1. Osage Avenue and South Watt Avenue
2. Osage Avenue and West Driveway

3. Osage Avenue and East Driveway

EXISTING INTERSECTION LANE CONFIGURATION

Existing intersection geometry (number of approach lanes and traffic control) is illustrated in **Figure 5**. The intersection of South Watt Avenue and Osage Avenue is controlled by stop signs on the Osage Avenue approaches.

FIGURE 5. EXISTING INTERSECTION LANE CONFIGURATION



TRAFFIC DATA COLLECTION

VOLUME DATA

Intersection turning movement counts were collected at the intersection of South Watt Avenue and Osage Avenue in 15-minute intervals on Wednesday, October 13, 2021, from 6:00 AM to 10:00 PM. These counts included data on pedestrians and bicyclists, as well as heavy vehicles. Detailed traffic count data is included in the Appendix.

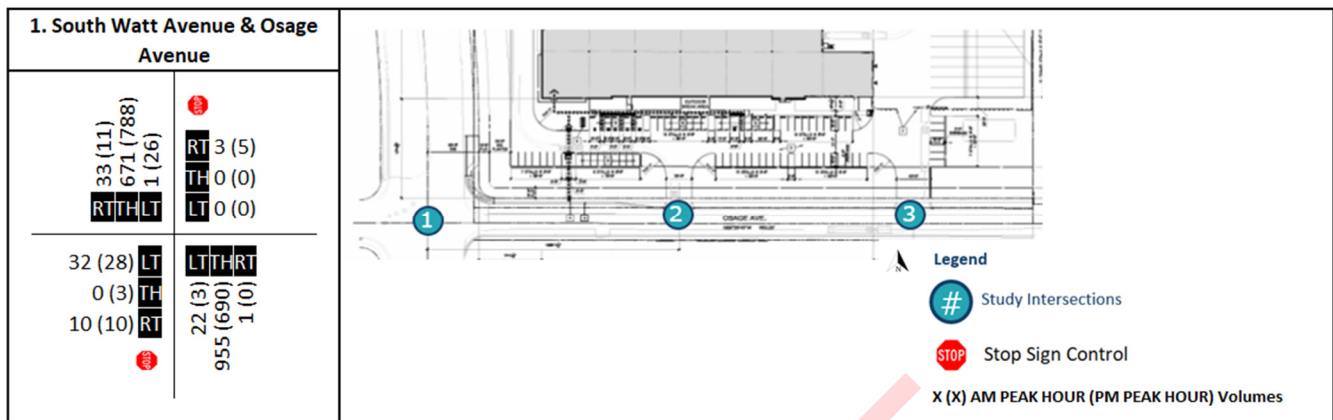
Due to the economic and travel disruptions of the COVID-19 pandemic, there was concern that these volumes might be lower than pre-pandemic levels. The 2021 counts were compared to peak period intersection counts collected at the intersection of South Watt Avenue and Fruitridge Road on Tuesday, October 2, 2018. Counts were compared for the 7:00 to 9:00 AM and 4:00 to 6:00 PM time periods. Compared to 2018, the 2021 counts were lower, as follows:

- Northbound AM – 12 percent lower
- Southbound AM – 14 percent lower
- Northbound PM – 1 percent lower
- Southbound PM – 11 percent lower

Based upon these results, the 2021 counts were adjusted (increased) to reflect 2018 traffic volume levels. Detailed calculations are included in the appendix.

Figure 6 illustrates the adjusted existing 2021 peak hour traffic volumes used in the analysis.

FIGURE 6. ADJUSTED EXISTING 2021 PEAK HOUR VOLUMES



SPEED DATA

On Wednesday, October 13, 2021, for 24 hours, travel speed and volume data was collected on South Watt Avenue just south of Osage Avenue. Detailed speed data is included in the appendix.

In the northbound direction, the average (mean) speed is 46 miles per hour. The 15th percentile speed is 39 miles per hour. The median (50th percentile) speed is 48 miles per hour. The 85th percentile speed is 55 miles per hour. The 95th percentile speed is 59 miles per hour. The 10-mile per hour pace is 46 miles per hour to 55 miles per hour, with 52 percent of the vehicles travelling within that speed range.

In the southbound direction, the average (mean) speed is 46 miles per hour. The 15th percentile speed is 35 miles per hour. The median (50th percentile) speed is 48 miles per hour. The 85th percentile speed is 58 miles per hour. The 95th percentile speed is 64 miles per hour. The 10-mile per hour pace is 46 miles per hour to 55 miles per hour, with 35 percent of the vehicles travelling within that speed range.

REGULATORY SETTING

CITY OF SACRAMENTO

The Mobility Element of the Sacramento 2035 General Plan outlines goals and policies that coordinate the transportation and circulation system with planned land uses. The following level of service policy has been used in this study, as amended on January 23, 2018:

Policy M 1.2.2 Level of Service (LOS) Standard. The City shall implement a flexible context sensitive Level of Service (LOS) standard, and will measure traffic operations against the vehicle LOS thresholds established in this policy. The City will measure Vehicle LOS based on the methodology contained in the latest version of the Highway Capacity Manual (HCM) published by the Transportation Research Board. The City’s specific vehicle LOS thresholds

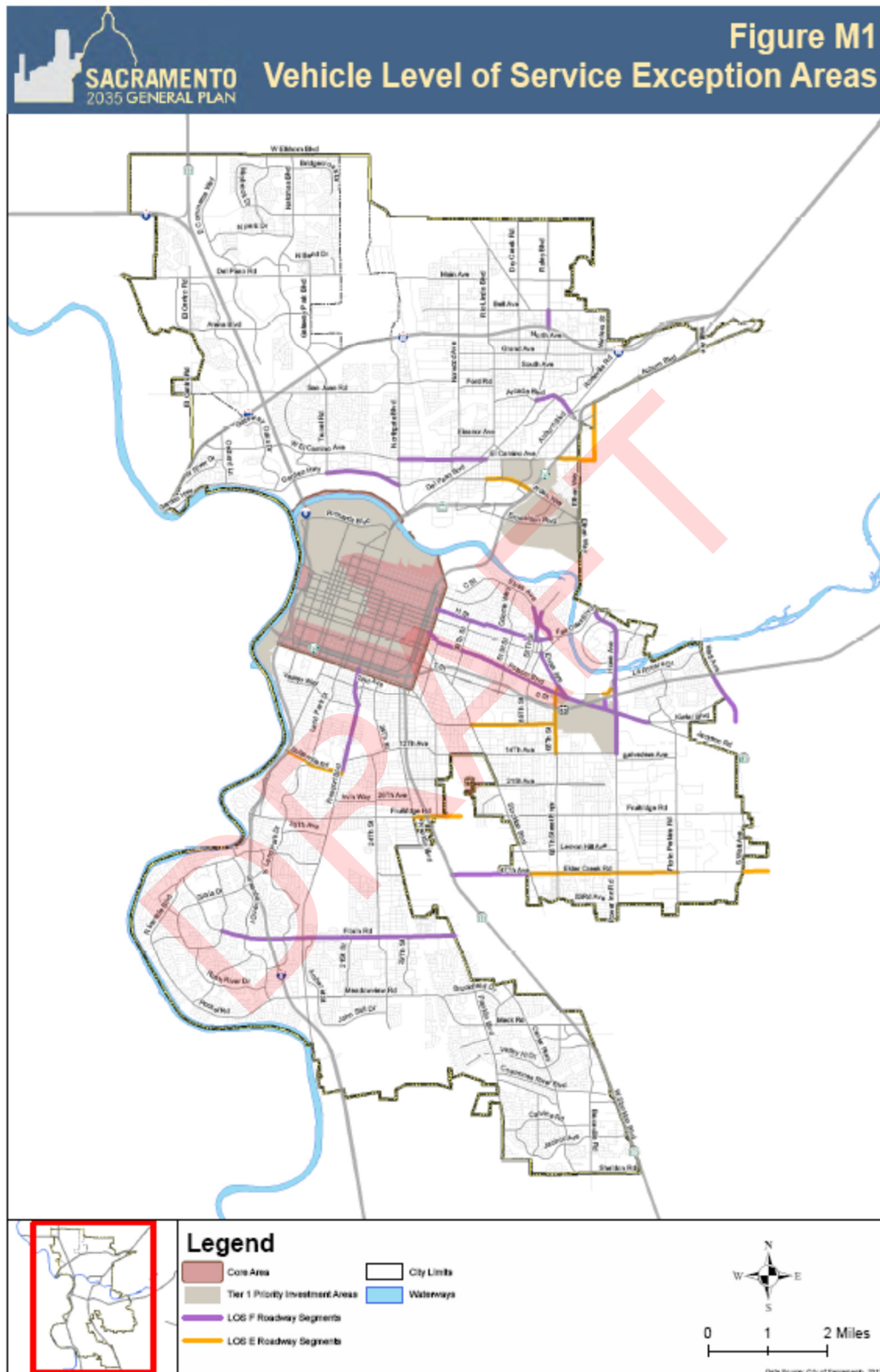
have been defined based on community values with respect to modal priorities, land use context, economic development, and environmental resources and constraints. As such, the City has established variable LOS thresholds appropriate for the unique characteristics of the City's diverse neighborhoods and communities. The City will strive to operate the roadway network at LOS D or better for vehicles during typical weekday conditions, including AM and PM peak hour with the following exceptions described below and mapped on Figure M-1 (**Figure 7**):

- A. Core Area (Central City Community Plan Area) - LOS F allowed
- B. Priority Investment Areas – LOS F allowed
- C. LOS E Roadways - LOS E is allowed for the following roadways because expansion of the roadways would cause undesirable impacts or conflict with other community values.
 - 65th Street: Elvas Avenue to 14th Avenue
 - Arden Way: Royal Oaks Drive to I-80 Business
 - Broadway: Stockton Boulevard to 65th Street
 - College Town Drive: Hornet Drive to La Rivera Drive
 - El Camino Avenue: I-80 Business to Howe Avenue
 - Elder Creek Road: Stockton Boulevard to Florin Perkins Road
 - Elder Creek Road: South Watt Avenue to Hedge Avenue
 - Fruitridge Road: Franklin Boulevard to SR 99
 - Fruitridge Road: SR 99 to 44th Street
 - Howe Avenue: El Camino Avenue to Auburn Boulevard
 - Sutterville Road: Riverside Boulevard to Freeport Boulevard

LOS E is also allowed on all roadway segments and associated intersections located within ½ mile walking distance of light rail stations.

- D. Other LOS F Roadways - LOS F is allowed for the following roadways because expansion of the roadways would cause undesirable impacts or conflict with other community values.
 - 47th Avenue: State Route 99 to Stockton Boulevard
 - Arcade Boulevard: Marysville Boulevard to Roseville Road
 - Carlson Drive: Moddison Avenue to H Street
 - Duckhorn Drive: Arena Boulevard to San Juan Road
 - El Camino Avenue: Grove Avenue to Del Paso Boulevard
 - Elvas Avenue: J Street to Folsom Boulevard

FIGURE 7. VEHICLE LEVEL OF SERVICE EXCEPTION AREAS



Source: Sacramento 2035 General Plan, Mobility Element, Amended January 23, 2018.

- Elvas Avenue/56th Street: 52nd Street to H Street
 - Florin Road: Havenside Drive to Interstate 5
 - Florin Road: Freeport Boulevard to Franklin Boulevard
 - Florin Road: Interstate 5 to Freeport Boulevard
 - Folsom Boulevard: 47th Street to 65th Street
 - Folsom Boulevard: Howe Avenue to Jackson Highway
 - Folsom Boulevard: US 50 to Howe Avenue
 - Freeport Boulevard: Sutterville Road (North) to Sutterville Road (South)
 - Freeport Boulevard: 21st Street to Sutterville Road (North)
 - Freeport Boulevard: Broadway to 21st Street
 - Garden Highway: Truxel Road to Northgate Boulevard
 - H Street: Alhambra Boulevard to 45th Street
 - H Street 45th: Street to Carlson Drive
 - Hornet Drive: US 50 Westbound On-ramp to Folsom Boulevard
 - Howe Avenue: US 50 to Fair Oaks Boulevard
 - Howe Avenue: US 50 to 14th Avenue
 - Raley Boulevard: Bell Avenue to Interstate 80
 - San Juan Road: Duckhorn Drive to Truxel Road
 - South Watt Avenue: US 50 to Kiefer Boulevard
 - West El Camino Avenue: Northgate Boulevard to Grove Avenue
- E. If maintaining the above LOS standards would, in the City’s judgment be infeasible and/or conflict with the achievement of other goals, LOS E or F conditions may be accepted provided that provisions are made to improve the overall system, promote non-vehicular transportation, and/or implement vehicle trip reduction measures as part of a development project or a city-initiated project. Additionally, the City shall not expand the physical capacity of the planned roadway network to accommodate a project beyond that identified in Figure M4 and M4a (2035 General Plan Roadway Classification and Lanes).

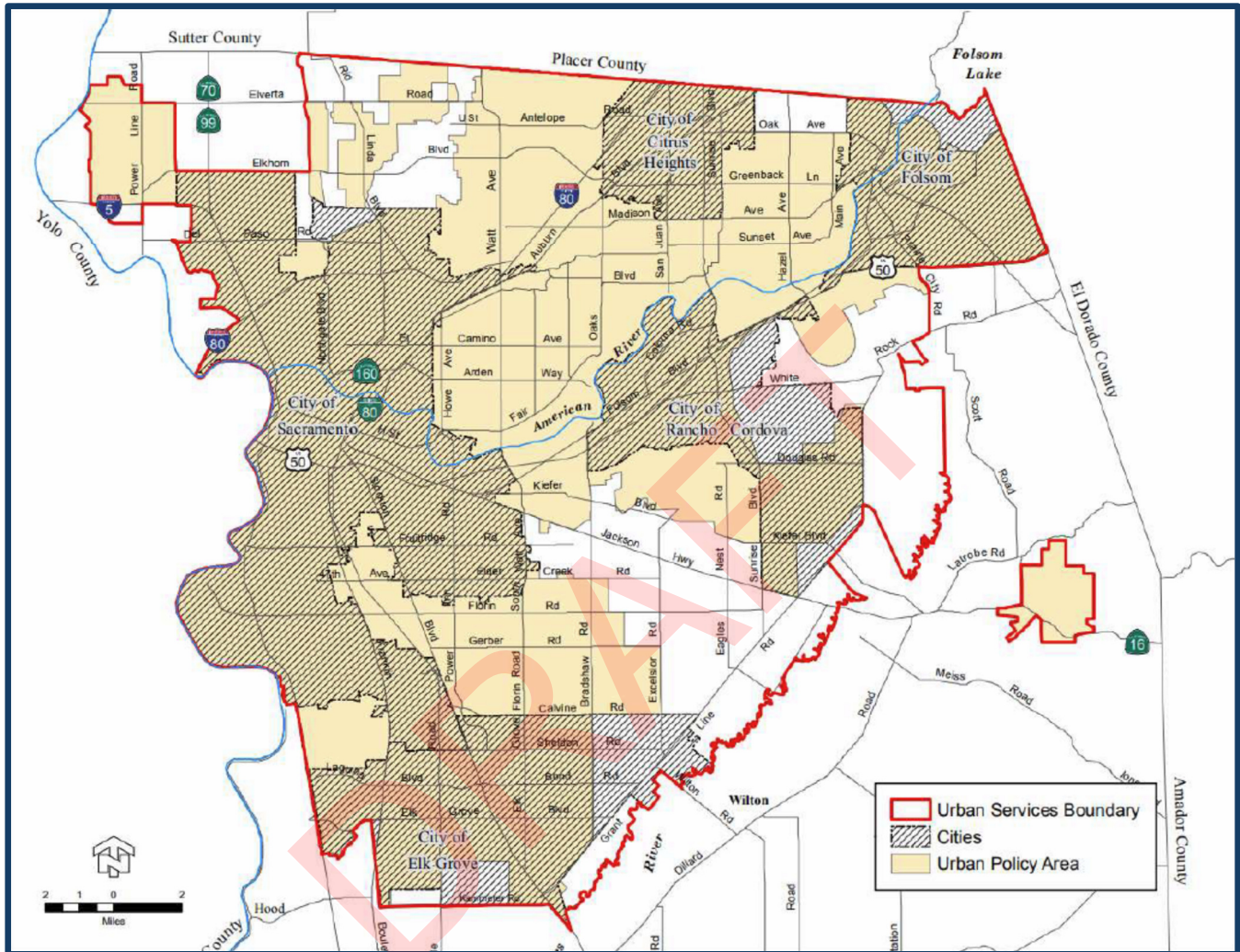
In accordance with the City policies, the applicable operating standard for the study area intersections is LOS D.

SACRAMENTO COUNTY

Sacramento County defines the minimum acceptable operation level for its roadways to be LOS D for rural areas and LOS E for urban areas. The urban areas are those areas that are dominated with urban type land uses and transportation infrastructure and are located within the Urban Service Boundary (USB), as shown in the Land Use Element of the Sacramento County General Plan and Figure F-1 (**Figure 8**). The rural areas are those areas that are either outside the USB or are dominated with rural type land uses and transportation infrastructure and are located within

the USB. The study area intersections are located on the boundary between the City of Sacramento and a rural area within the Urban Services Boundary.

FIGURE 8. SACRAMENTO COUNTY URBAN SERVICES BOUNDARY MAP



Source: Transportation Analysis Guidelines, Sacramento County, September 10, 2020.

Given the nature of the project and the adjacent urban development across South Watt Avenue, it is presumed that the County standard is LOS E. However, as this is less conservative than the City standard, LOS D shall be considered to be the standard in this analysis.

LEVEL OF SERVICE ANALYSIS AND METHODOLOGY

Intersection analyses were conducted using a methodology outlined in the Transportation Research Board’s Special Report 209, Highway Capacity Manual 6th Edition (HCM 6). The methodology utilized is known as “operational analysis.” This procedure calculates an average control delay per vehicle at an intersection and assigns a level of service designation based upon the delay. **Table 1** presents the level of service criteria for intersections in accordance with the HCM 6 methodology.

In accordance with City of Sacramento policy, at unsignalized intersection, the intersection average delay / LOS is used to determine conformity with City policies. Sacramento County policy considers LOS for individual movements / approaches.

TABLE 1. INTERSECTION LEVEL OF SERVICE

INTERSECTION LEVEL OF SERVICE CRITERIA		
LEVEL OF SERVICE (LOS)	TOTAL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Source: Highway Capacity Manual 6th Edition, Transportation Research Board.

Queue lengths at intersections and driveways have been estimated based upon the 95th percentile queue. HCM 6 computes the queue length for unsignalized intersections and roundabouts.

RESULTS OF EXISTING CONDITION ANALYSIS

Existing condition intersection analysis results are summarized in **Table 2**. For analysis purposes, the recorded heavy vehicle percentages were utilized for each movement, rather than a default value. The appendix includes the analysis details.

TABLE 2. EXISTING INTERSECTION OPERATION ANALYSIS

INTERSECTION	AM PEAK HOUR		PM PEAK HOUR	
	DELAY (SECONDS)	LOS	DELAY (SECONDS)	LOS
1. Osage Avenue & South Watt Avenue	2.8	A	1.7	A
- Northbound left turn	9.6	A	9.3	A
- Southbound left turn	10.0	A	9.1	A
- Eastbound	109.3	F	56.7	F
- Westbound	18.3	C	13.1	B

Source: DKS Associates, 2021.

The existing study area intersection operates at LOS A overall. The eastbound movement operates at LOS F in both peak hours, primarily due to the difficulty of making a left turn into the South Watt Avenue traffic stream. The westbound movement operates at LOS C in the AM peak hour and LOS B in the PM peak hour. However, it should be noted that only westbound right turns were recorded during the peak hours. Motorists may be choosing alternate routes to avoid the difficulty of making a left turn at this unsignalized intersection from westbound Osage Avenue.

PROJECT TRAVEL CHARACTERISTICS

TRIP GENERATION

Vehicular trip generation estimates of the project are based upon information published by the Institute of Transportation Engineers (ITE). Specifically, the following source has been utilized:

- Trip Generation, 11th Edition.

For conservatism in the analysis, no adjustments have been made for mode choice, as the mode choice in the site environs is predominantly via private automobile. Various manufacturing, industrial, and warehouse uses are permitted in the M-2(S)-R zone. Such uses could be accommodated within the proposed project. Several representative permitted land uses are included in the ITE data:

- Code 110 – General Light Industrial
- Code 130 – Industrial Park
- Code 140 – Manufacturing
- Code 150 – Warehousing
- Code 154 – High-Cube Transload and Short-Term Storage Warehouse
- Code 155 – High-Cube Fulfillment Center Warehouse – Non-Sort
- Code 156 – High-Cube Parcel Hub Warehouse

VEHICULAR TRIP GENERATION ESTIMATES

Table 3 summarizes trip generation for these land use types. Additional descriptive information on each land use type is included in the appendix.

TRUCK TRIP GENERATION ESTIMATES

ITE Trip Generation, 11th Edition, also provides information on the number of truck trips generated by each of the land use categories. **Table 4** summarizes the truck trip generation.

RECOMMENDED TRIP GENERATION ESTIMATES

As the transportation analysis will focus on peak weekday commuter period intersection operations, the manufacturing trip generation estimates (Code 140) have been selected for analysis, as they provide the most conservative (highest) peak hour estimates of total vehicle trips. **Table 5** summarizes the recommended trip generation estimates.

HOURLY TRIP GENERATION ESTIMATES

For the determination of vehicle volumes for traffic signal warrants, trip generation was estimated for the manufacturing land use for all 24 hours of a typical weekday based on ITE Trip Generation, 11th Edition, information. The ITE information provides a percentage of land use trips entering and exiting a site for each hour of the day. As the hourly information is from a different data sample

and is independent of project size, the hourly percentages were proportionally adjusted to match the AM and PM peak hour volume estimates. The derivation of the hourly adjustments is documented in the Appendix. Traffic counts collected on Wednesday, October 13, 2021, at the intersection of Osage Avenue and South Watt Avenue found that the AM peak hour occurs from 7:15 to 8:15 AM, while the PM peak hour occurs from 4:30 to 5:30 PM. **Table 6** summarizes the hourly trip generation.

TABLE 3. VEHICULAR TRIP GENERATION ESTIMATES

USE	ITE CODE	SIZE (1,000 SQUARE FEET)	VEHICLE TRIPS GENERATED (TRIP-ENDS)						
			WEEK- DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
GENERAL LIGHT INDUSTRIAL	110		565	85	12	97	7	43	50
INDUSTRIAL PARK	130		1,105	37	9	46	10	36	46
MANUFACTURING	140		717	71	22	93	31	70	101
WAREHOUSING	150		254	31	9	40	12	31	43
HIGH-CUBE TRANSLOAD AND SHORT-TERM STORAGE WAREHOUSE	154	136.72	191	8	3	11	4	10	14
HIGH-CUBE FULFILLMENT CENTER WAREHOUSE - NON-SORT	155		100	17	4	21	9	13	22
HIGH-CUBE PARCEL HUB WAREHOUSE	156		633	48	48	96	60	28	88

Note: Peak Hour refers to peak hour of adjacent street traffic.

Source: ITE Trip Generation, 11th Edition, 2021.

TABLE 4. TRUCK TRIP GENERATION ESTIMATES

USE	ITE CODE	SIZE (1,000 SQUARE FEET)	TRUCK TRIPS GENERATED (TRIP-ENDS)						
			WEEK-DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
GENERAL LIGHT INDUSTRIAL	110		34	1	0	1	1	0	1
INDUSTRIAL PARK	130		78	2	3	5	2	3	5
MANUFACTURING	140		62	2	2	4	2	2	4
WAREHOUSING	150		81	2	1	3	2	2	4
HIGH-CUBE TRANSLOAD AND SHORT-TERM STORAGE WAREHOUSE	154	136.72	30	1	2	3	0	1	1
HIGH-CUBE FULFILLMENT CENTER WAREHOUSE - NON-SORT	155		31	2	1	3	0	1	1
HIGH-CUBE PARCEL HUB WAREHOUSE	156		79	6	6	12	4	4	8

Note: Peak Hour refers to peak hour of adjacent street traffic.

Source: ITE Trip Generation, 11th Edition, 2021.

TABLE 5. RECOMMENDED VEHICULAR TRIP GENERATION ESTIMATES

USE	VEHICLE TYPE	SIZE (1,000 SQUARE FEET)	VEHICLE TRIPS GENERATED (TRIP-ENDS)						
			WEEK-DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
MANUFACTURING	TRUCKS		62	2	2	4	2	2	4
	TOTAL	136.72	717	71	22	93	31	70	101

Source: ITE Trip Generation, 11th Edition, 2021.

TABLE 6. HOURLY TRIP GENERATION ESTIMATES

TIME	TRIPS GENERATED (TRIP-ENDS)					
	ALL VEHICLE TRIPS			TRUCK TRIPS		
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
12:00 - 1:00 AM	1	6	7	0	0	0
1:00 - 2:00 AM	1	4	5	0	0	0
2:00 - 3:00 AM	1	3	4	0	0	0
3:00 - 4:00 AM	1	2	3	0	1	1
4:00 - 5:00 AM	4	1	5	0	0	0
5:00 - 6:00 AM	9	0	9	0	0	0
6:00 - 7:00 AM	52	8	60	1	1	2
7:00 - 8:00 AM	72	20	92	2	2	4
8:00 - 9:00 AM	23	11	34	3	3	6
9:00 - 10:00 AM	12	9	21	3	3	6
10:00 - 11:00 AM	10	9	19	4	3	7
11:00 - 12:00 PM	19	15	34	3	3	6
12:00 - 1:00 PM	27	19	46	2	3	5
1:00 - 2:00 PM	20	21	41	3	2	5
2:00 - 3:00 PM	16	22	38	2	2	4
3:00 - 4:00 PM	28	64	92	3	3	6
4:00 - 5:00 PM	23	56	79	2	2	4
5:00 - 6:00 PM	17	47	64	1	1	2
6:00 - 7:00 PM	4	8	12	1	1	2
7:00 - 8:00 PM	3	5	8	1	0	1
8:00 - 9:00 PM	3	5	8	0	1	1
9:00 - 10:00 PM	4	7	11	0	0	0
10:00 - 11:00 PM	5	7	12	0	0	0
11:00 - 12:00 AM	4	9	13	0	0	0
TOTAL	359	358	717	31	31	62
AM PEAK HOUR (7:15 TO 8:15 AM)	71	22	93	2	2	4
PM PEAK HOUR (4:30 TO 5:30 PM)	31	70	101	2	2	4

Note: Peak Hour refers to peak hour of adjacent street traffic.

Source: ITE Trip Generation, 11th Edition, 2021.

TRIP DISTRIBUTION

Vehicular trip distribution estimates of the project are based upon:

- Traffic counts collected at the intersection of Osage Avenue and South Watt Avenue on Wednesday, October 13, 2021, from 6:00 AM to 10:00 PM
- The functional and physical characteristics of area roadways
- Travel patterns of nearby industrial land uses

The traffic counts collected at the adjacent intersection segregated motorized vehicles by type: light, articulated trucks, and medium. For trip distribution purposes, light vehicles (typically automobiles and single-unit, 4-wheel trucks) were separated from “heavy” vehicles (articulated trucks and medium vehicles).

The west leg of the intersection of Osage Avenue and South Watt Avenue is a dead-end street, providing access to industrial and commercial uses. Intersection turning movements into and out of this leg of Osage Avenue provided information on distribution patterns, including heavy truck movements.

Regarding trips on Osage Avenue east of South Watt Avenue, the current travel patterns show that fewer than three percent of trips associated with the uses west of South Watt Avenue use this roadway. For trip distribution purposes of the proposed warehouse at 8981 Osage Avenue, it was assumed that 5 percent of light vehicle trips would use Osage Avenue east of the warehouse. It was also assumed that heavy vehicle traffic to and from the warehouse would be unlikely to use Osage Avenue east of the warehouse due to the current condition of the roadway. Osage Avenue east of South Watt Avenue is typically less than 20 feet wide, and the pavement is in poor condition.

Figure 9 illustrates the resultant trip distribution by time of day for light and heavy vehicles.

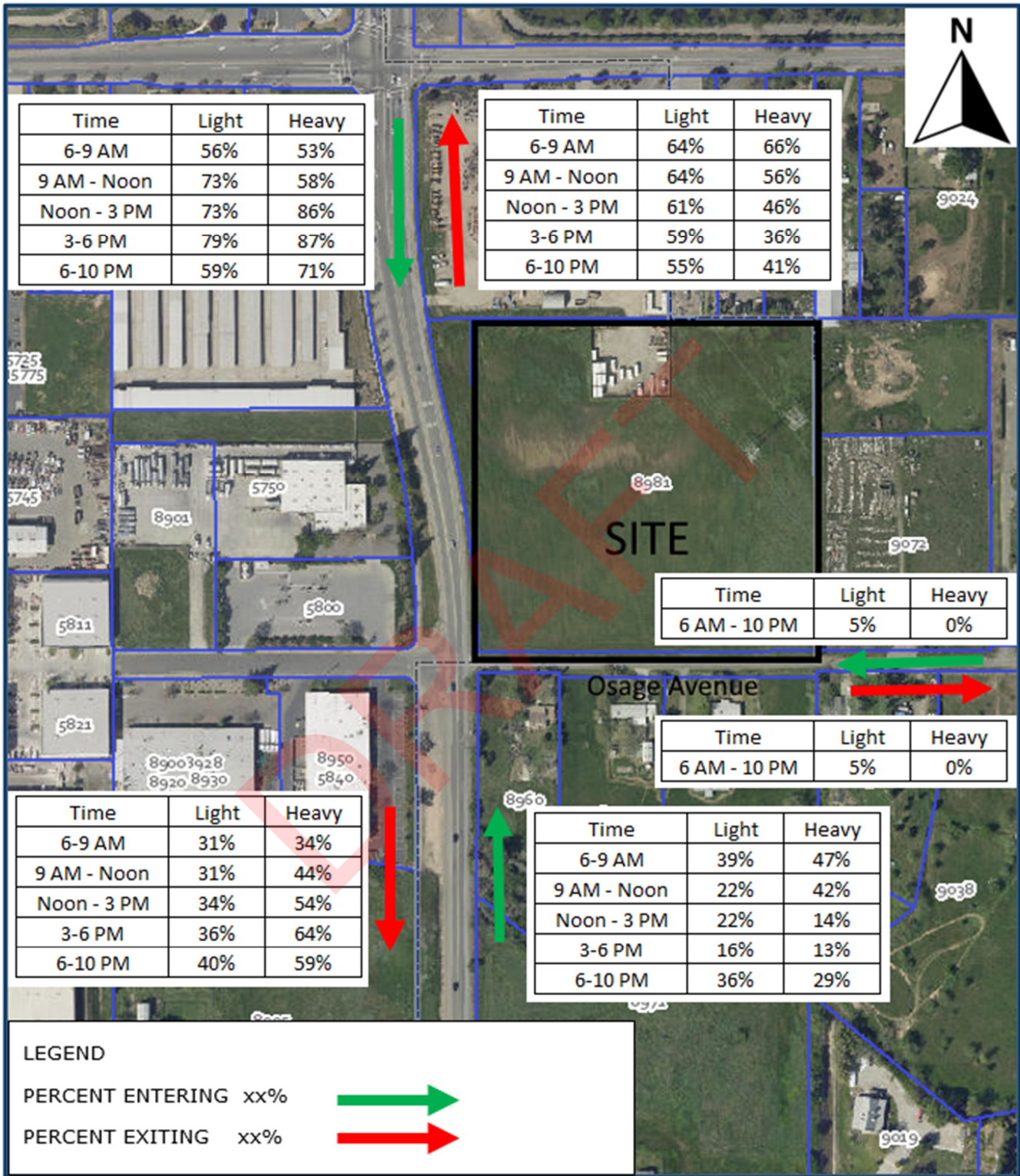
THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, thresholds of significance adopted by the governing jurisdictions in applicable general plans and previous environmental documents, and professional judgement, a significant impact would occur if the proposed project would:

INTERSECTIONS – CITY OF SACRAMENTO

- The traffic generated by the project degrades LOS from an acceptable LOS (without the project) to an unacceptable LOS (with the project),
- The LOS (without project) is unacceptable and project generated traffic increases the average vehicle delay by 5 seconds or more.
- Note: General Plan Mobility Element Policy M 1.2.2 sets forth definitions for what is considered an acceptable LOS. As previously discussed, Policy M 1.2.2 applies to the study area roadway facilities as follows:

FIGURE 9. ESTIMATED TRIP DISTRIBUTION



- Intersections - LOS A-D is always to be maintained; provided, LOS E or F may be acceptable if improvements are made to the overall transportation system and/or non-vehicular transportation and transit are promoted as part of the project or a City initiated project.

INTERSECTIONS – SACRAMENTO COUNTY

- Result in an unsignalized intersection movement / approach operating at an acceptable LOS to deteriorate to an unacceptable LOS, and also cause the intersection to meet a traffic signal warrant; or
- For an unsignalized intersection that meets a signal warrant, increase the delay by more than 5 seconds at a movement / approach that is operating at an unacceptable LOS without the project.

TRANSIT – CITY OF SACRAMENTO

- Adversely affect public transit operations,
- Fail to adequately provide access to transit.

TRANSIT – SACRAMENTO COUNTY

- Eliminate or adversely affect existing transit access, or operations; or
- Interfere with the implementation of transit service as planned in the Metropolitan Transportation Plan / Sustainable Communities Strategy (MTP/SCS); or
- Substantially increase transit demand and fail to provide adequate transit service

BICYCLE FACILITIES – CITY OF SACRAMENTO

- Adversely affect existing or planned bicycle facilities,
- Fail to adequately provide for access by bicycle.

PEDESTRIAN CIRCULATION – CITY OF SACRAMENTO

- Adversely affect existing or planned pedestrian facilities,
- Fail to adequately provide for access by pedestrians.

BICYCLE AND PEDESTRIAN FACILITIES – SACRAMENTO COUNTY

- Eliminate or adversely affect an existing bikeway or pedestrian facility in a way that would discourage its use;
- Interfere with the implementation of a planned bikeway as shown in the Bicycle Master Plan, or be in conflict with the Pedestrian Master Plan; or
- Fail to provide adequate access for bicyclists and pedestrians, resulting in unsafe conditions, including unsafe bicycle / pedestrian, bicycle / motor vehicle, or pedestrian / motor vehicle conflicts.

CONSTRUCTION-RELATED TRAFFIC IMPACTS – CITY OF SACRAMENTO

- Degrade an intersection or roadway to an unacceptable level,
- Cause inconveniences to motorists due to prolonged road closures, or
- Result in increased frequency of potential conflicts between vehicles, pedestrians, and bicyclists.

SUBSTANDARD RURAL ROADWAY FUNCTIONALITY – SACRAMENTO COUNTY

- Cause the substandard rural roadway to exceed an average daily traffic volume of 6,000 daily vehicles; or
- Add 600 or more new daily vehicle trips to a substandard rural roadway that already carries 6,000 or more daily vehicles.

SAFETY – SACRAMENTO COUNTY

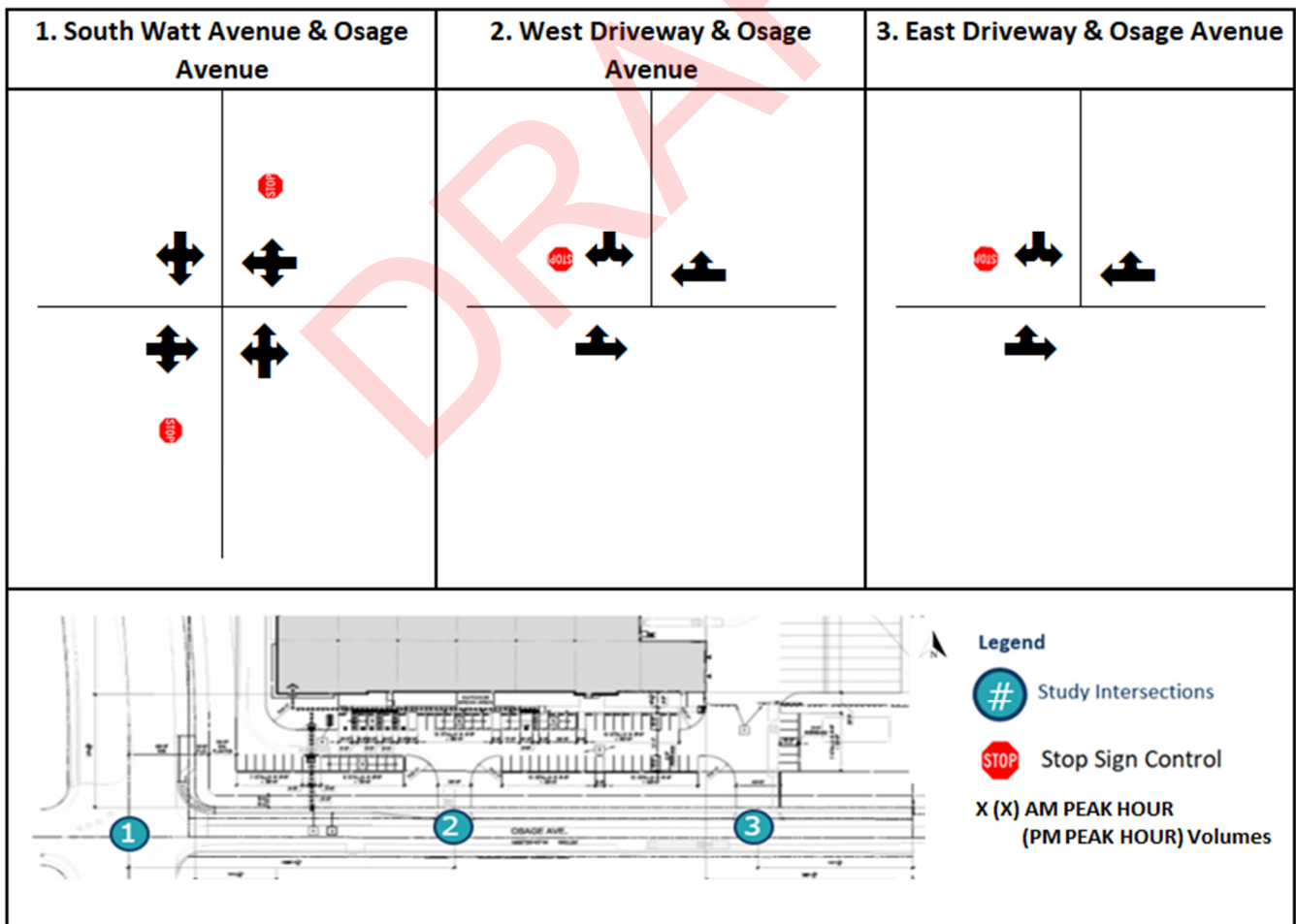
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

EXISTING PLUS PROJECT INTERSECTION LANE CONFIGURATION

Existing plus project intersection lane configuration is illustrated in **Figure 10**. At Intersection 1, no changes from existing condition are assumed.

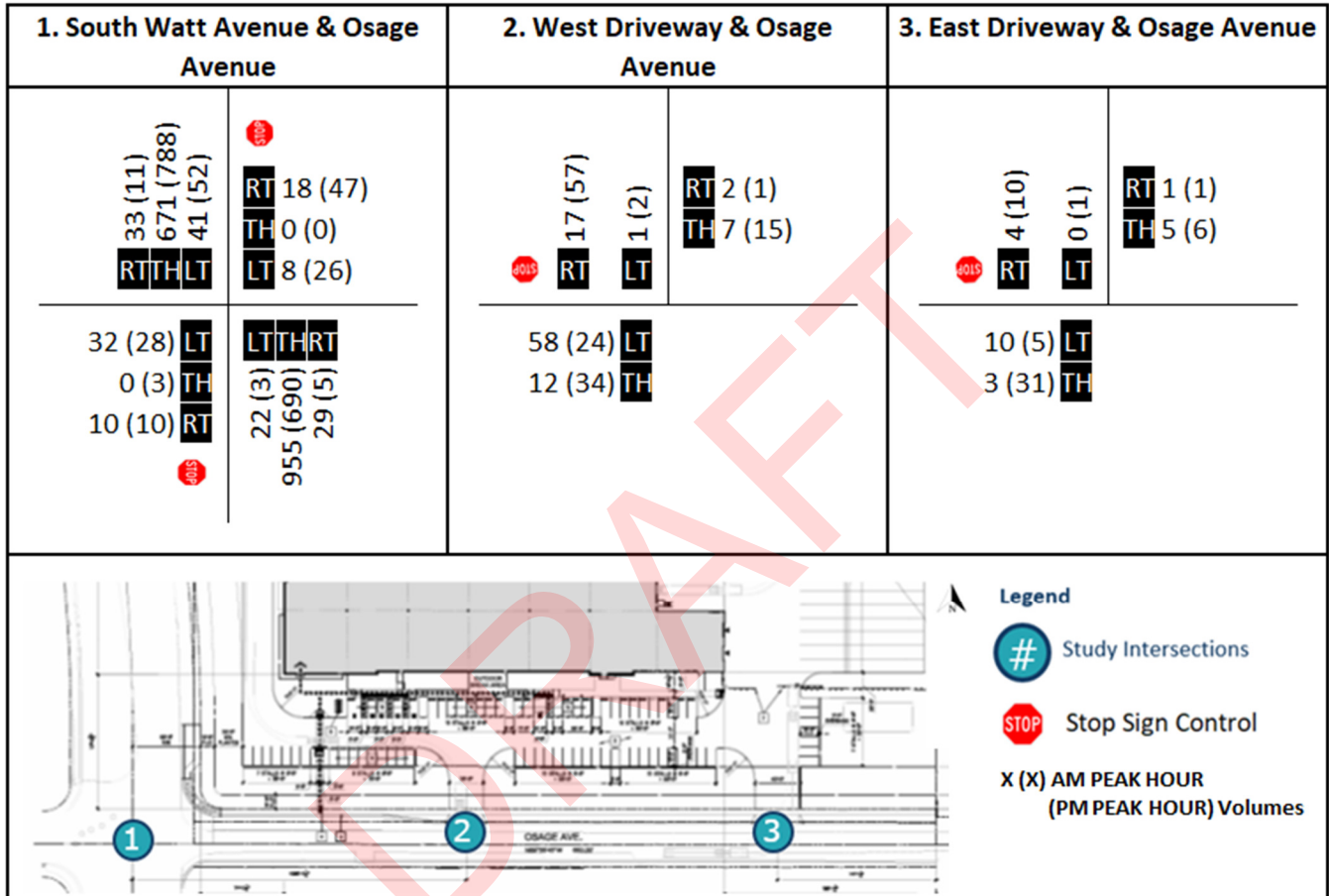
FIGURE 10. EXISTING PLUS PROJECT INTERSECTION LANE CONFIGURATION



EXISTING PLUS PROJECT TRAFFIC VOLUMES

Existing plus project traffic volumes were calculated by adding the trips associated with the project to existing traffic volumes. **Figure 11** illustrates the baseline plus project peak hour traffic volumes used in the analysis.

FIGURE 11. EXISTING PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES



RESULTS OF EXISTING PLUS PROJECT CONDITION ANALYSIS

Existing plus project condition intersection analysis results are summarized in **Table 7**.

- Intersection 1 would continue to operate at LOS A overall. However, the stop-sign controlled eastbound approach would remain at LOS F with increased delay. The westbound stop-sign controlled approach would operate at LOS E in both peak hours.
- Intersections 2 and 3 would operate at LOS A overall, and at LOS A for all controlled movements.

TABLE 7. EXISTING PLUS PROJECT INTERSECTION OPERATION ANALYSIS

INTERSECTION	EXISTING				EXISTING PLUS PROJECT			
	AM PEAK HOUR		PM PEAK HOUR		AM PEAK HOUR		PM PEAK HOUR	
	DELAY (SECONDS)	LOS	DELAY (SECONDS)	LOS	DELAY (SECONDS)	LOS	DELAY (SECONDS)	LOS
1. Osage Avenue & South Watt Avenue	2.8	A	1.7	A	5.3	A	4.3	A
- Northbound left turn	9.6	A	9.3	A	9.6	A	9.3	A
- Southbound left turn	10.0	A	9.1	A	10.5	B	9.3	A
- Eastbound	109.3	F	56.7	F	188.7	F	80.3	F
- Westbound	18.3	C	13.1	B	42.7	E	46.0	E
2. Osage Avenue & West Driveway	-	-	-	-	5.9	A	5.1	A
- Southbound	-	-	-	-	8.4	A	8.6	A
- Eastbound left turn	-	-	-	-	7.3	A	7.3	A
3. Osage Avenue & East Driveway	-	-	-	-	4.8	A	2.5	A
- Southbound	-	-	-	-	8.8	A	8.6	A
- Eastbound left turn	-	-	-	-	7.4	A	7.6	A

TRAFFIC SIGNAL WARRANT ANALYSIS

Traffic signal warrant analysis was conducted for Intersection 1. Details of the warrant analysis are included in the Appendix.

WARRANT 1: EIGHT-HOUR VEHICULAR VOLUME

The volumes at Intersection 1 meet Warrant 1 (Eight-Hour Vehicular Volume), Condition B (Interruption of Continuous Traffic) for eleven unique hours:

- 5:45 to 6:45 AM
- 6:45 to 7:45 AM
- 7:45 to 8:45 AM
- 9:30 to 10:30 AM
- 11:15 AM to 12:15 PM
- 12:15 to 1:15 PM
- 1:15 to 2:15 PM
- 2:15 to 3:15 PM
- 3:15 to 4:15 PM
- 4:15 to 5:15 PM
- 5:15 to 6:15 PM

WARRANT 2: FOUR-HOUR VEHICULAR VOLUME

The volumes at Intersection 2 meet Warrant 2 (Four-Hour Vehicular Volume) for five unique hours:

- 6:00 to 7:00 AM
- 7:00 to 8:00 AM
- 2:00 to 3:00 PM
- 3:00 to 4:00 PM
- 4:00 to 5:00 PM

WARRANT 3: PEAK HOUR VEHICULAR VOLUME

Warrant 3 (Peak Hour Vehicular Volume) is not satisfied.

IMPACTS AND MITIGATION MEASURES

Impact 1:

The proposed project would increase traffic volume and delay at study area intersections under the existing plus project scenario. Based on the analysis below, the impact is significant.

As summarized in Table 7, the project would increase traffic volumes and average delay at Intersection 1. While the LOS would remain at A overall, the Osage Avenue side street approaches would operate at LOS F (eastbound) and LOS E (westbound) during the peak hours. The increase in eastbound delay (more than 5 seconds) exceeds the Sacramento County threshold of significance, as the intersection warrants a traffic signal.

While Intersections 2 and 3 operate at an acceptable LOS A, existing Osage Avenue pavement width and condition is unsuitable for access to an industrial facility.

Mitigation Measure 1:

Improve the intersection of Osage Avenue and South Watt Avenue as follows:

- Install a traffic signal at the intersection, coordinated with the South Watt Avenue traffic signal system.
- Upgrade the intersection geometrics to City and County design guidelines, capable of accommodating heavy vehicles (typically WB-67 semi-trailer). This shall include, at a minimum:
 - Northbound approach – provide a left turn lane 200 feet long, and a through and right turn lane.
 - Southbound approach – provide a left turn lane 200 feet long, and a through and right turn lane.
 - Eastbound approach – restripe the existing pavement (40 feet wide) to accommodate a left turn lane 150 feet long and a through and right turn lane.
 - Westbound approach – provide a left turn lane 150 feet long, and a through and right turn lane.

- Accommodate pedestrian and bicycle movements at the intersection in accordance with City and County design guidelines.

Upgrade Osage Avenue along the site frontage. These improvements shall include an industrial local street cross-section north of the center line, and a reconstructed eastbound travel lane, shoulder, and drainage south of the center line.

With mitigation, Intersection 1 will operate at LOS B (17.1 seconds average delay) during the AM peak hour, and at LOS B (14.8 seconds average delay) during the PM peak hour.

Impact 2:

The proposed project could cause potentially significant impacts to transit. Based on the analysis below, the impact is less than significant.

The proposed project would not adversely affect public transit operations. The project would not modify or impede any existing or planned transit facilities / routes.

Mitigation Measure 2:

None required.

Impact 3:

The proposed project could cause potentially significant impacts to pedestrian facilities. Based on the analysis below, the impact is less than significant.

The proposed project would not adversely affect existing or planned pedestrian facilities. The project will include sidewalks along the project frontage. Mitigation measure 1 would include pedestrian crosswalks at Intersection 1, which will improve pedestrian access.

Mitigation Measure 3:

None required.

Impact 4:

The proposed project could cause potentially significant impacts to bicycle facilities. Based on the analysis below, the impact is less than significant.

The proposed project would not adversely affect existing or planned bicycle facilities.

Mitigation Measure 4:

None required.

Impact 5:

The proposed project could cause potentially significant impacts due to construction-related activities. Based on the analysis below, the impact is less than significant.

The City Code (City Code 12.20.030) requires that a construction traffic control plan be prepared and approved prior to the beginning of project construction, to the satisfaction of the City Traffic Engineer and subject to review by all affected agencies. All work performed during construction

must conform to the conditions and requirements of the approved plan. The plan shall ensure that safe and efficient movement of traffic through the construction work zone(s) is maintained. At a minimum, the plan shall include the following:

- Time and day of street closures
- Proper advance warning and posted signage regarding street closures
- Provision of driveway access plan to ensure safe vehicular, pedestrian, and bicycle movements
- Safe and efficient access routes for emergency vehicles
- Provisions for pedestrian safety
- Use of manual traffic control when necessary
- Number of anticipated truck trips, and time of day of arrival and departure of trucks
- Provision of a truck circulation pattern and staging area with a limitation on the number of trucks that can be waiting and any limitations on the size and type of trucks appropriate for the surrounding transportation network
- The plan must be available at the site for inspection by the City representative during all work. With the implementation of the traffic control plan, local roadways and freeway facilities will continue to operate at acceptable operating conditions and the impact of the project would be less than significant.

Mitigation Measure 5:

None required.

Impact 6:

The proposed project would add traffic to a substandard rural roadway. Based on the analysis below, the impact is less than significant.

Osage Avenue east of South Watt Avenue does not meet current County standards. Mitigation measure 1 would improve Osage Avenue along the site frontage, but not east of the site. The current estimated daily volume on Osage Avenue is 225 vehicles. An estimated 5 percent of site traffic would use Osage Avenue to and from the east, increasing the daily traffic volume to 261 vehicles. As the Osage Avenue daily volume east of the site would not exceed 6,000 vehicles, the project’s impact does not exceed the County threshold.

Mitigation Measure 6:

None required.

Impact 7:

The proposed project could substantially increase hazards. Based on the analysis below, the impact is less than significant.

The design of the project, its modifications to the existing roadway system, and its access points will conform with City and County design guidelines. No substandard or atypical features are proposed. The project will not introduce and sharp curves, dangerous intersections, or incompatible uses.

Mitigation Measure 7:

None required.

ON-SITE OPERATIONS REVIEW AND QUEUING

The project site plan was reviewed for conformity with accepted traffic engineering principles and City Design Guidelines. **Figure 3** shows the project site plan.

INTERSECTION AND DRIVEWAY SPACING

The review of driveway spacing is based upon traffic engineering principles to maintain efficient movement for motorized vehicles, pedestrians, and bicyclists, and minimize conflicts and crashes. Research has shown that proper spacing of intersections and driveways reduces crash frequency, as motorists have ample time between decision points to react to other vehicles that may affect their movement.

The proposed site plan includes two driveways. The west driveway is about 235 feet from Watt Avenue, measured inside curb to inside curb. This is beyond the intersection influence area for Intersection 1. The east driveway is about 240 feet from the west driveway, measured inside curb to inside curb. This spacing is acceptable as it provides adequate distance between intersections for sight distance, decision-making, and queuing.

DRIVEWAY THROAT LENGTHS AND INTERSECTION QUEUING

The “throat length” of a driveway is defined as the distance from the outer edge of the traveled way of the intersecting roadway to the first point along the driveway at which there are conflicting vehicular traffic movements. Conflicting movements include turning vehicles and vehicles entering / exiting parking stalls. Adequate throat length is critical to ensure that queued exiting vehicles do not interfere with / block entering vehicles, resulting in entering queues extending onto city sidewalks and / or streets.

Adequate queuing distance is necessary in turning lanes so that queued vehicles do not back into through travel lanes and disrupt normal traffic operations.

Based upon the peak period intersection analysis, it is recommended that a minimum throat length of 50 feet (to accommodate two light vehicles) be provided at the west driveway. The proposed site plan meets the criteria.

At the east driveway, it is recommended that a minimum throat length of 75 feet be provided, to accommodate one semi-trailer vehicle. To meet this recommendation, the first two parking spaces

located on the east side of the east driveway should be removed or relocated. Removal of these spaces would not affect conformity with the auto parking requirement, based upon the site plan tabulations.

DRAFT



APPENDICES

DRAFT



TRAFFIC COUNTS - 2018

DRAFT

National Data & Surveying Services

Intersection Turning Movement Count

Location: S Watt Ave & Fruitridge Rd
 City: Sacramento
 Control:

Project ID: 18-07351-001
 Date: 10/2/2018

Total

NS/EW Streets:	S Watt Ave				S Watt Ave				Fruitridge Rd				Fruitridge Rd				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	23	188	1	3	1	141	74	1	46	24	19	6	10	35	3	0	575
7:15 AM	28	204	2	0	7	181	78	1	39	26	12	9	13	58	3	0	661
7:30 AM	35	202	13	0	3	162	86	1	44	45	7	10	17	42	2	1	670
7:45 AM	39	188	24	1	4	127	105	0	35	48	17	6	23	73	1	0	691
8:00 AM	25	207	12	4	3	133	81	0	52	42	12	8	16	55	2	0	652
8:15 AM	24	181	2	3	3	142	86	2	59	27	11	7	10	52	6	0	615
8:30 AM	33	215	5	2	3	136	70	1	52	23	15	6	6	41	4	1	613
8:45 AM	18	176	1	2	1	147	96	1	57	21	14	5	6	26	2	0	573
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
	225	1561	60	15	25	1169	676	7	384	256	107	57	101	382	23	2	5050
APPROACH %'s :	12.09%	83.88%	3.22%	0.81%	1.33%	62.28%	36.01%	0.37%	47.76%	31.84%	13.31%	7.09%	19.88%	75.20%	4.53%	0.39%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	127	801	51	5	17	603	350	2	170	161	48	33	69	228	8	1	2674
PEAK HR FACTOR :	0.814	0.967	0.531	0.313	0.607	0.833	0.833	0.500	0.817	0.839	0.706	0.825	0.750	0.781	0.667	0.250	0.967
	0.976				0.910				0.904				0.789				

South Leg
 NB SB
 951 733
 910 659

NS/EW Streets:	S Watt Ave				S Watt Ave				Fruitridge Rd				Fruitridge Rd				TOTAL
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	17	142	8	1	11	176	71	2	128	62	25	11	3	45	3	0	705
4:15 PM	28	151	5	6	10	210	50	3	88	42	14	7	2	34	1	0	651
4:30 PM	25	130	6	2	14	143	63	1	140	58	17	4	2	42	3	0	650
4:45 PM	28	122	4	5	17	209	78	1	82	44	16	8	2	37	1	0	654
5:00 PM	26	139	5	1	10	187	63	1	125	60	15	6	3	34	1	0	676
5:15 PM	32	147	8	1	27	166	64	1	76	44	16	8	2	29	2	0	623
5:30 PM	15	137	4	1	11	172	71	0	70	41	14	7	1	44	1	0	589
5:45 PM	23	135	4	2	6	172	61	2	62	29	14	5	7	39	1	0	562
TOTAL VOLUMES :	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
	194	1103	44	19	106	1435	521	11	771	380	131	56	22	304	13	0	5110
APPROACH %'s :	14.26%	81.10%	3.24%	1.40%	5.11%	69.22%	25.13%	0.53%	57.62%	28.40%	9.79%	4.19%	6.49%	89.68%	3.83%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	98	545	23	14	52	738	262	7	438	206	72	30	9	158	8	0	2660
PEAK HR FACTOR :	0.875	0.902	0.719	0.583	0.765	0.879	0.840	0.583	0.782	0.831	0.720	0.682	0.750	0.878	0.667	0.000	0.943
	0.895				0.868				0.825				0.858				

680 833
 680 774



TRAFFIC COUNTS - 2021

DRAFT

All Traffic Data Services

1 S WATT AVE & OSAGE AVE AM
 Wednesday, October 13, 2021

Peak Hour

07:15 AM - 08:15 AM

Peak 15-Minutes

07:30 AM - 07:45 AM

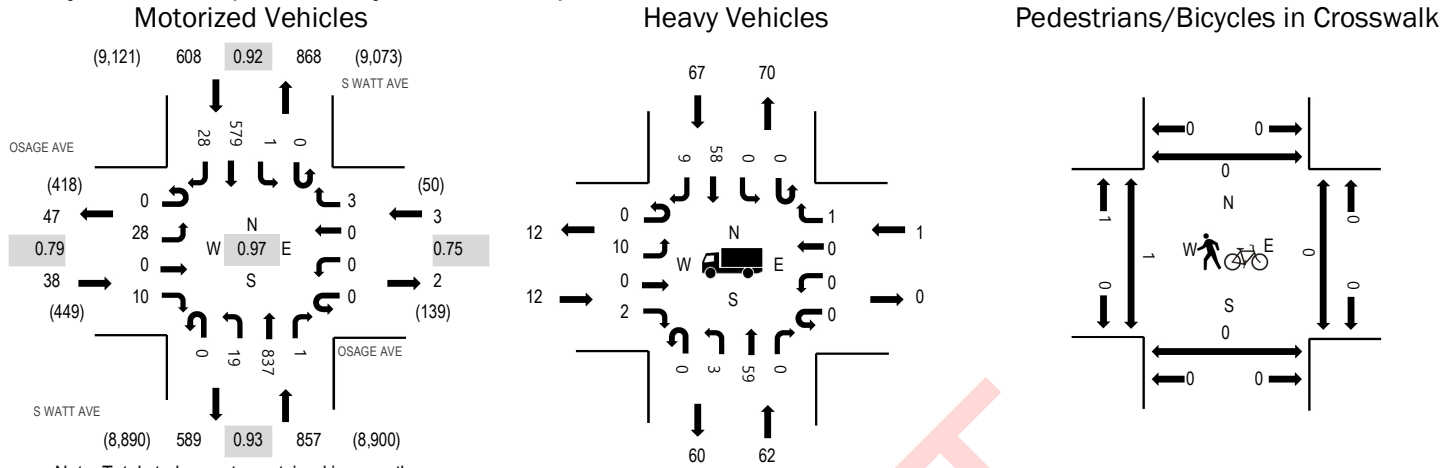
Traffic Counts - All Vehicles

Time	OSAGE AVE					OSAGE AVE					S WATT AVE					S WATT AVE					Total	Rolling Hour
	Eastbound			RTOR		Westbound			RTOR		Northbound			RTOR		Southbound						
	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR		
6:00 AM	0	4	3	7	0	0	0	0	1	0	0	5	167	0	0	0	1	96	7	0	291	1,287
6:15 AM	0	6	0	0	0	0	0	1	0	0	0	10	158	1	0	0	3	115	6	0	300	1,342
6:30 AM	0	11	0	2	0	0	2	0	2	0	0	16	153	0	0	0	1	109	5	0	301	1,398
6:45 AM	0	9	0	5	0	0	0	0	0	0	0	6	167	0	0	0	3	191	14	0	395	1,486
7:00 AM	0	10	2	1	0	0	0	0	3	0	0	4	168	0	0	0	0	147	11	0	346	1,467
7:15 AM	0	9	0	3	0	0	0	0	1	0	0	4	207	0	0	0	0	127	5	0	356	1,506
7:30 AM	0	7	0	2	0	0	0	0	0	0	0	3	211	0	0	0	0	158	8	0	389	1,495
7:45 AM	0	7	0	3	0	0	0	0	1	0	0	8	194	0	0	0	1	152	10	0	376	1,476
8:00 AM	0	5	0	2	0	0	0	0	1	0	0	4	225	1	0	0	0	142	5	0	385	1,416
8:15 AM	0	2	1	3	0	0	0	0	0	0	0	2	195	0	0	0	0	136	6	0	345	1,325
8:30 AM	0	4	0	4	0	0	0	0	0	0	0	2	207	0	0	0	1	146	6	0	370	1,269
8:45 AM	0	2	0	3	0	0	1	0	2	0	0	1	169	1	0	0	2	129	6	0	316	1,195
9:00 AM	0	3	0	2	0	0	0	0	0	0	0	1	155	0	0	0	0	123	10	0	294	1,182
9:15 AM	0	4	0	3	0	0	0	0	0	0	0	3	146	0	0	0	0	124	9	0	289	1,136
9:30 AM	0	7	0	4	0	0	0	0	0	0	0	1	158	0	0	0	1	112	13	0	296	1,122
9:45 AM	0	5	0	4	0	0	0	0	1	0	0	5	141	1	0	0	0	139	7	0	303	1,092
10:00 AM	0	11	0	0	0	0	0	0	0	0	0	4	118	0	0	0	1	110	4	0	248	1,041
10:15 AM	0	6	0	2	0	0	0	0	0	0	0	2	134	0	0	0	0	125	6	0	275	1,055
10:30 AM	0	4	0	1	0	0	0	0	0	0	0	1	134	0	0	0	0	122	4	0	266	1,025
10:45 AM	0	11	0	1	0	0	1	0	0	0	0	3	117	0	0	0	2	115	2	0	252	1,044
11:00 AM	0	0	0	6	0	0	0	0	1	0	0	3	127	0	0	0	2	119	4	0	262	1,074
11:15 AM	0	6	0	3	0	0	0	0	1	0	0	3	111	0	0	0	0	116	5	0	245	1,103
11:30 AM	0	3	0	3	0	0	0	0	0	0	0	2	131	0	0	0	2	140	4	0	285	1,127
11:45 AM	0	2	0	5	0	0	1	0	0	0	0	0	123	0	0	0	0	144	7	0	282	1,171
12:00 PM	0	5	1	3	0	0	0	0	0	0	0	2	119	0	0	0	2	150	9	0	291	1,178
12:15 PM	0	7	0	3	0	0	0	0	0	0	0	2	136	0	0	0	0	114	7	0	269	1,169
12:30 PM	0	4	0	3	0	0	0	0	0	0	0	1	165	3	0	0	2	147	4	0	329	1,206
12:45 PM	0	4	0	2	0	0	1	0	0	0	0	0	132	0	0	0	1	144	5	0	289	1,167
1:00 PM	0	3	0	3	0	0	0	0	1	0	0	2	112	0	0	0	0	156	5	0	282	1,251
1:15 PM	0	3	0	2	0	0	0	0	2	0	0	1	144	0	0	0	1	151	2	0	306	1,319
1:30 PM	0	5	0	1	0	0	0	0	0	0	0	0	123	0	0	0	0	155	6	0	290	1,366
1:45 PM	0	2	0	7	0	0	0	0	0	0	0	1	159	0	0	1	2	196	5	0	373	1,444
2:00 PM	0	5	0	8	0	0	0	0	0	0	0	5	158	0	0	0	1	165	8	0	350	1,407
2:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	159	0	0	0	3	185	2	0	353	1,394
2:30 PM	0	6	0	0	0	0	1	0	1	0	0	2	176	2	0	0	3	171	6	0	368	1,364
2:45 PM	0	15	1	6	0	0	0	0	2	0	0	0	151	0	0	0	6	140	15	0	336	1,370
3:00 PM	0	6	2	10	0	0	1	0	0	0	0	1	140	0	0	0	2	172	3	0	337	1,371
3:15 PM	0	4	1	2	0	0	0	0	0	0	0	0	153	0	0	0	2	155	6	0	323	1,384
3:30 PM	0	6	0	7	0	0	0	0	0	0	0	3	183	0	0	0	3	165	7	0	374	1,394
3:45 PM	0	3	0	5	0	0	0	0	0	0	0	0	164	1	0	0	7	150	7	0	337	1,399
4:00 PM	0	5	1	4	0	0	0	0	1	0	0	0	158	0	0	1	5	172	3	0	350	1,381
4:15 PM	0	8	1	0	0	0	0	0	1	0	0	0	155	0	0	0	5	157	6	0	333	1,427
4:30 PM	0	7	0	3	0	0	0	0	1	0	0	0	182	0	0	0	6	177	3	0	379	1,461
4:45 PM	0	5	0	3	0	0	0	0	2	0	0	1	155	0	0	0	2	147	4	0	319	1,415
5:00 PM	0	13	2	3	0	0	0	0	1	0	0	1	177	0	0	0	10	189	0	0	396	1,414
5:15 PM	0	3	1	1	0	0	0	0	1	0	0	1	168	0	0	1	4	184	3	0	367	1,306
5:30 PM	0	2	0	2	0	0	0	0	1	0	0	0	157	0	0	0	2	166	3	0	333	1,232
5:45 PM	0	0	0	4	0	0	0	0	0	0	0	0	136	0	0	0	5	170	3	0	318	1,167
6:00 PM	0	2	0	1	0	0	0	0	2	0	0	0	131	2	0	0	1	147	2	0	288	1,124
6:15 PM	0	0	0	2	0	0	0	0	1	0	0	2	114	0	0	0	2	171	1	0	293	1,084
6:30 PM	0	1	0	0	0	0	1	0	1	0	0	0	114	1	0	0	2	148	0	0	268	970
6:45 PM	0	1	0	1	0	0	1	0	1	0	0	0	115	3	0	0	0	150	3	0	275	871
7:00 PM	0	0	0	2	0	0	1	0	0	0	0	0	92	1	0	0	2	150	0	0	248	782
7:15 PM	0	0	0	0	0	0	0	0	2	0	0	0	65	0	0	0	0	112	0	0	179	718
7:30 PM	0	0	0	0	0	0	0	0	2	0	0	0	71	1	0	0	0	94	1	0	169	709
7:45 PM	0	1	0	0	0	0	0	0	0	0	0	2	67	0	0	0	0	112	4	0	186	708
8:00 PM	0	2	0	3	0	0	0	0	0	0	0	0	83	0	0	0	1	95	0	0	184	659
8:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	74	0	0	0	0	95	0	0	170	605
8:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	68	0	0	0	0	99	0	0	168	554
8:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	71	0	0	0	0	65	0	0	137	515
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	66	0	0	130	486
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	1	73	0	0	119	0
9:30 PM	0	1	0	0	0	0	0	0	0	0	0	1	63	0	0	0	0	64	0	0	129	0
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	2	60	0	0	108	0

Traffic Counts by Vehicle Type

Time	Eastbound					Westbound					Northbound					Southbound					Total	
	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR	U-Turn	Left	Thru	Right	RTOR		
Lights																						
6:00 AM	0	1	0	2	0	0	0	0	1	0	0	2	148	0	0	0	1	86	6	0	247	
6:15 AM	0	0	0	0	0	0	0	1	0	0	0	7	138	1	0	0	3	107	4	0	261	
6:30 AM	0	5	0	1	0	0	2	0	2	0	0	13	140	0	0	0	1	99	3	0	266	
6:45 AM	0	7	0	1	0	0	0	0	0	0	0	5	149	0	0	0	3	184	9	0	358	
7:00 AM	0	3	0	1	0	0	0	0	3	0	0	0	151	0	0	0	0	135	10	0	303	
7:15 AM	0	3	0	3	0	0	0	0	1	0	0	3	192	0	0	0	0	115	2	0	319	
7:30 AM	0	6	0	2	0	0	0	0	0	0	0	3	199	0	0	0	0	143	7	0	360	
7:45 AM	0	6	0	3	0	0	0	0	0	0	0	7	178	0	0	0	1	142	8	0	345	
8:00 AM	0	3	0	0	0	0	0	0	1	0	0	3	209	1	0	0	0	121	2	0	340	
8:15 AM	0	1	1	2	0	0	0	0	0	0	0	1	177	0	0	0	0	127	5	0	314	
8:30 AM	0	2	0	1	0	0	0	0	0	0	0	1	196	0	0	0	1	127	4	0	332	
8:45 AM	0	2	0	3	0	0	1	0	2	0	0	0	156	1	0	0	2	114	4	0	285	
9:00 AM	0	1	0	0	0	0	0	0	0	0	0	1	145	0	0	0	0	106	7	0	260	
9:15 AM	0	4	0	1	0	0	0	0	0	0	0	2	131	0	0	0	0	109	8	0	255	
9:30 AM	0	6	0	4	0	0	0	0	0	0	0	1	134	0	0	0	1	101	12	0	259	
9:45 AM	0	3	0	1	0	0	0	0	1	0	0	3	125	1	0	0	0	117	5	0	256	
10:00 AM	0	7	0	0	0	0	0	0	0	0	0	2	104	0	0	0	1	90	3	0	207	
10:15 AM	0	4	0	2	0	0	0	0	0	0	0	0	115	0	0	0	0	106	3	0	230	
10:30 AM	0	3	0	0	0	0	0	0	0	0	0	1	114	0	0	0	0	106	3	0	227	
10:45 AM	0	9	0	0	0	0	1	0	0	0	0	2	103	0	0	0	2	97	2	0	216	
11:00 AM	0	0	0	6	0	0	0	0	1	0	0	3	113	0	0	0	2	106	3	0	234	
11:15 AM	0	4	0	2	0	0	0	0	1	0	0	2	100	0	0	0	0	104	4	0	217	
11:30 AM	0	2	0	2	0	0	0	0	0	0	0	1	112	0	0	0	2	129	4	0	252	
11:45 AM	0	2	0	4	0	0	1	0	0	0	0	0	114	0	0	0	0	125	5	0	251	
12:00 PM	0	4	0	3	0	0	0	0	0	0	0	1	112	0	0	0	2	130	6	0	258	
12:15 PM	0	7	0	2	0	0	0	0	0	0	0	2	124	0	0	0	0	100	7	0	242	
12:30 PM	0	4	0	2	0	0	0	0	0	0	0	0	151	2	0	0	2	132	4	0	297	
12:45 PM	0	3	0	1	0	0	1	0	0	0	0	0	118	0	0	0	1	123	4	0	251	
1:00 PM	0	2	0	1	0	0	0	0	1	0	0	2	102	0	0	0	0	139	3	0	250	
1:15 PM	0	3	0	2	0	0	0	0	2	0	0	1	132	0	0	0	1	133	2	0	276	
1:30 PM	0	2	0	1	0	0	0	0	0	0	0	0	118	0	0	0	0	139	3	0	263	
1:45 PM	0	2	0	4	0	0	0	0	0	0	0	1	147	0	0	1	2	179	4	0	340	
2:00 PM	0	5	0	5	0	0	0	0	0	0	0	5	148	0	0	0	1	146	3	0	313	
2:15 PM	0	2	0	2	0	0	0	0	0	0	0	0	149	0	0	0	3	162	1	0	319	
2:30 PM	0	5	0	0	0	0	1	0	1	0	0	1	170	2	0	0	2	150	2	0	334	
2:45 PM	0	10	0	4	0	0	0	0	2	0	0	0	143	0	0	0	6	128	5	0	298	
3:00 PM	0	3	2	8	0	0	1	0	0	0	0	1	134	0	0	0	2	156	2	0	309	
3:15 PM	0	3	1	1	0	0	0	0	0	0	0	0	145	0	0	0	2	139	3	0	294	
3:30 PM	0	6	0	4	0	0	0	0	0	0	0	1	178	0	0	0	3	152	5	0	349	
3:45 PM	0	3	0	4	0	0	0	0	0	0	0	0	157	1	0	0	7	140	4	0	316	
4:00 PM	0	5	1	4	0	0	0	0	1	0	0	0	153	0	0	1	5	160	1	0	331	
4:15 PM	0	7	0	0	0	0	0	0	1	0	0	0	151	0	0	0	5	152	2	0	318	
4:30 PM	0	7	0	2	0	0	0	0	1	0	0	0	180	0	0	0	5	172	2	0	369	
4:45 PM	0	4	0	2	0	0	0	0	2	0	0	1	154	0	0	0	2	139	1	0	305	
5:00 PM	0	13	2	3	0	0	0	0	1	0	0	1	176	0	0	0	10	183	0	0	389	
5:15 PM	0	3	1	1	0	0	0	0	1	0	0	1	168	0	0	1	4	177	2	0	359	
5:30 PM	0	2	0	2	0	0	0	0	1	0	0	0	153	0	0	0	2	159	1	0	320	
5:45 PM	0	0	0	3	0	0	0	0	0	0	0	0	132	0	0	0	5	163	2	0	305	
6:00 PM	0	1	0	1	0	0	0	0	2	0	0	0	128	2	0	0	1	143	1	0	279	
6:15 PM	0	0	0	1	0	0	0	0	1	0	0	2	113	0	0	0	2	166	0	0	285	
6:30 PM	0	1	0	0	0	0	1	0	1	0	0	0	113	1	0	0	2	146	0	0	265	
6:45 PM	0	1	0	1	0	0	1	0	1	0	0	0	115	3	0	0	0	143	1	0	266	
7:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	92	1	0	0	2	146	0	0	242	
7:15 PM	0	0	0	0	0	0	0	0	2	0	0	0	64	0	0	0	0	111	0	0	177	
7:30 PM	0	0	0	0	0	0	0	0	2	0	0	0	71	1	0	0	0	89	0	0	163	
7:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	112	3	0	181	
8:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	81	0	0	0	1	93	0	0	177	
8:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	92	0	0	166	
8:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	97	0	0	162	
8:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	71	0	0	0	0	65	0	0	137	
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	63	0	0	0	0	66	0	0	129	
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	1	72	0	0	117	
9:30 PM	0	1	0	0	0	0	0	0	0	0	0	1	62	0	0	0	0	64	0	0	128	
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	2	60	0	0	108	

Study Peak Hour (for all study intersections)



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	31.6%	0.79
WB	33.3%	0.75
NB	7.2%	0.93
SB	11.0%	0.92
All	9.4%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	OSAGE AVE Eastbound				OSAGE AVE Westbound				S WATT AVE Northbound			S WATT AVE Southbound				Total	Rolling Hour	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru			Right
6:00 AM	0	4	3	7	0	0	0	1	0	5	167	0	0	1	96	7	291	1,287
6:15 AM	0	6	0	0	0	1	0	0	0	10	158	1	0	3	115	6	300	1,342
6:30 AM	0	11	0	2	0	2	0	2	0	16	153	0	0	1	109	5	301	1,398
6:45 AM	0	9	0	5	0	0	0	0	0	6	167	0	0	3	191	14	395	1,486
7:00 AM	0	10	2	1	0	0	0	3	0	4	168	0	0	0	147	11	346	1,467
7:15 AM	0	9	0	3	0	0	0	1	0	4	207	0	0	0	127	5	356	1,506
7:30 AM	0	7	0	2	0	0	0	0	0	3	211	0	0	0	158	8	389	1,495
7:45 AM	0	7	0	3	0	0	0	1	0	8	194	0	0	1	152	10	376	1,476
8:00 AM	0	5	0	2	0	0	0	1	0	4	225	1	0	0	142	5	385	1,416
8:15 AM	0	2	1	3	0	0	0	0	0	2	195	0	0	0	136	6	345	1,325
8:30 AM	0	4	0	4	0	0	0	0	0	2	207	0	0	1	146	6	370	1,269
8:45 AM	0	2	0	3	0	1	0	2	0	1	169	1	0	2	129	6	316	1,195
9:00 AM	0	3	0	2	0	0	0	0	0	1	155	0	0	0	123	10	294	1,182
9:15 AM	0	4	0	3	0	0	0	0	0	3	146	0	0	0	124	9	289	1,136
9:30 AM	0	7	0	4	0	0	0	0	0	1	158	0	0	1	112	13	296	1,122
9:45 AM	0	5	0	4	0	0	0	1	0	5	141	1	0	0	139	7	303	1,092
10:00 AM	0	11	0	0	0	0	0	0	0	4	118	0	0	1	110	4	248	1,041
10:15 AM	0	6	0	2	0	0	0	0	0	2	134	0	0	0	125	6	275	1,055
10:30 AM	0	4	0	1	0	0	0	0	0	1	134	0	0	0	122	4	266	1,025
10:45 AM	0	11	0	1	0	1	0	0	0	3	117	0	0	2	115	2	252	1,044
11:00 AM	0	0	0	6	0	0	0	1	0	3	127	0	0	2	119	4	262	1,074
11:15 AM	0	6	0	3	0	0	0	1	0	3	111	0	0	0	116	5	245	1,103
11:30 AM	0	3	0	3	0	0	0	0	0	2	131	0	0	2	140	4	285	1,127
11:45 AM	0	2	0	5	0	1	0	0	0	0	123	0	0	0	144	7	282	1,171
12:00 PM	0	5	1	3	0	0	0	0	0	2	119	0	0	2	150	9	291	1,178
12:15 PM	0	7	0	3	0	0	0	0	0	2	136	0	0	0	114	7	269	1,169
12:30 PM	0	4	0	3	0	0	0	0	0	1	165	3	0	2	147	4	329	1,206

12:45 PM	0	4	0	2	0	1	0	0	0	0	132	0	0	1	144	5	289	1,167
1:00 PM	0	3	0	3	0	0	0	1	0	2	112	0	0	0	156	5	282	1,251
1:15 PM	0	3	0	2	0	0	0	2	0	1	144	0	0	1	151	2	306	1,319
1:30 PM	0	5	0	1	0	0	0	0	0	0	123	0	0	0	155	6	290	1,366
1:45 PM	0	2	0	7	0	0	0	0	0	1	159	0	1	2	196	5	373	1,444
2:00 PM	0	5	0	8	0	0	0	0	0	5	158	0	0	1	165	8	350	1,407
2:15 PM	0	2	0	2	0	0	0	0	0	0	159	0	0	3	185	2	353	1,394
2:30 PM	0	6	0	0	0	1	0	1	0	2	176	2	0	3	171	6	368	1,364
2:45 PM	0	15	1	6	0	0	0	2	0	0	151	0	0	6	140	15	336	1,370
3:00 PM	0	6	2	10	0	1	0	0	0	1	140	0	0	2	172	3	337	1,371
3:15 PM	0	4	1	2	0	0	0	0	0	0	153	0	0	2	155	6	323	1,384
3:30 PM	0	6	0	7	0	0	0	0	0	3	183	0	0	3	165	7	374	1,394
3:45 PM	0	3	0	5	0	0	0	0	0	0	164	1	0	7	150	7	337	1,399
4:00 PM	0	5	1	4	0	0	0	1	0	0	158	0	1	5	172	3	350	1,381
4:15 PM	0	8	1	0	0	0	0	1	0	0	155	0	0	5	157	6	333	1,427
4:30 PM	0	7	0	3	0	0	0	1	0	0	182	0	0	6	177	3	379	1,461
4:45 PM	0	5	0	3	0	0	0	2	0	1	155	0	0	2	147	4	319	1,415
5:00 PM	0	13	2	3	0	0	0	1	0	1	177	0	0	10	189	0	396	1,414
5:15 PM	0	3	1	1	0	0	0	1	0	1	168	0	1	4	184	3	367	1,306
5:30 PM	0	2	0	2	0	0	0	1	0	0	157	0	0	2	166	3	333	1,232
5:45 PM	0	0	0	4	0	0	0	0	0	0	136	0	0	5	170	3	318	1,167
6:00 PM	0	2	0	1	0	0	0	2	0	0	131	2	0	1	147	2	288	1,124
6:15 PM	0	0	0	2	0	0	0	1	0	2	114	0	0	2	171	1	293	1,084
6:30 PM	0	1	0	0	0	1	0	1	0	0	114	1	0	2	148	0	268	970
6:45 PM	0	1	0	1	0	1	0	1	0	0	115	3	0	0	150	3	275	871
7:00 PM	0	0	0	2	0	1	0	0	0	0	92	1	0	2	150	0	248	782
7:15 PM	0	0	0	0	0	0	0	2	0	0	65	0	0	0	112	0	179	718
7:30 PM	0	0	0	0	0	0	0	2	0	0	71	1	0	0	94	1	169	709
7:45 PM	0	1	0	0	0	0	0	0	0	2	67	0	0	0	112	4	186	708
8:00 PM	0	2	0	3	0	0	0	0	0	0	83	0	0	1	95	0	184	659
8:15 PM	0	1	0	0	0	0	0	0	0	0	74	0	0	0	95	0	170	605
8:30 PM	0	1	0	0	0	0	0	0	0	0	68	0	0	0	99	0	168	554
8:45 PM	0	0	0	0	0	0	0	1	0	0	71	0	0	0	65	0	137	515
9:00 PM	0	0	0	0	0	0	0	0	0	0	64	0	0	0	66	0	130	486
9:15 PM	0	0	0	0	0	0	0	0	0	0	45	0	0	1	73	0	119	
9:30 PM	0	1	0	0	0	0	0	0	0	1	63	0	0	0	64	0	129	
9:45 PM	0	0	0	0	0	0	0	0	0	0	46	0	0	2	60	0	108	
Count Total	0	271	16	162	0	12	0	38	0	121	8,761	18	3	105	8,716	297	18,520	
Peak Hour	0	28	0	10	0	0	0	3	0	19	837	1	0	1	579	28	1,506	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles in Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
6:00 AM	11	22	0	11	44	6:00 AM	0	0	0	0	0	6:00 AM	1	0	0	0	1
6:15 AM	6	23	0	10	39	6:15 AM	0	0	0	0	0	6:15 AM	0	0	0	0	0
6:30 AM	7	16	0	12	35	6:30 AM	0	0	0	0	0	6:30 AM	0	0	0	0	0
6:45 AM	6	19	0	12	37	6:45 AM	0	0	0	0	0	6:45 AM	0	0	0	0	0
7:00 AM	9	21	0	13	43	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:15 AM	6	16	0	15	37	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:30 AM	1	12	0	16	29	7:30 AM	0	0	0	1	1	7:30 AM	1	0	0	0	1
7:45 AM	1	17	1	12	31	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
8:00 AM	4	17	0	24	45	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:15 AM	2	19	0	10	31	8:15 AM	0	0	0	0	0	8:15 AM	1	0	0	0	1
8:30 AM	5	12	0	21	38	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:45 AM	0	14	0	17	31	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
9:00 AM	4	10	0	20	34	9:00 AM	0	0	0	1	1	9:00 AM	0	0	0	0	0
9:15 AM	2	16	0	16	34	9:15 AM	0	0	0	0	0	9:15 AM	0	0	0	0	0
9:30 AM	1	24	0	12	37	9:30 AM	0	0	0	0	0	9:30 AM	0	0	0	0	0
9:45 AM	5	18	0	24	47	9:45 AM	0	0	0	0	0	9:45 AM	0	0	0	0	0
10:00 AM	4	16	0	21	41	10:00 AM	0	0	0	0	0	10:00 AM	2	0	0	0	2
10:15 AM	2	21	0	22	45	10:15 AM	0	0	0	0	0	10:15 AM	0	0	0	0	0

10:30 AM	2	20	0	17	39	10:30 AM	0	0	0	1	1	10:30 AM	0	0	0	0	0
10:45 AM	3	15	0	18	36	10:45 AM	0	0	0	0	0	10:45 AM	0	0	0	0	0
11:00 AM	0	14	0	14	28	11:00 AM	0	0	0	0	0	11:00 AM	0	0	0	0	0
11:15 AM	3	12	0	13	28	11:15 AM	0	0	0	0	0	11:15 AM	0	0	0	0	0
11:30 AM	2	20	0	11	33	11:30 AM	0	0	0	0	0	11:30 AM	0	0	0	0	0
11:45 AM	1	9	0	21	31	11:45 AM	0	0	0	0	0	11:45 AM	0	0	0	0	0
12:00 PM	2	8	0	23	33	12:00 PM	0	0	0	0	0	12:00 PM	0	0	0	0	0
12:15 PM	1	12	0	14	27	12:15 PM	0	0	0	0	0	12:15 PM	0	0	0	0	0
12:30 PM	1	16	0	15	32	12:30 PM	0	0	0	0	0	12:30 PM	2	0	0	0	2
12:45 PM	2	14	0	22	38	12:45 PM	0	0	0	0	0	12:45 PM	0	0	0	0	0
1:00 PM	3	10	0	19	32	1:00 PM	0	0	0	0	0	1:00 PM	0	0	0	0	0
1:15 PM	0	12	0	18	30	1:15 PM	0	1	0	0	1	1:15 PM	0	0	0	0	0
1:30 PM	3	5	0	19	27	1:30 PM	0	0	0	0	0	1:30 PM	1	0	0	0	1
1:45 PM	3	12	0	18	33	1:45 PM	0	0	0	0	0	1:45 PM	0	0	0	0	0
2:00 PM	3	10	0	24	37	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:15 PM	0	10	0	24	34	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:30 PM	1	7	0	26	34	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:45 PM	8	8	0	22	38	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
3:00 PM	5	6	0	17	28	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:15 PM	2	8	0	19	29	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:30 PM	3	7	0	15	25	3:30 PM	0	0	0	0	0	3:30 PM	1	0	0	0	1
3:45 PM	1	7	0	13	21	3:45 PM	0	0	0	0	0	3:45 PM	2	0	0	0	2
4:00 PM	0	5	0	14	19	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:15 PM	2	4	0	9	15	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:30 PM	1	2	0	7	10	4:30 PM	0	0	0	0	0	4:30 PM	1	0	0	0	1
4:45 PM	2	1	0	11	14	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
5:00 PM	0	1	0	6	7	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	8	8	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:30 PM	0	4	0	9	13	5:30 PM	0	1	0	0	1	5:30 PM	0	0	0	0	0
5:45 PM	1	4	0	8	13	5:45 PM	0	1	0	0	1	5:45 PM	0	0	0	0	0
6:00 PM	1	3	0	5	9	6:00 PM	0	0	0	0	0	6:00 PM	0	0	0	0	0
6:15 PM	1	1	0	6	8	6:15 PM	0	1	0	0	1	6:15 PM	0	0	0	0	0
6:30 PM	0	1	0	2	3	6:30 PM	0	0	0	0	0	6:30 PM	0	0	0	0	0
6:45 PM	0	0	0	9	9	6:45 PM	0	0	0	0	0	6:45 PM	0	0	0	0	0
7:00 PM	2	0	0	4	6	7:00 PM	0	0	0	0	0	7:00 PM	0	0	0	0	0
7:15 PM	0	1	0	1	2	7:15 PM	0	0	0	0	0	7:15 PM	0	0	0	0	0
7:30 PM	0	0	0	6	6	7:30 PM	0	0	0	0	0	7:30 PM	1	0	0	0	1
7:45 PM	0	4	0	1	5	7:45 PM	0	0	0	0	0	7:45 PM	0	0	0	0	0
8:00 PM	3	2	0	2	7	8:00 PM	0	1	0	0	1	8:00 PM	0	0	0	0	0
8:15 PM	0	1	0	3	4	8:15 PM	0	0	0	0	0	8:15 PM	0	0	0	0	0
8:30 PM	0	4	0	2	6	8:30 PM	0	0	0	0	0	8:30 PM	0	0	0	0	0
8:45 PM	0	0	0	0	0	8:45 PM	0	0	0	0	0	8:45 PM	0	0	0	0	0
9:00 PM	0	1	0	0	1	9:00 PM	0	0	0	0	0	9:00 PM	0	0	0	0	0
9:15 PM	0	1	0	1	2	9:15 PM	0	0	0	0	0	9:15 PM	0	0	0	0	0
9:30 PM	0	1	0	0	1	9:30 PM	0	0	0	0	0	9:30 PM	0	0	0	0	0
9:45 PM	0	0	0	0	0	9:45 PM	0	0	0	0	0	9:45 PM	0	0	0	0	0
Count Total	138	596	1	804	1,539	Count Total	0	5	0	3	8	Count Total	13	0	0	0	13
Peak Hour	12	62	1	67	142	Peak Hour	0	0	0	1	1	Peak Hour	1	0	0	0	1

All Traffic Data Services, LLC

www.alltrafficdata.net

Site Code: 2
Station ID:
S WATT AVE S.O OSAGE AVE

Start Time	13-Oct-21		14-Oct-21		15-Oct-21		16-Oct-21		17-Oct-21		18-Oct-21		19-Oct-21		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	71	69	*	*	*	*	*	*	*	*	*	*	*	*	71	69
01:00	42	54	*	*	*	*	*	*	*	*	*	*	*	*	42	54
02:00	79	116	*	*	*	*	*	*	*	*	*	*	*	*	79	116
03:00	137	238	*	*	*	*	*	*	*	*	*	*	*	*	137	238
04:00	313	401	*	*	*	*	*	*	*	*	*	*	*	*	313	401
05:00	644	467	*	*	*	*	*	*	*	*	*	*	*	*	644	467
06:00	725	541	*	*	*	*	*	*	*	*	*	*	*	*	725	541
07:00	764	539	*	*	*	*	*	*	*	*	*	*	*	*	764	539
08:00	644	487	*	*	*	*	*	*	*	*	*	*	*	*	644	487
09:00	463	448	*	*	*	*	*	*	*	*	*	*	*	*	463	448
10:00	516	529	*	*	*	*	*	*	*	*	*	*	*	*	516	529
11:00	555	565	*	*	*	*	*	*	*	*	*	*	*	*	555	565
12:00 PM	529	622	*	*	*	*	*	*	*	*	*	*	*	*	529	622
01:00	561	622	*	*	*	*	*	*	*	*	*	*	*	*	561	622
02:00	631	659	*	*	*	*	*	*	*	*	*	*	*	*	631	659
03:00	632	657	*	*	*	*	*	*	*	*	*	*	*	*	632	657
04:00	632	684	*	*	*	*	*	*	*	*	*	*	*	*	632	684
05:00	478	633	*	*	*	*	*	*	*	*	*	*	*	*	478	633
06:00	306	484	*	*	*	*	*	*	*	*	*	*	*	*	306	484
07:00	307	377	*	*	*	*	*	*	*	*	*	*	*	*	307	377
08:00	228	264	*	*	*	*	*	*	*	*	*	*	*	*	228	264
09:00	194	224	*	*	*	*	*	*	*	*	*	*	*	*	194	224
10:00	126	136	*	*	*	*	*	*	*	*	*	*	*	*	126	136
11:00	60	71	*	*	*	*	*	*	*	*	*	*	*	*	60	71
Total	9637	9887	0	0	0	0	0	0	0	0	0	0	0	9637	9887	
Day	19524		0		0		0		0		0		0	19524		
AM Peak	07:00	11:00	-	-	-	-	-	-	-	-	-	-	-	07:00	11:00	
Vol.	764	565	-	-	-	-	-	-	-	-	-	-	-	764	565	
PM Peak	15:00	16:00	-	-	-	-	-	-	-	-	-	-	-	15:00	16:00	
Vol.	632	684	-	-	-	-	-	-	-	-	-	-	-	632	684	

Comb. Total	19524	0	0	0	0	0	0	0	0	0	0	0	0	19524
ADT	ADT 19,524	AADT 19,524												



8950 CAL CENTER DRIVE, SUITE 340, SACRAMENTO, CA 95826 • 916.368.2000 • DKSASSOCIATES.COM

ADJUSTMENT OF YEAR 2021 TRAFFIC COUNTS

DRAFT



SPEED DATA - 2021

DRAFT

All Traffic Data Services, LLC

www.alltrafficdata.net

Site Code: 2
Station ID:
S WATT AVE S.O OSAGE AVE

NB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
10/13/21	2	1	0	1	0	1	3	9	26	17	8	2	0	1	71	51-60	43
01:00	2	0	0	0	0	1	4	3	7	12	10	1	2	0	42	56-65	22
02:00	7	0	0	0	0	0	2	14	16	18	12	9	1	0	79	51-60	34
03:00	6	1	0	0	0	3	10	15	33	37	26	4	0	2	137	51-60	70
04:00	26	1	1	8	4	8	27	80	92	47	14	4	1	0	313	46-55	172
05:00	77	3	4	4	3	53	133	204	119	35	7	1	0	1	644	41-50	337
06:00	94	1	0	4	9	57	165	220	145	19	6	3	0	2	725	41-50	385
07:00	80	2	0	3	16	65	174	261	135	21	6	1	0	0	764	41-50	435
08:00	60	3	1	4	6	47	105	229	133	45	9	0	0	2	644	46-55	362
09:00	53	1	1	4	5	31	58	126	117	57	9	1	0	0	463	46-55	243
10:00	45	1	2	0	4	31	72	170	120	49	17	4	1	0	516	46-55	290
11:00	34	1	1	5	1	31	103	185	121	56	10	6	0	1	555	46-55	306
12 PM	50	5	5	3	8	20	106	144	113	58	13	3	0	1	529	46-55	257
13:00	67	0	7	4	23	75	129	119	97	37	2	1	0	0	561	41-50	248
14:00	50	0	2	5	10	48	131	188	142	46	4	3	1	1	631	46-55	330
15:00	54	2	3	10	21	23	95	196	129	59	26	10	3	1	632	46-55	325
16:00	40	2	0	1	5	42	79	187	177	81	11	4	2	1	632	46-55	364
17:00	26	0	2	0	2	10	52	153	151	54	18	8	1	1	478	46-55	304
18:00	5	0	0	2	0	10	30	77	101	55	21	4	0	1	306	46-55	178
19:00	12	1	1	1	0	7	17	65	116	60	18	5	4	0	307	46-55	181
20:00	7	1	0	2	0	0	10	32	81	65	21	6	1	2	228	51-60	146
21:00	7	0	0	0	0	2	6	27	69	49	27	7	0	0	194	51-60	118
22:00	4	1	1	0	0	0	7	14	39	38	14	6	1	1	126	51-60	77
23:00	1	0	0	0	0	0	1	6	14	20	10	5	2	1	60	51-60	34
Total	809	27	31	61	117	565	1519	2724	2293	1035	319	98	20	19	9637		
Percent	8.4%	0.3%	0.3%	0.6%	1.2%	5.9%	15.8%	28.3%	23.8%	10.7%	3.3%	1.0%	0.2%	0.2%			
AM Peak	06:00	05:00	05:00	04:00	07:00	07:00	07:00	07:00	06:00	09:00	03:00	02:00	01:00	03:00	07:00		
Vol.	94	3	4	8	16	65	174	261	145	57	26	9	2	2	764		
PM Peak	13:00	12:00	13:00	15:00	13:00	13:00	14:00	15:00	16:00	16:00	21:00	15:00	19:00	20:00	15:00		
Vol.	67	5	7	10	23	75	131	196	177	81	27	10	4	2	632		
Total	809	27	31	61	117	565	1519	2724	2293	1035	319	98	20	19	9637		
Percent	8.4%	0.3%	0.3%	0.6%	1.2%	5.9%	15.8%	28.3%	23.8%	10.7%	3.3%	1.0%	0.2%	0.2%			

15th Percentile : 38 MPH
 50th Percentile : 48 MPH
 85th Percentile : 55 MPH
 95th Percentile : 59 MPH

Stats
 10 MPH Pace Speed : 46-55 MPH
 Number in Pace : 5017
 Percent in Pace : 52.1%
 Number of Vehicles > 55 MPH : 1491
 Percent of Vehicles > 55 MPH : 15.5%
 Mean Speed(Average) : 46 MPH

All Traffic Data Services, LLC

www.alltrafficdata.net

Site Code: 2
Station ID:
S WATT AVE S.O OSAGE AVE

SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
10/13/21	2	0	0	0	0	0	4	8	8	24	9	7	5	2	69	54-63	33
01:00	1	0	0	0	0	0	2	3	6	11	17	8	0	6	54	56-65	28
02:00	8	0	0	0	1	6	9	15	9	14	23	12	11	8	116	56-65	37
03:00	13	0	0	0	0	0	3	14	50	62	47	29	13	7	238	51-60	112
04:00	25	1	0	4	15	36	49	57	57	63	51	22	14	7	401	51-60	120
05:00	66	2	1	0	7	43	48	74	102	58	46	10	4	6	467	46-55	176
06:00	89	3	0	6	11	42	95	104	87	61	32	7	1	3	541	41-50	199
07:00	85	1	0	1	14	51	91	82	105	73	24	9	1	2	539	46-55	187
08:00	57	1	4	2	6	22	71	100	102	69	37	8	6	2	487	46-55	202
09:00	31	1	1	0	10	20	93	96	105	57	23	9	1	1	448	46-55	201
10:00	38	0	0	1	3	37	72	94	114	104	47	12	7	0	529	51-60	218
11:00	64	8	11	21	18	34	72	88	118	80	36	11	2	2	565	46-55	206
12 PM	59	1	3	3	25	96	110	143	99	49	21	11	2	0	622	41-50	253
13:00	120	21	19	29	29	67	121	96	65	36	14	4	0	1	622	41-50	217
14:00	83	4	3	10	52	98	137	106	77	47	24	10	6	2	659	41-50	243
15:00	65	1	8	12	48	107	126	105	86	54	26	10	5	4	657	36-45	233
16:00	50	3	12	12	16	84	139	128	107	82	33	10	3	5	684	41-50	267
17:00	37	0	1	3	20	44	109	144	117	98	42	12	3	3	633	46-55	261
18:00	18	0	1	2	4	27	100	102	88	74	38	16	10	4	484	41-50	202
19:00	17	0	0	3	0	5	29	65	90	88	58	17	3	2	377	51-60	178
20:00	3	0	1	0	1	3	14	42	71	52	42	20	10	5	264	51-60	123
21:00	6	0	0	0	1	1	1	28	63	59	36	17	5	7	224	51-60	122
22:00	2	0	0	1	0	0	2	15	27	37	26	12	6	8	136	51-60	64
23:00	0	0	0	0	1	0	1	10	16	19	17	1	4	2	71	54-63	36
Total	939	47	65	110	282	823	1498	1719	1769	1371	769	284	122	89	9887		
Percent	9.5%	0.5%	0.7%	1.1%	2.9%	8.3%	15.2%	17.4%	17.9%	13.9%	7.8%	2.9%	1.2%	0.9%			
AM Peak	06:00	11:00	11:00	11:00	11:00	07:00	06:00	06:00	11:00	10:00	04:00	03:00	04:00	02:00	11:00		
Vol.	89	8	11	21	18	51	95	104	118	104	51	29	14	8	565		
PM Peak	13:00	13:00	13:00	13:00	14:00	15:00	16:00	17:00	17:00	17:00	19:00	20:00	18:00	22:00	16:00		
Vol.	120	21	19	29	52	107	139	144	117	98	58	20	10	8	684		
Total	939	47	65	110	282	823	1498	1719	1769	1371	769	284	122	89	9887		
Percent	9.5%	0.5%	0.7%	1.1%	2.9%	8.3%	15.2%	17.4%	17.9%	13.9%	7.8%	2.9%	1.2%	0.9%			

15th Percentile : 35 MPH
 50th Percentile : 48 MPH
 85th Percentile : 58 MPH
 95th Percentile : 64 MPH

Stats
 10 MPH Pace Speed : 46-55 MPH
 Number in Pace : 3488
 Percent in Pace : 35.3%
 Number of Vehicles > 55 MPH : 2635
 Percent of Vehicles > 55 MPH : 26.7%
 Mean Speed(Average) : 46 MPH



TRIP GENERATION AND TRIP DISTRIBUTION MEMORANDUM

DRAFT

TRIP GENERATION AND DISTRIBUTION

DATE: October 24, 2021

TO: Matthew Ilagan | City of Sacramento

FROM: Vic Maslanka, Josh Pilachowski | DKS Associates

SUBJECT: 8981 Osage Avenue Warehouse

Project # 19179-015

INTRODUCTION

This memorandum summarizes the results of the vehicular trip generation analysis of the proposed development at 8981 Osage Avenue in the City of Sacramento.

PROJECT DESCRIPTION

The 9.51-acre project site is located at 8981 Osage Avenue, in the northeast quadrant of the intersection of Osage Avenue and South Watt Avenue. The site is currently vacant. The project proposes a warehouse of 136,720 square feet.

The project site is located within a heavy industrial M-2(S)-R zone.

TRIP GENERATION ESTIMATION

Vehicular trip generation estimates of the project are based upon information published by the Institute of Transportation Engineers (ITE). Specifically, the following source has been utilized:

- Trip Generation, 11th Edition.

For conservatism in the analysis, no adjustments have been made for mode choice, as the mode choice in the site environs is predominantly via private automobile. Various manufacturing, industrial, and warehouse uses are permitted in the M-2(S)-R zone. Such uses could be accommodated within the proposed project. Several representative permitted land uses are included in the ITE data:

- Code 110 – General Light Industrial
- Code 130 – Industrial Park
- Code 140 – Manufacturing
- Code 150 – Warehousing
- Code 154 – High-Cube Transload and Short-Term Storage Warehouse

- Code 155 – High-Cube Fulfillment Center Warehouse – Non-Sort
- Code 156 – High-Cube Parcel Hub Warehouse

VEHICULAR TRIP GENERATION ESTIMATES

Table 1 summarizes trip generation for these land use types. Additional descriptive information on each land use type is included in the appendix.

TABLE 1: VEHICULAR TRIP GENERATION ESTIMATES

USE	ITE CODE	SIZE (1,000 SQUARE FEET)	VEHICLE TRIPS GENERATED (TRIP-ENDS)						
			WEEK- DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
GENERAL LIGHT INDUSTRIAL	110		565	85	12	97	7	43	50
INDUSTRIAL PARK	130		1,105	37	9	46	10	36	46
MANUFACTURING	140		717	71	22	93	31	70	101
WAREHOUSING	150		254	31	9	40	12	31	43
HIGH-CUBE TRANSLOAD AND SHORT-TERM STORAGE WAREHOUSE	154	136.72	191	8	3	11	4	10	14
HIGH-CUBE FULFILLMENT CENTER WAREHOUSE - NON-SORT	155		100	17	4	21	9	13	22
HIGH-CUBE PARCEL HUB WAREHOUSE	156		633	48	48	96	60	28	88

NOTE: PEAK HOUR REFERS TO PEAK HOUR OF ADJACENT STREET TRAFFIC.

SOURCE: ITE TRIP GENERATION, 11TH EDITION, 2021.

TRUCK TRIP GENERATION ESTIMATES

ITE Trip Generation, 11th Edition, also provides information on the number of truck trips generated by each of the land use categories. Table 2 summarizes the truck trip generation.

TABLE 2: TRUCK TRIP GENERATION ESTIMATES

USE	ITE CODE	SIZE (1,000 SQUARE FEET)	TRUCK TRIPS GENERATED (TRIP-ENDS)						
			WEEK-DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
GENERAL LIGHT INDUSTRIAL	110		34	1	0	1	1	0	1
INDUSTRIAL PARK	130		78	2	3	5	2	3	5
MANUFACTURING	140		62	2	2	4	2	2	4
WAREHOUSING	150		81	2	1	3	2	2	4
HIGH-CUBE TRANSLOAD AND SHORT-TERM STORAGE WAREHOUSE	154	136.72	30	1	2	3	0	1	1
HIGH-CUBE FULFILLMENT CENTER WAREHOUSE - NON-SORT	155		31	2	1	3	0	1	1
HIGH-CUBE PARCEL HUB WAREHOUSE	156		79	6	6	12	4	4	8

SOURCE: ITE TRIP GENERATION, 11TH EDITION, 2021.

RECOMMENDED VEHICULAR TRIP GENERATION ESTIMATES

As the transportation analysis will focus on peak weekday commuter period intersection operations, the manufacturing trip generation estimates (Code 140) have been selected for analysis, as they provide the most conservative (highest) peak hour estimates of total vehicle trips. Table 3 summarizes the recommended trip generation estimates.

TABLE 3: RECOMMENDED VEHICULAR TRIP GENERATION ESTIMATES

USE	VEHICLE TYPE	SIZE (1,000 SQUARE FEET)	VEHICLE TRIPS GENERATED (TRIP-ENDS)						
			WEEK-DAY	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
MANUFACTURING	TRUCKS		62	2	2	4	2	2	4
	TOTAL	136.72	717	71	22	93	31	70	101

SOURCE: ITE TRIP GENERATION, 11TH EDITION, 2021.

HOURLY TRIP GENERATION ESTIMATES

For the determination of vehicle volumes for traffic signal warrants, trip generation was estimated for the manufacturing land use for all 24 hours of a typical weekday based on ITE Trip Generation, 11th Edition, information. The ITE information provides a percentage of land use trips entering and exiting a site for each hour of the day. As the hourly information is from a different data sample and is independent of project size, the hourly percentages were proportionally adjusted to match the AM and PM peak hour volume estimates. The derivation of the hourly adjustments is documented in the Appendix. Traffic counts collected on Wednesday, October 13, 2021, at the intersection of Osage Avenue and South Watt Avenue found that the AM peak hour occurs from 7:15 to 8:15 AM, while the PM peak hour occurs from 4:30 to 5:30 PM. Table 4 summarizes the hourly trip generation.

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TABLE 4: HOURLY TRIP GENERATION ESTIMATES

TIME	TRIPS GENERATED (TRIP-ENDS)					
	ALL VEHICLE TRIPS			TRUCK TRIPS		
	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
12:00 - 1:00 AM	1	6	7	0	0	0
1:00 - 2:00 AM	1	4	5	0	0	0
2:00 - 3:00 AM	1	3	4	0	0	0
3:00 - 4:00 AM	1	2	3	0	1	1
4:00 - 5:00 AM	4	1	5	0	0	0
5:00 - 6:00 AM	9	0	9	0	0	0
6:00 - 7:00 AM	52	8	60	1	1	2
7:00 - 8:00 AM	72	20	92	2	2	4
8:00 - 9:00 AM	23	11	34	3	3	6
9:00 - 10:00 AM	12	9	21	3	3	6
10:00 - 11:00 AM	10	9	19	4	3	7
11:00 - 12:00 PM	19	15	34	3	3	6
12:00 - 1:00 PM	27	19	46	2	3	5
1:00 - 2:00 PM	20	21	41	3	2	5
2:00 - 3:00 PM	16	22	38	2	2	4
3:00 - 4:00 PM	28	64	92	3	3	6
4:00 - 5:00 PM	23	56	79	2	2	4
5:00 - 6:00 PM	17	47	64	1	1	2
6:00 - 7:00 PM	4	8	12	1	1	2
7:00 - 8:00 PM	3	5	8	1	0	1
8:00 - 9:00 PM	3	5	8	0	1	1
9:00 - 10:00 PM	4	7	11	0	0	0
10:00 - 11:00 PM	5	7	12	0	0	0
11:00 - 12:00 AM	4	9	13	0	0	0
TOTAL	359	358	717	31	31	62
AM PEAK HOUR (7:15 TO 8:15 AM)	71	22	93	2	2	4
PM PEAK HOUR (4:30 TO 5:30 PM)	31	70	101	2	2	4

NOTE: PEAK HOUR REFERS TO PEAK HOUR OF ADJACENT STREET TRAFFIC.

SOURCE: ITE TRIP GENERATION, 11TH EDITION, 2021.

TRIP DISTRIBUTION ESTIMATION

Vehicular trip distribution estimates of the project are based upon:

- Traffic counts collected at the intersection of Osage Avenue and South Watt Avenue on Wednesday, October 13, 2021, from 6:00 AM to 10:00 PM
- The functional and physical characteristics of area roadways
- Travel patterns of nearby industrial land uses

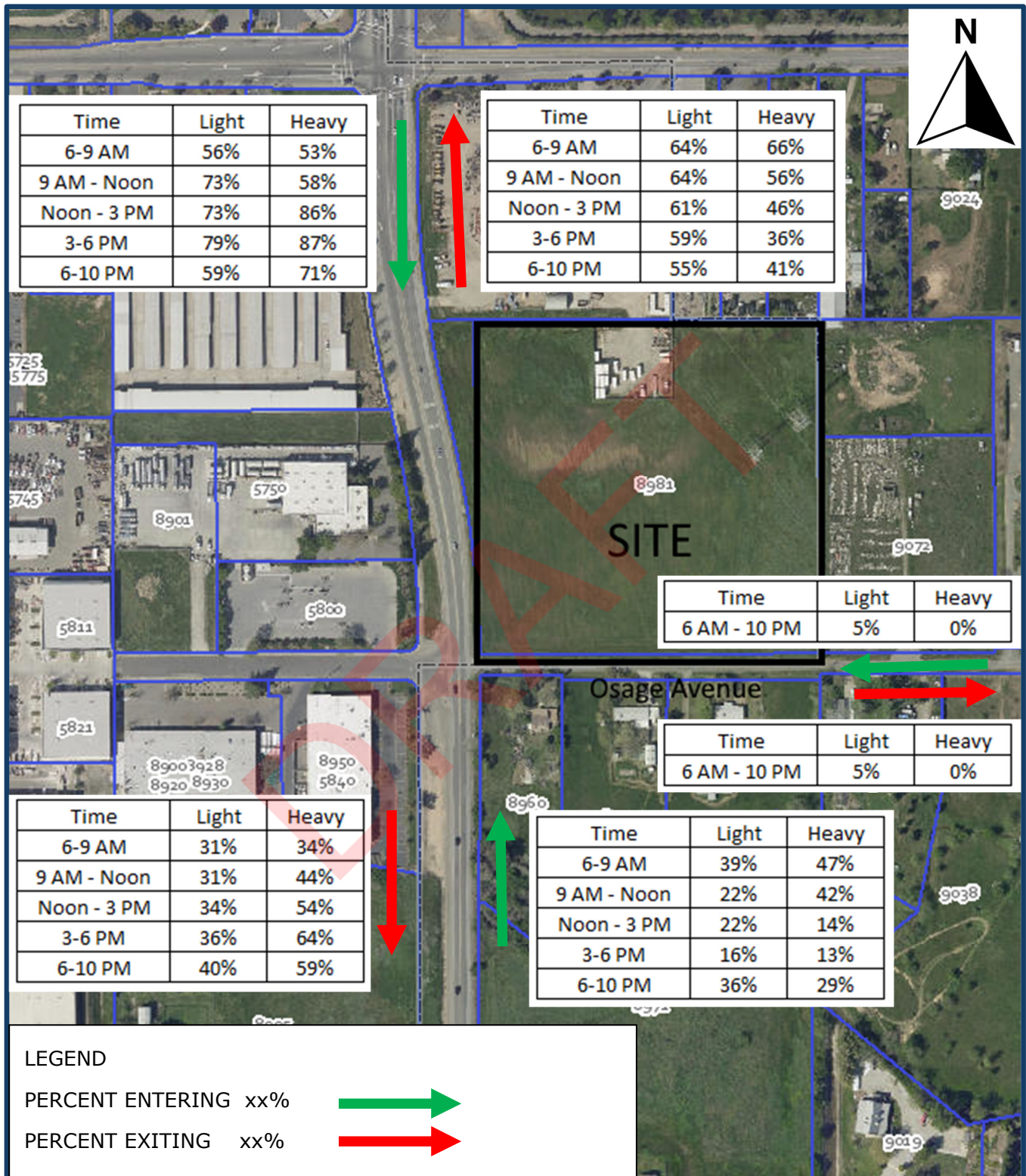
The traffic counts collected at the adjacent intersection segregated motorized vehicles by type – light, articulated trucks, and medium. For trip distribution purposes, light vehicles (typically automobiles and single-unit, 4-wheel trucks) were separated from “heavy” vehicles (articulated trucks and medium vehicles).

The west leg of the intersection of Osage Avenue and South Watt Avenue is a dead-end street, providing access to industrial and commercial uses. Intersection turning movements into and out of this leg of Osage Avenue provided information on distribution patterns.

Regarding trips on Osage Avenue east of South Watt Avenue, the current travel patterns show that fewer than three percent of trips associated with the uses west of South Watt Avenue use this roadway. For trip distribution purposes of the proposed warehouse at 8981 Osage Avenue, it was assumed that 5 percent of light vehicle trips would use Osage Avenue east of the warehouse, and that heavy vehicle traffic to and from the warehouse would be prohibited from using the roadway due to the current condition of the roadway. Osage Avenue east of South Watt Avenue is typically less than 20 feet wide, and the pavement is in poor condition.

Figure 1 illustrates the resultant trip distribution by time of day for light and heavy vehicles.

FIGURE 1: ESTIMATED TRIP DISTRIBUTION





APPENDIX

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Land Use: 110

General Light Industrial

Description

A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment. Industrial park (Land Use 130) and manufacturing (Land Use 140) are related uses.

Additional Data

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

The sites were surveyed in the 1980s, the 2000s, and the 2010s in Colorado, Connecticut, Indiana, New Jersey, New York, Oregon, Pennsylvania, and Texas.

Source Numbers

106, 157, 174, 177, 179, 184, 191, 251, 253, 286, 300, 611, 874, 875, 912

General Light Industrial (110)

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

Setting/Location: General Urban/Suburban

Number of Studies: 37

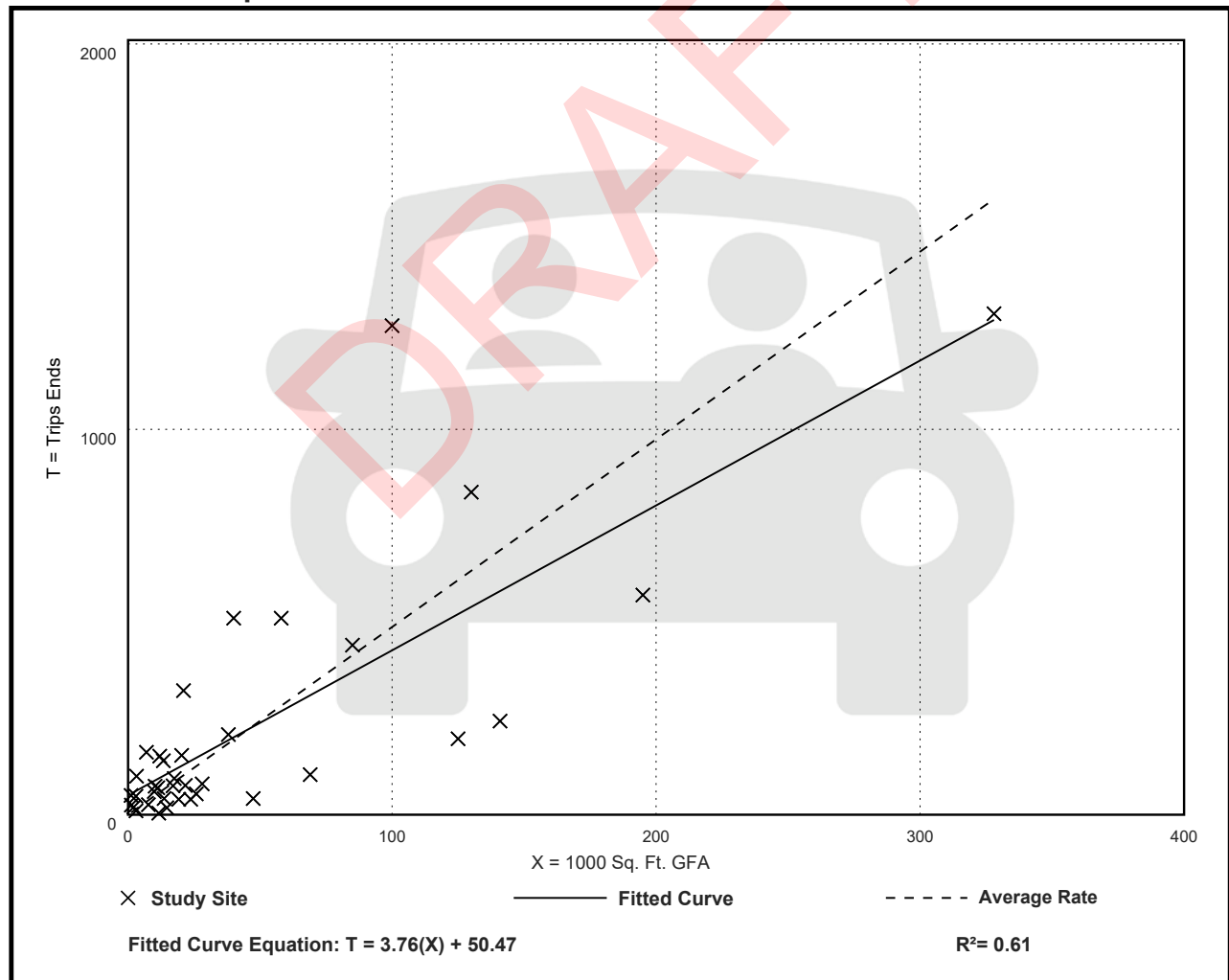
Avg. 1000 Sq. Ft. GFA: 45

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.87	0.34 - 43.86	4.08

Data Plot and Equation



General Light Industrial (110)

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: 41

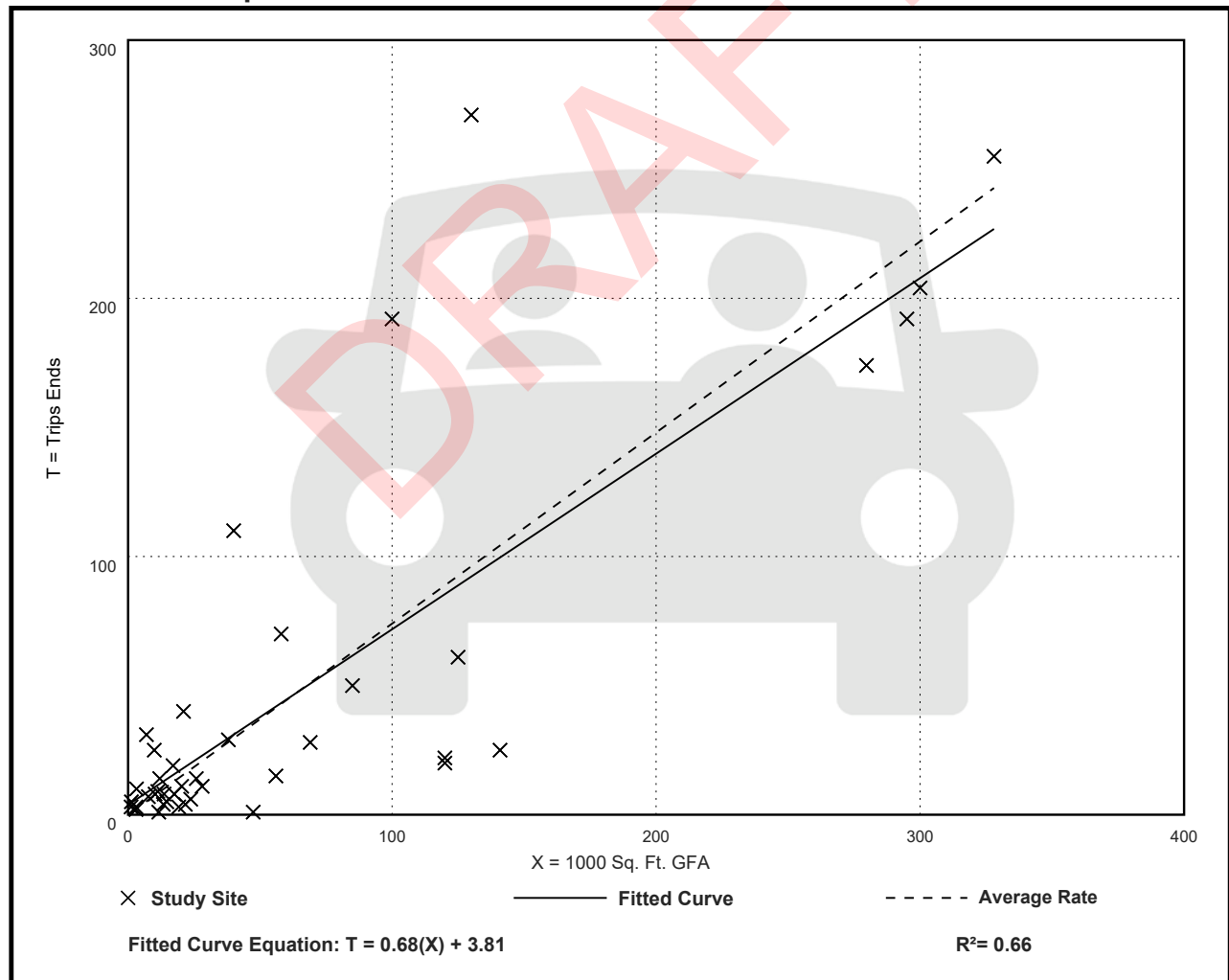
Avg. 1000 Sq. Ft. GFA: 65

Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.02 - 4.46	0.61

Data Plot and Equation



General Light Industrial (110)

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.**

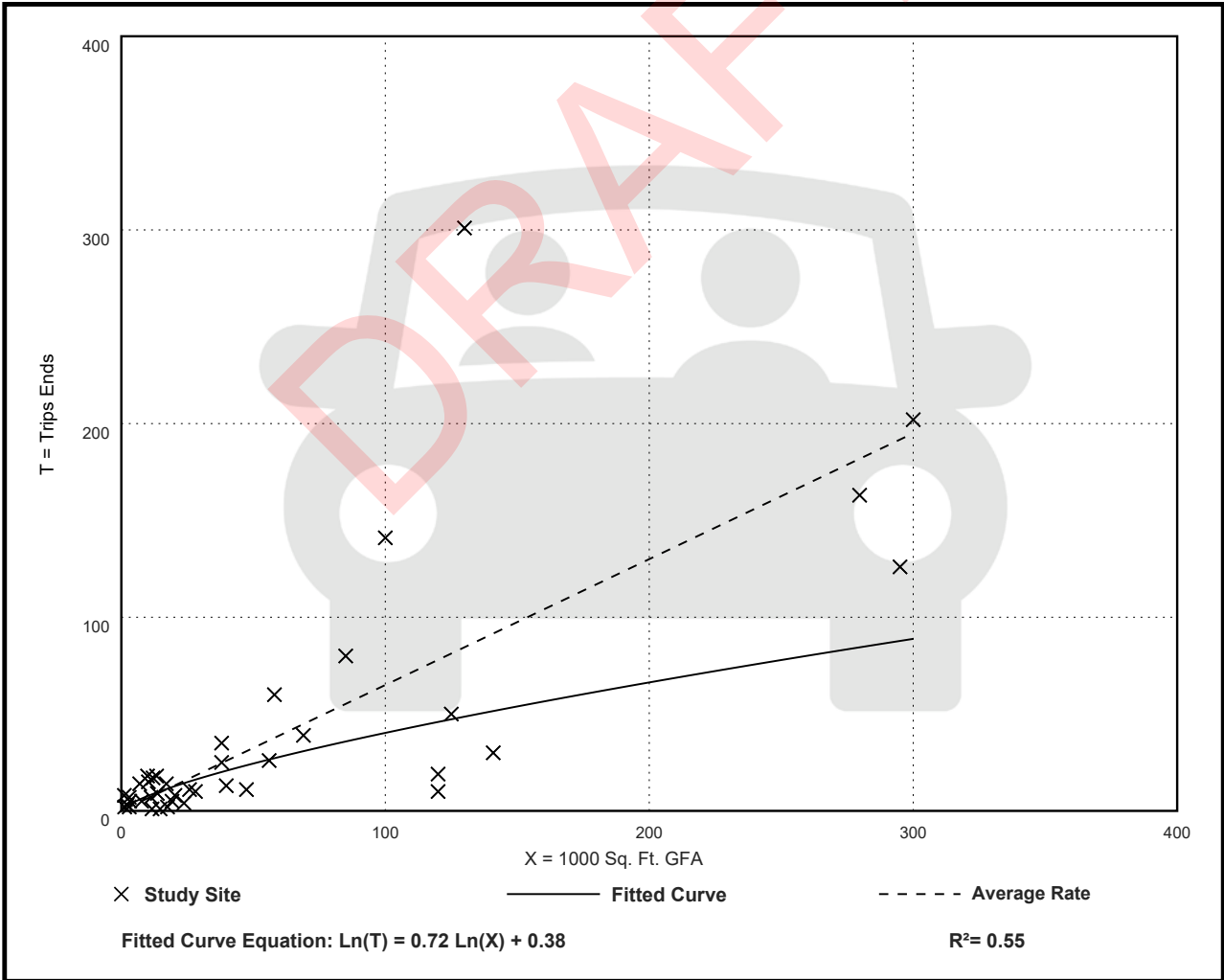
Setting/Location: General Urban/Suburban

Number of Studies: 40
Avg. 1000 Sq. Ft. GFA: 58
Directional Distribution: 14% entering, 86% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.65	0.07 - 7.02	0.56

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
AM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 40

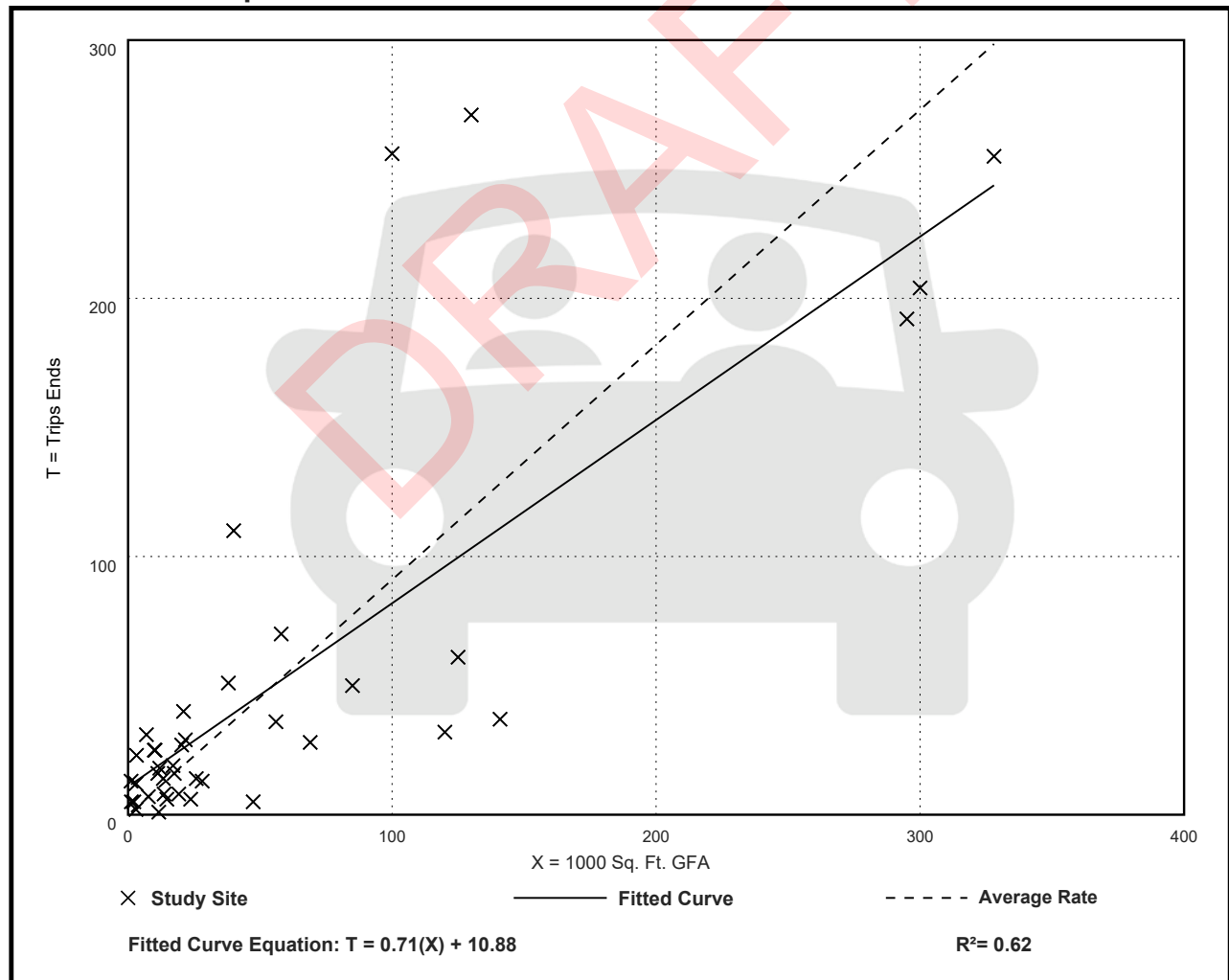
Avg. 1000 Sq. Ft. GFA: 56

Directional Distribution: 87% entering, 13% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.91	0.09 - 11.40	0.78

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
PM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 41

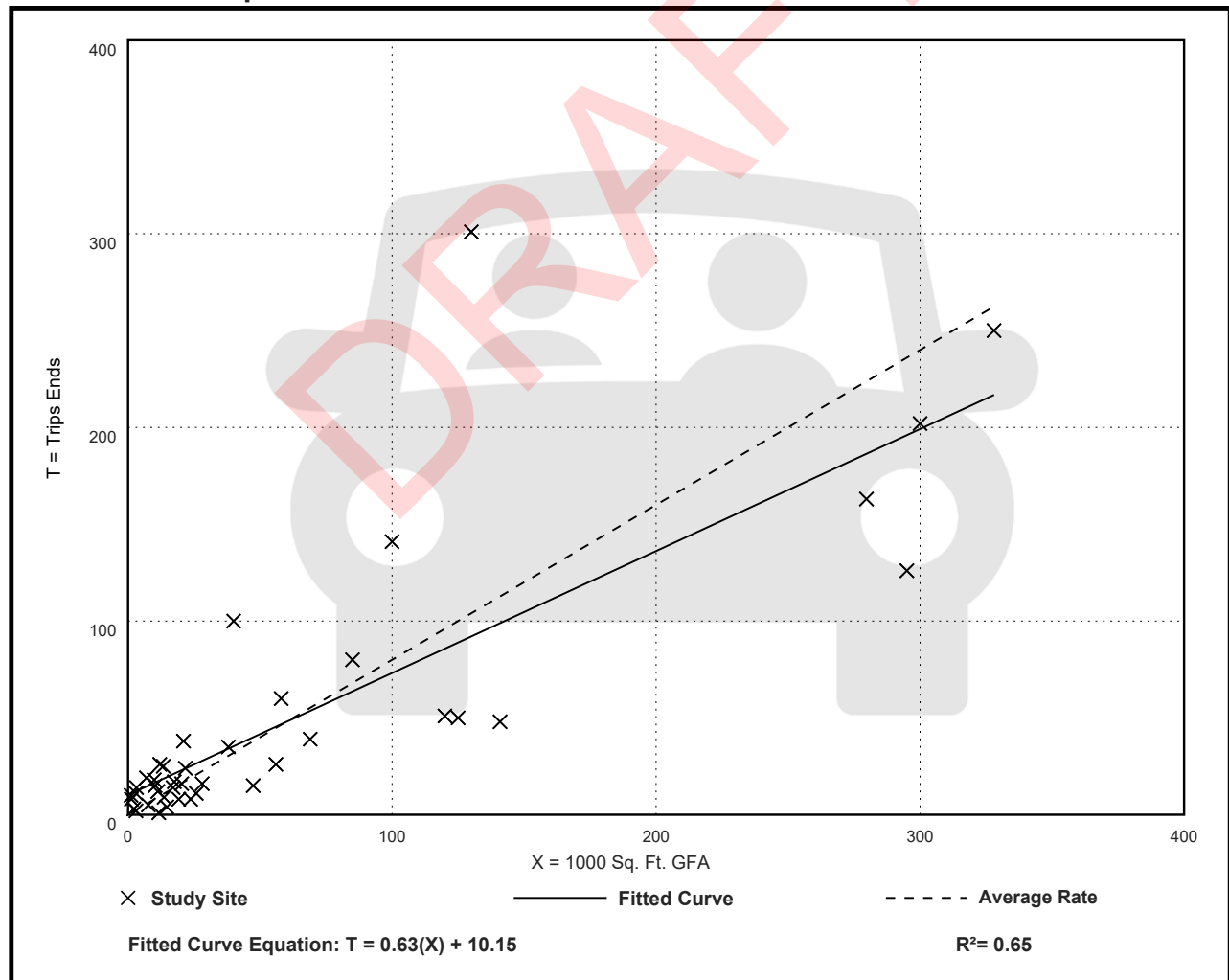
Avg. 1000 Sq. Ft. GFA: 62

Directional Distribution: 18% entering, 82% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.80	0.09 - 8.77	0.61

Data Plot and Equation



General Light Industrial (110)

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

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. 1000 Sq. Ft. GFA: 58

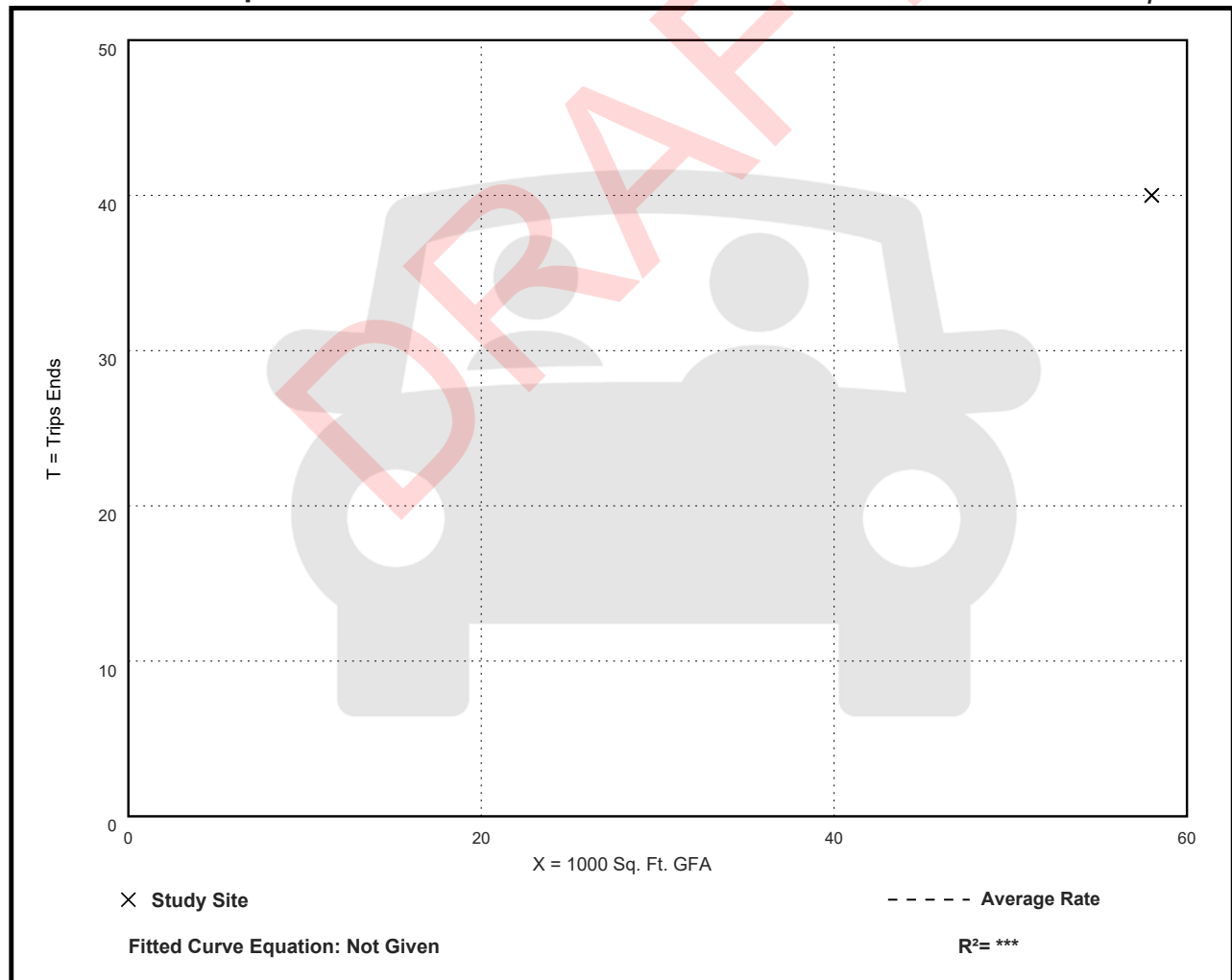
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.69	0.69 - 0.69	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

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

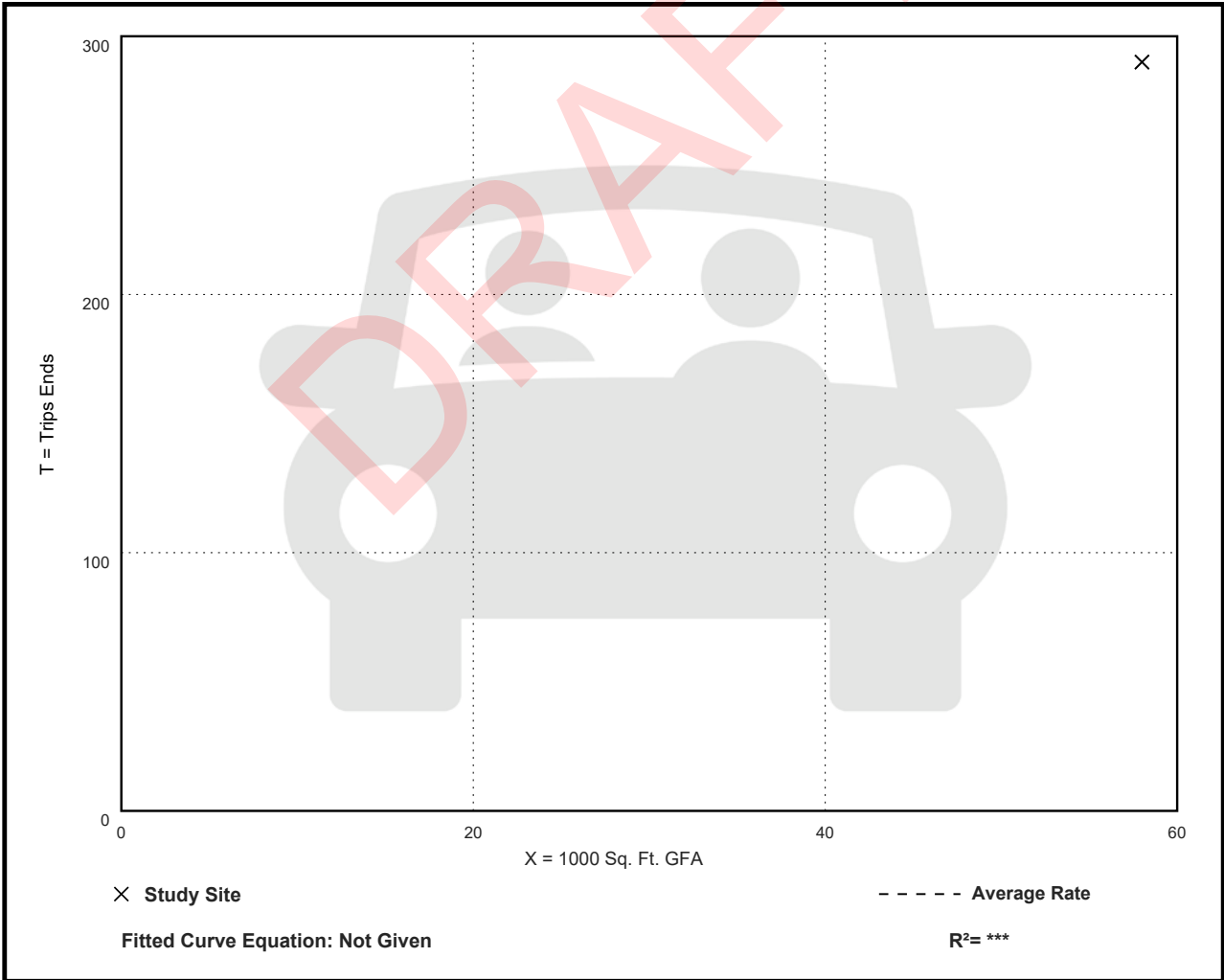
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. 1000 Sq. Ft. GFA: 58
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
5.00	5.00 - 5.00	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. 1000 Sq. Ft. GFA: 58

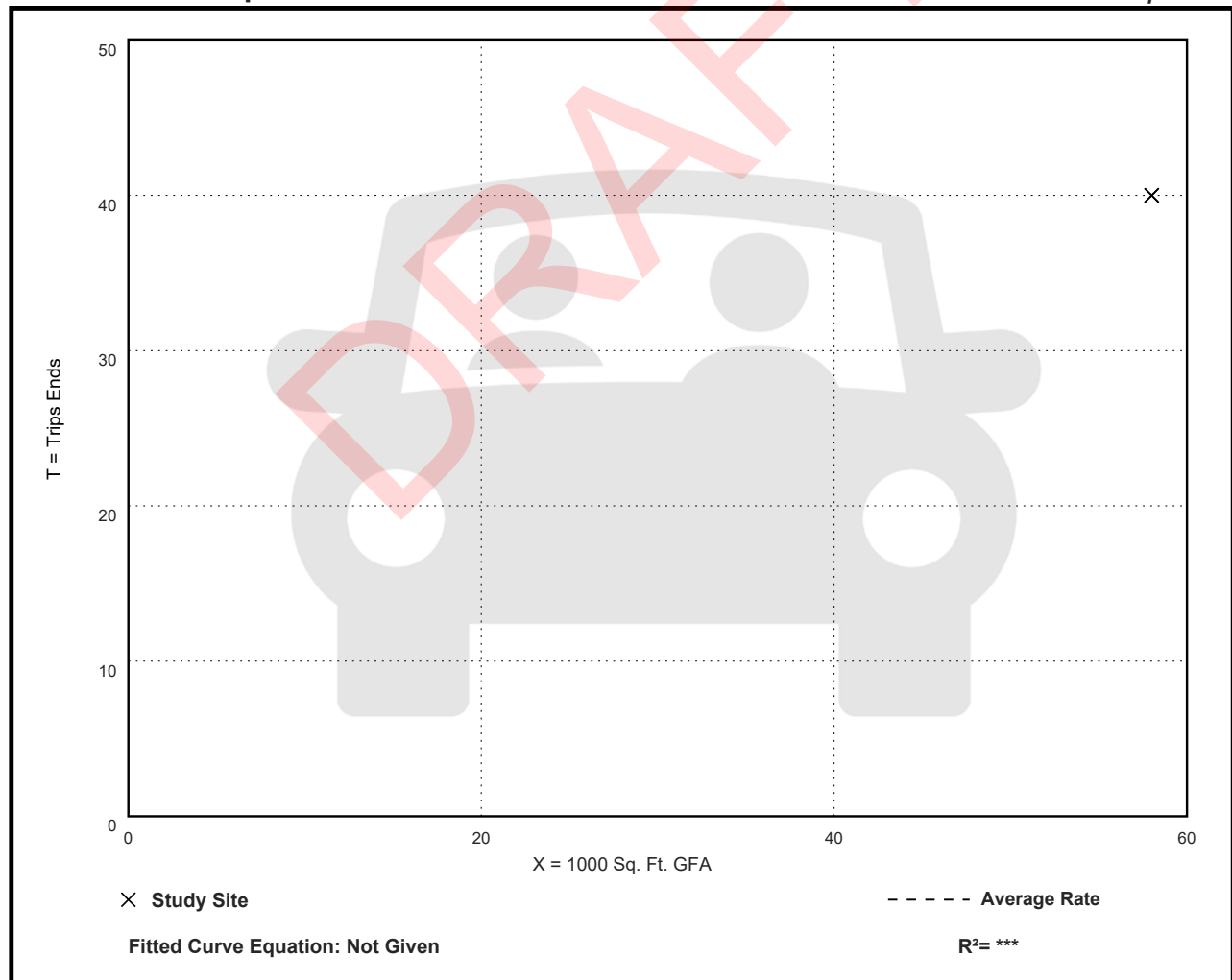
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.69	0.69 - 0.69	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

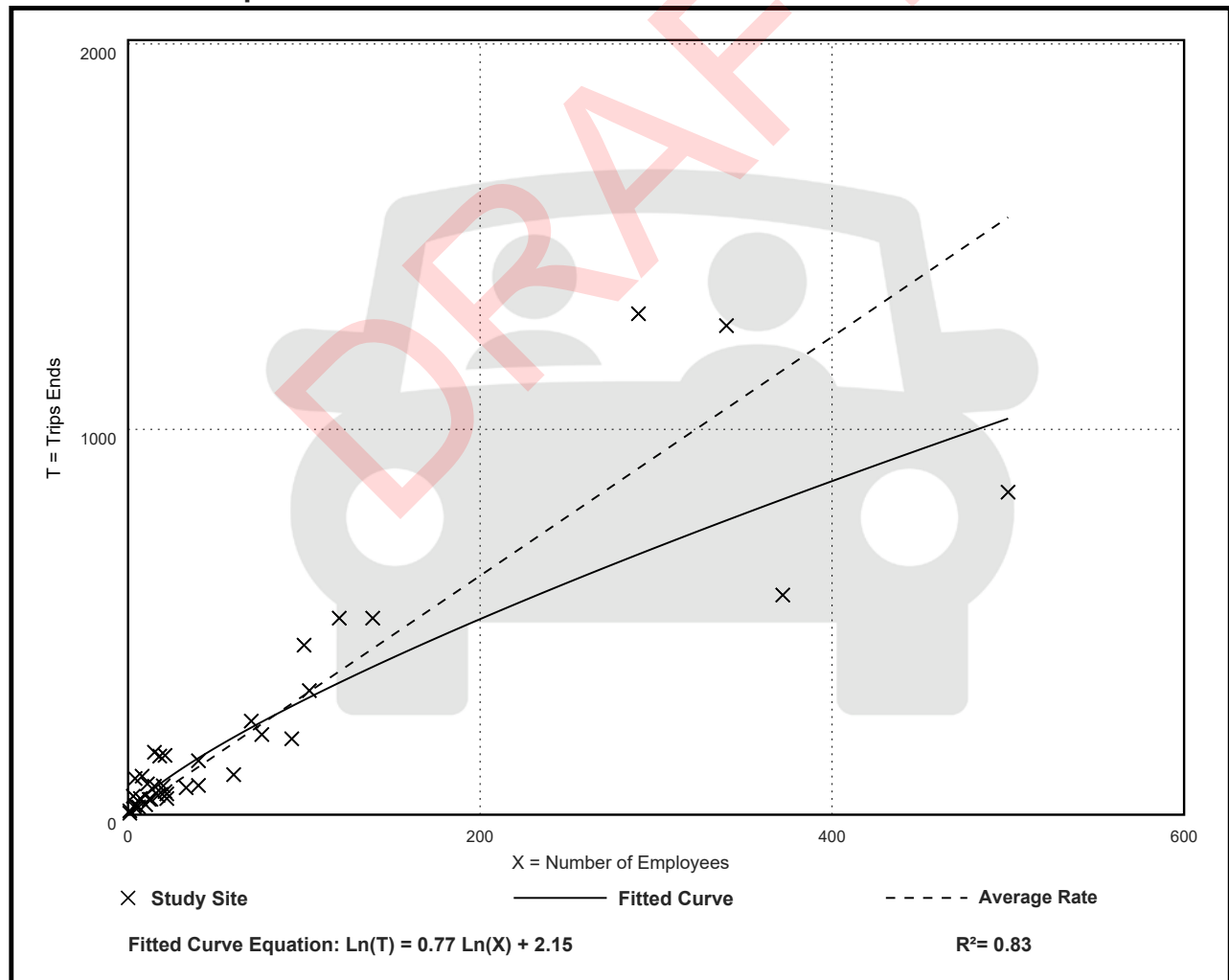
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 37
Avg. Num. of Employees: 71
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
3.10	1.53 - 23.50	1.81

Data Plot and Equation



General Light Industrial (110)

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: 41

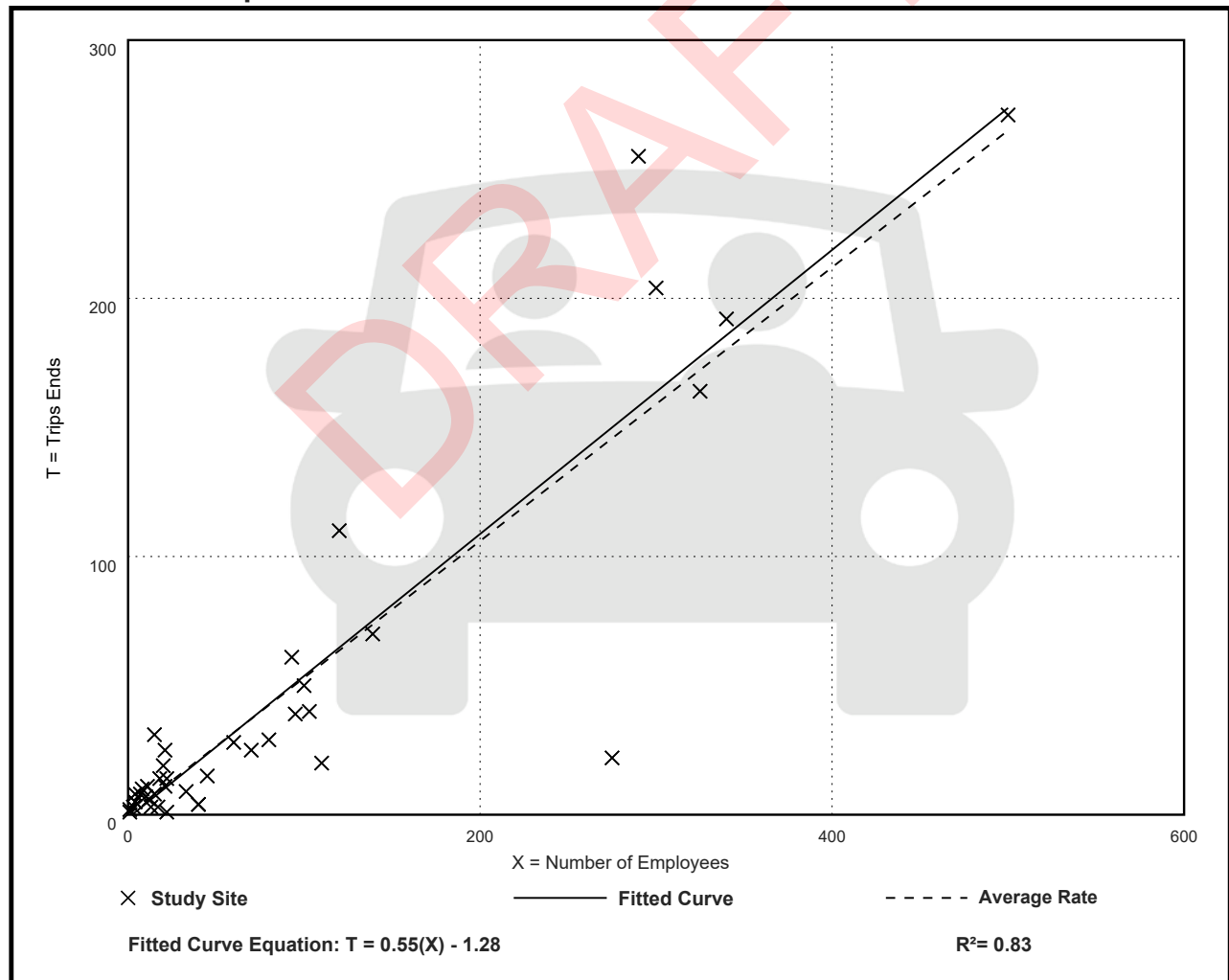
Avg. Num. of Employees: 83

Directional Distribution: 83% entering, 17% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.53	0.05 - 2.07	0.27

Data Plot and Equation



General Light Industrial (110)

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: 39

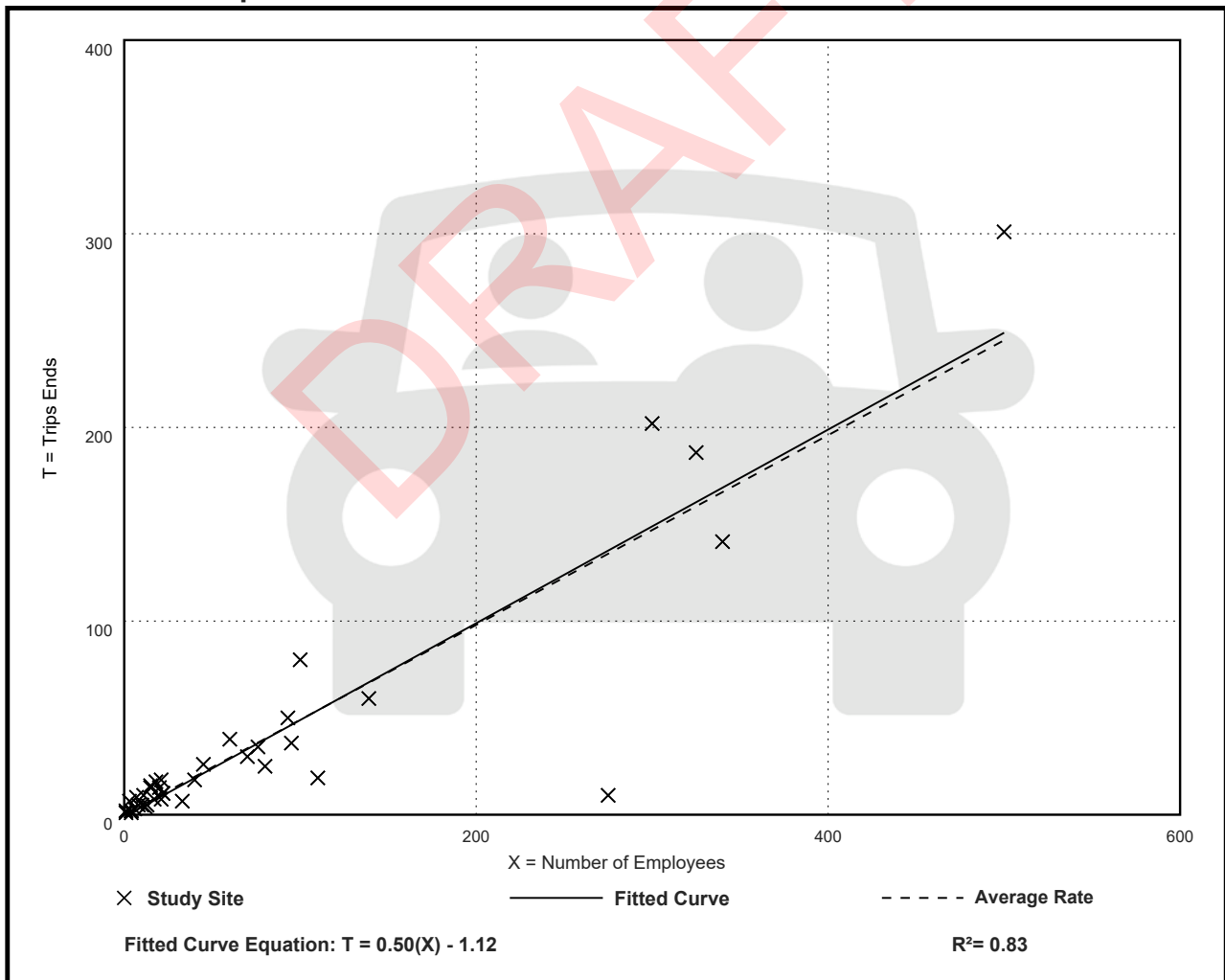
Avg. Num. of Employees: 75

Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.49	0.04 - 2.33	0.22

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: Employees

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 41

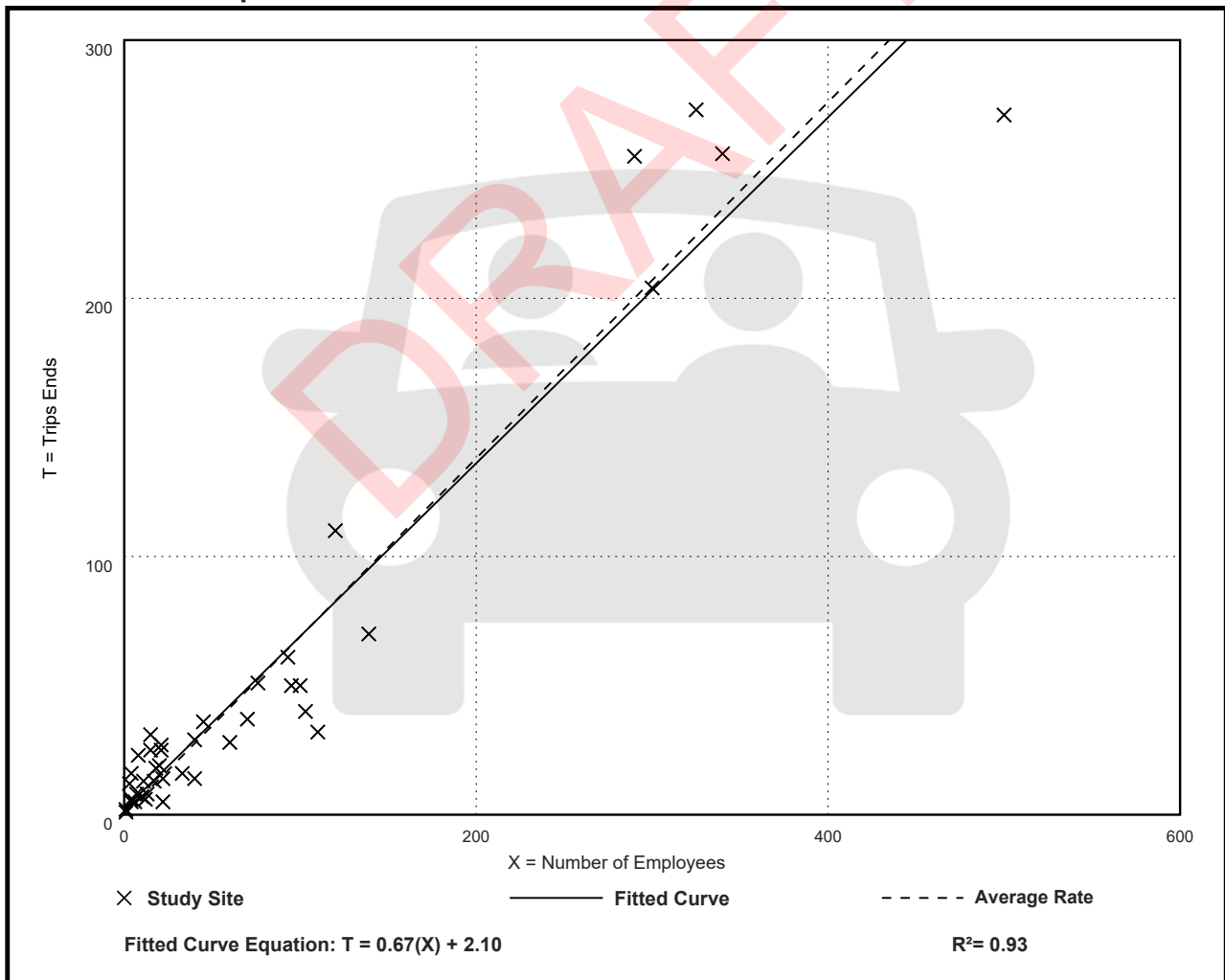
Avg. Num. of Employees: 76

Directional Distribution: 85% entering, 15% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.69	0.23 - 4.00	0.30

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: Employees

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 41

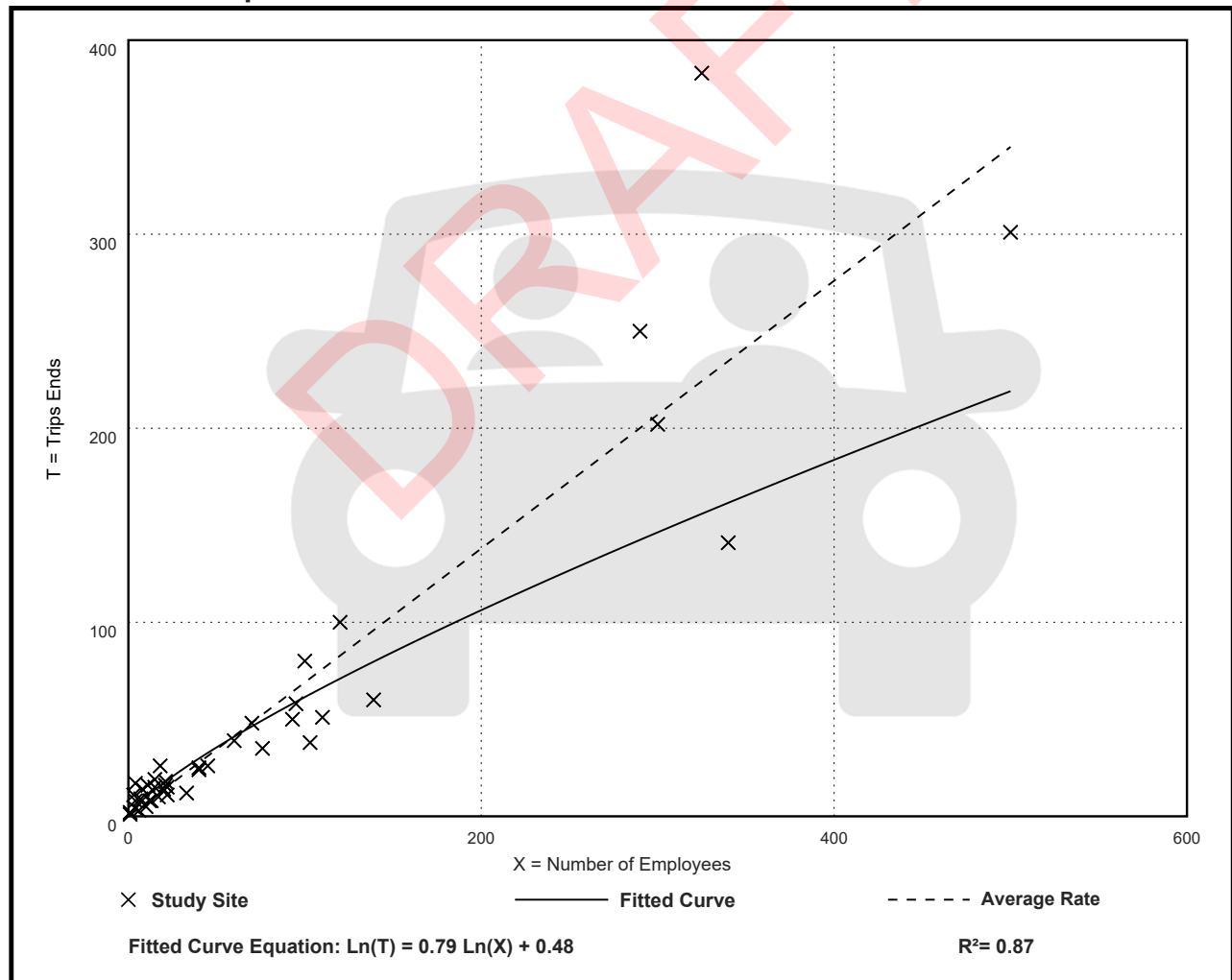
Avg. Num. of Employees: 76

Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.69	0.36 - 4.25	0.30

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: Employees
On a: Saturday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Employees: 139

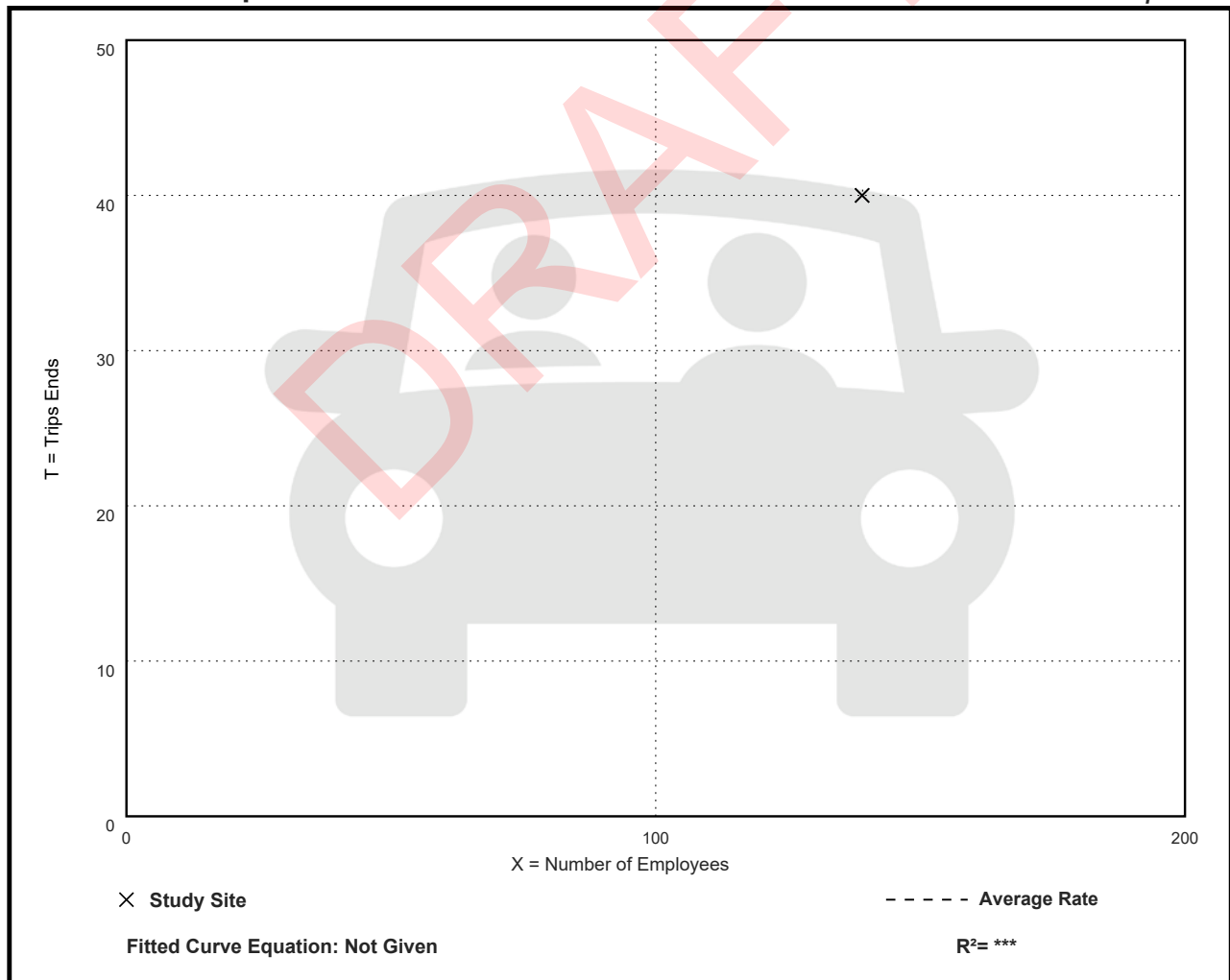
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.29	0.29 - 0.29	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

Vehicle Trip Ends vs: Employees
On a: Sunday

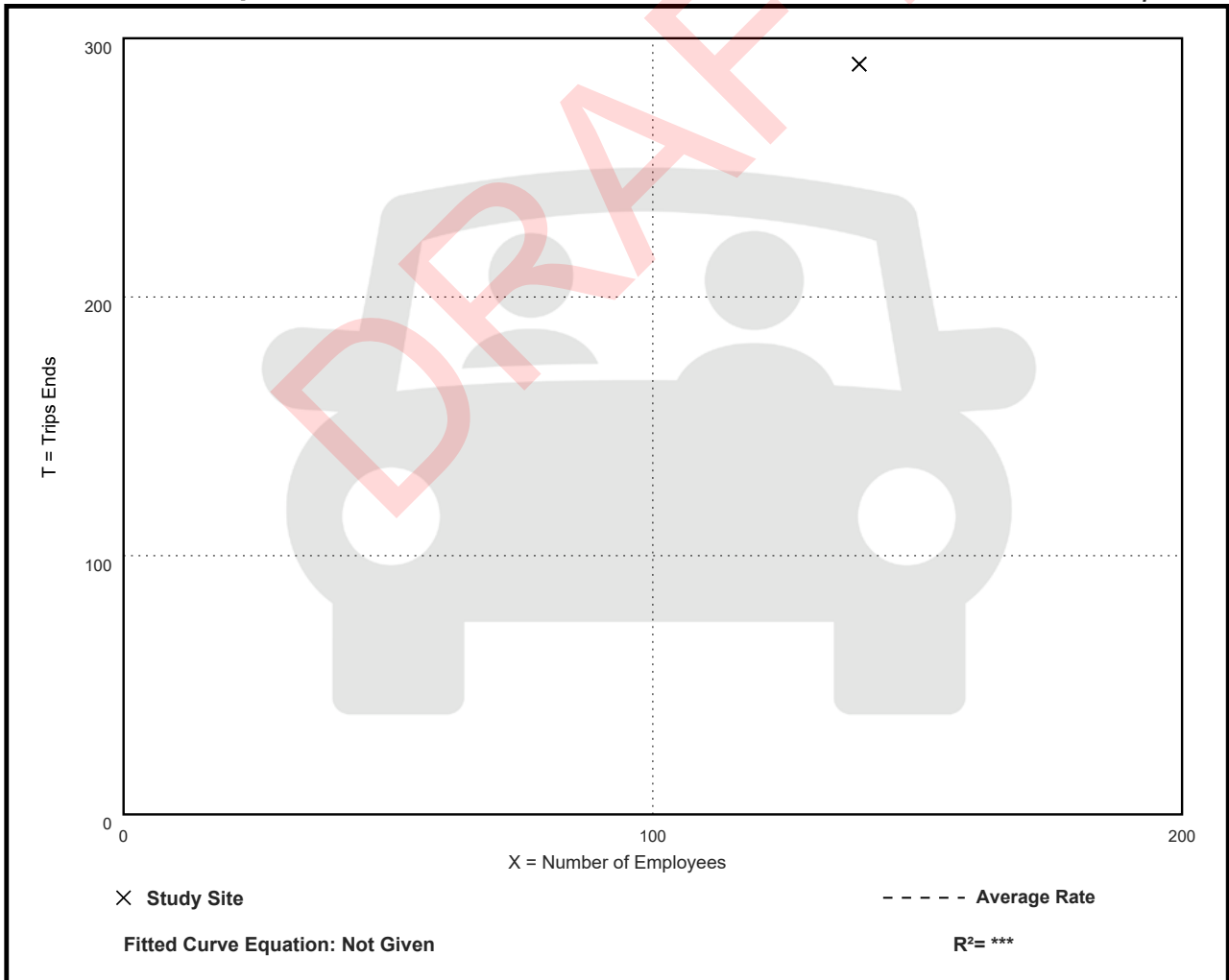
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Employees: 139
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.09	2.09 - 2.09	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

Vehicle Trip Ends vs: Employees

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Employees: 139

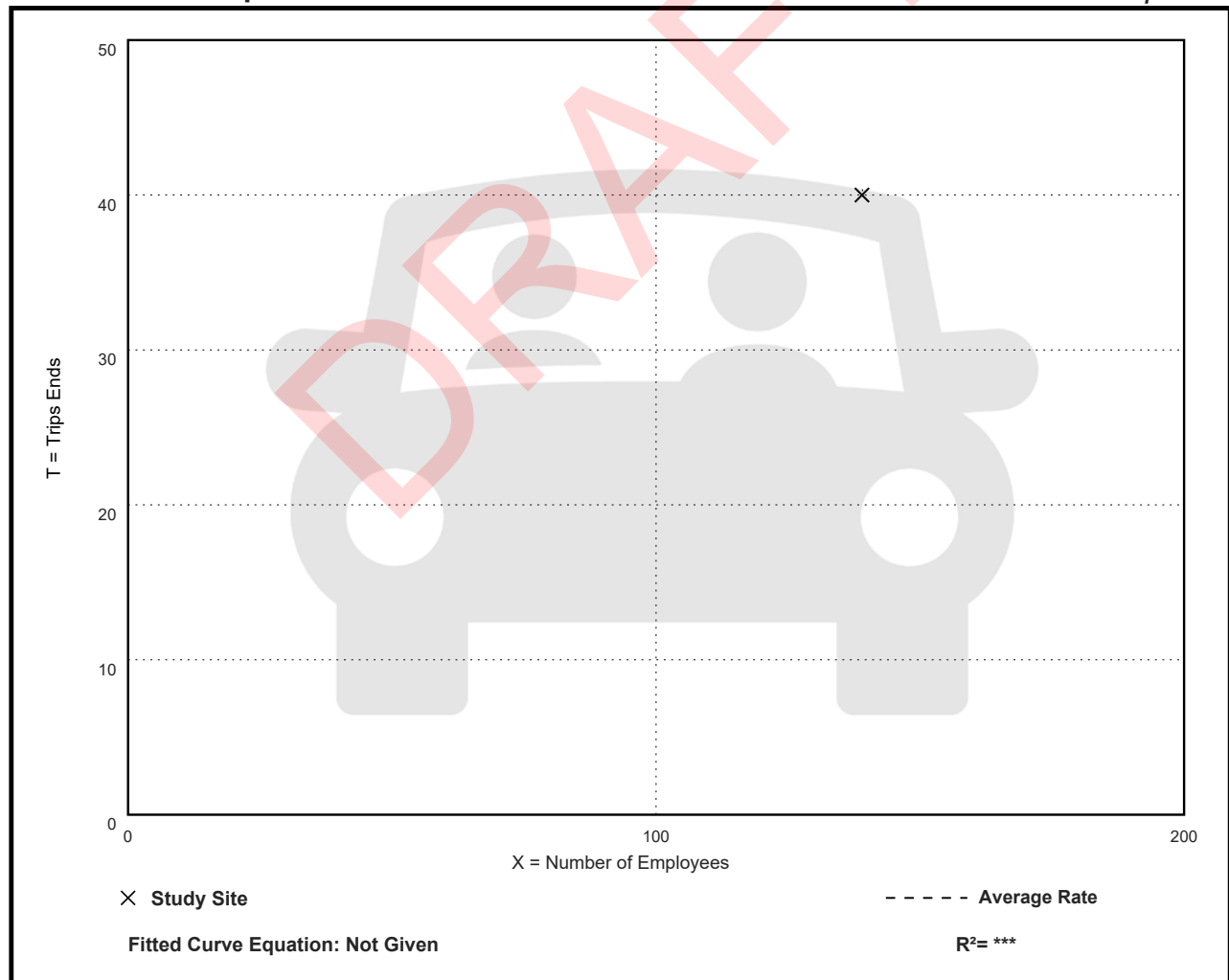
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.29	0.29 - 0.29	***

Data Plot and Equation

Caution – Small Sample Size



General Light Industrial (110)

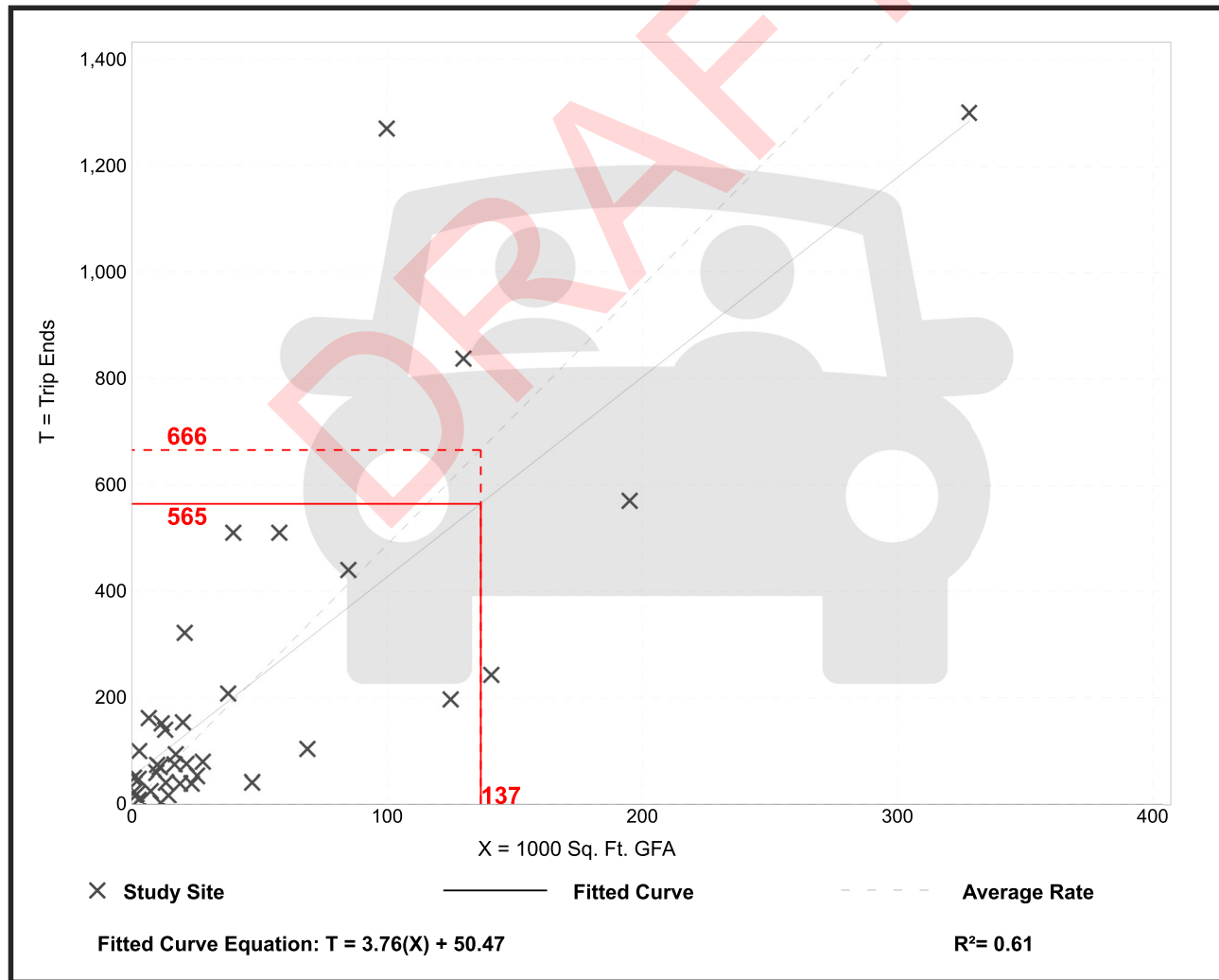
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 37
Avg. 1000 Sq. Ft. GFA: 45
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.87	0.34 - 43.86	4.08

Data Plot and Equation



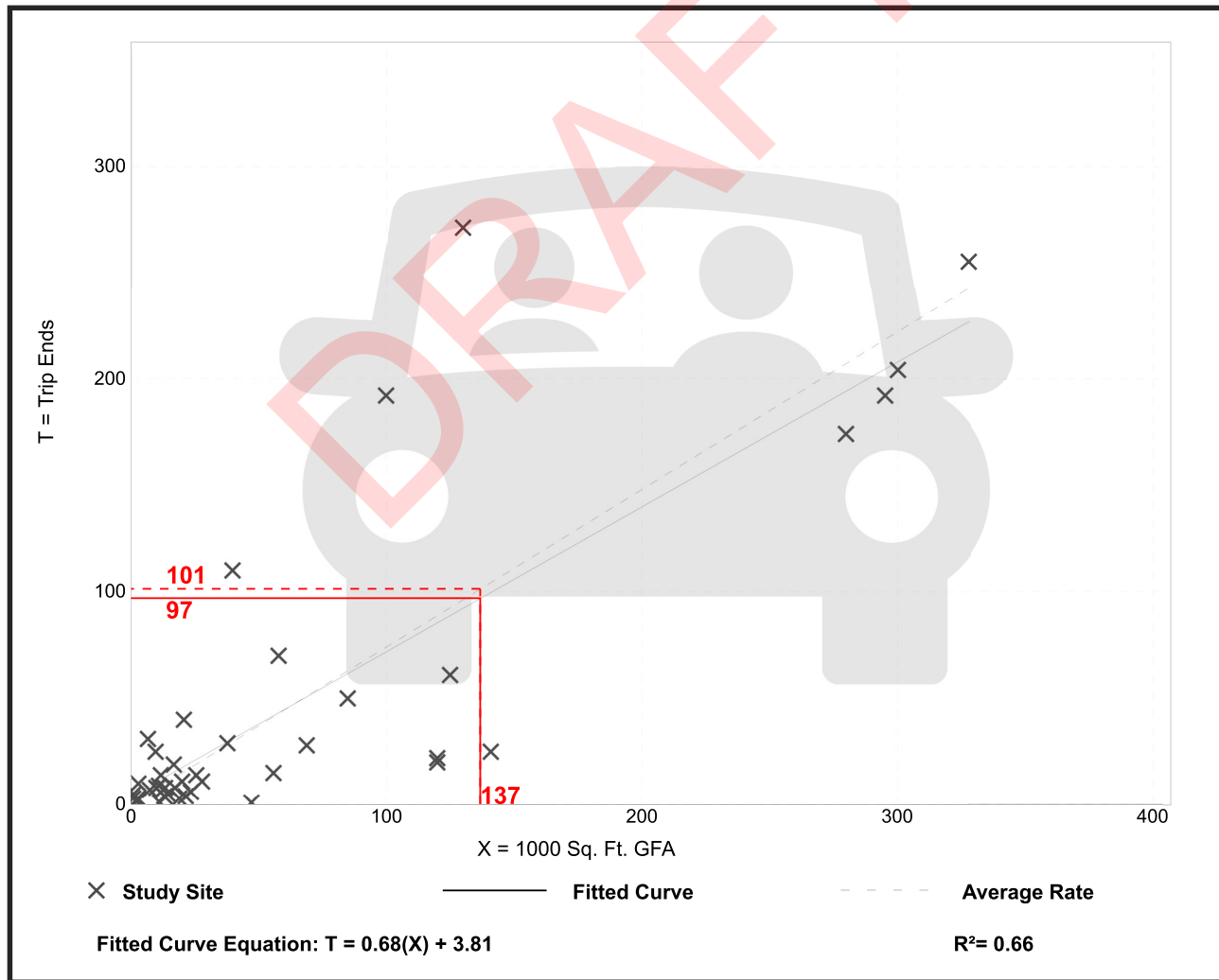
General Light Industrial (110)

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: 41
 Avg. 1000 Sq. Ft. GFA: 65
 Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.02 - 4.46	0.61

Data Plot and Equation



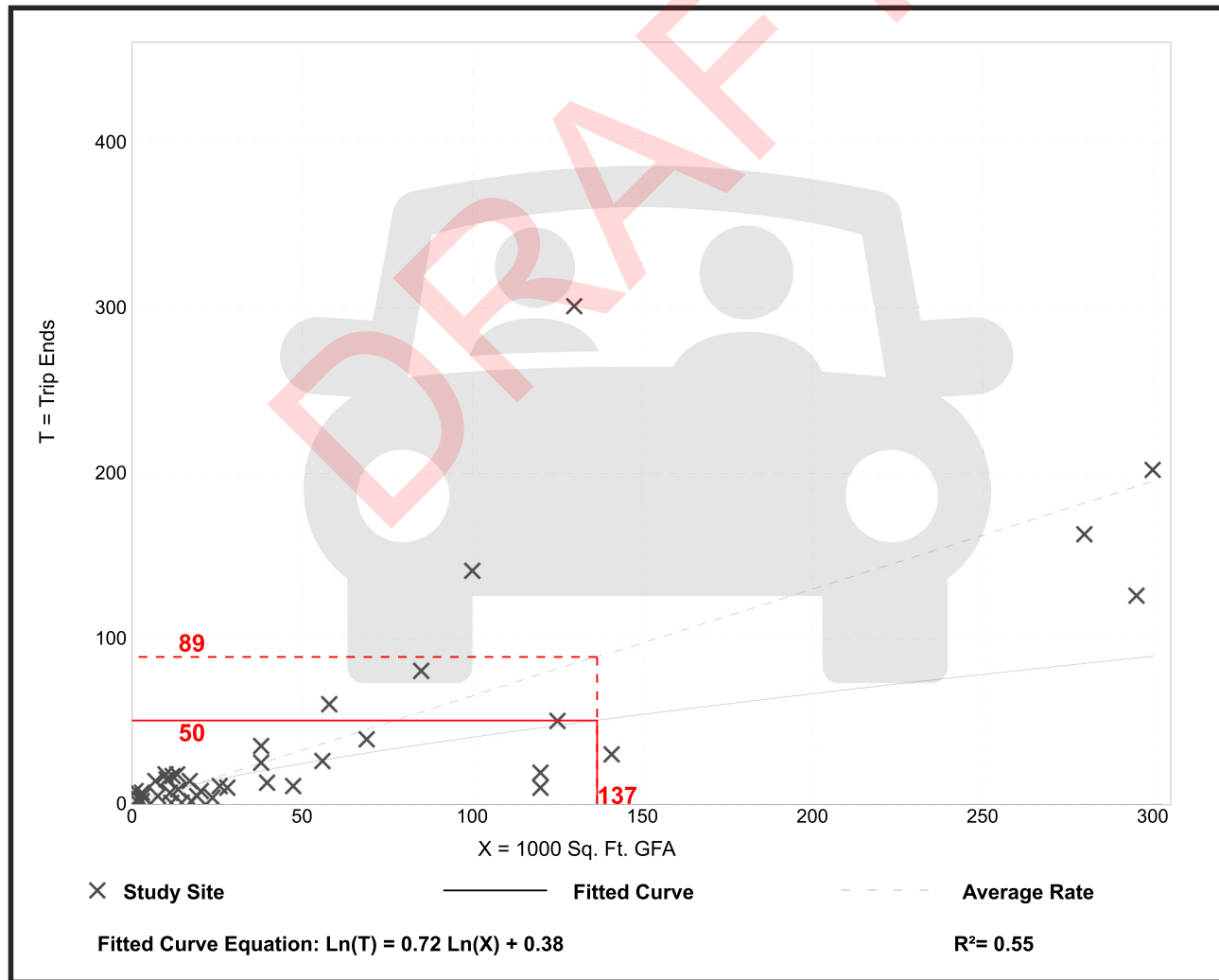
General Light Industrial (110)

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: 40
 Avg. 1000 Sq. Ft. GFA: 58
 Directional Distribution: 14% entering, 86% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.65	0.07 - 7.02	0.56

Data Plot and Equation



General Light Industrial (110)

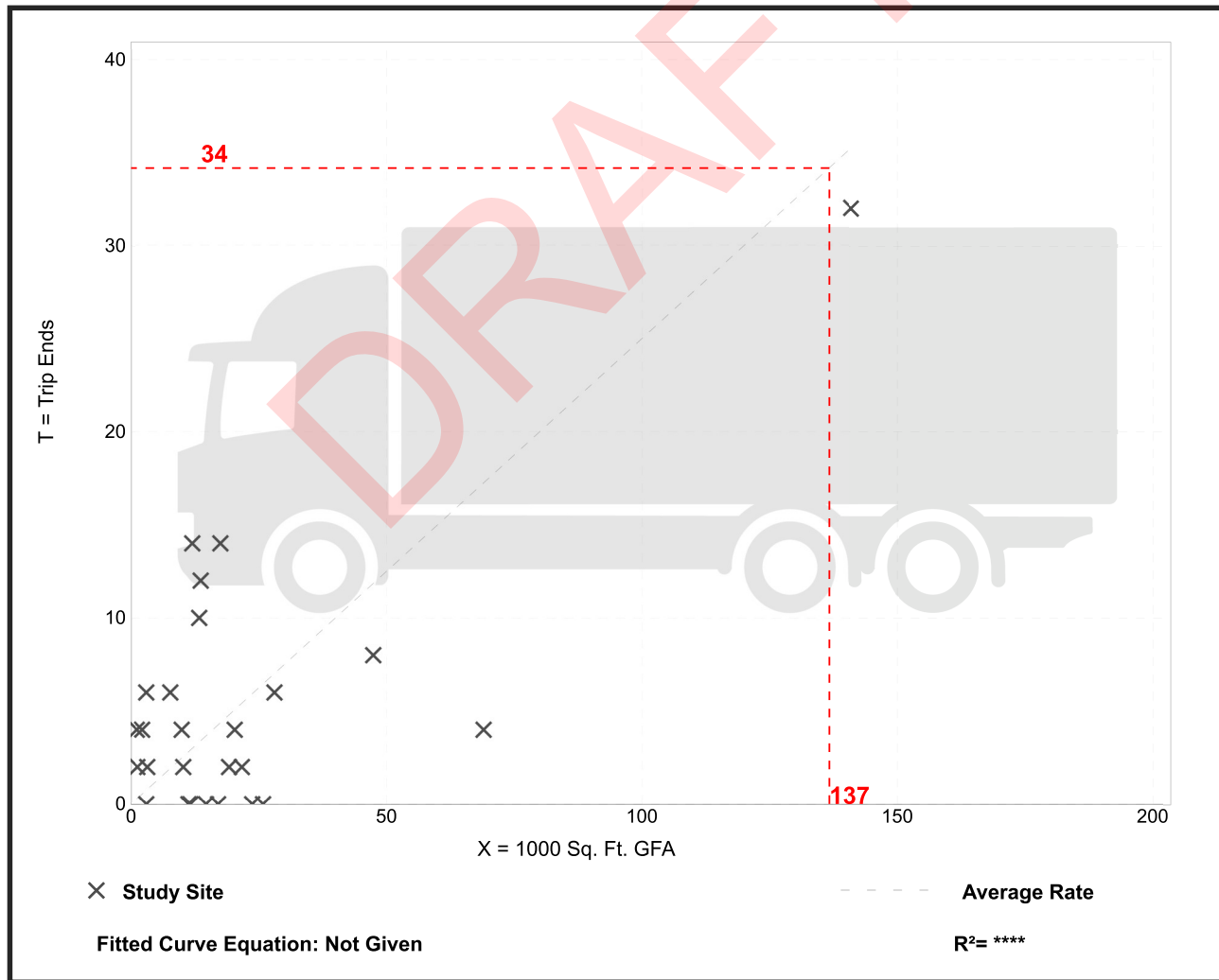
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 26
Avg. 1000 Sq. Ft. GFA: 21
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.25	0.00 - 3.51	0.36

Data Plot and Equation



General Light Industrial (110)

Truck 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: 25
 Avg. 1000 Sq. Ft. GFA: 22
 Directional Distribution: 60% entering, 40% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 1.59	0.08

Data Plot and Equation



General Light Industrial (110)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

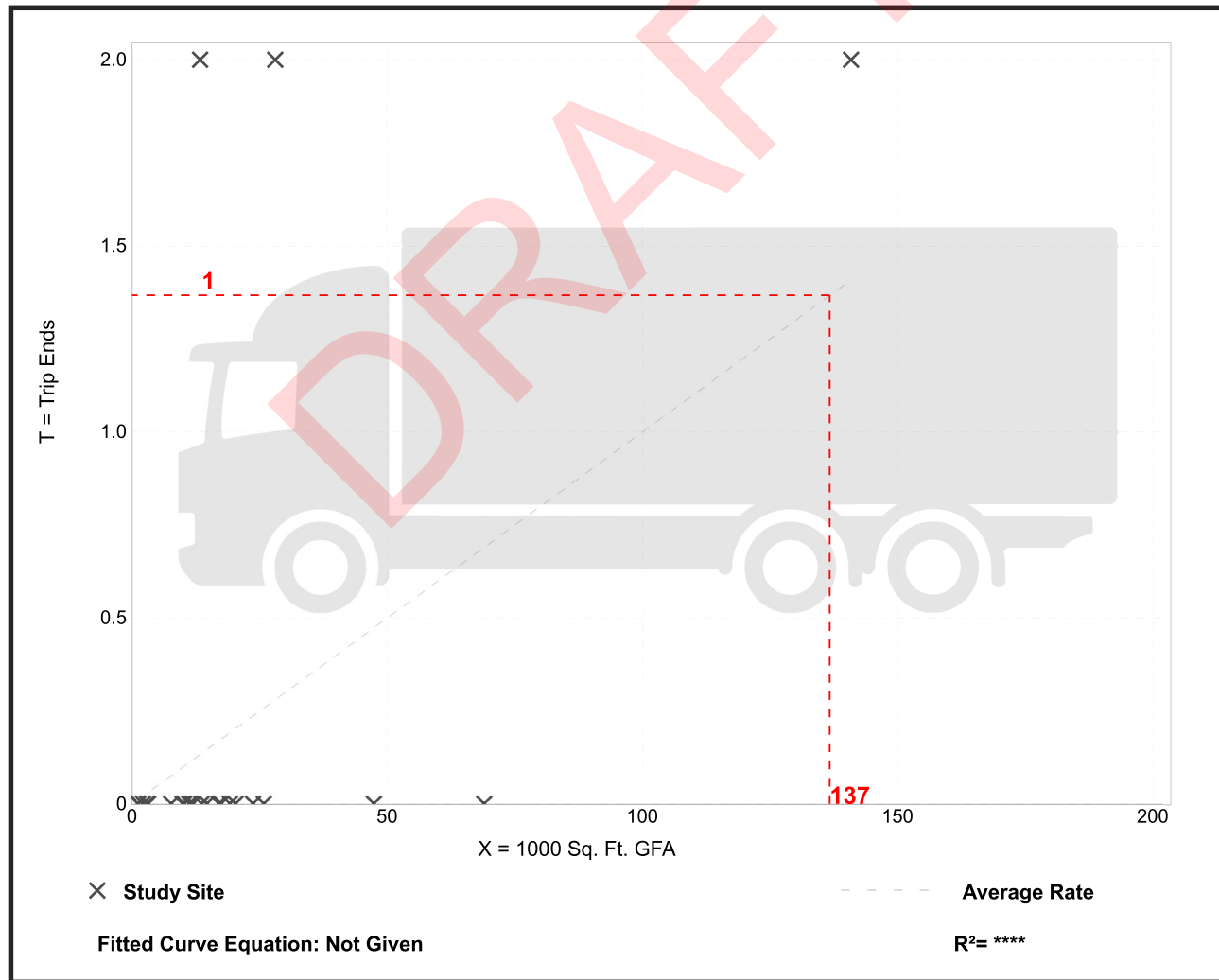
Setting/Location: General Urban/Suburban

Number of Studies: 25
 Avg. 1000 Sq. Ft. GFA: 21
 Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.15	0.03

Data Plot and Equation



Land Use: 130 Industrial Park

Description

An industrial park contains several individual industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities. Some parks in the database have a large number of small businesses and others have one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, 2010s, and the 2020s in California, Georgia, New Jersey, Massachusetts, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937, 1032, 1070

Industrial Park (130)

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

Setting/Location: General Urban/Suburban

Number of Studies: 27

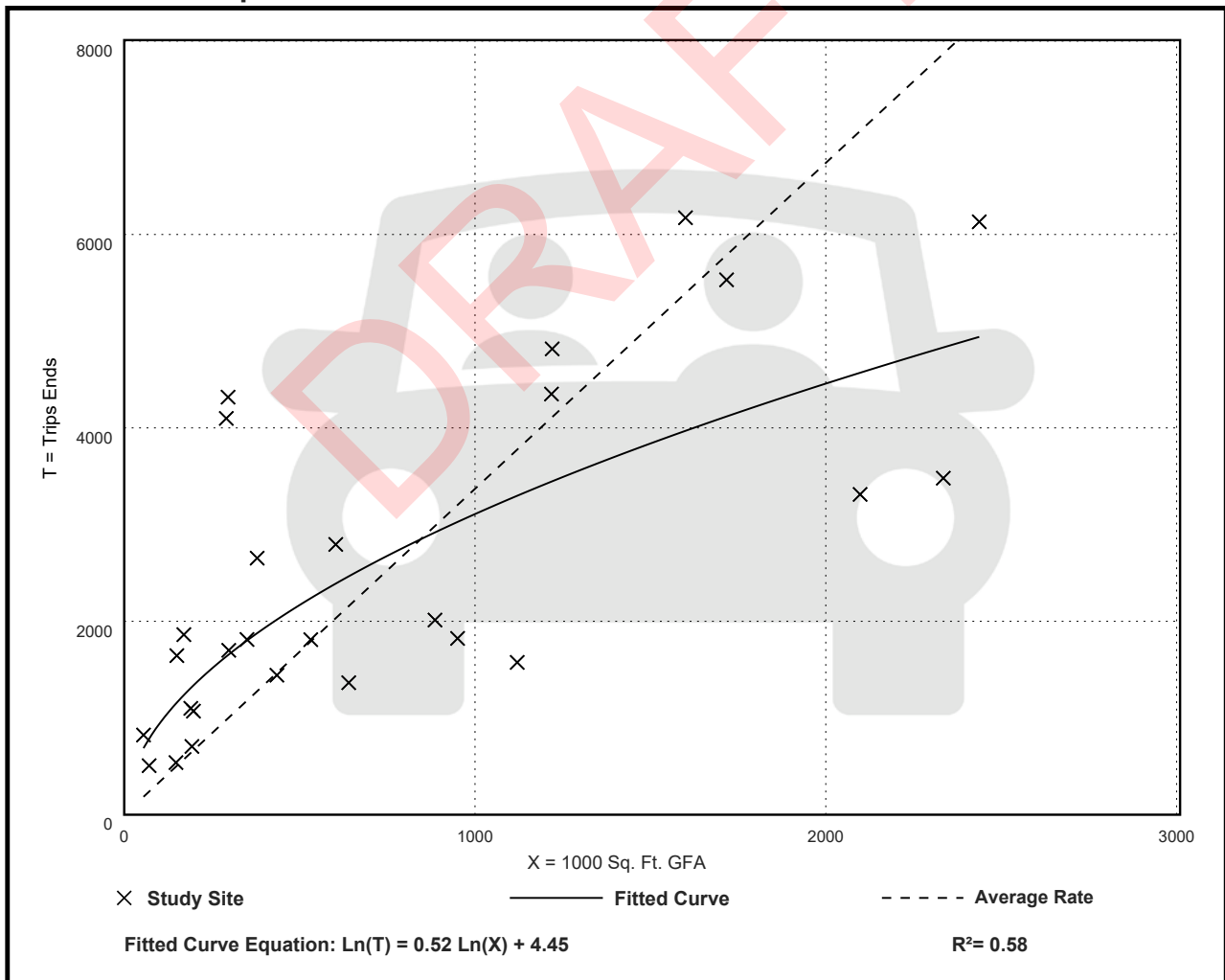
Avg. 1000 Sq. Ft. GFA: 762

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.37	1.41 - 14.98	2.60

Data Plot and Equation



Industrial Park (130)

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: 34

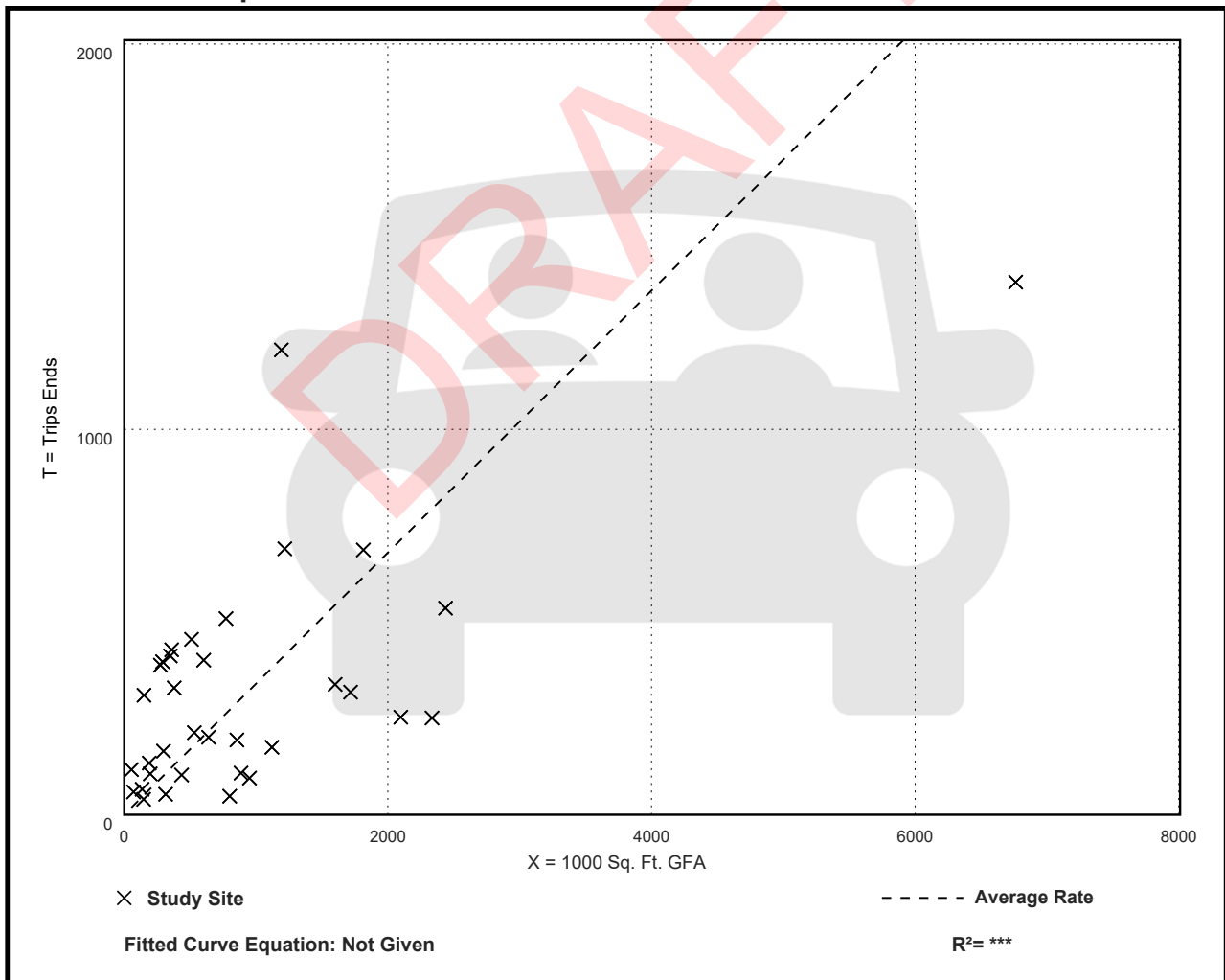
Avg. 1000 Sq. Ft. GFA: 956

Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



Industrial Park (130)

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: 35

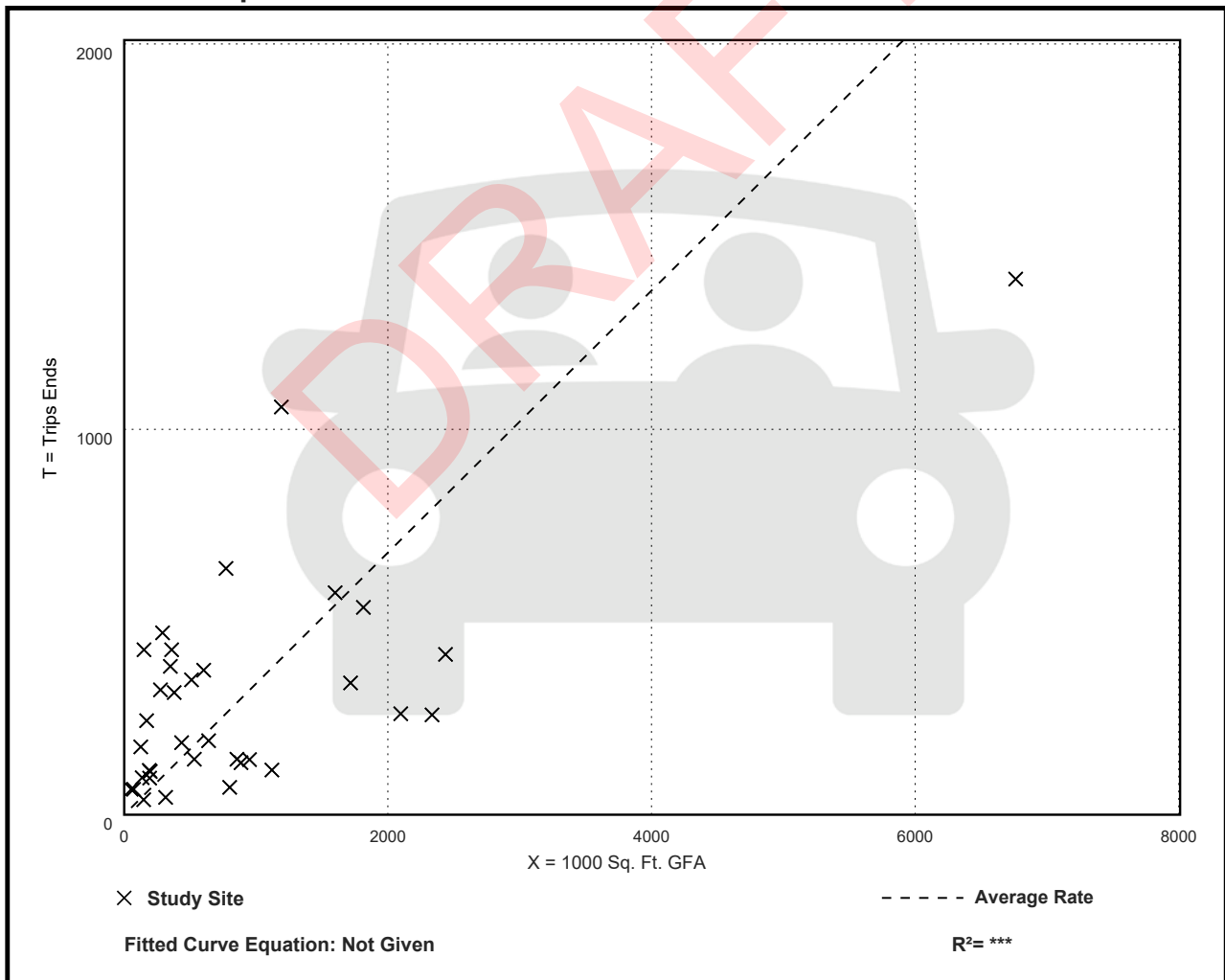
Avg. 1000 Sq. Ft. GFA: 899

Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
AM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 30

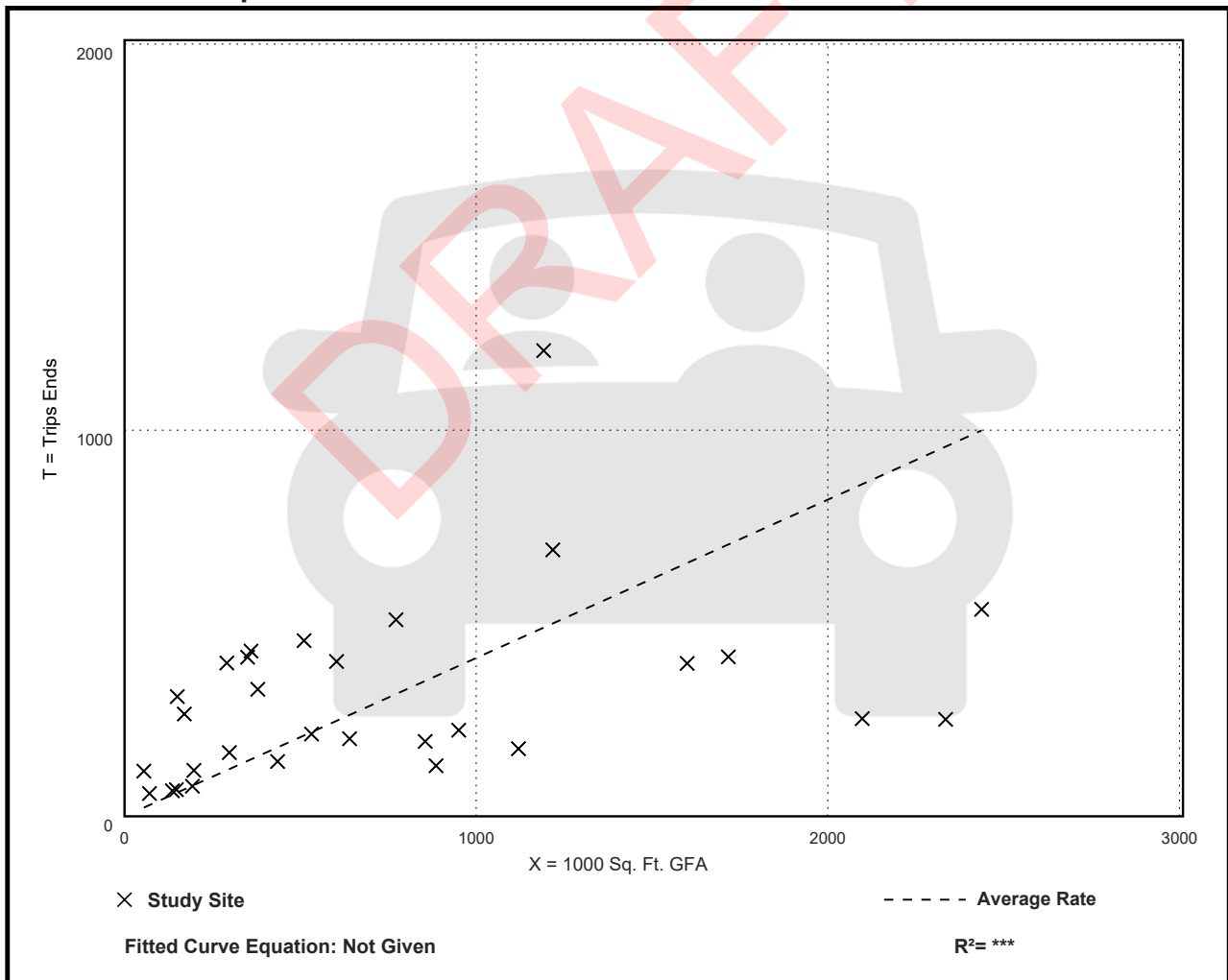
Avg. 1000 Sq. Ft. GFA: 757

Directional Distribution: 87% entering, 13% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.41	0.11 - 2.13	0.37

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
PM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 30

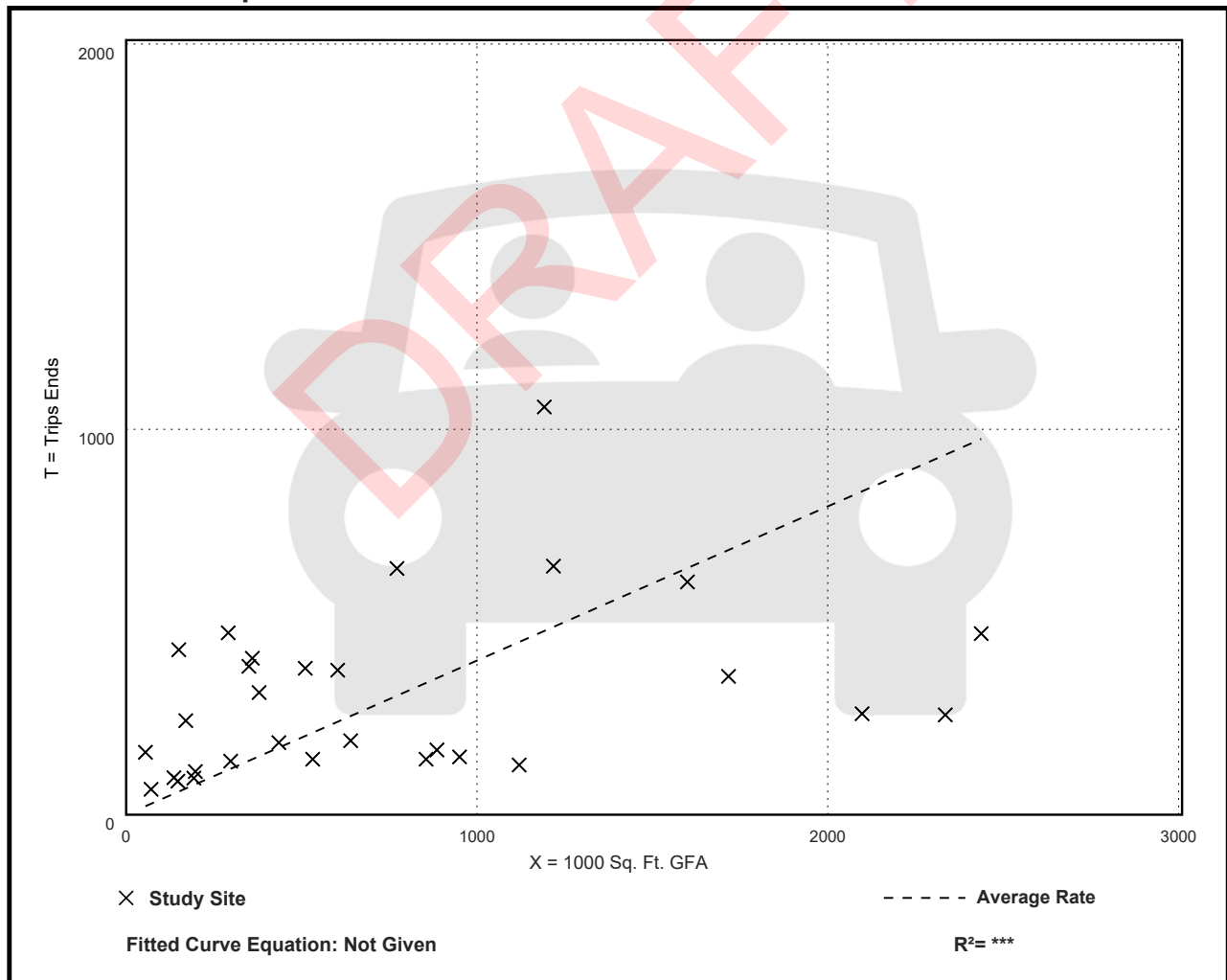
Avg. 1000 Sq. Ft. GFA: 757

Directional Distribution: 21% entering, 79% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.40	0.11 - 2.95	0.41

Data Plot and Equation



Industrial Park (130)

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

Setting/Location: General Urban/Suburban

Number of Studies: 5

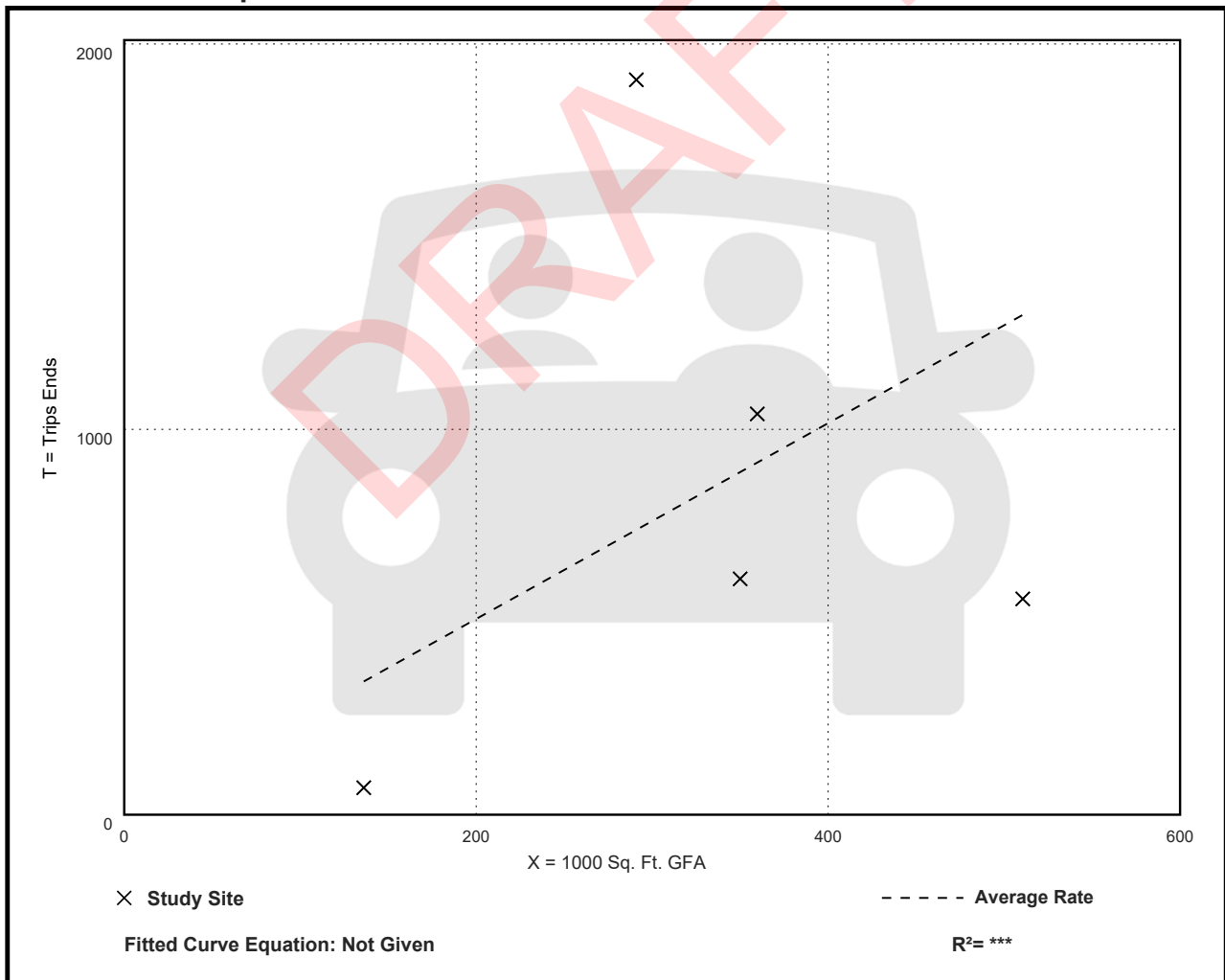
Avg. 1000 Sq. Ft. GFA: 329

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.54	0.51 - 6.55	2.23

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 321

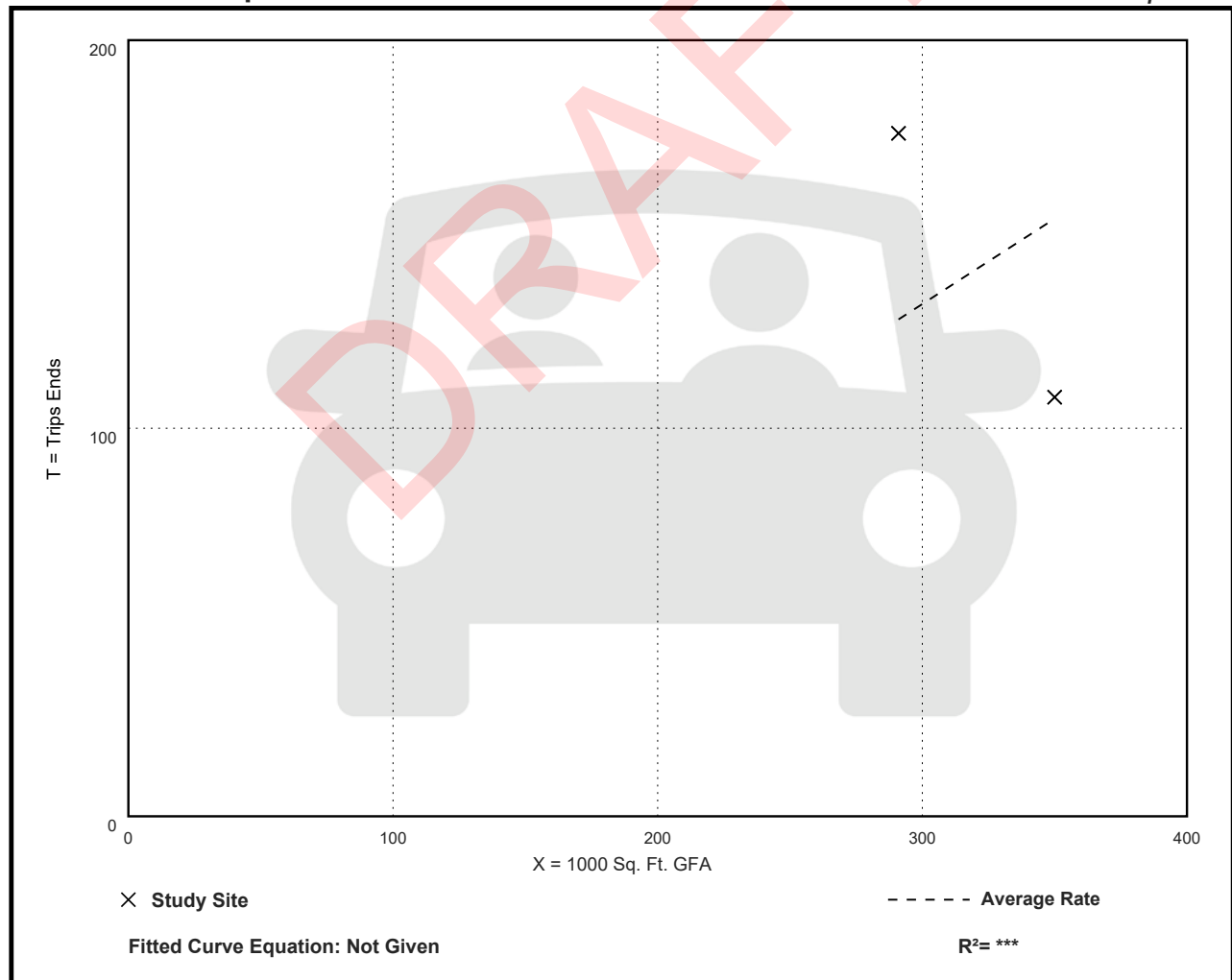
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.44	0.31 - 0.60	***

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

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

Setting/Location: General Urban/Suburban

Number of Studies: 5

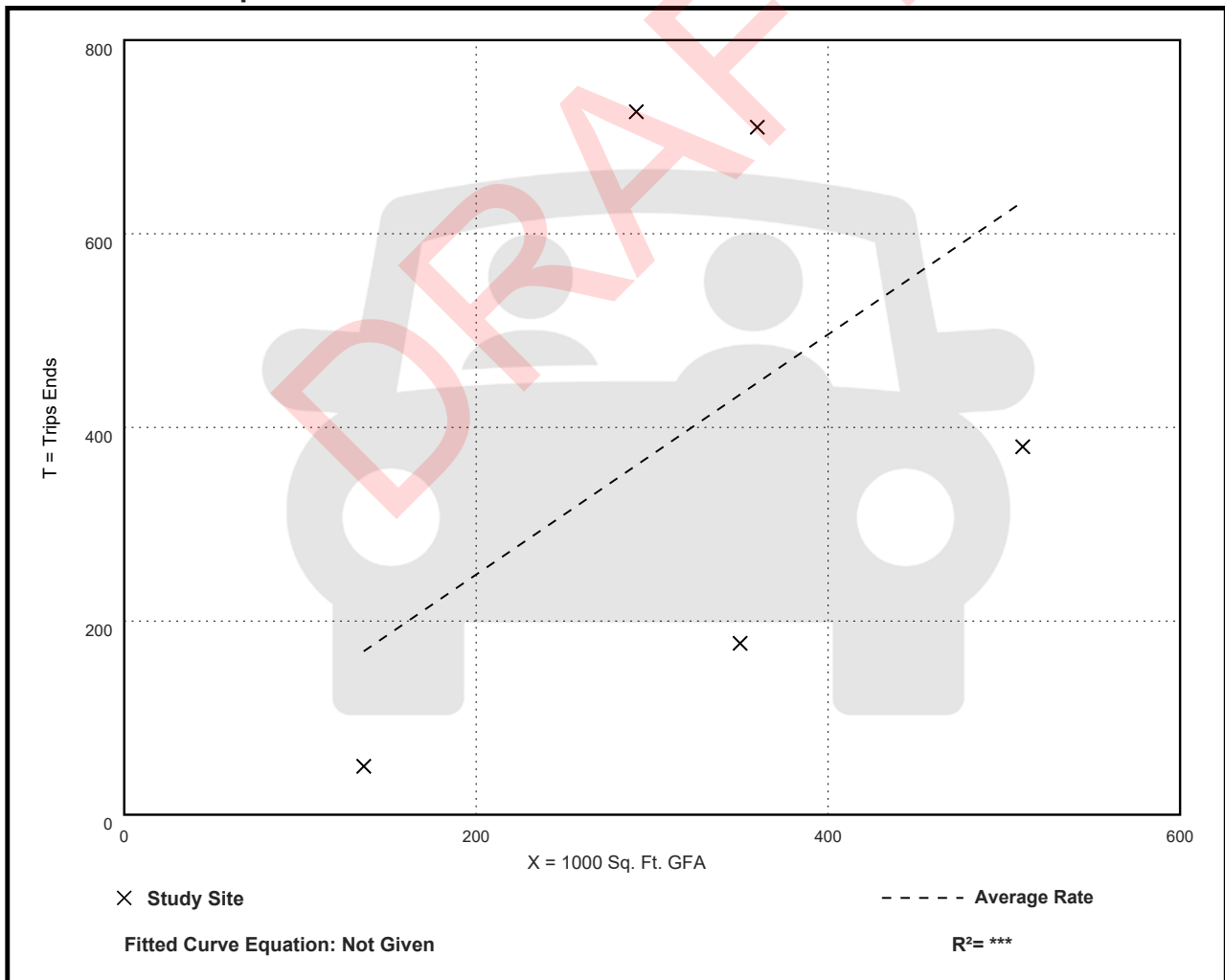
Avg. 1000 Sq. Ft. GFA: 329

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.24	0.37 - 2.49	0.90

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 321

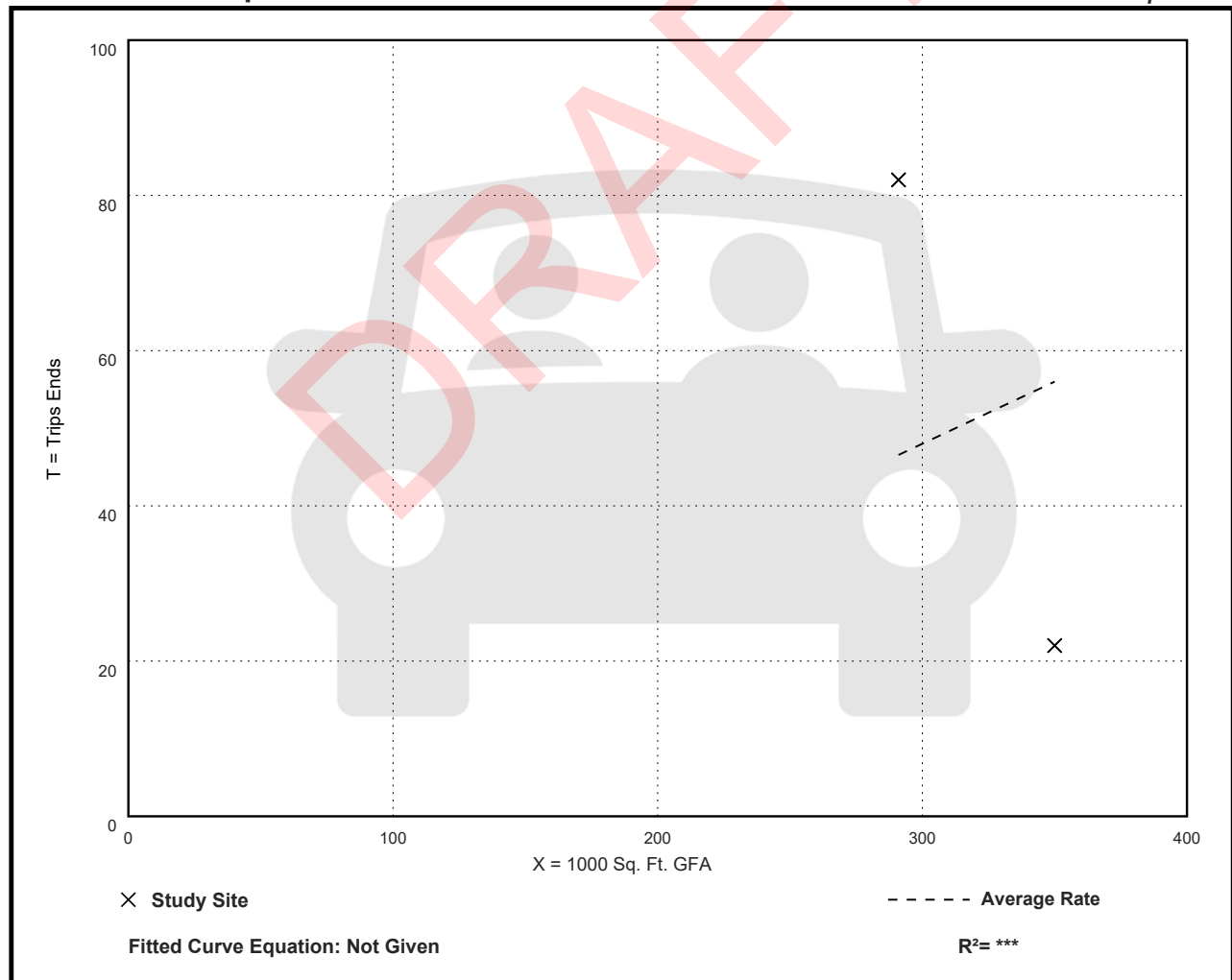
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.06 - 0.28	***

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

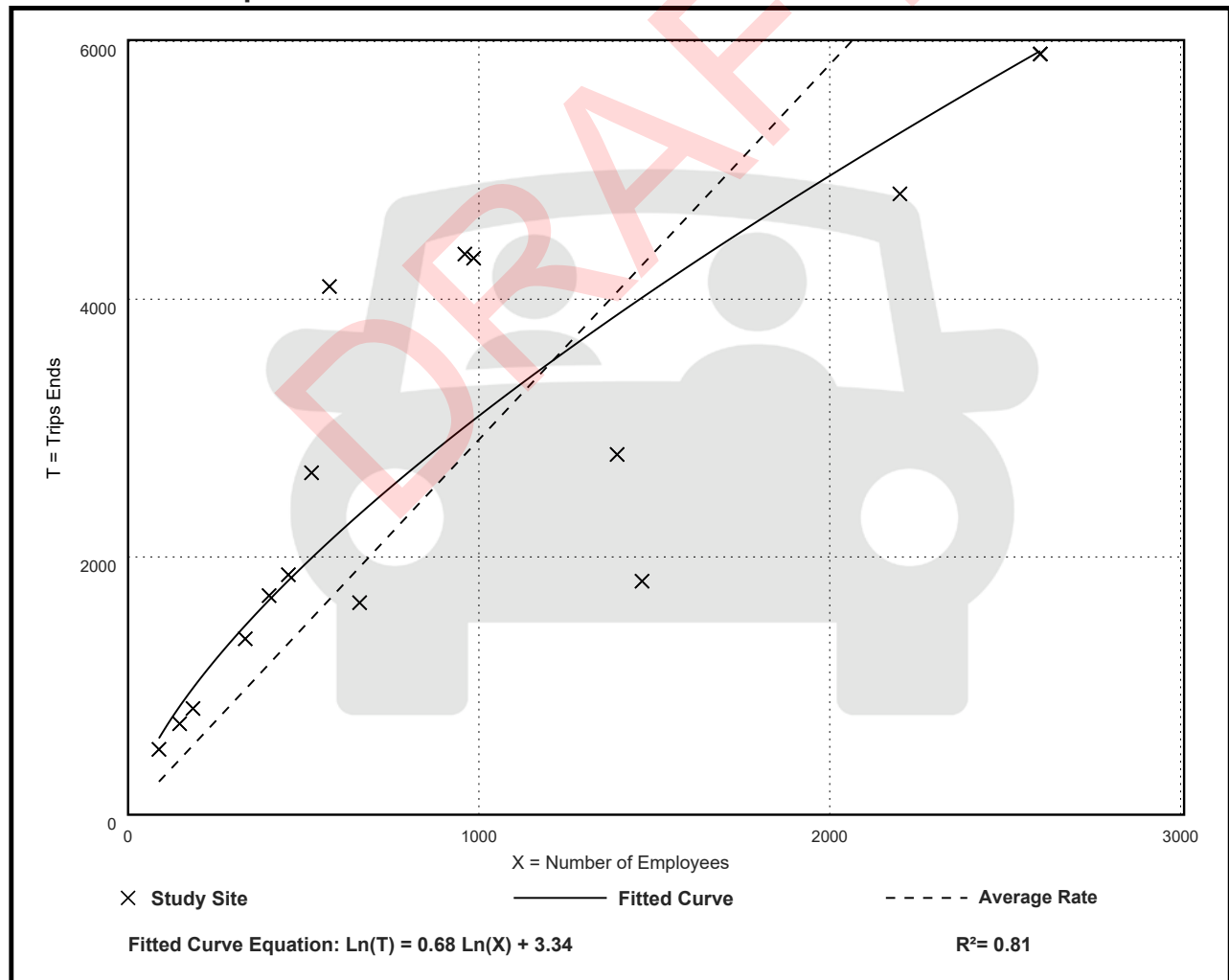
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 16
Avg. Num. of Employees: 973
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.91	1.24 - 7.14	1.42

Data Plot and Equation



Industrial Park (130)

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: 15

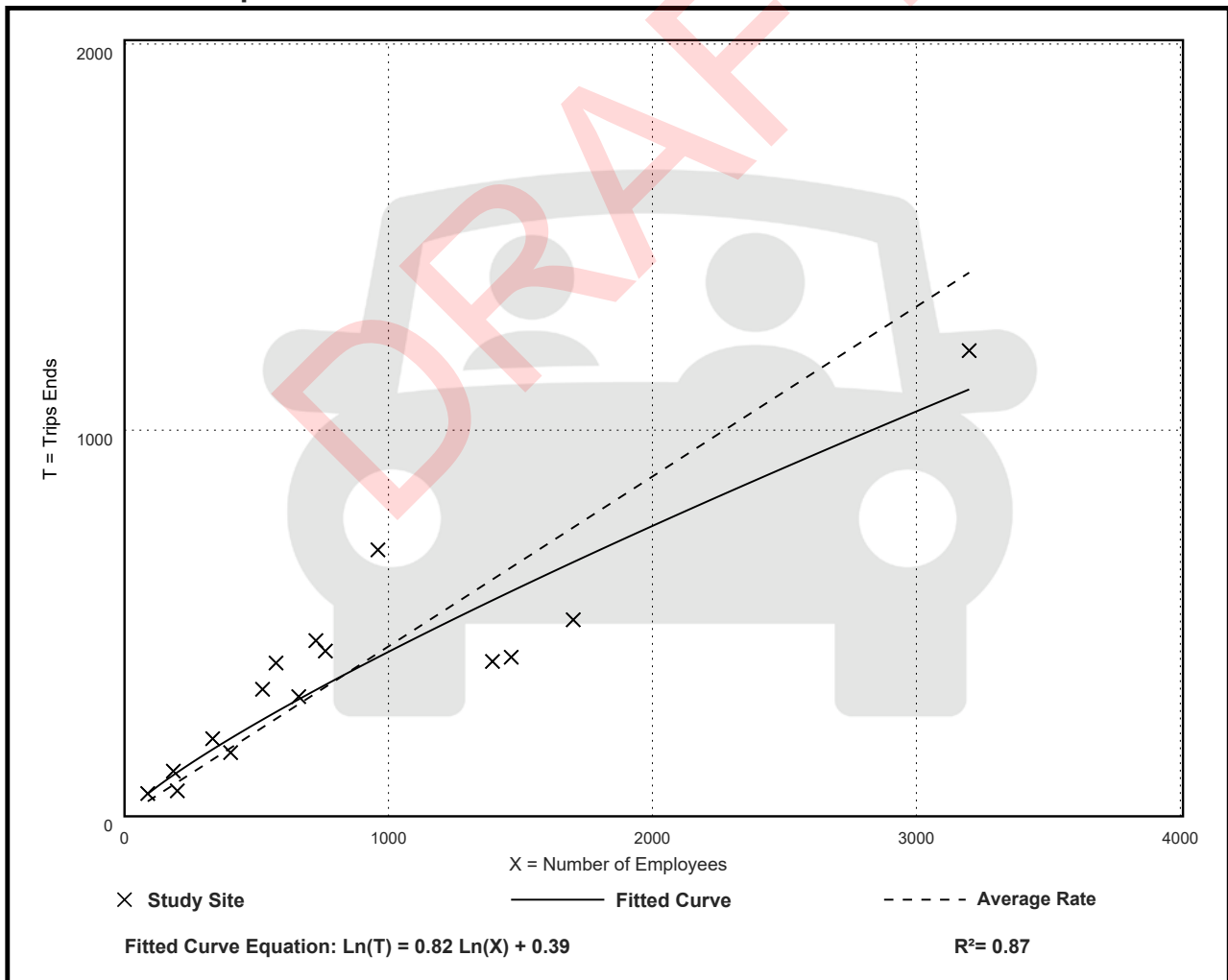
Avg. Num. of Employees: 878

Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.44	0.28 - 0.72	0.16

Data Plot and Equation



Industrial Park (130)

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: 14

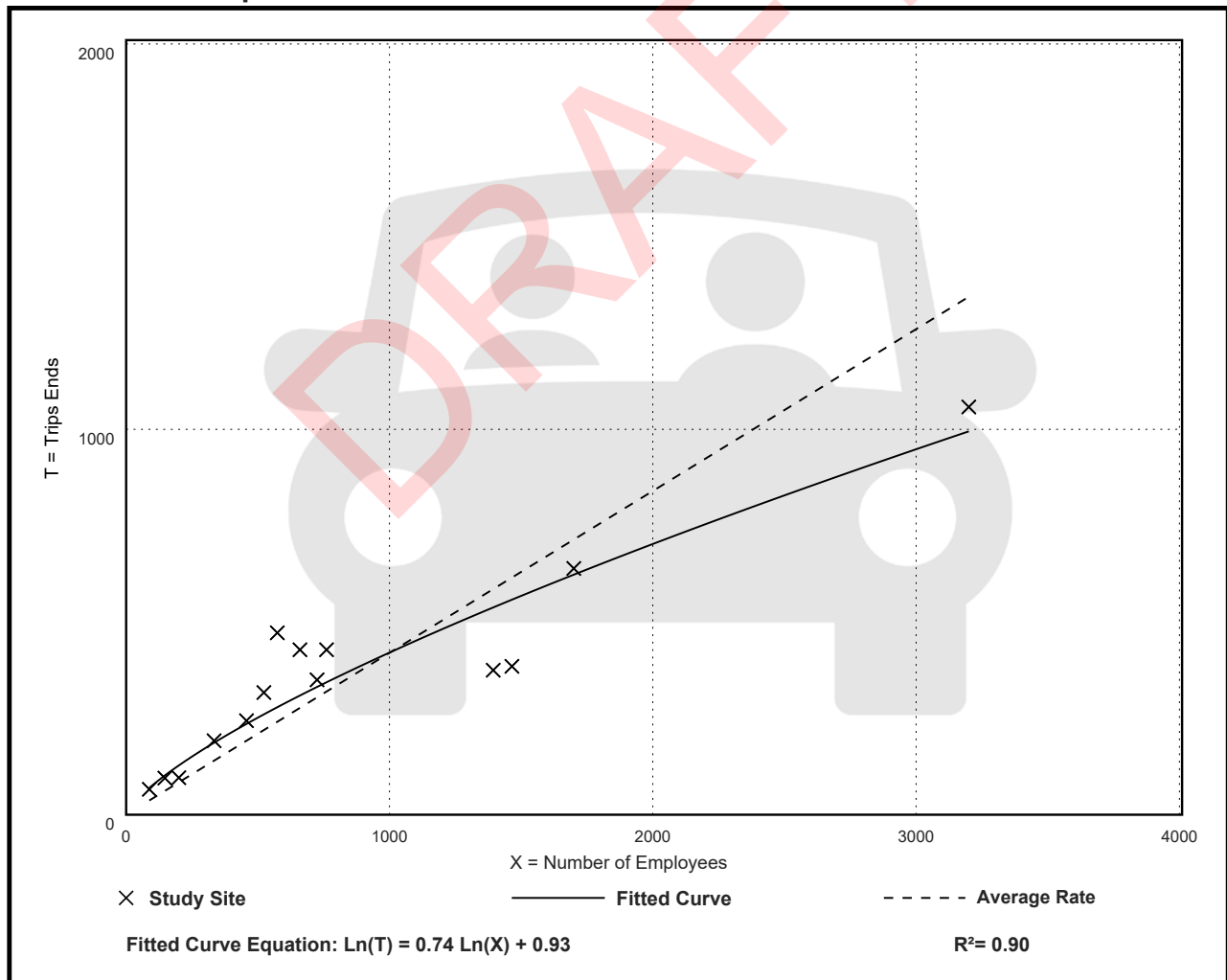
Avg. Num. of Employees: 873

Directional Distribution: 20% entering, 80% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.26 - 0.82	0.16

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: Employees

On a: **Weekday,**

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 19

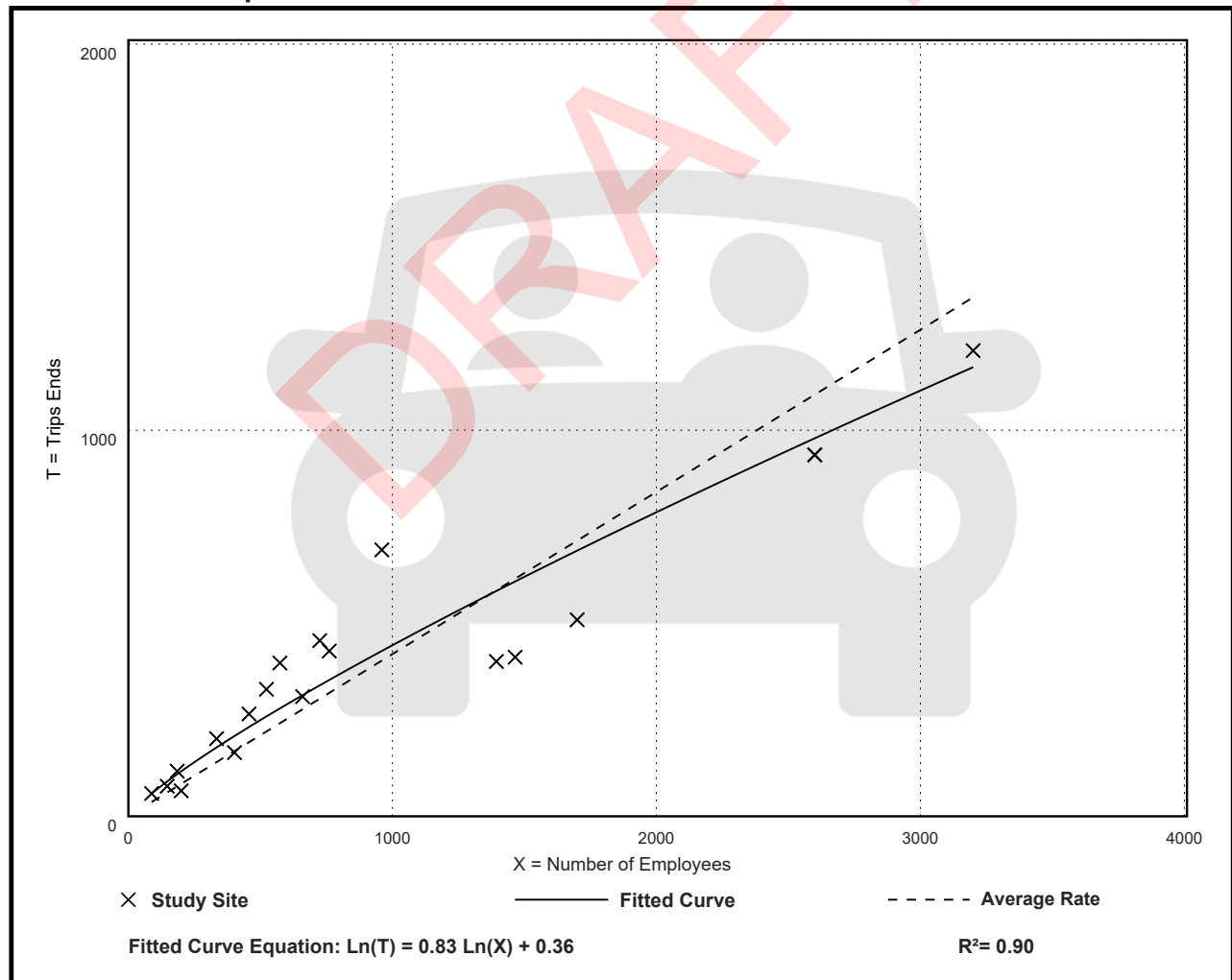
Avg. Num. of Employees: 999

Directional Distribution: 87% entering, 13% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.28 - 0.72	0.14

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: Employees

On a: **Weekday,**

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 19

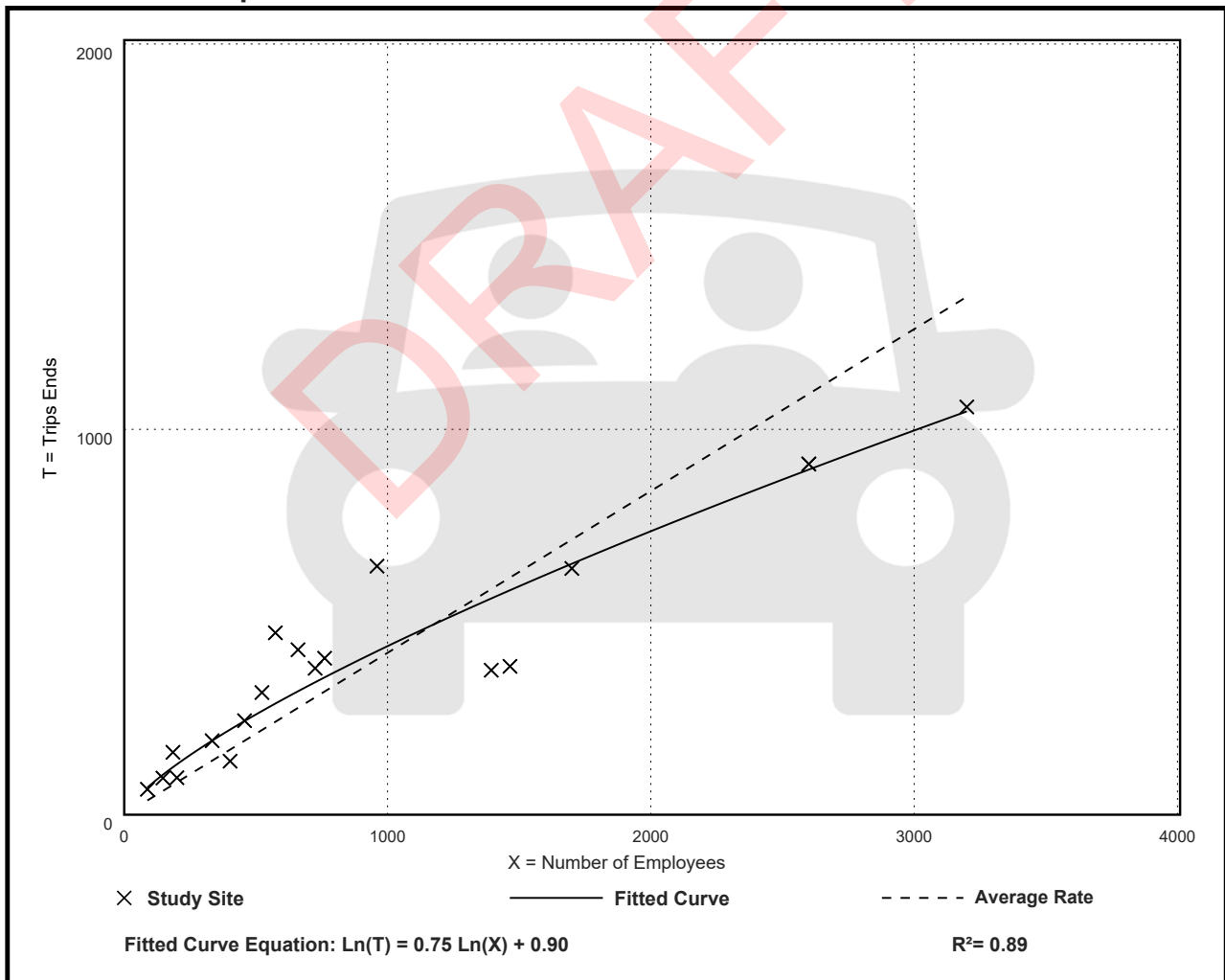
Avg. Num. of Employees: 999

Directional Distribution: 21% entering, 79% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.26 - 0.88	0.15

Data Plot and Equation



Industrial Park (130)

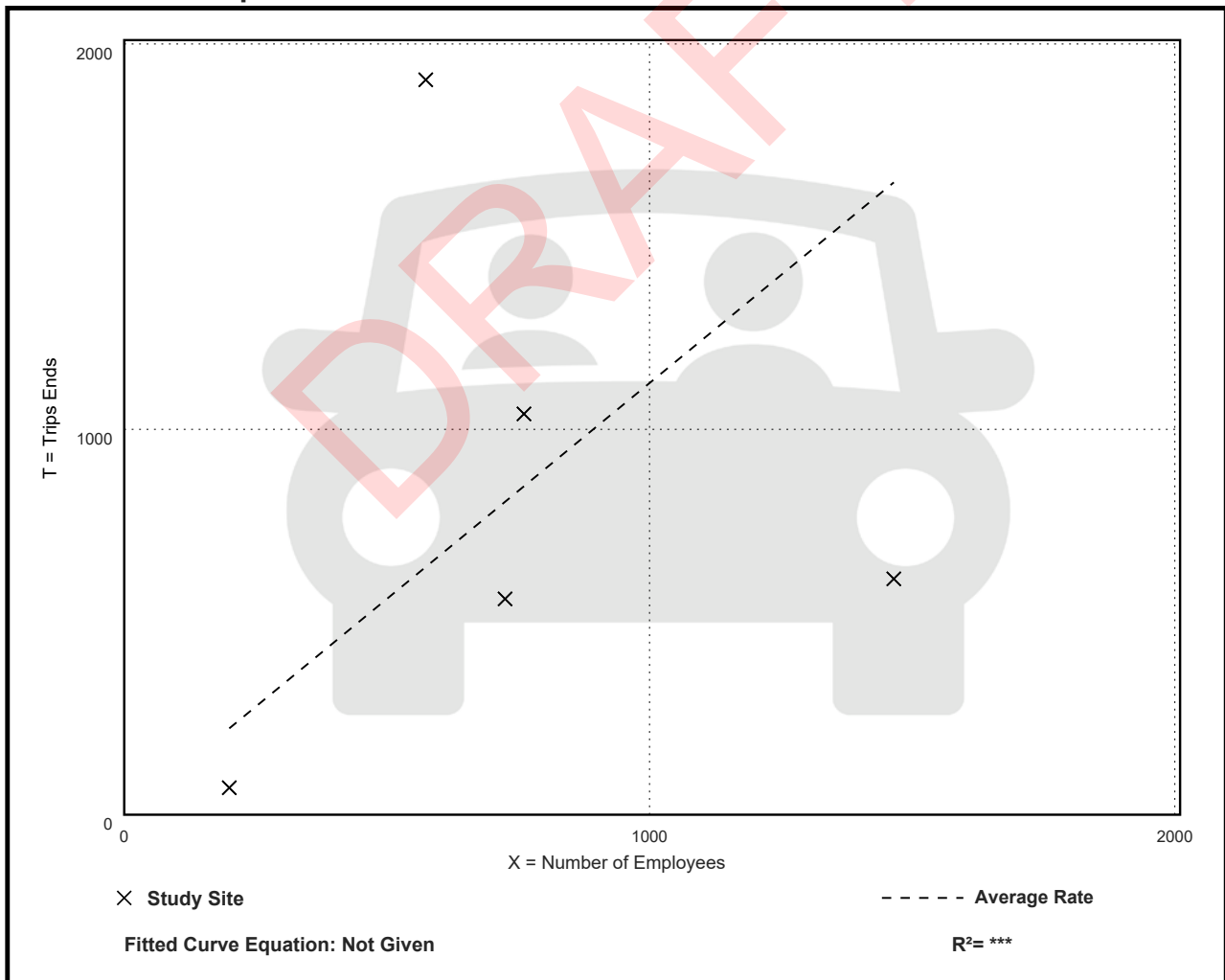
Vehicle Trip Ends vs: Employees
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 745
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.12	0.35 - 3.32	1.12

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: Employees

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Employees: 1020

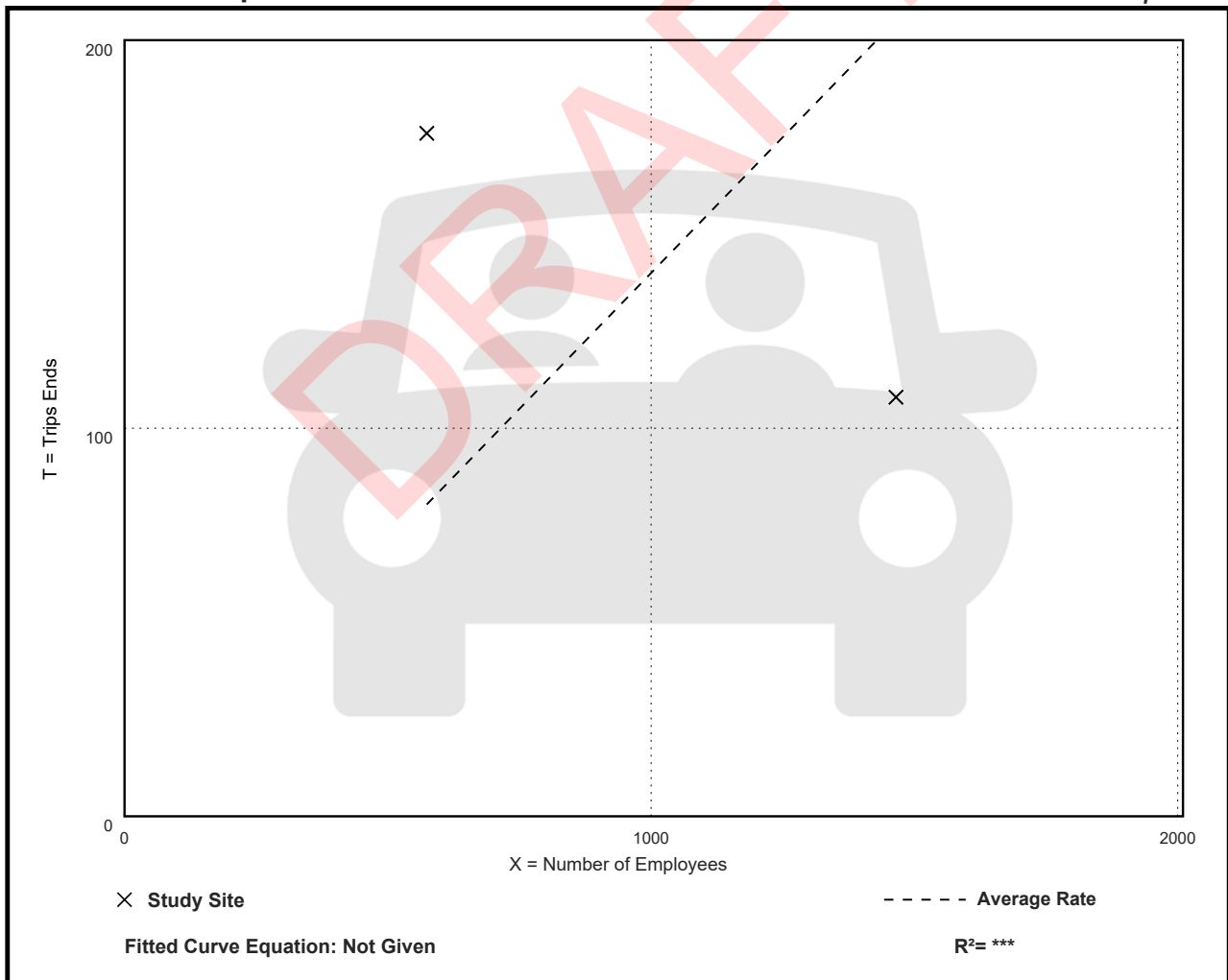
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.14	0.07 - 0.31	***

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

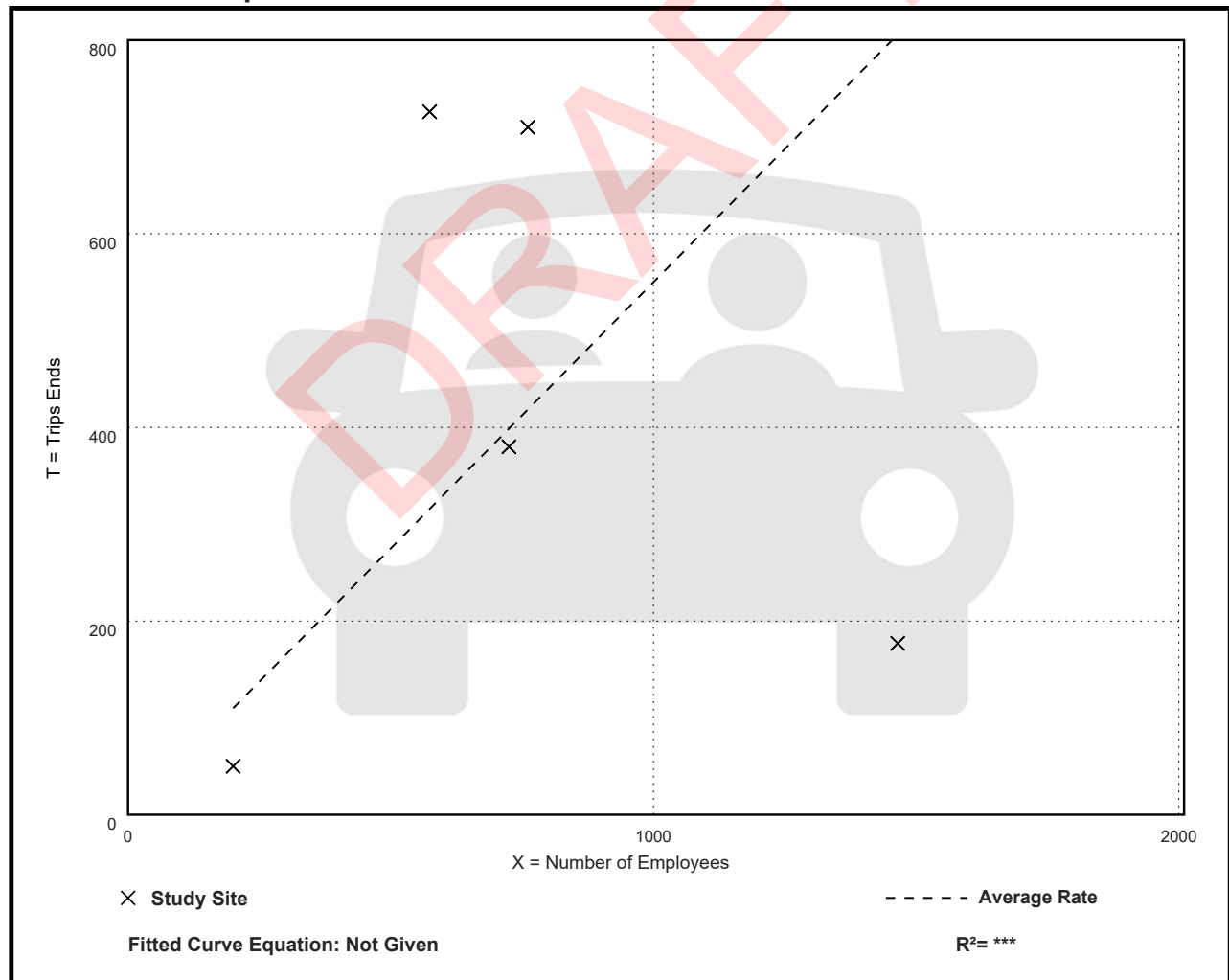
Vehicle Trip Ends vs: Employees
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 745
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.55	0.12 - 1.26	0.48

Data Plot and Equation



Industrial Park (130)

Vehicle Trip Ends vs: Employees

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Employees: 1020

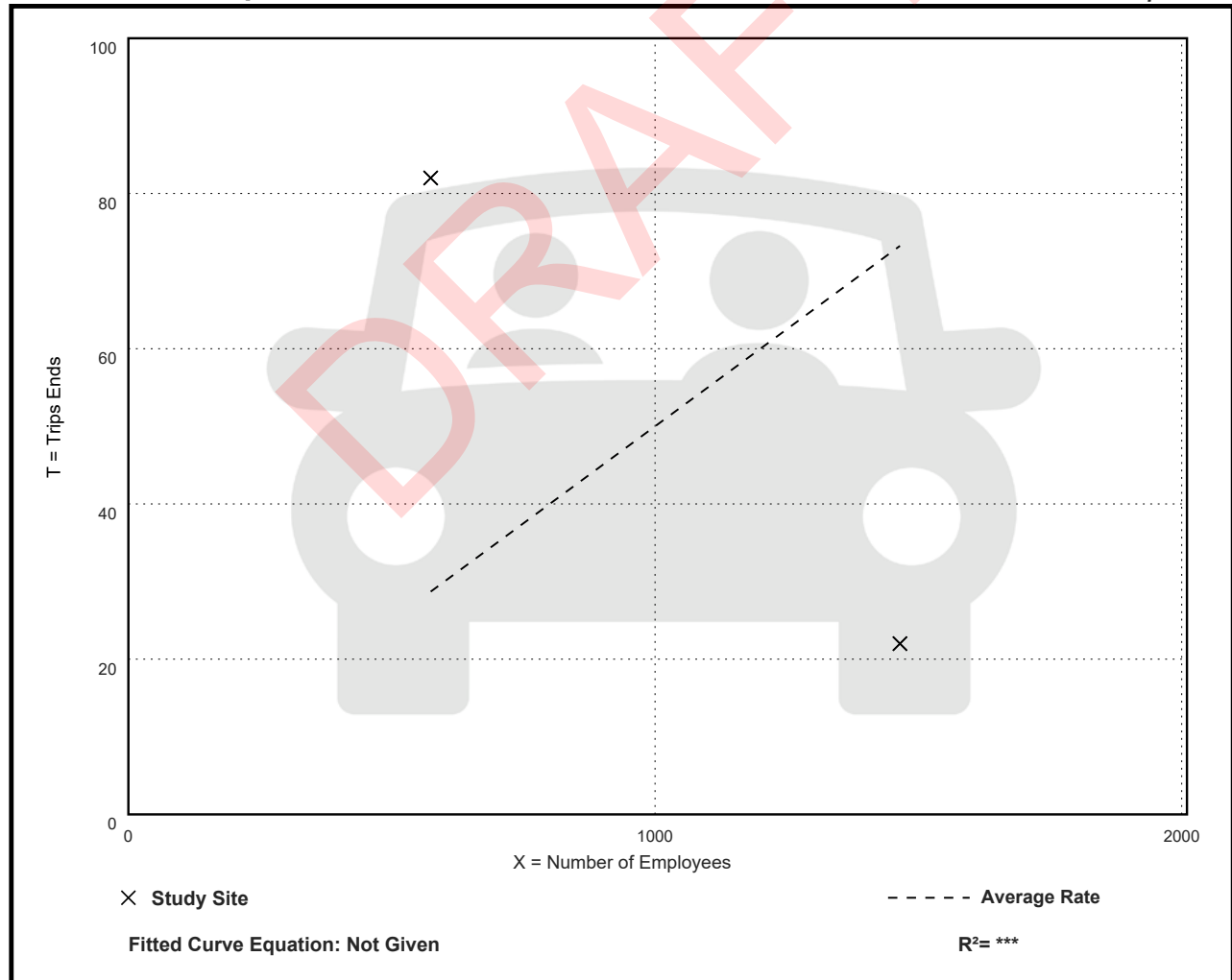
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.05	0.02 - 0.14	***

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

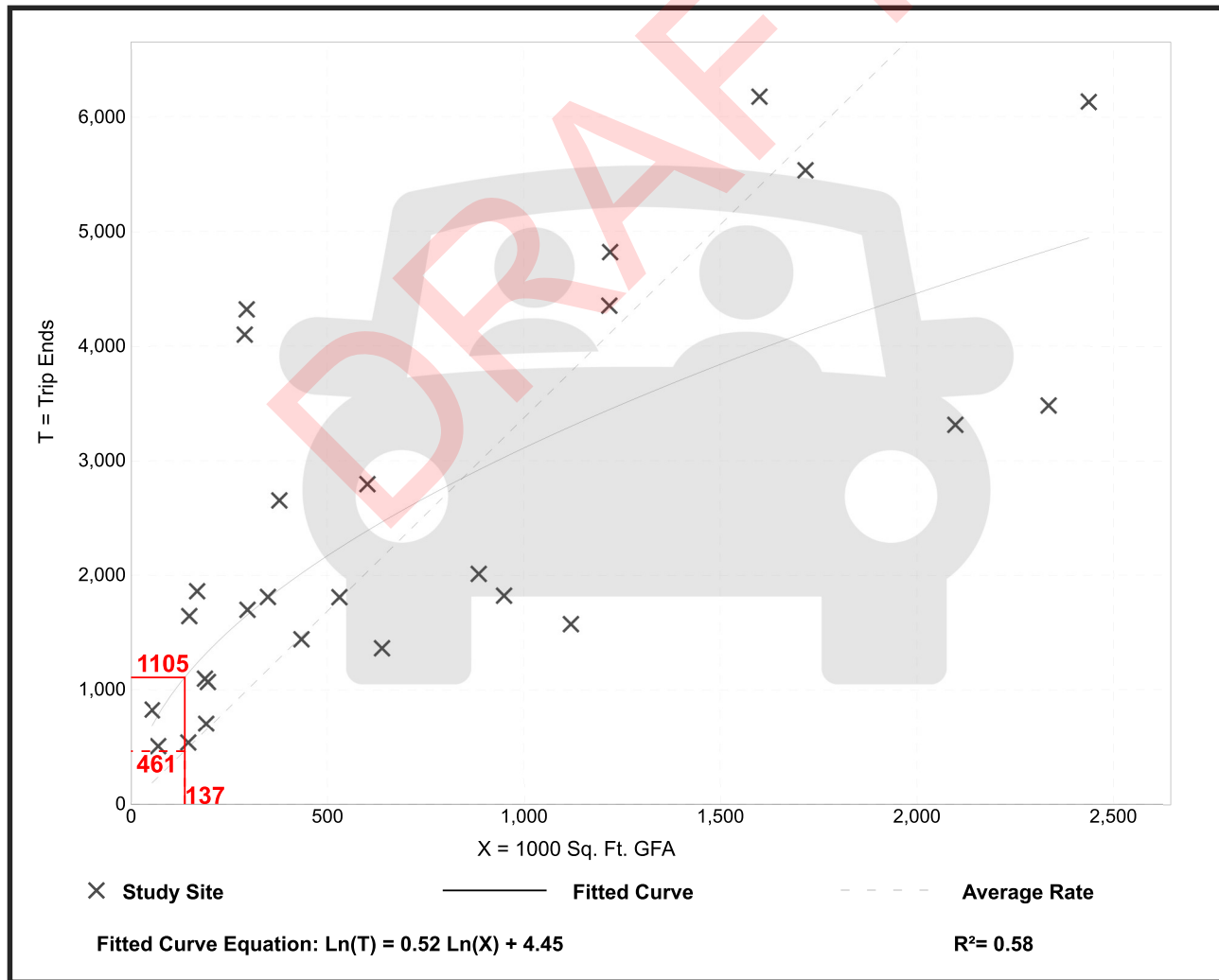
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 762
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.37	1.41 - 14.98	2.60

Data Plot and Equation



Industrial Park (130)

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.

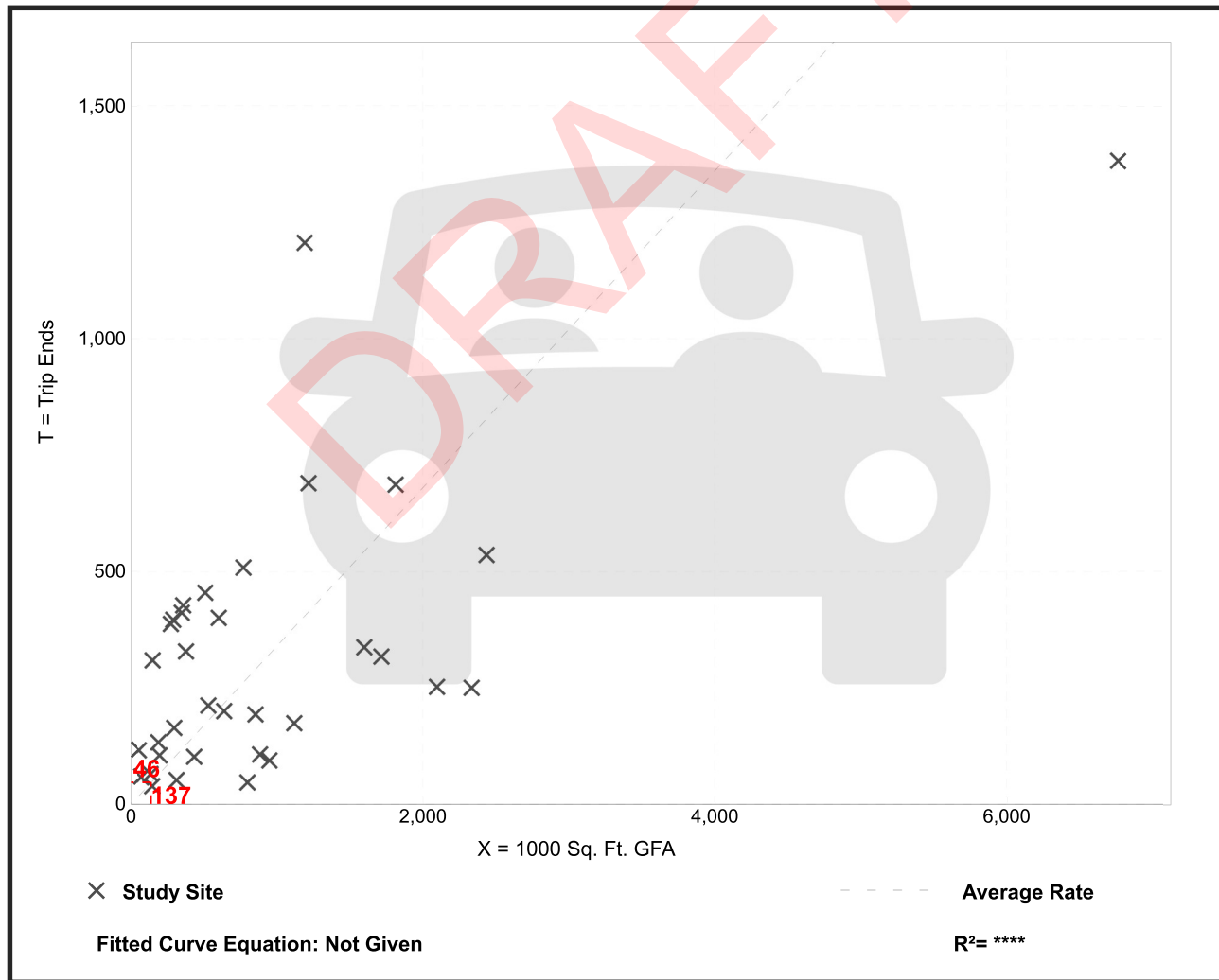
Setting/Location: General Urban/Suburban

Number of Studies: 34
 Avg. 1000 Sq. Ft. GFA: 956
 Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



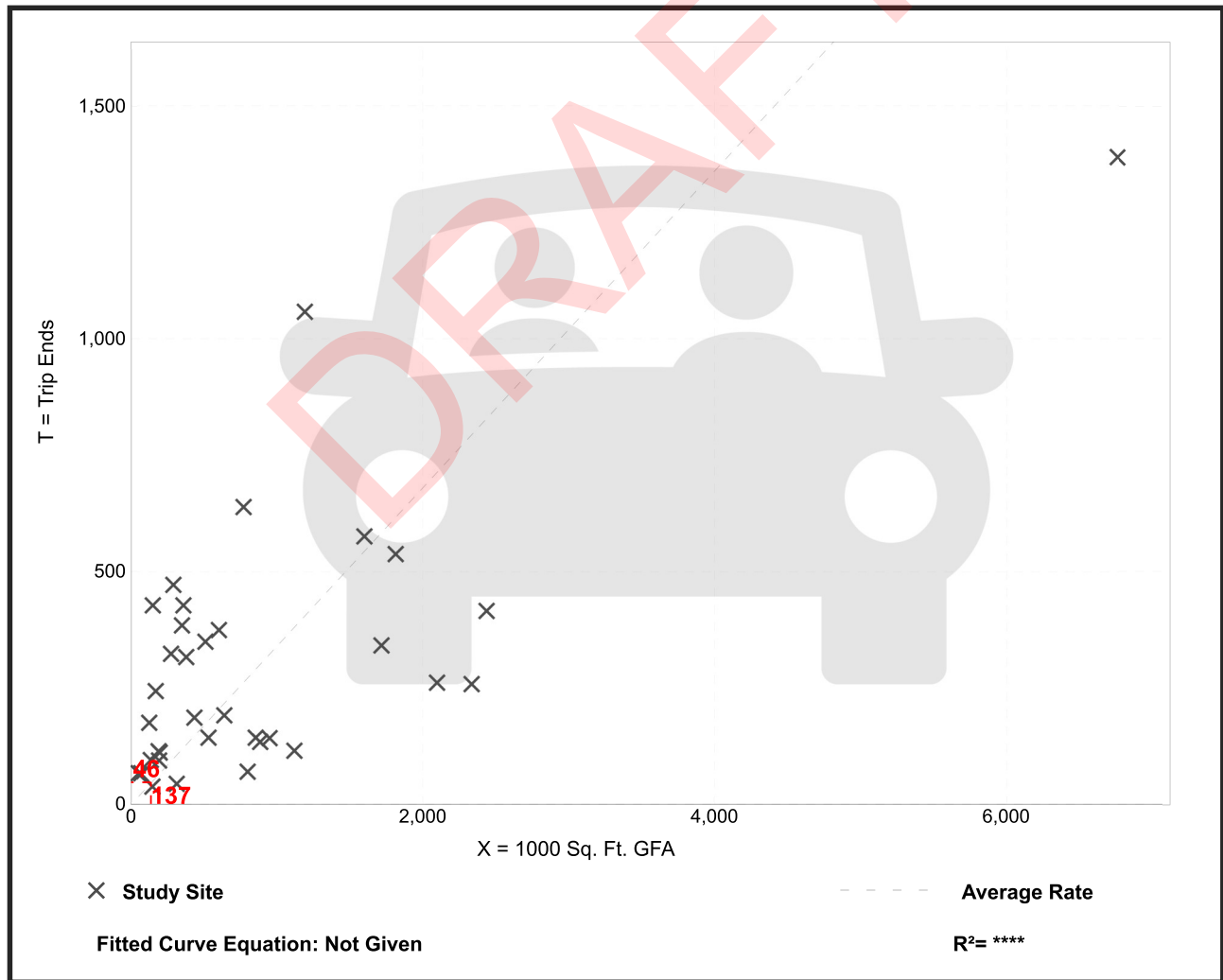
Industrial Park (130)

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: 35
 Avg. 1000 Sq. Ft. GFA: 899
 Directional Distribution: 22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Industrial Park (130)

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

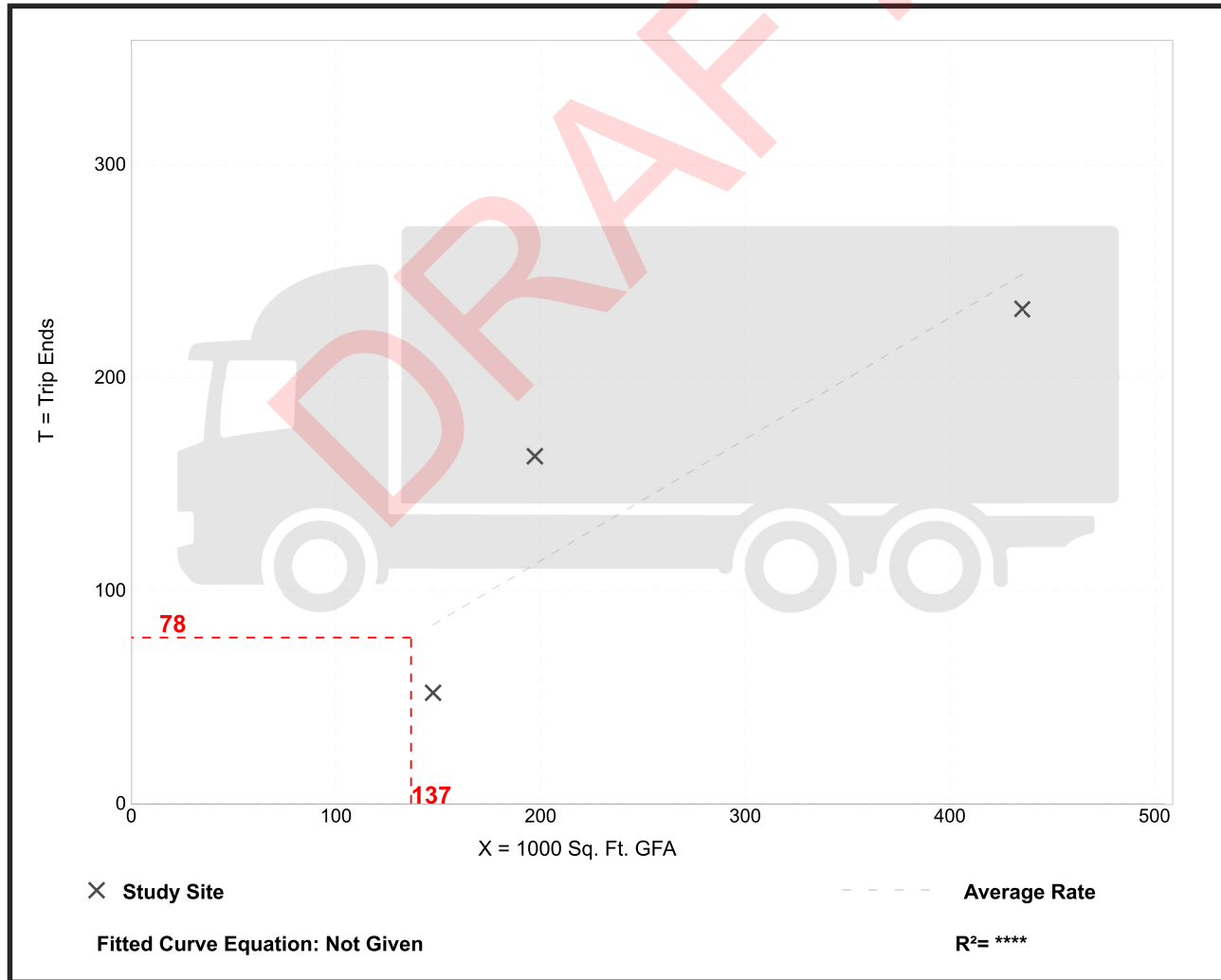
Setting/Location: General Urban/Suburban
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 260
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.57	0.35 - 0.83	0.20

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

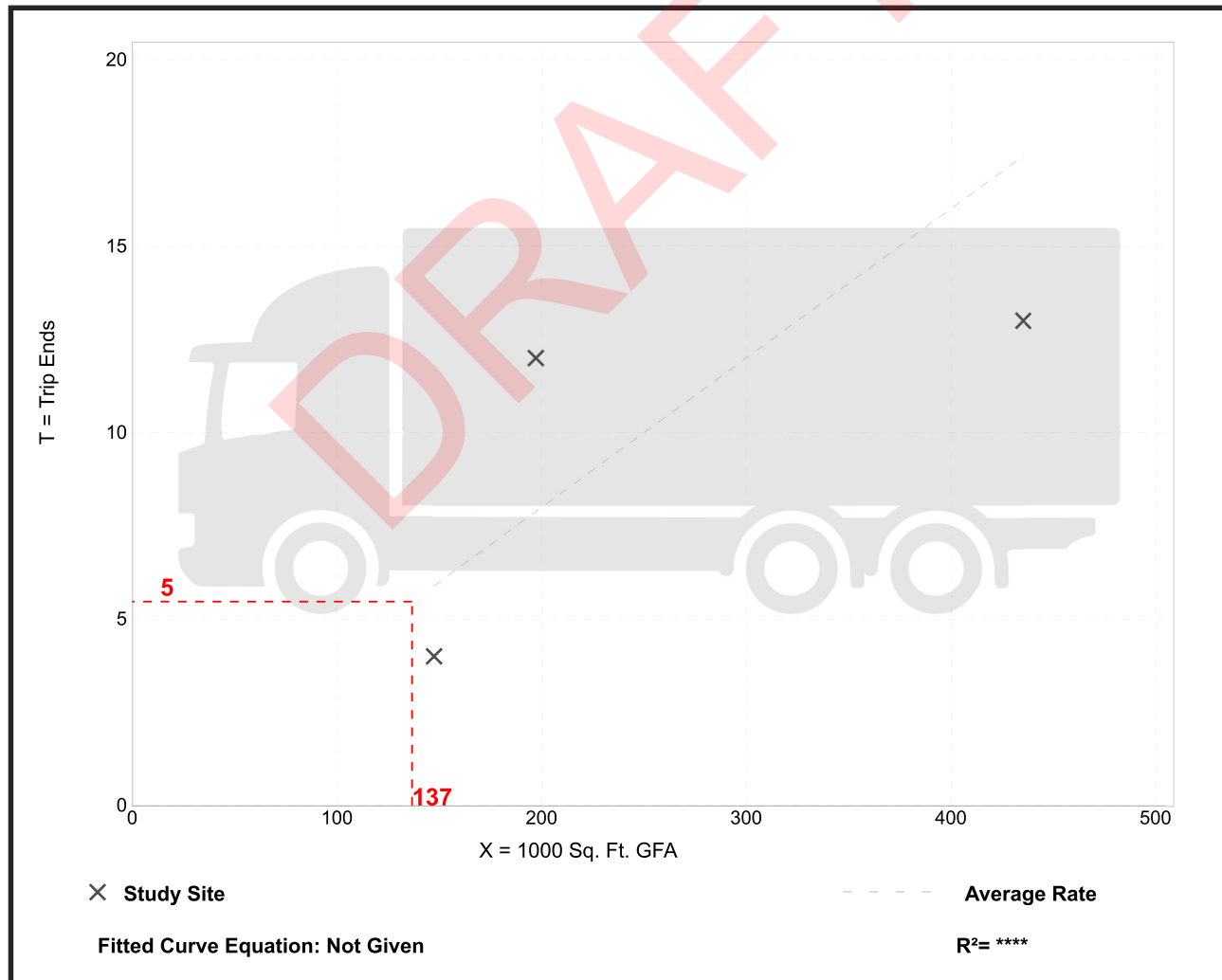
Setting/Location: General Urban/Suburban
 Number of Studies: 3
 Avg. 1000 Sq. Ft. GFA: 260
 Directional Distribution: 45% entering, 55% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.04	0.03 - 0.06	0.02

Data Plot and Equation

Caution – Small Sample Size



Industrial Park (130)

Truck 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

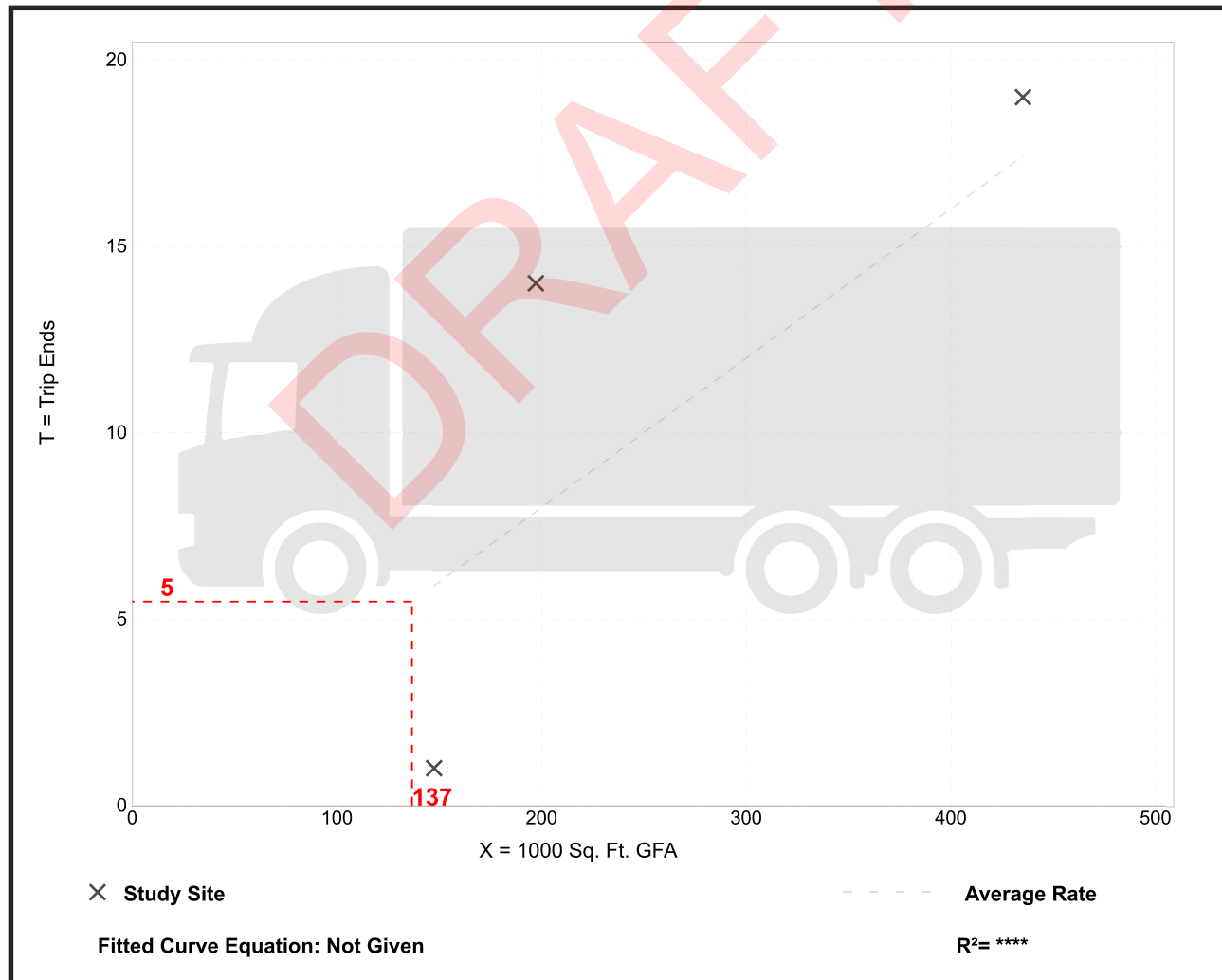
Number of Studies: 3
 Avg. 1000 Sq. Ft. GFA: 260
 Directional Distribution: 38% entering, 62% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.04	0.01 - 0.07	0.03

Data Plot and Equation

Caution – Small Sample Size



Land Use: 140

Manufacturing

Description

A manufacturing facility is an area where the primary activity is the conversion of raw materials or parts into finished products. Size and type of activity may vary substantially from one facility to another. In addition to the actual production of goods, a manufacturing facility typically has an office and may provide space for warehouse, research, and associated functions. General light industrial (Land Use 110) and industrial park (Land Use 130) are related uses.

Additional Data

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

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Minnesota, Missouri, New Jersey, New York, Oregon, Pennsylvania, South Dakota, Texas, Vermont, Washington, and West Virginia.

Source Numbers

177, 179, 184, 241, 357, 384, 418, 443, 583, 598, 611, 728, 747, 875, 879, 940, 969, 1067, 1068, 1082

Manufacturing (140)

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

Setting/Location: General Urban/Suburban

Number of Studies: 53

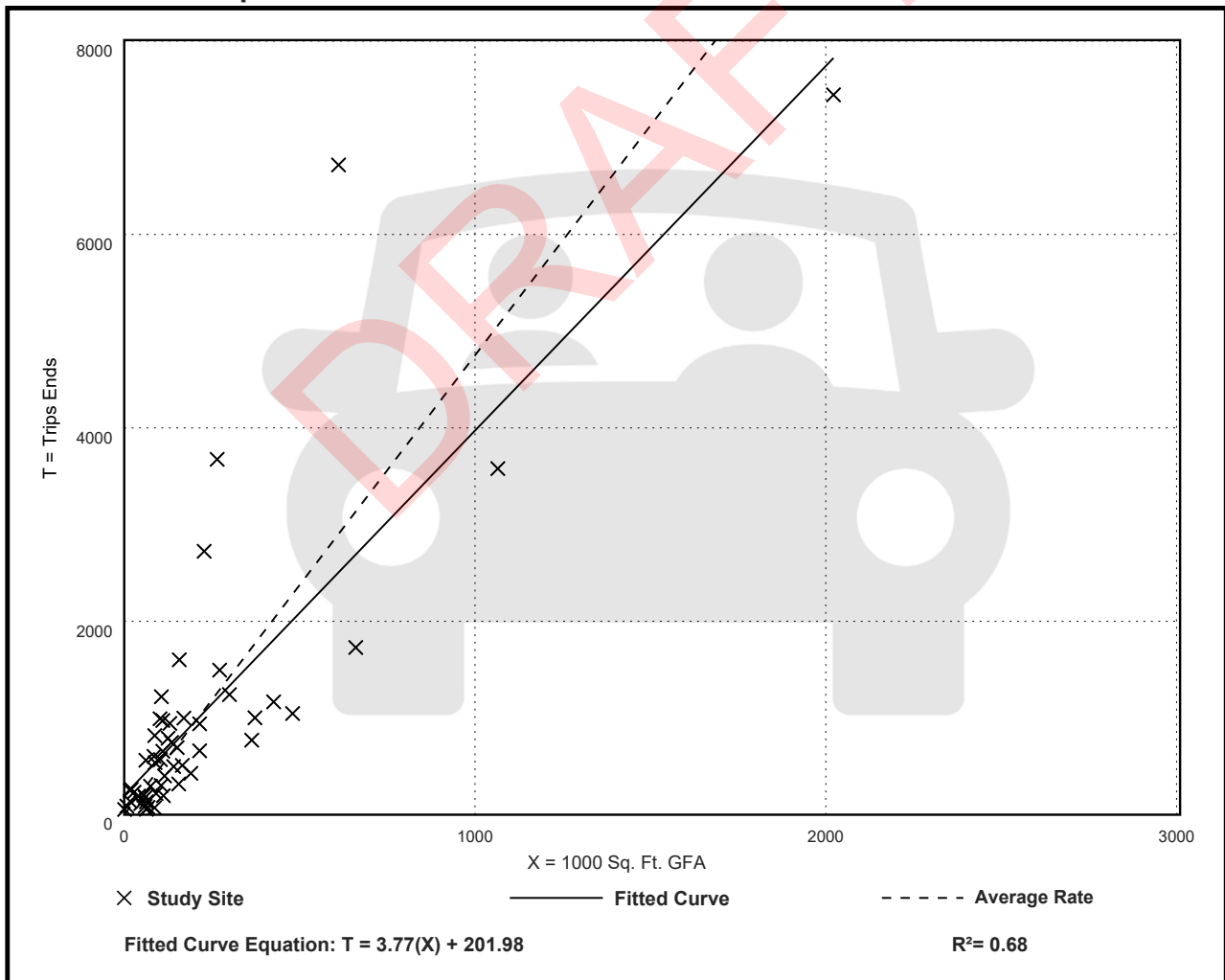
Avg. 1000 Sq. Ft. GFA: 208

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.75	0.83 - 49.50	3.20

Data Plot and Equation



Manufacturing (140)

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: 48

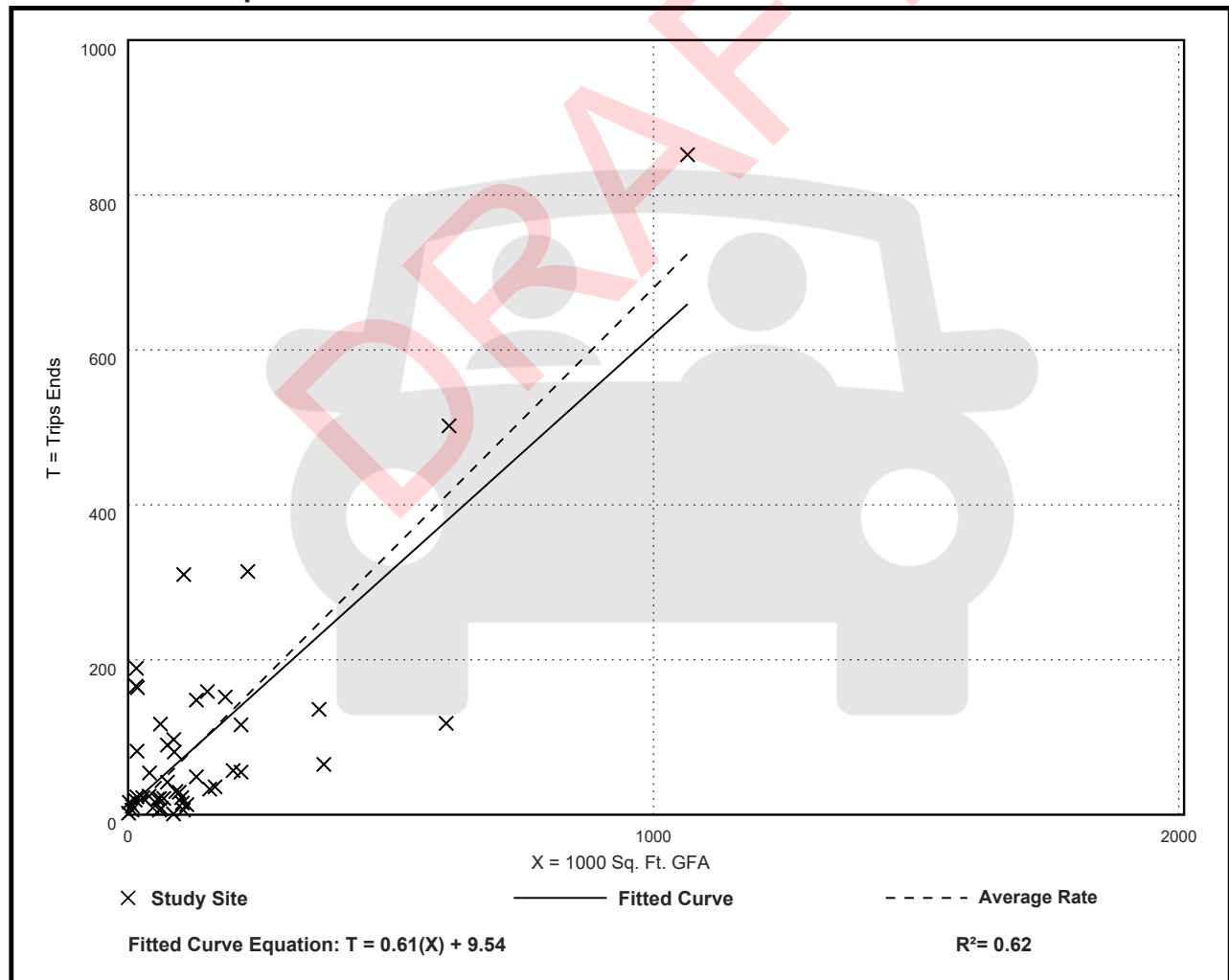
Avg. 1000 Sq. Ft. GFA: 138

Directional Distribution: 76% entering, 24% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.68	0.01 - 11.93	1.03

Data Plot and Equation



Manufacturing (140)

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: 55

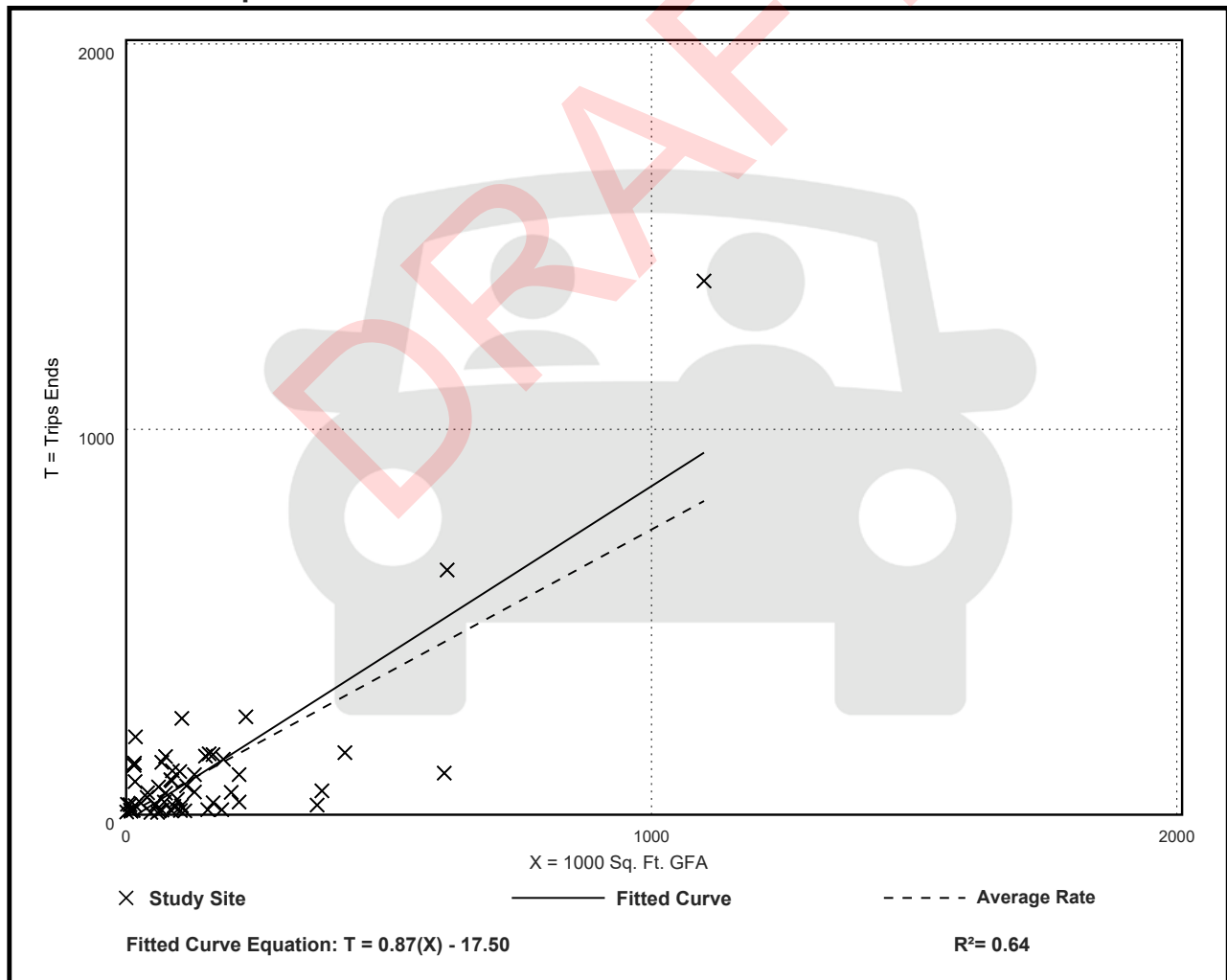
Avg. 1000 Sq. Ft. GFA: 142

Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.07 - 11.37	0.93

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
AM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 62

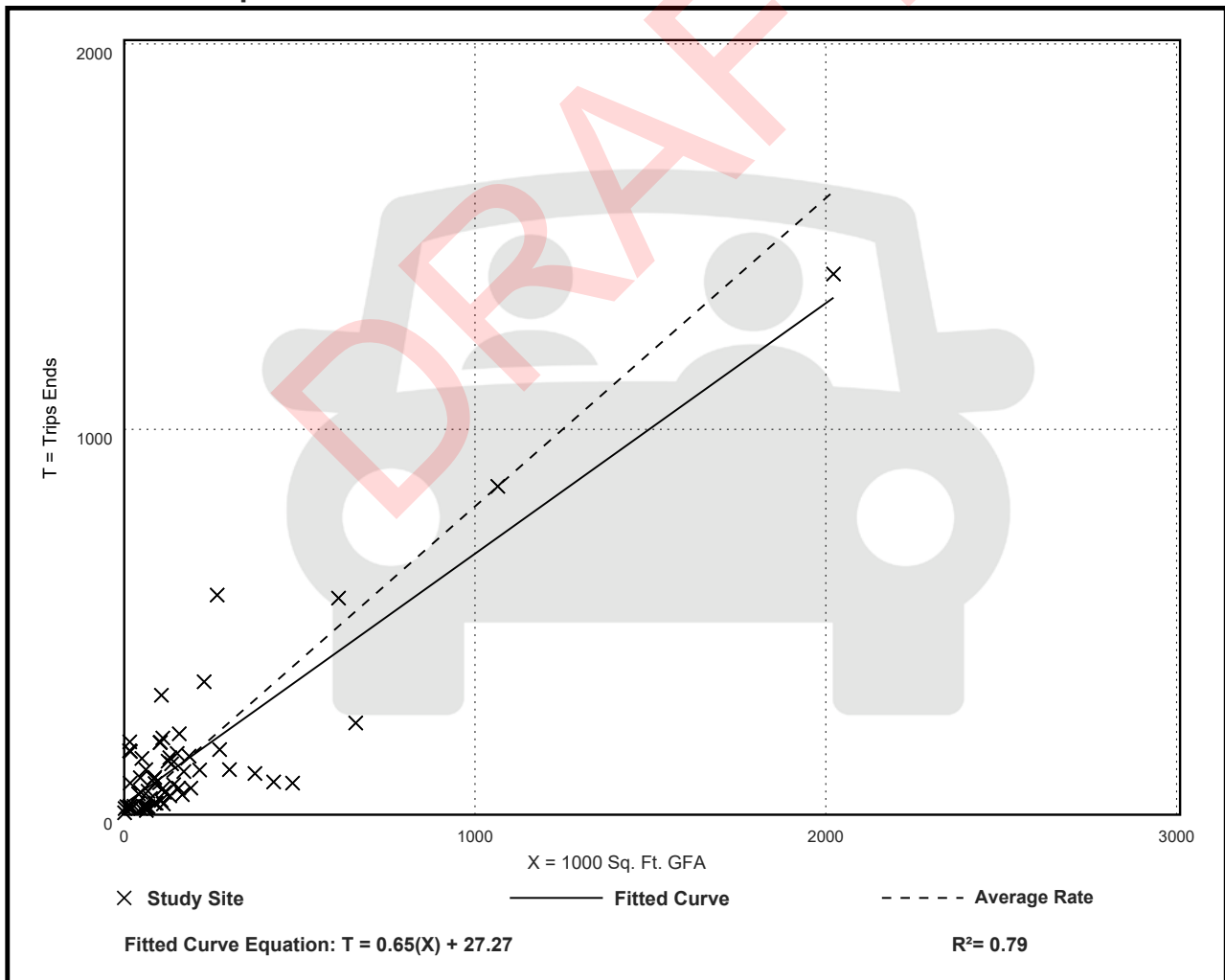
Avg. 1000 Sq. Ft. GFA: 178

Directional Distribution: 73% entering, 27% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.80	0.17 - 11.93	0.87

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
PM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 62

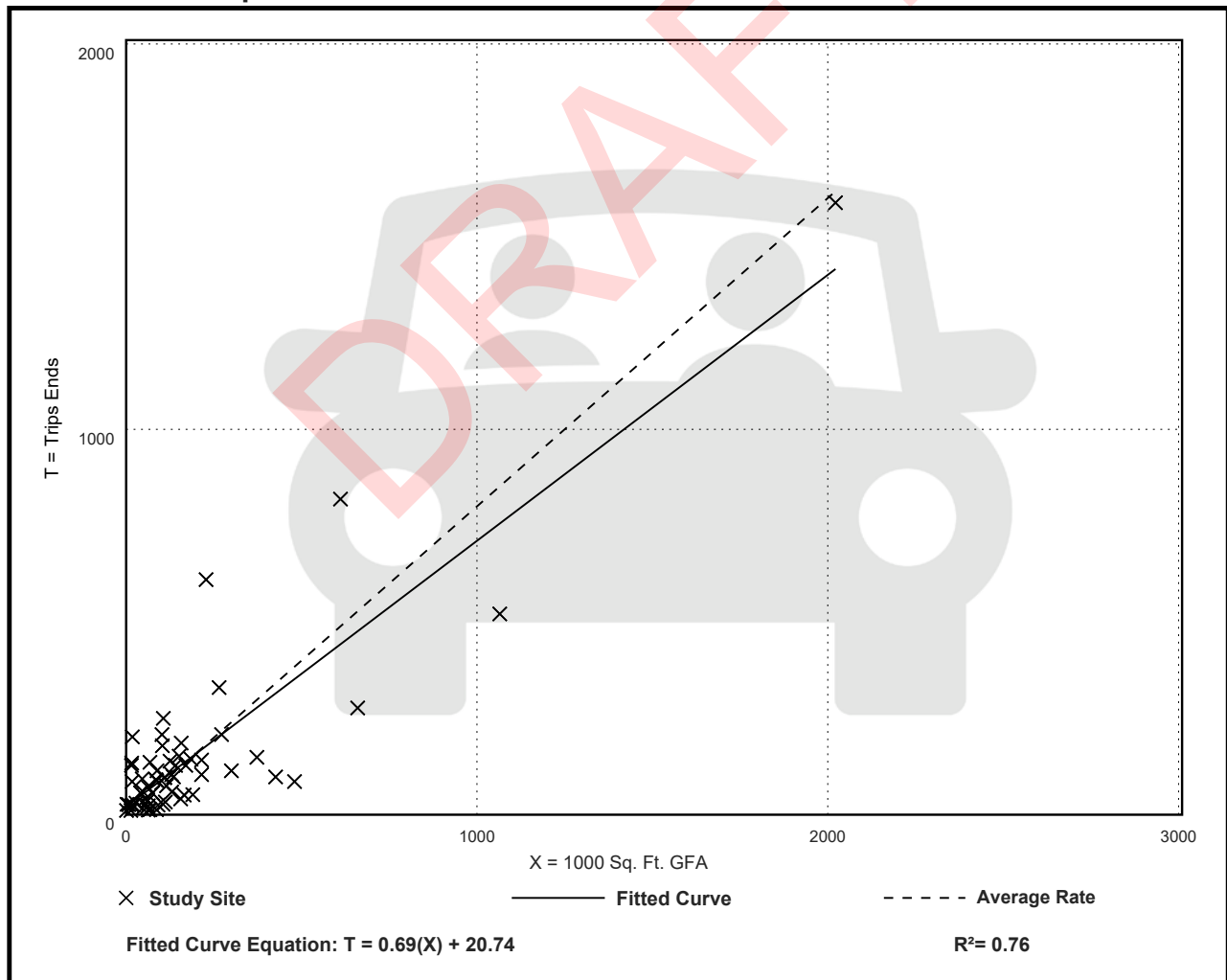
Avg. 1000 Sq. Ft. GFA: 180

Directional Distribution: 42% entering, 58% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.80	0.15 - 11.37	0.82

Data Plot and Equation



Manufacturing (140)

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

Setting/Location: General Urban/Suburban

Number of Studies: 5

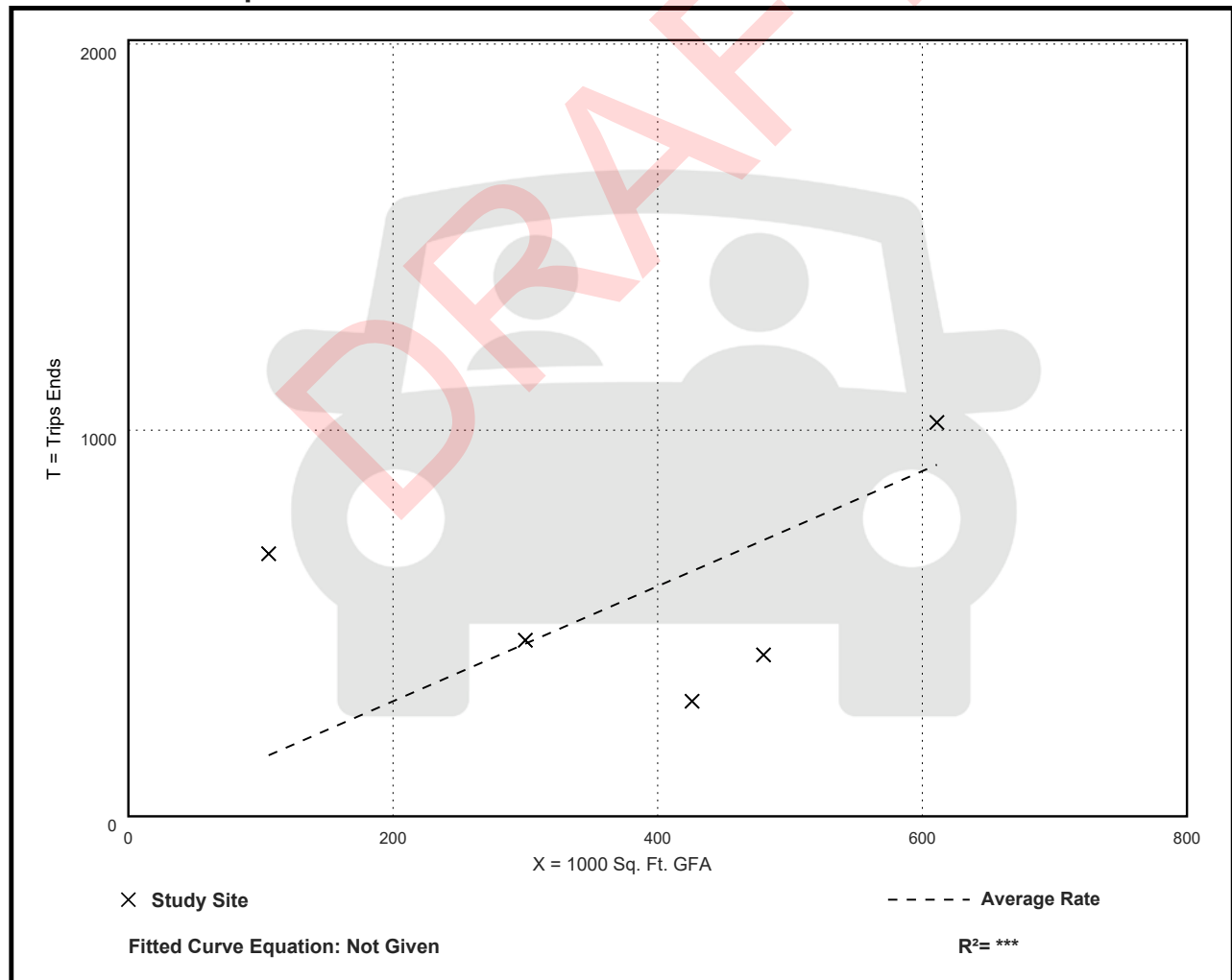
Avg. 1000 Sq. Ft. GFA: 385

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.49	0.70 - 6.42	1.41

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 5

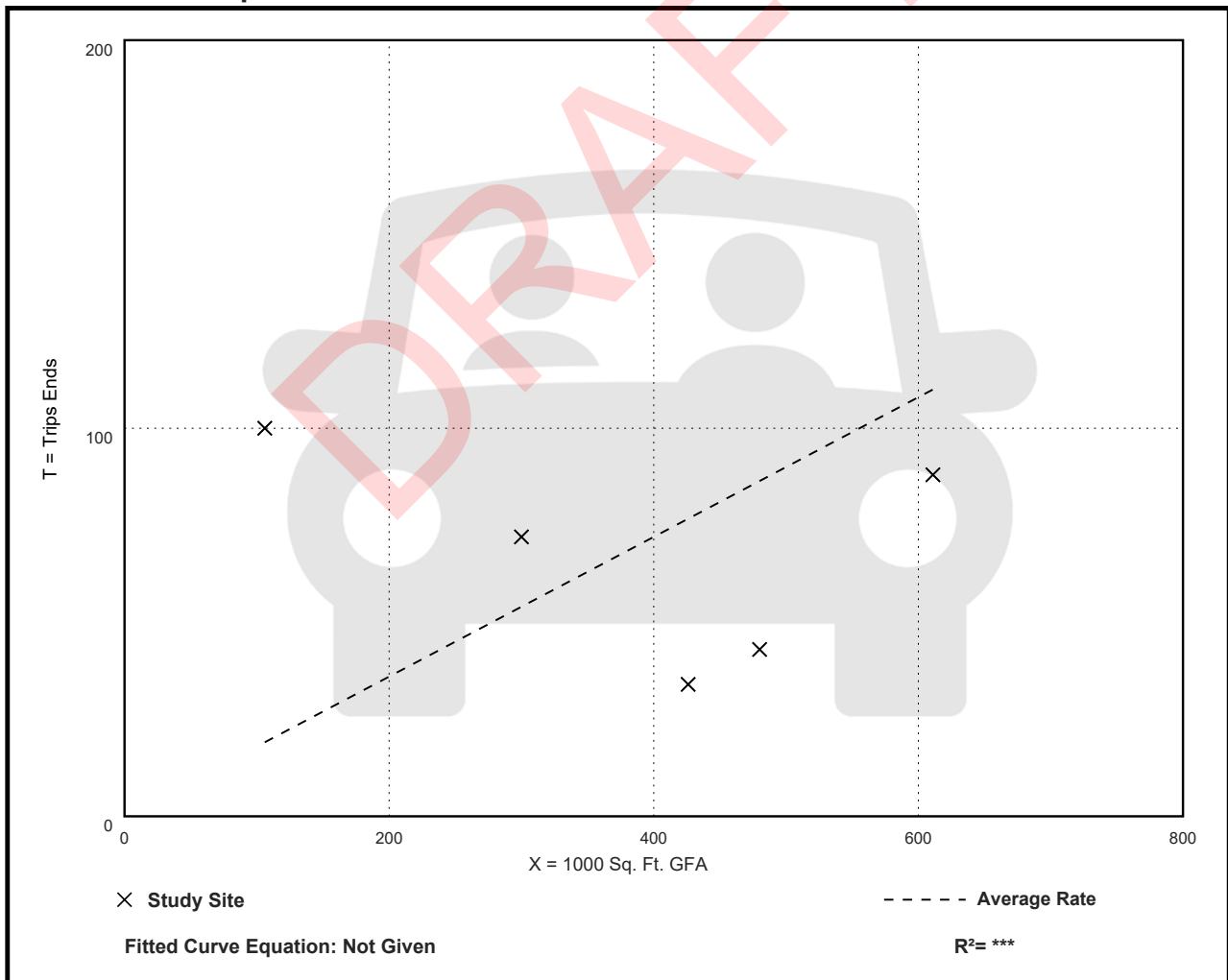
Avg. 1000 Sq. Ft. GFA: 385

Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.08 - 0.94	0.22

Data Plot and Equation



Manufacturing (140)

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

Setting/Location: General Urban/Suburban

Number of Studies: 5

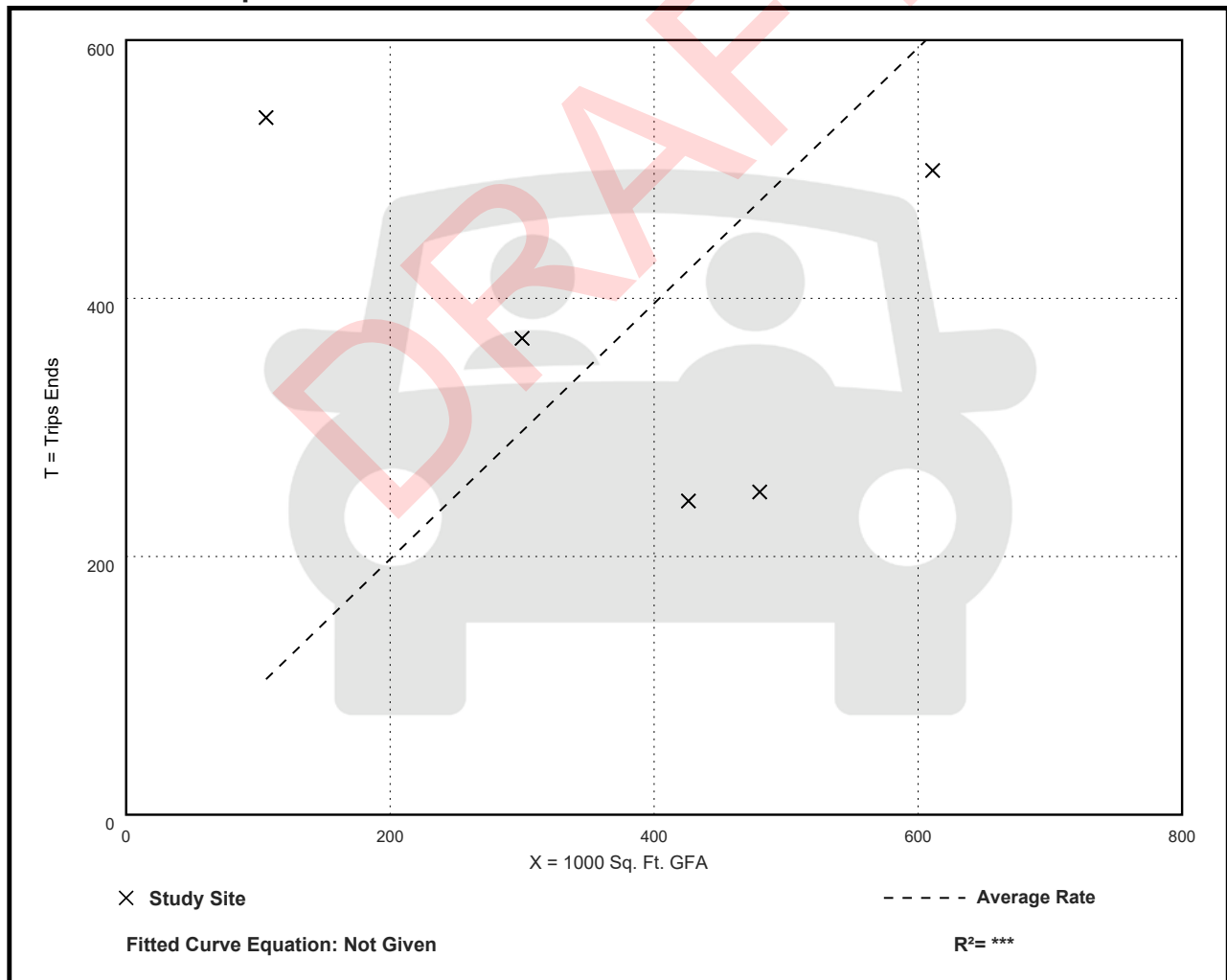
Avg. 1000 Sq. Ft. GFA: 385

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.99	0.52 - 5.09	1.14

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 5

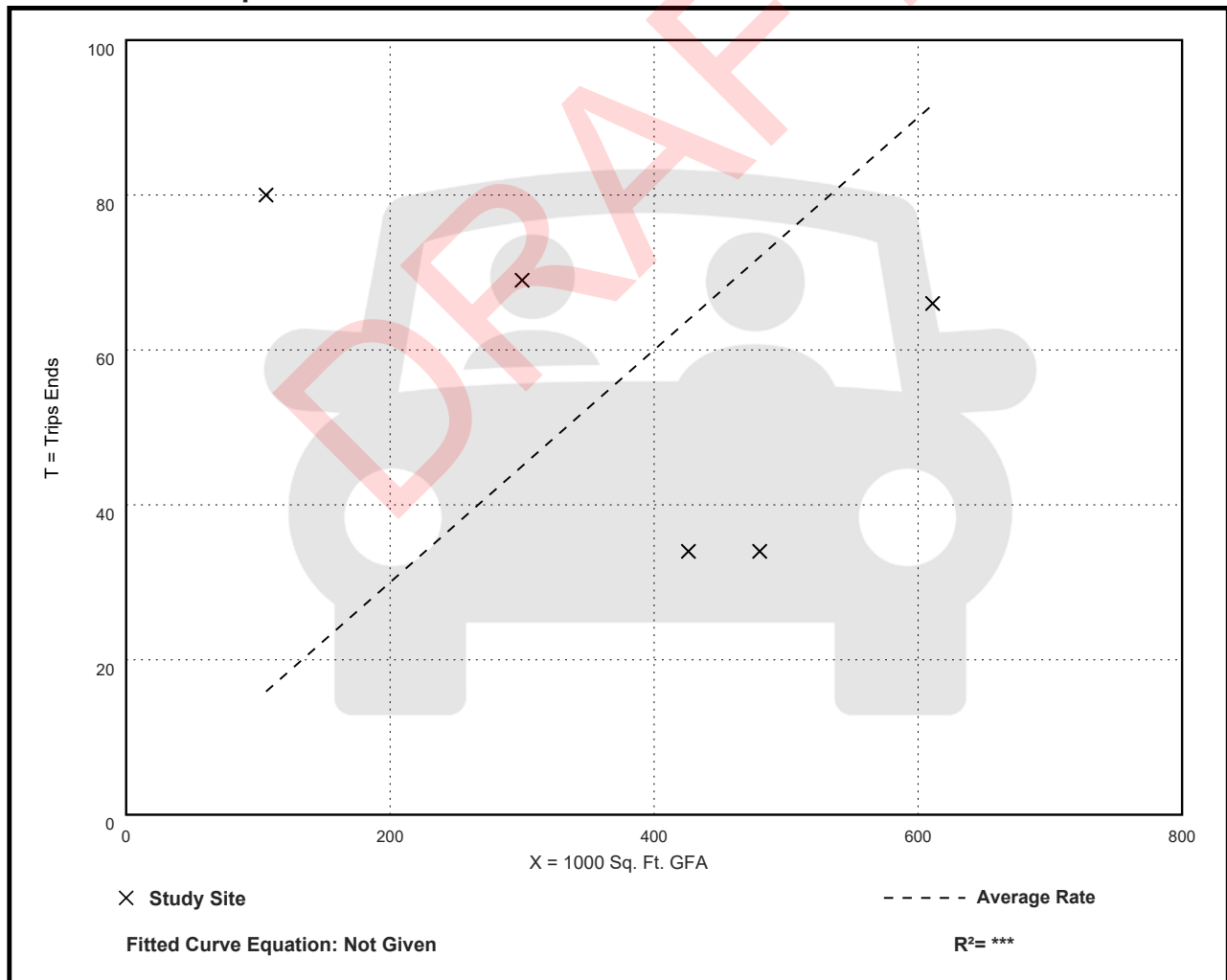
Avg. 1000 Sq. Ft. GFA: 385

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.07 - 0.75	0.17

Data Plot and Equation



Manufacturing (140)

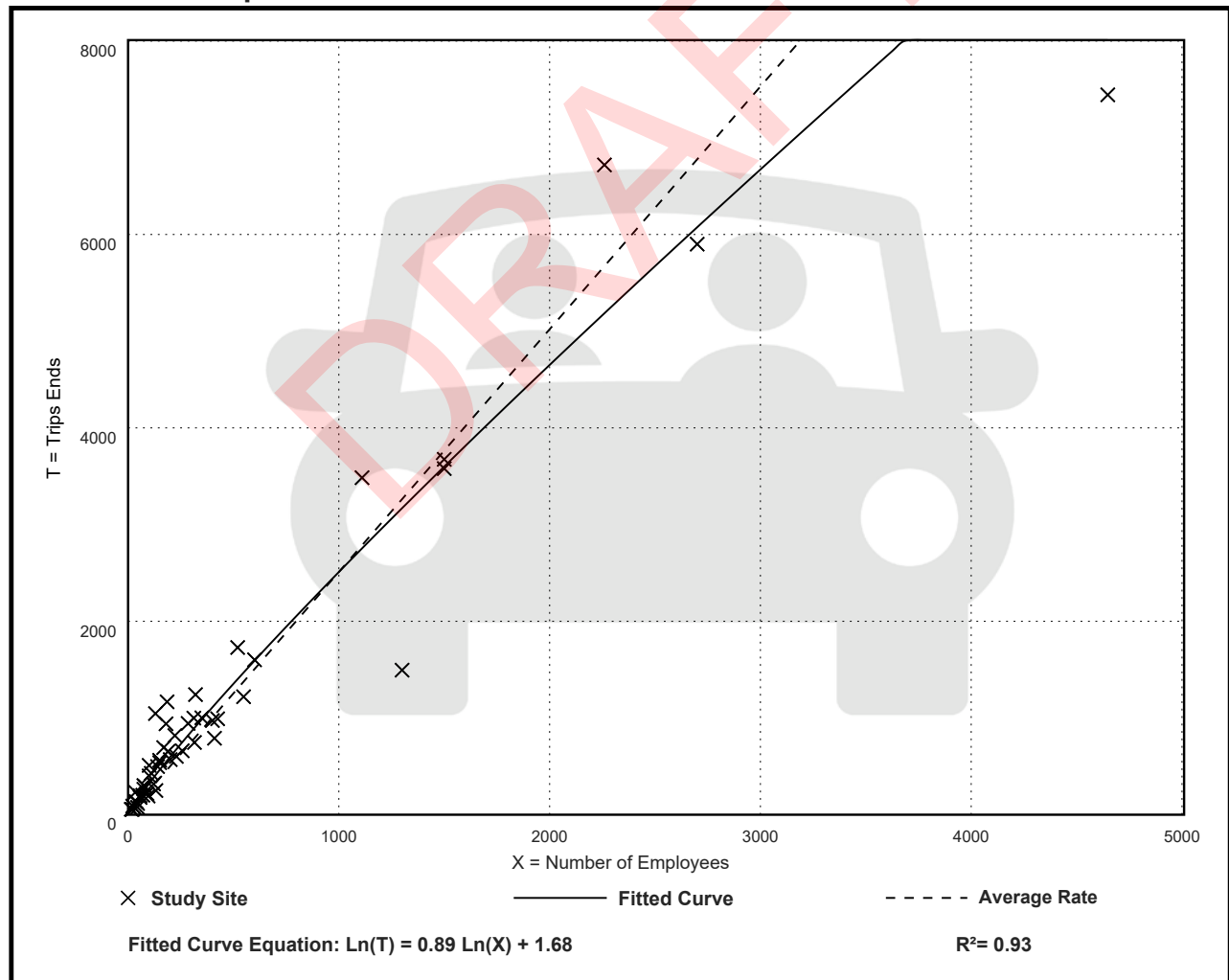
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 53
Avg. Num. of Employees: 437
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.51	1.15 - 8.05	0.96

Data Plot and Equation



Manufacturing (140)

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: 37

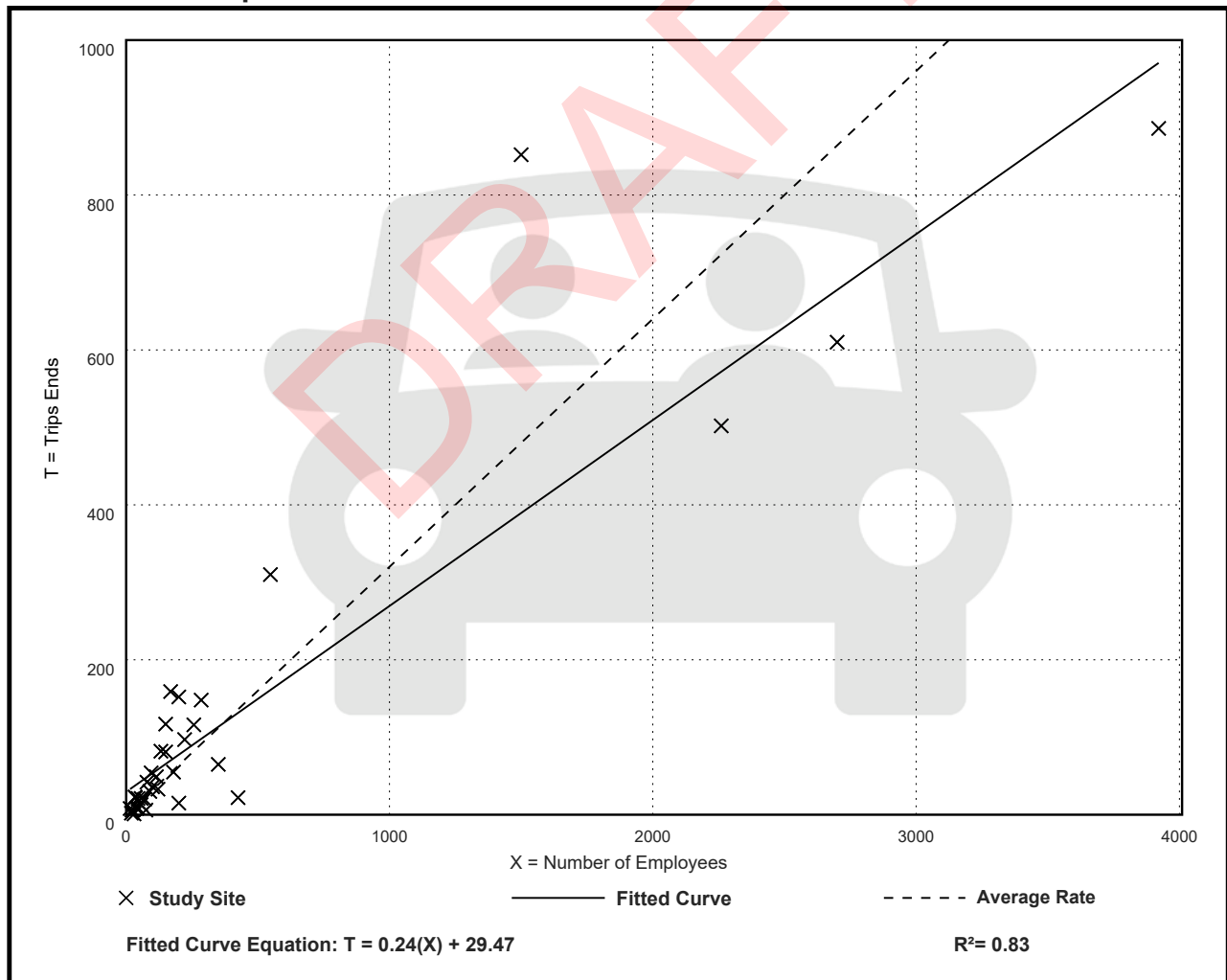
Avg. Num. of Employees: 400

Directional Distribution: 73% entering, 27% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.32	0.03 - 0.94	0.18

Data Plot and Equation



Manufacturing (140)

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: 37

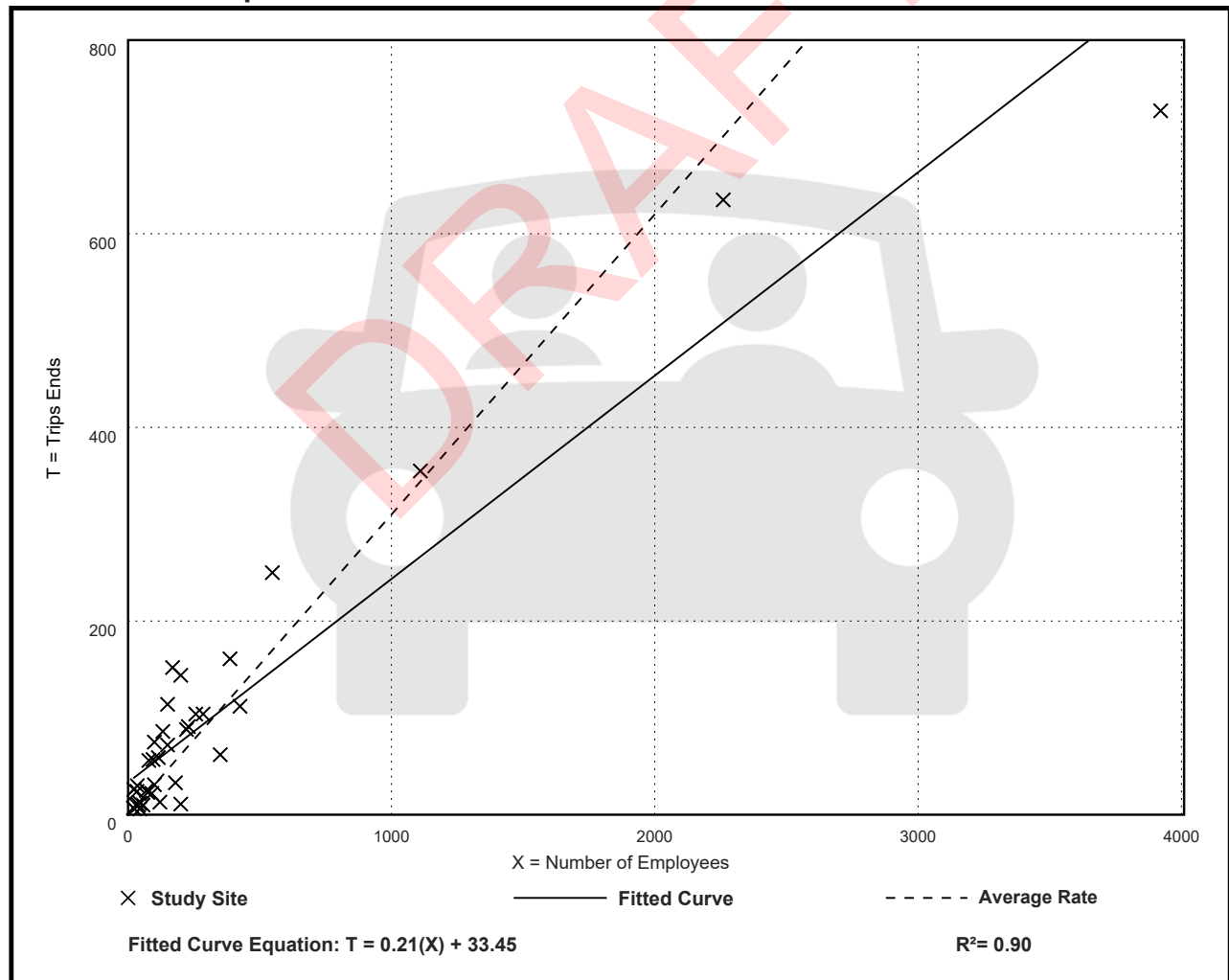
Avg. Num. of Employees: 334

Directional Distribution: 37% entering, 63% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.31	0.06 - 1.18	0.17

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Employees

On a: **Weekday,**

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 54

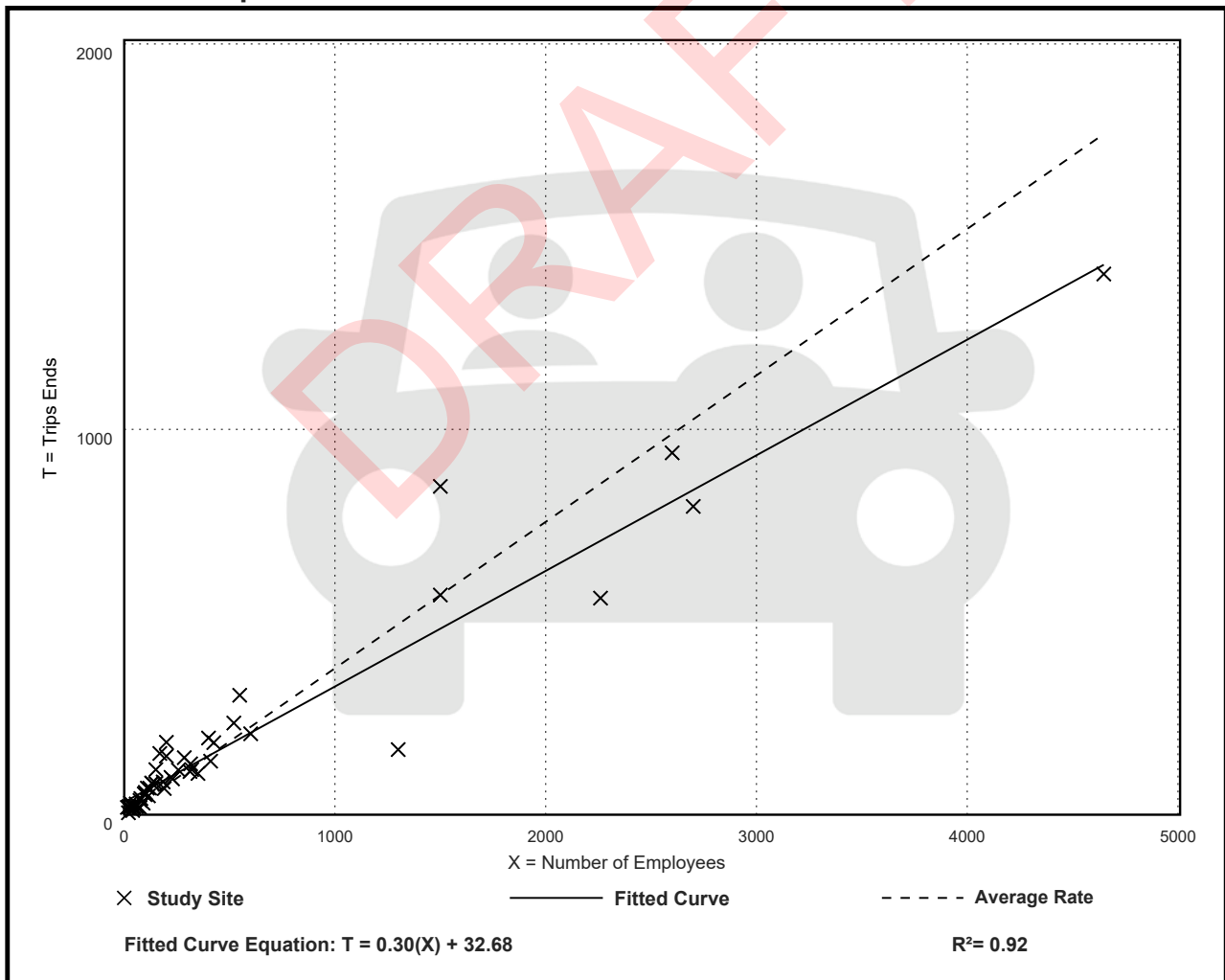
Avg. Num. of Employees: 459

Directional Distribution: 83% entering, 17% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.38	0.13 - 1.27	0.15

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Employees

On a: **Weekday,**

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 55

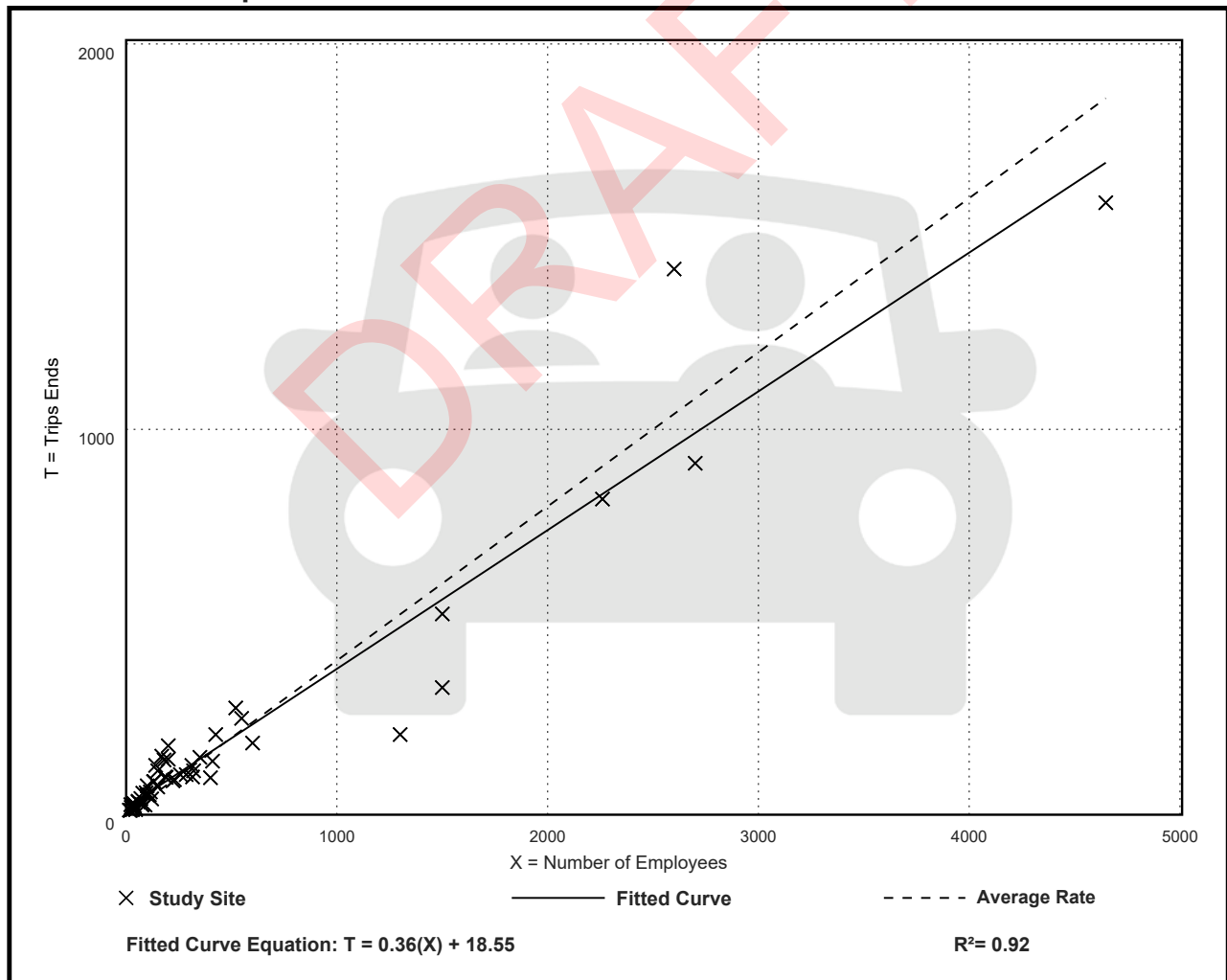
Avg. Num. of Employees: 454

Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.40	0.16 - 1.18	0.15

Data Plot and Equation



Manufacturing (140)

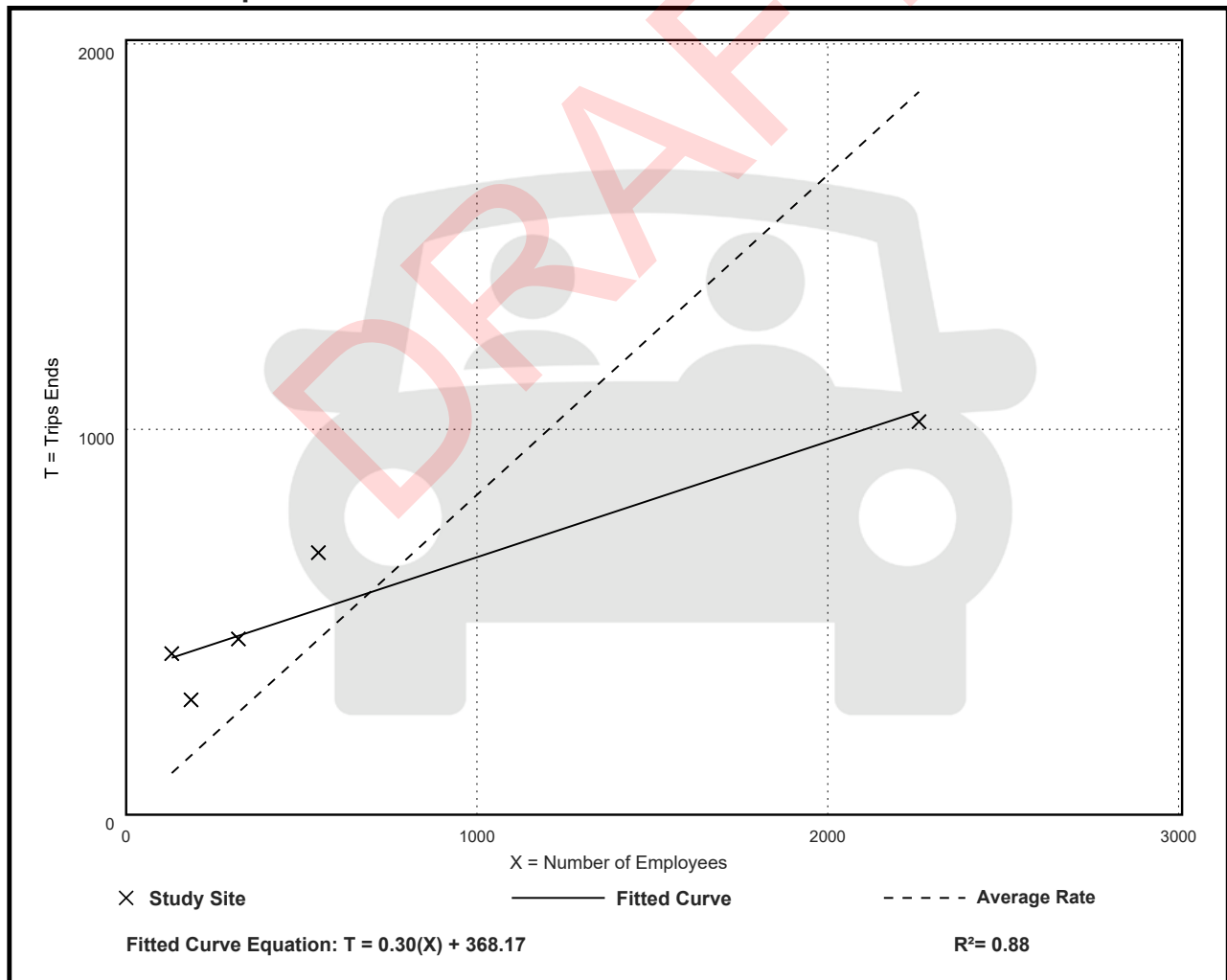
Vehicle Trip Ends vs: Employees
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 689
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.83	0.45 - 3.22	0.71

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Employees

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 5

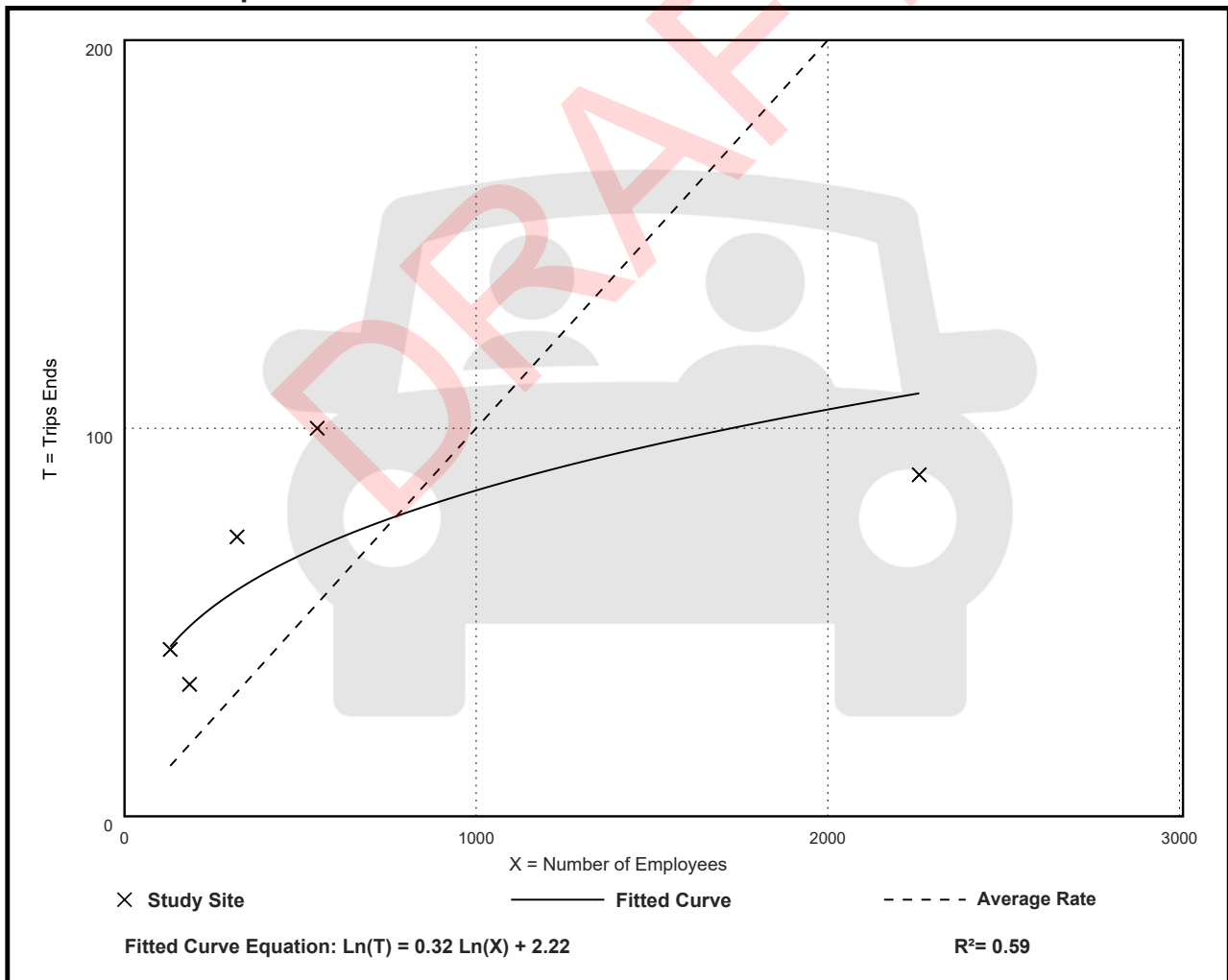
Avg. Num. of Employees: 689

Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.10	0.04 - 0.33	0.10

Data Plot and Equation



Manufacturing (140)

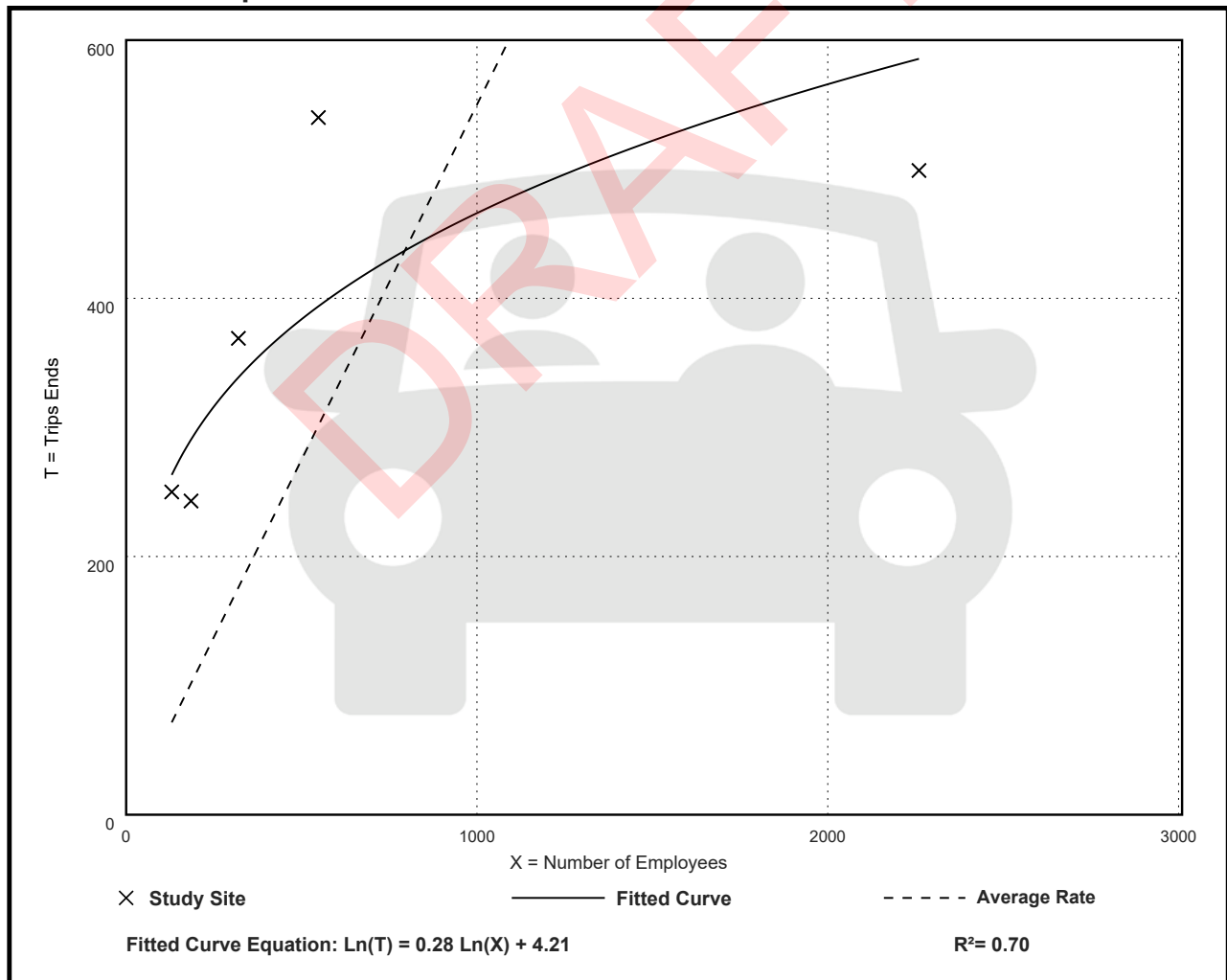
Vehicle Trip Ends vs: Employees
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 689
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.55	0.22 - 1.92	0.55

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Employees

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 5

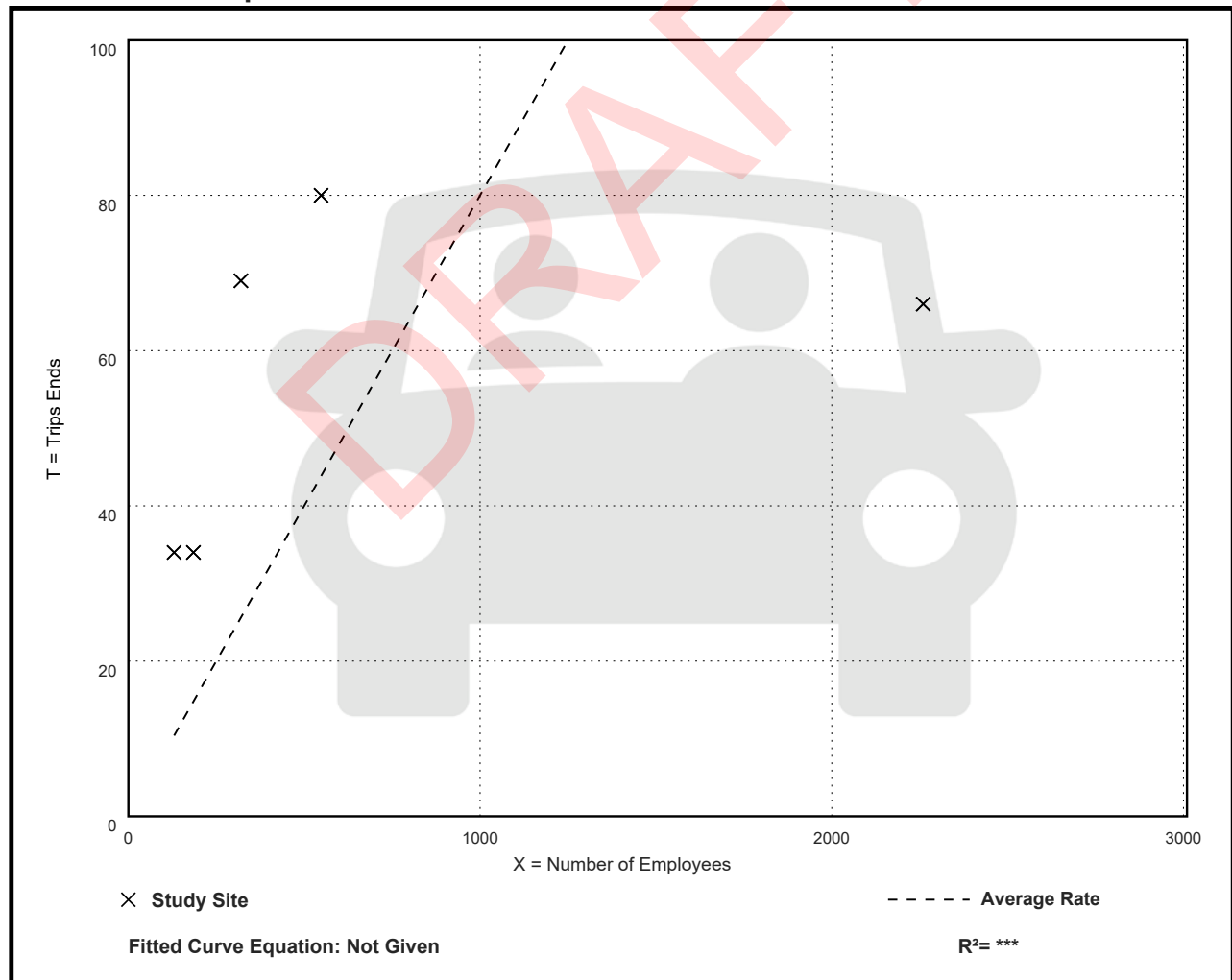
Avg. Num. of Employees: 689

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.08	0.03 - 0.26	0.09

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 37

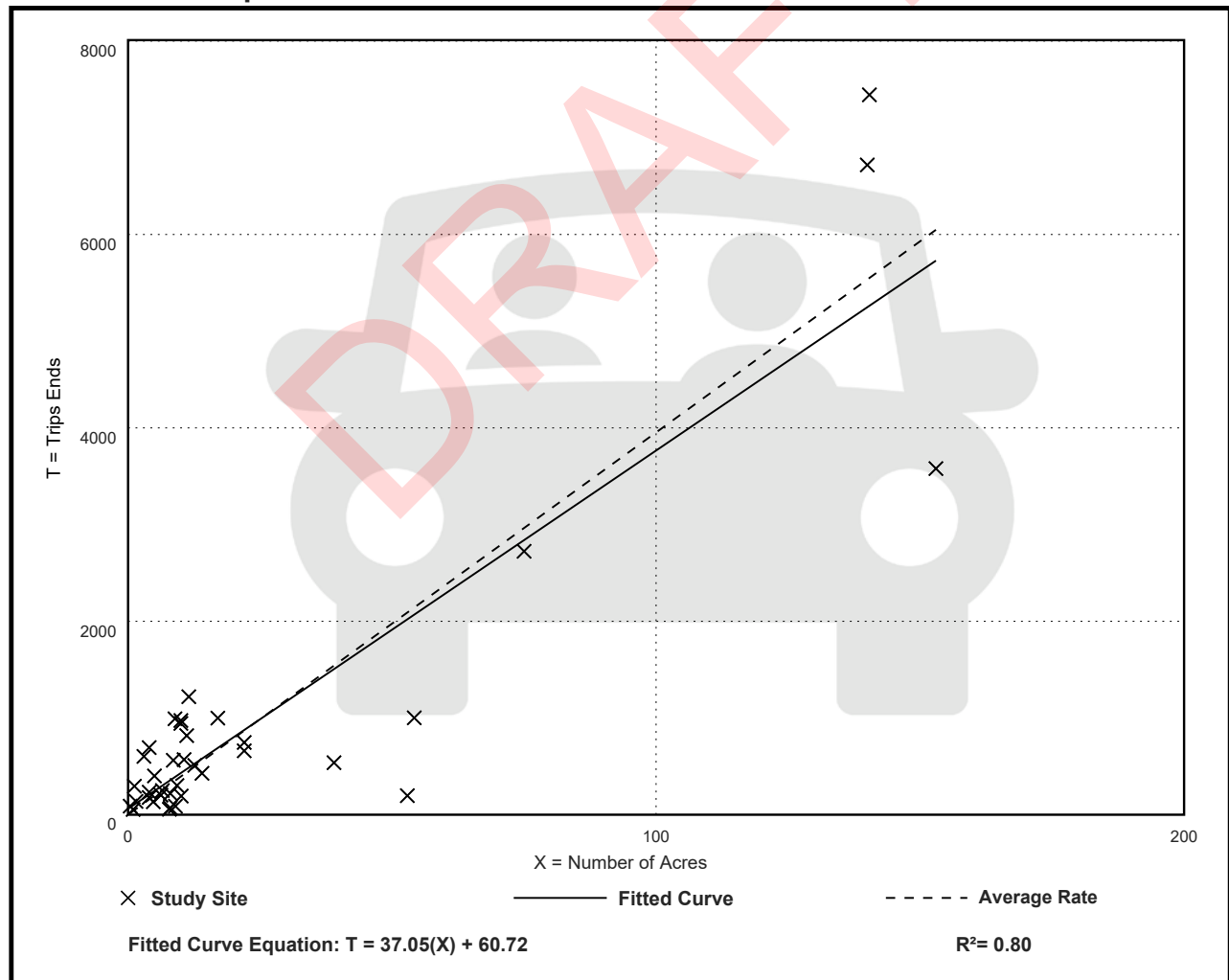
Avg. Num. of Acres: 24

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
39.53	3.72 - 245.83	27.04

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres

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: 32

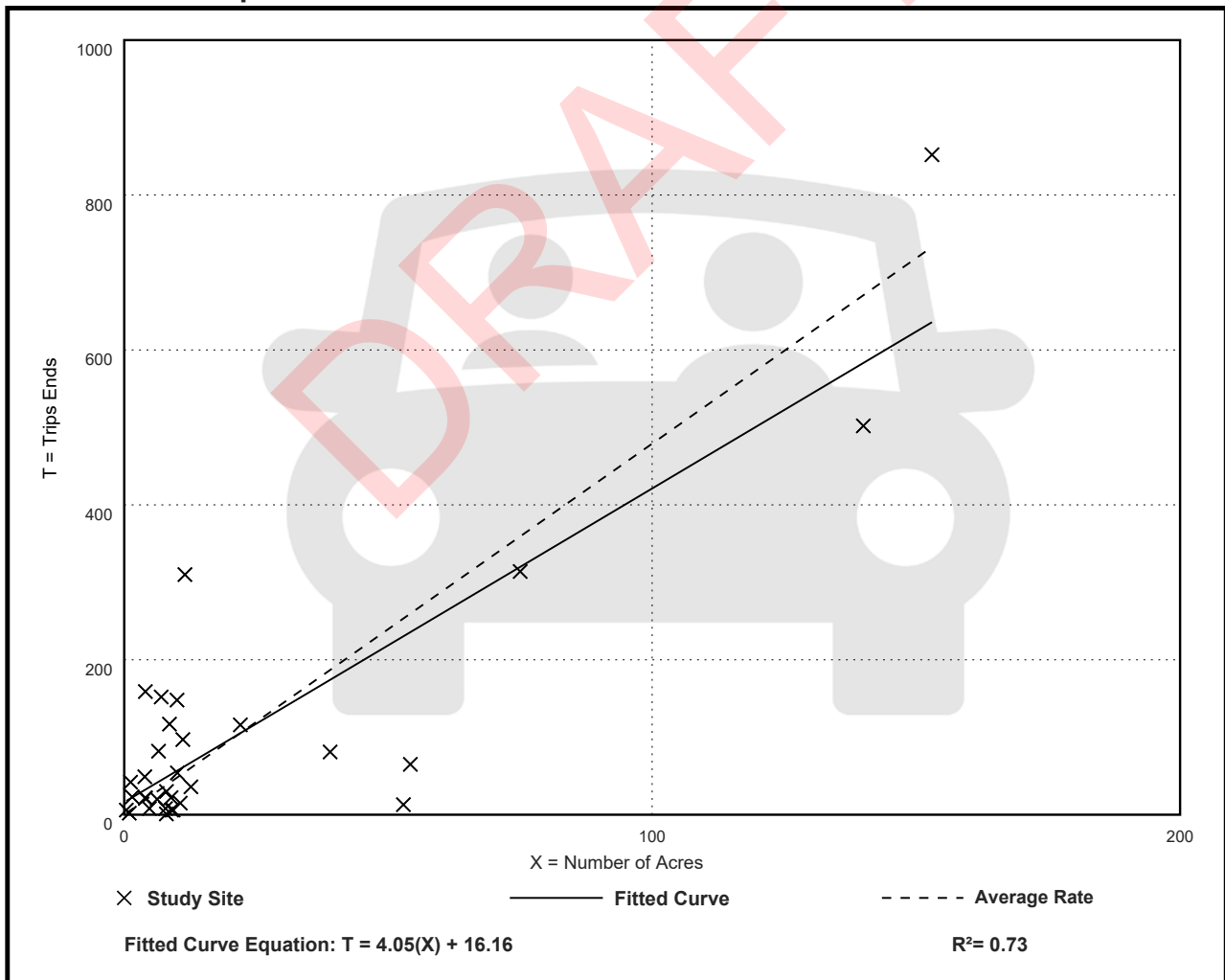
Avg. Num. of Acres: 22

Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
4.79	0.13 - 39.75	5.36

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres

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: 32

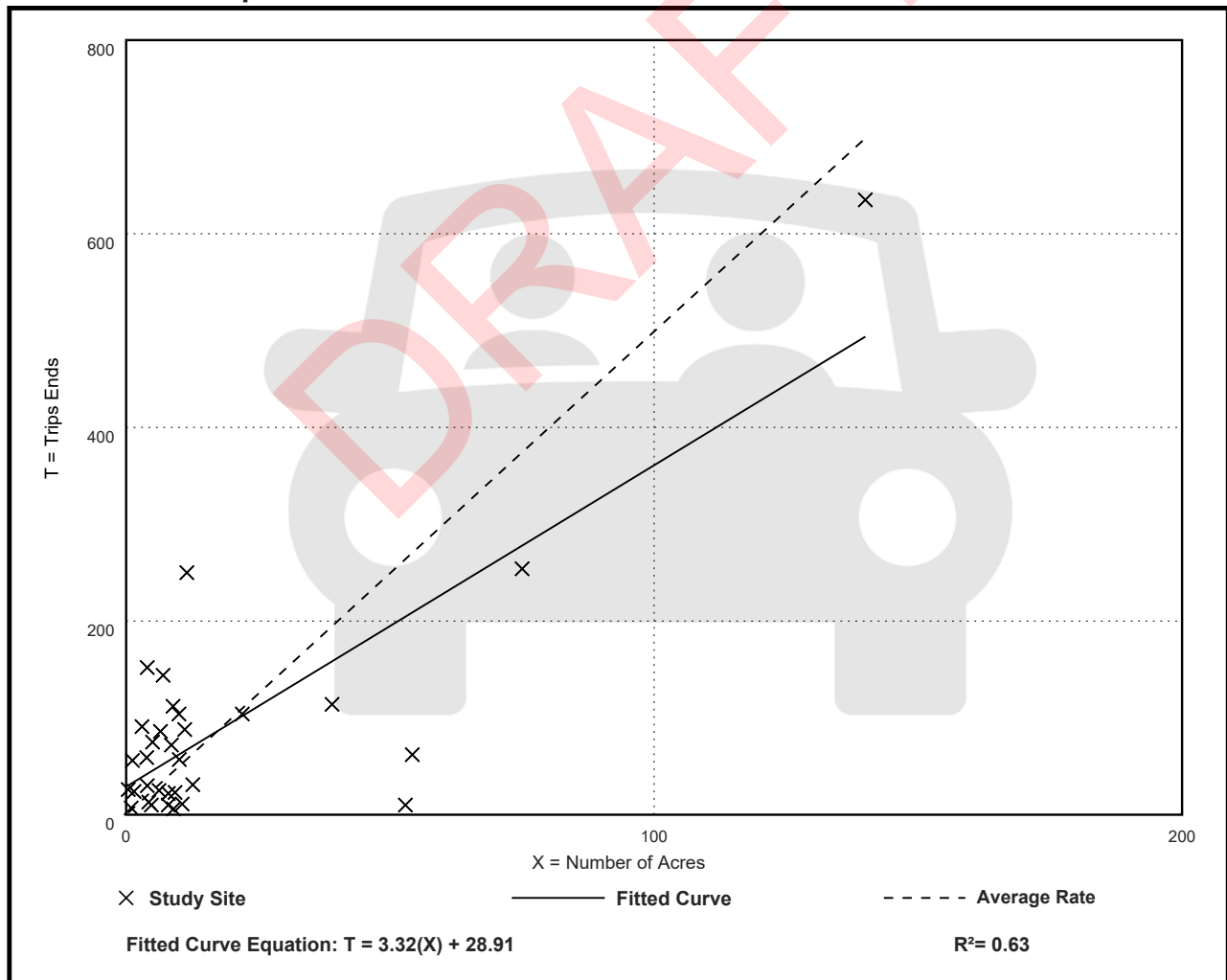
Avg. Num. of Acres: 17

Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
4.99	0.19 - 65.00	6.17

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres

On a: **Weekday,**

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 40

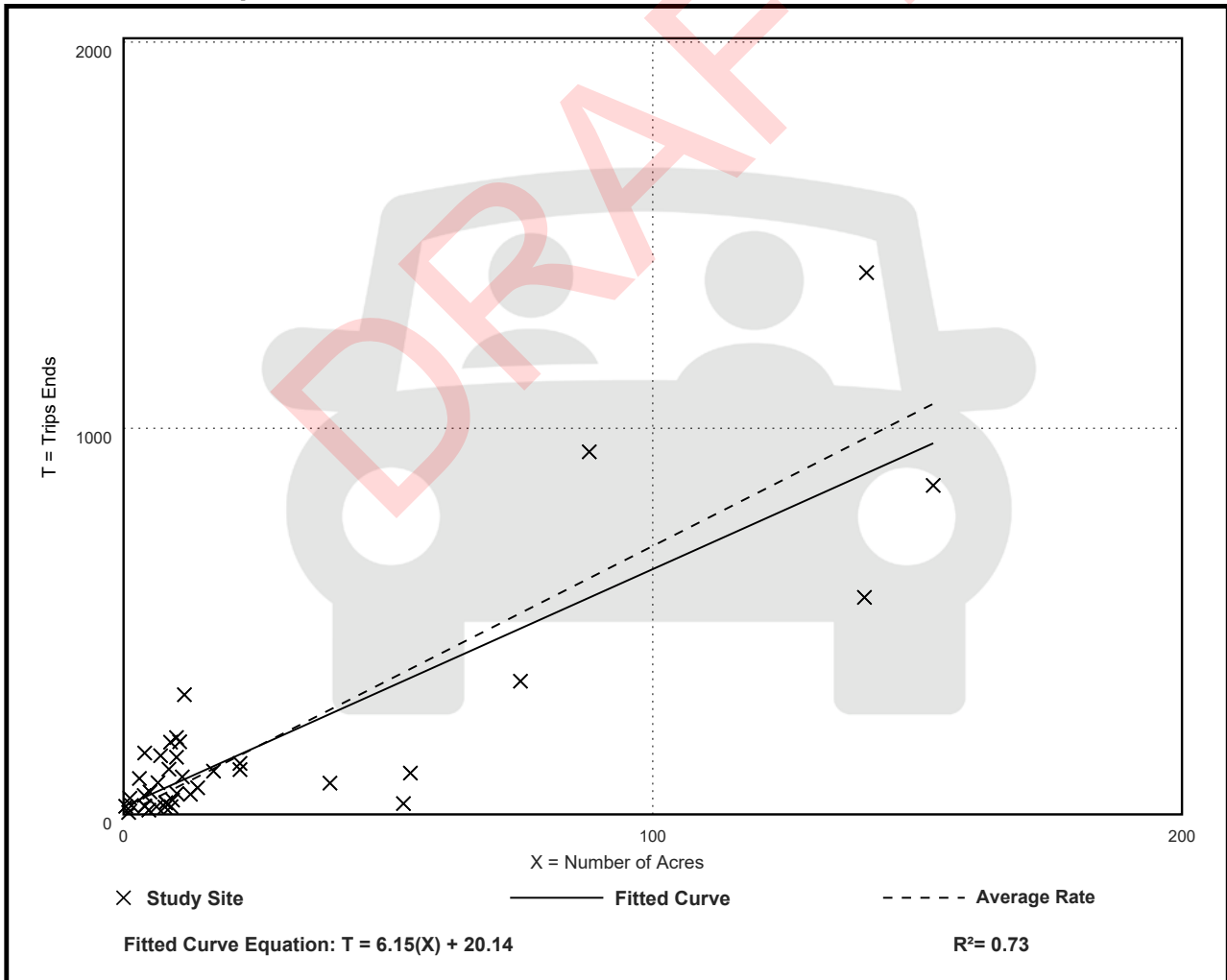
Avg. Num. of Acres: 25

Directional Distribution: 75% entering, 25% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
6.95	0.53 - 52.50	5.55

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres

On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 40

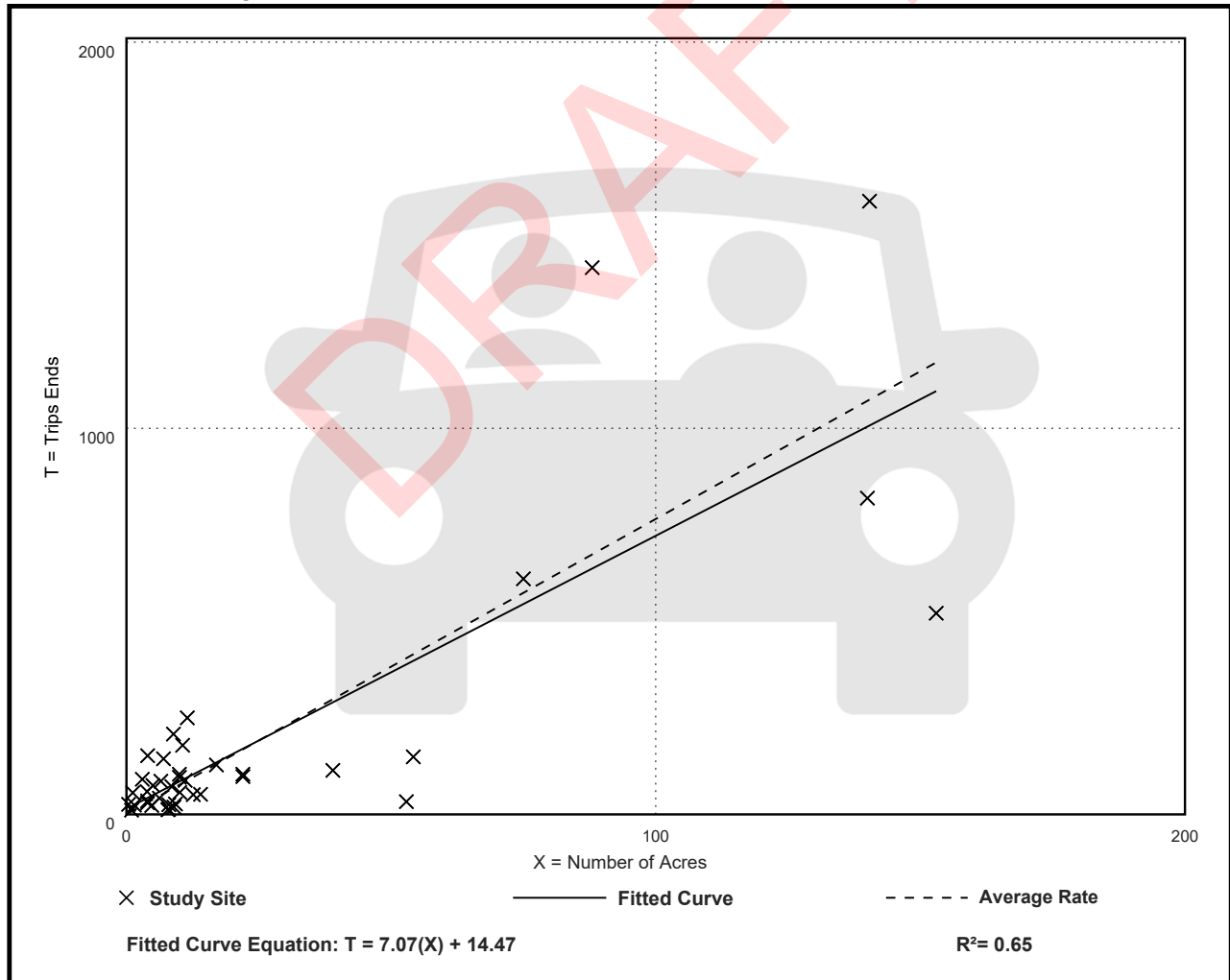
Avg. Num. of Acres: 25

Directional Distribution: 44% entering, 56% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
7.65	0.62 - 65.00	5.90

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: Acres
On a: Saturday

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Acres: 76

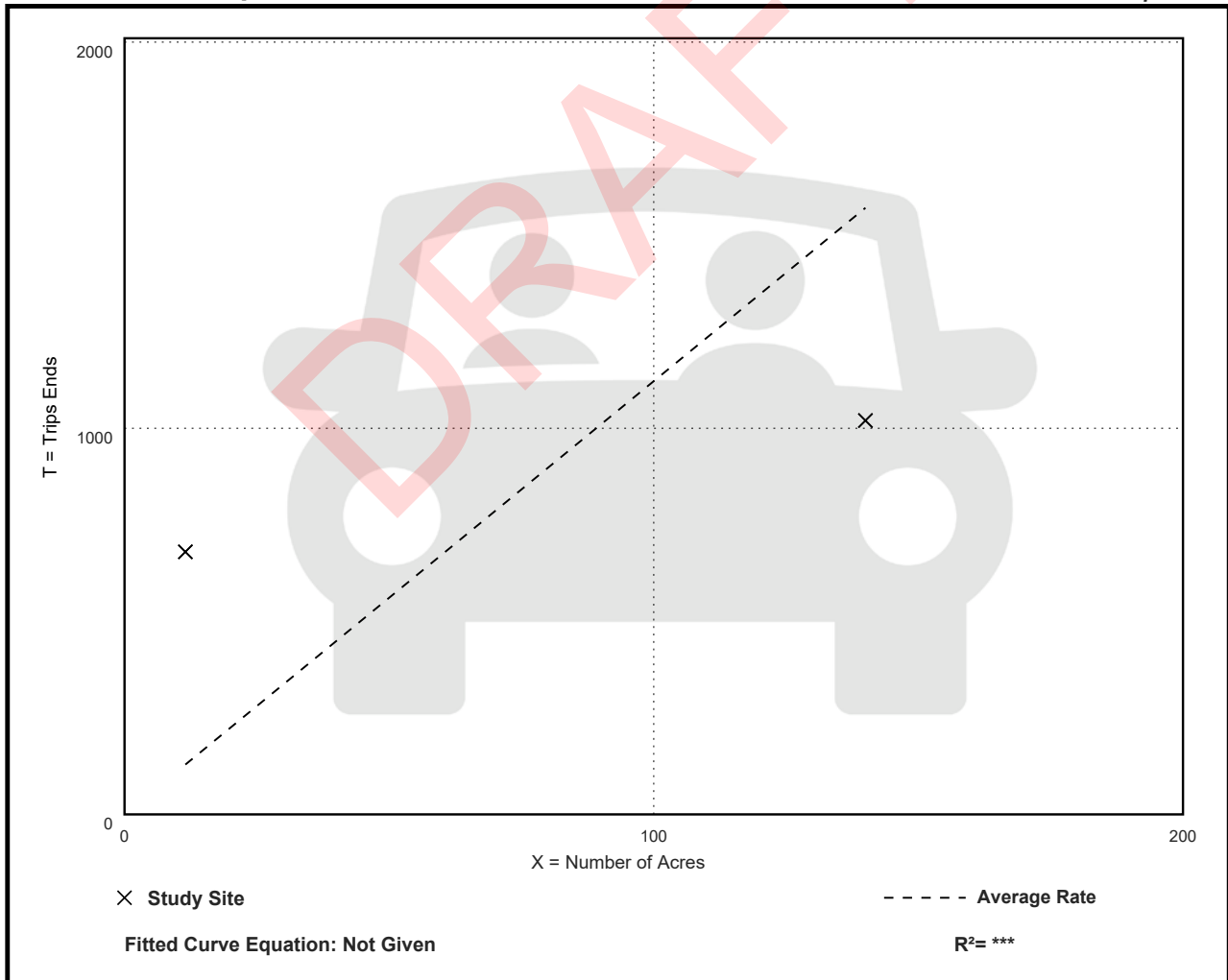
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
11.22	7.29 - 59.13	***

Data Plot and Equation

Caution – Small Sample Size



Manufacturing (140)

Vehicle Trip Ends vs: Acres

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Acres: 76

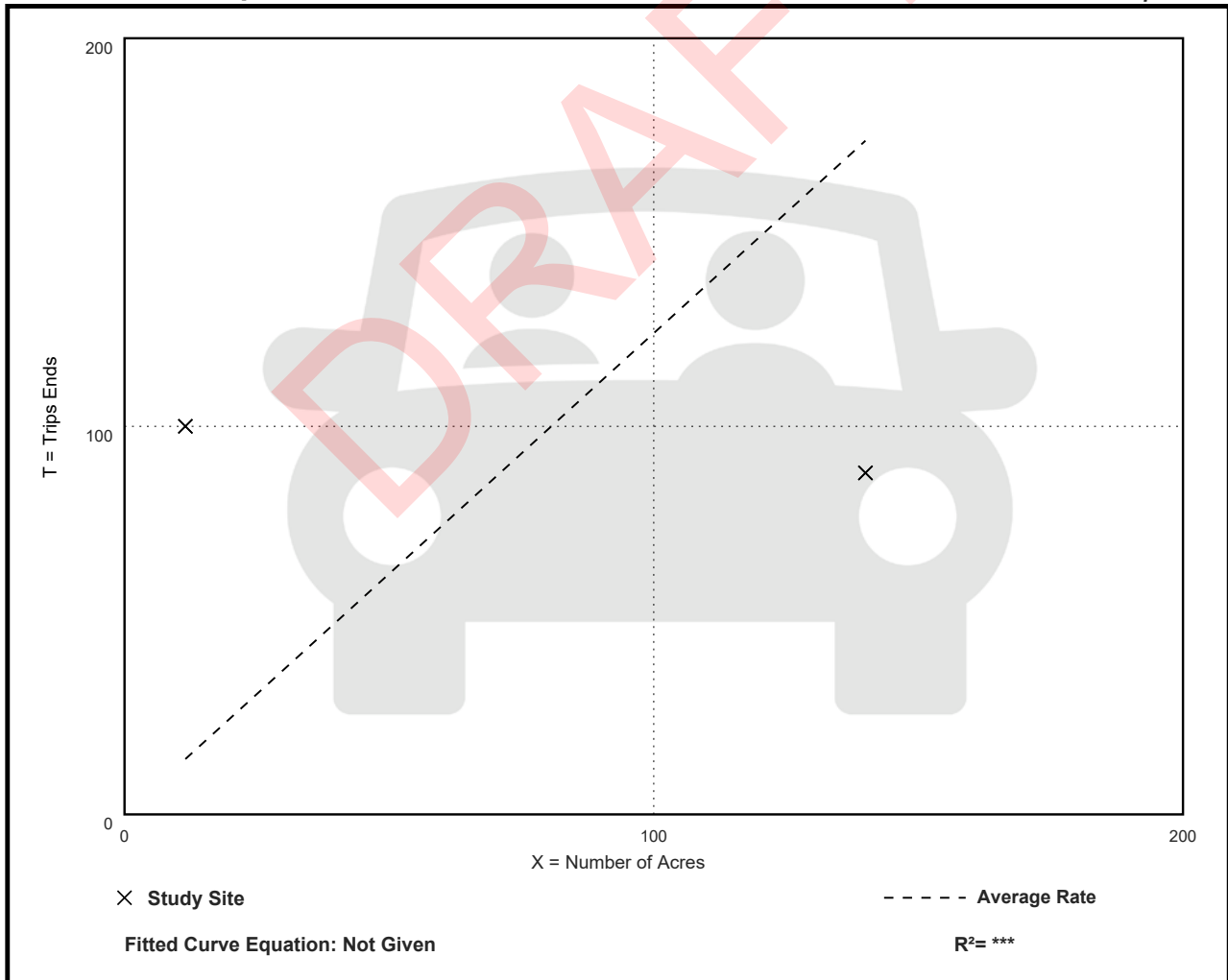
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
1.24	0.63 - 8.70	***

Data Plot and Equation

Caution – Small Sample Size



Manufacturing (140)

Vehicle Trip Ends vs: Acres
On a: Sunday

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Acres: 76

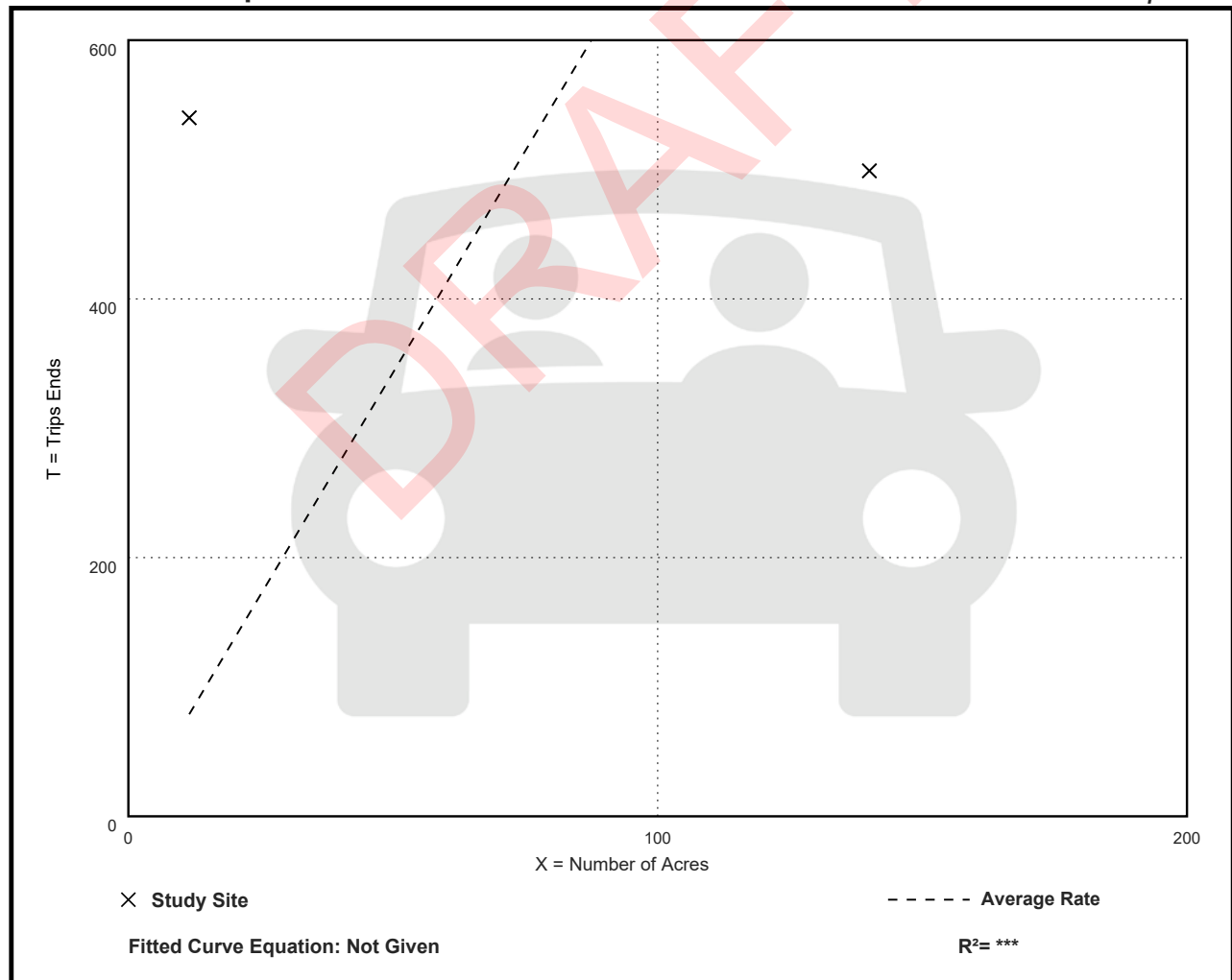
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
6.86	3.56 - 46.96	***

Data Plot and Equation

Caution – Small Sample Size



Manufacturing (140)

Vehicle Trip Ends vs: Acres

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. Num. of Acres: 76

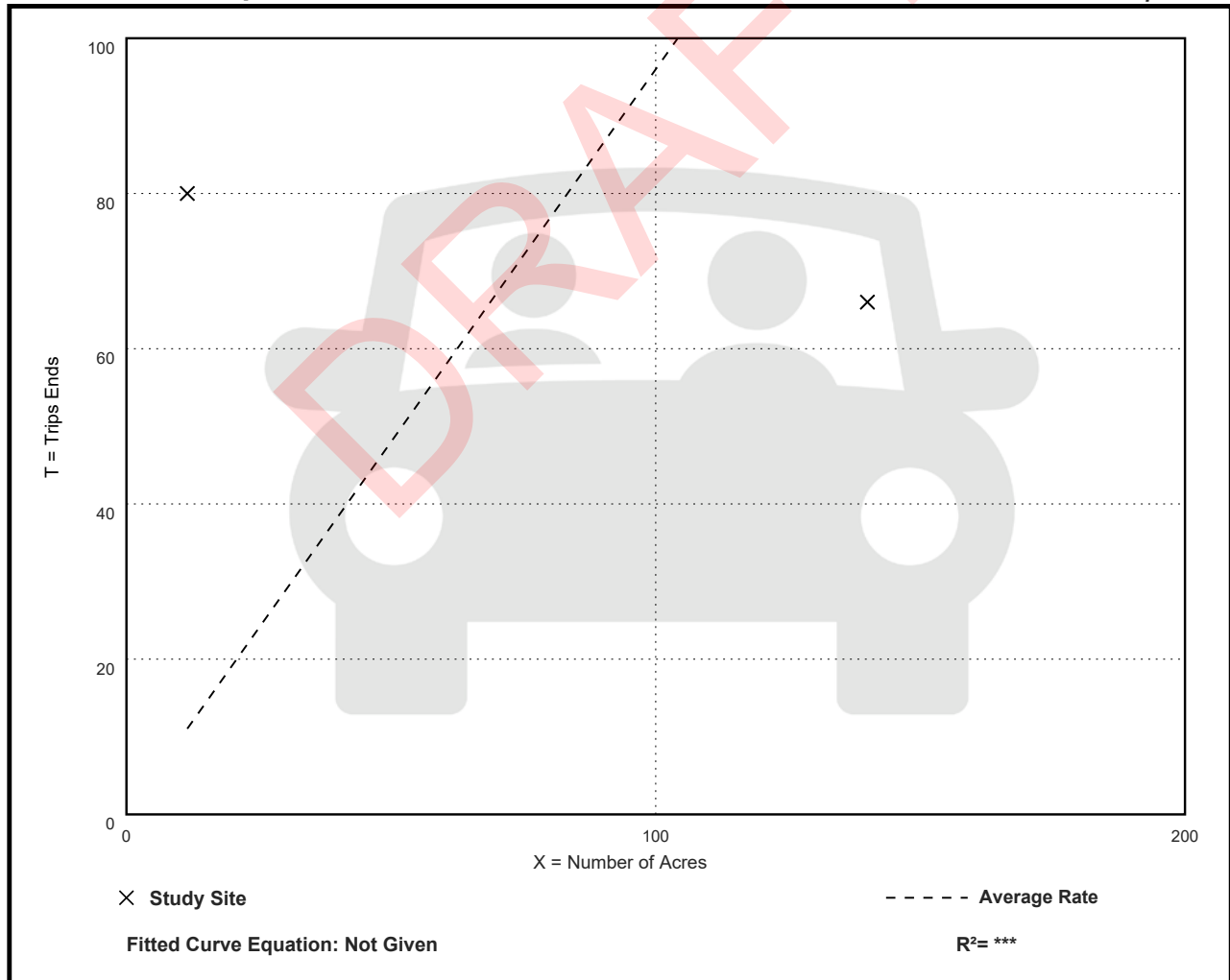
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Acre

Average Rate	Range of Rates	Standard Deviation
0.96	0.47 - 6.96	***

Data Plot and Equation

Caution – Small Sample Size



Manufacturing (140)

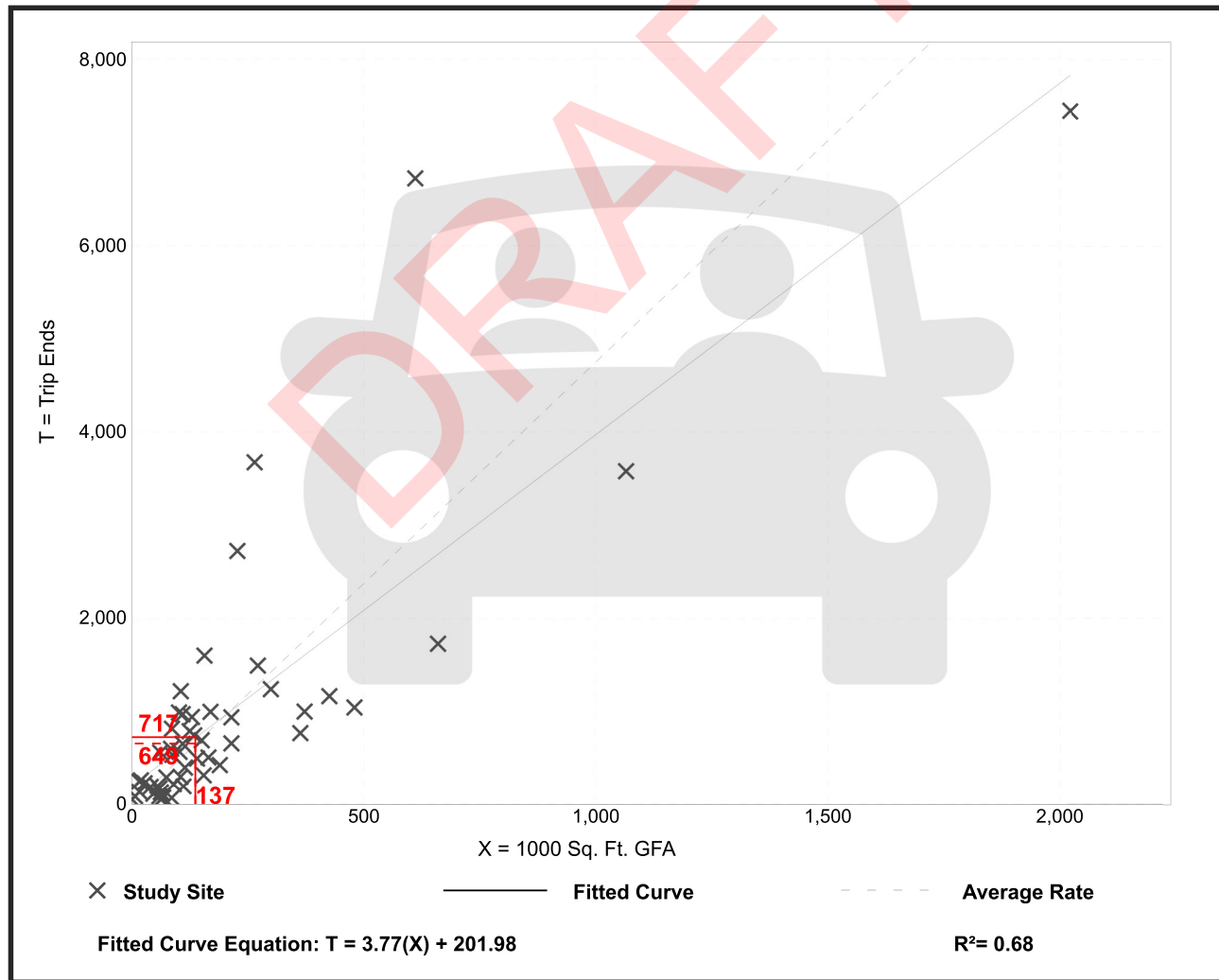
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 53
Avg. 1000 Sq. Ft. GFA: 208
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.75	0.83 - 49.50	3.20

Data Plot and Equation



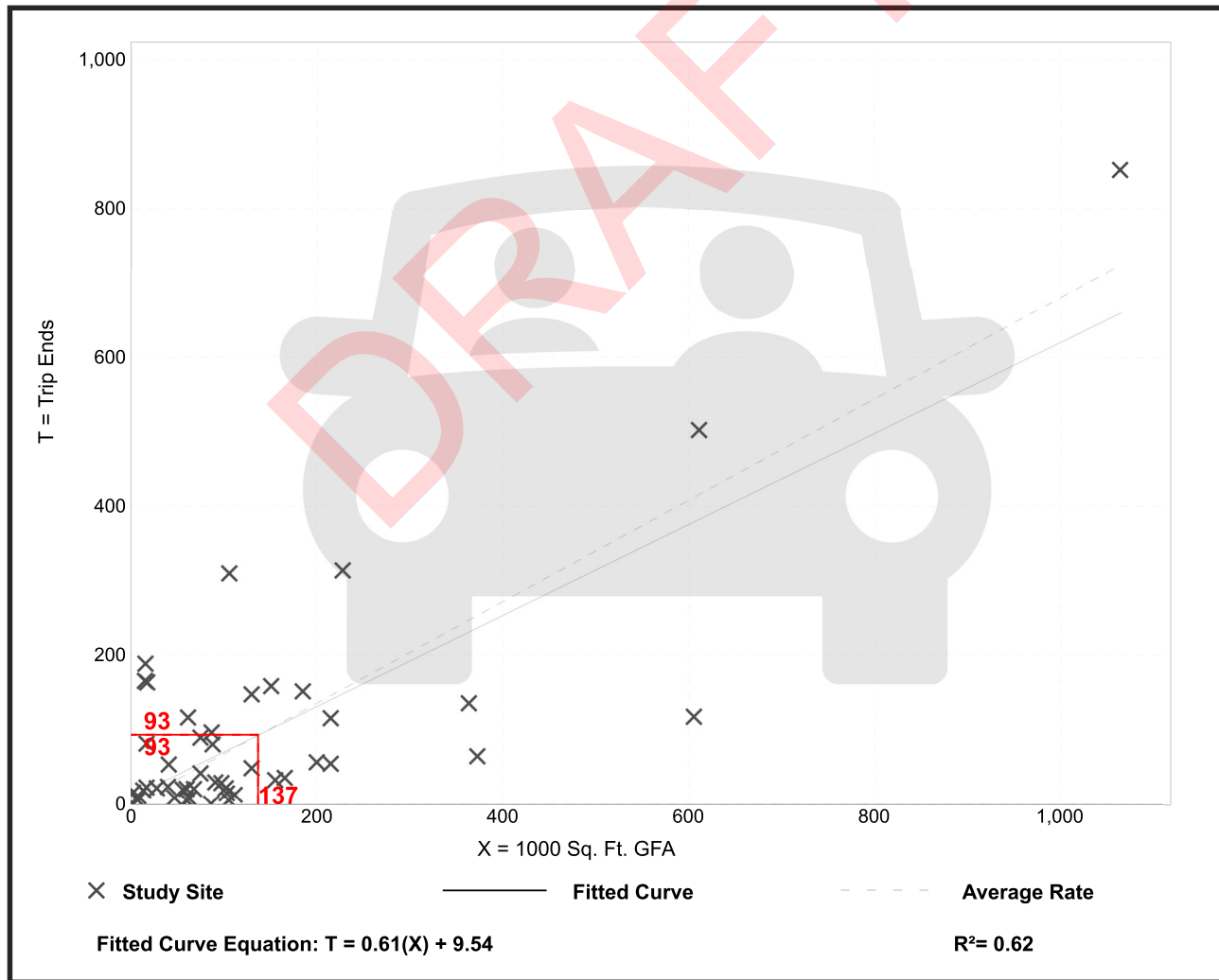
Manufacturing (140)

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: 48
 Avg. 1000 Sq. Ft. GFA: 138
 Directional Distribution: 76% entering, 24% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.68	0.01 - 11.93	1.03

Data Plot and Equation



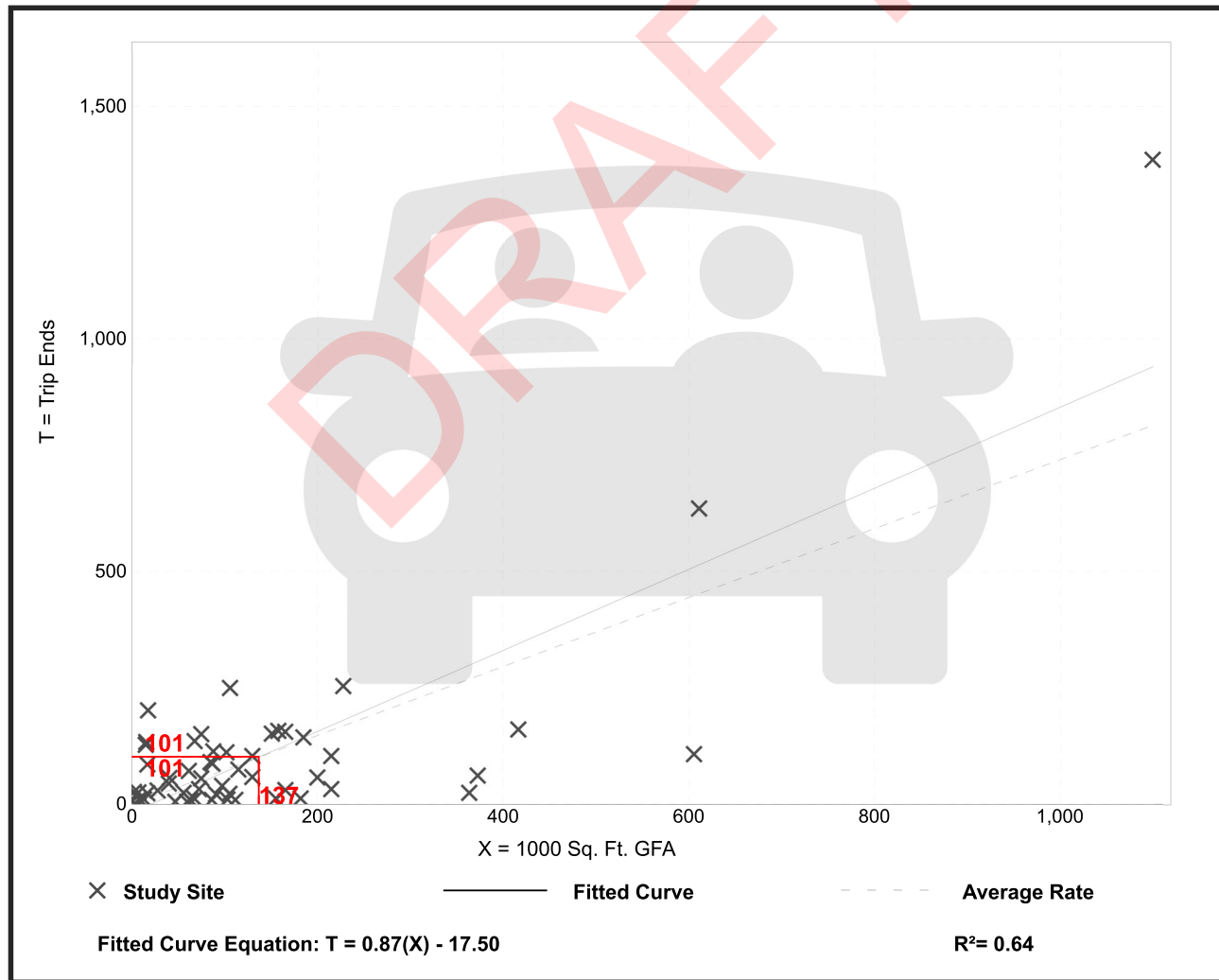
Manufacturing (140)

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: 55
 Avg. 1000 Sq. Ft. GFA: 142
 Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.07 - 11.37	0.93

Data Plot and Equation



Manufacturing (140)

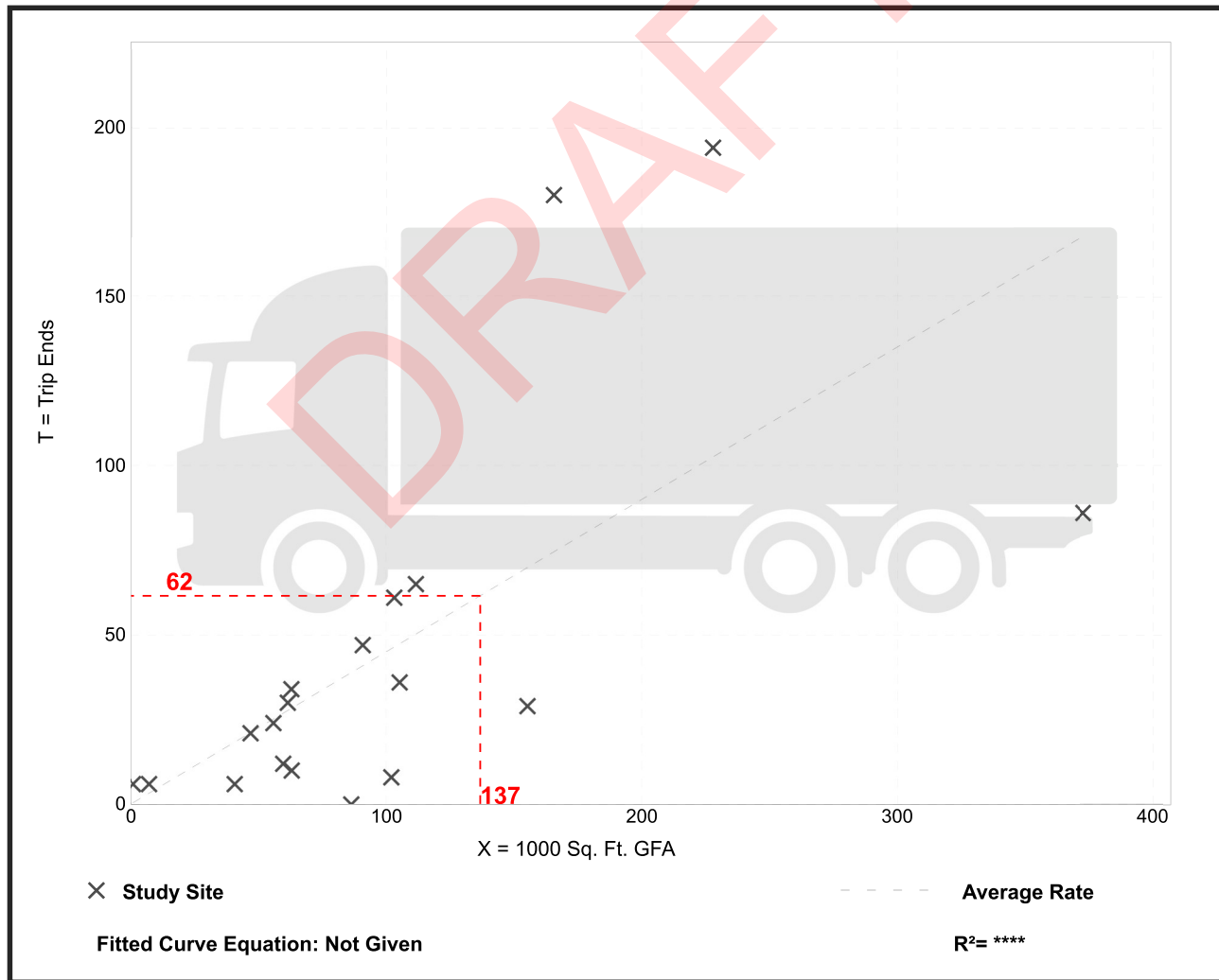
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 19
Avg. 1000 Sq. Ft. GFA: 101
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.45	0.00 - 5.50	0.34

Data Plot and Equation



Manufacturing (140)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

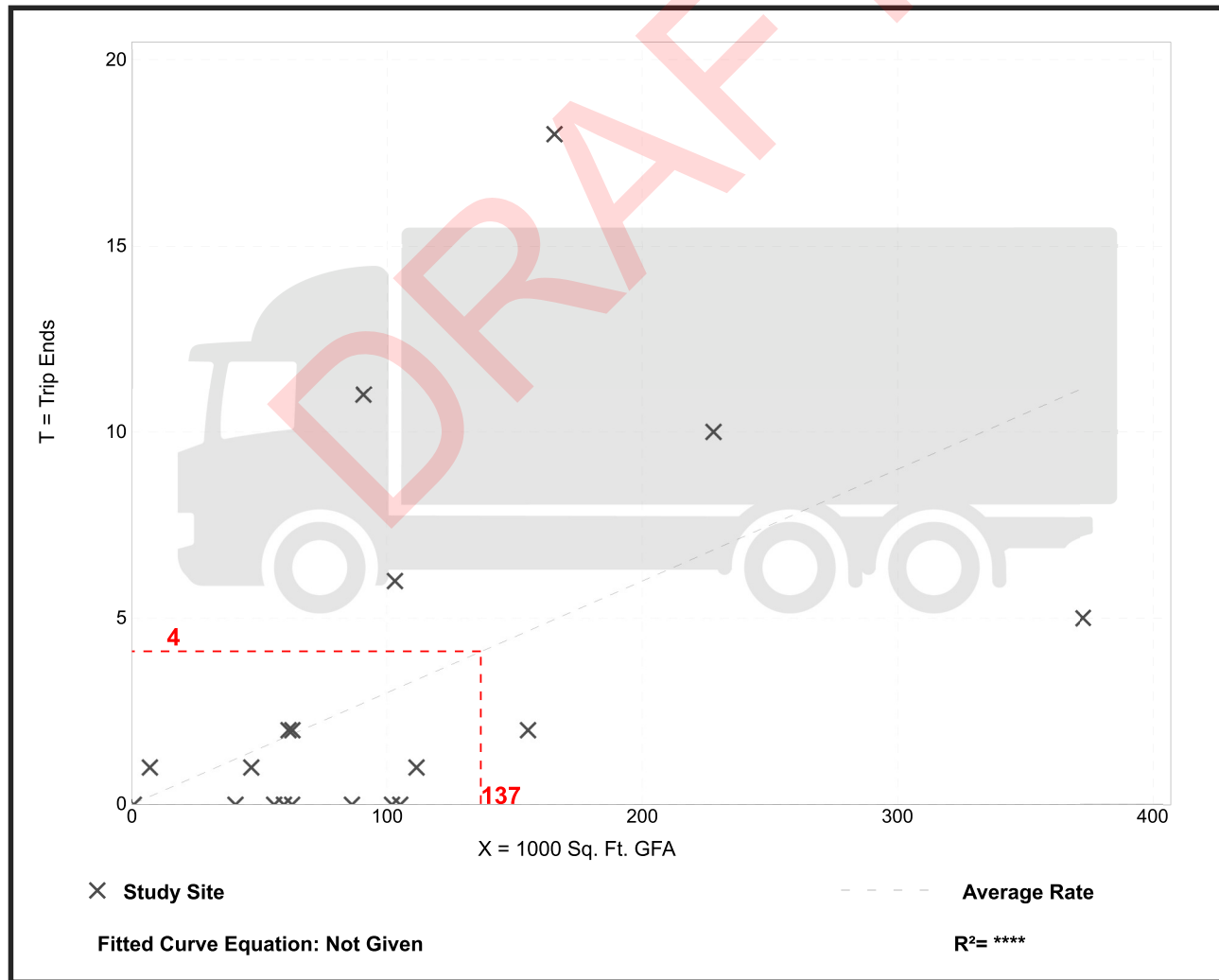
Setting/Location: General Urban/Suburban

Number of Studies: 19
 Avg. 1000 Sq. Ft. GFA: 101
 Directional Distribution: 56% entering, 44% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.14	0.04

Data Plot and Equation



Manufacturing (140)

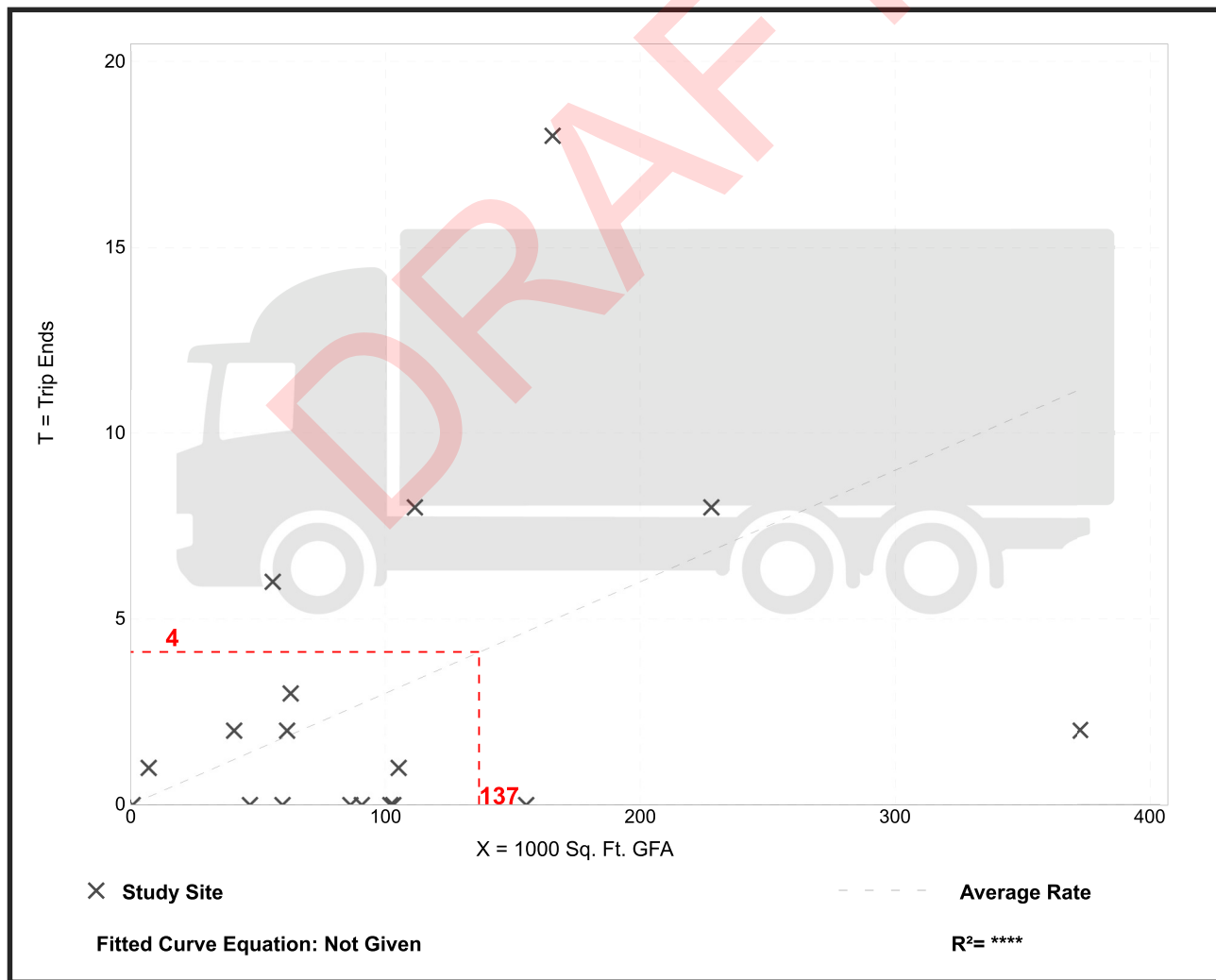
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 103
Directional Distribution: 41% entering, 59% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.14	0.04

Data Plot and Equation



Land Use: 150

Warehousing

Description

A warehouse is primarily devoted to the storage of materials, but it may also include office and maintenance areas. High-cube transload and short-term storage warehouse (Land Use 154), high-cube fulfillment center warehouse (Land Use 155), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related uses.

Additional Data

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

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, and Texas.

Source Numbers

184, 331, 406, 411, 443, 579, 583, 596, 598, 611, 619, 642, 752, 869, 875, 876, 914, 940, 1050

Warehousing (150)

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

Setting/Location: General Urban/Suburban

Number of Studies: 31

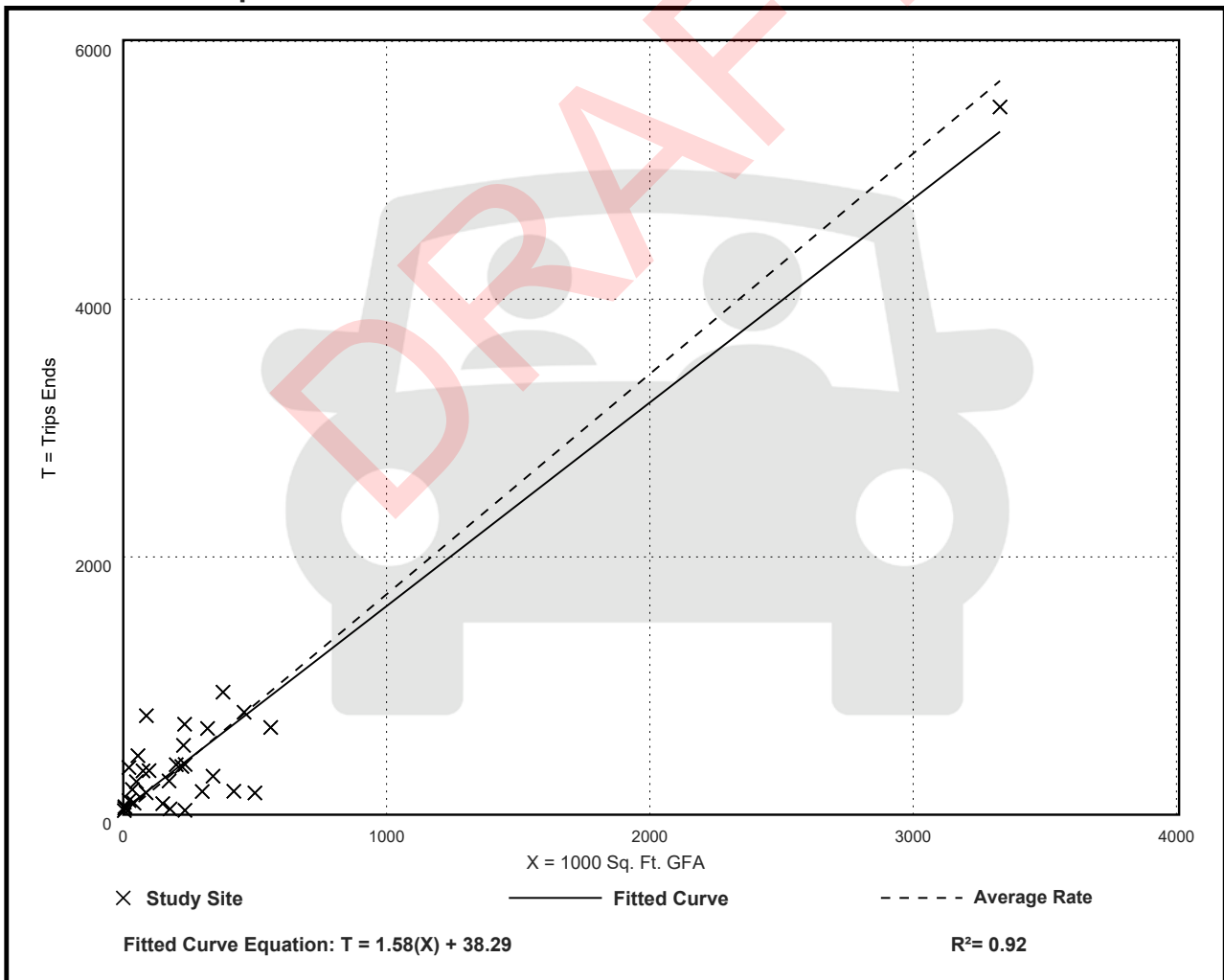
Avg. 1000 Sq. Ft. GFA: 292

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.71	0.15 - 16.93	1.48

Data Plot and Equation



Warehousing (150)

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: 36

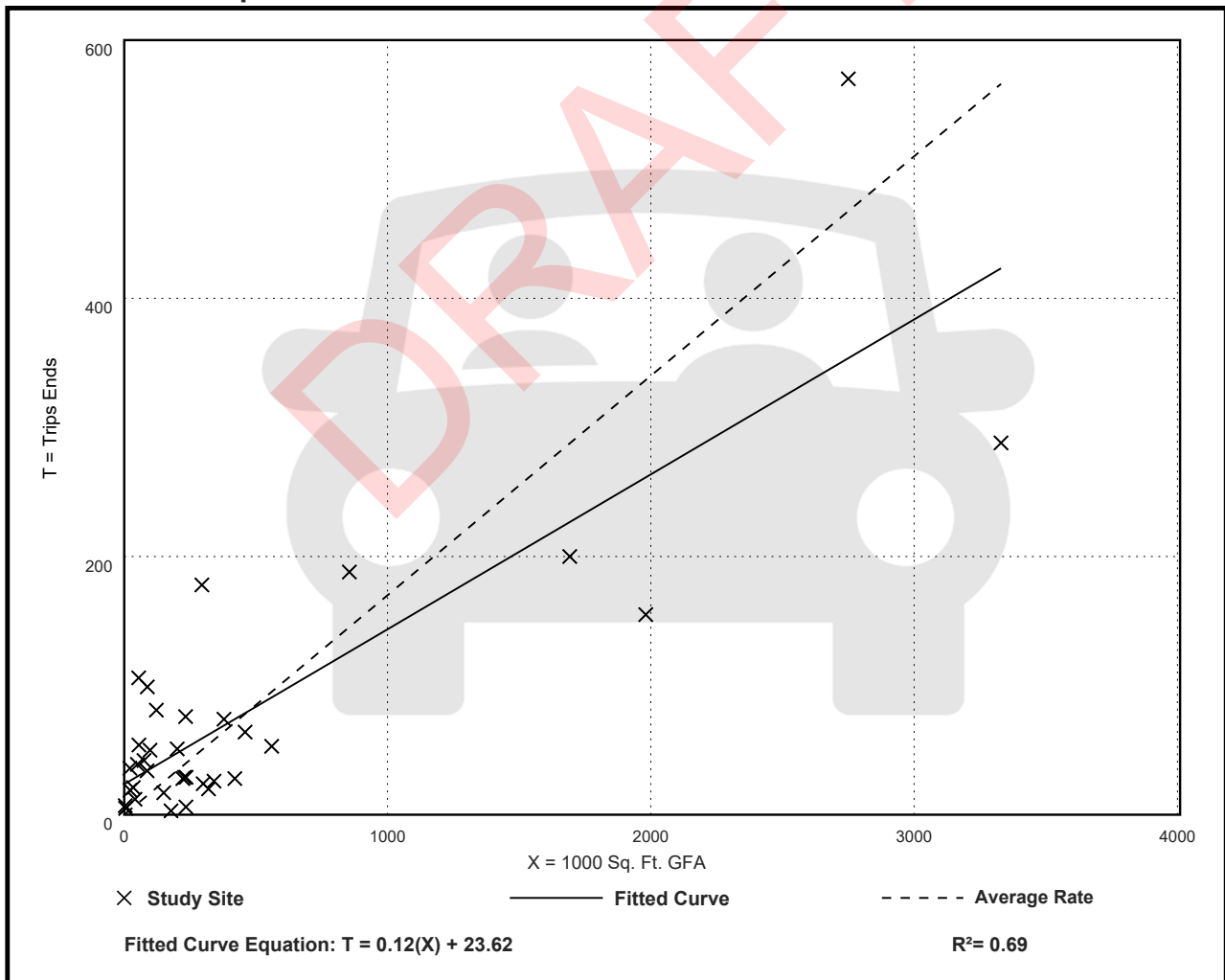
Avg. 1000 Sq. Ft. GFA: 448

Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.19

Data Plot and Equation



Warehousing (150)

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: 49

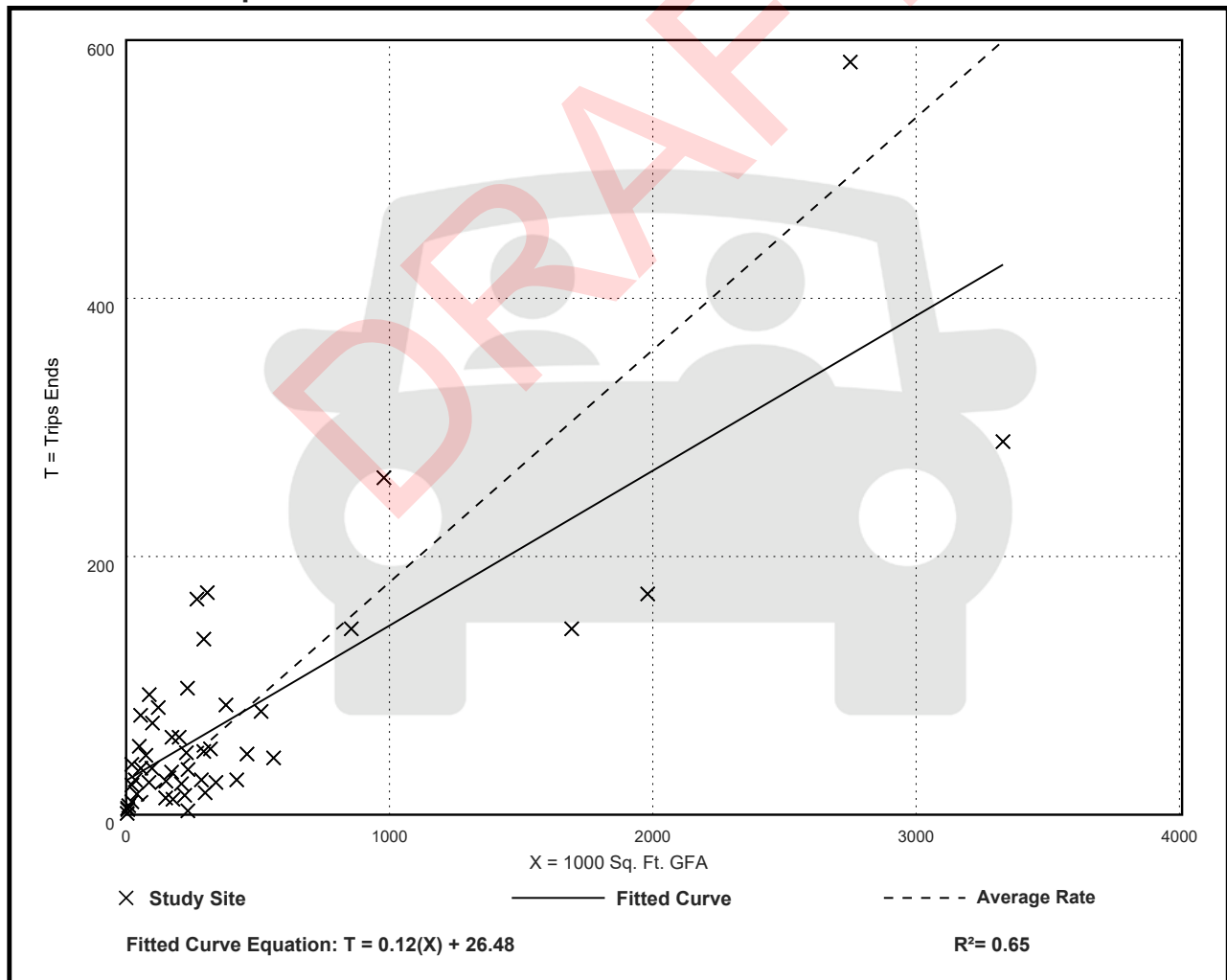
Avg. 1000 Sq. Ft. GFA: 400

Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.01 - 1.80	0.18

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

**On a: Weekday,
AM Peak Hour of Generator**

Setting/Location: General Urban/Suburban

Number of Studies: 25

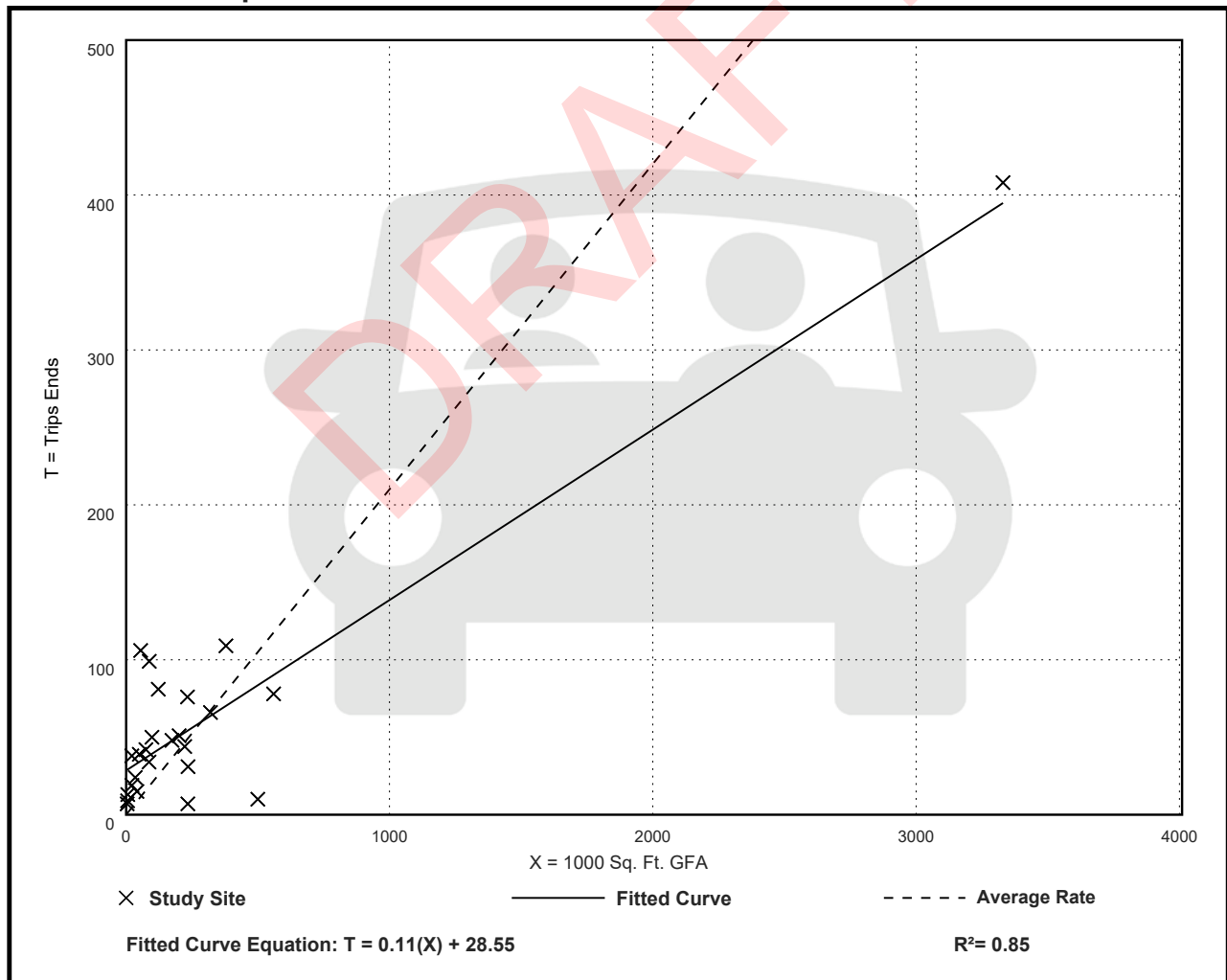
Avg. 1000 Sq. Ft. GFA: 284

Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.21	0.02 - 2.08	0.26

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 27

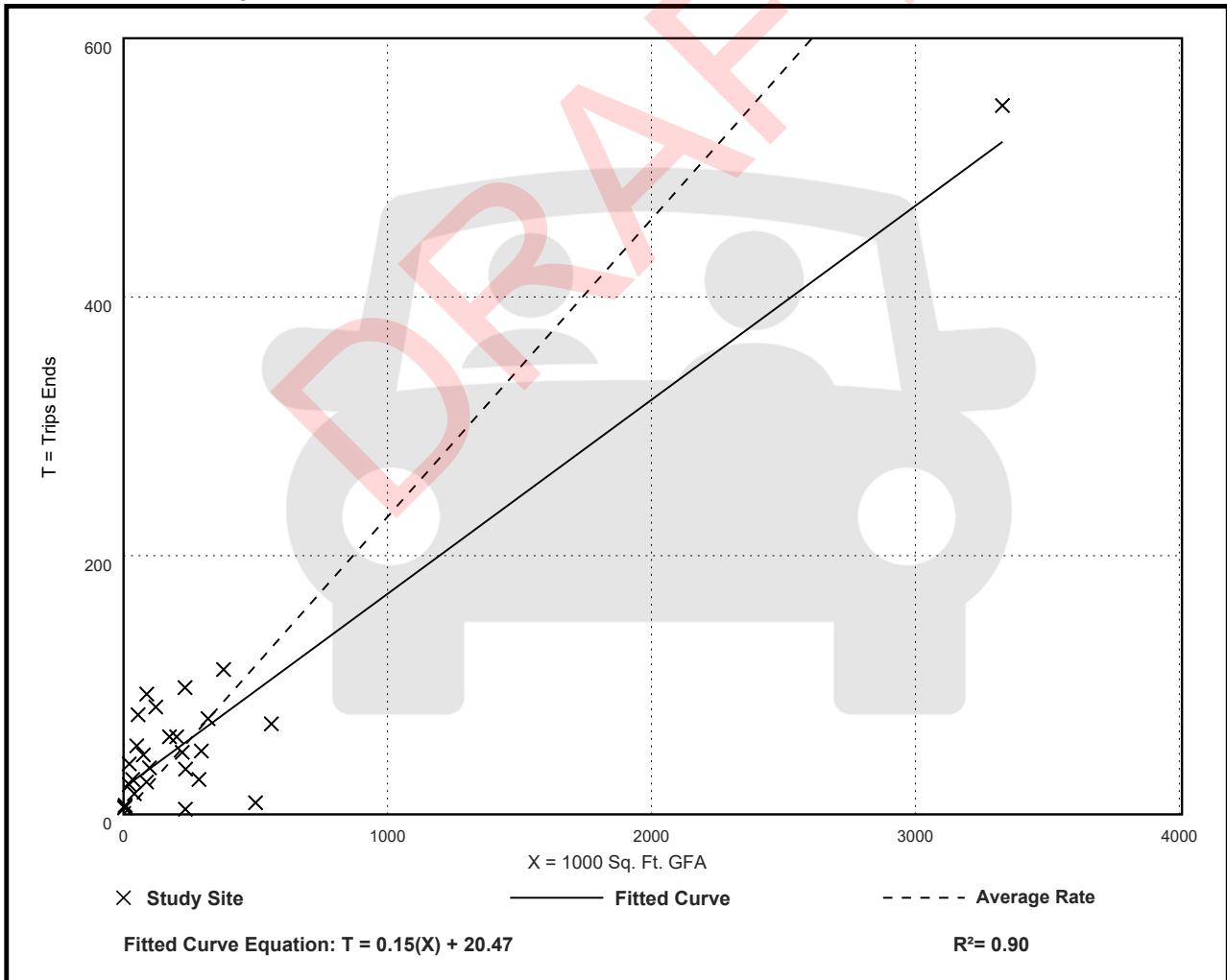
Avg. 1000 Sq. Ft. GFA: 284

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.23	0.02 - 1.80	0.23

Data Plot and Equation



Warehousing (150)

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

Setting/Location: General Urban/Suburban

Number of Studies: 3

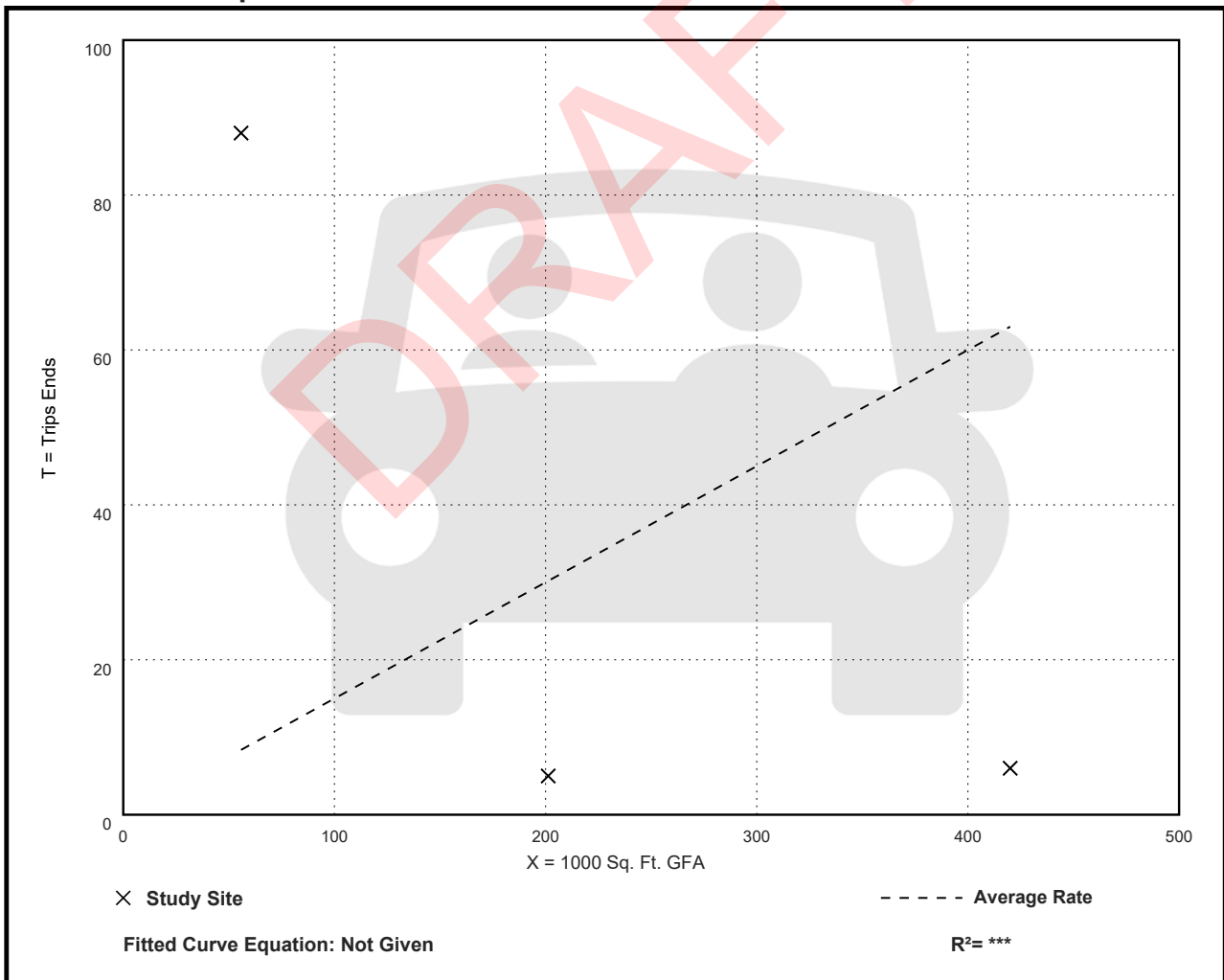
Avg. 1000 Sq. Ft. GFA: 226

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.01 - 1.58	0.53

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 129

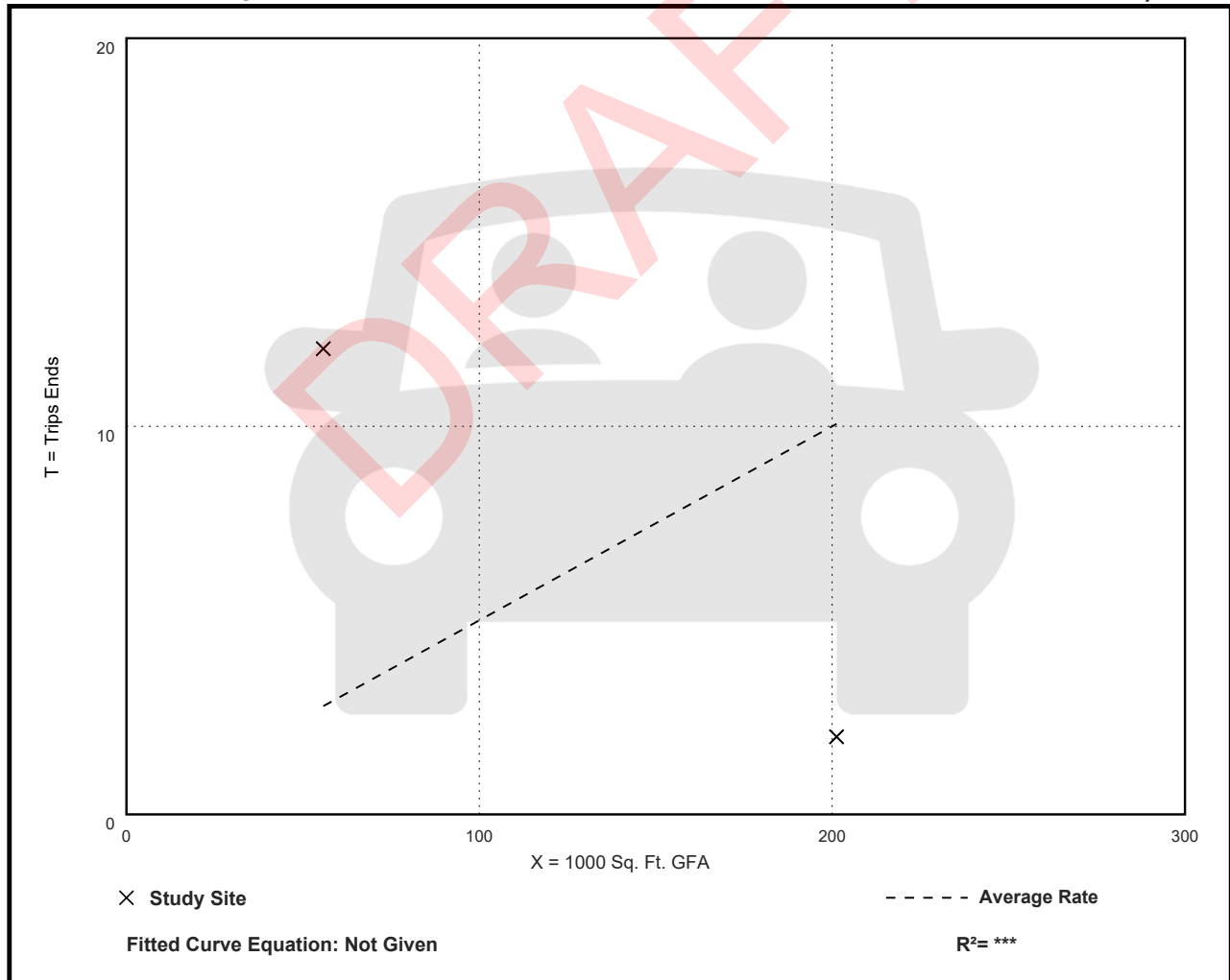
Directional Distribution: 64% entering, 36% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.05	0.01 - 0.22	***

Data Plot and Equation

Caution – Small Sample Size



Warehousing (150)

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

Setting/Location: General Urban/Suburban

Number of Studies: 3

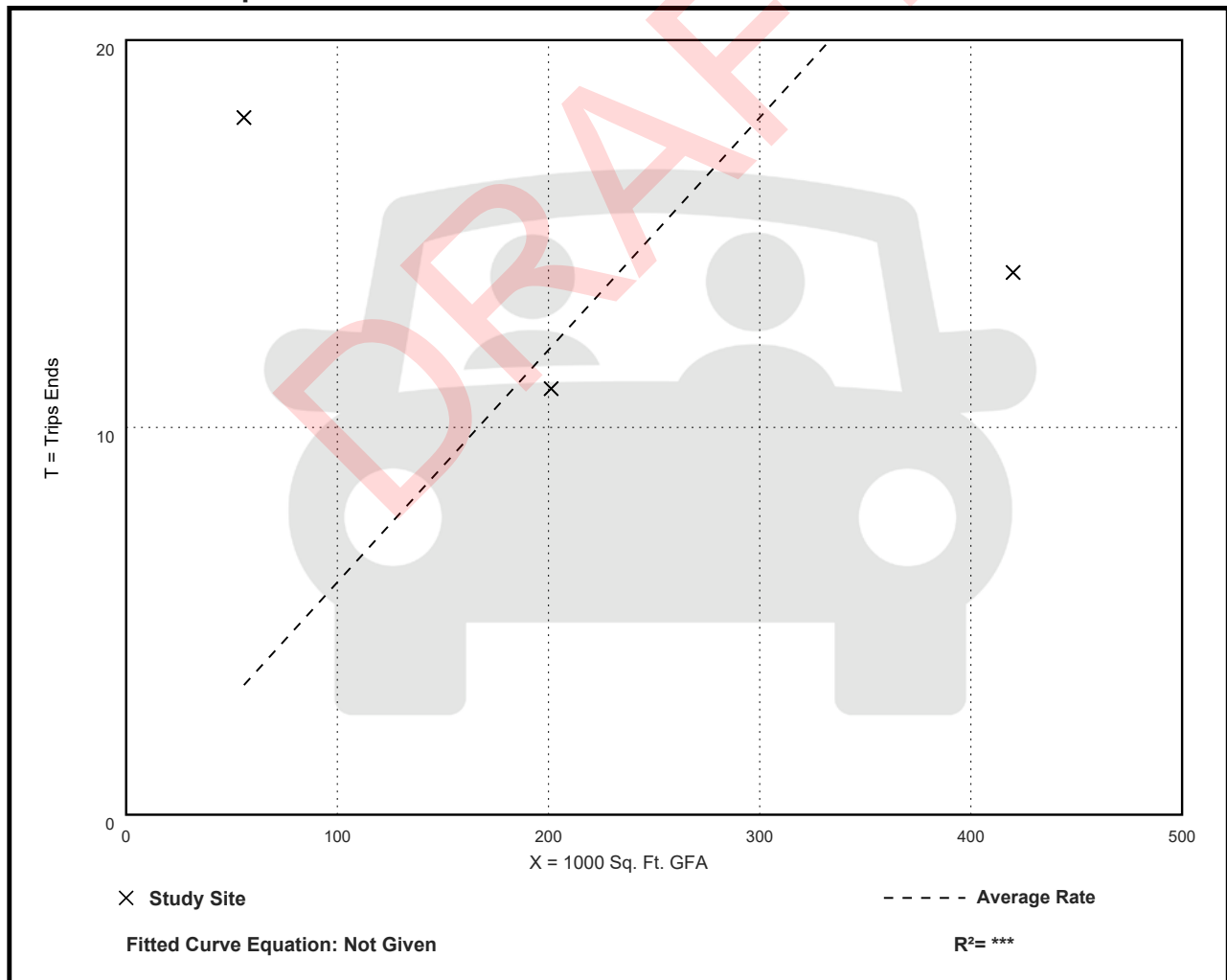
Avg. 1000 Sq. Ft. GFA: 226

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.06	0.03 - 0.32	0.10

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 129

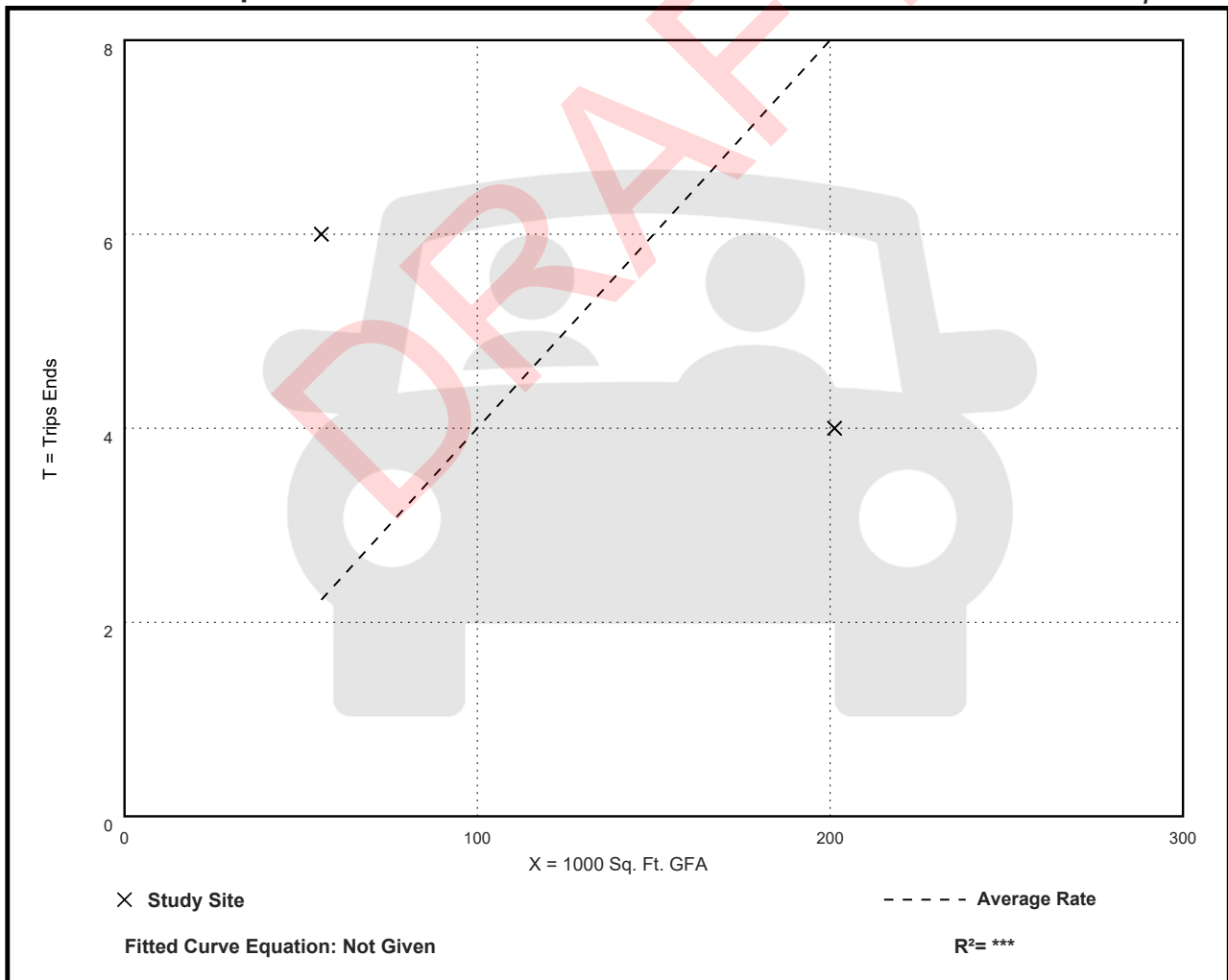
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.04	0.02 - 0.11	***

Data Plot and Equation

Caution – Small Sample Size



Warehousing (150)

Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 14

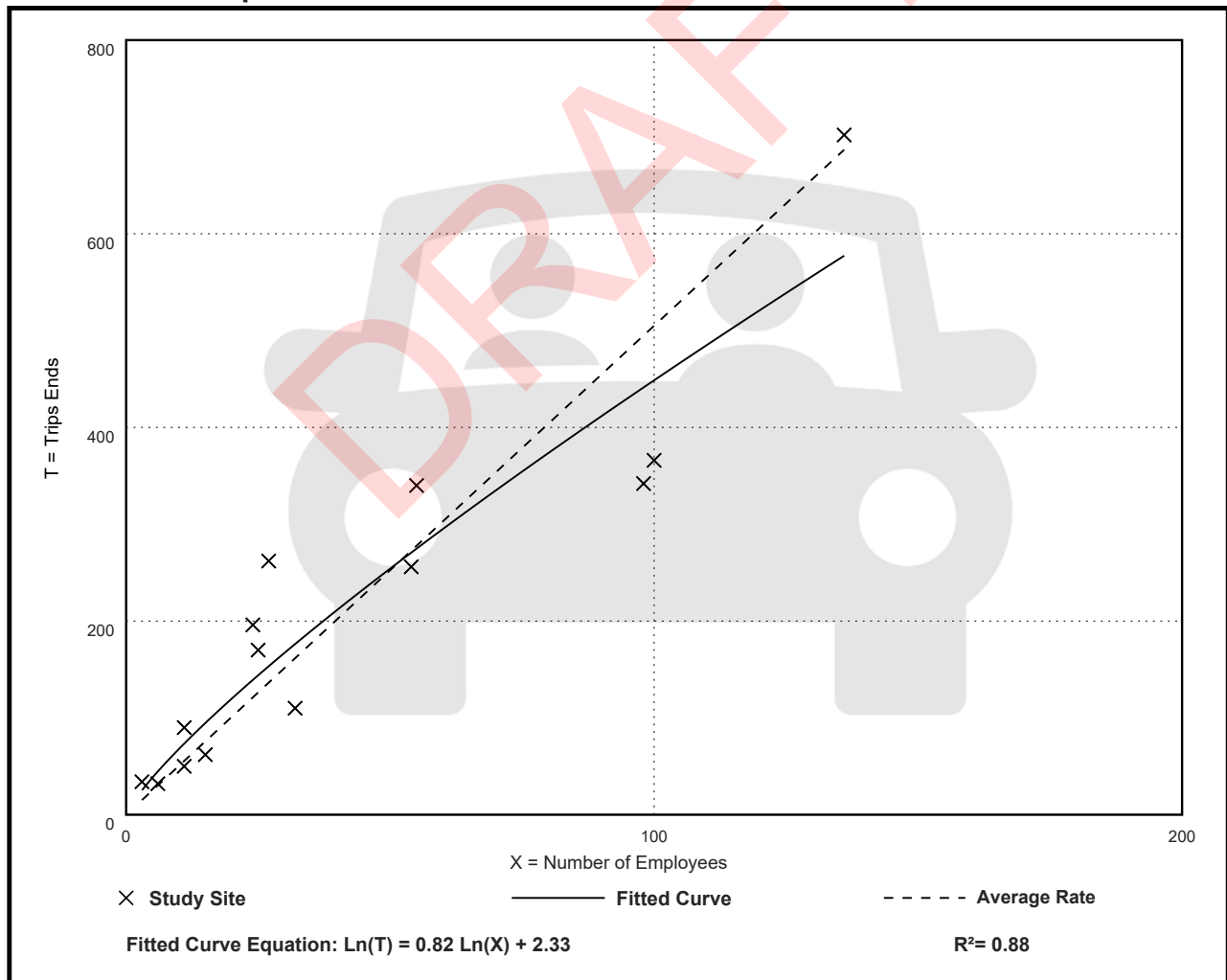
Avg. Num. of Employees: 43

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
5.05	3.44 - 11.33	1.77

Data Plot and Equation



Warehousing (150)

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: 14

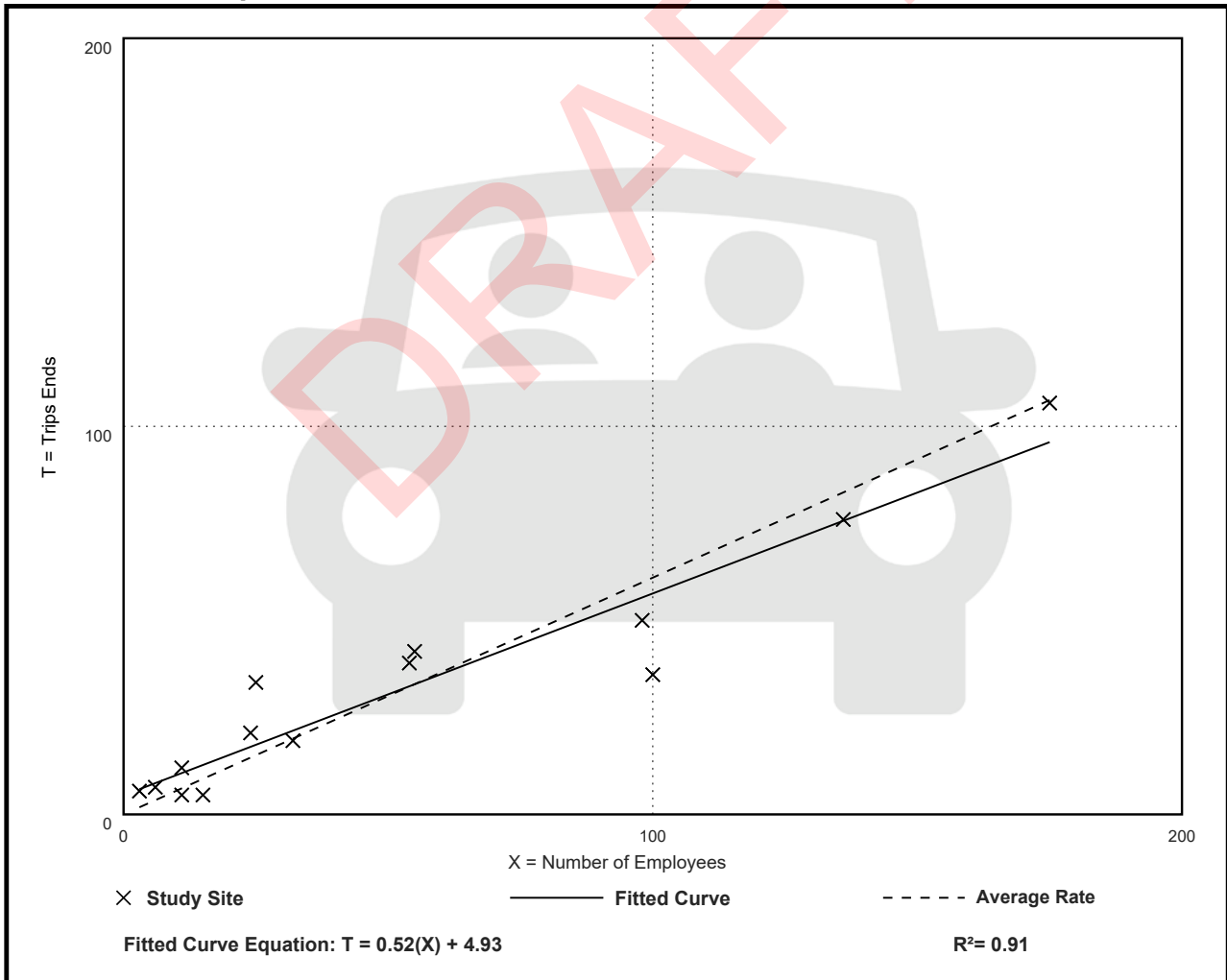
Avg. Num. of Employees: 53

Directional Distribution: 72% entering, 28% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.61	0.33 - 2.00	0.23

Data Plot and Equation



Warehousing (150)

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: 15

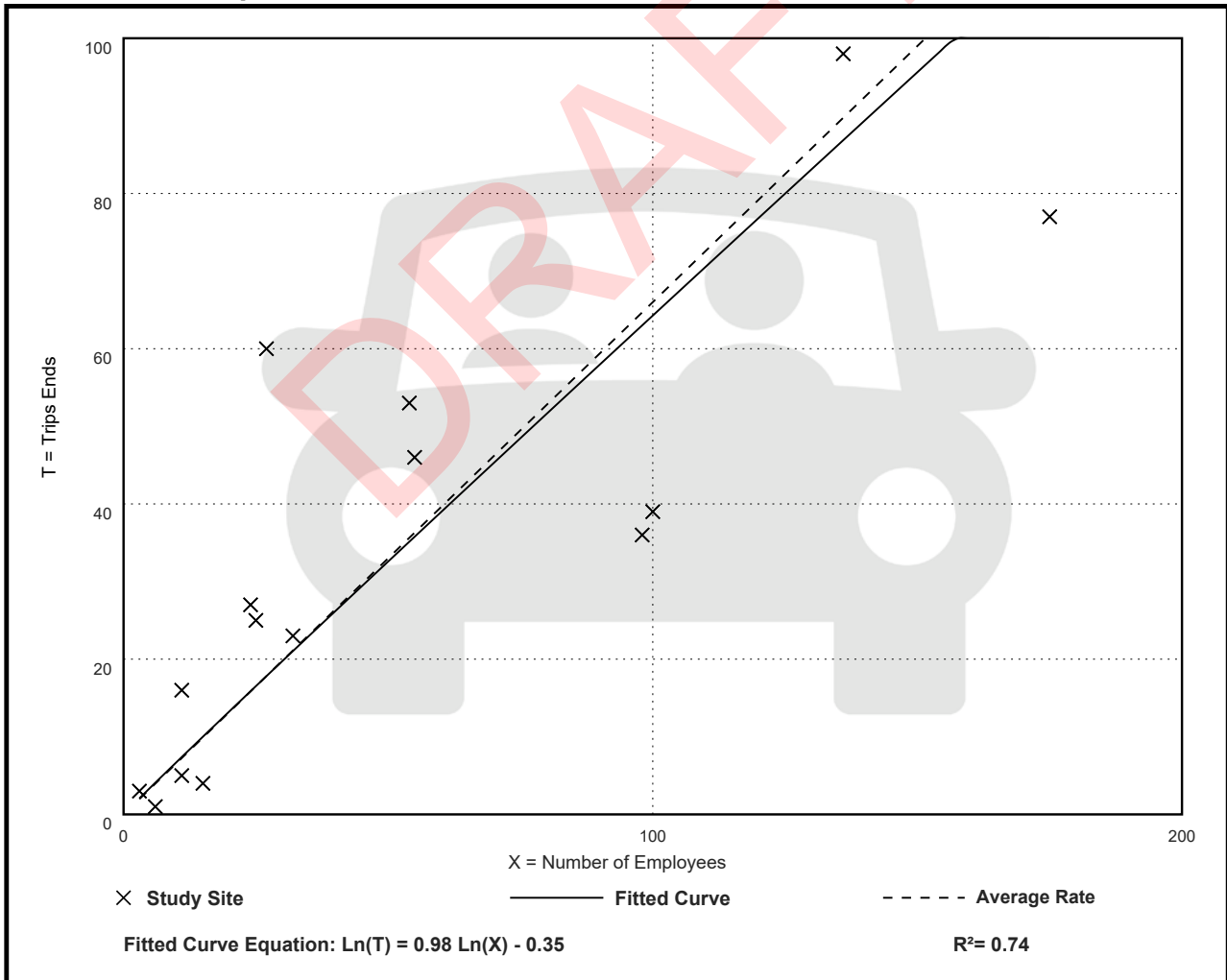
Avg. Num. of Employees: 51

Directional Distribution: 36% entering, 64% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.66	0.17 - 2.22	0.40

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: Employees

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 15

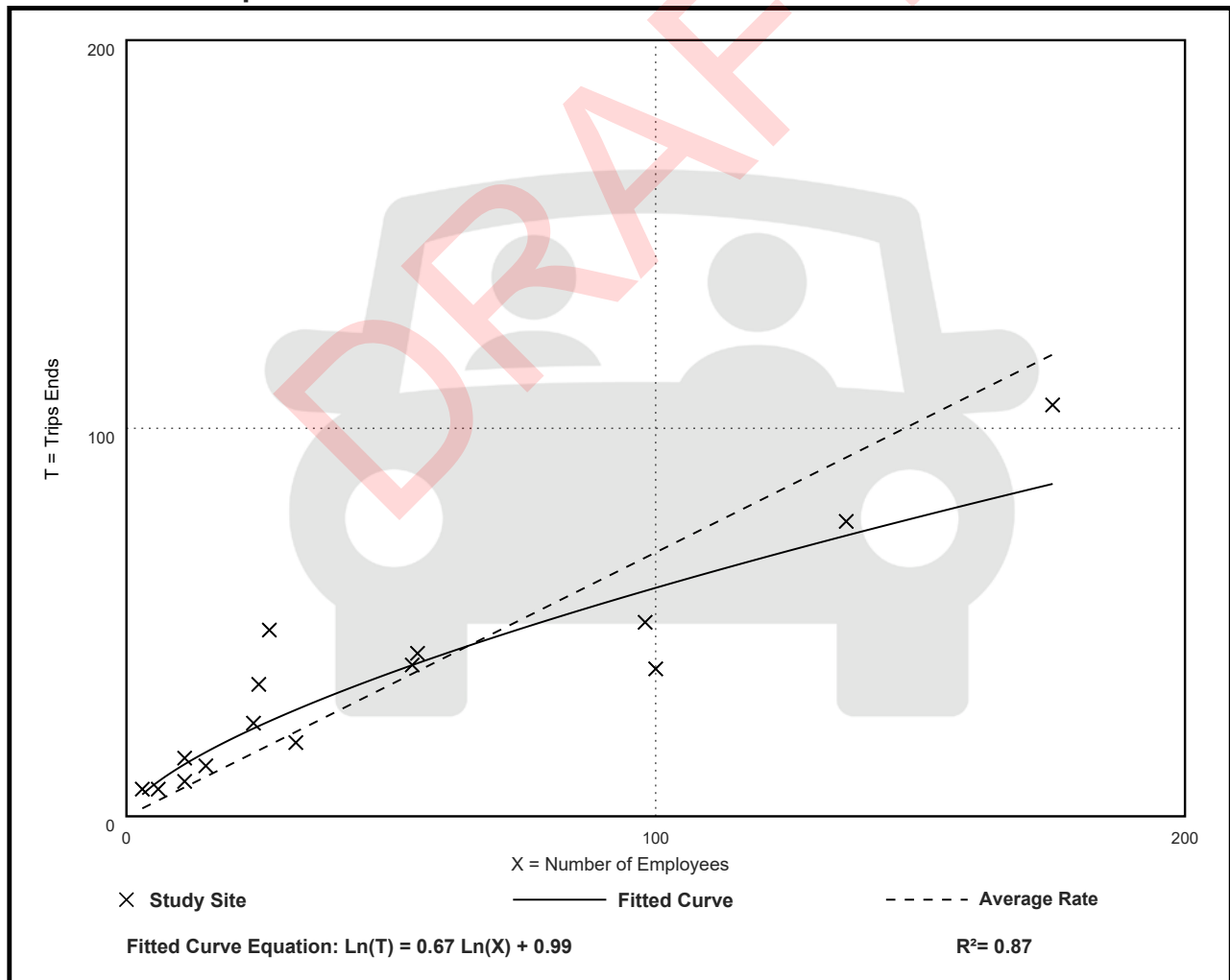
Avg. Num. of Employees: 51

Directional Distribution: 53% entering, 47% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.68	0.38 - 2.33	0.33

Data Plot and Equation



Warehousing (150)

Vehicle Trip Ends vs: Employees

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 15

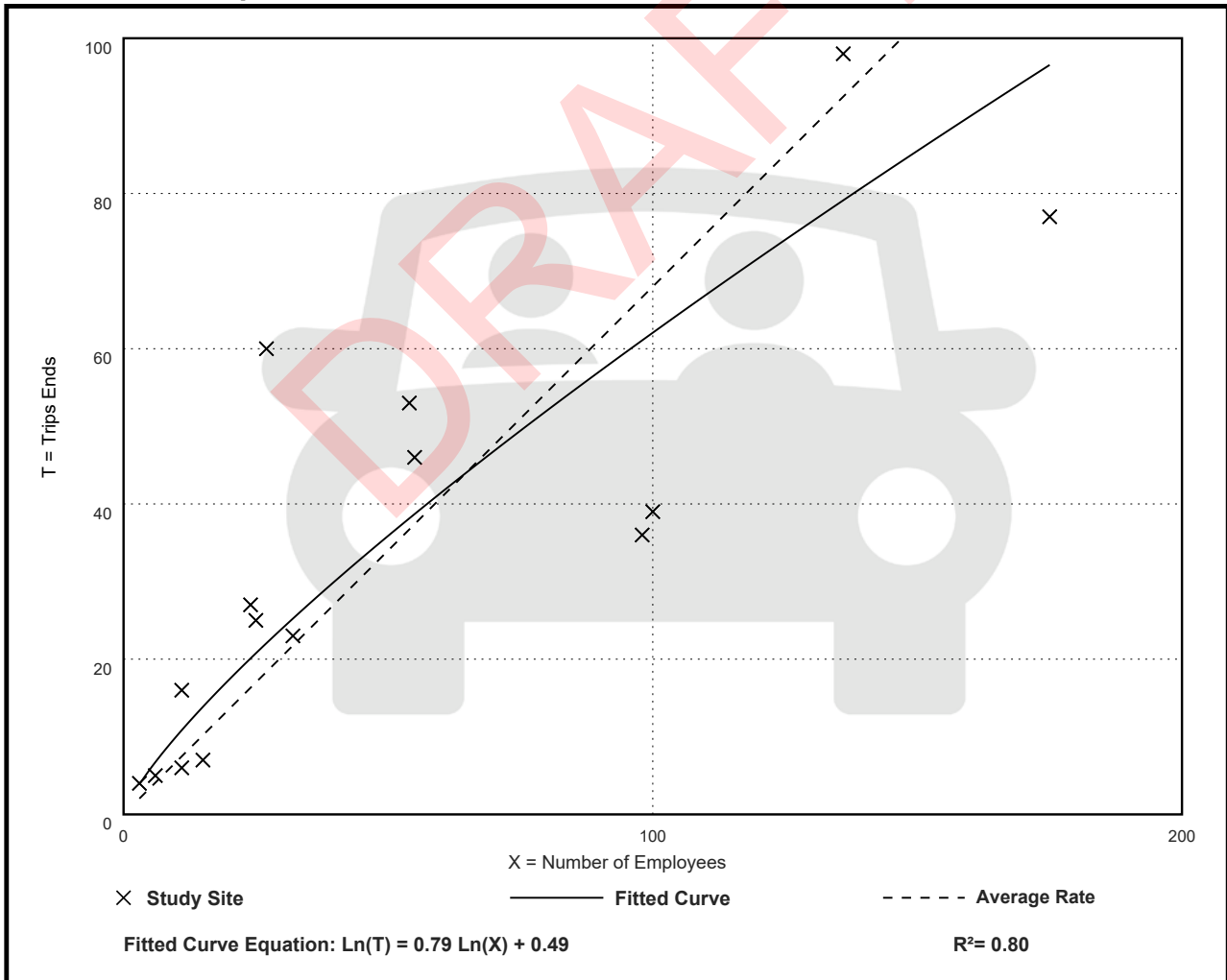
Avg. Num. of Employees: 51

Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.68	0.37 - 2.22	0.40

Data Plot and Equation



Warehousing (150)

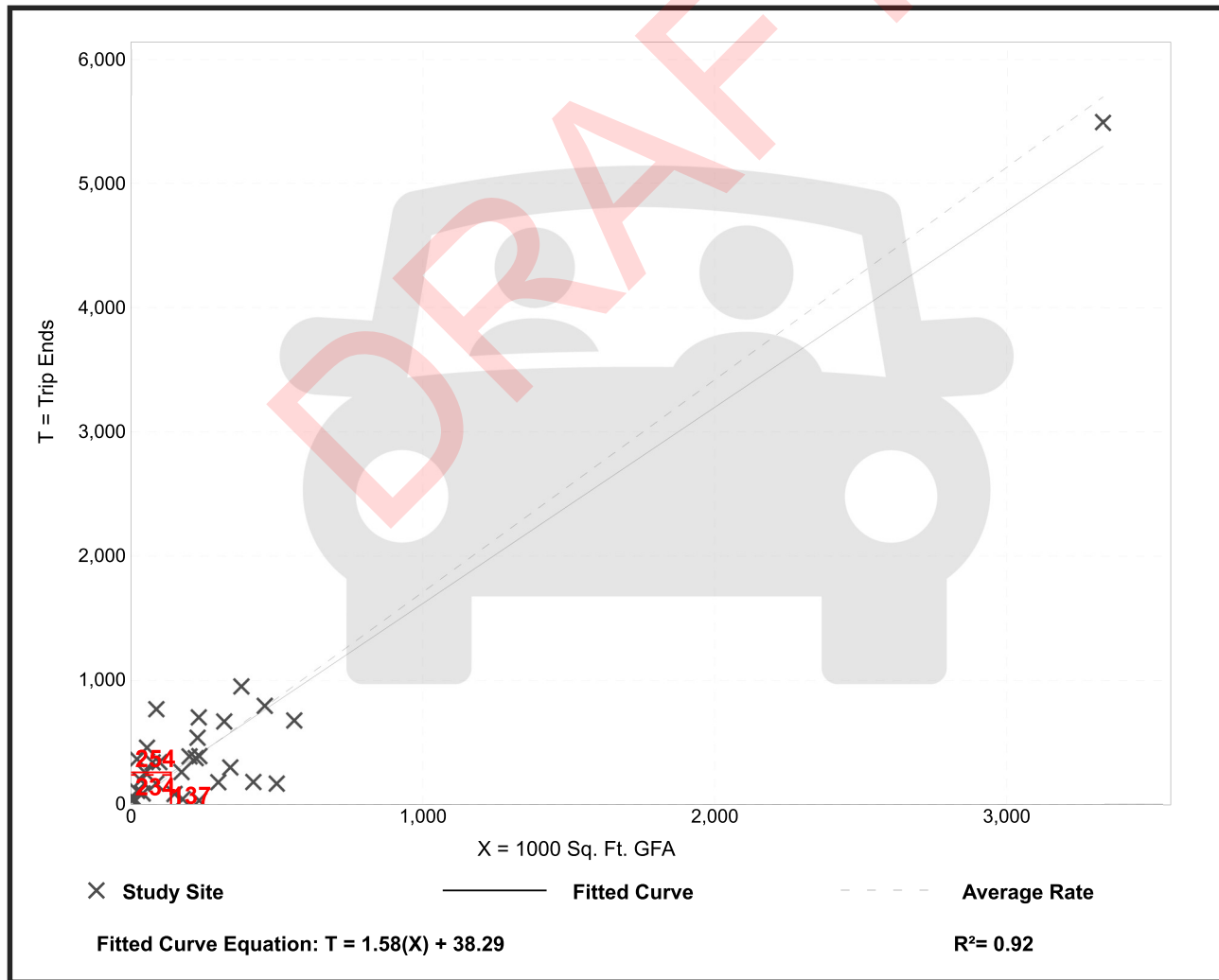
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 31
Avg. 1000 Sq. Ft. GFA: 292
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.71	0.15 - 16.93	1.48

Data Plot and Equation



Warehousing (150)

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.

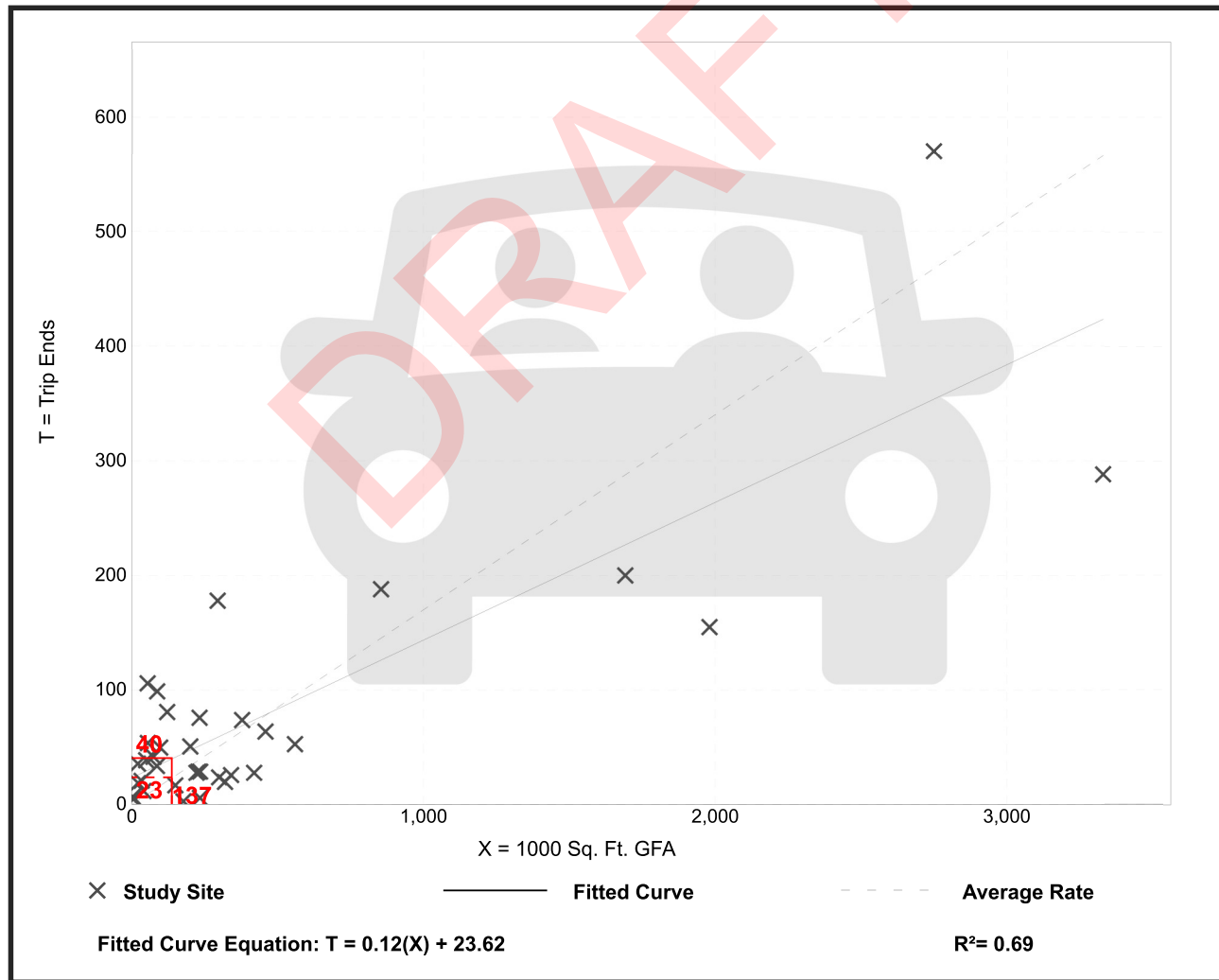
Setting/Location: General Urban/Suburban

Number of Studies: 36
 Avg. 1000 Sq. Ft. GFA: 448
 Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.19

Data Plot and Equation



Warehousing (150)

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.

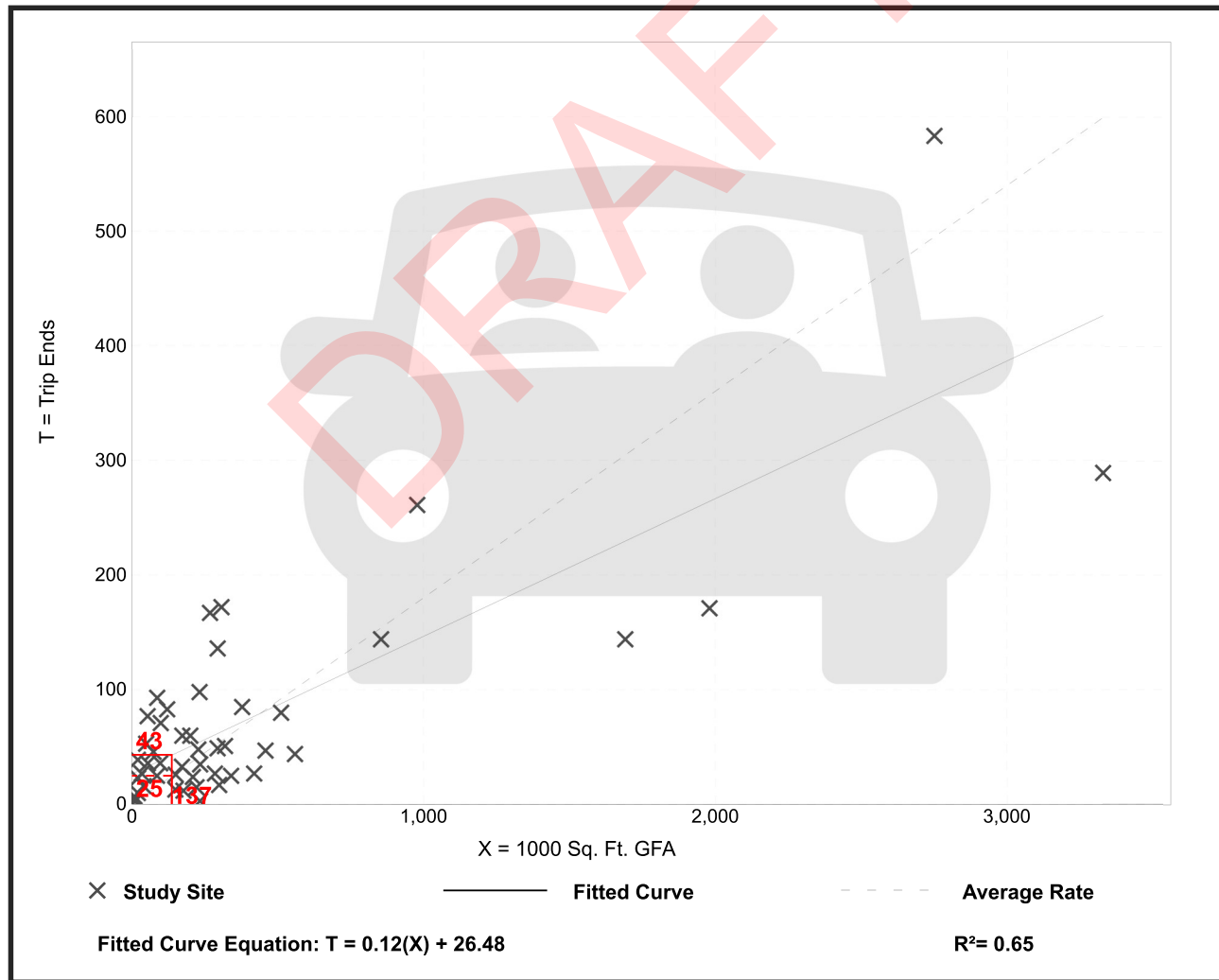
Setting/Location: General Urban/Suburban

Number of Studies: 49
 Avg. 1000 Sq. Ft. GFA: 400
 Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.01 - 1.80	0.18

Data Plot and Equation



Warehousing (150)

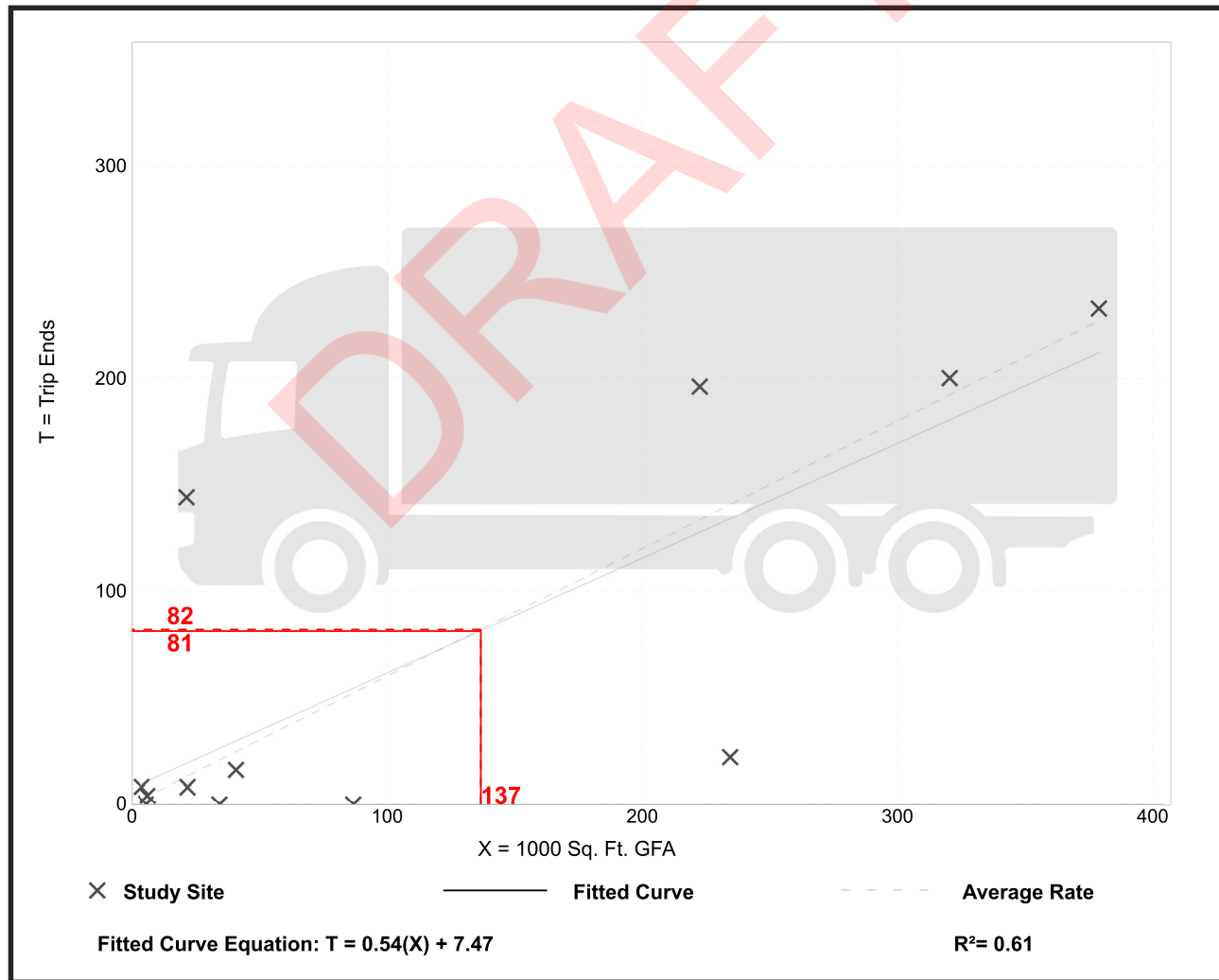
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 115
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.60	0.00 - 6.66	0.86

Data Plot and Equation



Warehousing (150)

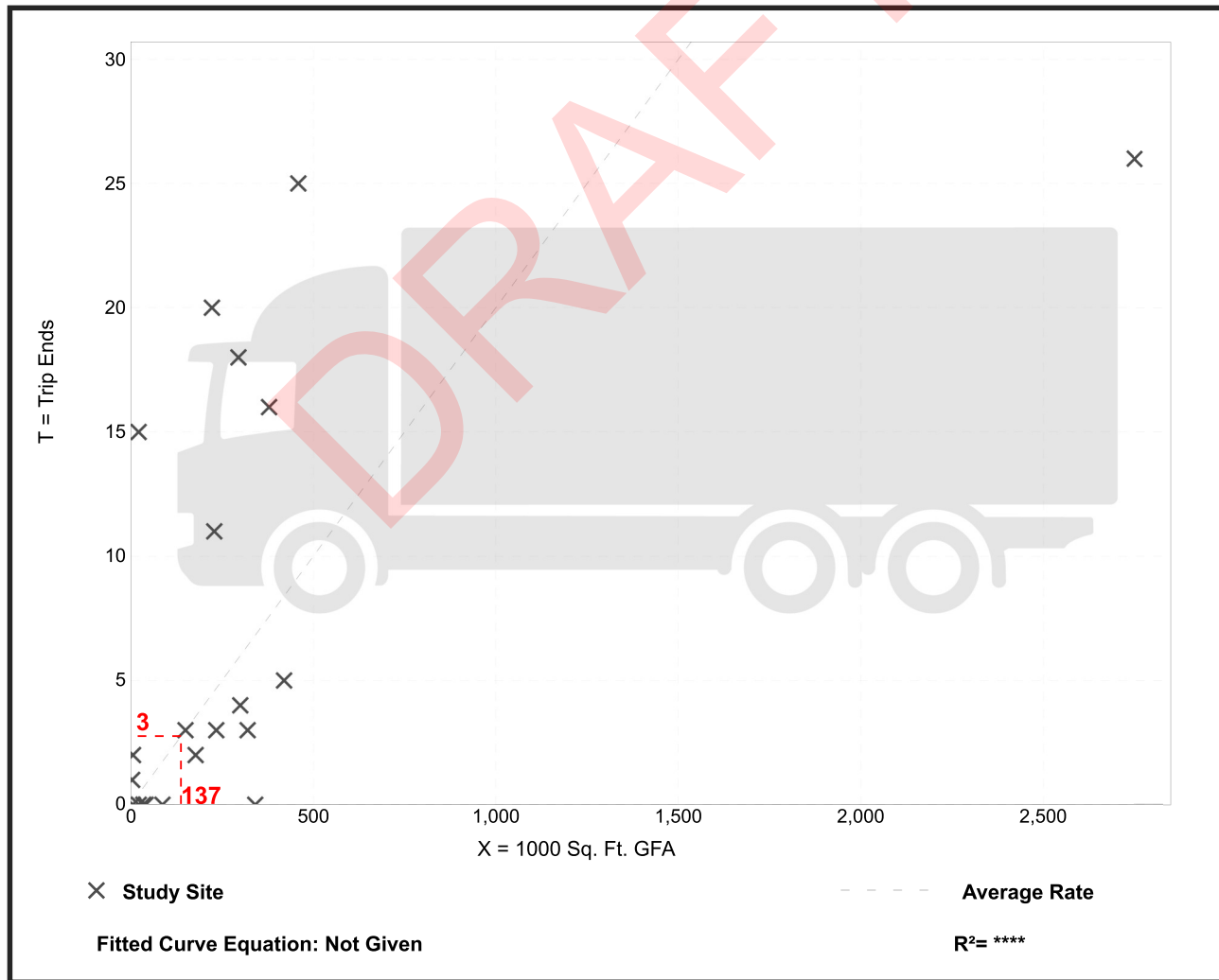
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 21
 Avg. 1000 Sq. Ft. GFA: 309
 Directional Distribution: 52% entering, 48% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.02	0.00 - 0.69	0.05

Data Plot and Equation



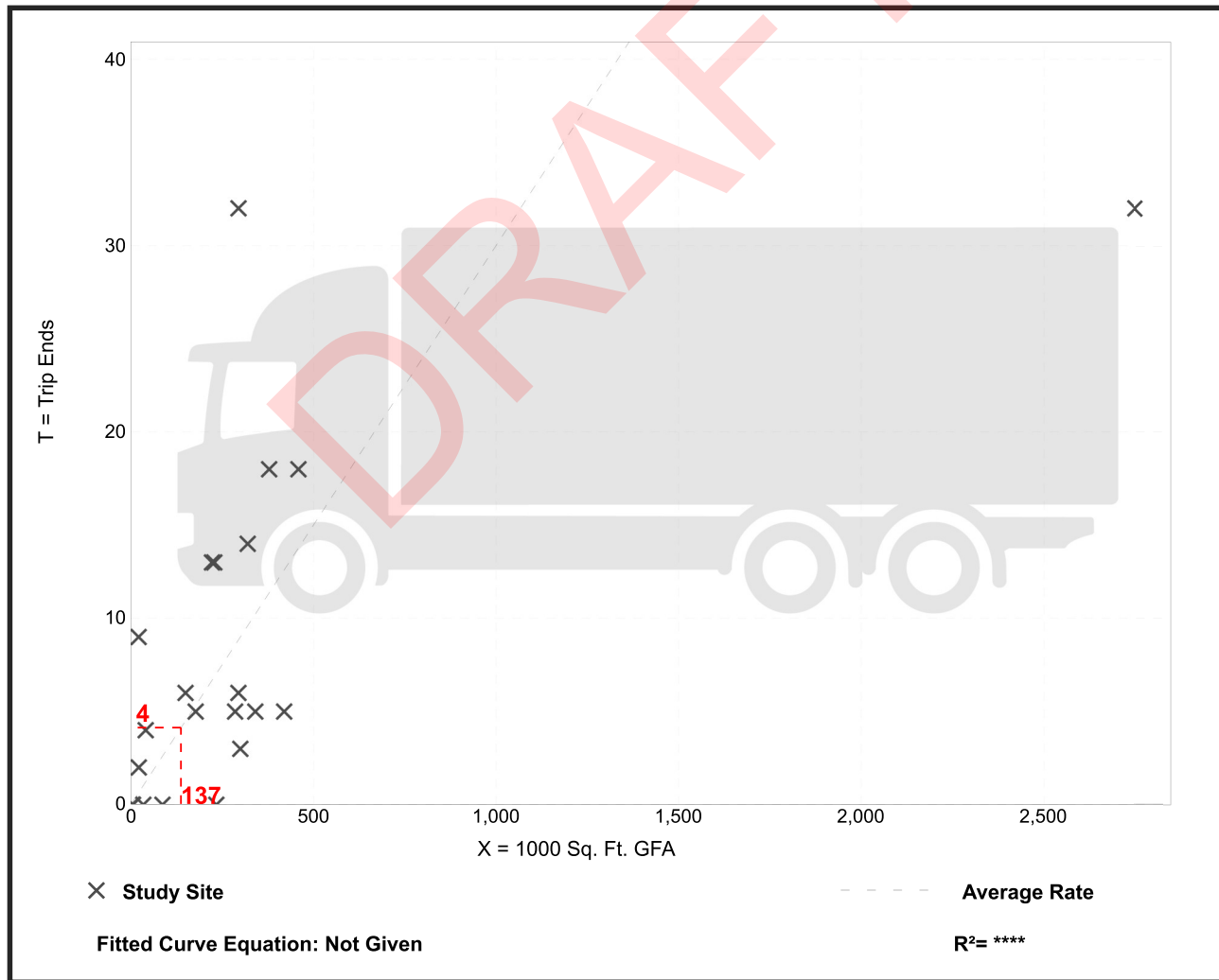
Warehousing (150)

Truck 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: 23
 Avg. 1000 Sq. Ft. GFA: 308
 Directional Distribution: 52% entering, 48% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.42	0.03

Data Plot and Equation



Land Use: 154

High-Cube Transload and Short-Term Storage Warehouse

Description

A high-cube warehouse (HCW) is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. A high-cube warehouse can be free-standing or located in an industrial park.

The HCWs included in this land use include transload and short-term storage facilities. A transload facility has the primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. A transload facility typically has little storage duration, high throughput, and its operations are high efficiency. A short-term HCW is a distribution facility often with custom/special features built into the structure for the movement of large volumes of freight with only short-term storage of products.

Some limited assembly and repackaging may occur within the facility.

A high-cube warehouse may contain a mezzanine. In a HCW setting, a mezzanine is a free-standing, semi-permanent structure that is commonly supported by structural steel columns and that is lined with racks or shelves. The gross floor area (GFA) values for the study sites in the database for this land use do NOT include the floor area of the mezzanine. The GFA values represent only the permanent ground-floor square footage.

The amount of office/employee welfare space that is provided within a HCW can be highly variable but is typically an insignificant portion of the overall building square footage. Within the trip generation database, common values are between 3,000 and 5,000 square feet for a Cold Storage HCW and between 5,000 and 10,000 square feet for Transload, Fulfillment Center, and Parcel Hub HCW (all of which are less than one percent of total GFA for a site). Therefore, for the trip generation data plots, any office space that is part of the normal operation of the warehouse is included in the total GFA.

Warehousing (Land Use 150), high-cube fulfillment center warehouse (Land Use 155), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related land uses.

The number of dock doors at a HCW is a potential independent variable. Future data submissions should include that information.

Additional Data

The High-Cube Warehouse/Distribution Center-related land uses underwent specialized consideration through a commissioned study titled “High-Cube Warehouse Vehicle Trip Generation Analysis,” published in October 2016. The results of this study are posted on the ITE website at <http://library.ite.org/pub/a3e6679a-e3a8-bf38-7f29-2961becdd498>.

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

The sites were surveyed in the 1980s, the 2000s, and the 2010s in Alberta (CAN), California, Florida, Michigan, New Jersey, Texas, and Washington.

Source Numbers

331, 605, 619, 642, 645, 649, 739, 750, 752, 903, 904, 941, 942, 943, 969

DRAFT

High-Cube Transload and Short-Term Storage Warehouse (154)

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

Setting/Location: General Urban/Suburban

Number of Studies: 91

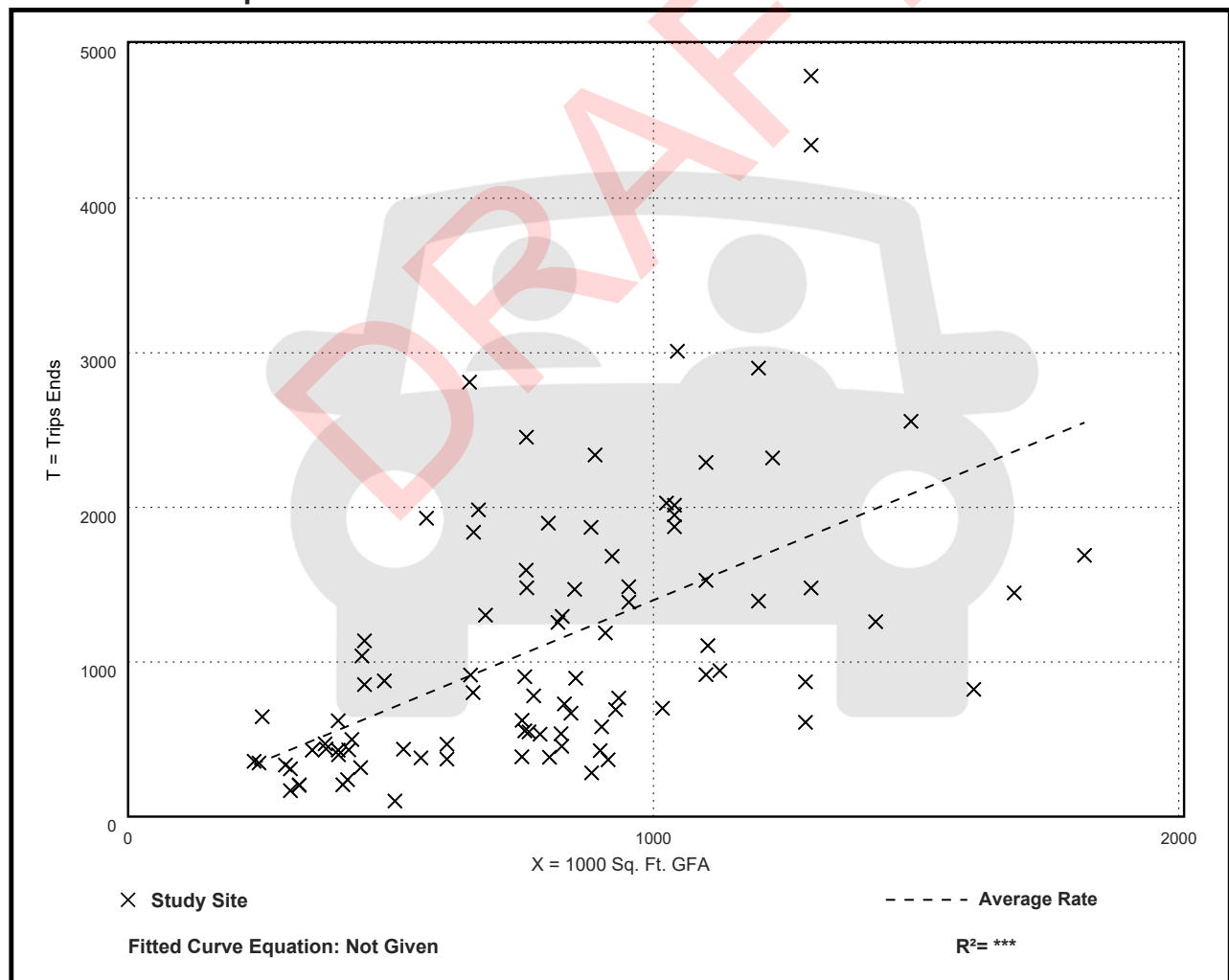
Avg. 1000 Sq. Ft. GFA: 798

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.40	0.20 - 4.32	0.86

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

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: 102

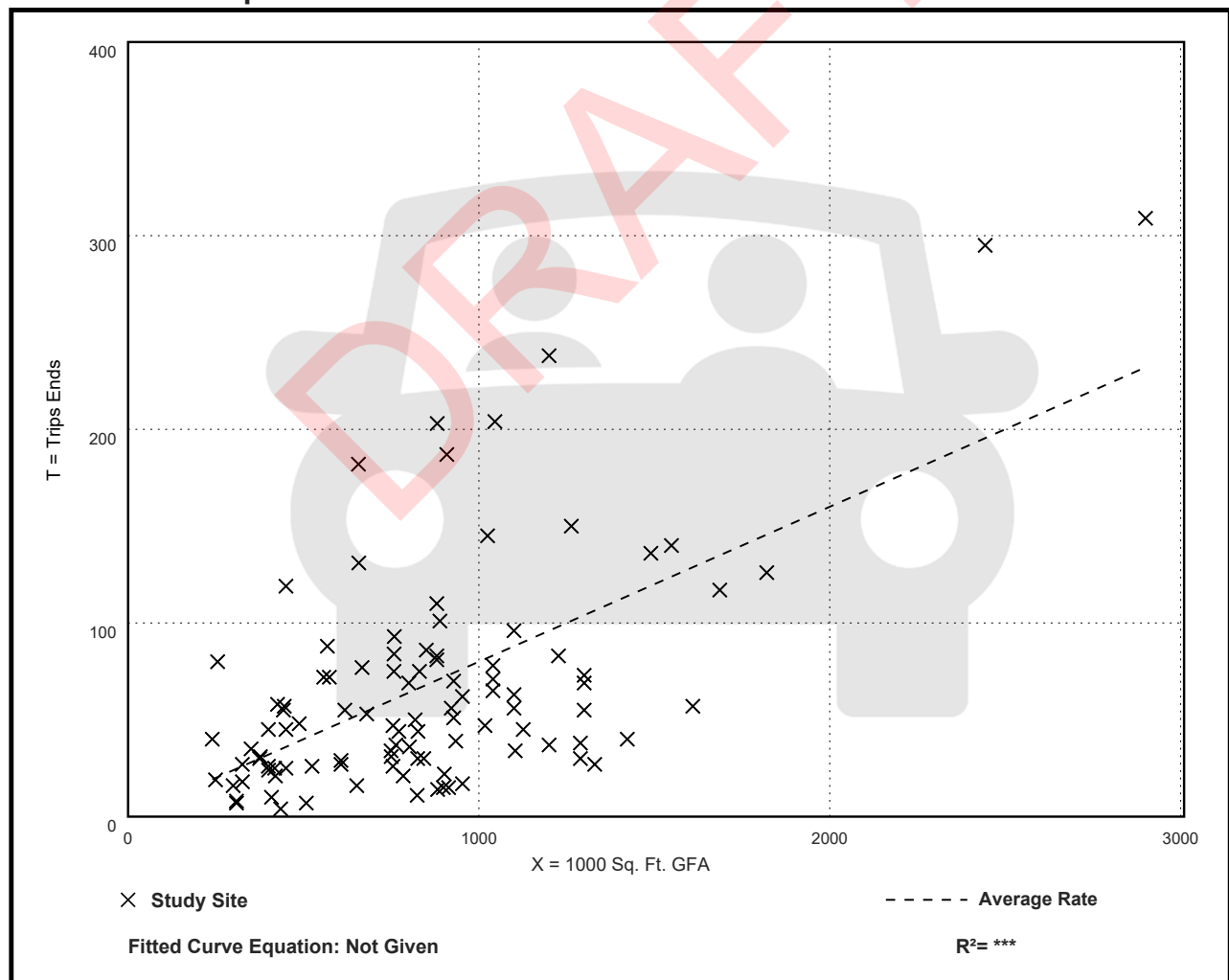
Avg. 1000 Sq. Ft. GFA: 846

Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.08	0.01 - 0.31	0.05

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

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: 103

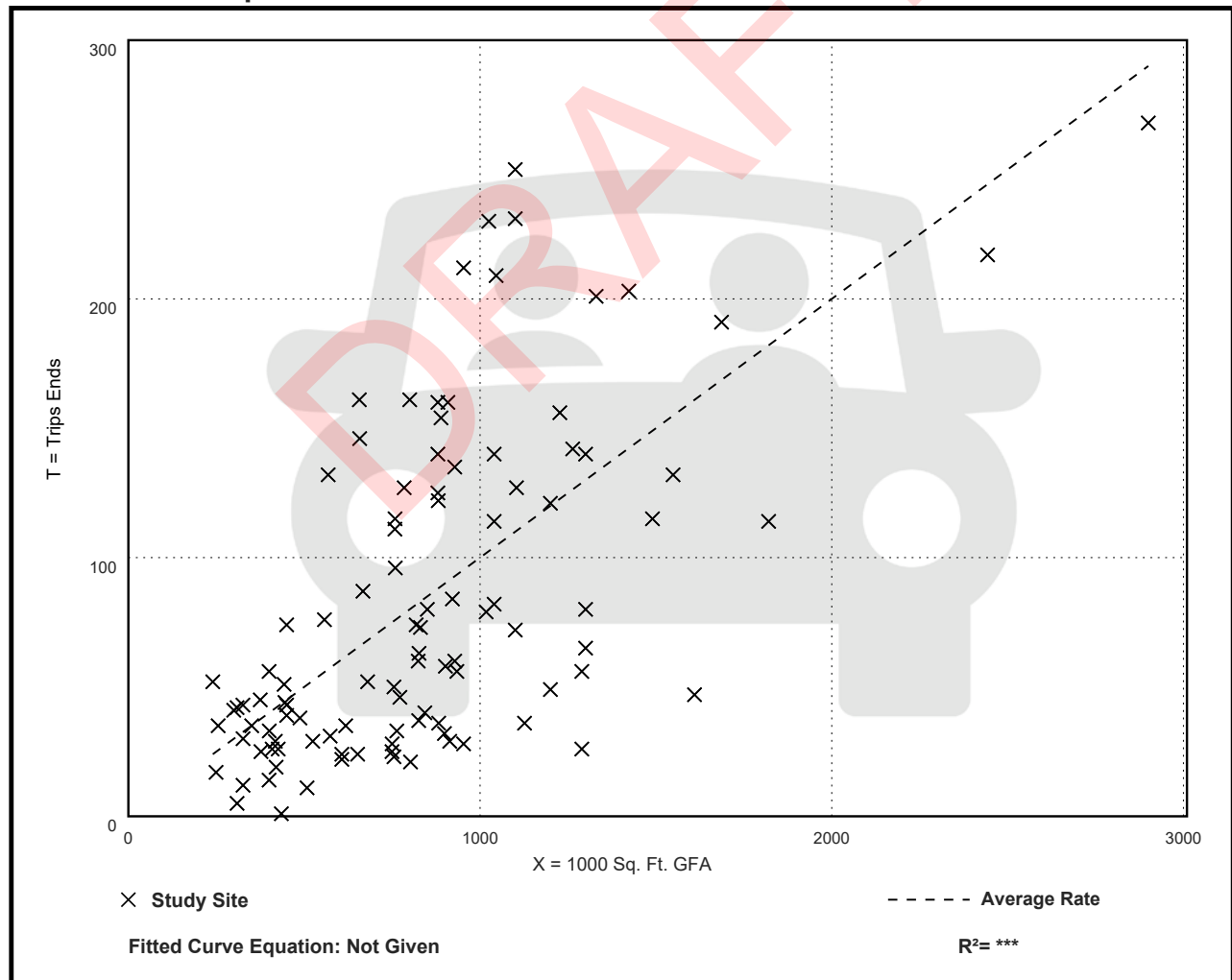
Avg. 1000 Sq. Ft. GFA: 840

Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.10	0.00 - 0.25	0.06

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 31

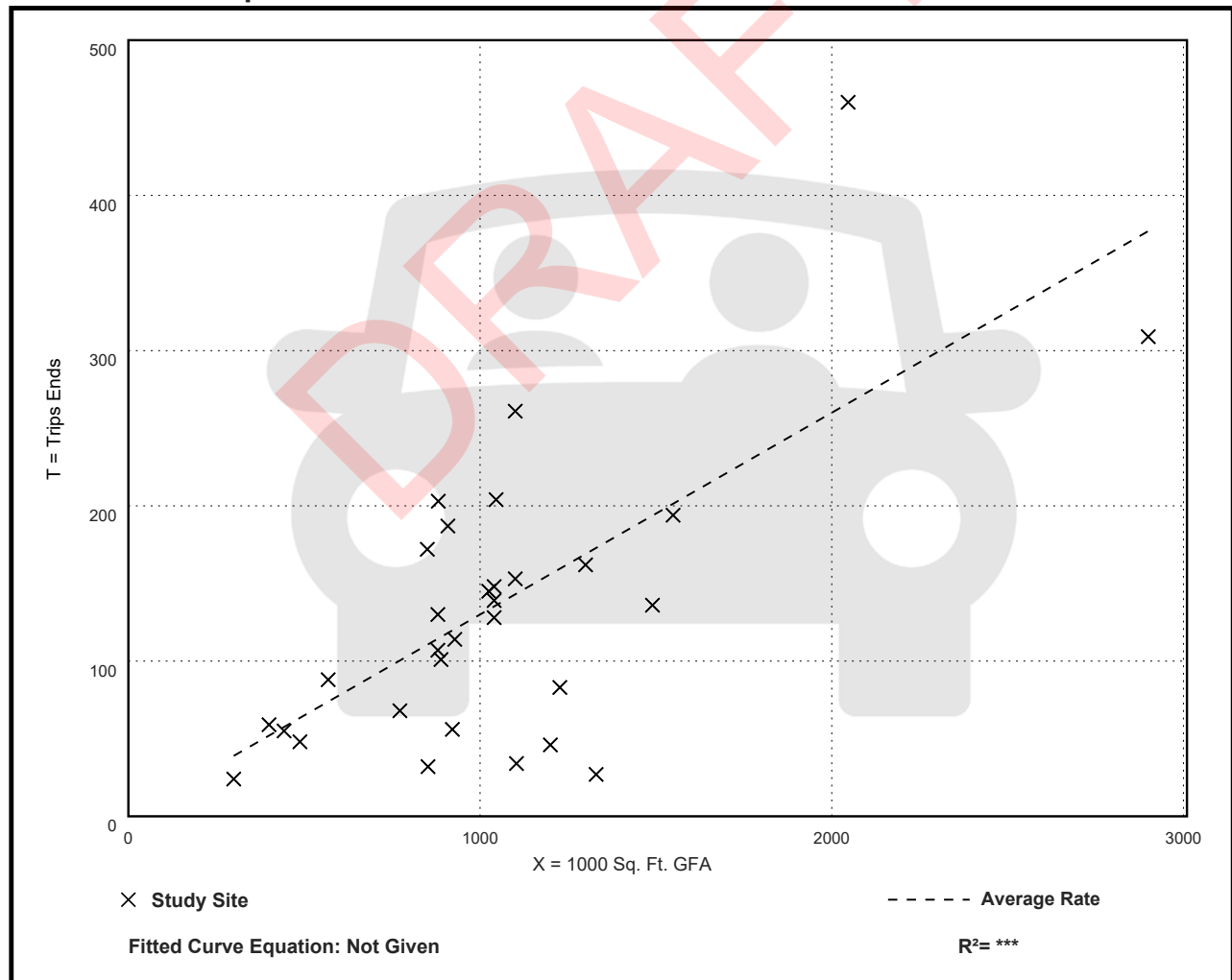
Avg. 1000 Sq. Ft. GFA: 1048

Directional Distribution: 78% entering, 22% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.13	0.02 - 0.24	0.06

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 34

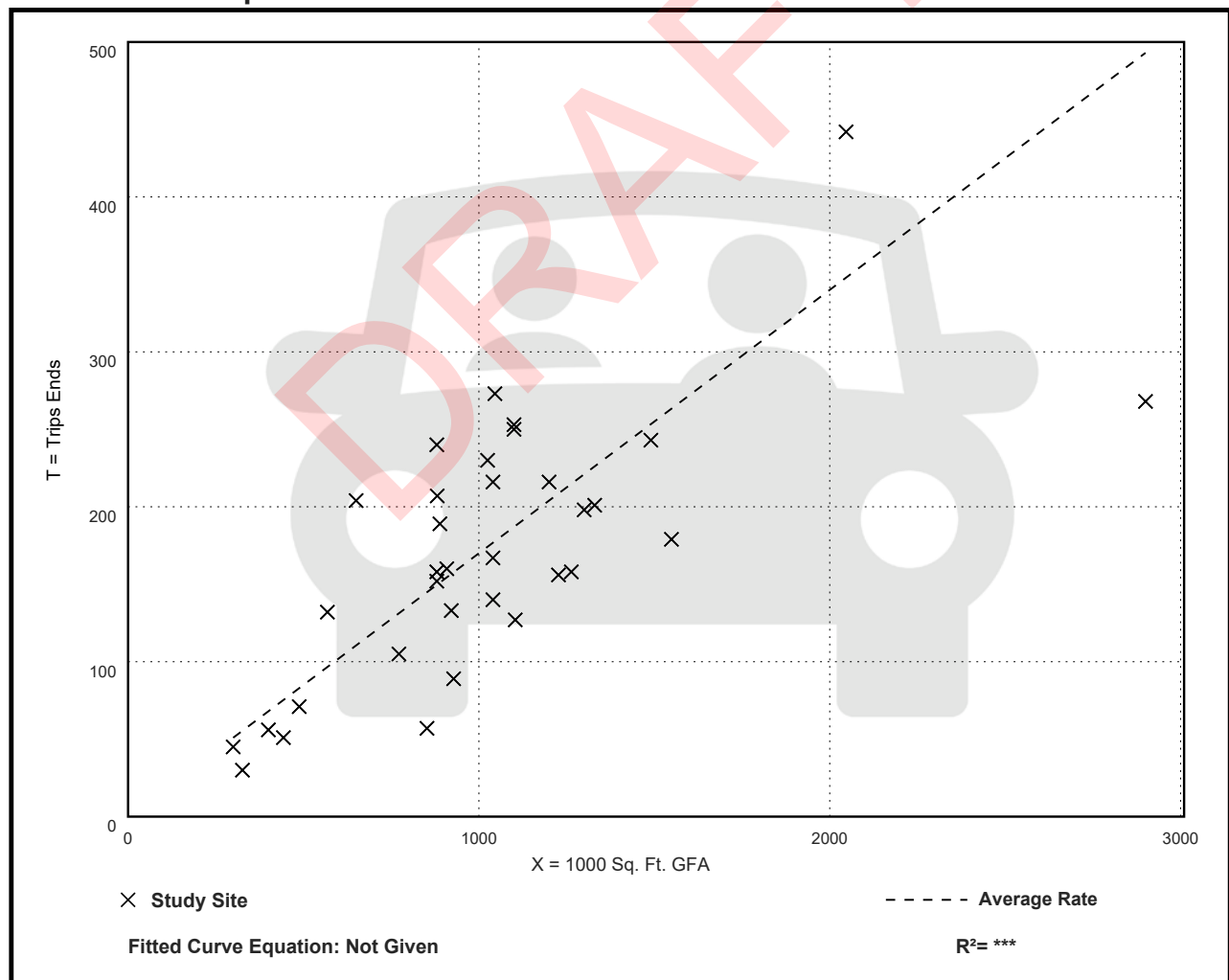
Avg. 1000 Sq. Ft. GFA: 1023

Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.07 - 0.31	0.06

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

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

Setting/Location: General Urban/Suburban

Number of Studies: 10

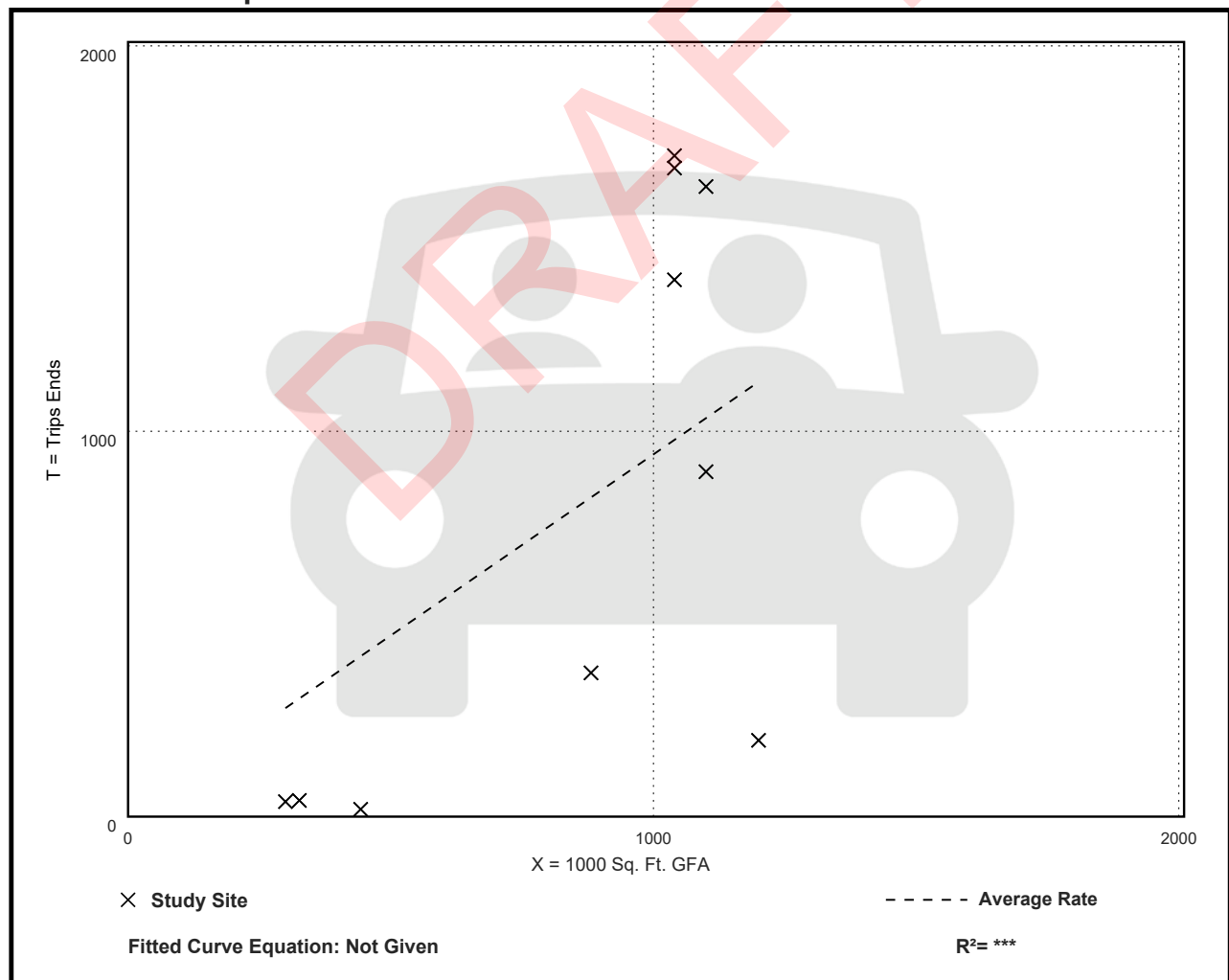
Avg. 1000 Sq. Ft. GFA: 847

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.94	0.04 - 1.65	0.65

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 9

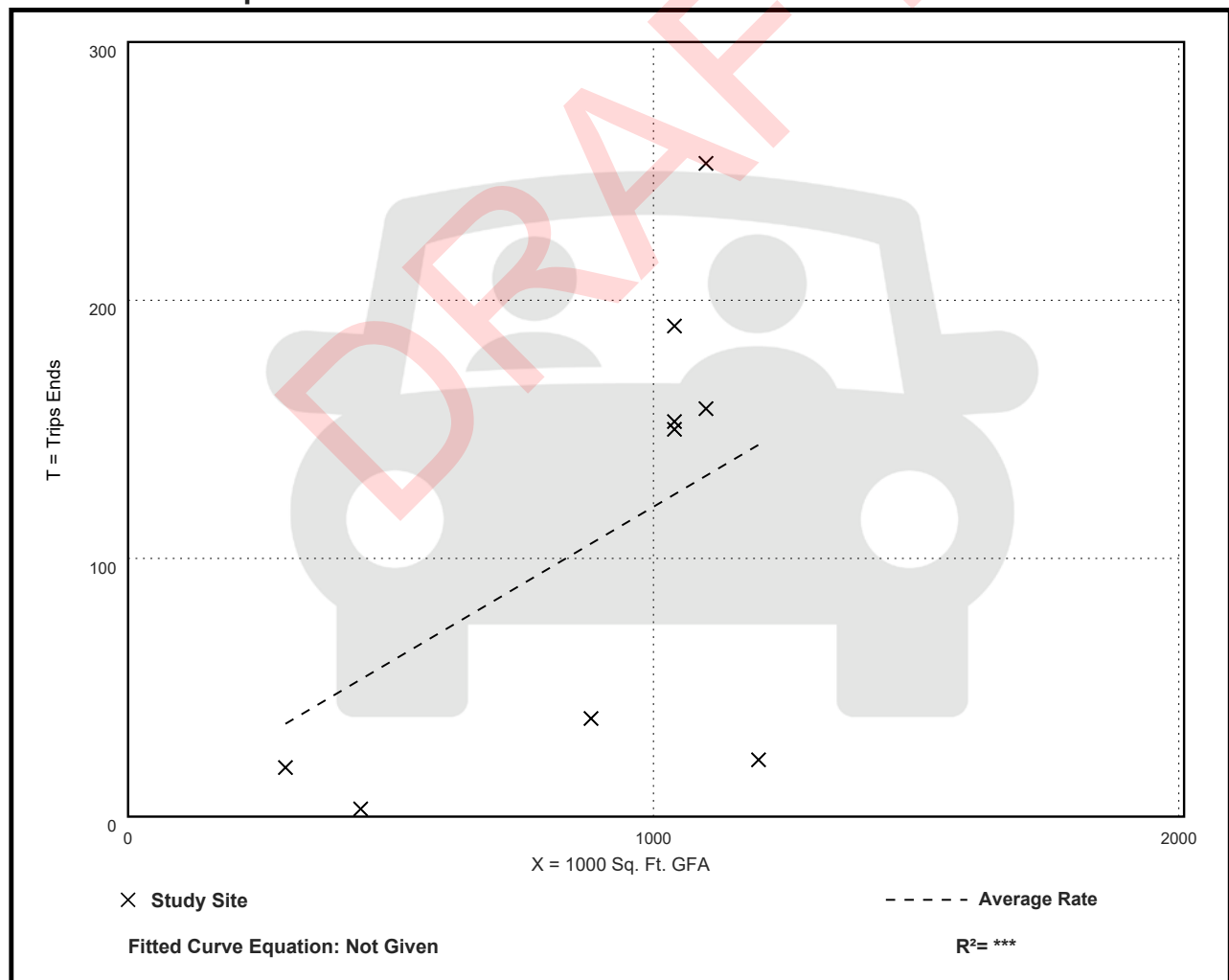
Avg. 1000 Sq. Ft. GFA: 905

Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.12	0.01 - 0.23	0.08

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

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

Setting/Location: General Urban/Suburban

Number of Studies: 10

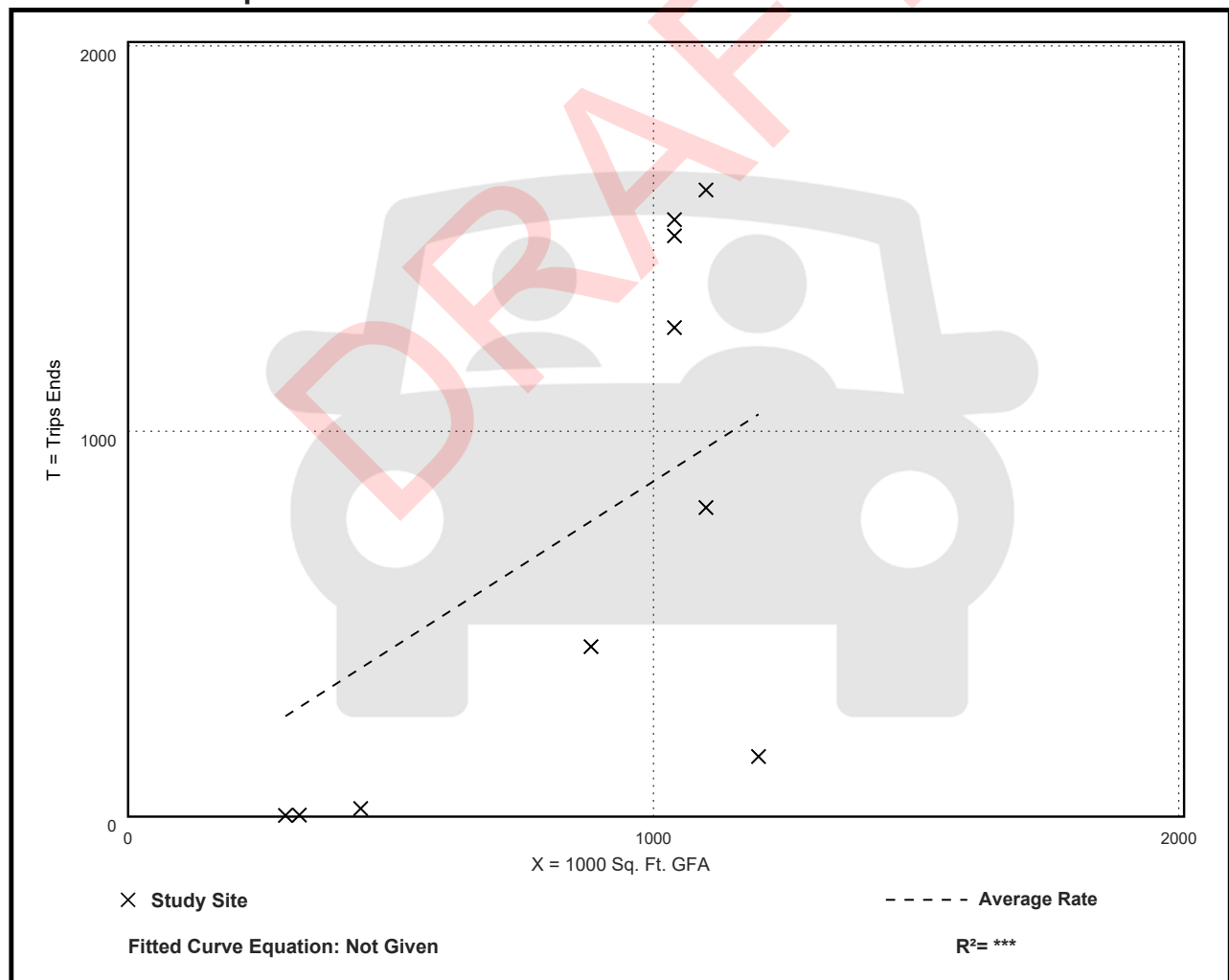
Avg. 1000 Sq. Ft. GFA: 847

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.87	0.01 - 1.49	0.61

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 9

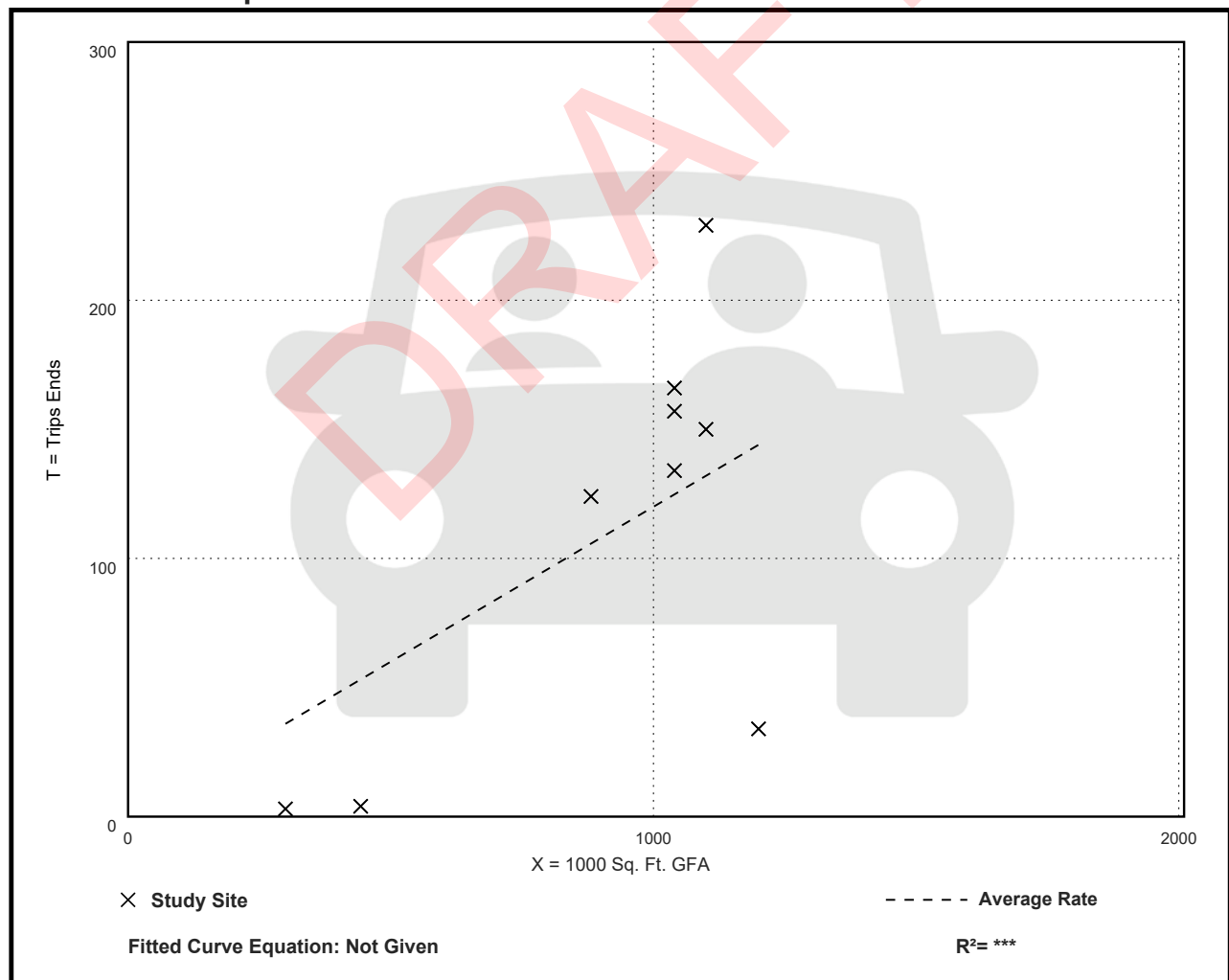
Avg. 1000 Sq. Ft. GFA: 905

Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.12	0.01 - 0.21	0.07

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

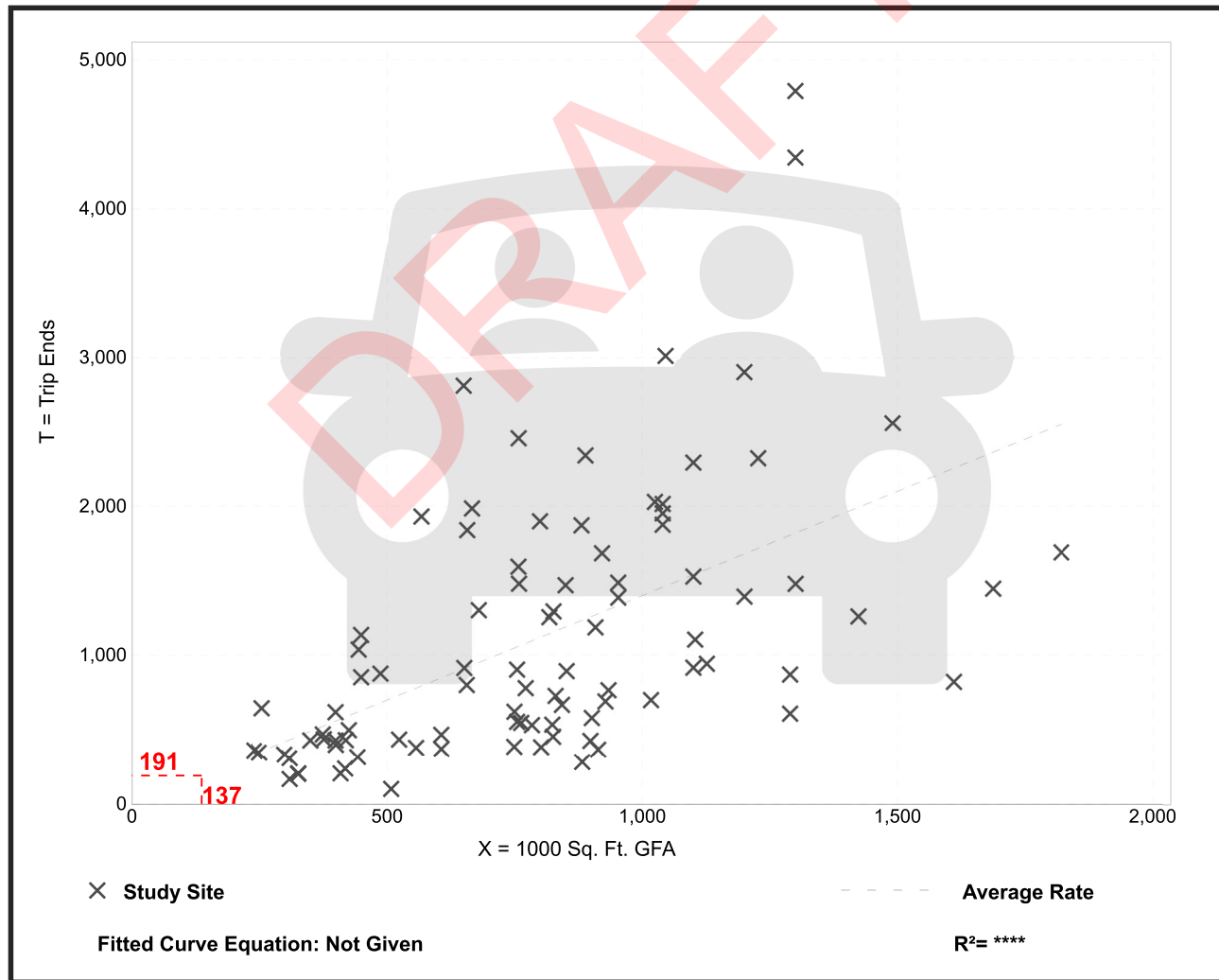
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 91
Avg. 1000 Sq. Ft. GFA: 798
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.40	0.20 - 4.32	0.86

Data Plot and Equation



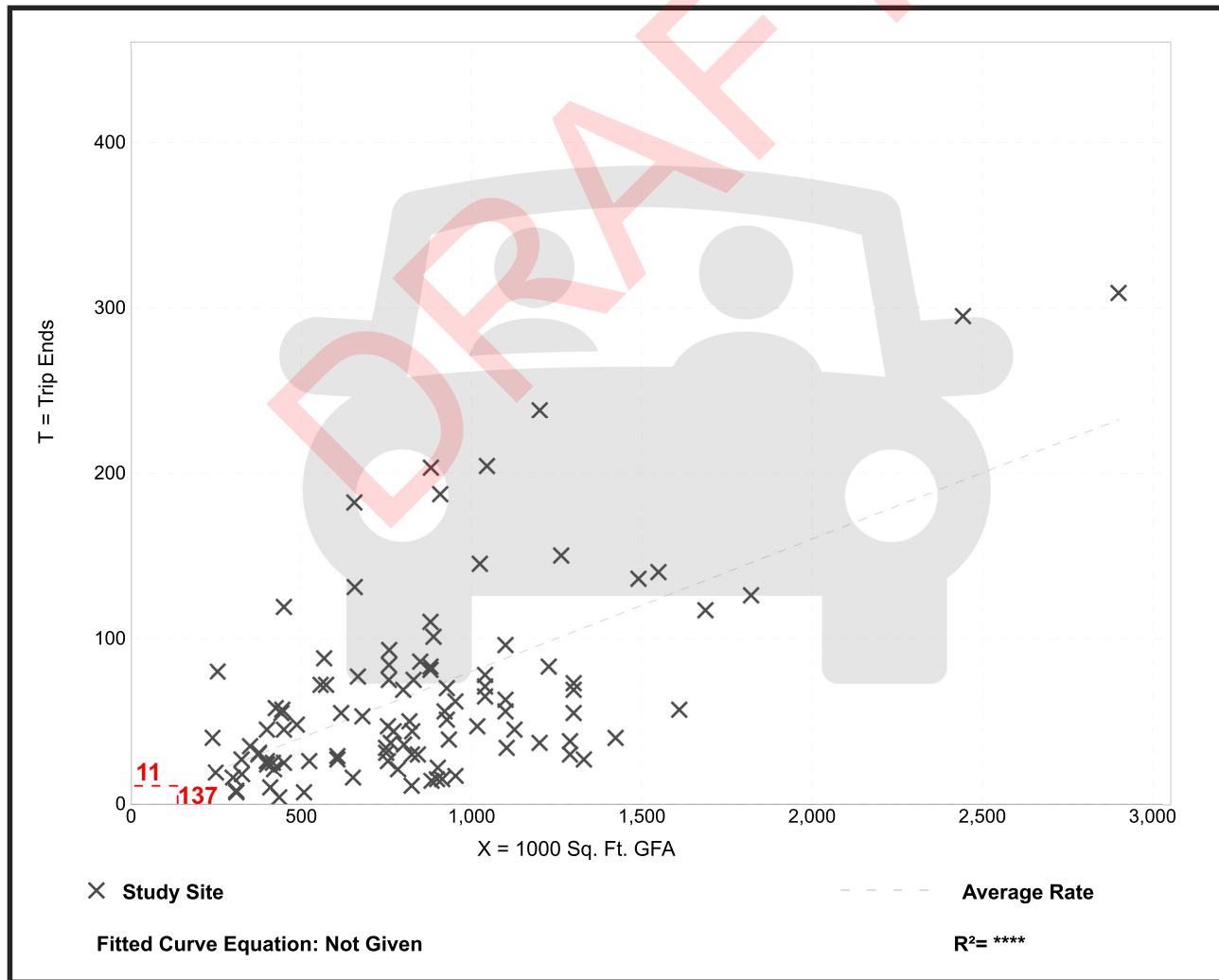
High-Cube Transload and Short-Term Storage Warehouse (154)

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: 102
 Avg. 1000 Sq. Ft. GFA: 846
 Directional Distribution: 77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.08	0.01 - 0.31	0.05

Data Plot and Equation



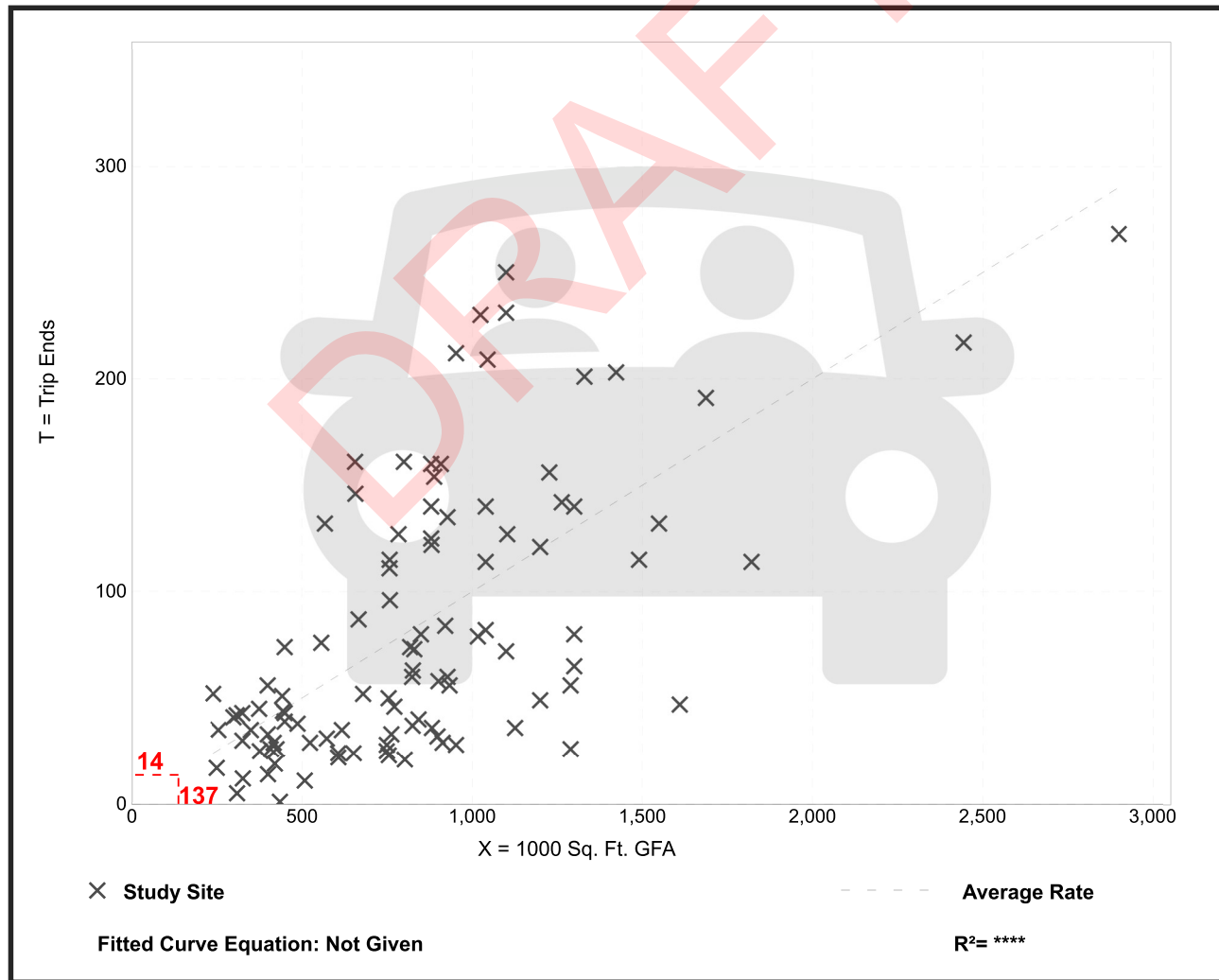
High-Cube Transload and Short-Term Storage Warehouse (154)

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: 103
 Avg. 1000 Sq. Ft. GFA: 840
 Directional Distribution: 28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.10	0.00 - 0.25	0.06

Data Plot and Equation



High-Cube Transload and Short-Term Storage Warehouse (154)

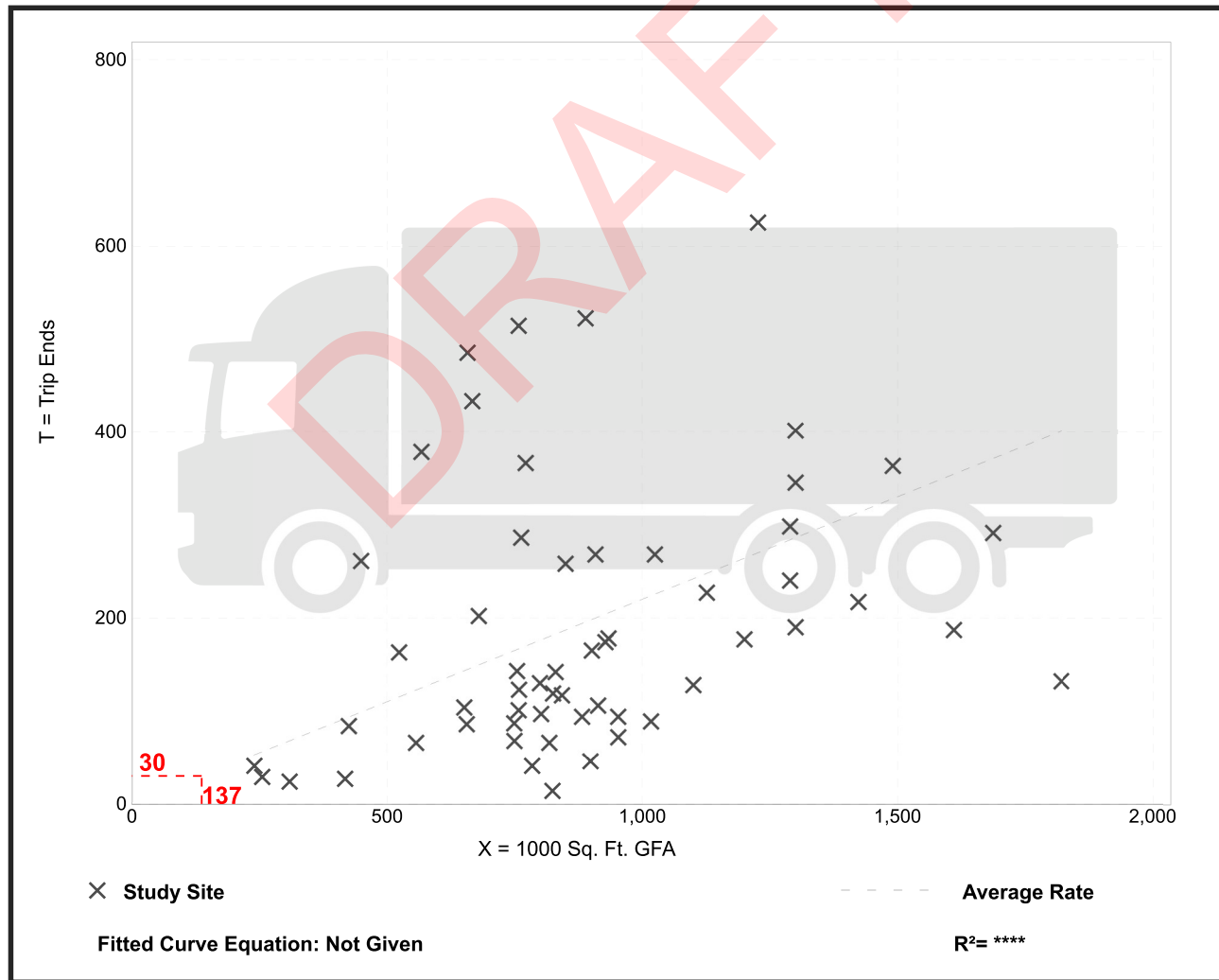
Truck Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday

Setting/Location: General Urban/Suburban
 Number of Studies: 57
 Avg. 1000 Sq. Ft. GFA: 892
 Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.22	0.02 - 0.74	0.16

Data Plot and Equation



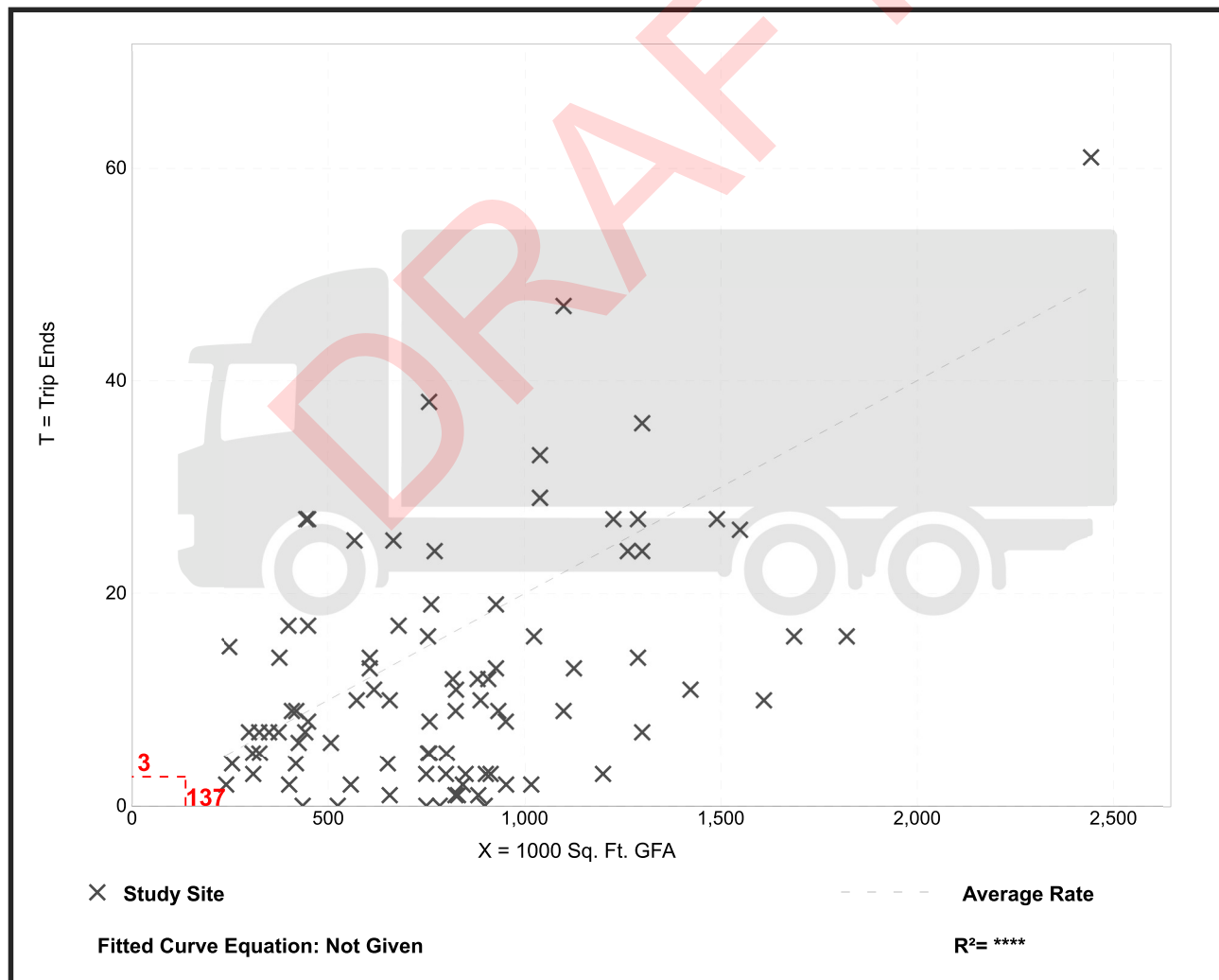
High-Cube Transload and Short-Term Storage Warehouse (154)

Truck 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: 90
 Avg. 1000 Sq. Ft. GFA: 812
 Directional Distribution: 49% entering, 51% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.02	0.00 - 0.06	0.01

Data Plot and Equation



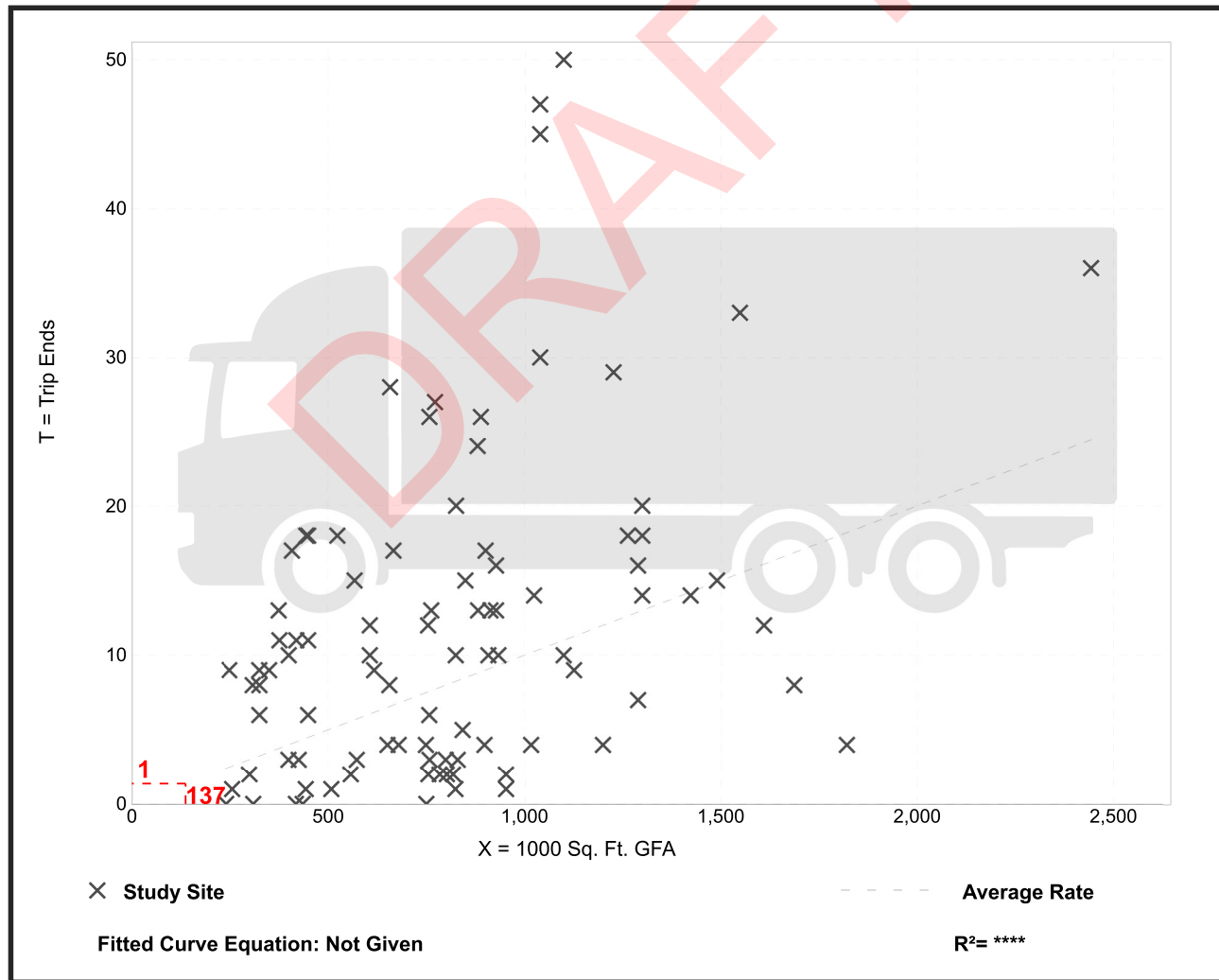
High-Cube Transload and Short-Term Storage Warehouse (154)

Truck 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: 91
 Avg. 1000 Sq. Ft. GFA: 807
 Directional Distribution: 47% entering, 53% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.05	0.01

Data Plot and Equation



Land Use: 155

High-Cube Fulfillment Center Warehouse

Description

A high-cube warehouse (HCW) is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. A high-cube warehouse can be free-standing or located in an industrial park.

Warehousing (Land Use 150), high-cube transload and short-term storage warehouse (Land Use 154), high-cube parcel hub warehouse (Land Use 156), and high-cube cold storage warehouse (Land Use 157) are related land uses.

Land Use Subcategory

Each fulfillment center in the ITE database has been categorized as either a sort or non-sort facility. A sort facility is a fulfillment center that ships out smaller items, requiring extensive sorting, typically by manual means. A non-sort facility is a fulfillment center that ships large box items that are processed primarily with automation rather than through manual means. Separate sets of data plots are presented for the sort and non-sort fulfillment centers. Some limited assembly and repackaging may occur within the facility.

Additional Data

A high-cube warehouse may contain a mezzanine. In a HCW setting, a mezzanine is a free-standing, semi-permanent structure that is commonly supported by structural steel columns and that is lined with racks or shelves. The gross floor area (GFA) values for the study sites in the database for this land use do NOT include the floor area of the mezzanine. The GFA values represent only the permanent ground-floor square footage.

The amount of office/employee welfare space that is provided within a HCW can be highly variable but is typically an insignificant portion of the overall building square footage. Within the trip generation database, common values are between 3,000 and 5,000 square feet for a Cold Storage HCW and between 5,000 and 10,000 square feet for Transload, Fulfillment Center, and Parcel Hub HCW (all of which are less than one percent of total GFA for a site). Therefore, for the trip generation data plots, any office space that is part of the normal operation of the warehouse is included in the total GFA.

The High-Cube Warehouse/Distribution Center-related land uses underwent specialized consideration through a commissioned study titled "High-Cube Warehouse Vehicle Trip Generation Analysis," published in October 2016. The results of this study are posted on the ITE website at <http://library.ite.org/pub/a3e6679a-e3a8-bf38-7f29-2961becdd498>.

The sites were surveyed in the 2000s and the 2010s in California, New Jersey, and Texas.

Source Numbers

752, 941, 1001, 1002, 1011

DRAFT

High-Cube Fulfillment Center Warehouse - Non-Sort (155)

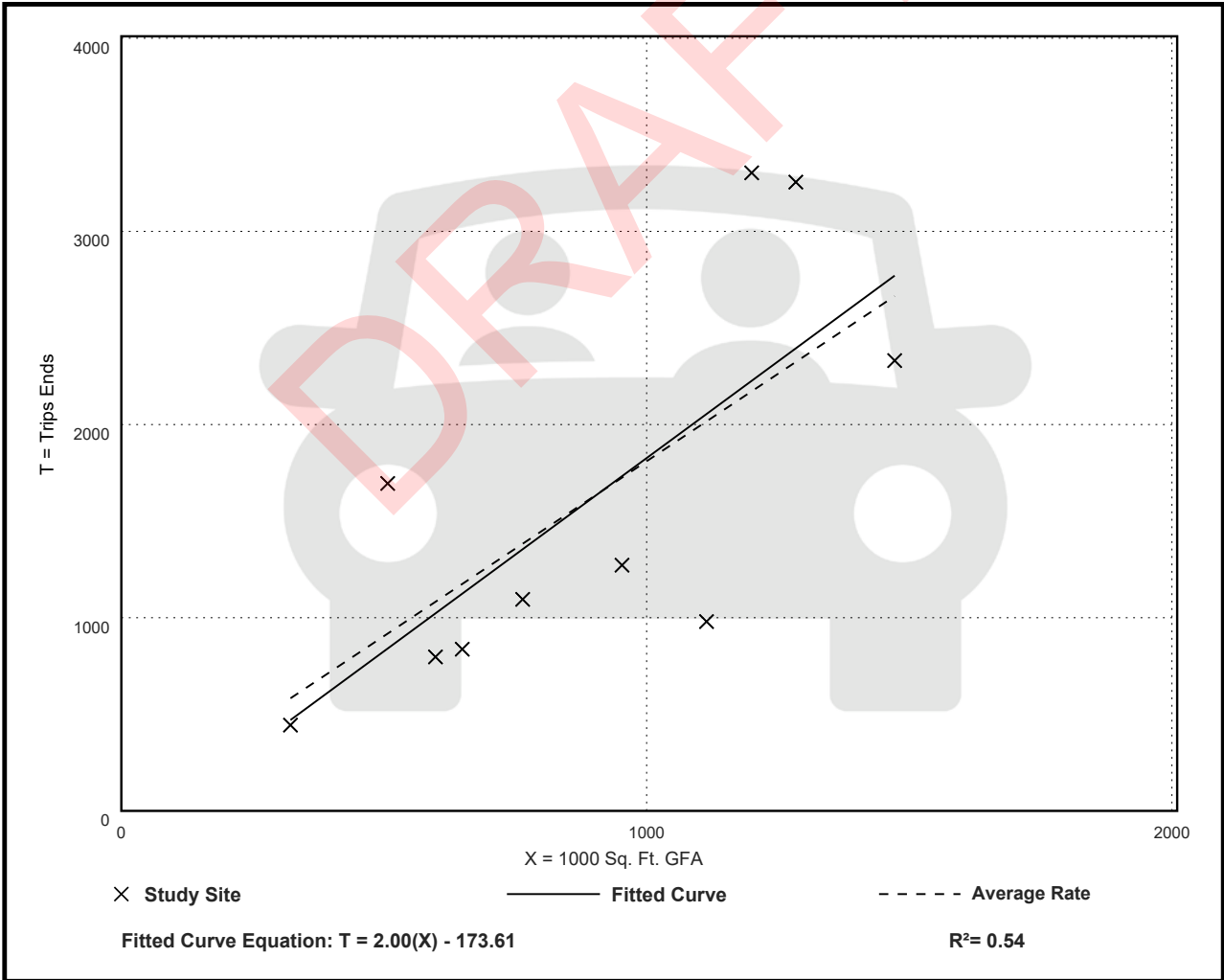
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
 On a: Weekday

Setting/Location: General Urban/Suburban
 Number of Studies: 10
 Avg. 1000 Sq. Ft. GFA: 886
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.81	0.88 - 3.34	0.76

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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.

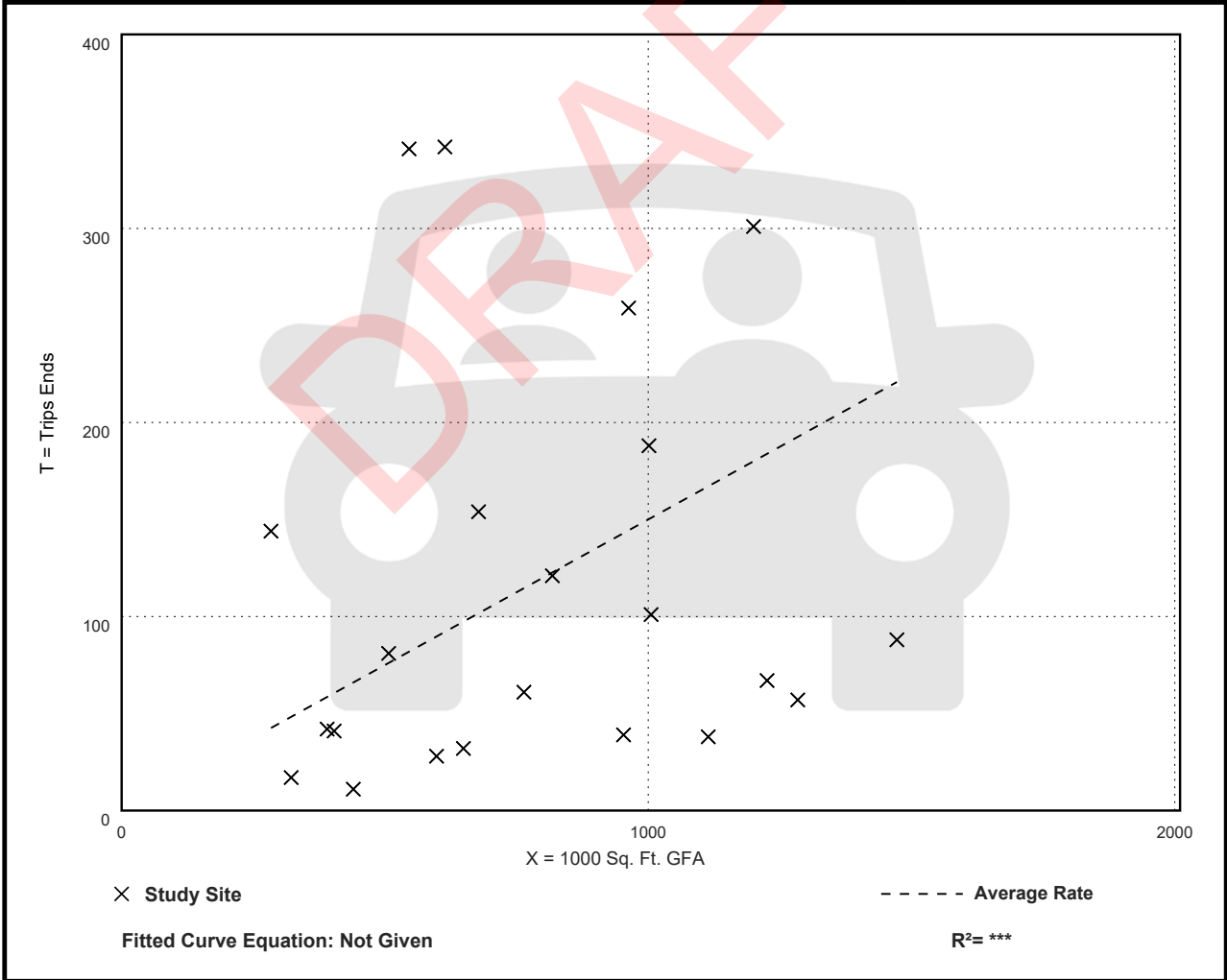
Setting/Location: General Urban/Suburban

Number of Studies: 22
Avg. 1000 Sq. Ft. GFA: 783
Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.03 - 0.62	0.15

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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.

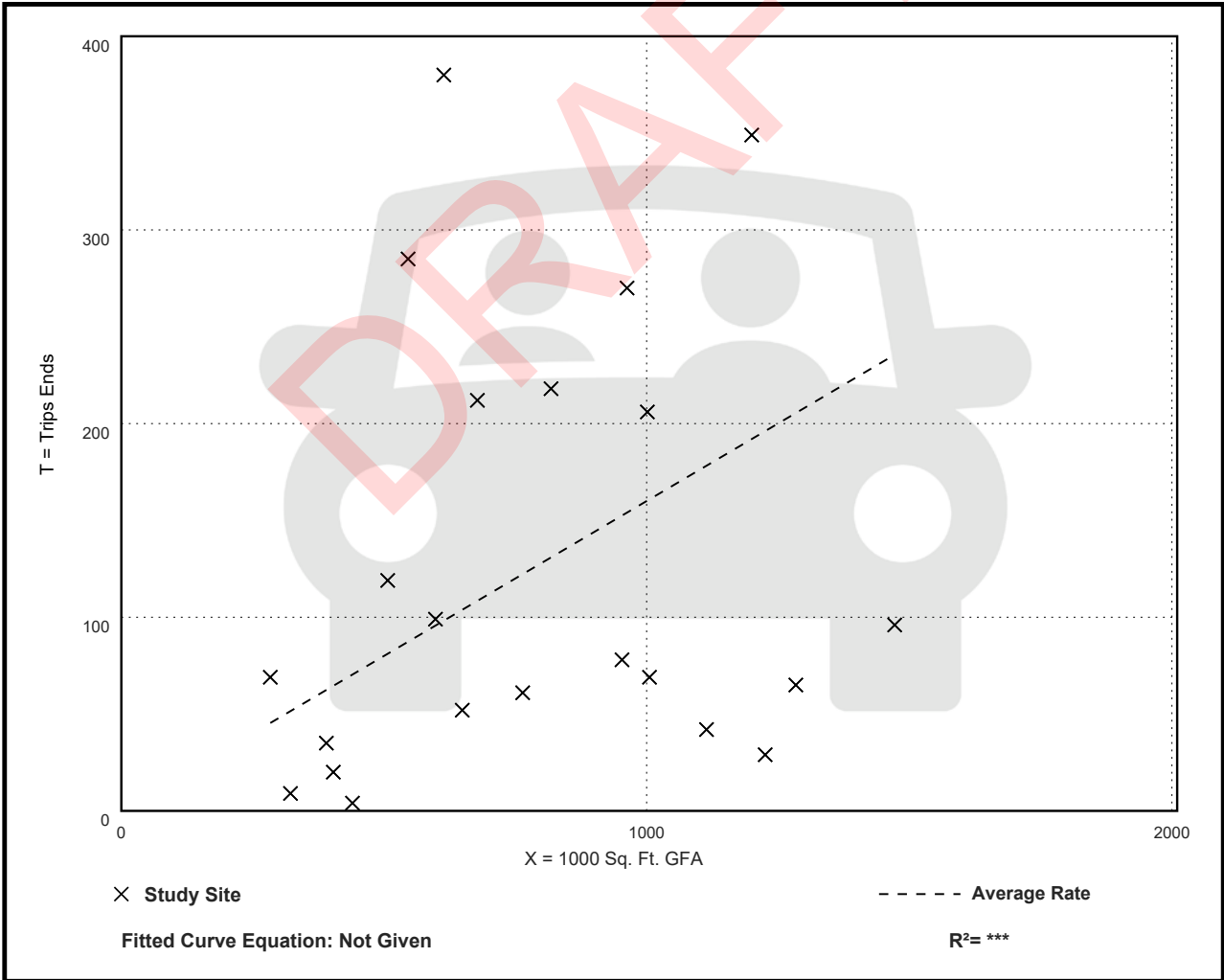
Setting/Location: General Urban/Suburban

Number of Studies: 22
Avg. 1000 Sq. Ft. GFA: 783
Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.01 - 0.62	0.15

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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

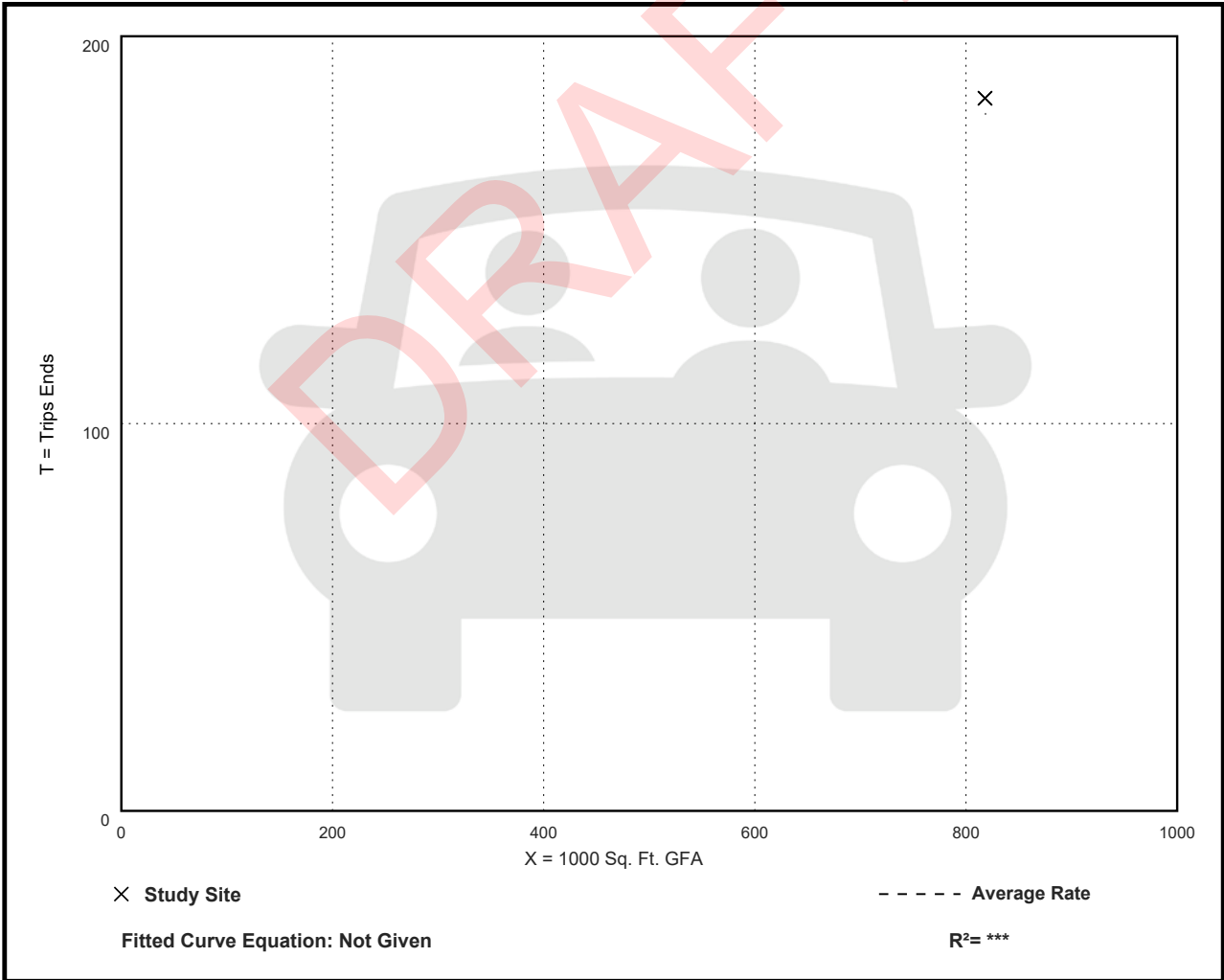
Setting/Location: General Urban/Suburban
 Number of Studies: 1
 Avg. 1000 Sq. Ft. GFA: 818
 Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.22	0.22 - 0.22	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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

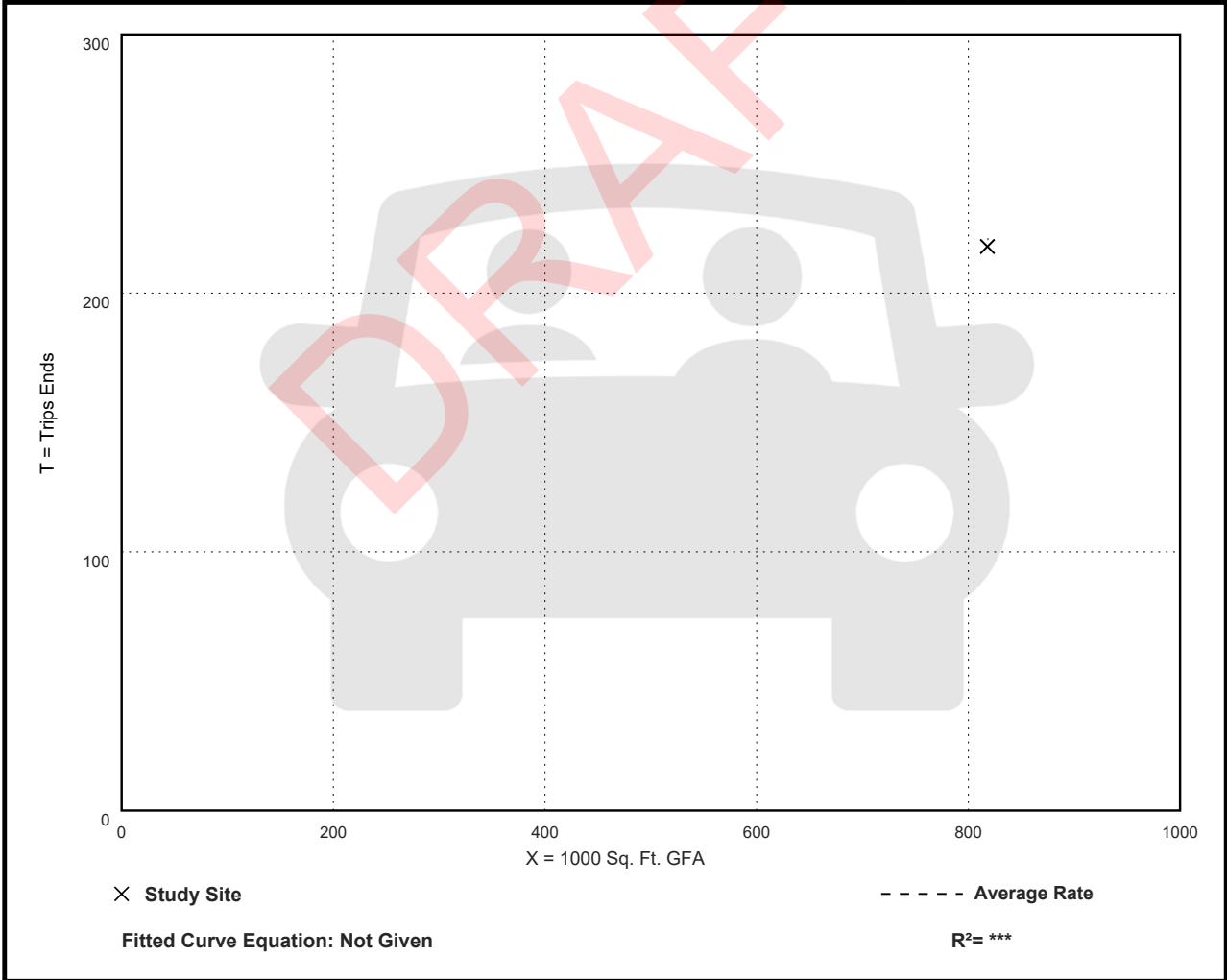
Setting/Location: General Urban/Suburban
 Number of Studies: 1
 Avg. 1000 Sq. Ft. GFA: 818
 Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.27	0.27 - 0.27	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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

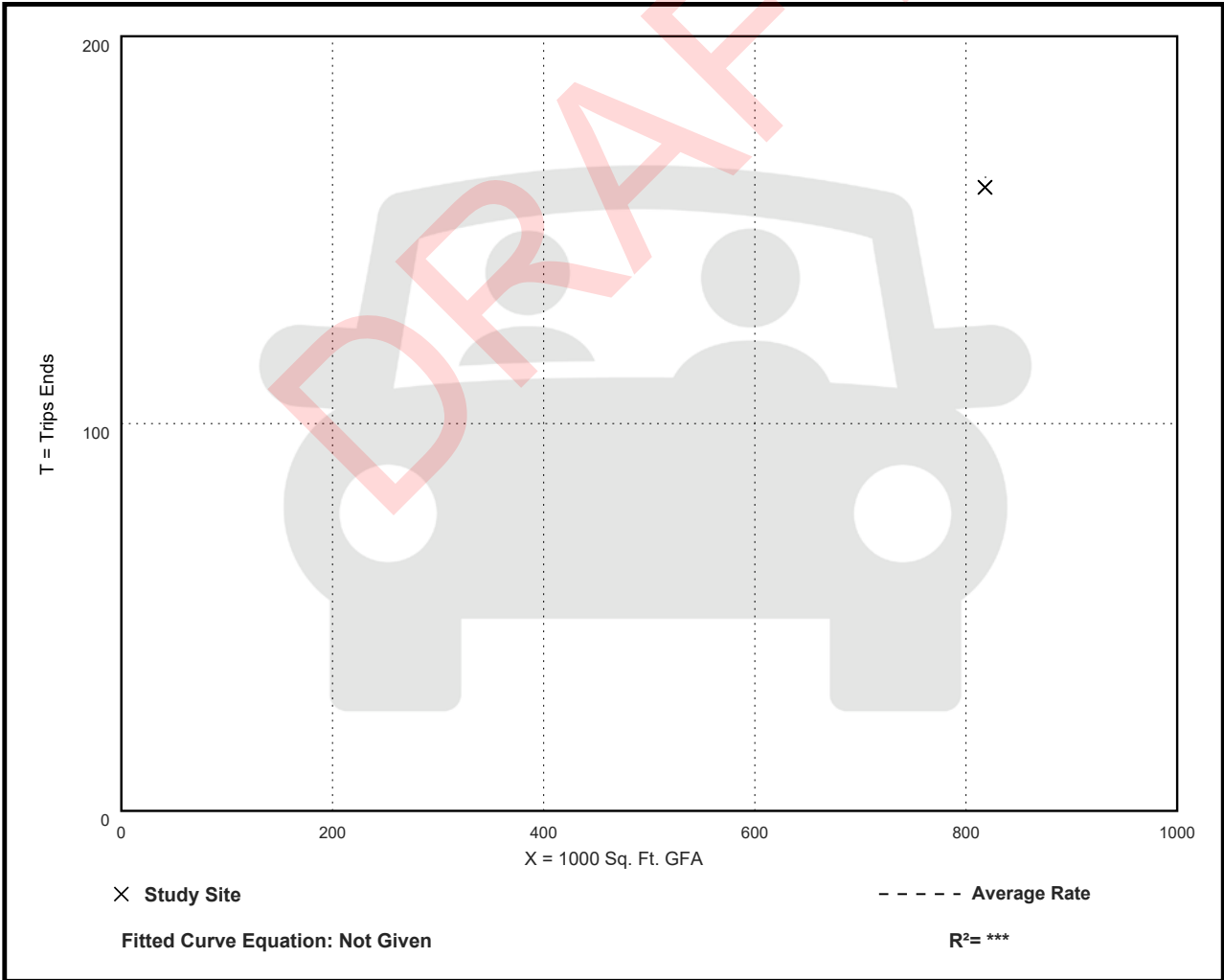
Setting/Location: General Urban/Suburban
 Number of Studies: 1
 Avg. 1000 Sq. Ft. GFA: 818
 Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.20	0.20 - 0.20	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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

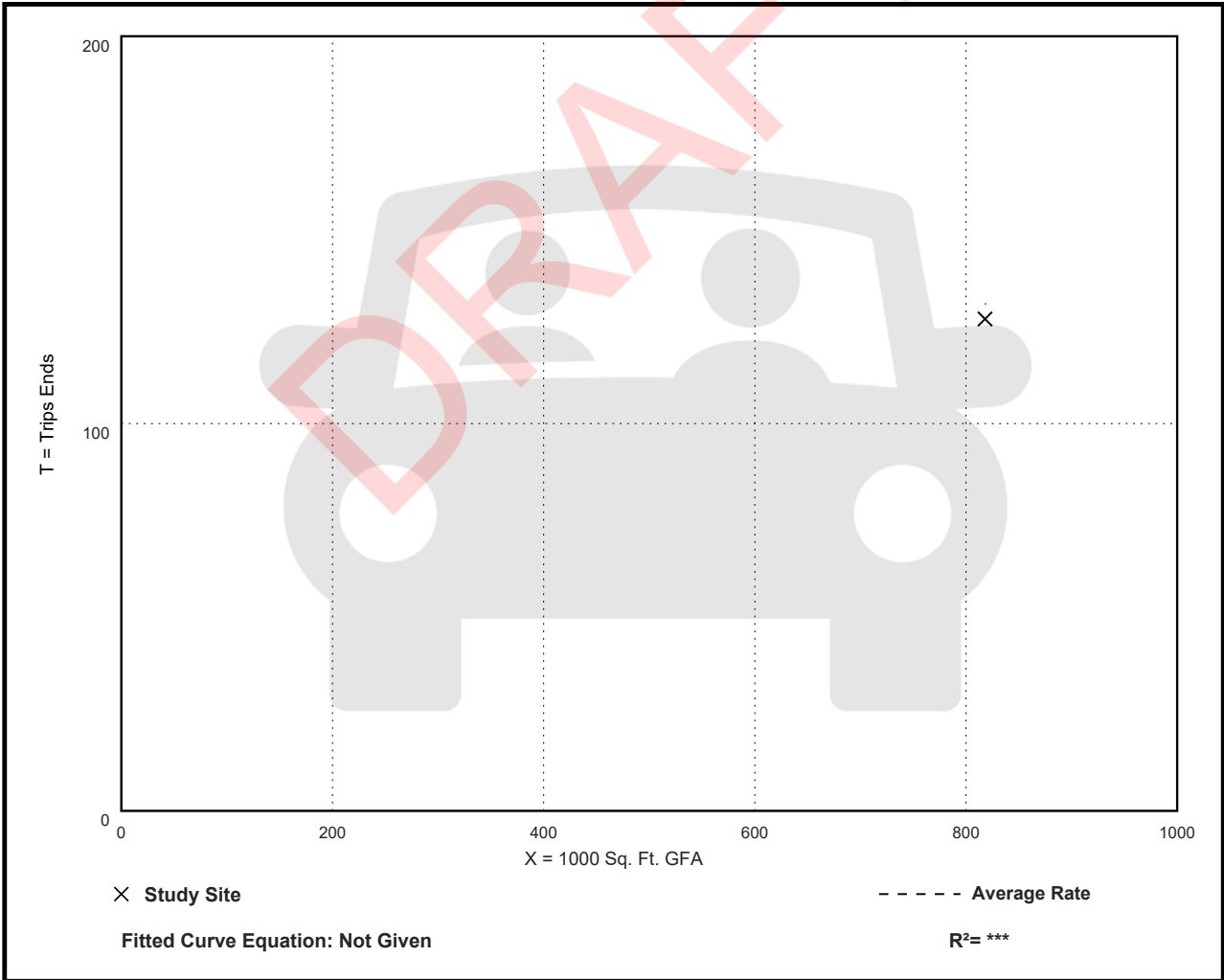
Setting/Location: General Urban/Suburban
 Number of Studies: 1
 Avg. 1000 Sq. Ft. GFA: 818
 Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.16 - 0.16	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 7

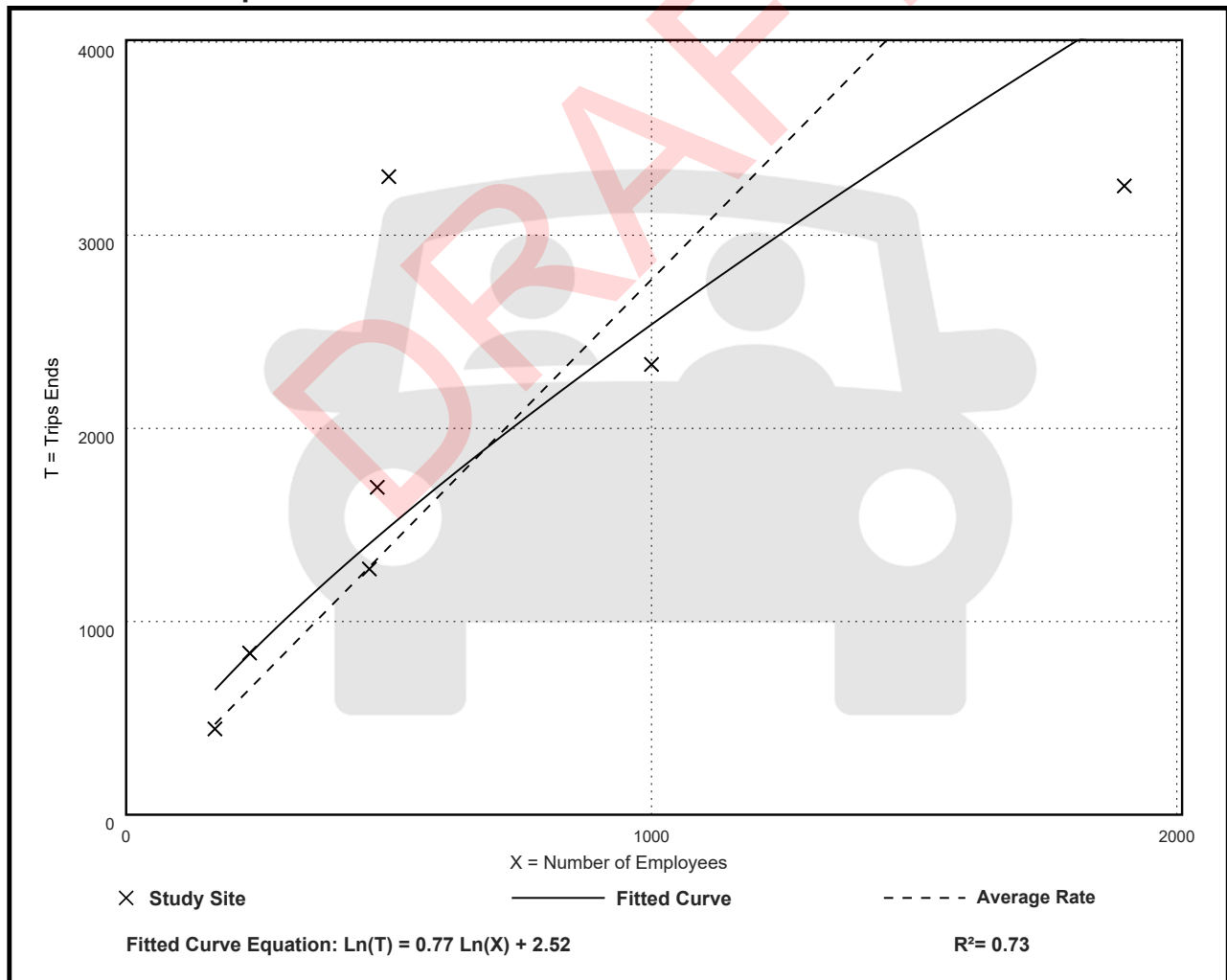
Avg. Num. of Employees: 678

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.77	1.71 - 6.61	1.58

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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: 7

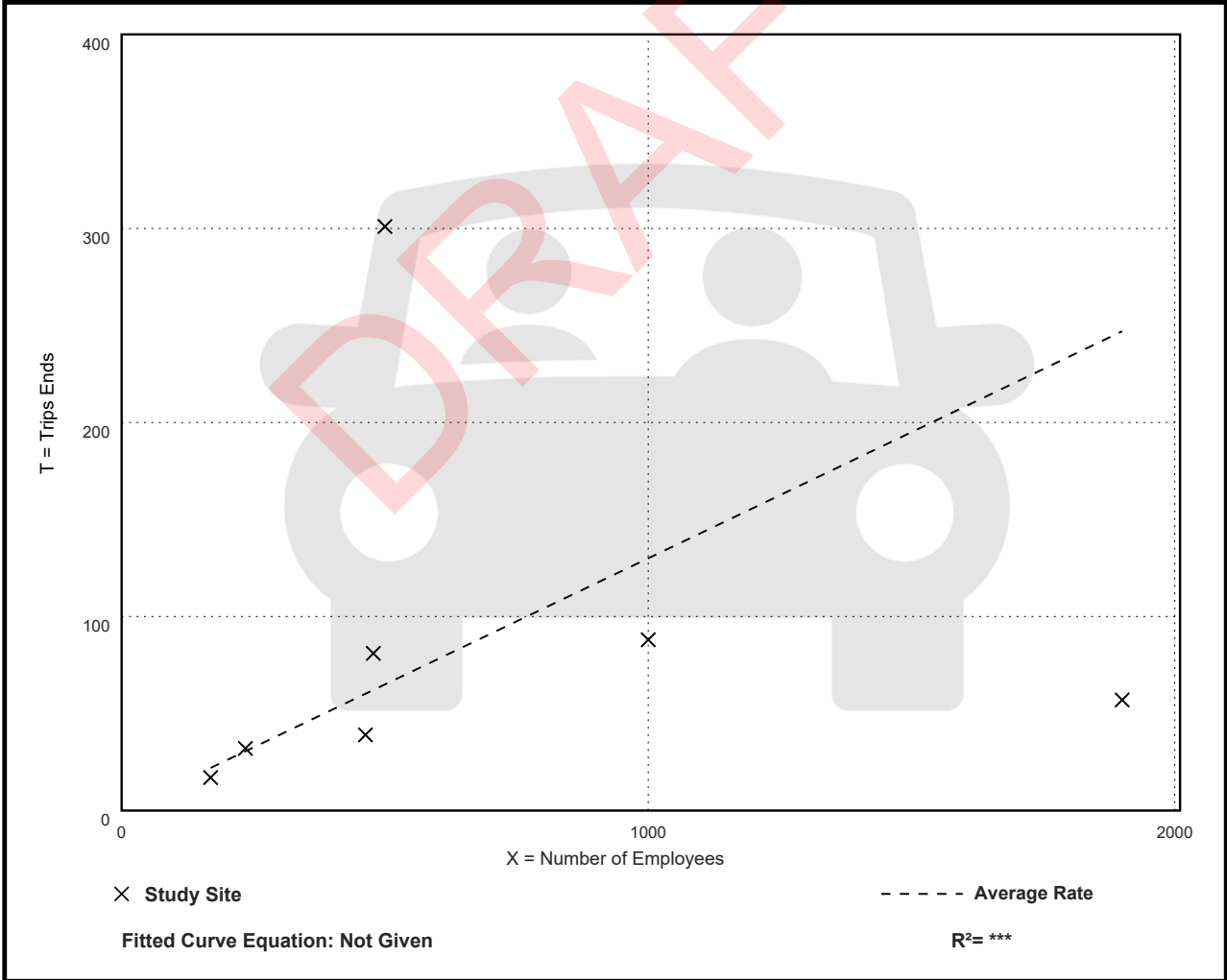
Avg. Num. of Employees: 678

Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.13	0.03 - 0.60	0.18

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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: 7

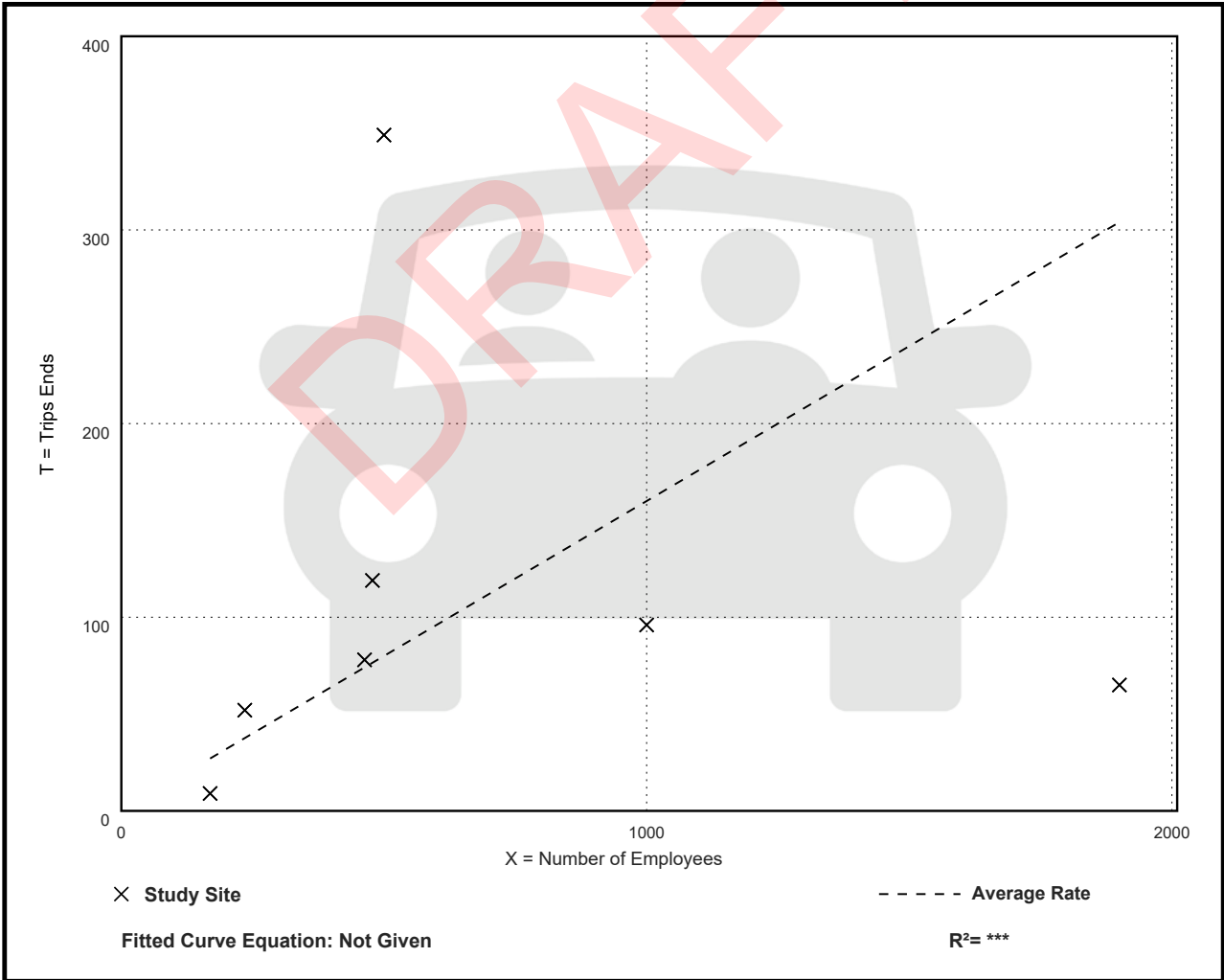
Avg. Num. of Employees: 678

Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.16	0.03 - 0.70	0.21

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Sort (155)

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

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 1360

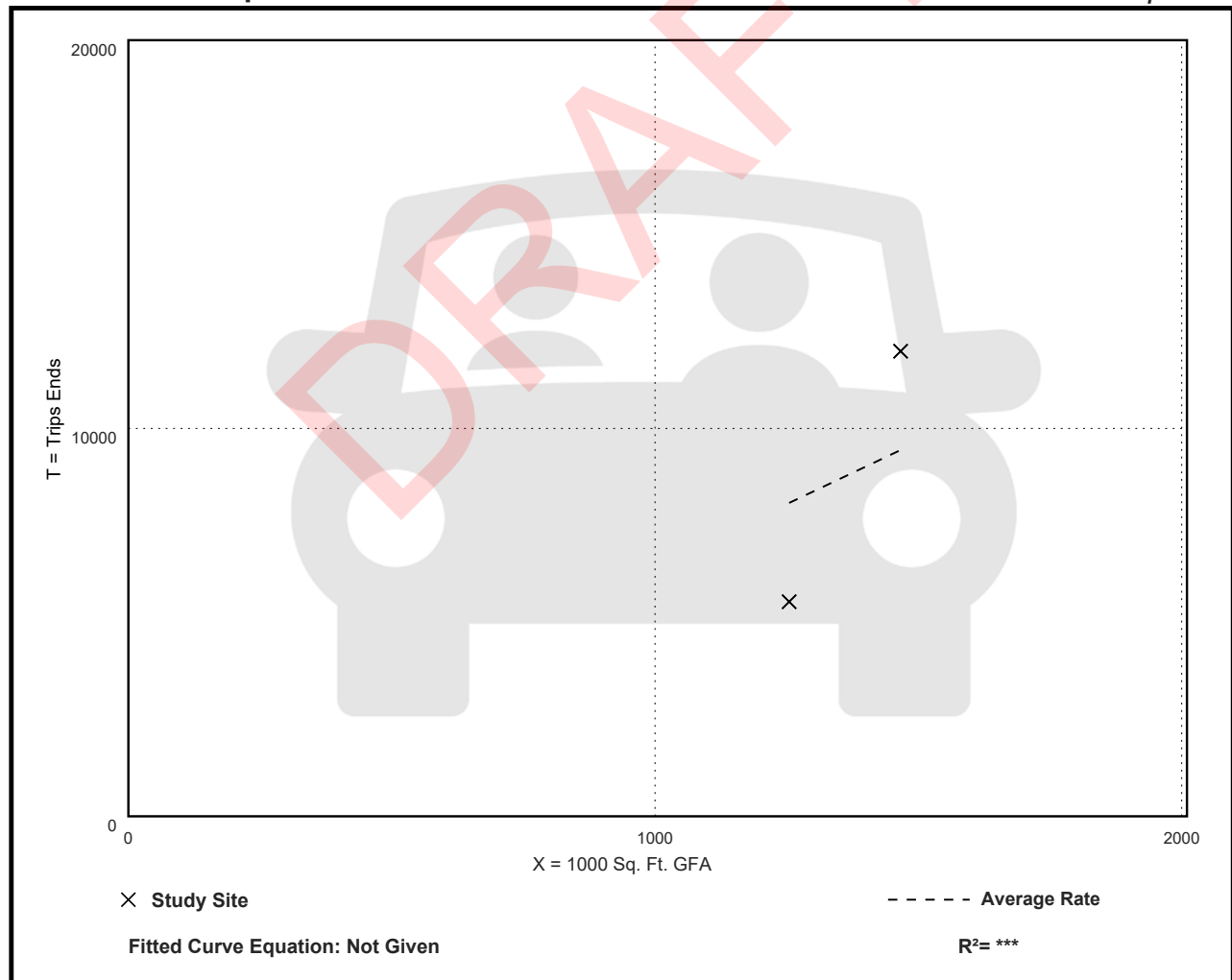
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
6.44	4.41 - 8.18	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Sort (155)

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: 3

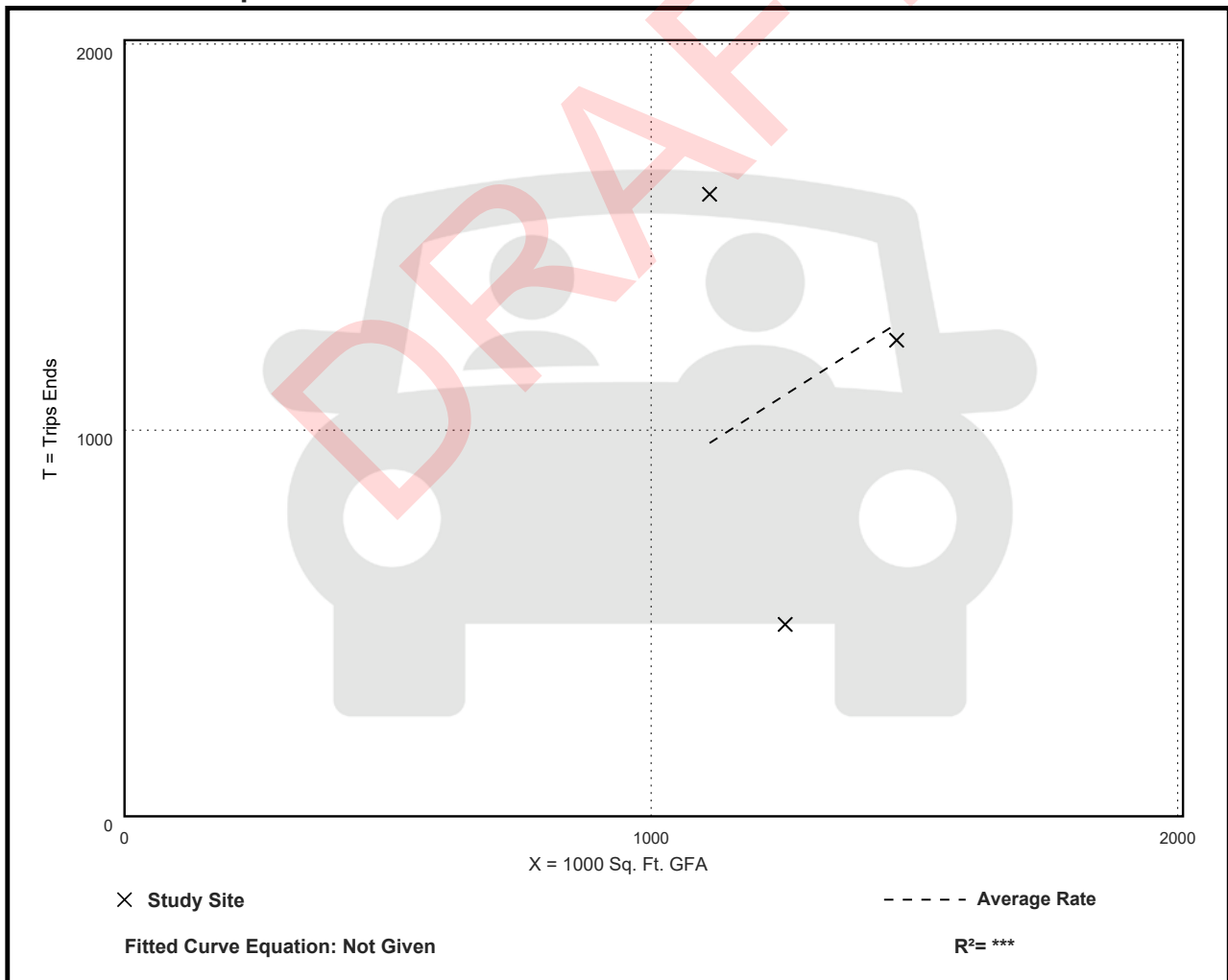
Avg. 1000 Sq. Ft. GFA: 1277

Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.87	0.40 - 1.45	0.51

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Sort (155)

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: 3

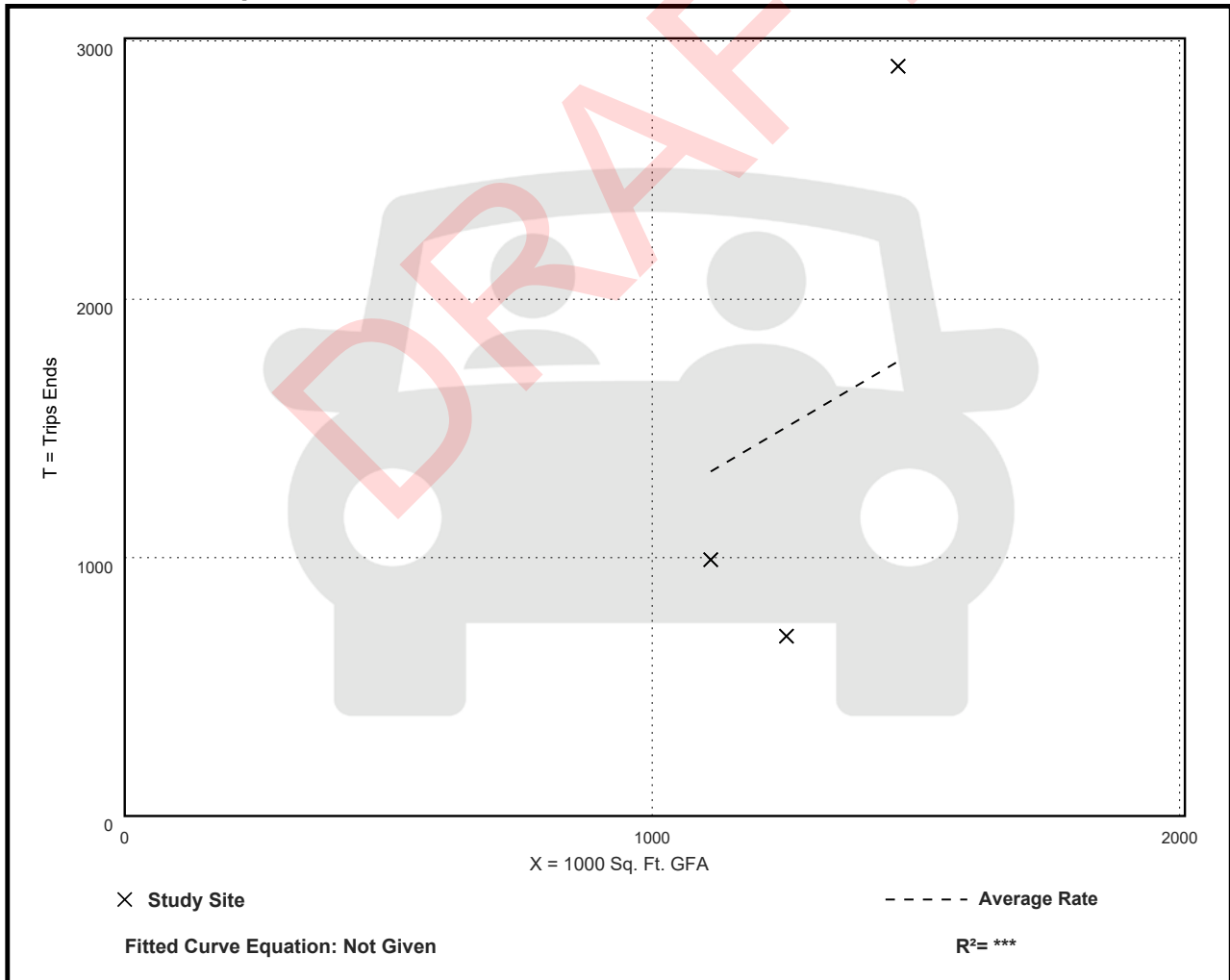
Avg. 1000 Sq. Ft. GFA: 1277

Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.20	0.55 - 1.98	0.77

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Sort (155)

Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Employees: 4700

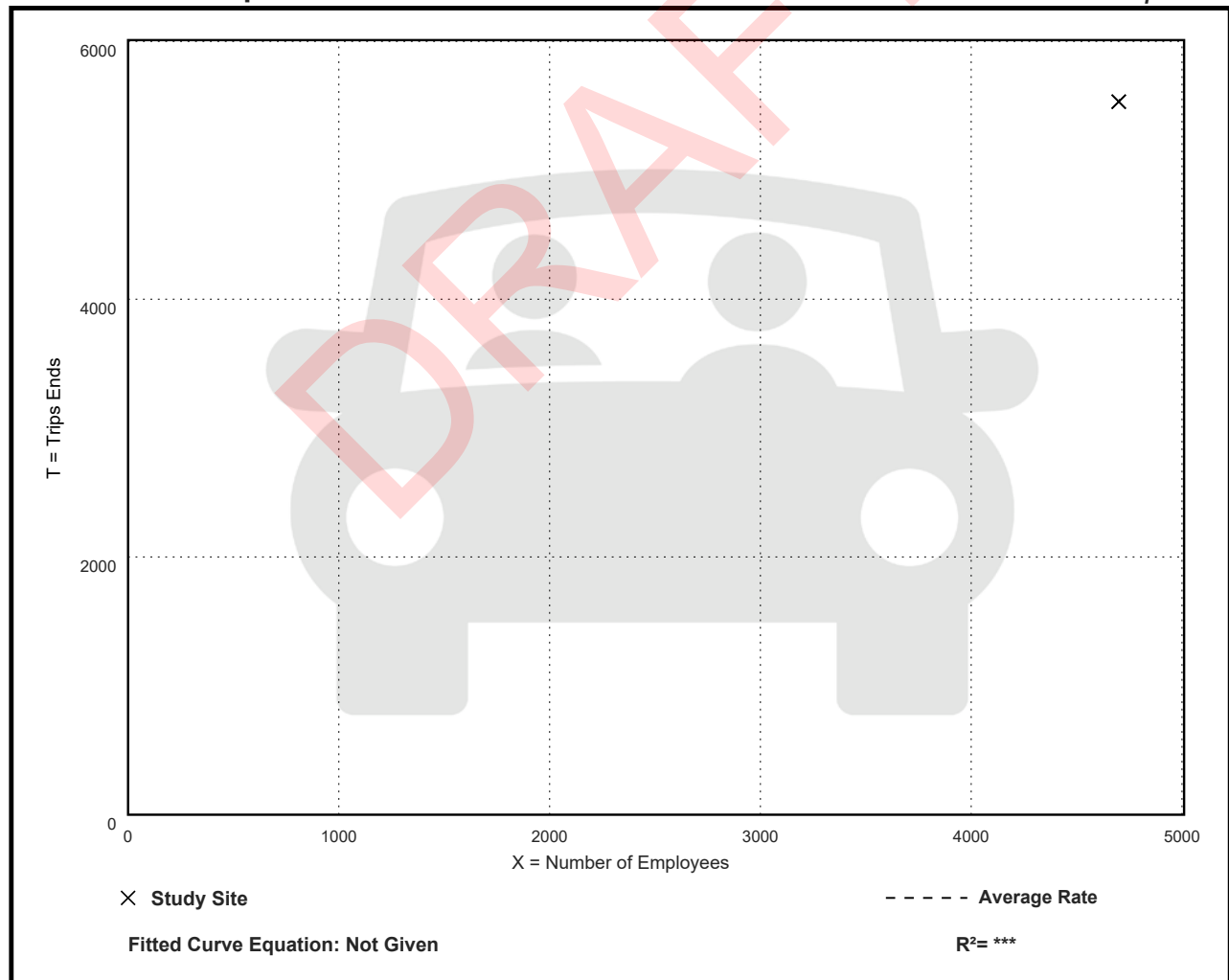
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.18	1.18 - 1.18	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Sort (155)

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: 1

Avg. Num. of Employees: 4700

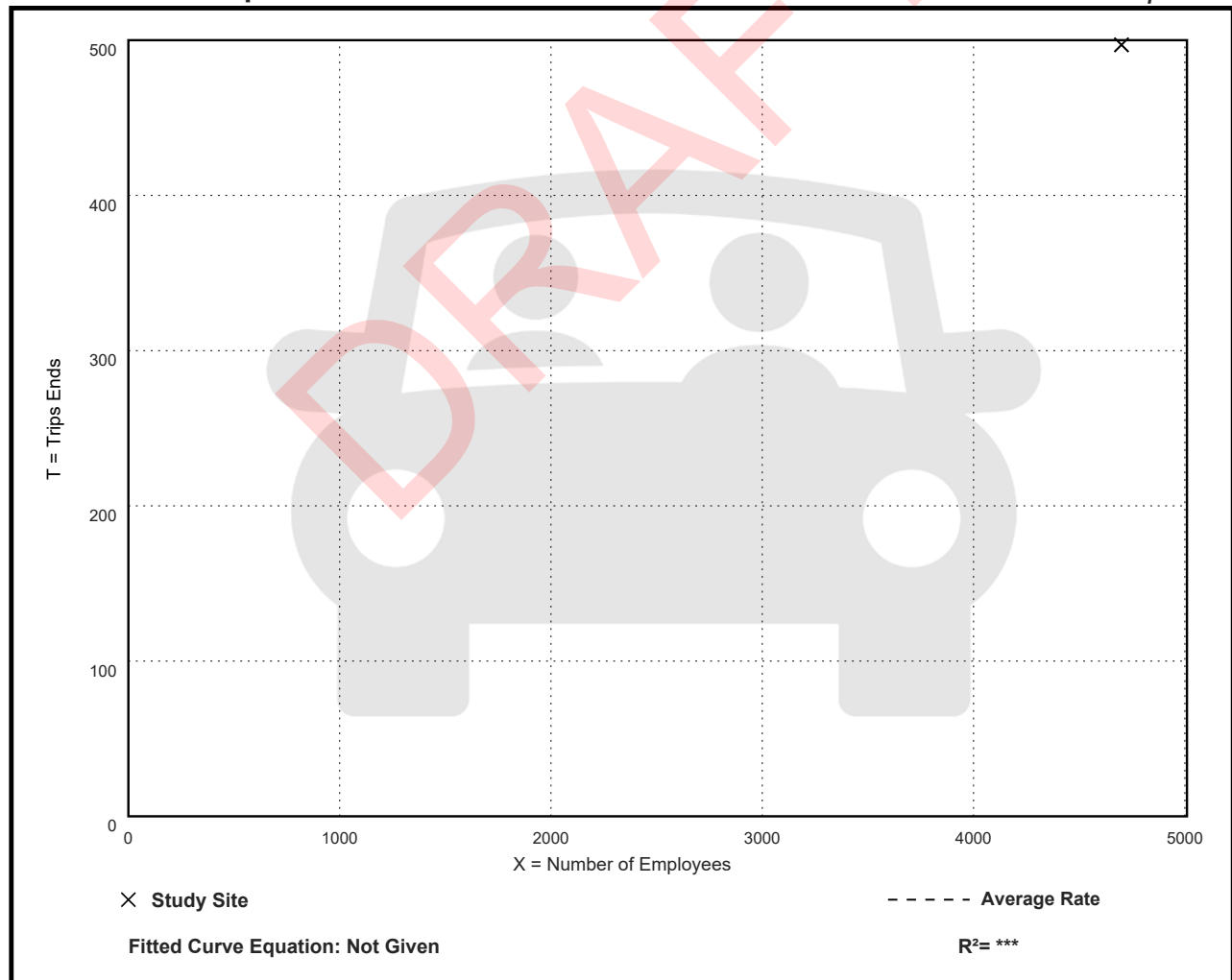
Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.11	0.11 - 0.11	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Sort (155)

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: 1

Avg. Num. of Employees: 4700

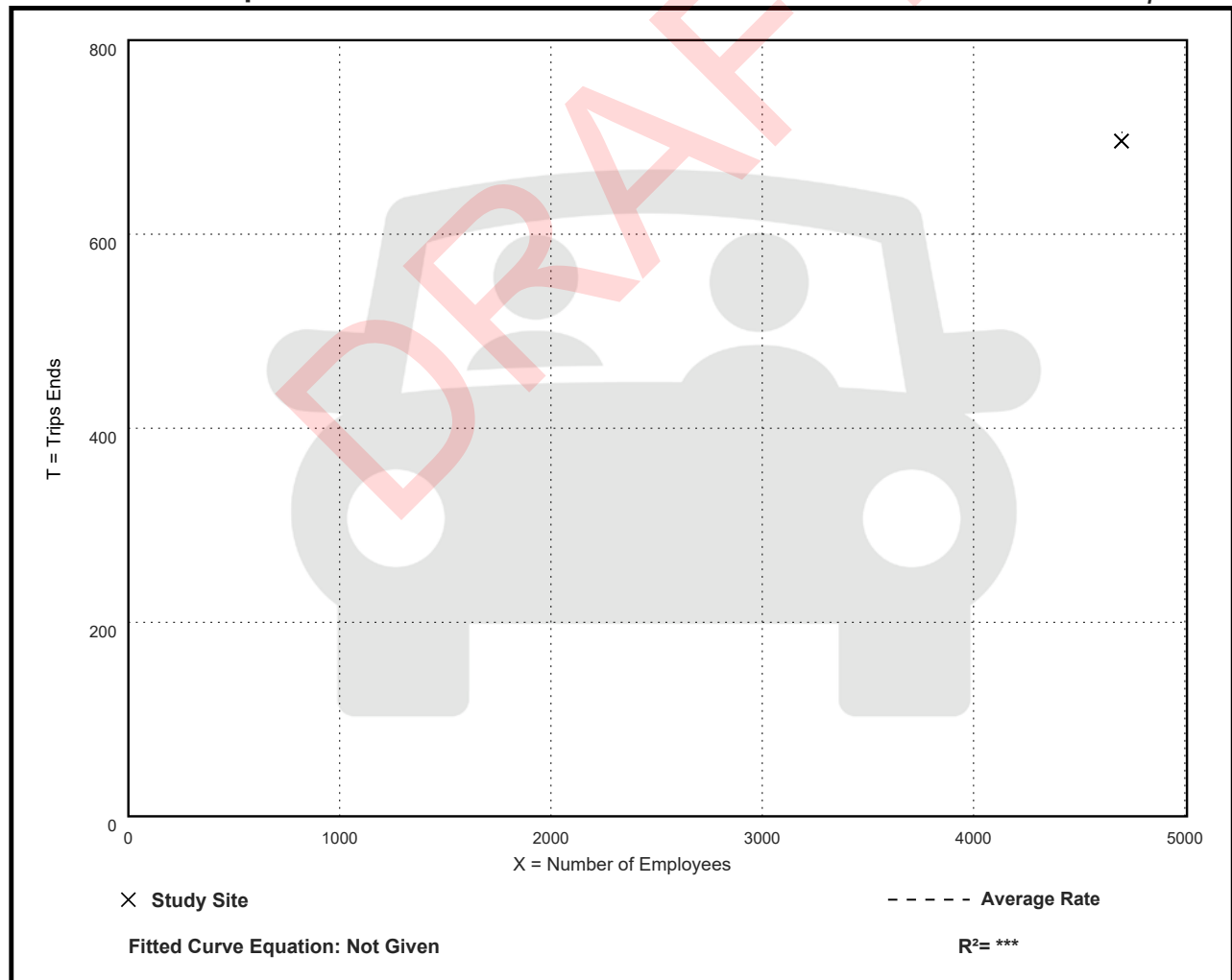
Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.15	0.15 - 0.15	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

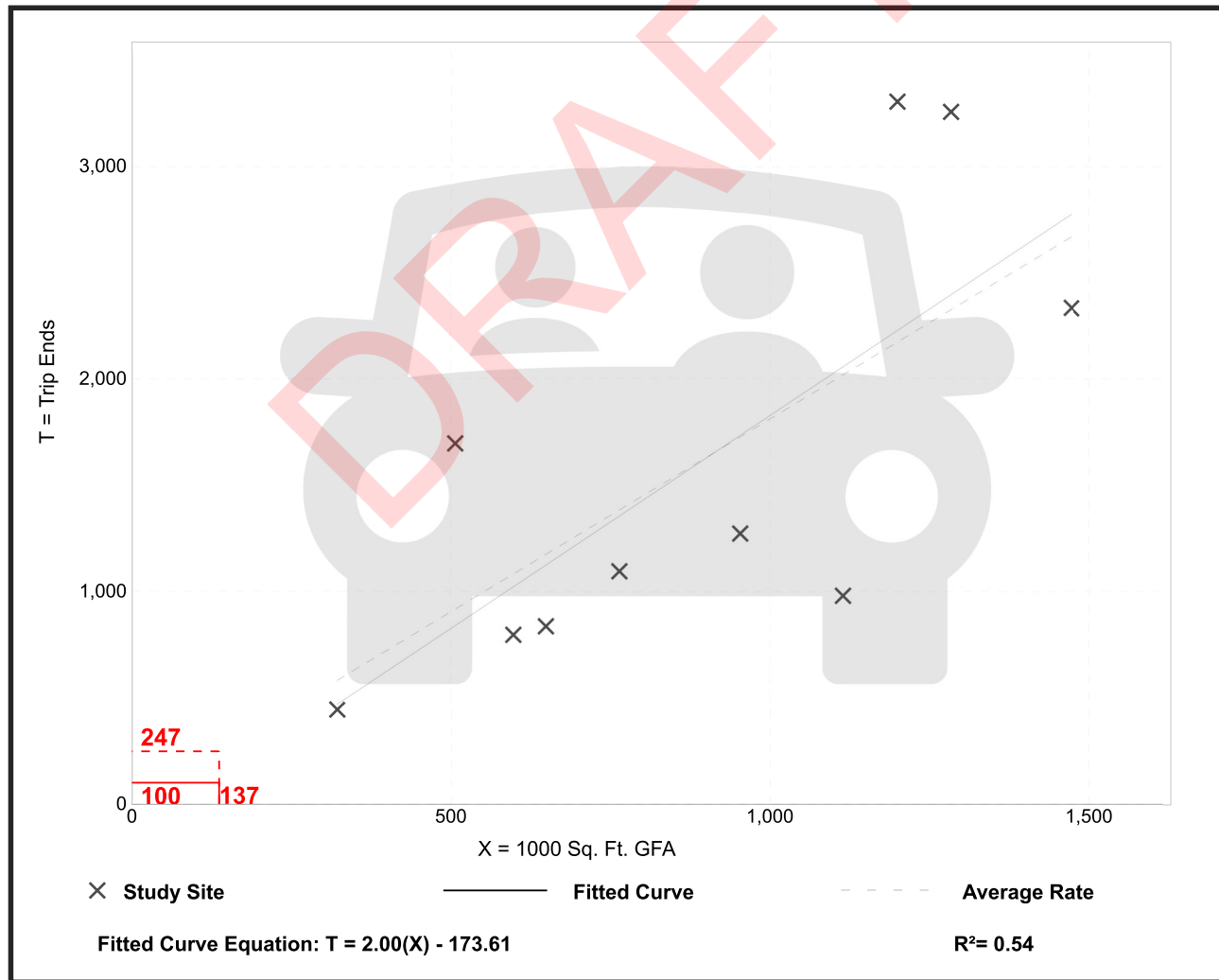
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 10
Avg. 1000 Sq. Ft. GFA: 886
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.81	0.88 - 3.34	0.76

Data Plot and Equation



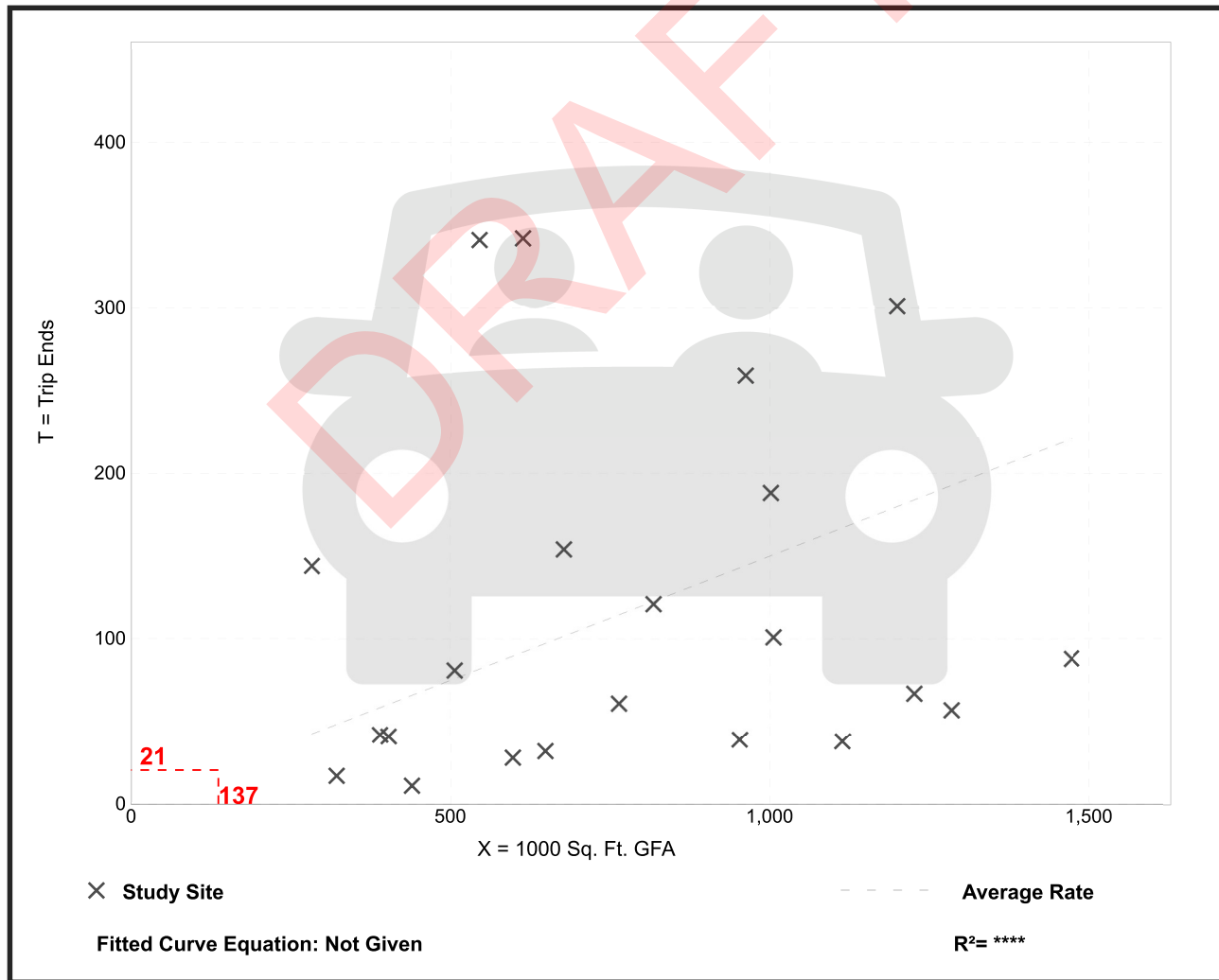
High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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: 22
 Avg. 1000 Sq. Ft. GFA: 783
 Directional Distribution: 81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.15	0.03 - 0.62	0.15

Data Plot and Equation



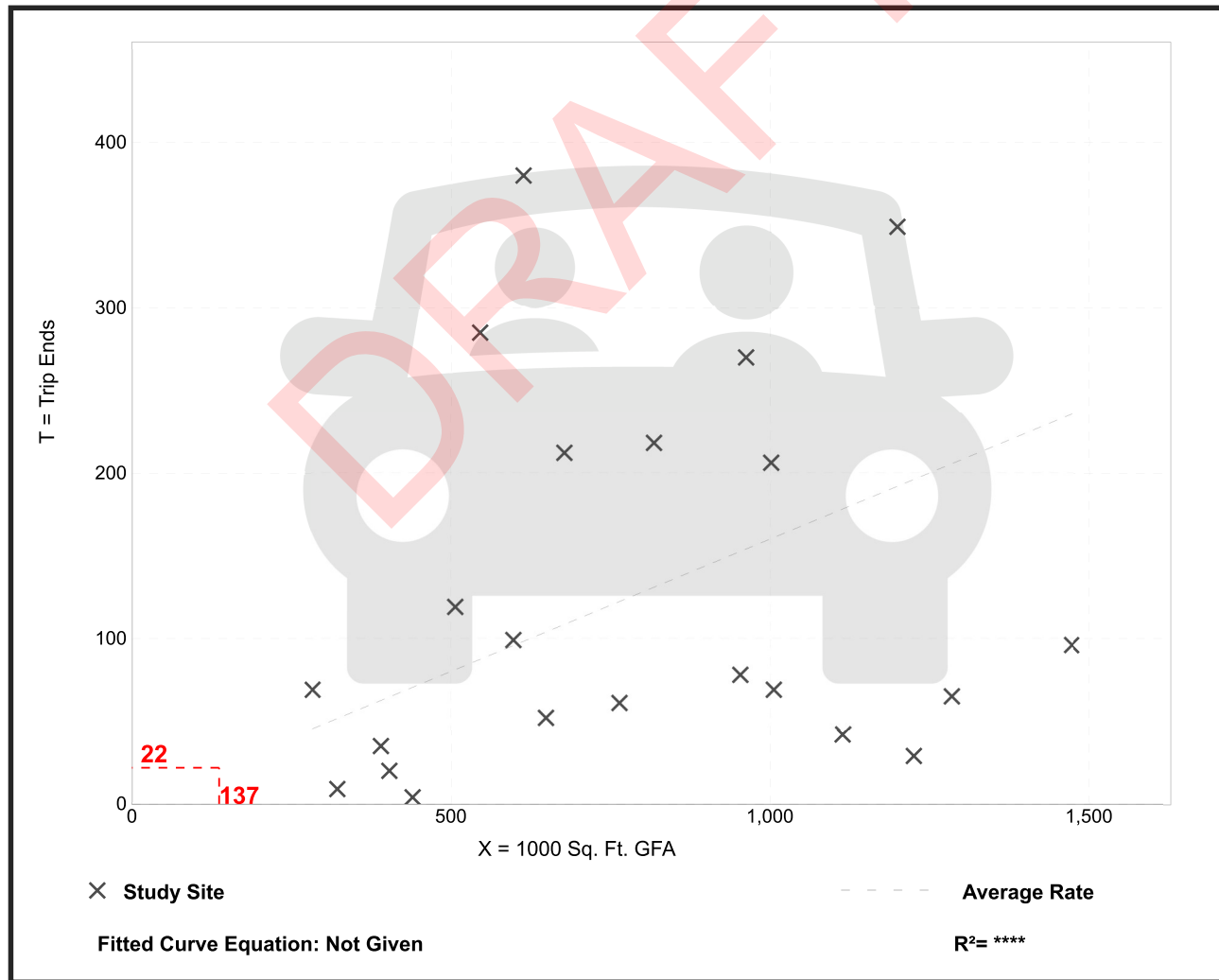
High-Cube Fulfillment Center Warehouse - Non-Sort (155)

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: 22
 Avg. 1000 Sq. Ft. GFA: 783
 Directional Distribution: 39% entering, 61% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.01 - 0.62	0.15

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

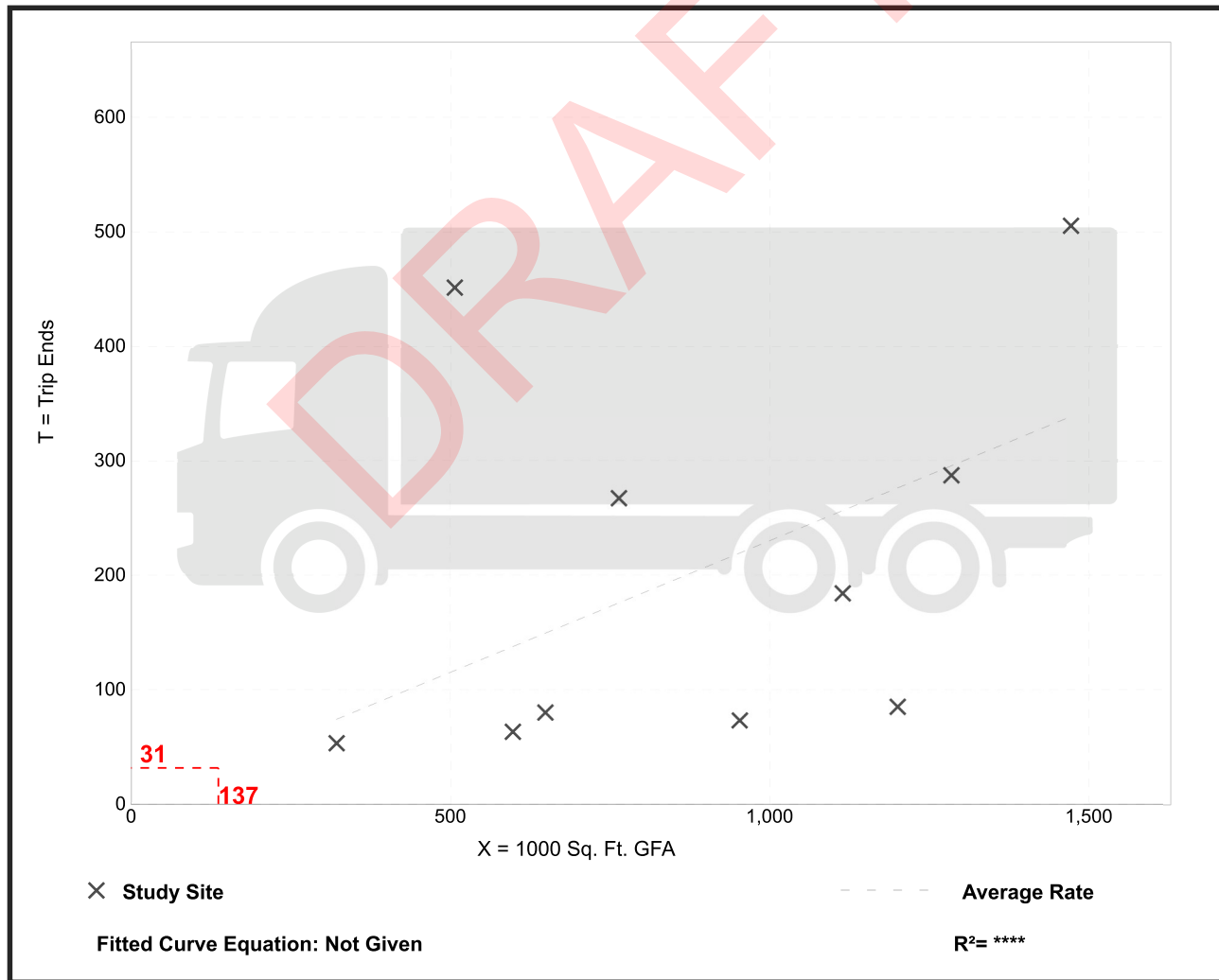
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 10
Avg. 1000 Sq. Ft. GFA: 886
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.23	0.07 - 0.89	0.20

Data Plot and Equation



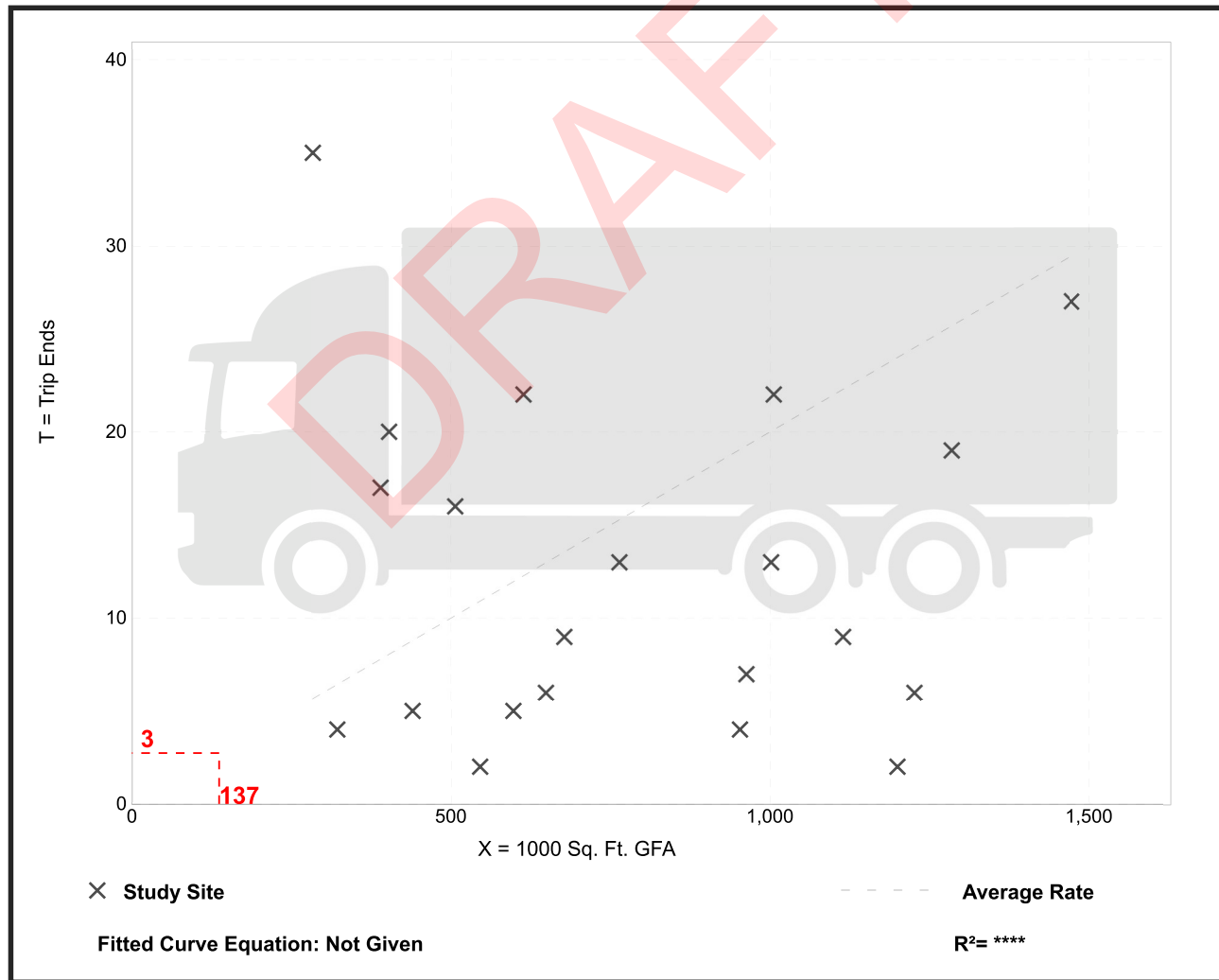
High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Truck 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: 21
 Avg. 1000 Sq. Ft. GFA: 782
 Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.02	0.00 - 0.12	0.02

Data Plot and Equation



High-Cube Fulfillment Center Warehouse - Non-Sort (155)

Truck 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: 21
 Avg. 1000 Sq. Ft. GFA: 782
 Directional Distribution: 46% entering, 54% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.05	0.01

Data Plot and Equation



Land Use: 156

High-Cube Parcel Hub Warehouse

Description

A high-cube warehouse (HCW) is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. A high-cube warehouse can be free-standing or located in an industrial park.

A high-cube parcel hub warehouses typically serves as a regional and local freight-forwarder facility for time sensitive shipments via airfreight and ground carriers. A site can also include truck maintenance, wash, or fueling facilities. Some limited assembly and repackaging may occur within the facility.

A high-cube warehouse may contain a mezzanine. In a HCW setting, a mezzanine is a free-standing, semi-permanent structure that is commonly supported by structural steel columns and that is lined with racks or shelves. The gross floor area (GFA) values for the study sites in the database for this land use do NOT include the floor area of the mezzanine. The GFA values represent only the permanent ground-floor square footage.

The amount of office/employee welfare space that is provided within a HCW can be highly variable but is typically an insignificant portion of the overall building square footage. Within the trip generation database, common values are between 3,000 and 5,000 square feet for a Cold Storage HCW and between 5,000 and 10,000 square feet for Transload, Fulfillment Center, and Parcel Hub HCW (all of which are less than one percent of total GFA for a site). Therefore, for the trip generation data plots, any office space that is part of the normal operation of the warehouse is included in the total GFA.

Warehousing (Land Use 150), high-cube transload and short-term storage warehouse (Land Use 154), high-cube fulfillment center warehouse (Land Use 155), and high-cube cold storage warehouse (Land Use 157) are related land uses.

Additional Data

The High-Cube Warehouse/Distribution Center-related land uses underwent specialized consideration through a commissioned study titled "High-Cube Warehouse Vehicle Trip Generation Analysis," published in October 2016. The results of this study are posted on the ITE website at <http://library.ite.org/pub/a3e6679a-e3a8-bf38-7f29-2961becdd498>.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 2010s in California, Connecticut, and Minnesota.

Source Numbers

869, 892, 941, 1001, 1011

DRAFT

High-Cube Parcel Hub Warehouse (156)

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

Setting/Location: General Urban/Suburban

Number of Studies: 8

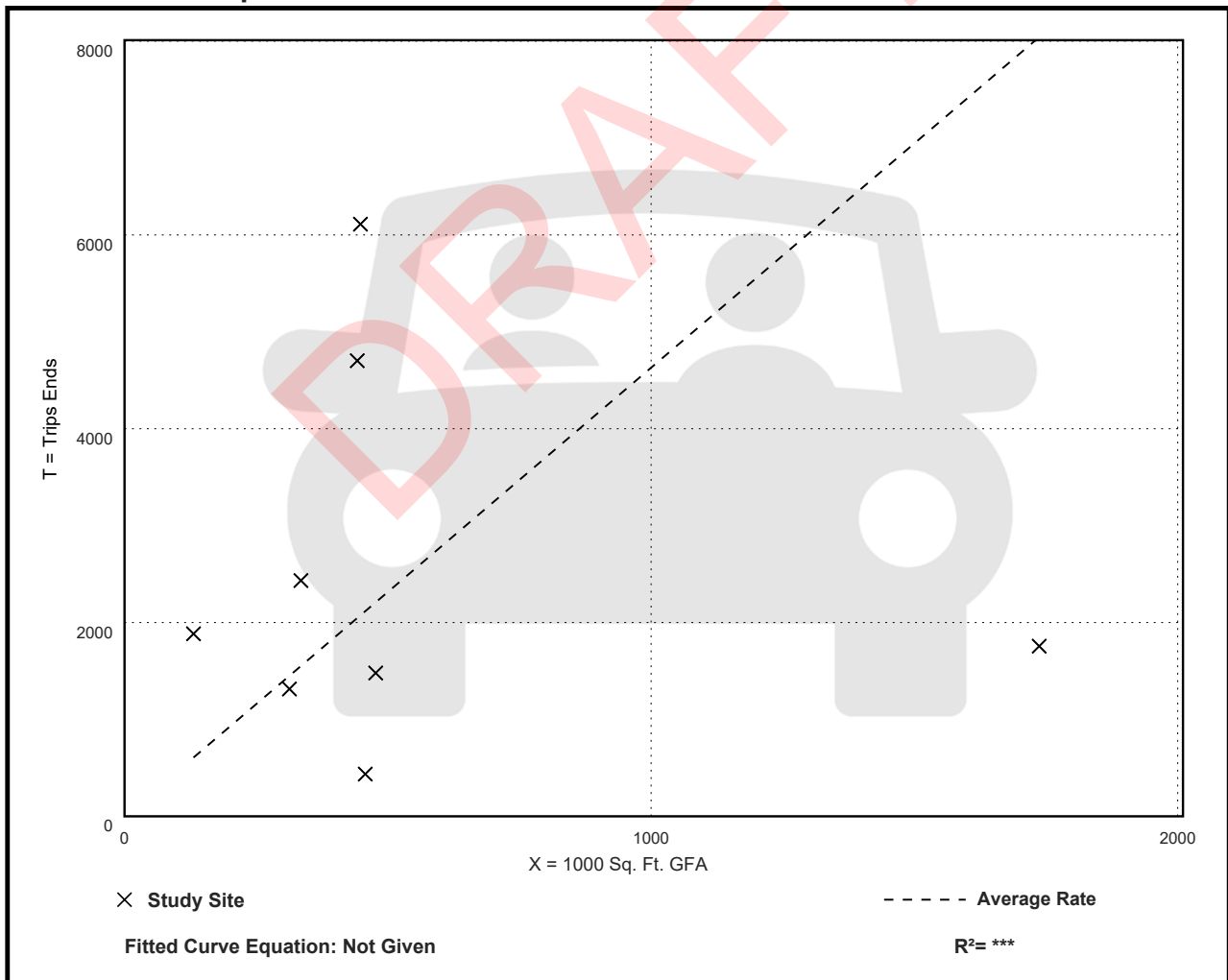
Avg. 1000 Sq. Ft. GFA: 543

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.63	0.95 - 14.38	5.06

Data Plot and Equation



High-Cube Parcel Hub Warehouse (156)

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: 4

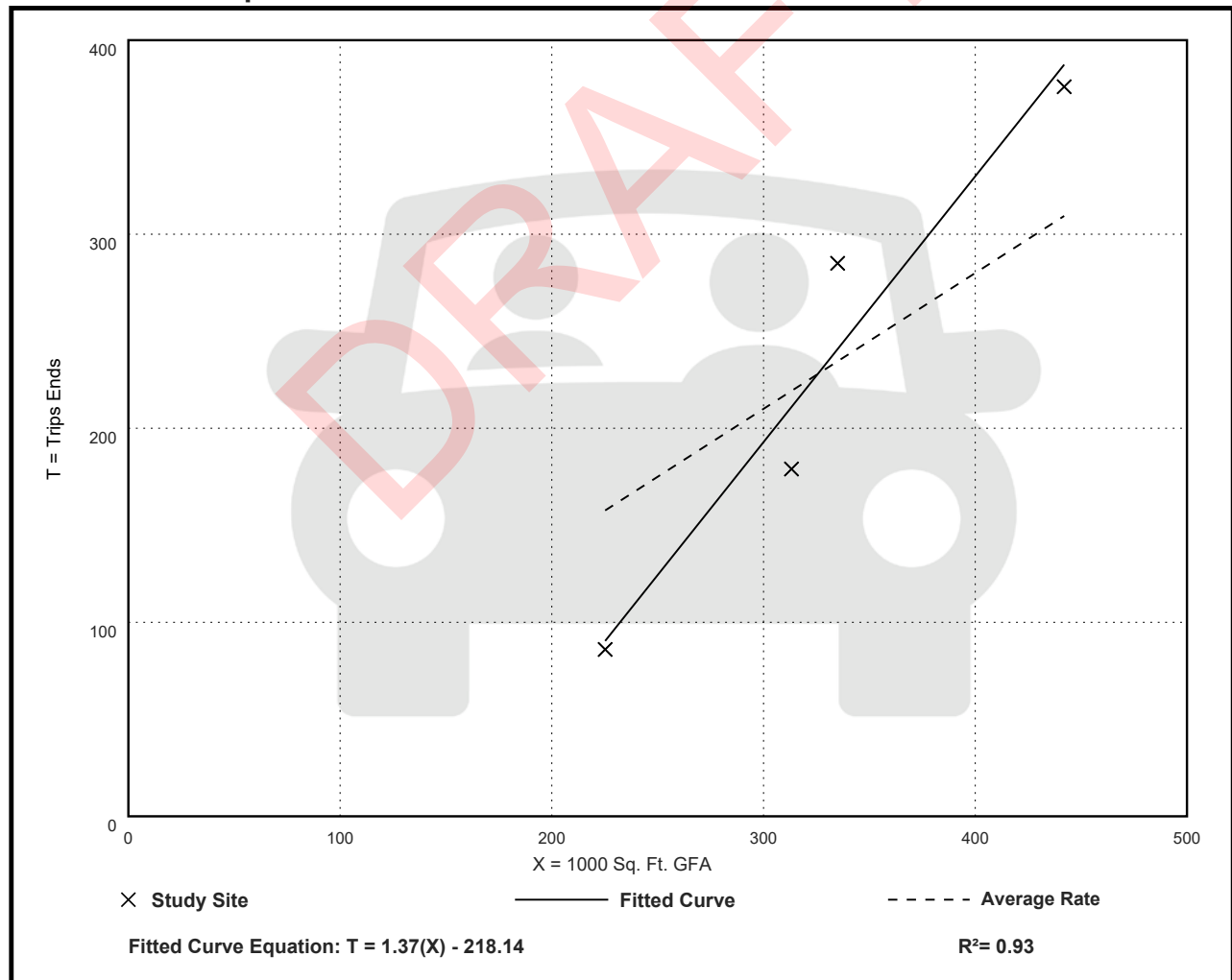
Avg. 1000 Sq. Ft. GFA: 329

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.70	0.38 - 0.85	0.21

Data Plot and Equation



High-Cube Parcel Hub Warehouse (156)

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: 4

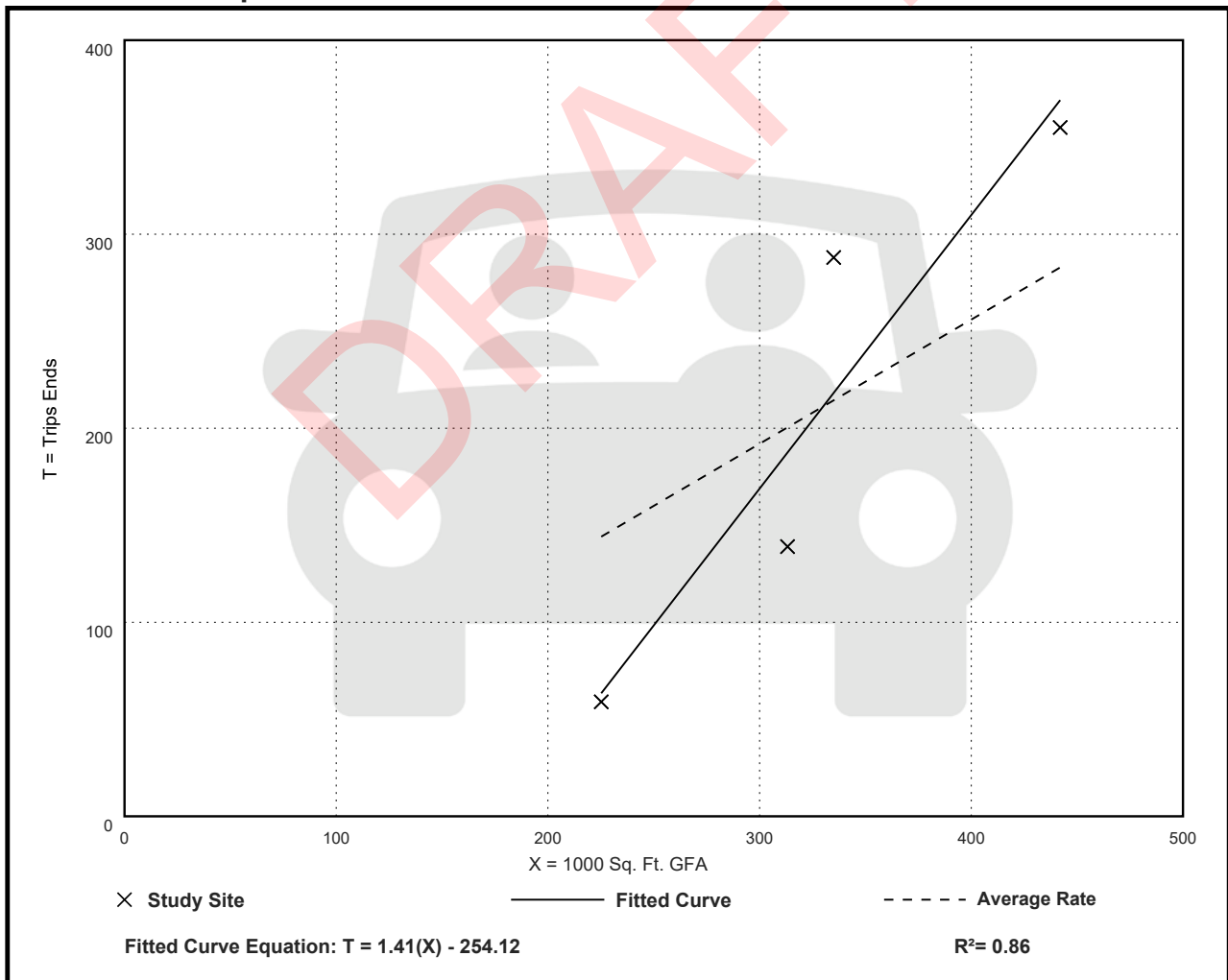
Avg. 1000 Sq. Ft. GFA: 329

Directional Distribution: 68% entering, 32% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.64	0.26 - 0.86	0.27

Data Plot and Equation



High-Cube Parcel Hub Warehouse (156)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

AM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 324

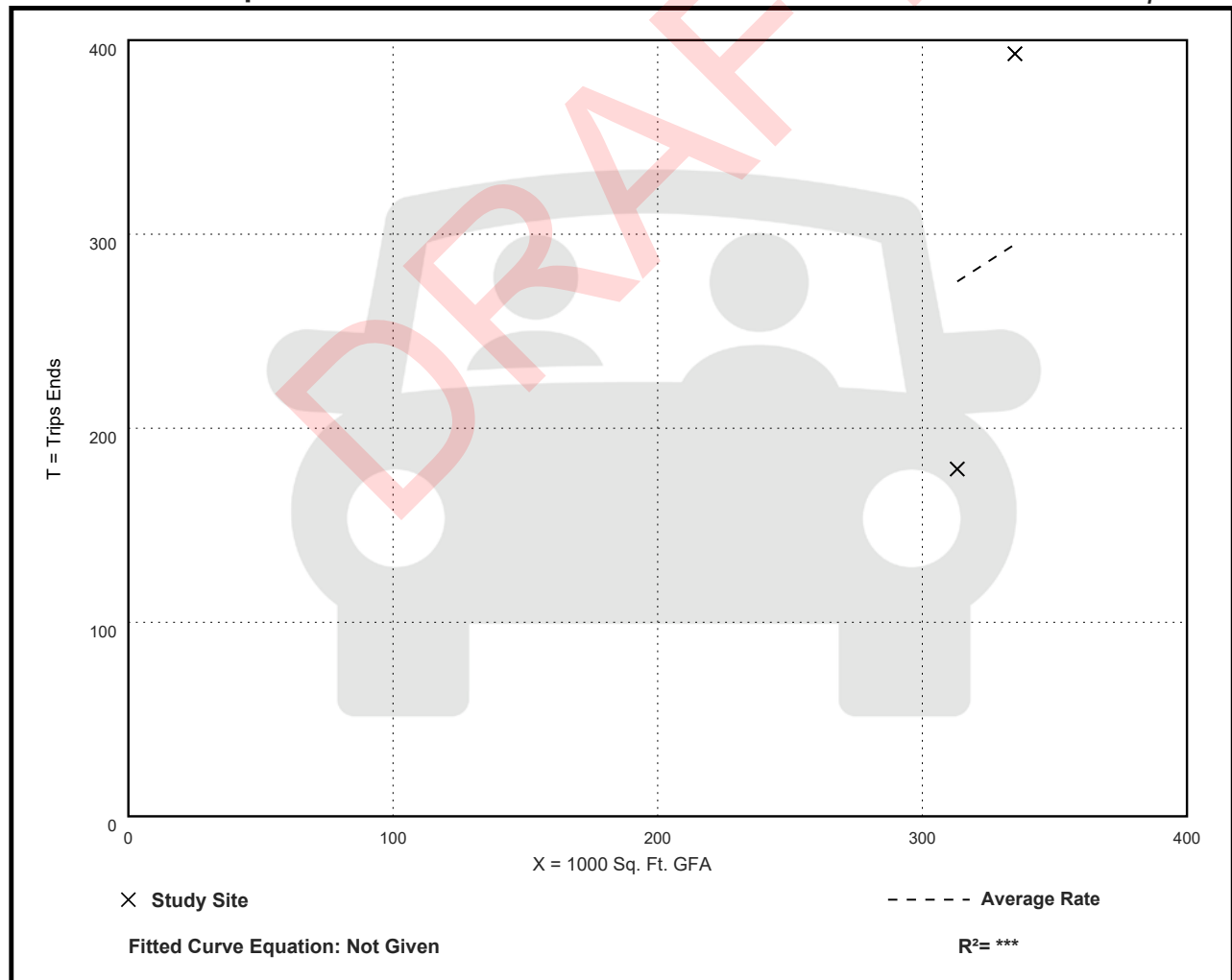
Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.88	0.57 - 1.17	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 324

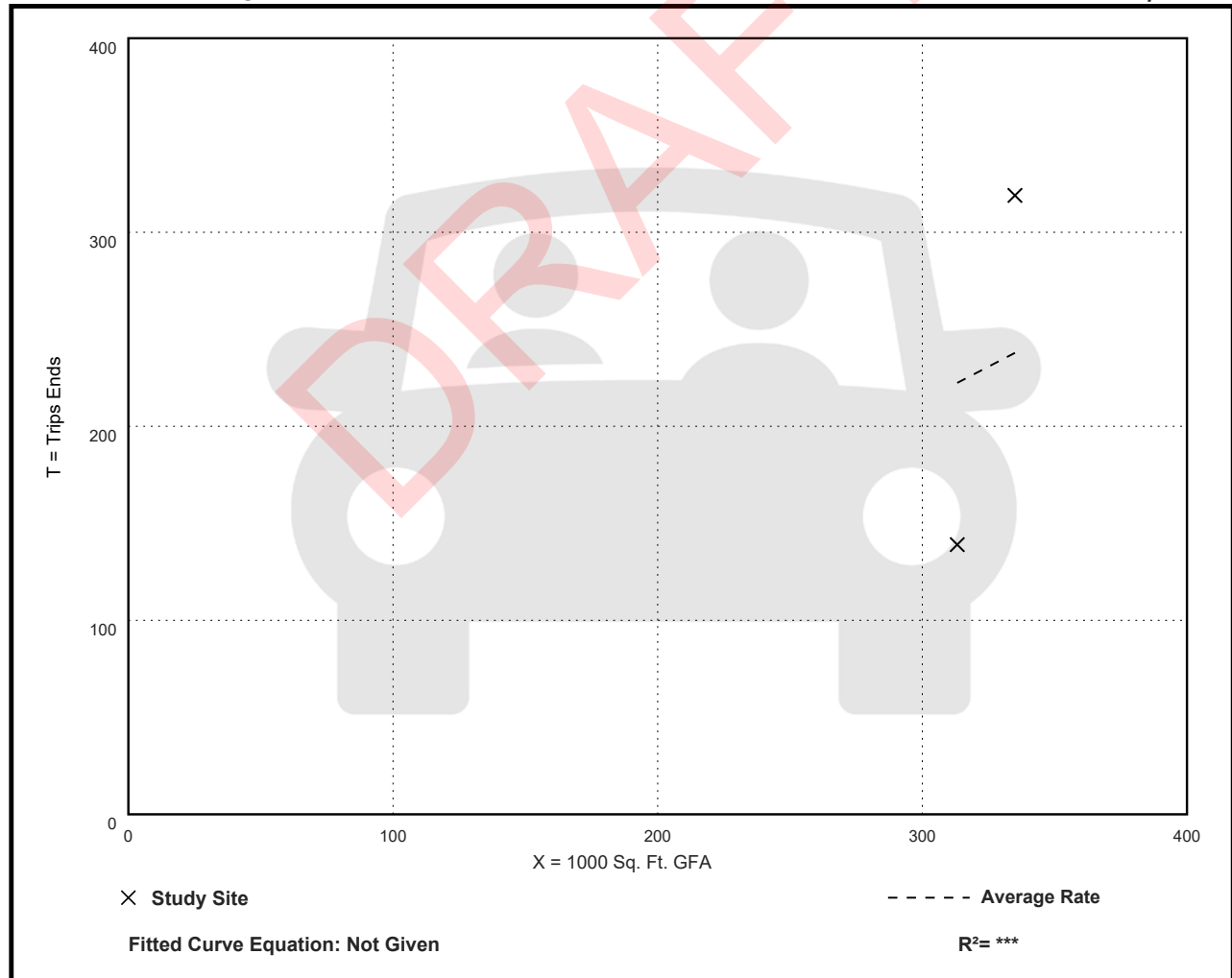
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.71	0.44 - 0.95	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Employees: 902

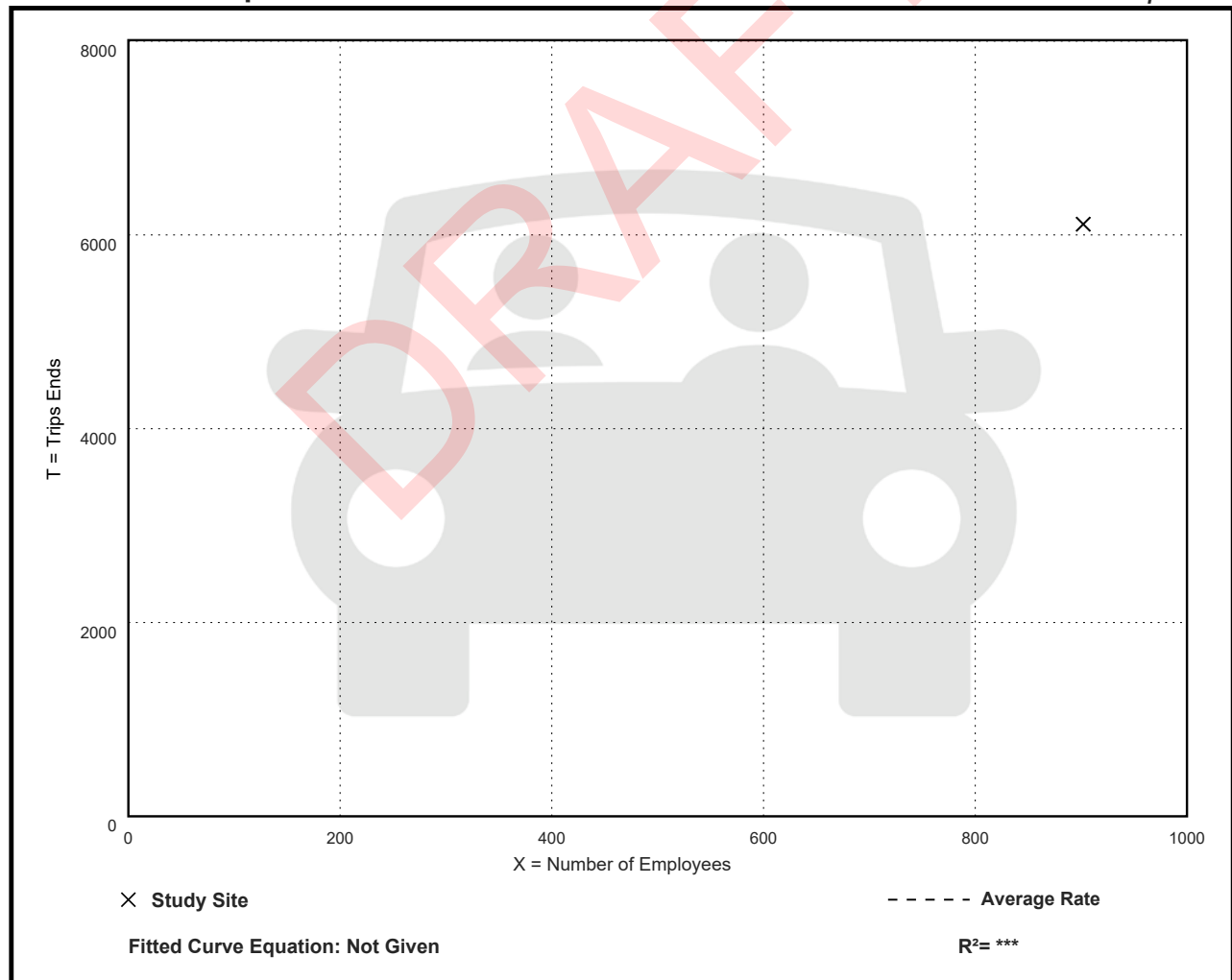
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
6.77	6.77 - 6.77	***

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

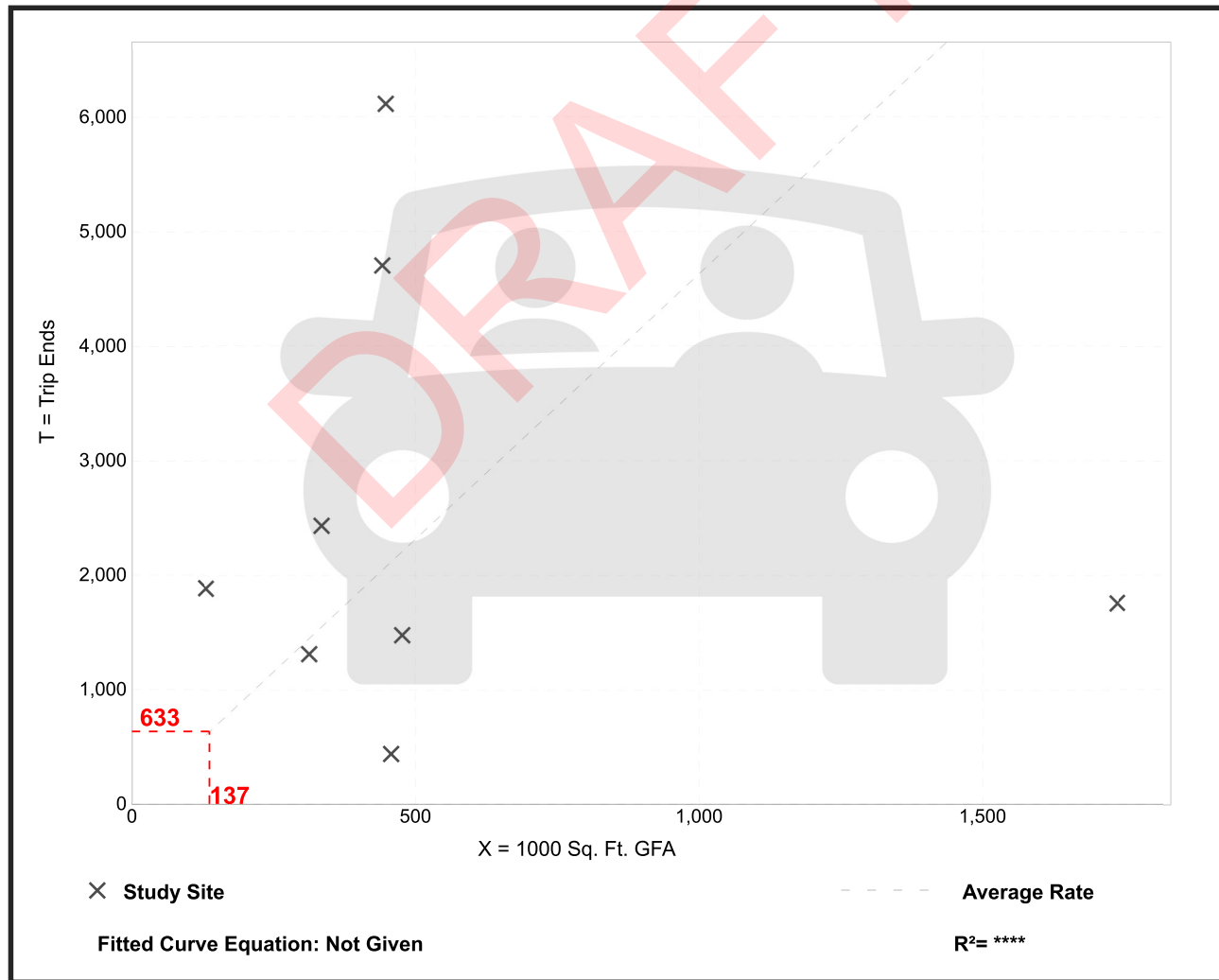
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 543
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.63	0.95 - 14.38	5.06

Data Plot and Equation



High-Cube Parcel Hub Warehouse (156)

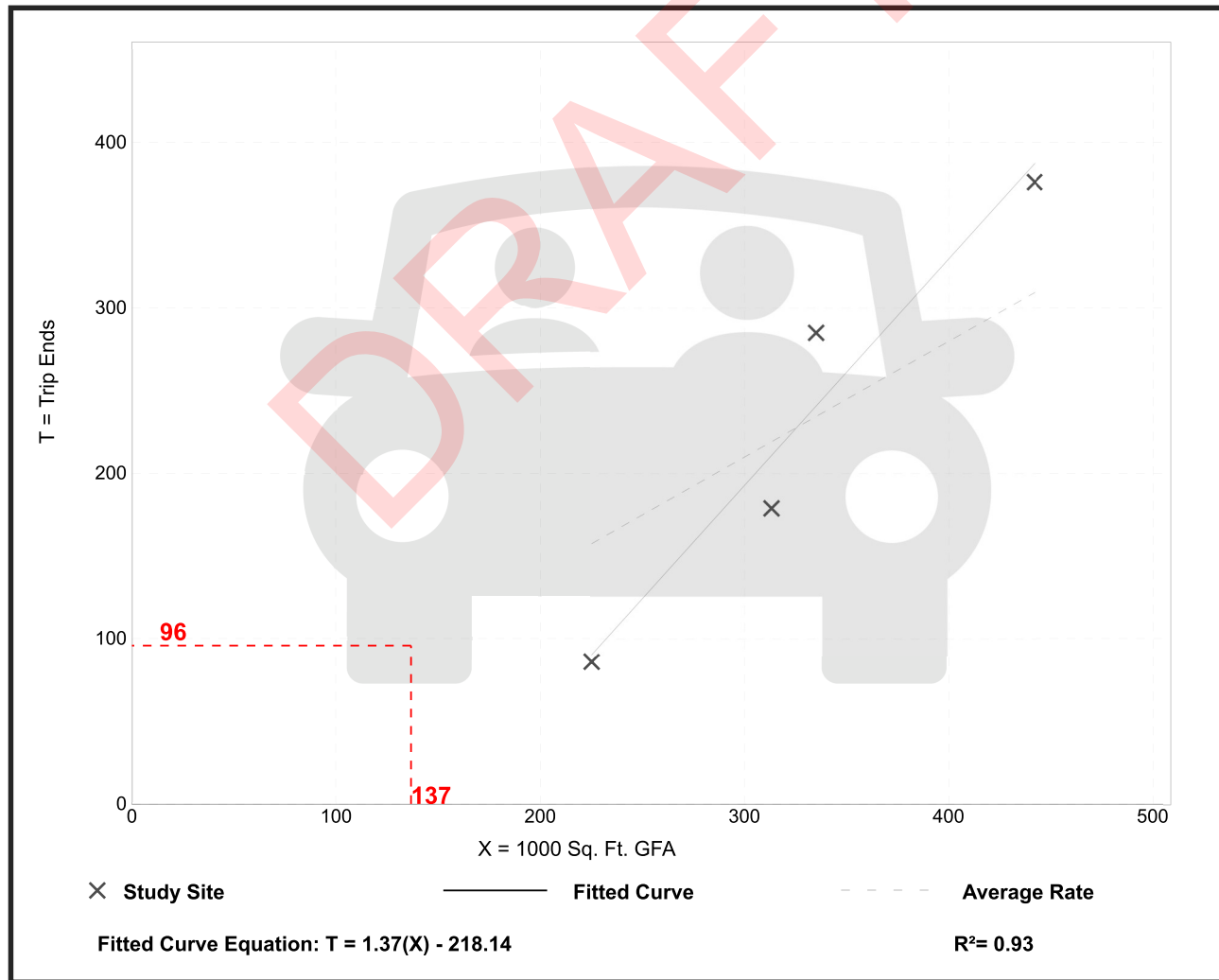
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 4
 Avg. 1000 Sq. Ft. GFA: 329
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.70	0.38 - 0.85	0.21

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

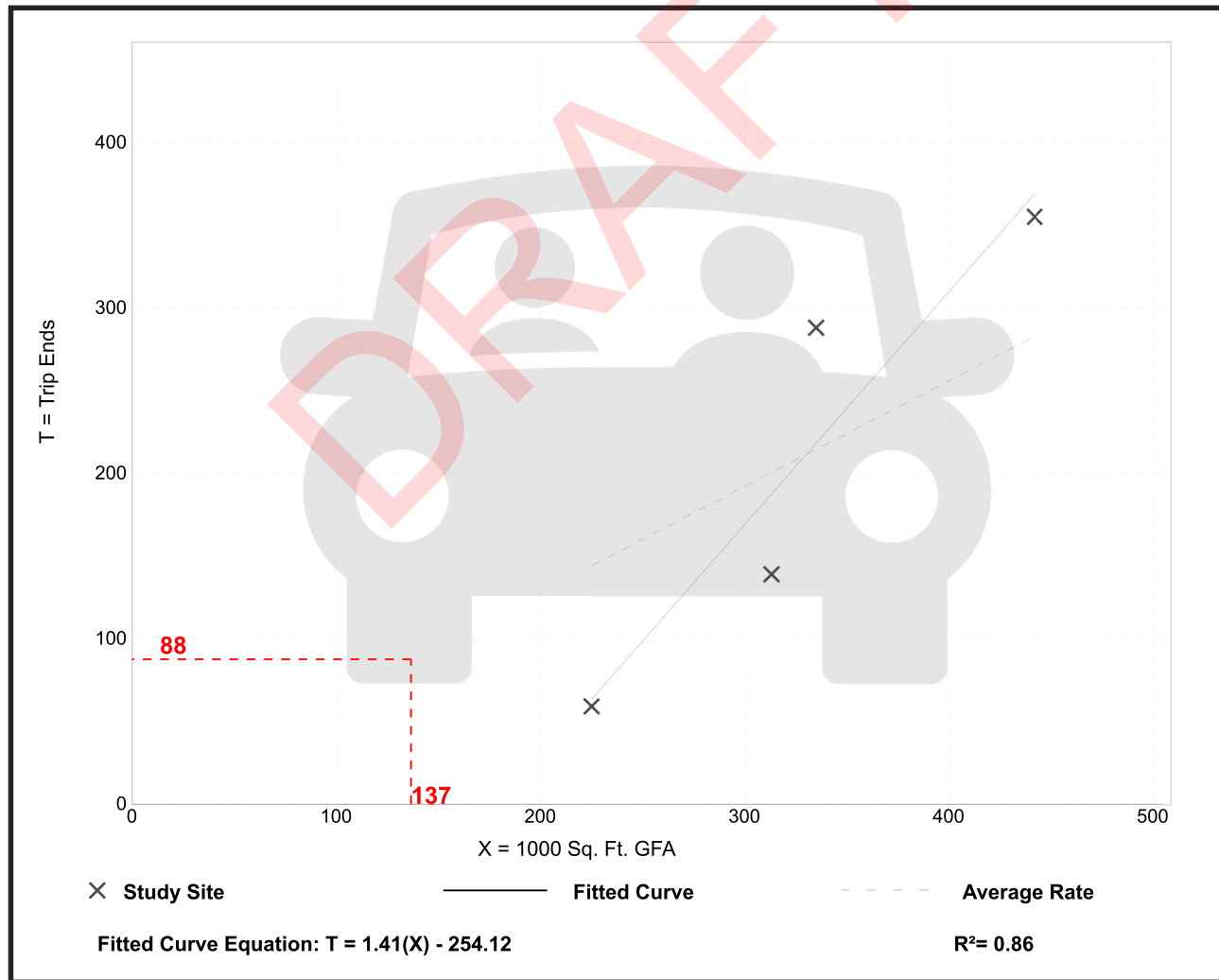
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 4
 Avg. 1000 Sq. Ft. GFA: 329
 Directional Distribution: 68% entering, 32% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.64	0.26 - 0.86	0.27

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

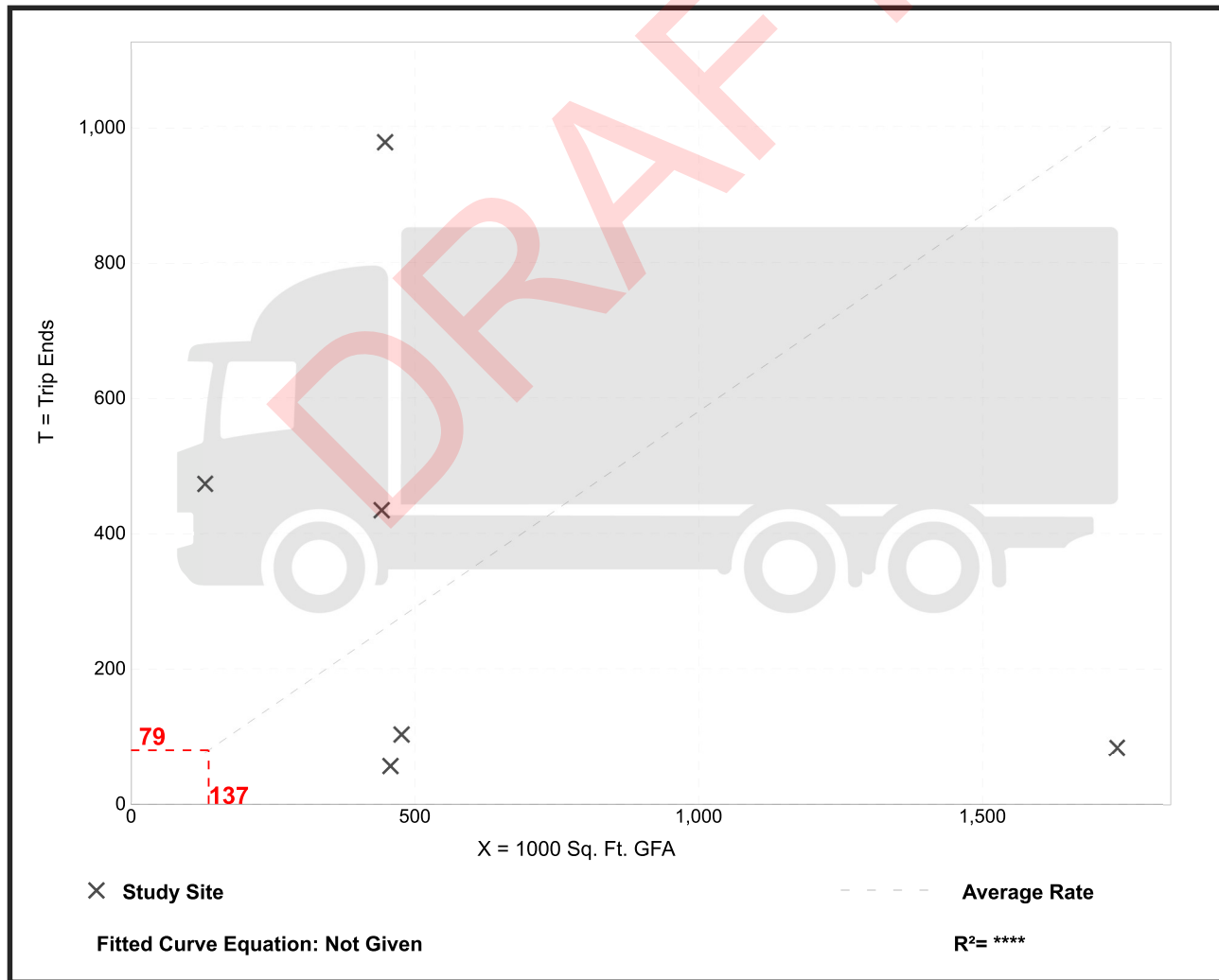
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. 1000 Sq. Ft. GFA: 615
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.58	0.05 - 3.61	1.00

Data Plot and Equation



High-Cube Parcel Hub Warehouse (156)

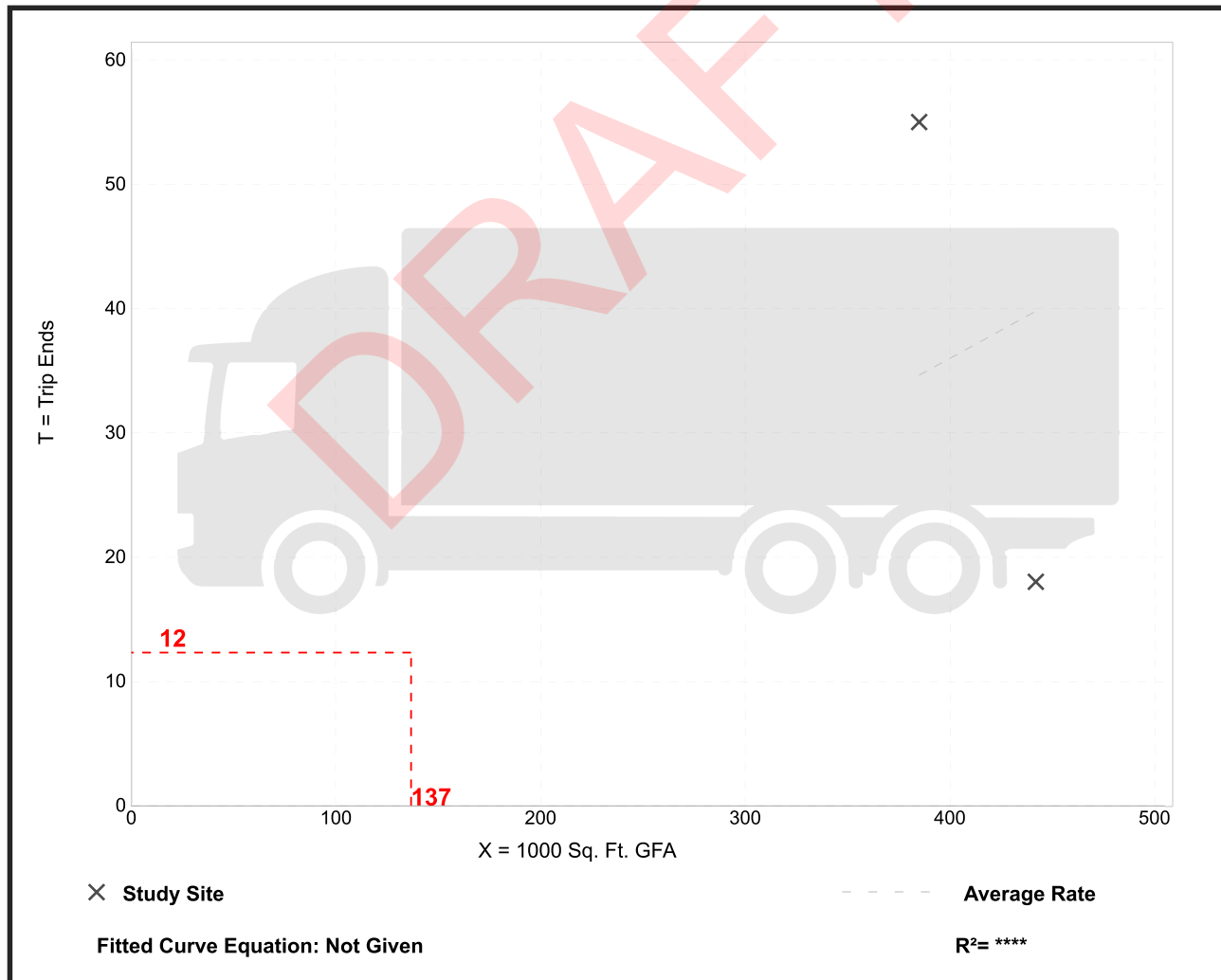
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 2
 Avg. 1000 Sq. Ft. GFA: 414
 Directional Distribution: Not Available

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.09	0.04 - 0.14	*

Data Plot and Equation

Caution – Small Sample Size



High-Cube Parcel Hub Warehouse (156)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

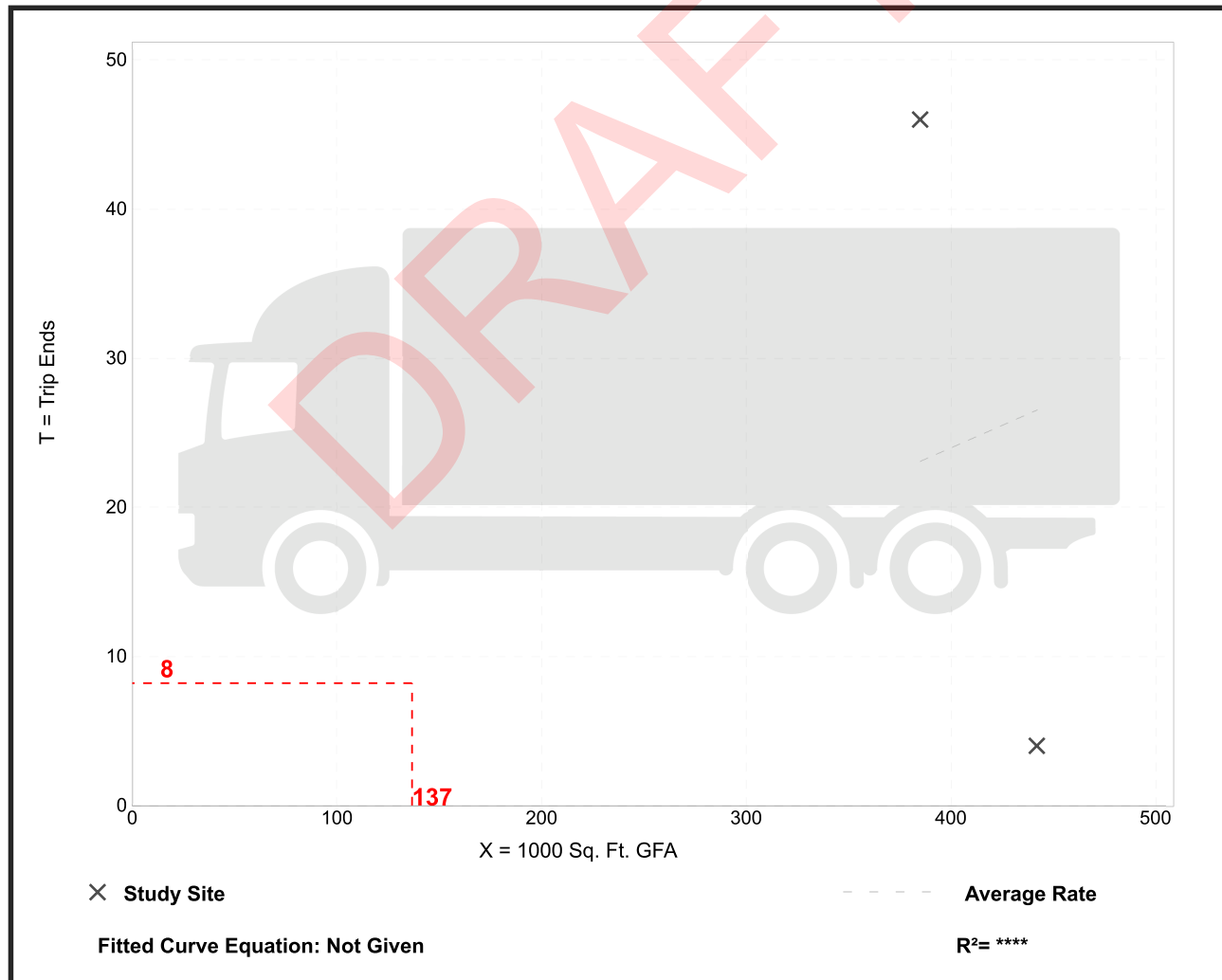
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 414
Directional Distribution: Not Available

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.06	0.01 - 0.12	*

Data Plot and Equation

Caution – Small Sample Size



Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	140		
Land Use	Manufacturing		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	20		
	% of 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	1.2%	0.4%	2.0%
1:00 - 2:00 AM	0.9%	0.3%	1.4%
2:00 - 3:00 AM	0.7%	0.3%	1.0%
3:00 - 4:00 AM	0.5%	0.4%	0.7%
4:00 - 5:00 AM	0.8%	1.3%	0.3%
5:00 - 6:00 AM	1.6%	3.0%	0.1%
6:00 - 7:00 AM	9.9%	17.1%	2.6%
7:00 - 8:00 AM	8.5%	13.7%	3.2%
8:00 - 9:00 AM	4.4%	6.2%	2.7%
9:00 - 10:00 AM	3.4%	3.9%	3.0%
10:00 - 11:00 AM	3.2%	3.3%	3.0%
11:00 - 12:00 PM	5.6%	6.3%	4.9%
12:00 - 1:00 PM	7.6%	8.9%	6.3%
1:00 - 2:00 PM	6.7%	6.7%	6.7%
2:00 - 3:00 PM	6.1%	5.1%	7.1%
3:00 - 4:00 PM	14.9%	9.4%	20.6%
4:00 - 5:00 PM	7.4%	3.4%	11.5%
5:00 - 6:00 PM	6.1%	2.6%	9.6%
6:00 - 7:00 PM	1.9%	1.2%	2.7%
7:00 - 8:00 PM	1.3%	1.1%	1.5%
8:00 - 9:00 PM	1.2%	1.0%	1.5%
9:00 - 10:00 PM	1.6%	1.2%	2.1%
10:00 - 11:00 PM	2.0%	1.7%	2.4%
11:00 - 12:00 AM	2.3%	1.3%	3.1%

Hourly Distribution of Entering and Exiting Truck Trips by Land Use

Source: ITE *Trip Generation Manual*, 11th Edition

Land Use Code	140		
Land Use	Manufacturing		
Setting	General Urban/Suburban		
Time Period	Weekday		
# Data Sites	19		
	% of 24-Hour Truck Trips		
Time	Total	Entering	Exiting
12:00 - 1:00 AM	0.5%	0.5%	0.5%
1:00 - 2:00 AM	0.6%	0.5%	0.7%
2:00 - 3:00 AM	0.7%	0.5%	0.9%
3:00 - 4:00 AM	1.3%	0.9%	1.6%
4:00 - 5:00 AM	0.9%	1.2%	0.7%
5:00 - 6:00 AM	0.0%	0.0%	0.0%
6:00 - 7:00 AM	4.2%	4.9%	3.5%
7:00 - 8:00 AM	4.4%	5.1%	3.7%
8:00 - 9:00 AM	7.8%	7.9%	7.7%
9:00 - 10:00 AM	10.2%	10.0%	10.3%
10:00 - 11:00 AM	11.1%	12.3%	9.8%
11:00 - 12:00 PM	9.7%	9.8%	9.6%
12:00 - 1:00 PM	7.8%	7.0%	8.7%
1:00 - 2:00 PM	7.6%	9.1%	6.1%
2:00 - 3:00 PM	6.8%	5.8%	7.7%
3:00 - 4:00 PM	9.7%	8.6%	10.8%
4:00 - 5:00 PM	4.9%	4.2%	5.6%
5:00 - 6:00 PM	3.6%	3.5%	3.7%
6:00 - 7:00 PM	2.1%	2.1%	2.1%
7:00 - 8:00 PM	1.4%	1.9%	0.9%
8:00 - 9:00 PM	1.5%	1.4%	1.6%
9:00 - 10:00 PM	1.2%	1.6%	0.7%
10:00 - 11:00 PM	0.9%	0.5%	1.4%
11:00 - 12:00 AM	1.2%	0.9%	1.4%

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use

Source: ITE Trip Generation Manual , 11th Edition

Vehicle Type	All		140		Manufacturing		General Urban/Suburban	
Land Use Code	All		140		Manufacturing		General Urban/Suburban	
Land Use	All		140		Manufacturing		General Urban/Suburban	
Setting	All		140		Manufacturing		General Urban/Suburban	
Time Period	All		140		Manufacturing		General Urban/Suburban	
Source	All		140		Manufacturing		General Urban/Suburban	
# Data Sites	All		140		Manufacturing		General Urban/Suburban	
	ITE Hourly Data		ITE Daily and Peak Hour Data		Adjustment Factors		Adjusted Hourly Distribution	
	20		53 Daily, 48 AM, 55 PM		Weekday			
	% of 24-Hour Vehicle Trips		% of 24-Hour Vehicle Trips		% of 24-Hour Vehicle Trips		% of 24-Hour Vehicle Trips	
Time (15-min beginning)	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting
12:00 AM	0.1%	0.5%			0.84	0.86	0.1%	0.4%
12:15 AM	0.1%	0.5%			0.84	0.86	0.1%	0.4%
12:30 AM	0.1%	0.5%			0.84	0.86	0.1%	0.4%
12:45 AM	0.1%	0.5%			0.84	0.86	0.1%	0.4%
1:00 AM	0.1%	0.4%			0.84	0.86	0.1%	0.3%
1:15 AM	0.1%	0.4%			0.84	0.86	0.1%	0.3%
1:30 AM	0.1%	0.4%			0.84	0.86	0.1%	0.3%
1:45 AM	0.1%	0.4%			0.84	0.86	0.1%	0.3%
2:00 AM	0.1%	0.3%			0.84	0.86	0.1%	0.2%
2:15 AM	0.1%	0.3%			0.84	0.86	0.1%	0.2%
2:30 AM	0.1%	0.3%			0.84	0.86	0.1%	0.2%
2:45 AM	0.1%	0.3%			0.84	0.86	0.1%	0.2%
3:00 AM	0.1%	0.2%			0.84	0.86	0.1%	0.1%
3:15 AM	0.1%	0.2%			0.84	0.86	0.1%	0.1%
3:30 AM	0.1%	0.2%			0.84	0.86	0.1%	0.1%
3:45 AM	0.1%	0.2%			0.84	0.86	0.1%	0.1%
4:00 AM	0.3%	0.1%			0.84	0.86	0.3%	0.1%
4:15 AM	0.3%	0.1%			0.84	0.86	0.3%	0.1%
4:30 AM	0.3%	0.1%			0.84	0.86	0.3%	0.1%
4:45 AM	0.3%	0.1%			0.84	0.86	0.3%	0.1%
5:00 AM	0.8%	0.0%			0.84	0.86	0.6%	0.0%
5:15 AM	0.8%	0.0%			0.84	0.86	0.6%	0.0%
5:30 AM	0.8%	0.0%			0.84	0.86	0.6%	0.0%
5:45 AM	0.8%	0.0%			0.84	0.86	0.6%	0.0%
6:00 AM	4.3%	0.7%			0.84	0.86	3.6%	0.6%
6:15 AM	4.3%	0.7%			0.84	0.86	3.6%	0.6%
6:30 AM	4.3%	0.7%			0.84	0.86	3.6%	0.6%
6:45 AM	4.3%	0.7%			0.84	0.86	3.6%	0.6%
7:00 AM	3.4%	0.8%			0.84	0.86	2.9%	0.7%
7:15 AM	3.4%	0.8%			1.67	1.98	5.7%	1.6%
7:30 AM	3.4%	0.8%			1.67	1.98	5.7%	1.6%
7:45 AM	3.4%	0.8%			1.67	1.98	5.7%	1.6%
8:00 AM	1.6%	0.7%			1.67	1.98	2.6%	1.3%
8:15 AM	1.6%	0.7%			0.84	0.86	1.3%	0.6%
8:30 AM	1.6%	0.7%			0.84	0.86	1.3%	0.6%
8:45 AM	1.6%	0.7%			0.84	0.86	1.3%	0.6%
9:00 AM	1.0%	0.7%			0.84	0.86	0.8%	0.6%
9:15 AM	1.0%	0.7%			0.84	0.86	0.8%	0.6%
9:30 AM	1.0%	0.7%			0.84	0.86	0.8%	0.6%
9:45 AM	1.0%	0.7%			0.84	0.86	0.8%	0.6%
10:00 AM	0.8%	0.8%			0.84	0.86	0.7%	0.7%
10:15 AM	0.8%	0.8%			0.84	0.86	0.7%	0.7%
10:30 AM	0.8%	0.8%			0.84	0.86	0.7%	0.7%
10:45 AM	0.8%	0.8%			0.84	0.86	0.7%	0.7%
11:00 AM	1.6%	1.2%			0.84	0.86	1.3%	1.0%
11:15 AM	1.6%	1.2%			0.84	0.86	1.3%	1.0%
11:30 AM	1.6%	1.2%			0.84	0.86	1.3%	1.0%
11:45 AM	1.6%	1.2%			0.84	0.86	1.3%	1.0%
12:00 PM	2.2%	1.6%			0.84	0.86	1.9%	1.4%
12:15 PM	2.2%	1.6%			0.84	0.86	1.9%	1.4%
12:30 PM	2.2%	1.6%			0.84	0.86	1.9%	1.4%
12:45 PM	2.2%	1.6%			0.84	0.86	1.9%	1.4%
1:00 PM	1.7%	1.7%			0.84	0.86	1.4%	1.4%
1:15 PM	1.7%	1.7%			0.84	0.86	1.4%	1.4%
1:30 PM	1.7%	1.7%			0.84	0.86	1.4%	1.4%
1:45 PM	1.7%	1.7%			0.84	0.86	1.4%	1.4%
2:00 PM	1.3%	1.8%			0.84	0.86	1.1%	1.5%
2:15 PM	1.3%	1.8%			0.84	0.86	1.1%	1.5%
2:30 PM	1.3%	1.8%			0.84	0.86	1.1%	1.5%
2:45 PM	1.3%	1.8%			0.84	0.86	1.1%	1.5%
3:00 PM	2.3%	5.2%			0.84	0.86	2.0%	4.4%
3:15 PM	2.3%	5.2%			0.84	0.86	2.0%	4.4%
3:30 PM	2.3%	5.2%			0.84	0.86	2.0%	4.4%
3:45 PM	2.3%	5.2%			0.84	0.86	2.0%	4.4%
4:00 PM	0.9%	2.9%			0.84	0.86	0.7%	2.5%
4:15 PM	0.9%	2.9%			0.84	0.86	0.7%	2.5%
4:30 PM	0.9%	2.9%			2.87	1.85	2.5%	5.3%
4:45 PM	0.9%	2.9%			2.87	1.85	2.5%	5.3%
5:00 PM	0.6%	2.4%			2.87	1.85	1.9%	4.4%
5:15 PM	0.6%	2.4%			2.87	1.85	1.9%	4.4%
5:30 PM	0.6%	2.4%			0.84	0.86	0.5%	2.1%
5:45 PM	0.6%	2.4%			0.84	0.86	0.5%	2.1%
6:00 PM	0.3%	0.7%			0.84	0.86	0.3%	0.6%
6:15 PM	0.3%	0.7%			0.84	0.86	0.3%	0.6%
6:30 PM	0.3%	0.7%			0.84	0.86	0.3%	0.6%
6:45 PM	0.3%	0.7%			0.84	0.86	0.3%	0.6%
7:00 PM	0.3%	0.4%			0.84	0.86	0.2%	0.3%
7:15 PM	0.3%	0.4%			0.84	0.86	0.2%	0.3%
7:30 PM	0.3%	0.4%			0.84	0.86	0.2%	0.3%
7:45 PM	0.3%	0.4%			0.84	0.86	0.2%	0.3%
8:00 PM	0.2%	0.4%			0.84	0.86	0.2%	0.3%
8:15 PM	0.2%	0.4%			0.84	0.86	0.2%	0.3%
8:30 PM	0.2%	0.4%			0.84	0.86	0.2%	0.3%
8:45 PM	0.2%	0.4%			0.84	0.86	0.2%	0.3%
9:00 PM	0.3%	0.5%			0.84	0.86	0.3%	0.5%
9:15 PM	0.3%	0.5%			0.84	0.86	0.3%	0.5%
9:30 PM	0.3%	0.5%			0.84	0.86	0.3%	0.5%
9:45 PM	0.3%	0.5%			0.84	0.86	0.3%	0.5%
10:00 PM	0.4%	0.6%			0.84	0.86	0.4%	0.5%
10:15 PM	0.4%	0.6%			0.84	0.86	0.4%	0.5%
10:30 PM	0.4%	0.6%			0.84	0.86	0.4%	0.5%
10:45 PM	0.4%	0.6%			0.84	0.86	0.4%	0.5%
11:00 PM	0.3%	0.8%			0.84	0.86	0.3%	0.7%
11:15 PM	0.3%	0.8%			0.84	0.86	0.3%	0.7%
11:30 PM	0.3%	0.8%			0.84	0.86	0.3%	0.7%
11:45 PM	0.3%	0.8%			0.84	0.86	0.3%	0.7%
AM Peak Hour (7:15 to 8:15 AM)	11.9%	3.1%	19.8%	6.1%	1.67	1.98	19.8%	6.1%
PM Peak Hour (4:30 to 5:30 PM)	3.0%	10.6%	8.6%	19.5%	2.87	1.85	8.6%	19.5%

Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use										
Source: ITE Trip Generation Manual , 11th Edition										
Vehicle Type	Truck									
Land Use Code	140									
Land Use	Manufacturing									
Setting	General Urban/Suburban									
Time Period	Weekday									
Source	ITE Hourly Data				ITE Daily and Peak Hour Data		Adjustment Factors		Adjusted Hourly Distribution	
# Data Sites	19		19 Daily, 19 AM, 18 PM							
	% of 24-Hour Vehicle Trips								% of 24-Hour Vehicle Trips	
Time (15-min beginning)	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting	Entering	Exiting
12:00 AM	0.1%	0.1%			0.96	0.96	0.1%	0.1%		
12:15 AM	0.1%	0.1%			0.96	0.96	0.1%	0.1%		
12:30 AM	0.1%	0.1%			0.96	0.96	0.1%	0.1%		
12:45 AM	0.1%	0.1%			0.96	0.96	0.1%	0.1%		
1:00 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
1:15 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
1:30 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
1:45 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
2:00 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
2:15 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
2:30 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
2:45 AM	0.1%	0.2%			0.96	0.96	0.1%	0.2%		
3:00 AM	0.2%	0.4%			0.96	0.96	0.2%	0.4%		
3:15 AM	0.2%	0.4%			0.96	0.96	0.2%	0.4%		
3:30 AM	0.2%	0.4%			0.96	0.96	0.2%	0.4%		
3:45 AM	0.2%	0.4%			0.96	0.96	0.2%	0.4%		
4:00 AM	0.3%	0.2%			0.96	0.96	0.3%	0.2%		
4:15 AM	0.3%	0.2%			0.96	0.96	0.3%	0.2%		
4:30 AM	0.3%	0.2%			0.96	0.96	0.3%	0.2%		
4:45 AM	0.3%	0.2%			0.96	0.96	0.3%	0.2%		
5:00 AM	0.0%	0.0%			0.96	0.96	0.0%	0.0%		
5:15 AM	0.0%	0.0%			0.96	0.96	0.0%	0.0%		
5:30 AM	0.0%	0.0%			0.96	0.96	0.0%	0.0%		
5:45 AM	0.0%	0.0%			0.96	0.96	0.0%	0.0%		
6:00 AM	1.2%	0.9%			0.96	0.96	1.2%	0.8%		
6:15 AM	1.2%	0.9%			0.96	0.96	1.2%	0.8%		
6:30 AM	1.2%	0.9%			0.96	0.96	1.2%	0.8%		
6:45 AM	1.2%	0.9%			0.96	0.96	1.2%	0.8%		
7:00 AM	1.3%	0.9%			0.96	0.96	1.2%	0.9%		
7:15 AM	1.3%	0.9%			1.11	1.36	1.4%	1.3%		
7:30 AM	1.3%	0.9%			1.11	1.36	1.4%	1.3%		
7:45 AM	1.3%	0.9%			1.11	1.36	1.4%	1.3%		
8:00 AM	2.0%	1.9%			1.11	1.36	2.2%	2.6%		
8:15 AM	2.0%	1.9%			0.96	0.96	1.9%	1.9%		
8:30 AM	2.0%	1.9%			0.96	0.96	1.9%	1.9%		
8:45 AM	2.0%	1.9%			0.96	0.96	1.9%	1.9%		
9:00 AM	2.5%	2.6%			0.96	0.96	2.4%	2.5%		
9:15 AM	2.5%	2.6%			0.96	0.96	2.4%	2.5%		
9:30 AM	2.5%	2.6%			0.96	0.96	2.4%	2.5%		
9:45 AM	2.5%	2.6%			0.96	0.96	2.4%	2.5%		
10:00 AM	3.1%	2.5%			0.96	0.96	3.0%	2.4%		
10:15 AM	3.1%	2.5%			0.96	0.96	3.0%	2.4%		
10:30 AM	3.1%	2.5%			0.96	0.96	3.0%	2.4%		
10:45 AM	3.1%	2.5%			0.96	0.96	3.0%	2.4%		
11:00 AM	2.4%	2.4%			0.96	0.96	2.4%	2.3%		
11:15 AM	2.4%	2.4%			0.96	0.96	2.4%	2.3%		
11:30 AM	2.4%	2.4%			0.96	0.96	2.4%	2.3%		
11:45 AM	2.4%	2.4%			0.96	0.96	2.4%	2.3%		
12:00 PM	1.7%	2.2%			0.96	0.96	1.7%	2.1%		
12:15 PM	1.7%	2.2%			0.96	0.96	1.7%	2.1%		
12:30 PM	1.7%	2.2%			0.96	0.96	1.7%	2.1%		
12:45 PM	1.7%	2.2%			0.96	0.96	1.7%	2.1%		
1:00 PM	2.3%	1.5%			0.96	0.96	2.2%	1.5%		
1:15 PM	2.3%	1.5%			0.96	0.96	2.2%	1.5%		
1:30 PM	2.3%	1.5%			0.96	0.96	2.2%	1.5%		
1:45 PM	2.3%	1.5%			0.96	0.96	2.2%	1.5%		
2:00 PM	1.5%	1.9%			0.96	0.96	1.4%	1.9%		
2:15 PM	1.5%	1.9%			0.96	0.96	1.4%	1.9%		
2:30 PM	1.5%	1.9%			0.96	0.96	1.4%	1.9%		
2:45 PM	1.5%	1.9%			0.96	0.96	1.4%	1.9%		
3:00 PM	2.2%	2.7%			0.96	0.96	2.1%	2.6%		
3:15 PM	2.2%	2.7%			0.96	0.96	2.1%	2.6%		
3:30 PM	2.2%	2.7%			0.96	0.96	2.1%	2.6%		
3:45 PM	2.2%	2.7%			0.96	0.96	2.1%	2.6%		
4:00 PM	1.0%	1.4%			0.96	0.96	1.0%	1.4%		
4:15 PM	1.0%	1.4%			0.96	0.96	1.0%	1.4%		
4:30 PM	1.0%	1.4%			1.68	1.38	1.8%	1.9%		
4:45 PM	1.0%	1.4%			1.68	1.38	1.8%	1.9%		
5:00 PM	0.9%	0.9%			1.68	1.38	1.5%	1.3%		
5:15 PM	0.9%	0.9%			1.68	1.38	1.5%	1.3%		
5:30 PM	0.9%	0.9%			0.96	0.96	0.8%	0.9%		
5:45 PM	0.9%	0.9%			0.96	0.96	0.8%	0.9%		
6:00 PM	0.5%	0.5%			0.96	0.96	0.5%	0.5%		
6:15 PM	0.5%	0.5%			0.96	0.96	0.5%	0.5%		
6:30 PM	0.5%	0.5%			0.96	0.96	0.5%	0.5%		
6:45 PM	0.5%	0.5%			0.96	0.96	0.5%	0.5%		
7:00 PM	0.5%	0.2%			0.96	0.96	0.4%	0.2%		
7:15 PM	0.5%	0.2%			0.96	0.96	0.4%	0.2%		
7:30 PM	0.5%	0.2%			0.96	0.96	0.4%	0.2%		
7:45 PM	0.5%	0.2%			0.96	0.96	0.4%	0.2%		
8:00 PM	0.3%	0.4%			0.96	0.96	0.3%	0.4%		
8:15 PM	0.3%	0.4%			0.96	0.96	0.3%	0.4%		
8:30 PM	0.3%	0.4%			0.96	0.96	0.3%	0.4%		
8:45 PM	0.3%	0.4%			0.96	0.96	0.3%	0.4%		
9:00 PM	0.4%	0.2%			0.96	0.96	0.4%	0.2%		
9:15 PM	0.4%	0.2%			0.96	0.96	0.4%	0.2%		
9:30 PM	0.4%	0.2%			0.96	0.96	0.4%	0.2%		
9:45 PM	0.4%	0.2%			0.96	0.96	0.4%	0.2%		
10:00 PM	0.1%	0.4%			0.96	0.96	0.1%	0.3%		
10:15 PM	0.1%	0.4%			0.96	0.96	0.1%	0.3%		
10:30 PM	0.1%	0.4%			0.96	0.96	0.1%	0.3%		
10:45 PM	0.1%	0.4%			0.96	0.96	0.1%	0.3%		
11:00 PM	0.2%	0.4%			0.96	0.96	0.2%	0.3%		
11:15 PM	0.2%	0.4%			0.96	0.96	0.2%	0.3%		
11:30 PM	0.2%	0.4%			0.96	0.96	0.2%	0.3%		
11:45 PM	0.2%	0.4%			0.96	0.96	0.2%	0.3%		
AM Peak Hour (7:15 to 8:15 AM)	5.8%	4.7%	6.5%	6.5%	1.11	1.36	6.5%	6.5%		
PM Peak Hour (4:30 to 5:30 PM)	3.8%	4.7%	6.5%	6.5%	1.68	1.38	6.5%	6.5%		



TRAFFIC SIGNAL WARRANTS

DRAFT

STUDY AND ANALYSIS INFORMATION

Municipality: Sacramento City
 County: Sacramento County

Analysis Date: 10/26/2021
 Conducted By: VJM
 Agency/Company Name: DKS Associates

Analysis Information

Data Collection Date: 10/13/2021
 Day of the Week: Wednesday

Is the intersection in a built-up area of an isolated community of <10,000 population? No

Major Street Information

Major Street Name and Route Number: S. Watt Avenue
 Major Street Approach #1 Direction: S-Bound
 Major Street Approach #2 Direction: N-Bound

Number of Lanes for Moving Traffic on Each Major Street Approach: 1 LANE(S)
 Speed Limit or 85th Percentile Speed on the Major Street: 55 MPH

Minor Street Information

Minor Street Name and Route Number: Osage Avenue
 Minor Street Approach #1 Direction: E-Bound
 Minor Street Approach #2 Direction: W-Bound

Number of Lanes for Moving Traffic on Each Minor Street Approach: 1 LANE(S)

TRAFFIC SIGNAL WARRANT ANALYSIS FINDINGS

	Applicable?	Warrant Met?
Warrant 1, Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2, Four-Hour Vehicular Volume	Yes	Yes
Warrant 3, Peak Hour	Yes	No
Warrant 4, Pedestrian Volume	No	N/A
Warrant 5, School Crossing	No	N/A
Warrant 6, Coordinated Signal System	No	N/A
Warrant 7, Crash Experience	No	N/A
Warrant 8, Roadway Network	No	N/A
Warrant 9, Intersection Near a Grade Crossing	No	N/A
Bicycle Signal Warrant (CA)	No	N/A

Traffic Signal Warrant Analysis Workbook

11/6/2021

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 AM	12:14 AM			0		
12:15 AM	12:29 AM			0		
12:30 AM	12:44 AM			0		
12:45 AM	12:59 AM			0		
1:00 AM	1:14 AM			0		
1:15 AM	1:29 AM			0		
1:30 AM	1:44 AM			0		
1:45 AM	1:59 AM			0		
2:00 AM	2:14 AM			0		
2:15 AM	2:29 AM			0		
2:30 AM	2:44 AM			0		
2:45 AM	2:59 AM			0		
3:00 AM	3:14 AM			0		
3:15 AM	3:29 AM			0		
3:30 AM	3:44 AM			0		
3:45 AM	3:59 AM			0		
4:00 AM	4:14 AM			0		
4:15 AM	4:29 AM			0		
4:30 AM	4:44 AM			0		
4:45 AM	4:59 AM			0		
5:00 AM	5:14 AM			0		
5:15 AM	5:29 AM			0		
5:30 AM	5:44 AM			0		
5:45 AM	5:59 AM			0		
6:00 AM	6:14 AM	127	201	329	16	3
6:15 AM	6:29 AM	150	197	348	7	3
6:30 AM	6:44 AM	140	197	338	15	6
6:45 AM	6:59 AM	248	202	451	16	2
7:00 AM	7:14 AM	190	201	391	14	6
7:15 AM	7:29 AM	165	249	414	13	7
7:30 AM	7:44 AM	204	252	456	10	6
7:45 AM	7:59 AM	201	238	439	11	7
8:00 AM	8:14 AM	177	267	444	8	6
8:15 AM	8:29 AM	168	226	394	6	3
8:30 AM	8:44 AM	180	240	420	10	3
8:45 AM	8:59 AM	162	197	359	5	6
9:00 AM	9:14 AM	158	179	337	5	3
9:15 AM	9:29 AM	157	170	327	8	3
9:30 AM	9:44 AM	149	181	330	13	3
9:45 AM	9:59 AM	172	167	339	11	4
10:00 AM	10:14 AM	135	137	272	12	3
10:15 AM	10:29 AM	153	153	306	9	3
10:30 AM	10:44 AM	148	151	299	5	3
10:45 AM	10:59 AM	139	134	273	13	4
11:00 AM	11:14 AM	148	144	292	7	5
11:15 AM	11:29 AM	143	126	269	10	5
11:30 AM	11:44 AM	172	146	318	6	4
11:45 AM	11:59 AM	177	135	312	8	5

Traffic Signal Warrant Analysis Workbook

11/6/2021

ENTER VOLUME DATA PER 15 MINUTE INTERVAL, PER APPROACH

Time Interval		Major Street Approach #1 (S-Bound)	Major Street Approach #2 (N-Bound)	Major Street Combined	Minor Street Approach #1 (E-Bound)	Minor Street Approach #2 (W-Bound)
Begin At	End Of	Volume	Volume	Total Volume	Volume	Volume
12:00 PM	12:14 PM	189	133	322	9	5
12:15 PM	12:29 PM	144	151	295	11	5
12:30 PM	12:44 PM	180	183	363	7	5
12:45 PM	12:59 PM	177	143	320	6	6
1:00 PM	1:14 PM	188	122	310	6	6
1:15 PM	1:29 PM	179	155	334	5	7
1:30 PM	1:44 PM	188	131	319	6	5
1:45 PM	1:59 PM	236	169	405	10	5
2:00 PM	2:14 PM	201	171	372	14	6
2:15 PM	2:29 PM	218	167	385	4	6
2:30 PM	2:44 PM	207	188	395	6	8
2:45 PM	2:59 PM	186	157	343	23	8
3:00 PM	3:14 PM	206	146	352	19	17
3:15 PM	3:29 PM	191	158	349	7	16
3:30 PM	3:44 PM	204	191	395	14	16
3:45 PM	3:59 PM	192	168	360	9	16
4:00 PM	4:14 PM	206	160	367	11	10
4:15 PM	4:29 PM	192	157	350	9	10
4:30 PM	4:44 PM	217	185	403	10	20
4:45 PM	4:59 PM	180	159	340	8	21
5:00 PM	5:14 PM	231	181	412	18	17
5:15 PM	5:29 PM	223	172	395	5	17
5:30 PM	5:44 PM	195	159	354	4	8
5:45 PM	5:59 PM	203	137	340	5	7
6:00 PM	6:14 PM	170	134	304	3	4
6:15 PM	6:29 PM	197	117	314	2	3
6:30 PM	6:44 PM	170	116	286	1	4
6:45 PM	6:59 PM	174	119	293	2	4
7:00 PM	7:14 PM	173	94	267	2	2
7:15 PM	7:29 PM	128	66	194	0	3
7:30 PM	7:44 PM	108	73	181	0	3
7:45 PM	7:59 PM	133	70	203	1	1
8:00 PM	8:14 PM	109	84	193	5	1
8:15 PM	8:29 PM	108	75	183	1	1
8:30 PM	8:44 PM	113	69	182	1	1
8:45 PM	8:59 PM	74	72	146	0	2
9:00 PM	9:14 PM	76	65	141	0	2
9:15 PM	9:29 PM	84	45	129	0	2
9:30 PM	9:44 PM	73	65	138	1	2
9:45 PM	9:59 PM	71	46	117	0	2
10:00 PM	10:14 PM			0		
10:15 PM	10:29 PM			0		
10:30 PM	10:44 PM			0		
10:45 PM	10:59 PM			0		
11:00 PM	11:14 PM			0		
11:15 PM	11:29 PM			0		
11:30 PM	11:44 PM			0		
11:45 PM	11:59 PM			0		

Approach Totals:	10,654	9,654	20,308	483	387
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Traffic Signal Warrant Analysis Workbook

Time Interval		Major Street Left Turn #1 (S-Bound)	Major Street Left Turn #2 (N-Bound)
Begin At	End Of	Volume	Volume
12:00 AM	12:14 AM		
12:15 AM	12:29 AM		
12:30 AM	12:44 AM		
12:45 AM	12:59 AM		
1:00 AM	1:14 AM		
1:15 AM	1:29 AM		
1:30 AM	1:44 AM		
1:45 AM	1:59 AM		
2:00 AM	2:14 AM		
2:15 AM	2:29 AM		
2:30 AM	2:44 AM		
2:45 AM	2:59 AM		
3:00 AM	3:14 AM		
3:15 AM	3:29 AM		
3:30 AM	3:44 AM		
3:45 AM	3:59 AM		
4:00 AM	4:14 AM		
4:15 AM	4:29 AM		
4:30 AM	4:44 AM		
4:45 AM	4:59 AM		
5:00 AM	5:14 AM		
5:15 AM	5:29 AM		
5:30 AM	5:44 AM		
5:45 AM	5:59 AM		
6:00 AM	6:14 AM	8	6
6:15 AM	6:29 AM	10	11
6:30 AM	6:44 AM	8	18
6:45 AM	6:59 AM	10	7
7:00 AM	7:14 AM	6	5
7:15 AM	7:29 AM	12	5
7:30 AM	7:44 AM	12	3
7:45 AM	7:59 AM	13	9
8:00 AM	8:14 AM	6	5
8:15 AM	8:29 AM	3	2
8:30 AM	8:44 AM	4	2
8:45 AM	8:59 AM	5	1
9:00 AM	9:14 AM	3	1
9:15 AM	9:29 AM	3	3
9:30 AM	9:44 AM	4	1
9:45 AM	9:59 AM	3	6
10:00 AM	10:14 AM	3	4
10:15 AM	10:29 AM	2	2
10:30 AM	10:44 AM	2	1
10:45 AM	10:59 AM	4	3
11:00 AM	11:14 AM	6	3
11:15 AM	11:29 AM	4	3
11:30 AM	11:44 AM	6	2
11:45 AM	11:59 AM	4	0

Yes Use California MUTCD option:
 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor-street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major-street" volume.
 If this option is selected, populate columns HB and HC and select "Yes"

Traffic Signal Warrant Analysis Workbook

11/6/2021

Time Interval		Major Street Left Turn #1 (S-Bound)	Major Street Left Turn #2 (N-Bound)
Begin At	End Of	Volume	Volume
12:00 PM	12:14 PM	7	2
12:15 PM	12:29 PM	5	2
12:30 PM	12:44 PM	7	1
12:45 PM	12:59 PM	6	0
1:00 PM	1:14 PM	4	2
1:15 PM	1:29 PM	5	1
1:30 PM	1:44 PM	4	0
1:45 PM	1:59 PM	7	1
2:00 PM	2:14 PM	4	5
2:15 PM	2:29 PM	6	0
2:30 PM	2:44 PM	6	2
2:45 PM	2:59 PM	10	0
3:00 PM	3:14 PM	8	1
3:15 PM	3:29 PM	8	0
3:30 PM	3:44 PM	9	3
3:45 PM	3:59 PM	14	0
4:00 PM	4:14 PM	9	0
4:15 PM	4:29 PM	8	0
4:30 PM	4:44 PM	14	0
4:45 PM	4:59 PM	9	1
5:00 PM	5:14 PM	17	1
5:15 PM	5:29 PM	12	1
5:30 PM	5:44 PM	4	0
5:45 PM	5:59 PM	8	0
6:00 PM	6:14 PM	2	0
6:15 PM	6:29 PM	3	2
6:30 PM	6:44 PM	3	0
6:45 PM	6:59 PM	1	0
7:00 PM	7:14 PM	3	0
7:15 PM	7:29 PM	1	0
7:30 PM	7:44 PM	1	0
7:45 PM	7:59 PM	1	2
8:00 PM	8:14 PM	2	0
8:15 PM	8:29 PM	1	0
8:30 PM	8:44 PM	1	0
8:45 PM	8:59 PM	1	0
9:00 PM	9:14 PM	1	0
9:15 PM	9:29 PM	2	0
9:30 PM	9:44 PM	1	1
9:45 PM	9:59 PM	3	0
10:00 PM	10:14 PM		
10:15 PM	10:29 PM		
10:30 PM	10:44 PM		
10:45 PM	10:59 PM		
11:00 PM	11:14 PM		
11:15 PM	11:29 PM		
11:30 PM	11:44 PM		
11:45 PM	11:59 PM		
Approach Totals:		356	131



MUTCD WARRANT 1, EIGHT-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Combination of Conditions A and B Necessary?*: **No**

**Only applicable for Warrant 1 if after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems. See Section 4C.02 of the 2014 MUTCD for application.*

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or More	1	600	480	420	336	150	120	105	84
2 or More	2 or More	600	480	420	336	200	160	140	112
1	2 or More	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or More	1	900	720	630	504	75	60	53	42
2 or More	2 or More	900	720	630	504	100	80	70	56
1	2 or More	750	600	525	420	100	80	70	56

Condition A Evaluation

Number of Unique Hours Met: **1** Condition A Satisfied? **No**

Condition B Evaluation

Number of Unique Hours Met: **11** Condition B Satisfied? **Yes**

Combination of Condition A and Condition B Evaluation

Number of Unique Hours Met for Condition A: **N/A**

Number of Unique Hours Met for Condition B: **N/A**

Combination of Condition A and Condition B Satisfied? **N/A**

MUTCD WARRANT 2, FOUR-HOUR VEHICULAR VOLUME

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Total Number of Unique Hours Met On Figure 4C-2
7

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?
Yes

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	320	24	
5:30 AM	657	42	
5:45 AM	979	73	Met
6:00 AM	1,422	96	Met
6:15 AM	1,486	93	Met
6:30 AM	1,557	95	Met
6:45 AM	1,672	93	Met
7:00 AM	1,658	90	Met
7:15 AM	1,711	84	Met
7:30 AM	1,699	68	Met
7:45 AM	1,671	60	Met
8:00 AM	1,599	46	
8:15 AM	1,495	40	
8:30 AM	1,428	42	
8:45 AM	1,338	45	
9:00 AM	1,320	48	
9:15 AM	1,253	58	
9:30 AM	1,234	58	
9:45 AM	1,203	50	
10:00 AM	1,139	51	
10:15 AM	1,156	49	
10:30 AM	1,118	51	
10:45 AM	1,133	56	
11:00 AM	1,172	50	
11:15 AM	1,201	54	
11:30 AM	1,225	56	
11:45 AM	1,268	59	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 PM	1,273	59	
12:15 PM	1,265	53	
12:30 PM	1,305	49	
12:45 PM	1,264	46	
1:00 PM	1,349	48	
1:15 PM	1,411	56	
1:30 PM	1,460	56	
1:45 PM	1,534	58	
2:00 PM	1,469	74	Met
2:15 PM	1,445	83	Met
2:30 PM	1,407	88	Met
2:45 PM	1,405	99	Met
3:00 PM	1,418	104	Met
3:15 PM	1,431	98	Met
3:30 PM	1,431	92	Met
3:45 PM	1,434	102	Met
4:00 PM	1,418	102	Met
4:15 PM	1,456	116	Met
4:30 PM	1,497	126	Met
4:45 PM	1,459	104	Met
5:00 PM	1,461	89	Met
5:15 PM	1,368	61	Met
5:30 PM	1,296	39	
5:45 PM	1,229	33	
6:00 PM	1,190	23	
6:15 PM	1,151	22	
6:30 PM	1,033	20	
6:45 PM	930	17	
7:00 PM	840	14	
7:15 PM	767	12	
7:30 PM	756	10	
7:45 PM	757	11	
8:00 PM	700	10	
8:15 PM	649	8	
8:30 PM	594	10	
8:45 PM	550	10	
9:00 PM	519	12	
9:15 PM	379	10	
9:30 PM	252	6	
9:45 PM	114	4	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	Yes
---	-----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*	
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	No
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	No
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	Yes
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
5

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	320	24	
5:30 AM	657	42	
5:45 AM	979	73	
6:00 AM	1,422	96	Met
6:15 AM	1,486	93	Met
6:30 AM	1,557	95	Met
6:45 AM	1,672	93	Met
7:00 AM	1,658	90	Met
7:15 AM	1,711	84	Met
7:30 AM	1,699	68	
7:45 AM	1,671	60	
8:00 AM	1,599	46	
8:15 AM	1,495	40	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
8:30 AM	1,428	42	
8:45 AM	1,338	45	
9:00 AM	1,320	48	
9:15 AM	1,253	58	
9:30 AM	1,234	58	
9:45 AM	1,203	50	
10:00 AM	1,139	51	
10:15 AM	1,156	49	
10:30 AM	1,118	51	
10:45 AM	1,133	56	
11:00 AM	1,172	50	
11:15 AM	1,201	54	
11:30 AM	1,225	56	
11:45 AM	1,268	59	
12:00 PM	1,273	59	
12:15 PM	1,265	53	
12:30 PM	1,305	49	
12:45 PM	1,264	46	
1:00 PM	1,349	48	
1:15 PM	1,411	56	
1:30 PM	1,460	56	
1:45 PM	1,534	58	
2:00 PM	1,469	74	
2:15 PM	1,445	83	Met
2:30 PM	1,407	88	Met
2:45 PM	1,405	99	Met
3:00 PM	1,418	104	Met
3:15 PM	1,431	98	Met
3:30 PM	1,431	92	Met
3:45 PM	1,434	102	Met
4:00 PM	1,418	102	Met
4:15 PM	1,456	116	Met
4:30 PM	1,497	126	Met
4:45 PM	1,459	104	Met
5:00 PM	1,461	89	Met
5:15 PM	1,368	61	
5:30 PM	1,296	39	
5:45 PM	1,229	33	
6:00 PM	1,190	23	
6:15 PM	1,151	22	
6:30 PM	1,033	20	
6:45 PM	930	17	
7:00 PM	840	14	
7:15 PM	767	12	
7:30 PM	756	10	
7:45 PM	757	11	
8:00 PM	700	10	
8:15 PM	649	8	
8:30 PM	594	10	
8:45 PM	550	10	
9:00 PM	519	12	
9:15 PM	379	10	
9:30 PM	252	6	
9:45 PM	114	4	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

South Watt Avenue and Osage Avenue
Existing Plus Project
Intersection Delay by Approach

	AM Peak Hour			PM Peak Hour		
	Vehicles	Average Delay (seconds)	Total Delay (hours)	Vehicles	Average Delay (seconds)	Total Delay (hours)
Northbound left turn	22	9.6	0.06	3	9.3	0.01
Southbound left turn	41	10.5	0.12	52	9.3	0.13
Eastbound	42	165.3	1.93	41	74.8	0.85
Westbound	26	40.9	0.30	73	43.9	0.89
Total (Controlled movements)	131	66.0	2.40	169	40.1	1.88



INTERSECTION OPERATIONS EXISTING CONDITIONS

DRAFT

HCM 6th TWSC
1: S Watt Ave & Osage Ave

10/26/2021

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	0	10	0	0	3	22	955	1	1	671	33
Future Vol, veh/h	32	0	10	0	0	3	22	955	1	1	671	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	38	0	20	0	0	33	23	7	0	0	10	36
Mvmt Flow	32	0	10	0	0	3	22	955	1	1	671	33

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1691	1690	688	1695	1706	956	704	0	0	956	0	0
Stage 1	690	690	-	1000	1000	-	-	-	-	-	-	-
Stage 2	1001	1000	-	695	706	-	-	-	-	-	-	-
Critical Hdwy	7.48	6.5	6.4	7.1	6.5	6.53	4.33	-	-	4.1	-	-
Critical Hdwy Stg 1	6.48	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.48	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.842	4	3.48	3.5	4	3.597	2.407	-	-	2.2	-	-
Pot Cap-1 Maneuver	60	94	417	74	92	274	804	-	-	727	-	-
Stage 1	382	449	-	295	324	-	-	-	-	-	-	-
Stage 2	252	324	-	436	442	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	57	88	417	69	86	274	804	-	-	727	-	-
Mov Cap-2 Maneuver	57	88	-	69	86	-	-	-	-	-	-	-
Stage 1	360	448	-	278	305	-	-	-	-	-	-	-
Stage 2	235	305	-	425	441	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	109.3	18.3	0.2	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	804	-	-	72	274	727	-	-
HCM Lane V/C Ratio	0.027	-	-	0.583	0.011	0.001	-	-
HCM Control Delay (s)	9.6	0	-	109.3	18.3	10	0	-
HCM Lane LOS	A	A	-	F	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.5	0	0	-	-

HCM 6th TWSC
1: S Watt Ave & Osage Ave

10/26/2021

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	28	3	10	0	0	5	3	690	0	26	788	11
Future Vol, veh/h	28	3	10	0	0	5	3	690	0	26	788	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	0	20	0	0	0	0	1	0	4	4	55
Mvmt Flow	28	3	10	0	0	5	3	690	0	26	788	11

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1545	1542	794	1548	1547	690	799	0	0	690	0	0
Stage 1	846	846	-	696	696	-	-	-	-	-	-	-
Stage 2	699	696	-	852	851	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.4	7.1	6.5	6.2	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.48	3.5	4	3.3	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	92	116	361	94	115	449	833	-	-	895	-	-
Stage 1	354	381	-	435	446	-	-	-	-	-	-	-
Stage 2	427	446	-	357	379	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	87	109	361	86	108	449	833	-	-	895	-	-
Mov Cap-2 Maneuver	87	109	-	86	108	-	-	-	-	-	-	-
Stage 1	352	361	-	432	443	-	-	-	-	-	-	-
Stage 2	420	443	-	326	359	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	56.7		13.1		0			0.3		
HCM LOS	F		B							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	833	-	-	109	449	895	-	-
HCM Lane V/C Ratio	0.004	-	-	0.376	0.011	0.029	-	-
HCM Control Delay (s)	9.3	0	-	56.7	13.1	9.1	0	-
HCM Lane LOS	A	A	-	F	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0	0.1	-	-



INTERSECTION OPERATIONS EXISTING PLUS PROJECT CONDITIONS

DRAFT

HCM 6th TWSC
1: S Watt Ave & Osage Ave

11/12/2021

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	32	0	10	8	0	18	22	955	29	41	671	33
Future Vol, veh/h	32	0	10	8	0	18	22	955	29	41	671	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	38	0	20	9	0	13	23	7	3	3	10	36
Mvmt Flow	32	0	10	8	0	18	22	955	29	41	671	33

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1793	1798	688	1789	1800	970	704	0	0	984	0	0
Stage 1	770	770	-	1014	1014	-	-	-	-	-	-	-
Stage 2	1023	1028	-	775	786	-	-	-	-	-	-	-
Critical Hdwy	7.48	6.5	6.4	7.19	6.5	6.33	4.33	-	-	4.13	-	-
Critical Hdwy Stg 1	6.48	5.5	-	6.19	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.48	5.5	-	6.19	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.842	4	3.48	3.581	4	3.417	2.407	-	-	2.227	-	-
Pot Cap-1 Maneuver	51	81	417	60	81	293	804	-	-	698	-	-
Stage 1	344	413	-	279	319	-	-	-	-	-	-	-
Stage 2	244	314	-	380	406	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	42	69	417	52	69	293	804	-	-	698	-	-
Mov Cap-2 Maneuver	42	69	-	52	69	-	-	-	-	-	-	-
Stage 1	323	373	-	262	300	-	-	-	-	-	-	-
Stage 2	215	295	-	335	367	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	188.7	42.7	0.2	0.6
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	804	-	-	53	121	698	-	-
HCM Lane V/C Ratio	0.027	-	-	0.792	0.215	0.059	-	-
HCM Control Delay (s)	9.6	0	-	188.7	42.7	10.5	0	-
HCM Lane LOS	A	A	-	F	E	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3.3	0.8	0.2	-	-

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	58	12	7	2	1	17
Future Vol, veh/h	58	12	7	2	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	17	43	0	0	0
Mvmt Flow	58	12	7	2	1	17
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	9	0	-	0	136	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	128	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1624	-	-	-	862	1080
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	903	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1624	-	-	-	831	1080
Mov Cap-2 Maneuver	-	-	-	-	831	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	903	-
Approach	EB	WB		SB		
HCM Control Delay, s	6	0		8.4		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1624	-	-	-	1062	
HCM Lane V/C Ratio	0.036	-	-	-	0.017	
HCM Control Delay (s)	7.3	0	-	-	8.4	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	

Intersection						
Int Delay, s/veh	4.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	10	3	5	1	0	4
Future Vol, veh/h	10	3	5	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	20	0	20	0	0	50
Mvmt Flow	10	3	5	1	0	4
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	6	0	-	0	29	6
Stage 1	-	-	-	-	6	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	4.3	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.38	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1505	-	-	-	991	952
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	1005	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1505	-	-	-	984	952
Mov Cap-2 Maneuver	-	-	-	-	984	-
Stage 1	-	-	-	-	1015	-
Stage 2	-	-	-	-	1005	-
Approach	EB	WB		SB		
HCM Control Delay, s	5.7	0		8.8		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1505	-	-	-	952	
HCM Lane V/C Ratio	0.007	-	-	-	0.004	
HCM Control Delay (s)	7.4	0	-	-	8.8	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

HCM 6th TWSC
1: S Watt Ave & Osage Ave

11/12/2021

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	3	10	26	0	47	3	690	5	52	788	11
Future Vol, veh/h	28	3	10	26	0	47	3	690	5	52	788	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	0	20	5	0	2	0	1	5	5	4	55
Mvmt Flow	28	3	10	26	0	47	3	690	5	52	788	11

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1620	1599	794	1603	1602	693	799	0	0	695	0	0
Stage 1	898	898	-	699	699	-	-	-	-	-	-	-
Stage 2	722	701	-	904	903	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.5	6.4	7.15	6.5	6.22	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	6.14	5.5	-	6.15	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.5	-	6.15	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4	3.48	3.545	4	3.318	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	82	107	361	84	107	443	833	-	-	887	-	-
Stage 1	331	361	-	426	445	-	-	-	-	-	-	-
Stage 2	415	444	-	327	359	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	67	95	361	73	95	443	833	-	-	887	-	-
Mov Cap-2 Maneuver	67	95	-	73	95	-	-	-	-	-	-	-
Stage 1	329	323	-	423	442	-	-	-	-	-	-	-
Stage 2	369	441	-	282	321	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	80.3		46		0		0.6	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	833	-	-	86	158	887	-	-
HCM Lane V/C Ratio	0.004	-	-	0.477	0.462	0.059	-	-
HCM Control Delay (s)	9.3	0	-	80.3	46	9.3	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2	2.1	0.2	-	-

Intersection						
Int Delay, s/veh	5.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	24	34	15	1	2	57
Future Vol, veh/h	24	34	15	1	2	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	9	13	0	0	0
Mvmt Flow	24	34	15	1	2	57
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	16	0	-	0	98	16
Stage 1	-	-	-	-	16	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1615	-	-	-	906	1069
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1615	-	-	-	892	1069
Mov Cap-2 Maneuver	-	-	-	-	892	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	946	-
Approach	EB	WB		SB		
HCM Control Delay, s	3	0		8.6		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1615	-	-	-	1062	
HCM Lane V/C Ratio	0.015	-	-	-	0.056	
HCM Control Delay (s)	7.3	0	-	-	8.6	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Intersection

Int Delay, s/veh 2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	5	31	6	1	1	10
Future Vol, veh/h	5	31	6	1	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	40	3	0	0	0	20
Mvmt Flow	5	31	6	1	1	10

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	7	0	0 48 7
Stage 1	-	-	- 7 -
Stage 2	-	-	- 41 -
Critical Hdwy	4.5	-	- 6.4 6.4
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.56	-	- 3.5 3.48
Pot Cap-1 Maneuver	1397	-	- 967 1025
Stage 1	-	-	- 1021 -
Stage 2	-	-	- 987 -
Platoon blocked, %	-	-	- - -
Mov Cap-1 Maneuver	1397	-	- 963 1025
Mov Cap-2 Maneuver	-	-	- 963 -
Stage 1	-	-	- 1017 -
Stage 2	-	-	- 987 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1397	-	-	-	1019
HCM Lane V/C Ratio	0.004	-	-	-	0.011
HCM Control Delay (s)	7.6	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0



INTERSECTION OPERATIONS EXISTING PLUS PROJECT CONDITIONS WITH SIGNAL INTERSECTION 1

DRAFT

HCM 6th Signalized Intersection Summary

1: S Watt Ave & Osage Ave

11/12/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	32	0	10	8	0	18	22	955	29	41	671	33
Future Volume (veh/h)	32	0	10	8	0	18	22	955	29	41	671	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1337	1900	1604	1767	1900	1707	1559	1796	1856	1856	1752	1366
Adj Flow Rate, veh/h	32	0	10	8	0	18	22	955	29	41	671	33
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	38	0	20	9	0	13	23	7	3	3	10	36
Cap, veh/h	34	0	71	13	0	41	27	1231	37	52	1194	59
Arrive On Green	0.03	0.00	0.04	0.01	0.00	0.03	0.02	0.71	0.71	0.03	0.72	0.72
Sat Flow, veh/h	1273	0	1610	1682	0	1610	1485	1734	53	1767	1656	81
Grp Volume(v), veh/h	32	0	10	8	0	18	22	0	984	41	0	704
Grp Sat Flow(s),veh/h/ln	1273	0	1610	1682	0	1610	1485	0	1787	1767	0	1737
Q Serve(g_s), s	2.5	0.0	0.6	0.5	0.0	1.1	1.5	0.0	35.6	2.3	0.0	19.0
Cycle Q Clear(g_c), s	2.5	0.0	0.6	0.5	0.0	1.1	1.5	0.0	35.6	2.3	0.0	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.05
Lane Grp Cap(c), veh/h	34	0	71	13	0	41	27	0	1268	52	0	1252
V/C Ratio(X)	0.95	0.00	0.14	0.60	0.00	0.44	0.81	0.00	0.78	0.79	0.00	0.56
Avail Cap(c_a), veh/h	55	0	293	69	0	290	61	0	1268	76	0	1252
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.6	0.0	46.0	49.4	0.0	48.0	48.9	0.0	9.4	48.2	0.0	6.6
Incr Delay (d2), s/veh	77.7	0.0	0.9	35.8	0.0	7.4	41.2	0.0	4.7	28.4	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.3	0.3	0.0	0.5	0.8	0.0	10.6	1.4	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	126.3	0.0	46.9	85.3	0.0	55.4	90.1	0.0	14.1	76.6	0.0	8.4
LnGrp LOS	F	A	D	F	A	E	F	A	B	E	A	A
Approach Vol, veh/h		42			26			1006			745	
Approach Delay, s/veh		107.4			64.6			15.7			12.1	
Approach LOS		F			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	76.9	6.3	8.4	7.3	78.0	8.2	6.5				
Change Period (Y+Rc), s	5.5	5.9	5.5	4.0	5.5	5.9	5.5	4.0				
Max Green Setting (Gmax), s	4.3	52.5	4.1	18.2	4.1	52.7	4.3	18.0				
Max Q Clear Time (g_c+I1), s	4.3	37.6	2.5	2.6	3.5	21.0	4.5	3.1				
Green Ext Time (p_c), s	0.0	5.9	0.0	0.0	0.0	4.6	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				17.1								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

1: S Watt Ave & Osage Ave

11/12/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	28	3	10	26	0	47	3	690	5	52	788	11
Future Volume (veh/h)	28	3	10	26	0	47	3	690	5	52	788	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1604	1826	1900	1870	1900	1885	1826	1826	1841	1085
Adj Flow Rate, veh/h	28	3	10	26	0	47	3	690	5	52	788	11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	0	20	5	0	2	0	1	5	5	4	55
Cap, veh/h	39	18	61	37	0	74	6	1236	9	66	1260	18
Arrive On Green	0.02	0.05	0.05	0.02	0.00	0.05	0.00	0.66	0.66	0.04	0.70	0.70
Sat Flow, veh/h	1753	385	1284	1739	0	1610	1810	1869	14	1739	1811	25
Grp Volume(v), veh/h	28	0	13	26	0	47	3	0	695	52	0	799
Grp Sat Flow(s),veh/h/ln	1753	0	1669	1739	0	1610	1810	0	1883	1739	0	1836
Q Serve(g_s), s	1.4	0.0	0.7	1.3	0.0	2.6	0.1	0.0	17.8	2.7	0.0	21.1
Cycle Q Clear(g_c), s	1.4	0.0	0.7	1.3	0.0	2.6	0.1	0.0	17.8	2.7	0.0	21.1
Prop In Lane	1.00		0.77	1.00		1.00	1.00		0.01	1.00		0.01
Lane Grp Cap(c), veh/h	39	0	79	37	0	74	6	0	1245	66	0	1278
V/C Ratio(X)	0.71	0.00	0.16	0.70	0.00	0.63	0.52	0.00	0.56	0.79	0.00	0.63
Avail Cap(c_a), veh/h	84	0	334	83	0	322	82	0	1245	102	0	1278
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.7	0.0	41.2	43.8	0.0	42.2	44.8	0.0	8.2	42.9	0.0	7.4
Incr Delay (d2), s/veh	21.2	0.0	1.0	21.5	0.0	8.5	56.7	0.0	1.8	19.6	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.3	0.8	0.0	1.2	0.2	0.0	5.5	1.4	0.0	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.9	0.0	42.1	65.3	0.0	50.7	101.5	0.0	10.0	62.6	0.0	9.7
LnGrp LOS	E	A	D	E	A	D	F	A	A	E	A	A
Approach Vol, veh/h		41			73			698			851	
Approach Delay, s/veh		57.7			55.9			10.4			12.9	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	65.4	7.4	8.3	5.8	68.5	7.5	8.2				
Change Period (Y+Rc), s	5.5	5.9	5.5	4.0	5.5	5.9	5.5	4.0				
Max Green Setting (Gmax), s	5.3	41.5	4.3	18.0	4.1	42.7	4.3	18.0				
Max Q Clear Time (g_c+I1), s	4.7	19.8	3.3	2.7	2.1	23.1	3.4	4.6				
Green Ext Time (p_c), s	0.0	4.1	0.0	0.0	0.0	4.9	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

APPENDIX D
VMT ANALYSIS



VMT ANALYSIS

DATE: December 9, 2021

TO: Matthew Ilagan, Pelle Clarke | City of Sacramento

FROM: Josh Pilachowski, David Tokarski, Jim Damkowitch | DKS Associates

SUBJECT: 8981 Osage Avenue Warehouse VMT Analysis

Project #19179-015

In accordance with Senate Bill 743 (SB 743) and the resulting changes to the California Environmental Quality Act (CEQA) Guidelines published by the Natural Resources Agency, local agencies may no longer use measures of vehicle delay such as Level of Service (LOS) to quantify transportation impacts on the environment. VMT is a systemic metric and is a useful indicator of overall land use and transportation efficiency, where the most efficient system is one that minimizes VMT by encouraging shorter vehicle trip lengths, more walking and biking, or increased carpooling and transit. Vehicle miles traveled (VMT) has been codified in the CEQA Guidelines as the most appropriate measure for measuring transportation impacts under CEQA. This change went into effect statewide on July 1, 2020. The City of Sacramento's draft transportation impact guidelines are consistent with OPR's recommendation of using VMT as a metric.

Based on current practice of the City of Sacramento, transportation impacts are considered significant if the proposed project would result in a VMT per capita or office VMT per employee above 85% of the regional average, consistent with technical guidance published by the Governor's Office of Planning and Research (OPR). The OPR guidance does not specify a particular significance threshold for industrial employment and recommends that local jurisdictions determine this threshold based on local conditions. Some jurisdictions in the Sacramento region (including Sacramento County (adopted) and the City of Rancho Cordova (draft guidelines)) have determined that the significance threshold for industrial employment is 100% of regional average. The draft City of Sacramento Transportation Impact Analysis Guidelines do not specify a significance threshold for industrial land uses. For consistency purposes, this analysis applies the significance threshold of 100% of regional average for industrial uses.

The methodology in this analysis for evaluating VMT and completing an SB 743 compliant analysis of the proposed project in the City of Sacramento is described below.

VMT SCREENING

VMT SCREENING CRITERIA

Pursuant to SB 743 and technical guidance published by OPR, there are several screening procedures to potentially streamline project analysis (i.e., provide a presumptive non-impact finding and obviate the need for a VMT analysis). The various screening options are listed below with a brief determination of whether a given screen is triggered by the proposed project.

- **Project Size:** Projects that generate fewer than 110 trips per day can be presumed to have a less than significant transportation impact. Based on the trip generation data presented in the Focused Transportation Analysis (in a separate document prepared by DKS), the proposed project does not meet this screening criteria.
- **Proximity to High Quality Transit:** Residential or office projects within one-half mile of an existing major transit station or stop along an existing high-quality transit corridor can be presumed to have a less than significant transportation impact. The proposed project is not currently served by transit. The project does not meet this screening criteria.
- **Affordable Housing Development:** The proposed project does not include the provision of housing. The proposed project does not meet this screening criteria.
- **Locally Serving Retail:** Typically less than 50,000 square feet. The proposed project does not contain commercial square footage and thus does not meet this screening criteria.
- **Infrastructure:** Projects that would not likely lead to a substantial or measurable increase in vehicle travel are presumed to be VMT neutral and generally presumed to have a less than significant transportation impact (i.e., induced VMT). These include: Roadway Maintenance and Rehab Projects; Signal Timing / Synchronization / Adaptive Signal Control /Signal Preemption Improvements; Intersection Control Type and Turn Lane Channelization Improvements; Widening for Local or Local Collector Streets; and Transit / Bicycle / Pedestrian Infrastructure Improvements. The proposed project does not contain any substantial infrastructure improvements that meet this screening criteria.
- **Project Location:** Projects that fall within an identified location (in this case SACOG's hexagon methodology is used for screening purposes) that demonstrates VMT per Capita for residential projects below 85% of the regional average for that metric, or VMT per Employee for employment-based projects below 100% of the regional average for that metric. As illustrated in **Figure 1**, the project is in a hexagon with an estimated VMT of 95.1% of the regional average. Thus, the project meets this screening criteria.

VMT IMPACT AND MITIGATION

As the project meets the screening criteria based on VMT for employee, the impact is less-than-significant. No mitigation is required.

FIGURE 1: VMT EMPLOYMENT SCREENING MAP

