

The Craftsman on Elliot

Mesa, Arizona

Parking Demand Study

Lee Engineering Project No. 1313.02

March 12, 2024

Prepared for:

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Scottsdale, AZ 85253

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1. INTRODUCTION

A parking demand study was requested for The Craftsman on Elliot, a proposed mixed-use development on the northwest corner of Elliot and Hawes Roads in Mesa, Arizona. The developer is seeking a parking reduction from the City's general parking space requirement to better align the site's proposed parking supply with anticipated demand while eliminating areas of unused bulk parking. This report follows the latest guidance (August 2023) identified in the City of Mesa's Code of Ordinances, Title 11, Article 4, Chapter 32 as well as other state of the practice materials.

2. PROPOSED DEVELOPMENT

2.1. VICINITY AND SURROUNDING AREA

The proposed development is planned on parcel APN 304-04-031, an undeveloped parcel containing 22.46 acres (gross) with a designated City zoning of Mixed-Use Urban (MX-U), a zoning district that permits credit for on-street parking spaces located immediately adjacent to the frontage of the property, which may be counted toward required off-street parking for non-residential uses; however, no on-street parking is proposed or anticipated.

This site is in a developing area of Mesa, adjacent to a recently constructed distribution warehouse to its east and future residential units to its south, southwest and northeast. The future residential developments and undeveloped properties in the immediate area of the subject site are mostly comprised of the larger Hawes Crossing master plan, of which the subject property is part. A vicinity map of the project area is provided in **Figure 1**.

2.2. SITE DESCRIPTION AND LAND USE DETAILS

A copy of the proposed site layout plan is provided in **Figure 2**. The site is shown to consist of multiple land use types that will generate traffic to and from the site, including the following uses:

- Mixed-Use Residential (Apartments): 84 Dwelling Units (DU's)
- Apartments: 264 DU's
- Carriage Homes: 8 DU's
- Live/Work Units: 18 DU's
- Mixed Use Units: 12 DU's
- General Office Space: 15,000 SF GFA
- Sit-Down Restaurant: 6,000 SF indoor area plus 1,480 SF patio
- Restaurant with Drive-Through Window: 2,500 SF
- Retail Space: 16,300 SF
- Fitness/Clubhouse: 2,630 SF (half of bldg. area)

In addition to the above land uses, a number of ancillary uses are not expected to generate trips or require additional parking since they are for use by property tenants:

- Urban Plaza Open Space: 24,550 SF
- Flex Lawn (Open Space)
- Pet Park
- Pickleball Courts: 2 Courts
- Fitness/Clubhouse: 2,630 SF (half of bldg. area)

Following is the magnitude of proposed development aggregated by land use. It is noted that the number of residential bedrooms may change slightly from the information below. In addition, half of the site's fitness/clubhouse area (2,630 SF) was included as office space assuming there will be some outside activity associated with rental/leasing operations and property maintenance.

- Residential: 386 DU's (252 1-bedroom and 134 2-bedroom units, 520 total bedrooms)
- Office: 17,630 SF
- Retail: 16,300 SF
- Services: 8,500 SF (excluding 1,480 SF outdoor seating)

2.3. PARKING SUPPLY

To accommodate vehicle demand, a total of 797 parking spaces (21 ADA spaces) are proposed, located in areas throughout the property to best serve the individual land uses. The parking layout consists of 447 covered spaces (405 of which are covered residential parking), 74 garage spaces, and 276 uncovered spaces. In general, residential parking is proposed toward the back (north) two-thirds of the property, retail/office parking toward the south and adjacent to the office buildings on the east side of the property, and shared parking spaces grouped in strategic areas throughout the site.

Designating the parking spaces to specific land use groups, 573 spaces can be associated with the residential areas, 146 spaces associated with the retail, office, mixed use, and work-live combinations, and 78 that are considered shared spaces, spots near the pickleball area, retail, and clubhouse areas that can serve all uses depending upon the time of day. The 78 shared spaces are highlighted in Figure 2 with an "M" designation.

3. REQUIRED PARKING

3.1. CITY OF MESA PARKING CODE REQUIREMENT, INDIVIDUAL USES

The City of Mesa's requirements for the base number of off-street parking spaces for specific land uses is in its most recent Code of Ordinances, Title 11, Article 4, Chapter 32, On-Site Parking, Loading and Circulation. From Table 11-32-3(A), the following minimum standards are indicated for the individual land uses associated with the Craftsman on Elliot:

Table 1 – City of Mesa Parking Requirement

Component	Units	Parking Code	Code Required Parking
<i>Residential (Units, Not located within 1/4 mile of BRT or LRT station)</i>			810.6
Mixed-Use Apartments	84	2.1 spaces per Unit	176.4
Apartments	264	2.1 spaces per Unit	554.4
Carriage House	8	2.1 spaces per Unit	16.8
Main St Live/Work	18	2.1 spaces per Unit	37.8
Main St Mixed-Use	12	2.1 spaces per Unit	25.2
<i>Office Area (1,000 SF GFA)</i>			47.0
General Office	17.63	1.0 space per 375 SF	47.0
<i>Retail / Services (1,000 SF GFA)</i>			171.7
Restaurant - Indoor	6.0	1.0 space per 75 SF	80.0
Restaurant - Outdoor	1.48	1.0 space per 200 SF	7.4
Restaurant - Drive Thru Indoor	2.5	1.0 space per 100 SF	25.0
Retail / Shops	2.5	1.0 space per 275 SF	9.1
Retail (Mixed-Use Areas)	13.8	1.0 space per 275 SF	50.2
Total Required Parking Parking per Code (Individual Uses) =			1,029

Assuming the site consists of individual land uses, the City of Mesa parking code would require 1,029 off-street parking spaces. In this instance, parking supply would be 232 spaces (1,029 required minus 797 provided) or 22.6% below the City’s requirement. However, the City acknowledges two conditions:

1. City code may over-estimate individual parking need and permits alternative information using state-of-the-practice materials for City consideration.
2. Parking demand for each land use may peak at different times throughout the day and permits a shared parking analysis within mixed-use developments, helping reduce the number of unused spaces to allow better use of the subject property.

3.2. STATE OF THE PRACTICE PARKING RATIO ESTIMATES

To determine if the City of Mesa parking requirements over- or under-estimate parking need compared to average US rates, a review of current state-of-the-practice materials was conducted, analyzing the Institute of Transportation Engineers (ITE) *Parking Generation Manual* (6th Edition, 2023) and the Urban Land Institute (ULI) *Shared Parking* (3rd Edition, 2020).

From review of both publications that use results based on national research, definitions for each land use and parking conditions are not exact, but the most comparative data is presented. The ITE data presents parking demand using the 85th percentile rate of the peak period while the ULI data presents a base ratio, which is the expected peak accumulation of vehicles in the peak hour for each use. The ULI data breaks down parking demand into more granular subcategories (residential units/visitors or employees/visitors). Also, the City Zoning Ordinance parking ratios in effect prior to 2023 for multi-family residential developments are also presented for comparison purposes. All data is presented in **Table 2**.

Table 2 – Previous City of Mesa, ITE and ULI Peak Parking Ratios

	City of Mesa Parking Code	ITE Trip Generation ² (6th Edition) 85th %-ile	ULI Shared Parking (3rd Edition)
	<i>Previous Code 685 Spaces ¹</i>		
	<i>Current Code 811 Spaces</i>	<i>533 spaces</i>	<i>487 Spaces</i>
All Types Combined	2.1 spaces per Unit		
Studio Apartments	1.5 spaces per Unit ¹		0.85 spaces per Unit
1-Bedroom Apartments	1.5 spaces per Unit ¹	1.27 spaces per Unit	0.90 spaces per Unit
2-Bedroom Apartments	2.0 spaces per Unit ¹	1.59 spaces per Unit ³	1.65 spaces per Unit
3+ Bedroom Apartments	2.0 spaces per Unit ¹		2.50 spaces per Unit
Guest	0.1 spaces per Unit ¹		0.1 spaces per Unit
<i>Office (17,630 SF)</i>	<i>47 Spaces</i>	<i>53 Spaces</i>	<i>67 Spaces</i>
General Office	2.7 per KSF	2.98 per KSF	
Employees			3.5 per KSF
Visitors			0.3 per KSF
<i>Retail / Services (27,050 SF)</i>	<i>157 Spaces</i>	<i>210 Spaces</i>	<i>233 Spaces</i>
Restaurant - Indoor	13.3 per KSF		
Restaurant - Outdoor	5.0 per KSF		
Sit-Down Restaurant (Family)		13.61 per KSF	
Employees			2.15 per KSF
Visitors			15.25 per KSF
Restaurant - Drive Thru Indoor	10.0 per KSF		
Restaurant - Drive Thru Outdoor	5.0 per KSF		
Fast-Food Restaurant		10.17 per KSF	
Employees			2.0 per KSF
Visitors			12.4 per KSF
Retail General / Shops	2.7 per KSF	4.44 per KSF	
Employees			0.7 per KSF
Visitors			2.9 per KSF
Total Parking Req'd. (Prev. Code)	889 Total Spaces		
Total Parking Req'd. (Current Code)	1014 Total Spaces	796 Total Spaces	787 Total Spaces

Notes:

1. Previous City of Mesa Parking Code
2. ITE data reflects 85th Percentile Peak Period Parking Demand
3. ITE - 2 or more bedrooms
4. Restaurant, ITE - High-Turnover (Sit-Down), ULI - Family
5. Fast-Food Restaurant, ITE w/Drive-Thru Window

When applying the indicated parking ratios to the land uses within the Craftsman on Elliot, the following is noted:

- The existing and previous City of Mesa residential parking ratios are similar except for studio and 1-bedroom apartments. Previously only 1.6 spaces per unit (apartment plus guest) was required compared to the current 2.1 spaces per unit. Applying the site’s estimated apartment composition (252 1-bedroom and 134 2-bedroom units), 685 parking spaces would have been required under the previous City code compared to the current 811 spaces. This results in 126 more parking spaces required under the current code than before.

- The ITE 85th percentile parking ratios for the residential land use are lower than the City's requirement while for general office and restaurant land uses they are approximately the same (assuming no outdoor seating). The only ITE rate higher than the City's current parking requirement is for general retail shops at 4.44 spaces per 1,000 SF compared to the City's rate of 2.7 spaces per KSF. In all, the calculated number of parking spaces needed to accommodate the peak parking demand for all uses simultaneously using the ITE values would result in 796 parking spaces being required. Noting 797 spaces are proposed for the site, this would result in 1 vacant surplus parking space. *It is noted that use of the ITE average peak parking rates would result in a total of 579 spaces being required, 218 spaces below the parking supply being provided.*
- The ULI parking ratios are lower than the City's requirement for the residential component and slightly higher for the other land uses. Using the ULI data, a parking requirement of 787 spaces would result, which means the site would be over-parked by 10 parking stalls (1.3%) without considering the impacts of shared parking.

4. SHARED PARKING

The City permits a shared parking analysis to be performed when two or more nonresidential uses or a mixed-use development, with different peak parking characteristics, use the same off-street parking spaces to determine if the parking supply will meet their off-street parking requirements. The City does not provide a specific methodology but indicates use of state-of-the-practice materials to estimate parking need.

To analyze, *Shared Parking* (3rd Edition) by Urban Land Institute was referenced. This publication was used to help determine the parking supply required to accommodate parking demand throughout the day under the combination of different on-site land uses. This publication provides a more detailed for analysis purposes by separating parking demand based on resident and visitor (for multi-family residential dwelling units), employee and visitor (for office, retail, and restaurant uses) and a reserved condition if specific designated spaces are to be defined within the site compared to other local jurisdictions that do not include this refinement (City of Tempe and City of Phoenix). It is assumed the subject site will have reserved parking spaces for the residential units (74 garage spaces) and the office buildings (assumed to include the 29 retail spaces fronting the two buildings). A total of 34 spaces, located in the cut-out locations associated with the Main Street live/work and mixed-use areas appear to be dedicated to its residential tenants.

Table 3 shows the ULI weekday parking adjustment percentages, by hour, for each land use and parking component within the site while **Table 4** shows the weekend percentages.

Table 5 shows the calculated number of parking spaces for each land use component using the ULI parking ratios under typical weekday conditions. The unit rate for the residential dwellings was calculated on a blended average of the 1- and 2-bedroom units with the 74 reserved spaces (garage spaces) subtracted from its calculated number of spaces. Similarly, the calculated number of employee parking spaces for the assumed office spaces has been subtracted to estimate the number of reserved spaces dedicated to the office area (29 spaces assumed). The results show an approximate hourly parking demand for the site based on the individual land use.

It is noted that the results do not consider internal site interaction or alternative travel modes, which would reduce the parking demand further. As indicated from the traffic impact analysis conducted for this site, the NCHRP Internal Trip Capture Estimation Tool indicates a 18% AM and 43% PM peak period internal capture rate for the site (i.e., people from the office, residential, or other retail components could simply walk to the restaurants, reducing the number of parking spaces required). The NCHRP sheets have been attached.

Table 6 shows the calculated number of parking spaces for each land use component using the ULI parking ratios under typical weekend conditions.

Table 3 – ULI Weekday Time of Day Adjustment Factors (Percentages)

Land Use Component	Type	ULI - WEEKDAY TIME OF DAY ADJUSTMENT FACTORS (Percent)															
		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
Residential	Units	95	80	67	55	50	45	40	40	40	40	45	50	60	70	80	85
Residential	Reserved (Garage)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Residential	Guests	0	10	20	20	20	20	20	20	20	20	20	40	60	100	100	100
Office	Visitors	0	1	20	60	100	45	15	45	95	45	15	10	5	2	1	0
Office	Employees	3	15	50	90	100	100	85	85	95	95	85	60	25	15	5	3
Office	Reserved (Bldg. Front)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Retail <400K SF	Visitors	1	5	15	35	60	75	100	100	95	85	85	85	90	80	65	45
Retail <400K SF	Employees	10	15	25	45	75	95	100	100	100	100	100	100	100	100	90	60
Family Restaurant	Visitors	25	50	60	75	85	90	100	90	50	45	45	75	80	80	80	60
Family Restaurant	Employees	50	45	90	0	100	100	100	100	100	75	75	95	95	95	95	80
Fast Casual/Fast Food	Visitors	5	10	20	30	55	85	100	100	90	60	55	60	85	80	50	30
Fast Casual/Fast Food	Employees	20	20	30	40	75	100	100	100	95	70	60	70	90	90	60	40

Table 4 – ULI Weekend Time of Day Adjustment Factors (Percentages)

Land Use Component	Type	ULI - WEEKEND TIME OF DAY ADJUSTMENT FACTORS (Percent)															
		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
Residential	Units	100	95	88	80	75	70	68	65	65	68	71	74	77	80	83	86
Residential	Reserved (Garage)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Residential	Guests	0	20	20	20	20	20	20	20	20	20	20	40	60	100	100	100
Office	Visitors	0	20	60	80	90	100	90	80	60	40	20	10	5	0	0	0
Office	Employees	0	20	60	80	90	100	90	80	60	40	20	10	5	0	0	0
Office	Reserved (Bldg. Front)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Retail <400K SF	Visitors	1	5	30	50	70	90	95	100	100	95	90	80	75	70	65	50
Retail <400K SF	Employees	10	15	40	75	85	95	100	100	100	100	100	95	85	80	75	65
Family Restaurant	Visitors	10	25	45	70	90	90	100	85	65	40	45	60	70	70	65	30
Family Restaurant	Employees	50	75	90	90	100	100	100	100	100	75	75	95	95	95	95	80
Fast Casual/Fast Food	Visitors	5	10	20	30	55	85	100	100	90	60	55	60	85	80	50	30
Fast Casual/Fast Food	Employees	15	20	30	40	75	100	100	100	95	70	60	70	90	90	60	40

Table 5 – ULI Weekday Time of Day Parking Demand

Land Use Component	Type	ULI Spaces per		Calculated Spaces	ULI - WEEKDAY TIME OF DAY ADJUSTMENT FACTORS (Parking spaces)																
		Unit	Units		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	
Residential (Note 1)	Units	1.16	DU	386	374	355	299	251	206	187	168	150	150	150	150	168	187	224	262	299	318
Residential	Reserved	1	X	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
Residential	Guests	0.1	DU	386	39	0	4	8	8	8	8	8	8	8	8	16	23	39	39	39	39
Office	Visitors	0.3	KSF	17.6	5	0	0	1	3	5	2	1	2	5	2	1	1	0	0	0	0
Office (Note 1)	Employees	3.5	KSF	17.6	33	1	5	17	30	33	33	28	28	31	31	28	20	8	5	2	1
Office	Reserved	1	X	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Retail <400K SF	Visitors	2.9	KSF	16.3	47	0	2	7	16	28	35	47	47	45	40	40	40	42	38	31	21
Retail <400K SF	Employees	0.7	KSF	16.3	11	1	2	3	5	8	10	11	11	11	11	11	11	11	11	10	7
Family Restaurant (Note 2)	Visitors	15.25	KSF	7.48	114	29	57	68	86	97	103	114	103	57	51	51	86	91	91	91	68
Family Restaurant	Employees	2.15	KSF	6	13	7	6	12	0	13	13	13	13	13	10	10	12	12	12	12	10
Fast Casual/Fast Food	Visitors	12.4	KSF	2.5	31	2	3	6	9	17	26	31	31	28	19	17	19	26	25	16	9
Fast Casual/Fast Food	Employees	2	KSF	2.5	5	1	1	2	2	4	5	5	5	5	4	3	4	5	5	3	2

Notes:

1. Calc. blended average and/or minus reserved spaces.
2. Includes outdoor seating for visitors.
3. Yellow highlight is peak demand
4. Number of unused parking supply based on 797 on-site parking spaces

	Parking Spaces Req per ULI =	775	499	482	478	468	503	506	511	501	456	429	440	499	545	591	606	578
	Unused Spaces =	22	298	315	319	329	294	291	286	296	341	368	357	298	252	206	191	219

Land Use Component	Est. # of Dedicated Spaces	Subtotals Per Land Group															
		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
Residential =	573	429	377	333	288	269	250	232	232	232	232	250	277	321	375	412	431
Office =	29	30	34	47	62	67	64	58	59	65	62	58	50	37	34	31	30
Retail =	117	40	71	98	118	167	192	221	210	159	135	132	172	187	182	163	117

Note: There are 78 shared spaces that can be used by the office, retail, or residential land uses during peak times.

Table 6 – ULI Weekend Time of Day Parking Demand

Land Use Component	Type	ULI Spaces per		Calculated Spaces	ULI - WEEKEND TIME OF DAY ADJUSTMENT FACTORS - Parking spaces)																
		Unit	Units		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	
Residential (Note 1)	Units	1.16	DU	386	374	374	355	329	299	281	262	254	243	243	254	266	277	288	299	310	322
Residential	Reserved	1	X	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
Residential	Guests	0.1	DU	386	39	0	8	8	8	8	8	8	8	8	8	8	16	23	39	39	39
Office	Visitors	0.3	KSF	17.6	5	0	1	3	4	5	5	5	4	3	2	1	1	0	0	0	0
Office (Note 1)	Employees	3.5	KSF	17.6	33	0	7	20	26	30	33	30	26	20	13	7	3	2	0	0	0
Office	Reserved	1	X	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Retail <400K SF	Visitors	2.9	KSF	16.3	47	0	2	14	24	33	42	45	47	47	45	42	38	35	33	31	24
Retail <400K SF	Employees	0.7	KSF	16.3	11	1	2	4	8	9	10	11	11	11	11	11	10	9	9	8	7
Family Restaurant (Note 2)	Visitors	15.25	KSF	7.48	114	11	29	51	80	103	103	114	97	74	46	51	68	80	80	74	34
Family Restaurant	Employees	2.15	KSF	6	13	7	10	12	12	13	13	13	13	13	10	10	12	12	12	12	10
Fast Casual/Fast Food	Visitors	12.4	KSF	2.5	31	2	3	6	9	17	26	31	31	28	19	17	19	26	25	16	9
Fast Casual/Fast Food	Employees	2	KSF	2.5	5	1	1	2	2	4	5	5	5	5	4	3	4	5	5	3	2

Notes:	Parking Spaces Req per ULI =	775	499	521	552	575	606	610	619	588	555	515	519	551	583	605	596	550
	Unused Spaces =	22	298	276	245	222	191	187	178	209	242	282	278	246	214	192	201	247

- 1. Calc. blended average and/or minus reserved spaces.
- 2. Includes outdoor seating for visitors.
- 3. Yellow highlight is peak demand
- 4. Number of unused parking supply based on 797 on-site parking spaces

Land Use Component	Est. # of Dedicated Spaces	Subtotals Per Land Group															
		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM
Residential =	574	448	437	411	381	363	344	336	325	325	336	348	367	385	412	423	435
Office =	29	29	37	52	59	64	67	64	59	52	44	37	33	31	29	29	29
Retail =	117	22	47	89	135	179	199	219	204	178	135	134	151	167	164	144	86

Note: There are 78 shared spaces that can be used by the office, retail, or residential land uses during peak times.

The results in Table 5 for the shared parking weekday conditions are summarized as follows:

- Assuming no shared parking, the ULI data (weekday or weekend) indicates a total of 775 parking spaces would be needed to accommodate the on-site parking demand assuming all land uses peak at the same time. This would result in a 22-space parking over-supply (2.8%) compared to the 797 spaces being proposed.
- The ULI shared parking analysis indicates peak weekday parking demand at the Craftsman on Elliot is to occur during the 8 PM hour with 606 parking spaces being occupied. Noting a 797-space supply, 76.0% of the parking spaces will be occupied at peak site demand, resulting in a 191-parking space surplus (24.0%).
- Parking for each individual land use peaks at different times throughout the day. With 78 parking spaces dedicated as shared spaces, a total of 224 parking spaces are available to the office and retail components. Under the indicated assumptions, these spaces are estimated to be over-parked between the hours of 10 AM to 3 PM (maximum over-parked condition at Noon, 55 spaces). Although the retail and office-related spaces may be full, there will be 286 unused parking spaces throughout the site. Additionally, if applying the average AM/PM NCHRP site interaction percentage of 30% (AM = 18%, PM = 43%) to the 279 peak parking space demand associated with the office/retail spaces, only 196 spaces (279×0.70) would be occupied, resulting in the retail, office, and shared space areas being under-parked by 28 vehicles.

The results in Table 6 for the shared parking weekend conditions are summarized as follows:

- The shared parking demand for the Craftsman on Elliot is higher during the weekend than the weekday, although this assumed the office areas are open during the weekend. If the office uses operate on the weekends, peak parking demand occurs during the 60-minute period beginning at Noon with 619 occupied spaces (178 vacant spaces) resulting in a parking surplus of 22.3% (178 vacant spaces / 797 provided spaces).
- Noting 78 on-site parking spaces are dedicated to shared space, the 224 total spaces available to the retail and office uses will be fully occupied from 10 AM to 3 PM, peaking during the Noon hour at 283 spaces (59 space under-supply). However, at this time, 178 spaces will be available throughout the site. Additionally, if the average NCHRP site interaction percentage of 30% is applied, only 198 parking spaces would be needed, resulting in 26 spaces provided to the office/retail/shared uses being vacant.
- The above results are only applicable if all the site's 17,630 SF of office space is open during the weekend. If any portion of the office use is closed, parking demand will be reduced and more parking spaces will be unoccupied.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis conducted, the following conclusions are presented:

- The Craftsman on Elliot is planned to provide a total of 797 parking spaces to accommodate peak parking demand.
- For the multi-use development, adding the City of Mesa's parking space requirement for each individual land use is not appropriate. If the individual parking requirements for each land use were applied, a total of 1,029 spaces would be required under the current parking code.
- The City will consider a potential parking reduction to City requirements if state-of-the-practice material indicates such a reduction is reasonable. The ITE *Parking Generation* (6th Edition) and the ULI *Shared Parking* (3rd edition) result in less on-site parking being required as compared to the current City parking code. In total, using the ITE *Parking Generation*, 796 total spaces would be required, while the ULI results indicate 787 total parking spaces would meet parking demand, if the site were to accommodate peak demand for each individual land use. The 797 parking spaces being proposed for the site would accommodate the individual peak parking demand estimated using the ITE or ULI peak parking rates.
- The City permits a shared parking analysis to reduce parking supply noting multi-use sites have different parking characteristics, permitting a parking space to be used by different land uses throughout the day as needed. In following the methodology outlined in the ULI *Shared Parking* (3rd Edition) and using its identified rates per land use, peak parking demand is expected to occur at 8 PM during weekday conditions and at Noon during weekend conditions. During the higher weekend period, peak parking demand is estimated at 619 spaces, 77.7% of the 797 total parking spaces being occupied. This results in a 178 parking spaces surplus. During peak weekday periods, a 191-parking space surplus is expected.

Based on the analysis conducted, the following recommendations are presented:

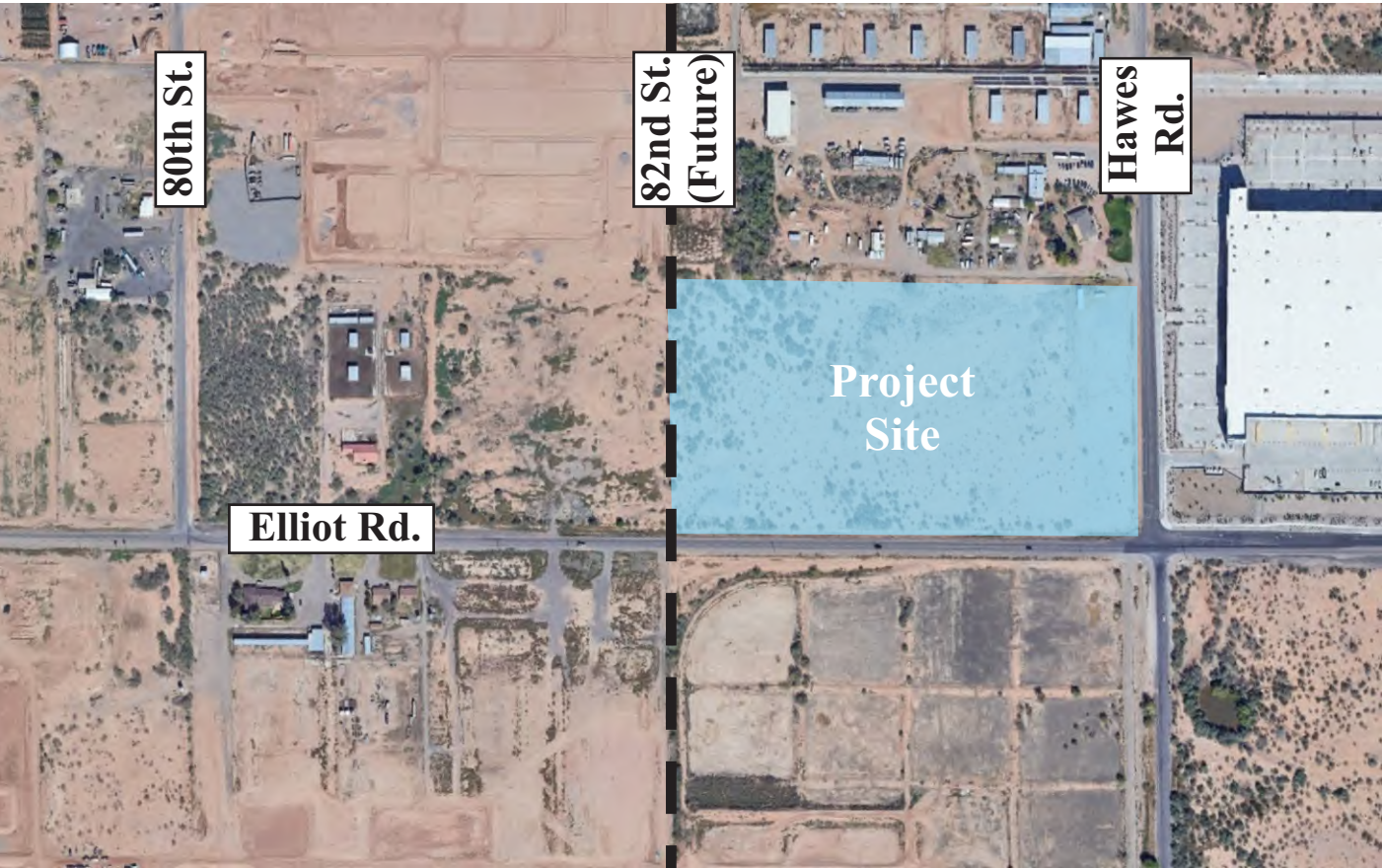
- The 797 parking spaces proposed at the Craftsman on Elliot site will result in a parking surplus of 178 spaces during peak demand. This result does not include additional parking reduction factors such as site-interaction or alternative travel modes. Assuming trip generation and parking generation are similar, the NCHRP spreadsheet tool indicates the proposed mix of site land uses will result in an internal site interaction of 18% during the AM and 43% during peak afternoon conditions. When applying the average of these factors to the shared parking results to estimate midday conditions, parking demand is expected to be less than the 619-space demand that has been estimated and result in a surplus of more than 178 spaces.
- It is recommended the City consider the 797 parking spaces proposed for the Craftsman on Elliot as adequate to accommodate estimated parking demand.

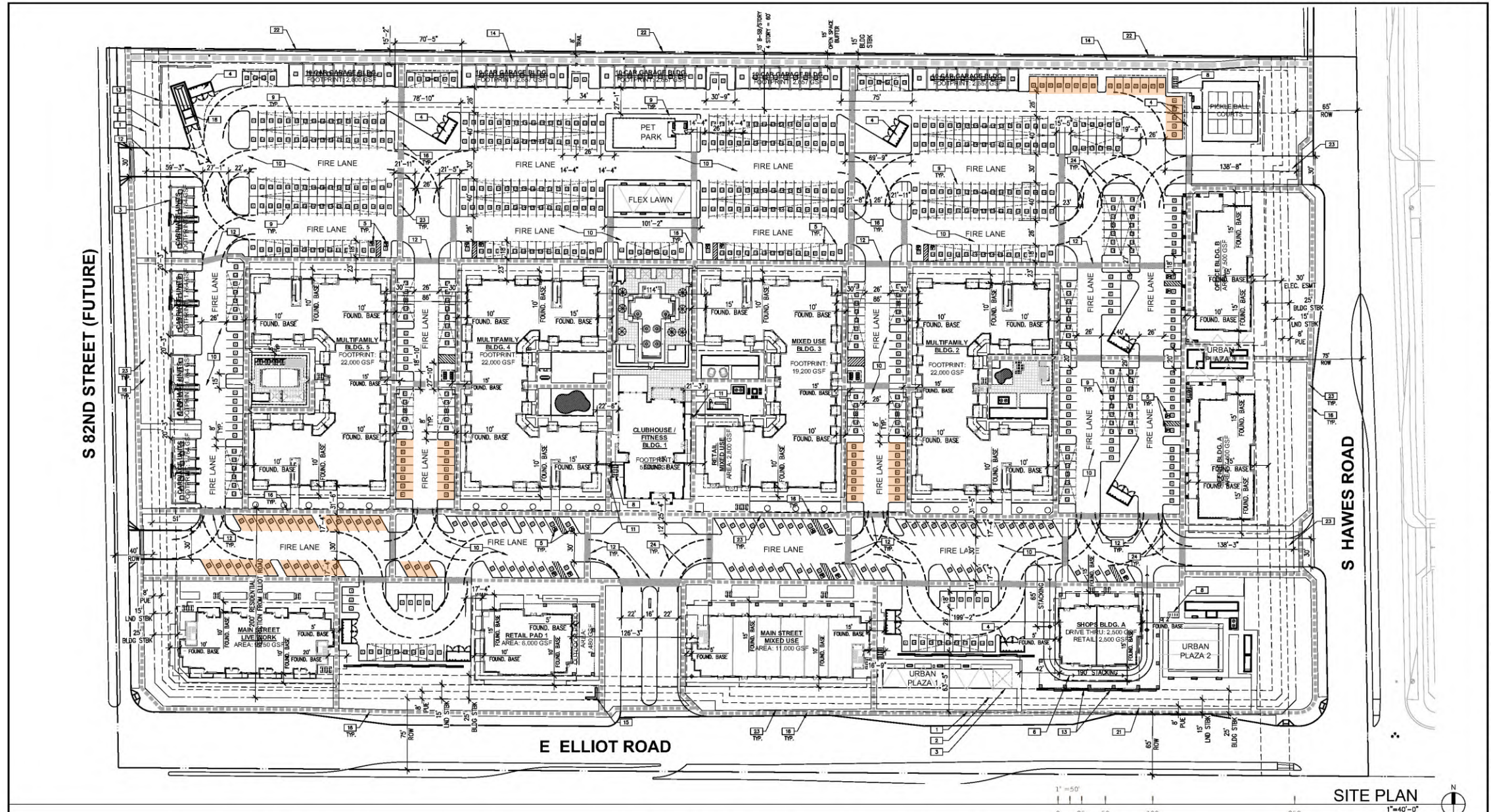
ATTACHMENTS



Project Area

Enlargement Area





SITE PLAN KEYNOTES		TRASH VOLUME CALCULATION		DEVELOPMENT DATA		RESIDENTIAL PROJECT DATA		COMMERCIAL PROJECT DATA	
1	PROPERTY LINE (---)	18	C.O.M. STANDARD CMU TRASH COMPACTOR ENCLOSURE. SEE SITE DETAILS SHEET.	PROJECT DESCRIPTION: THE SCOPE OF THIS PROJECT IS THE MASTER PLANNING OF A MIXED USE DEVELOPMENT THAT INCLUDES A NEW MULTI-STORY MULTIFAMILY APARTMENT BUILDINGS AND 3 COMMERCIAL USE SINGLE STORY BUILDINGS, RUI COVER ONE PHASE.		RESIDENTIAL BUILDING MIXED-USE APARTMENTS (11) x 19,200 SF = 211,200 SF		VALUES ARE APPROXIMATE FOR INITIAL SITE PLANNING PURPOSES COMMERCIAL SITE AREA 285,500 SF (3.55 AC)	
2	LANDSCAPE SETBACK LINE	19	DECORATIVE SECURITY METAL FENCE. SEE LANDSCAPE PLANS FOR FENCE DESIGN.	A.P.N. 304-04-031		APARTMENTS (33) x 22,000 SF = 726,000 SF		BUILDINGS COVERAGE 42,950 SF	
3	25' MAX. BUILDING SETBACK LINE	20	SITE ACCESS DRIVEWAY TO ALIGN WITH ADJACENT PROPERTY.	LOCATION NWC ELLIOT RD. AND S. HAWES RD., MESA, AZ		CARRIAGE HOUSE (1) x 1,800 SF = 1,800 SF		TOTAL BUILDINGS AREA 113,800 SF	
4	C.O.M. STANDARD DOUBLE BIN ENCLOSURE. SEE SITE DETAILS SHEET.	21	PROPOSED FUTURE BUS PAD. OFF-SITE STREET DESIGN SHOWN FOR REFERENCE ONLY.	GROSS SITE AREA 978,367 SF (22.48 ACRES)		MAIN ST LIVE/WORK (1) x 11,000 SF		OPEN SPACE (20%) 57,100 SF	
5	C.O.M. STANDARD ACCESSIBLE PARKING STALL. SEE SITE DETAILS SHEET.	22	8' H SCREENING WALL ALONG NORTH PROPERTY LINE. SEE LANDSCAPE PLANS.	NET SITE AREA 838,760 SF (19.25 ACRES)		TOTAL UNITS 388 DU		BUILDING TYPE 15,200 SF	
6	DRIVE-THRU STACKING PER MZO SECTION 11.31.18(C)	23	PEDESTRIAN CIRCULATION PATH (---) ON 6'-0" WIDE ADA COMPLIANT SIDEWALK, 35' INSIDE RADIUS, 55' OUTSIDE RADIUS	CURRENT ZONING M4(A) (MIXED USE URBAN) COMMERCIAL AND MULTIFAMILY DEVELOPMENT		OFFICE (1) x 10,000 SF		REST - SET DOWN 8,000 SF	
7	RETENTION BASIN. SEE CIVIL PLANS.	24	FIRE TRUCK MANEUVERING CLEARANCE, 35' INSIDE RADIUS, 55' OUTSIDE RADIUS	PROPOSED USE MIXED USE		RESIDENTIAL (COVERED) 400 SF		REST - PATIO 1,000 SF	
8	BIKE RACKS (8 BIKE STALLS PER RACK), TYPICAL.			EXISTING USE VACANT LOT / AGRICULTURE MIXED USE / EMPLOYMENT		TOTAL BUILDINGS AREA 113,800 SF		REST - DRIVE THRU 2,500 SF	
9	PRE-ENGINEERED PARKING SHADE STRUCTURE; TYPICAL. SEE SITE DETAILS SHEET.			LOT USE PERCENTAGES (NET AREAS)		TOTAL UNITS 388 DU		RETAIL 18,300 SF	
10	FIRE LANE, PAINT CURB PER CITY STANDARDS.			RESIDENTIAL 563,280 SF (12.71 AC) = 66%		DENSITY ALLOWED 26 DU / AC		TOTAL COMMERCIAL 41,280 SF	
11	SECURED-ACCESS PEDESTRIAN GATE. SEE LANDSCAPE PLANS.			COMMERCIAL 285,000 SF (3.55 AC) = 34%		DENSITY PROVIDED 17.13 DU/LAC		PARKING 1,075 SF 40	
12	6" WIDE PAVERS FINISH PEDESTRIAN CROSSWALKS AT PAVEMENT, RAISE 3" ABOVE VEHICLE LANE PER MZO SECTION 11-32-4(C)			MAXIMUM SETBACKS PROVIDED: (SIDE(S) REAR(S) SIDE(W) FRONT(S))		BUILDINGS COVERAGE 42,950 SF		OFFICE 1,075 SF 40	
13	DECORATIVE SCREEN WALL. SEE LANDSCAPE PLANS.			BUILDING 25' 25' 25' 25'		BUILDING COVERAGE 21%		REST - SET DOWN 1,075 SF 40	
14	8'-0" STABILIZED D.G. PEDESTRIAN TRAIL PER HAWES CROSSING PAD (---)			LANDSCAPE 15' 15' 15' 15'		TOTAL BUILDINGS AREA 113,800 SF		REST - PATIO 1,000 SF 8	
15	PROPOSED FUTURE MONUMENT SIGN LOCATION.			URBAN-PLAZA AREA: 8,300 SF		PARKING 388 UNITS (1.8 SP/DU) = 698 SP		REST - DRIVE THRU 2,500 SF 25	
16	6" CONCRETE SIDEWALK, TYPICAL.			URBAN-PLAZA #1 8,300 SF		RESIDENTIAL (SURFACE) 84 SP		RETAIL 18,300 SF 80	
17	CITY OF MESA TYPICAL PARKING STALL LAYOUT. SEE SITE DETAILS SHEET.			URBAN-PLAZA #2 13,750 SF		RESIDENTIAL (GARAGE) 74 SP		TOTAL COMMERCIAL 41,280 SF	
				URBAN-PLAZA #3 2,500 SF		RESIDENTIAL (COVERED) 400 SP		DEDICATED RETAIL 104	
				SHARED PARKING 24,500 SF		SHARED (SURFACE) 78 SP		COVERED 42	
				TOTAL SITE AREA 838,760 SF		TOTAL PARKING 851 SP		SHARED 78	
				REQUIRED COVERAGE: 2.2% (PER HAWES CROSSING PAD) 18,378 SF		PARKING RATIO: 851 SP / 388 DU = 1.89 SP/DU		PROVIDED 224	
				AREA PROVIDED (2.2%) = 24,500 SF				PARKING RATIO: 5.3 SP / 1,000 SF	

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THE CRAFTSMAN ON ELLIOT
8264 EAST ELLIOT ROAD
MESA, ARIZONA 85212

OVERALL SITE PLAN

DATE	2/22/2021
SP/DRS	SP/DRS SUBMITTAL #1

PA / PM: C. BRUCE
DRAWN BY: W.M.
JOB NO.: PHX22-0196-00

SHEET
DR050

Craftsman on Elliot - Parking Study

Shared Parking Spaces

Site Layout Plan

North
Not to scale

Figure 2

Land Use: 217 Multifamily Housing— 1 BR (Low-Rise)

Description

Low-rise multifamily housing with one bedroom is a residential building with two or three floors (levels) of residence that consist entirely of 1-bedroom dwelling units. A studio or micro-apartment or condominium is treated as a 1-bedroom dwelling unit for this land use.

For this land use, a studio apartment is defined as a self-contained dwelling unit in which the living room, bedroom, and kitchen are combined into a single room. A micro-apartment is defined as a single-occupant studio apartment with a compact design that typically ranges between approximately 200 and 400 gross square feet.

Various configurations can fit this description, including the following:

- Walkup apartment or multiplex-access to the individual dwelling units is typically internal to the structure and provided through a shared entry, stairway, and hallway
- Mansion apartment-several dwelling units within what appears from the outside to be a single-family dwelling unit
- Stacked townhouse-designed to match the external appearance of a townhouse, but which have dwelling units that share both floors and walls and with access through a central entry and stairway

Land Use Subcategory

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

Time-of-Day Distribution for Parking Demand

The current database for this land use does not have sufficient data to produce a detailed, hour-by-hour distribution of parking demand from which the analyst can determine a peak period of parking demand. Based on the time periods for which data were collected for this land use and on a review of comparable land uses with hour-by-hour parking demand data, the presumed peak period for parking demand for this land use is between late-evening and early-morning.

Additional Data

The average parking supply ratios for the study sites with parking supply information are shown in the table below.

Setting	Proximity to Rail Transit	Parking Supply Per Dwelling Unit
Dense Multi-Use Urban	Within ½ mile of rail transit	0.47 (3 sites)
	Not within ½ mile of rail transit	0.59 (4 sites)
General Urban/Suburban	Within ½ mile of rail transit	1.08 (5 sites)
	Not within ½ mile of rail transit	1.35 (13 sites)

The average peak parking occupancy at the seven sites in a dense multi-use urban setting is 97 percent. The average peak parking occupancy at the 18 sites in a general urban/suburban setting is 70 percent.

The sites were surveyed in the 2000s, the 2010s, and the 2020s in California, Colorado, District of Columbia, Massachusetts, Oregon, and Wisconsin.

Source Numbers

419, 535, 536, 537, 544, 545, 579, 584, 585, 608, 610, 617

Multifamily Housing - 1 BR (Low-Rise) Not Close to Rail Transit (217)

Peak Period Parking Demand vs: Dwelling Units

On a: Weekday (Monday - Friday)

Setting/Location: General Urban/Suburban

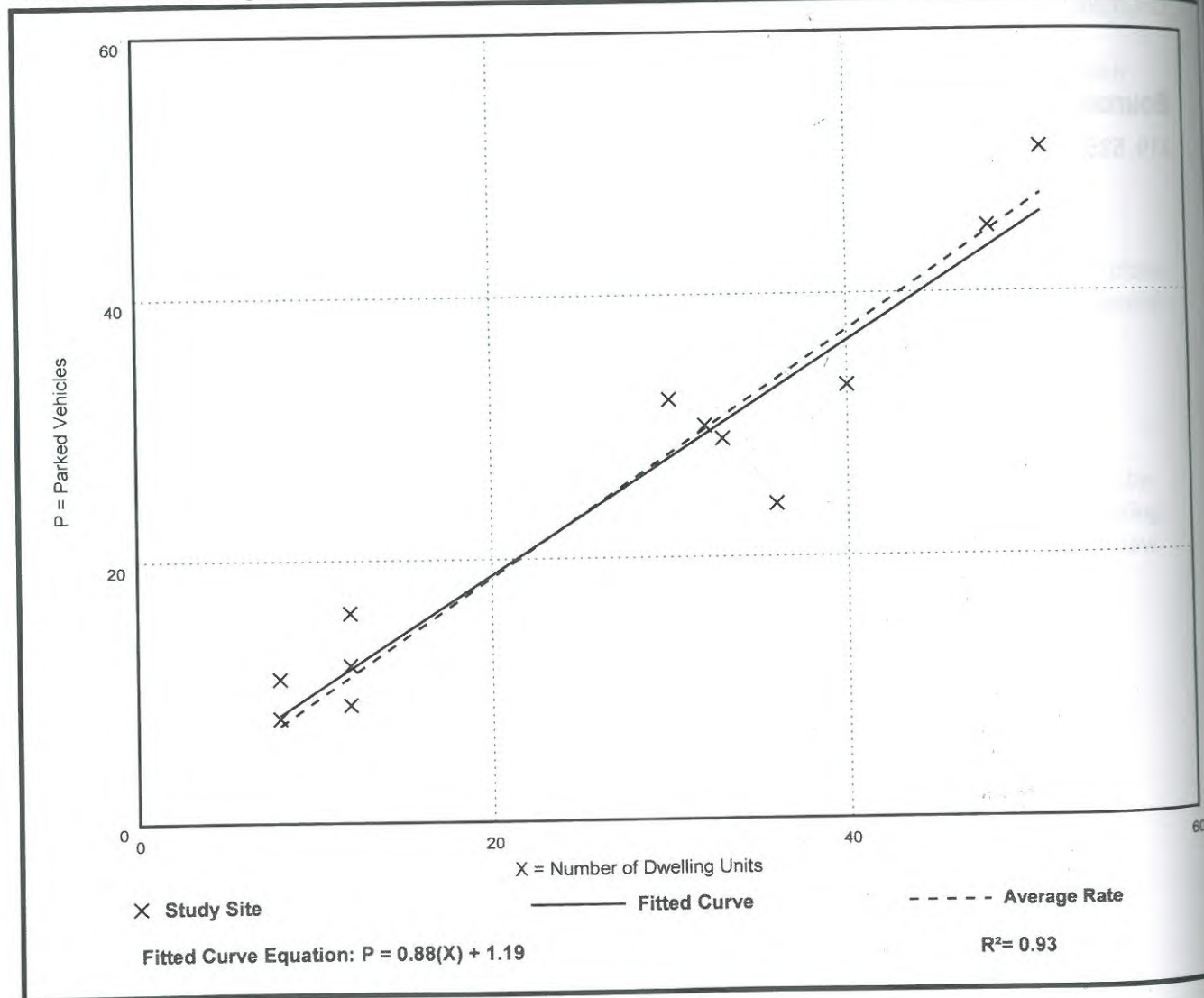
Number of Studies: 14

Avg. Num. of Dwelling Units: 25

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.93	0.67 - 1.38	0.88 / 1.27	***	0.16 (17%)

Data Plot and Equation



Land Use: 220 Multifamily Housing— 2+ BR (Low-Rise)

Description

Low-rise multifamily housing with two-or-more bedrooms is a residential building with two or three floors (levels) of residence that contain at least one dwelling unit with two or more bedrooms.

Various configurations can fit this description, including the following:

- Walkup apartment or multiplex-access to the individual dwelling units is typically internal to the structure and provided through a shared entry, stairway, and hallway
- Mansion apartment-several dwelling units within what appears from the outside to be a single-family dwelling unit
- Stacked townhouse-designed to match the external appearance of a townhouse, but which have dwelling units that share both floors and walls and with access through a central entry and stairway

Land Use Subcategory

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

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Time-of-Day Distribution for Parking Demand

The following table presents a Time-of-Day distribution of parking demand (1) on a weekday (13 study sites) and a Saturday (eight study sites) in a general urban/suburban setting and (2) on a weekday (three study sites) and a Saturday (three study sites) in a dense multi-use urban setting.

Hour Beginning	Percent of Peak Parking Demand			
	General Urban/Suburban		Dense Multi-Use Urban	
	Weekday	Saturday	Weekday	Saturday
12:00-4:00 a.m.	97	92	89	100
5:00 a.m.	100	100	100	92
6:00 a.m.	96	99	97	92
7:00 a.m.	85	97	84	84
8:00 a.m.	67	92	58	76
9:00 a.m.	54	83	55	81
10:00 a.m.	48	79	47	78
11:00 a.m.	45	71	55	86
12:00 p.m.	45	68	55	81
1:00 p.m.	42	65	55	73
2:00 p.m.	42	62	42	70
3:00 p.m.	47	66	45	49
4:00 p.m.	49	66	47	51
5:00 p.m.	56	67	50	46
6:00 p.m.	64	70	68	43
7:00 p.m.	72	78	58	49
8:00 p.m.	77	77	58	59
9:00 p.m.	85	80	61	62
10:00 p.m.	92	82	74	76
11:00 p.m.	95	88	84	86

Additional Data

The average parking supply ratios and average peak parking occupancy for the study sites with parking supply information are shown in the table below.

Setting	Proximity to Rail Transit	Parking Supply Per Dwelling Unit	Average Peak Parking Occupancy
Dense Multi-Use Urban	Within ½ mile of rail transit	1.2 (21 sites)	73%
	Not within ½ mile of rail transit	1.3 (18 sites)	70%
General Urban/Suburban	Within ½ mile of rail transit	1.6 (31 sites)	72%
	Not within ½ mile of rail transit	1.7 (114 sites)	72%

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), Arizona, California, Colorado, District of Columbia, Maine, Maryland, Massachusetts, New Jersey, Ontario (CAN), Oregon, Pennsylvania, Tennessee, Virginia, Washington, and Wisconsin.

Source Numbers

209, 218, 219, 247, 255, 277, 314, 402, 414, 419, 432, 437, 505, 512, 533, 535, 536, 537, 538, 544, 545, 577, 578, 579, 580, 584, 585, 587, 603, 604, 610, 611, 617, 620, 631

Multifamily Housing - 2+ BR (Low-Rise) Not Close to Rail Transit (220)

Peak Period Parking Demand vs: Dwelling Units

On a: Weekday (Monday - Friday)

Setting/Location: General Urban/Suburban

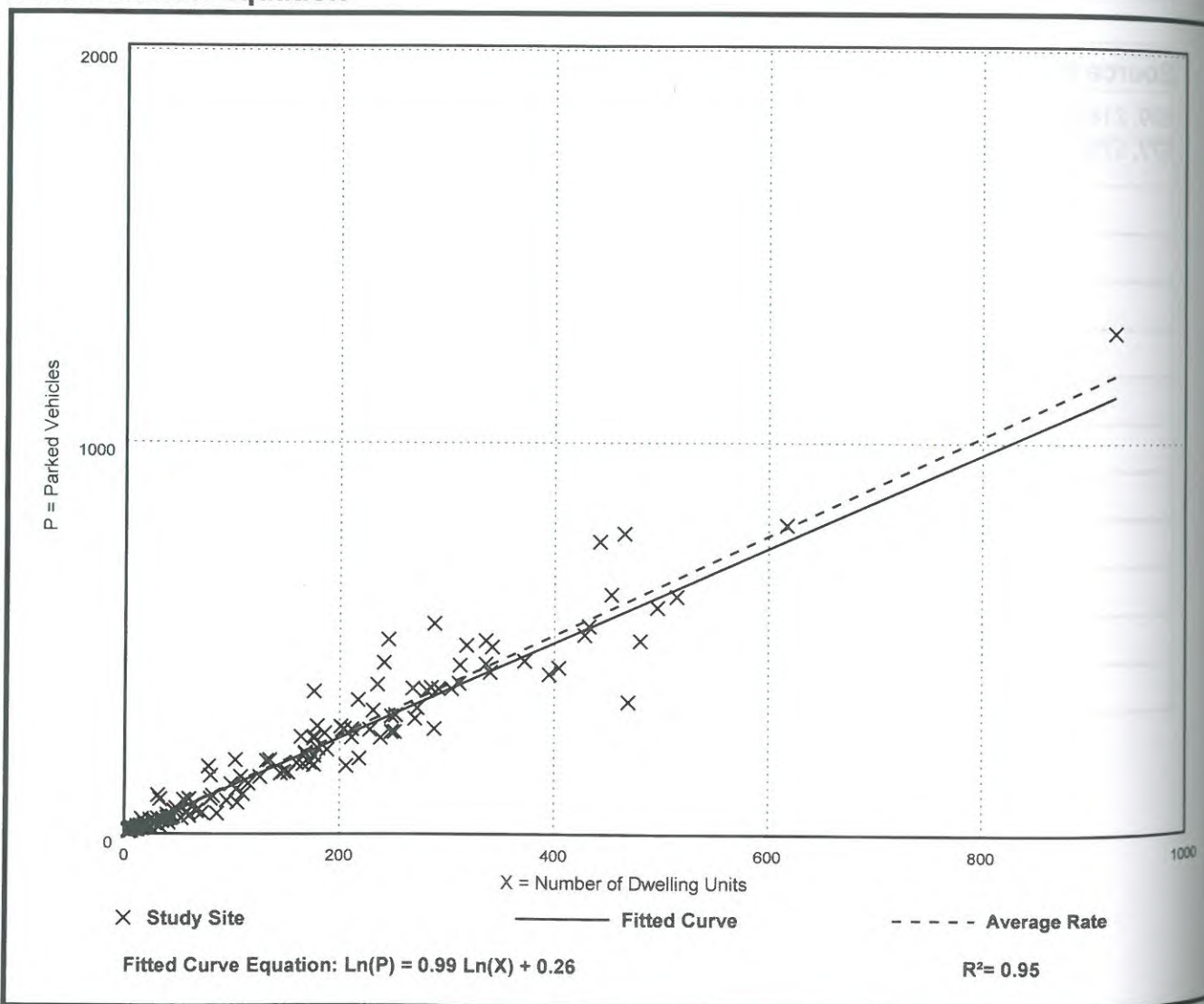
Number of Studies: 143

Avg. Num. of Dwelling Units: 154

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.27	0.58 - 3.16	1.07 / 1.59	1.22 - 1.32	0.29 (23%)

Data Plot and Equation



Multifamily Housing - 2+ BR (Low-Rise) Not Close to Rail Transit (220)

Peak Period Parking Demand vs: Dwelling Units

On a: Saturday

Setting/Location: General Urban/Suburban

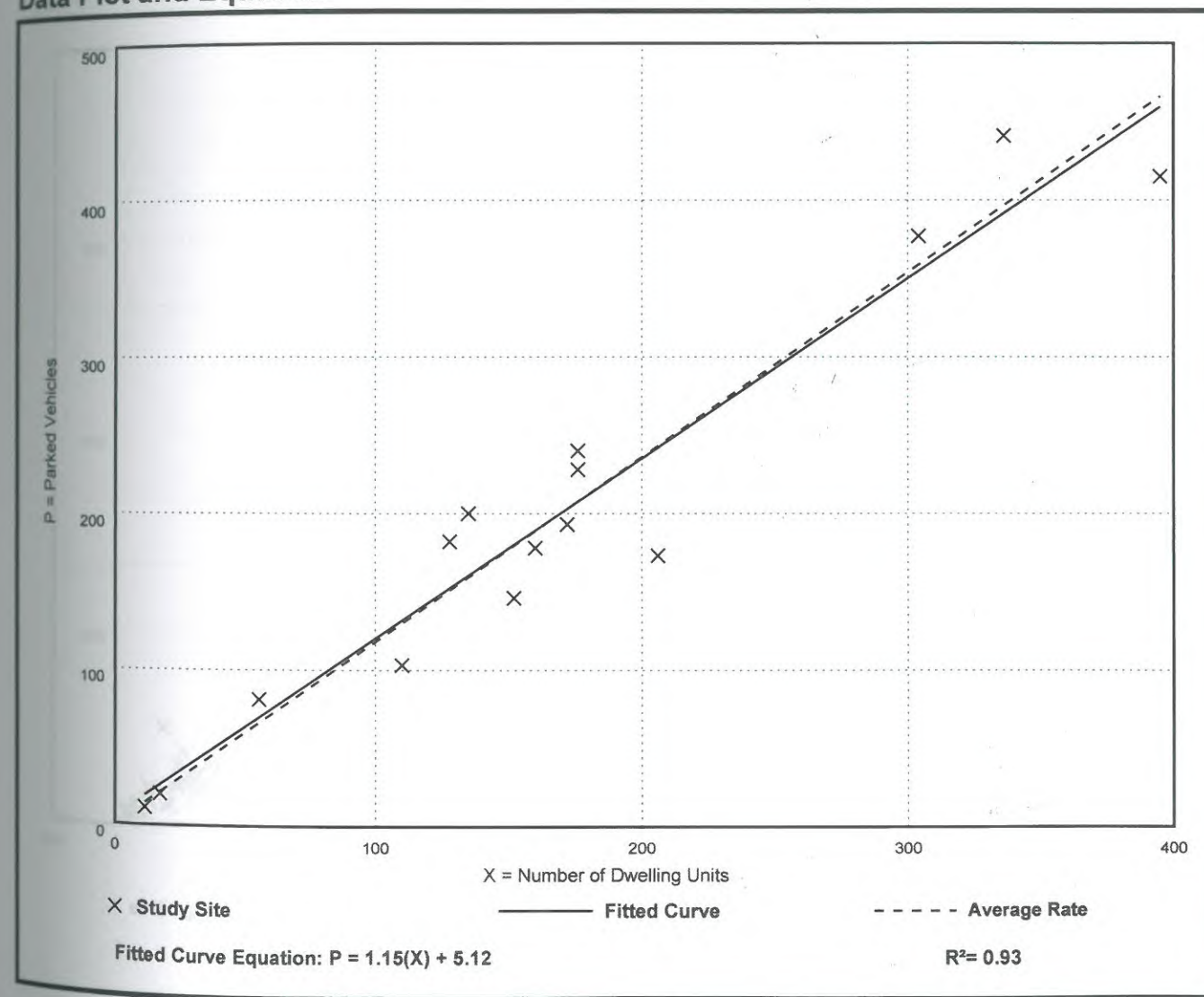
Number of Studies: 15

Avg. Num. of Dwelling Units: 169

Peak Period Parking Demand per Dwelling Unit

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.18	0.84 - 1.48	1.07 / 1.44	***	0.19 (16%)

Data Plot and Equation



General Office Building (710)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA

On a: Weekday (Monday - Friday)

Setting/Location: General Urban/Suburban

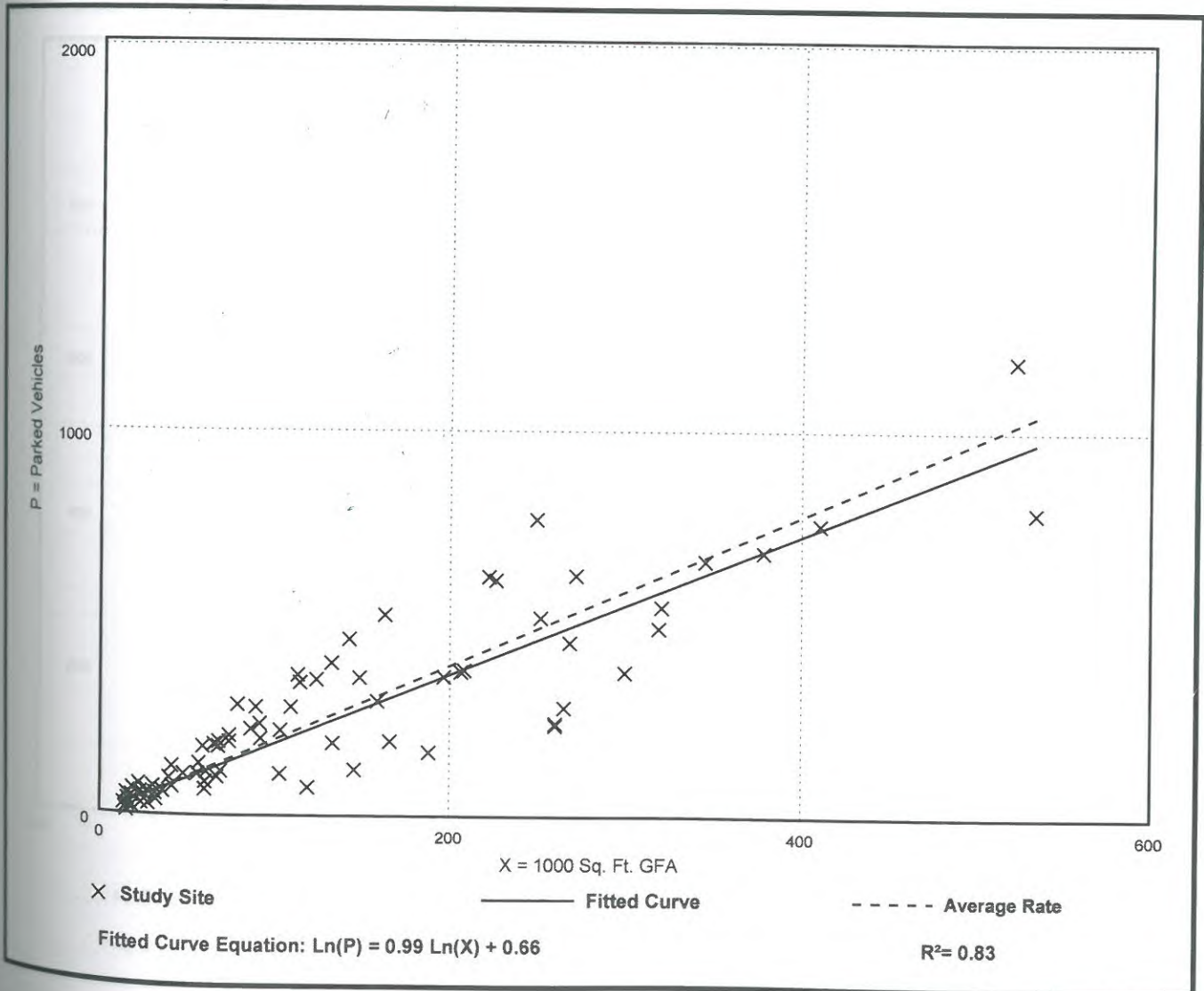
Number of Studies: 77

Avg. 1000 Sq. Ft. GFA: 131

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
1.95	0.50 - 3.60	1.68 / 2.98	1.79 - 2.11	0.70 (36%)

Data Plot and Equation



Land Use: 932 High-Turnover (Sit-Down) Restaurant

Description

A high-turnover (sit-down) restaurant is full-service eating establishment with a typical duration of stay of 60 minutes or less. This type of restaurant is usually moderately priced, frequently belongs to a restaurant chain, and is commonly referred to as casual dining. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours a day. These restaurants typically do not accept reservations. A patron commonly waits to be seated, is served by wait staff, orders from a menu, and pays after the meal. Some facilities offer carry-out for a small proportion of their customers. Some facilities within this land use may also contain a bar area for serving food and alcoholic drinks.

Land Use Subcategory

Data are separated into two subcategories for this land use:

- Restaurants that serve breakfast
- Restaurants that do not serve breakfast

The "serves breakfast" subcategory includes restaurants that serve customers during breakfast, lunch, and dinner; during breakfast and lunch; and during breakfast only. The "does not serve breakfast" subcategory includes restaurants that serve customers during lunch and dinner, during dinner only, and during lunch only.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday (Monday–Thursday) at restaurants that serve breakfast, lunch, and dinner (10 study sites) and at restaurants that serve only lunch and dinner (25 sites). The following table also presents a time-of-day distribution of parking demand on a Saturday at restaurants that serve breakfast, lunch, and dinner (nine study sites) and at restaurants that serve only lunch and dinner (six sites).

Hour Beginning	Percent of Monday–Thursday Peak Parking Demand		Percent of Saturday Peak Parking Demand	
	Serving Breakfast, Lunch, and Dinner	Serving Lunch and Dinner	Serving Breakfast, Lunch, and Dinner	Serving Lunch and Dinner
12:00–4:00 a.m.	–	–	–	–
5:00 a.m.	–	–	–	–
6:00 a.m.	–	–	–	–
7:00 a.m.	–	–	–	–
8:00 a.m.	64	–	55	–
9:00 a.m.	74	–	76	–
10:00 a.m.	82	–	91	–
11:00 a.m.	89	28	100	33
12:00 p.m.	100	96	97	56
1:00 p.m.	86	100	91	69
2:00 p.m.	57	51	73	58
3:00 p.m.	44	37	51	49
4:00 p.m.	39	34	43	63
5:00 p.m.	62	56	57	77
6:00 p.m.	73	87	66	100
7:00 p.m.	95	91	80	100
8:00 p.m.	76	73	62	85
9:00 p.m.	–	–	–	55
10:00 p.m.	–	–	–	35
11:00 p.m.	–	–	–	–

High-Turnover (Sit Down) Restaurant Does Not Serve Breakfast (932)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA

On a: Weekday (Monday - Thursday)

Setting/Location: General Urban/Suburban

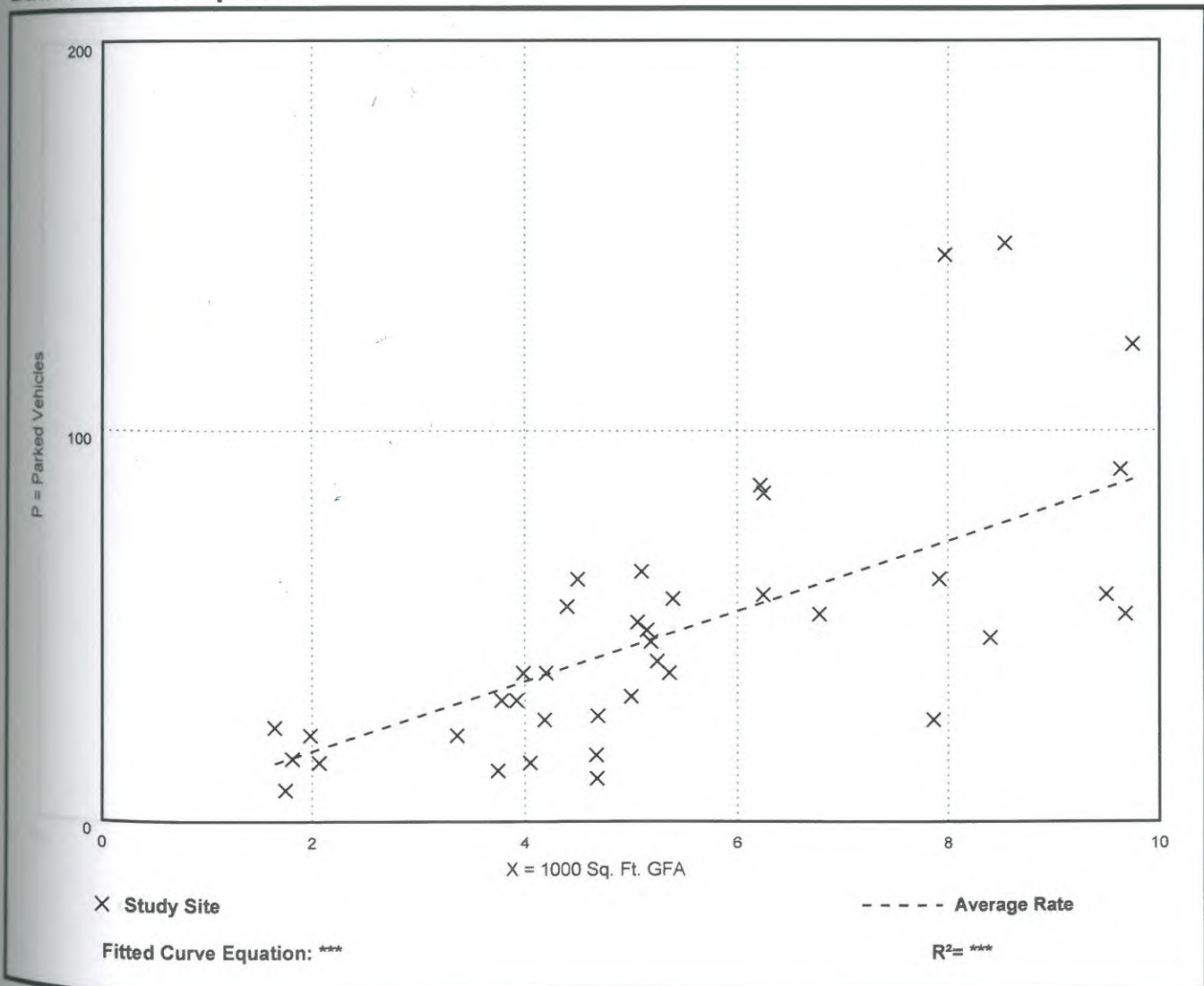
Number of Studies: 39

Avg. 1000 Sq. Ft. GFA: 5.4

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
8.97	2.35 - 18.20	6.66 / 13.44	7.71 - 10.23	4.03 (45%)

Data Plot and Equation



High-Turnover (Sit Down) Restaurant Serves Breakfast (932)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA

On a: Weekday (Monday - Thursday)

Setting/Location: General Urban/Suburban

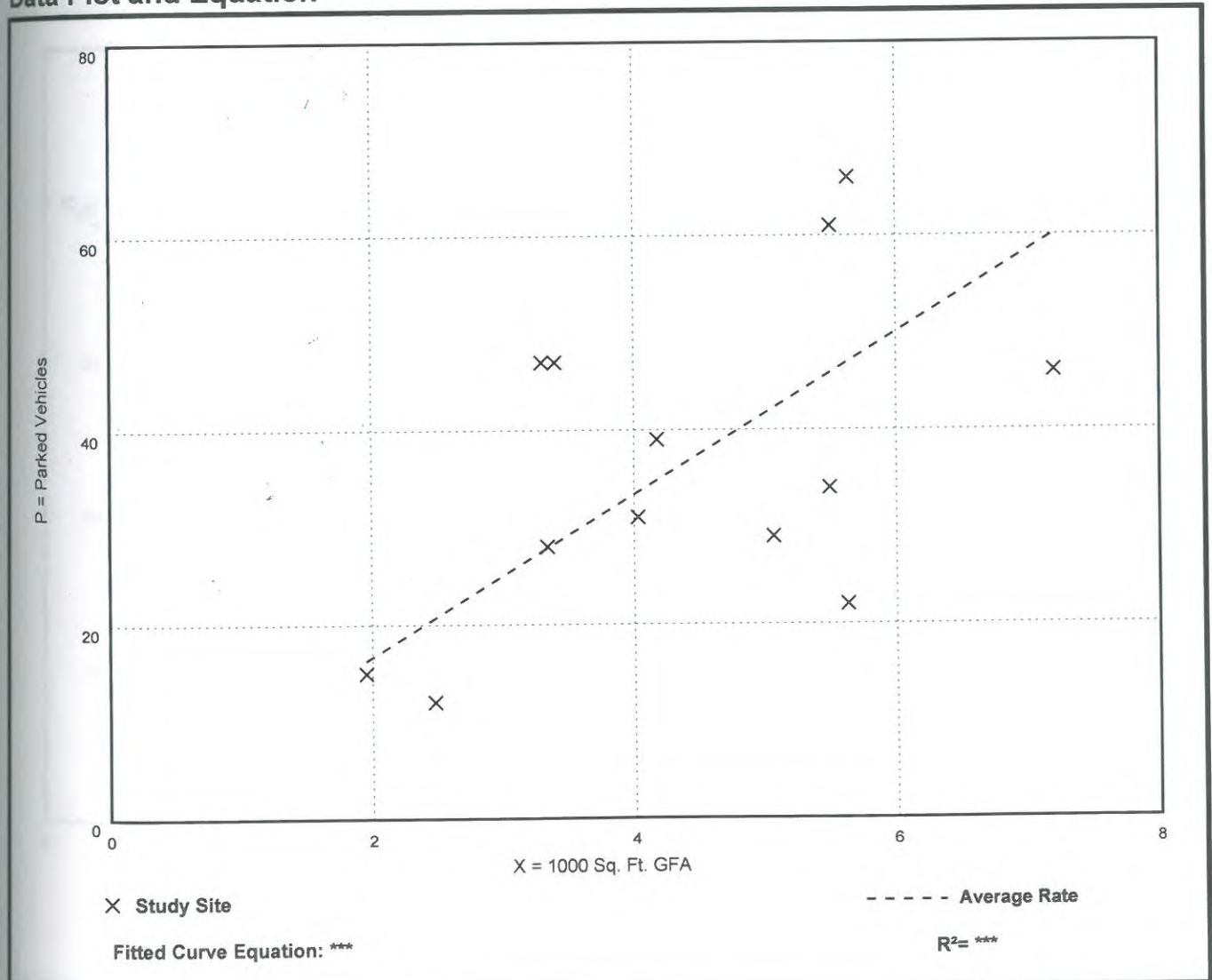
Number of Studies: 13

Avg. 1000 Sq. Ft. GFA: 4.4

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
8.34	3.91 - 14.24	6.31 / 13.61	***	3.25 (39%)

Data Plot and Equation



Land Use: 934 Fast-Food Restaurant with Drive-Through Window

Description

This land use includes any fast-food restaurant with a drive-through window. This type of restaurant is characterized by a large drive-through and large carry-out clientele, long hours of service (some are open for breakfast, all are open for lunch and dinner, some are open late at night or 24 hours a day), and high turnover rates for eat-in customers. The restaurant does not provide table service. A patron generally orders from a menu board and pays before receiving the meal. A typical duration of stay for an eat-in patron is less than 30 minutes.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a Monday-through-Thursday weekday (one study site), a Saturday (two study sites), and a Sunday (one study site) in a general urban/suburban setting.

Hour Beginning	Percent of Peak Parking Demand		
	Monday through Thursday	Saturday	Sunday
12:00–4:00 a.m.	–	–	–
5:00 a.m.	–	–	–
6:00 a.m.	–	–	–
7:00 a.m.	–	–	–
8:00 a.m.	–	–	–
9:00 a.m.	–	–	–
10:00 a.m.	20	–	–
11:00 a.m.	40	50	34
12:00 p.m.	100	84	57
1:00 p.m.	93	100	100
2:00 p.m.	80	94	71
3:00 p.m.	53	64	48
4:00 p.m.	33	64	55
5:00 p.m.	40	59	64
6:00 p.m.	37	100	55
7:00 p.m.	20	72	57
8:00 p.m.	33	72	57
9:00 p.m.	20	61	66
10:00 p.m.	–	–	–
11:00 p.m.	–	–	–

Fast Food Restaurant with Drive-Through Window (934)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA

On a: Weekday (Monday - Thursday)

Setting/Location: General Urban/Suburban

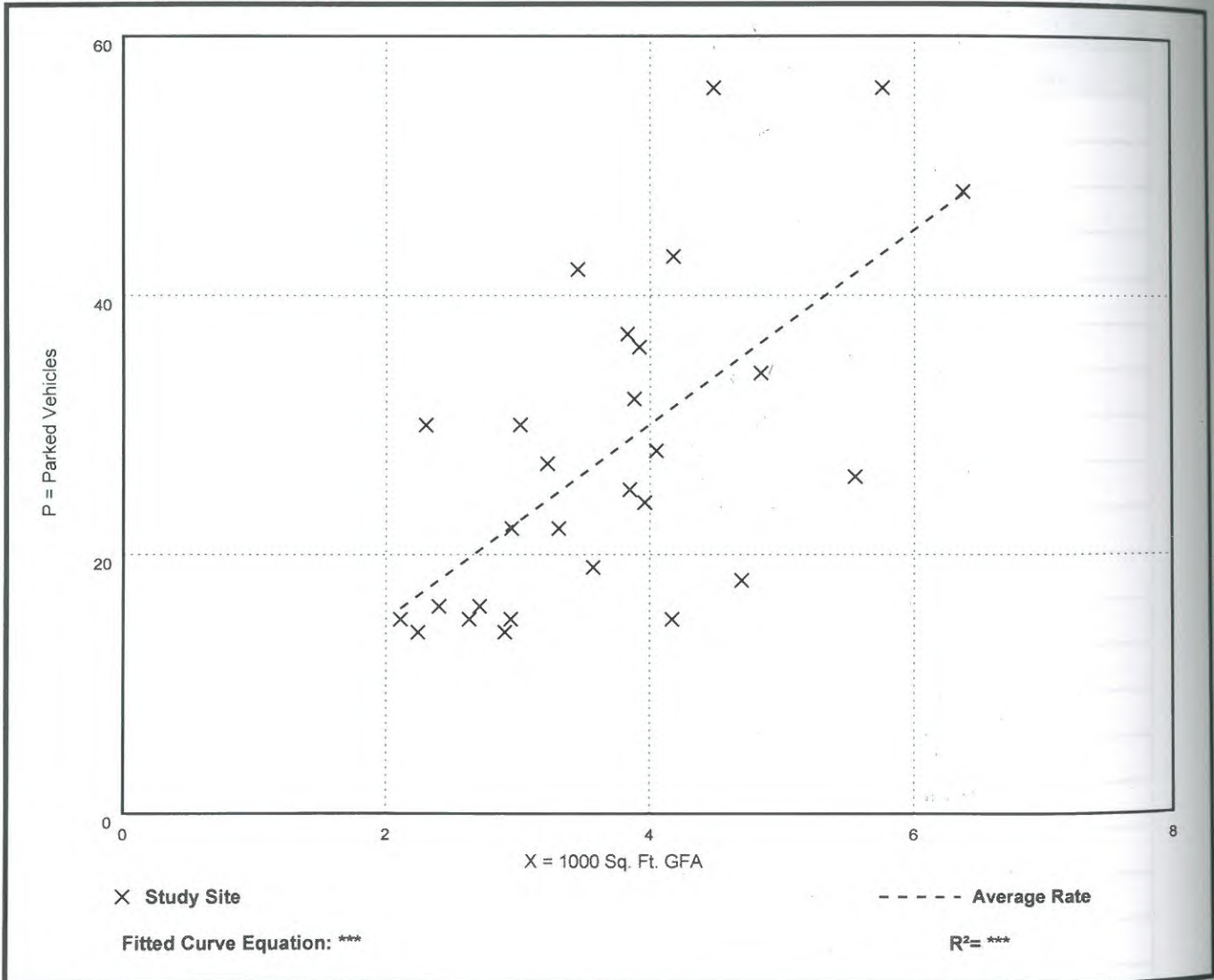
Number of Studies: 28

Avg. 1000 Sq. Ft. GFA: 3.7

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
7.51	3.60 - 13.04	6.17 / 10.17	6.58 - 8.44	2.52 (34%)

Data Plot and Equation



Land Use: 822 Strip Retail Plaza (<40k)

Description

A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). Because a strip retail plaza is open-air, the GLA is the same as the gross floor area (GFA) of the building.

The 40,000 square feet GLA threshold between shopping plaza and strip retail plaza (Land Use 822) is based on an examination of the parking demand database. All shopping plazas with a supermarket as their anchor in the database are larger than 40,000 square feet GLA.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a Monday–Thursday (five study sites), a Friday (two study sites), and a Saturday (four study sites).

Hour Beginning	Percent of Peak Parking Demand		
	Monday–Thursday	Friday	Saturday
12:00–4:00 a.m.	–	–	–
5:00 a.m.	–	–	–
6:00 a.m.	–	–	–
7:00 a.m.	–	–	–
8:00 a.m.	19	19	–
9:00 a.m.	33	40	38
10:00 a.m.	47	44	55
11:00 a.m.	55	52	66
12:00 p.m.	89	96	85
1:00 p.m.	100	96	100
2:00 p.m.	73	84	96
3:00 p.m.	73	52	79
4:00 p.m.	66	50	66
5:00 p.m.	70	63	64
6:00 p.m.	75	49	67
7:00 p.m.	70	100	70
8:00 p.m.	54	94	70
9:00 p.m.	48	73	51
10:00 p.m.	–	–	–
11:00 p.m.	–	–	–

Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Weekday (Monday - Thursday)

Setting/Location: General Urban/Suburban

Number of Studies: 14

Avg. 1000 Sq. Ft. GLA: 18

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.79	1.44 - 6.67	2.07 / 4.44	***	1.14 (41%)

Data Plot and Equation

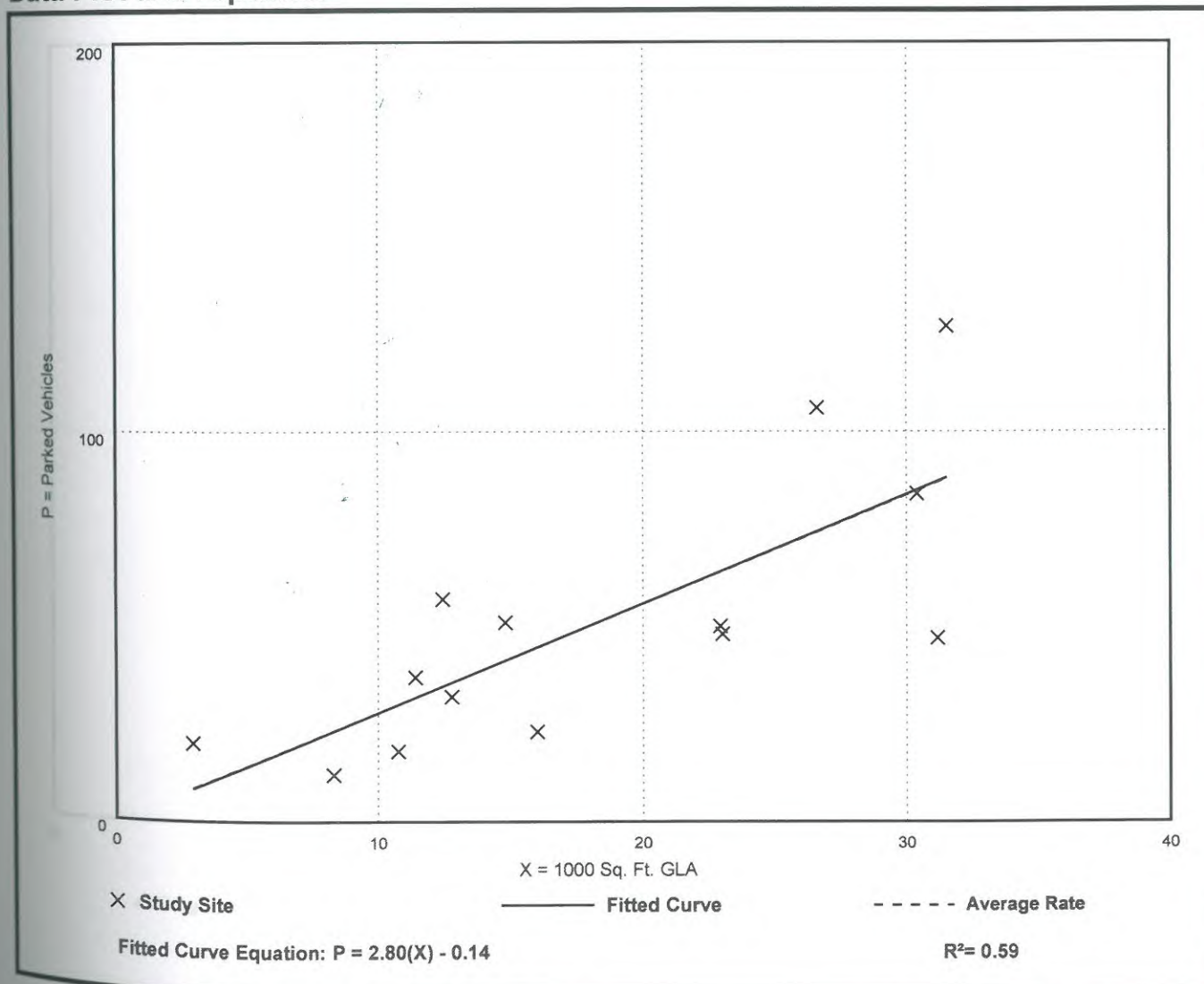


FIGURE 2-2 Base Parking Ratios

Land use	Weekday (parking spaces/unit land use)		Weekend (parking spaces/unit land use)		Peak ratio	Units	Source
	Visitors	Employees	Visitors	Employees			
Retail <400,000 sq ft	2.90	0.70	3.20	0.80	4.00	ksf GLA	1
Retail 400,000–600,000 sq ft	sliding scale between <400,000 and 600,000				scaled 4.00 to 4.50	ksf GLA	1
Retail 600,000–1 million sq ft	3.20	0.80	3.60	0.90	4.50	ksf GLA	1
Retail 1 million–2 million sq ft	sliding scale between 1 million and 2 million sq ft				scaled 4.00 to 4.50	ksf GLA	2
Retail >2 million sq ft	2.90	0.70	3.20	0.80	4.00	ksf GLA	2
Supermarket/grocery	4.00	0.75	4.00	0.75	4.75	ksf GLA	2,3
Pharmacy	3.00	0.40	3.00	0.40	3.40	ksf GLA	3
Discount stores/superstores	3.40	0.85	3.80	0.95	4.75	ksf GLA	3
Home improvement stores/garden	3.10	0.80	3.45	0.90	4.35	ksf GLA	2
Fine/casual dining	13.25	2.25	15.25	2.50	17.75	ksf GLA	2,3
Family restaurant	15.25	2.15	15.00	2.10	17.10	ksf GLA	2,3
Fast casual/fast food	12.40	2.00	12.70	2.00	14.70	ksf GLA	3
Bar/lounge/nightclub	15.25	1.25	17.50	1.50	19.00	ksf GLA	2
Family entertainment	1.80	0.20	2.50	0.25	2.75	ksf GLA	2
Active entertainment	1.50	0.15	1.80	0.20	2.00	ksf GLA	2
Amusement park/water park	3.00	0.30	3.70	0.37	4.07	ksf GLA	2
Adult active entertainment	9.00	1.00	10.00	1.20	11.20	ksf GLA	2
Cineplex	0.15	0.01	0.24	0.01	0.25	seat	2,3
Specialty movie theater	0.18	0.02	0.29	0.01	0.30	seat	2,3
Live theater	0.30	0.07	0.33	0.07	0.40	seat	2,3
Outdoor amphitheater	0.30	0.07	0.33	0.07	0.40	seat	2
Public park/destination open space	4.00	0.40	5.00	0.50	5.50	acre	2
Museum/aquarium	4.00	0.40	4.50	0.50	5.00	ksf GLA	2
Public library	2.00	0.25	1.90	2.00	3.90	ksf GLA	2
Health club	6.60	0.40	5.50	0.25	7.00	ksf GLA	2,3
Daycare center	1.50	2.00			3.50	ksf GFA	2,3
Convention center	5.50	0.50	5.50	0.50	6.00	ksf GFA	2

(continued on next page)

FIGURE 2-2 (continued)

Land use	Weekday (parking spaces/unit land use)		Weekend (parking spaces/unit land use)		Peak ratio	Units	Source
	Visitors	Employees	Visitors	Employees			
Hotel-business	1.00	0.15	1.00	0.15	1.15	key	2,3
Hotel-leisure	1.00	0.15	1.00	0.15	1.15	key	2,3
Restaurant/lounge	6.67	1.20	7.67	1.33	9.00	ksf GLA	2,3
Meeting/banquet (0-20 sq ft/key)	scaled from 0 to 30	scaled from 0 to 2.0	scaled from 0 to 20	scaled from 0 to 2.0	scaled from 0 to 32	ksf GLA	2,3
Meeting/banquet (20-50 sq ft/key)	scaled from 30 to 20	scaled from 2 to 1.5	scaled from 20 to 10	scaled from 2 to 1.5	scaled from 32 to 21.5	ksf GLA	2,3
Meeting/banquet (50-100 sq ft/key)	scaled from 20 to 10	scaled from 1.5 to 1.0	scaled from 10 to 5.5	scaled from 1.5 to 1.0	scaled from 21.5 to 11.1	ksf GLA	2,3
Convention (100-200 sq ft/key)	scaled from 10 to 5.5	scaled from 1 to 0.5	5.50	scaled from 1 to 0.5	scaled from 11.1 to 6	ksf GLA	2,3
Convention (>200 sq ft/key)	use convention center but adjust for captive on site						2,3
Residential							
Studio efficiency	0.10	0.85	0.15	0.85	1.00	unit	2,3
1 bedroom	0.10	0.90	0.15	0.90	1.05	unit	2,3
2 bedrooms	0.10	1.65	0.15	1.65	1.80	unit	2,3
3+ bedrooms	0.10	2.50	0.15	2.50	2.65	unit	2,3
Senior housing	0.55	0.30	0.42	0.30	0.85	unit	2,3
Office <25,000 sq ft	0.30	3.50	0.03	0.35	3.80	ksf GFA	3
Office 25,000-100,000 sq ft	sliding scale between <25,000 and 100,000				scaled from 3.8 to 3.4	ksf GFA	3
Office = 100,000 sq ft	0.25	3.15	0.03	0.32	3.40	ksf GFA	3
Office 100,000-500,000 sq ft	sliding scale between 100,000 and 200,000				scaled from 3.4 to 2.8	ksf GFA	3
Office >500,000 sq ft	0.20	2.60	0.02	0.26	2.80	ksf GFA	3
Open plan/ high-density office	0.25	5.75	0.03	0.58	6.00	ksf GFA	2
Medical/dental office	3.00	1.60	0.00	0.00	4.60	ksf GFA	2,3
Bank (drive-in branch)	3.50	2.50	3.00	1.75	6.00	ksft GFA	2,3
Arena	0.27	0.03	0.30	0.03	0.33	seat	2
Pro football stadium	0.30	0.01	0.30	0.01	0.31	seat	2
Pro baseball stadium	0.31	0.01	0.34	0.01	0.35	seat	2

Sources:

1. *Parking Requirements for Shopping Centers*, 2nd ed. (Washington, DC: ULI, 1999).
2. Developed by Team Members from a combination of sources.
3. *Parking Generation*, 5th ed. (Washington, DC: Institute of Transportation Engineers, 2019).

Note: New land uses and changes to second edition titles shown in **bold**. Changes or new ratios are highlighted in blue.

FIGURE 2-4 Weekday Time-of-Day Adjustments

Land use		6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.	12 a.m.
Retail typical	Visitors	1%	5%	15%	35%	60%	75%	100%	100%	95%	85%	85%	85%	90%	80%	65%	45%	15%	5%	0%
December	Visitors	1%	5%	15%	30%	55%	75%	90%	100%	100%	95%	80%	85%	90%	90%	85%	50%	30%	10%	0%
Late December	Visitors	1%	5%	10%	20%	40%	65%	90%	100%	100%	100%	95%	85%	70%	55%	40%	25%	15%	5%	0%
All	Employees	10%	15%	25%	45%	75%	95%	100%	100%	100%	100%	100%	100%	100%	100%	90%	60%	40%	20%	0%
Supermarket/ grocery	Visitors	5%	20%	30%	50%	60%	67%	85%	90%	95%	97%	100%	100%	100%	85%	55%	35%	20%	5%	5%
	Employees	20%	30%	40%	80%	90%	100%	100%	100%	100%	100%	100%	100%	80%	50%	35%	20%	20%	20%	20%
Pharmacy	Visitors	5%	20%	30%	60%	60%	67%	85%	90%	95%	97%	100%	100%	100%	85%	55%	35%	20%	5%	5%
	Employees	20%	30%	40%	80%	90%	100%	100%	100%	100%	100%	100%	100%	80%	50%	35%	20%	20%	20%	20%
Discount stores/ superstores	Visitors	15%	35%	45%	65%	75%	85%	100%	100%	100%	100%	95%	85%	75%	60%	45%	30%	10%	5%	1%
	Employees	25%	45%	55%	75%	85%	100%	100%	100%	100%	100%	100%	95%	85%	70%	55%	40%	20%	20%	20%
Home improvement stores/garden	Visitors	15%	20%	35%	55%	85%	99%	100%	99%	98%	90%	85%	80%	75%	60%	50%	30%	10%	0%	0%
	Employees	25%	30%	45%	65%	95%	100%	100%	100%	100%	100%	95%	90%	85%	70%	60%	40%	20%	0%	0%
Food and beverage																				
Fine/casual dining	Visitors	0%	0%	0%	0%	15%	40%	75%	75%	65%	40%	50%	75%	95%	100%	100%	100%	95%	75%	25%
	Employees	0%	20%	50%	75%	90%	90%	90%	90%	90%	75%	75%	100%	100%	100%	100%	100%	100%	85%	35%
Family restaurant	Visitors	25%	50%	60%	75%	85%	90%	100%	90%	50%	45%	45%	75%	80%	80%	80%	60%	55%	75%	25%
	Employees	50%	75%	90%	90%	100%	100%	100%	100%	100%	75%	75%	95%	95%	95%	95%	80%	65%	65%	35%
Fast casual/ fast food/food court/food halls	Visitors	5%	10%	20%	30%	55%	85%	100%	100%	90%	60%	55%	60%	85%	80%	50%	30%	20%	10%	5%
	Employees	20%	20%	30%	40%	75%	100%	100%	100%	95%	70%	60%	70%	90%	90%	60%	40%	30%	20%	20%
Bar/lounge/ nightclub	Visitors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	50%	75%	100%	100%	75%	50%
	Employees	0%	0%	0%	5%	5%	5%	5%	10%	10%	10%	20%	45%	70%	100%	100%	100%	100%	90%	60%
Entertainment																				
Family entertainment	Visitors	0%	0%	0%	0%	45%	65%	85%	95%	100%	95%	90%	70%	60%	45%	0%	0%	0%	0%	0%
	Employees	0%	0%	5%	25%	75%	100%	100%	100%	100%	100%	100%	80%	70%	55%	10%	5%	5%	5%	5%
Active entertainment	Visitors	0%	0%	0%	0%	25%	65%	85%	90%	95%	95%	90%	95%	100%	95%	90%	65%	10%	0%	0%
	Employees	5%	5%	5%	25%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	10%	5%	5%
Adult active entertainment	Visitors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	50%	75%	100%	100%	100%	100%
	Employees	0%	0%	0%	5%	5%	5%	5%	10%	10%	10%	20%	45%	70%	100%	100%	100%	100%	100%	100%
All movies typical	Visitors	0%	0%	0%	0%	0%	0%	20%	45%	55%	55%	55%	60%	60%	80%	100%	100%	80%	65%	40%
Late December	Visitors	0%	0%	0%	0%	0%	0%	35%	60%	75%	80%	80%	80%	70%	80%	100%	100%	85%	70%	55%
All	Employees	0%	0%	0%	0%	0%	10%	50%	60%	60%	75%	75%	100%	100%	100%	100%	100%	100%	70%	50%
Live theater	Visitors	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	25%	100%	100%	0%	0%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	30%	30%	30%	30%	30%	100%	100%	100%	100%	30%	10%	5%
Outdoor amphitheater	Visitors	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	25%	100%	100%	0%	0%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	30%	30%	30%	30%	30%	100%	100%	100%	100%	30%	10%	5%
Public park/ destination open space	Visitors	1%	5%	10%	25%	50%	65%	85%	95%	100%	95%	90%	70%	90%	100%	100%	100%	80%	50%	10%
	Employees	5%	10%	25%	50%	75%	100%	100%	100%	100%	100%	100%	80%	100%	100%	100%	100%	100%	60%	20%
Museum/ aquarium	Visitors	0%	0%	0%	0%	45%	65%	85%	95%	100%	95%	90%	85%	60%	30%	10%	0%	0%	0%	0%
	Employees	5%	5%	5%	25%	75%	100%	100%	100%	100%	100%	100%	80%	75%	10%	5%	0%	0%	5%	5%
Arena	Visitors	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%	10%	25%	100%	100%	85%	0%	0%
No matinee	Employees	0%	10%	10%	20%	20%	20%	30%	30%	30%	30%	30%	30%	100%	100%	100%	100%	30%	10%	5%

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FIGURE 2-4 (continued)

Land use		6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.	12 a.m.
Entertainment (continued)																				
Pro football stadium 8 p.m. start	Visitors	0%	0%	0%	1%	1%	1%	5%	5%	5%	5%	5%	5%	10%	50%	100%	100%	85%	25%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	30%	30%	30%	30%	30%	100%	100%	100%	100%	100%	25%	10%
Pro baseball stadium	Visitors	0%	0%	0%	1%	1%	1%	5%	5%	5%	5%	5%	5%	10%	50%	100%	100%	85%	25%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	30%	30%	30%	30%	30%	100%	100%	100%	100%	100%	25%	10%
Health club	Visitors	70%	40%	40%	70%	70%	80%	60%	70%	70%	70%	80%	90%	100%	90%	80%	70%	35%	10%	0%
	Employees	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	100%	100%	75%	50%	20%	20%	20%	0%
Public library	Visitors	0%	0%	0%	100%	100%	98%	98%	78%	72%	65%	70%	79%	60%	50%	40%	0%	0%	0%	0%
	Employees	0%	10%	50%	100%	100%	100%	100%	100%	100%	100%	100%	90%	75%	50%	20%	10%	0%	0%	0%
Daycare center	Visitors	0%	2%	25%	75%	20%	20%	20%	20%	20%	100%	50%	20%	5%	0%	0%	0%	0%	0%	0%
	Employees	0%	50%	75%	90%	90%	90%	90%	90%	90%	100%	100%	100%	60%	40%	10%	0%	0%	0%	0%
Convention center	Visitors	0%	0%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	30%	30%	10%	0%	0%	0%
	Employees	5%	30%	33%	33%	100%	100%	100%	100%	100%	100%	90%	70%	40%	25%	20%	20%	5%	0%	0%
Hotel and residential																				
Hotel-business	Visitors	95%	90%	80%	70%	60%	60%	55%	55%	60%	60%	65%	70%	75%	75%	80%	85%	95%	100%	100%
Hotel-leisure	Visitors	95%	95%	90%	80%	70%	70%	65%	65%	70%	70%	75%	80%	85%	85%	90%	95%	95%	100%	100%
Employee	Employees	10%	30%	100%	100%	100%	100%	100%	100%	100%	100%	70%	70%	40%	20%	20%	20%	20%	10%	5%
Restaurant/ lounge	Visitors	0%	10%	30%	10%	10%	5%	100%	100%	33%	10%	10%	30%	55%	60%	70%	67%	60%	40%	30%
Meeting/banquet (<100 sq ft/key)	Visitors	0%	0%	30%	60%	60%	60%	65%	65%	65%	65%	65%	100%	100%	100%	100%	100%	50%	0%	0%
Convention (>100 sq ft/key)	Visitors	0%	0%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	30%	30%	10%	0%	0%	0%
Employee	Employees	10%	10%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	40%	40%	20%	0%	0%	0%
Residential guest	Visitors	0%	10%	20%	20%	20%	20%	20%	20%	20%	20%	20%	40%	60%	100%	100%	100%	100%	80%	50%
Resident reserved	Residents	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Residential suburban	Residents	95%	80%	67%	55%	50%	45%	40%	40%	40%	40%	45%	50%	60%	70%	80%	85%	95%	97%	100%
Residential urban	Residents	95%	85%	75%	65%	60%	55%	50%	50%	50%	55%	60%	65%	70%	75%	80%	85%	95%	97%	100%
Active senior housing	Visitors & employees	95%	97%	100%	100%	99%	98%	98%	99%	98%	100%	99%	94%	96%	98%	97%	97%	97%	98%	98%
	Residents	95%	97%	100%	100%	99%	98%	98%	99%	98%	100%	99%	94%	96%	98%	97%	97%	97%	98%	98%
Office																				
Office	Visitors	0%	1%	20%	60%	100%	45%	15%	45%	95%	45%	15%	10%	5%	2%	1%	0%	0%	0%	0%
	Employees unreserved	3%	15%	50%	90%	100%	100%	85%	85%	95%	95%	85%	60%	25%	15%	5%	3%	1%	0%	0%
	Employees reserved	00%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Medical/ dental office	Visitors	0%	0%	90%	90%	100%	100%	30%	90%	100%	100%	90%	80%	67%	30%	15%	0%	0%	0%	0%
	Employees	0%	20%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	67%	30%	15%	0%	0%	0%	0%
Bank (drive-in branch)	Visitors	0%	0%	50%	90%	100%	50%	50%	50%	70%	50%	80%	100%	0%	0%	0%	0%	0%	0%	0%
	Employees	0%	0%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%

Source: See chapter 4 discussions for each land use.

FIGURE 2-5 Weekend Time-of-Day Adjustments

Land use		6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.	12 a.m.
Retail typical	Visitors	1%	5%	30%	50%	70%	90%	95%	100%	100%	95%	90%	80%	75%	70%	65%	50%	30%	10%	0%
December	Visitors	1%	5%	10%	35%	60%	85%	100%	100%	100%	100%	90%	80%	65%	60%	55%	50%	35%	15%	1%
Late December	Visitors	1%	5%	10%	20%	40%	60%	80%	95%	100%	100%	95%	85%	70%	60%	50%	30%	20%	10%	0%
All	Employees	10%	15%	40%	75%	85%	95%	100%	100%	100%	100%	100%	95%	85%	80%	75%	65%	45%	15%	0%
Supermarket/ grocery	Visitors	10%	25%	50%	75%	95%	100%	100%	100%	100%	100%	100%	90%	50%	33%	25%	15%	5%	4%	3%
	Employees	15%	35%	70%	85%	100%	100%	100%	100%	85%	75%	60%	55%	45%	40%	30%	20%	10%	10%	5%
Pharmacy	Visitors	8%	25%	50%	75%	95%	100%	100%	100%	100%	100%	100%	90%	50%	33%	25%	15%	5%	4%	3%
	Employees	15%	35%	70%	85%	100%	100%	100%	100%	85%	75%	60%	55%	45%	40%	30%	20%	10%	10%	5%
Discount stores/ superstores	Visitors	10%	15%	20%	30%	45%	65%	85%	95%	100%	100%	100%	95%	80%	60%	45%	30%	10%	5%	1%
	Employees	20%	25%	30%	40%	55%	75%	95%	100%	100%	100%	100%	100%	90%	70%	55%	40%	20%	15%	0%
Home improvement stores/garden	Visitors	15%	20%	35%	55%	60%	80%	95%	100%	95%	95%	80%	75%	75%	80%	90%	70%	10%	0%	9%
	Employees	25%	30%	45%	65%	70%	90%	100%	100%	100%	100%	90%	85%	85%	90%	100%	80%	20%	0%	0%
Food and beverage																				
Fine/casual dining	Visitors	0%	0%	0%	0%	0%	15%	50%	55%	45%	45%	45%	60%	90%	95%	100%	90%	90%	90%	50%
	Employees	0%	20%	30%	60%	75%	75%	75%	75%	75%	75%	75%	100%	100%	100%	100%	100%	100%	85%	50%
Family restaurant	Visitors	10%	25%	45%	70%	90%	90%	100%	85%	65%	40%	45%	60%	70%	70%	65%	30%	25%	15%	10%
	Employees	50%	75%	90%	90%	100%	100%	100%	100%	100%	75%	75%	95%	95%	95%	95%	80%	65%	65%	35%
Fast casual/ fast food/food court/food halls	Visitors	5%	10%	20%	30%	55%	85%	100%	100%	90%	60%	55%	60%	85%	80%	50%	30%	20%	10%	5%
	Employees	15%	20%	30%	40%	75%	100%	100%	100%	95%	70%	60%	70%	90%	90%	60%	40%	30%	20%	20%
Bar/lounge/ nightclub	Visitors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	50%	75%	100%	100%	100%	100%
	Employees	0%	0%	0%	5%	5%	5%	5%	10%	10%	10%	20%	45%	70%	100%	100%	100%	100%	100%	100%
Entertainment																				
Family entertainment	Visitors	0%	0%	0%	0%	25%	65%	85%	90%	95%	95%	90%	95%	100%	95%	90%	65%	10%	0%	0%
	Employees	5%	5%	5%	25%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	10%	5%	5%
Active entertainment	Visitors	0%	0%	0%	0%	25%	65%	85%	90%	95%	95%	90%	95%	100%	95%	90%	65%	10%	0%	0%
	Employees	5%	5%	5%	25%	75%	100%	100%	100%	100%	100%	90%	100%	100%	100%	100%	75%	10%	5%	5%
Adult active entertainment	Visitors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	50%	75%	100%	100%	100%	100%
	Employees	0%	0%	0%	5%	5%	5%	5%	10%	10%	10%	20%	45%	70%	100%	100%	100%	100%	100%	100%
All movies typical	Visitors	0%	0%	0%	0%	0%	0%	20%	45%	55%	55%	55%	60%	60%	80%	100%	100%	100%	80%	50%
Late December	Visitors	0%	0%	0%	0%	0%	0%	35%	60%	75%	80%	80%	80%	70%	80%	100%	100%	100%	85%	70%
All	Employees	0%	0%	0%	0%	0%	0%	50%	60%	60%	75%	75%	100%	100%	100%	100%	100%	100%	70%	50%
Live theater	Visitors	0%	0%	0%	1%	1%	1%	1%	17%	67%	67%	1%	1%	1%	25%	100%	100%	0%	0%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	100%	100%	100%	30%	30%	100%	100%	100%	100%	30%	10%	5%
Outdoor amphitheater	Visitors	0%	0%	0%	1%	1%	1%	1%	17%	67%	67%	1%	1%	1%	25%	100%	100%	0%	0%	0%
	Employees	0%	10%	10%	20%	20%	20%	30%	100%	100%	100%	30%	30%	100%	100%	100%	100%	30%	10%	5%
Public park/ destination open space	Visitors	0%	0%	0%	1%	30%	60%	75%	90%	97%	100%	98%	85%	70%	80%	100%	100%	95%	50%	10%
	Employees	0%	0%	10%	25%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	90%	80%
Museum/ aquarium	Visitors	0%	0%	0%	0%	45%	65%	85%	95%	100%	95%	90%	85%	60%	30%	10%	0%	0%	0%	0%
	Employees	5%	5%	5%	25%	75%	100%	100%	100%	100%	100%	100%	80%	75%	10%	5%	0%	0%	5%	5%
Arena	Visitors	0%	0%	0%	1%	1%	1%	1%	25%	95%	95%	81%	1%	1%	25%	100%	100%	0%	0%	0%
No matinee	Employees	0%	10%	10%	20%	20%	20%	30%	100%	100%	100%	100%	30%	100%	100%	100%	100%	30%	10%	5%

(continued on next page)

FIGURE 2-5 (continued)

Land use		6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.	12 a.m.
Entertainment (continued)																				
Pro football stadium 8 p.m. start	Visitors	0%	0%	1%	1%	5%	5%	50%	100%	100%	85%	25%	0%	0%	0%	0%	0%	0%	0%	0%
	Employees	0%	5%	10%	20%	30%	30%	100%	100%	100%	100%	25%	10%	5%	5%	0%	0%	0%	0%	0%
Pro baseball stadium	Visitors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	50%	90%	100%	100%	100%	100%	0%
	Employees	0%	0%	0%	5%	5%	5%	5%	5%	5%	5%	20%	75%	75%	100%	100%	100%	100%	100%	100%
Health club	Visitors	80%	45%	35%	50%	35%	50%	50%	30%	25%	30%	55%	100%	95%	60%	30%	10%	1%	1%	0%
	Employees	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	75%	100%	100%	75%	50%	20%	20%	20%	0%
Public library	Visitors	0%	0%	0%	0%	100%	90%	80%	65%	50%	35%	11%	5%	5%	0%	0%	0%	0%	0%	0%
	Employees	0%	0%	10%	50%	100%	100%	100%	100%	100%	50%	10%	10%	10%	10%	0%	0%	0%	0%	0%
Daycare center	Visitors	0%	2%	25%	75%	20%	20%	20%	20%	20%	20%	100%	50%	20%	5%	0%	0%	0%	0%	0%
	Employees	0%	50%	75%	90%	90%	90%	90%	90%	90%	100%	100%	100%	60%	40%	10%	0%	0%	0%	0%
Convention center	Visitors	0%	0%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	30%	30%	10%	0%	0%	0%
	Employees	5%	30%	33%	33%	100%	100%	100%	100%	100%	100%	90%	70%	40%	25%	20%	20%	5%	0%	0%
Hotel and residential																				
Hotel-business	Visitors	95%	90%	80%	70%	60%	60%	55%	55%	60%	60%	65%	70%	75%	75%	80%	85%	95%	100%	100%
Hotel-leisure	Visitors	95%	95%	90%	80%	70%	70%	65%	65%	70%	70%	75%	80%	85%	85%	90%	95%	95%	100%	100%
Employee	Employees	10%	30%	100%	100%	100%	100%	100%	100%	100%	100%	70%	70%	40%	20%	20%	20%	20%	10%	5%
Restaurant/ lounge	Visitors	0%	10%	30%	10%	10%	5%	100%	100%	33%	10%	10%	30%	55%	60%	70%	67%	60%	40%	30%
Meeting/banquet (<100 sq ft/key)	Visitors	0%	0%	30%	60%	60%	60%	65%	65%	65%	65%	65%	100%	100%	100%	100%	100%	50%	0%	0%
Convention (>100 sq ft/key)	Visitors	0%	0%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	30%	30%	10%	0%	0%	0%
Employee	Employees	10%	10%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	10%	10%
Residential guest	Visitors	0%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	40%	60%	100%	100%	100%	100%	80%	50%
Resident reserved	Residents	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Residential suburban	Residents	100%	95%	88%	80%	75%	70%	68%	65%	65%	68%	71%	74%	77%	80%	83%	86%	89%	92%	100%
Residential urban	Residents	90%	85%	80%	75%	70%	69%	68%	67%	66%	55%	60%	55%	50%	55%	65%	75%	85%	90%	100%
Active senior housing	Visitors	94%	98%	97%	95%	93%	94%	97%	99%	100%	100%	99%	98%	98%	98%	97%	95%	94%	98%	98%
	Employees	94%	98%	97%	95%	93%	94%	97%	99%	100%	100%	99%	98%	98%	98%	97%	95%	94%	98%	98%
Office																				
Office	Visitors	0%	20%	60%	80%	90%	100%	90%	80%	60%	40%	20%	10%	5%	0%	0%	0%	0%	0%	0%
	Employees unreserved	0%	20%	60%	80%	90%	100%	90%	80%	60%	40%	20%	10%	5%	0%	0%	0%	0%	0%	0%
	Employees reserved	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Medical/ dental office	Visitors	0%	0%	90%	90%	100%	100%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Employees	0%	20%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bank (drive-in branch)	Visitors	0%	0%	25%	40%	75%	100%	90%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Employees	0%	0%	90%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Source: See chapter 4 discussions for each land use.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Craftsman on Elliot	Organization:	Lee Eng
Project Location:	Mesa AZ	Performed By:	MAJ
Scenario Description:	Full site build-out	Date:	3/12/2024
Analysis Year:		Checked By:	MAJ
Analysis Period:	AM Peak Hour	Date:	3/12/2024

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	712	15	1,000 SF GFA	26	21	5
Retail	822	16	1,000 SF GFA	40	24	16
Restaurant	932,934	9	1,000 SF GFA	170	89	81
Cinema/Entertainment				0		
Residential	221	386	DU	158	36	122
Hotel				0		
All Other Land Uses ²				0		
				394	170	224

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	3	0	0	0
Retail	1		2	0	1	0
Restaurant	3	2		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	18	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	394	170	224
Internal Capture Percentage	18%	21%	16%
External Vehicle-Trips ⁵	324	135	189
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	24%	80%
Retail	17%	25%
Restaurant	26%	9%
Cinema/Entertainment	N/A	N/A
Residential	8%	16%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Craftsman on Elliot	Organization:	Lee Eng
Project Location:	Mesa AZ	Performed By:	MAJ
Scenario Description:	Full site build-out	Date:	3/12/2024
Analysis Year:		Checked By:	MAJ
Analysis Period:	PM Street Peak Hour	Date:	3/12/2024

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	712	15	1,000 SF GFA	32	11	21
Retail	822	16	1,000 SF GFA	110	55	55
Restaurant	932,934	9	1,000 SF GFA	137	76	61
Cinema/Entertainment				0		
Residential	221	386	DU	151	92	59
Hotel				0		
All Other Land Uses ²				0		
				430	234	196

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant	1.00			1.00		
Cinema/Entertainment	1.00			1.00		
Residential	1.00			1.00		
Hotel	1.00			1.00		
All Other Land Uses ²	1.00			1.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		4	1	0	0	0
Retail	1		16	0	14	0
Restaurant	2	25		0	11	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	6	11	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	430	234	196
Internal Capture Percentage	43%	40%	47%
External Vehicle-Trips ⁵	244	141	103
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	45%	24%
Retail	64%	56%
Restaurant	37%	62%
Cinema/Entertainment	N/A	N/A
Residential	27%	32%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1