CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil • Structural • Transportation • Surveying

201 Boston Post Road West, Suite 101
Marlborough, MA 01752
Tel.: (508) 481-7400
Fax: (508) 481-7406
www.chappellengineering.com

Parking Assessment

To: Mr. Tyler Alten
Lundgren Equity Partners
163 Washington Street
Auburn, MA 01501

From: Shaun Kelly, Sr. Project Manager
Patrick Bradley, Traffic Engineer

Reg: Retail/Bank Expansion
225 Shrewsbury Street
Worcester, Massachusetts

Date: May 31, 2024
Project #: 24022

INTRODUCTION

Chappell Engineering Associates, LLC (CEA) has conducted this Parking Assessment for the redevelopment of a site located on the south side of Shrewsbury Street abutting Casco Street and Albany Street at 255 Shrewsbury Street in Worcester, Massachusetts. The site currently contains the Shrewsbury Street Marketplace and a vacant building formerly used to store ambulances. Access to the site is provided via driveways on Shrewsbury Street, Casco Street, and Albany Street. As proposed, the former ambulance storage building will be razed and replaced with an approximately 15,375 square foot building consisting of 9,500 square feet of retail space, a 5,100 square foot new DCU bank with drive-through lanes, and a 775 square foot hallway providing a pedestrian connection between the parking field and Casco Street. The existing 5,100 square foot bank will be retrofitted with a new retail use. A total of 125 parking spaces are proposed on site, of which 16 spaces are restricted for use by the residents at the 224 Shrewsbury Street development, leaving a total of 109 parking spaces for the existing and proposed uses on site.

The site is located within Worcester's Commercial Corridors Overly District (CCOD), which was adopted in the city's zoning ordinance in February 2015 (Section 1.2.6 of Chapter 12.02(1)). Part of the intent of the CCOD was to reduce the amount of land devoted to parking and utilize parking areas more efficiently.[1] Uses within the CCOD allow for a reduction in the required on-site parking

[1] *Downtown Urban Revitalization Plan, Worcester, Massachusetts, April 2016*; Prepared for the City of Worcester Redevelopment Authority, Prepared by the BSC Group.

ratios by up to 50 percent due to a denser urban environment that includes available on-street parking and public transportation, both of which are located adjacent to the site.

This assessment has been prepared to review the existing parking demand of the current uses on the site as well as the parking requirements of the proposed retail and bank expansion on the local zoning ordinance and inclusion within the CCOD. As this assessment shows, the current uses require significantly less parking than would be required by zoning due to shared area land uses, available parking alternatives, and public transportation. Based on this existing parking demand, adequate spaces will remain on site to accommodate the proposed expansion without requiring any reduction from zoning as allowed within the CCOD.

Without taking credit for the existing observed parking demand and evaluating parking demand strictly based on zoning requirements, then the proposed expansion project would require a 41 percent reduction from zoning, which is within the maximum of 50 percent allowed for uses within the CCOD. When considering the availability of on-street parking in the area, the total reduction from zoning would only be 28 percent. Using parking demand data based on industry standard parking requirements, the proposed development would require a 42 percent reduction from zoning, which is also still within the maximum of 50 percent allowed.

EXISTING CONDITIONS

The existing 25,500± square foot retail plaza on site currently includes the Mexicali Cantina Grill (restaurant), Gentle Dental (medical clinic), Digital Federal Credit Union (bank), In-House Coffee (restaurant), and All Systems Go Esports Bar (restaurant). In addition, a separate 7,100 square foot vacant building exists behind the retail building that was formerly used to store ambulances. A total of 146 parking spaces are provided on site to support these uses.

In 2006, a previous developer was granted a Special Permit by the Planning Board for a 49 percent parking reduction within the Flexible Parking Overlay District, granting approval of 160 parking spaces for 34,159 square feet of mixed-use retail and office space. Approximately 11,525 square feet of the 2006-approved tenant program was never fully developed, which accounts for the discrepancy. The Flexible Parking Overlay District was deleted from the Zoning Ordinance and the Commercial Corridors Overlay District was approved in 2015.

Field observations revealed that a significant number of the existing parking spaces were not being utilized. Therefore, a parking survey was performed during times when both the existing retail and restaurant uses would incur the greatest demand for parking. Based on information from the Institute of Transportation Engineers (ITE) *Parking Generation* manual,[2] shopping centers (Land Use Code 822) generate the greatest demand for parking on a Saturday between the hours of 12:00 and 3:00 PM when between 79 and 100 percent of the peak parking demand occurs. Before 12:00

[2] *Parking Generation Manual, 6th Edition;* Institute of Transportation Engineers; Washington DC; 2023.

PM and after 3:00 PM, the peak parking demand drops to an hourly average of 38 to 70 percent, respectively. However, since a large portion of the space within the Shrewsbury Street Marketplace is occupied by restaurants and bars, the ITE manual for High Turnover (Sit Down) Restaurant – Lounge/Bar (Land Use Code 932) suggests that between 85 and 100 percent of the peak parking demand occurs on a Saturday between 6:00 and 9:00 PM.

Drive-In Bank (Land Use Code 912) parking demand is also high during the midday hours, with rates between 90-94 percent between the hours of 12:00 and 3:00 PM on Saturdays. Therefore, the parking demand counts were performed on Saturday March 19, 2022, between 12:00 and 3:00 PM and on Saturday April 9, 2022 between 6:00 and 9:00 PM. The parking count data are summarized in Tables 1 and 2 and the count worksheets are provided in the Appendix. As shown, the on-site parking demand ranged from a low of 43 spaces to a maximum demand of 69 spaces during these six-hour time periods. Based on hourly parking demand information from the ITE *Parking Generation Manual*, parking demand for existing uses is expected to be lower than 69 spaces during all other times of the day.

Table 1
Existing On-Site Parking Demand
Saturday 12:00 to 3:00 PM [a]

Time Period	Number of Cars Parked on Site
12:00 – 12:15 PM	60
12:15 – 12:30 PM	57
12:30 – 12:45 PM	61
12:45 – 1:00 PM	64
1:00 – 1:15 PM	55
1:15 – 1:30 PM	62
1:30 – 1:45 PM	**68**
1:45 – 2:00 PM	62
2:00 – 2:15 PM	64
2:15 – 2:30 PM	61
2:30 – 2:45 PM	54
2:45 – 3:00 PM	44

[a] Parking counts conducted on Saturday March 19, 2022.

Table 2
Existing On-Site Parking Demand
Saturday 6:00 to 9:00 PM [a]

Time Period	Number of Cars Parked on Site
6:00 – 6:15 PM	52
6:15 – 6:30 PM	50
6:30 – 6:45 PM	58
6:45 – 7:00 PM	66
7:00 – 7:15 PM	66
7:15 – 7:30 PM	66
7:30 – 7:45 PM	**69**
7:45 – 8:00 PM	68
8:00 – 8:15 PM	67
8:15 – 8:30 PM	66
8:30 – 8:45 PM	57
8:45 – 9:00 PM	43

[a] Parking counts conducted on Saturday April 9, 2022.

In addition to the on-site demand, the parking survey also evaluated the on-street supply and demand for parking as summarized on the count sheets in the Appendix. The supply of on-street parking was based on an assumption of 22 feet per vehicle. The survey revealed that 8 parking spaces are available on Shrewsbury Street along the site frontage and at times, all of those spaces were occupied between the hours surveyed. Along Casco Street, a total of 24 parking spaces are available on both sides of the road and a maximum of 16 spaces were observed to be used (highest

demand from 6:00 to 9:00 PM). Both Shrewsbury Street and Casco Street are signed for 1-hour parking. Along Albany Street, a total of 19 parking spaces are available on both sides along the site frontage and only two vehicles were observed to be parking during the study periods. There are no parking restrictions along this section of Albany Street with the exception of a "No Parking Here to Driveway" sign at the driveway opposite the site. To the west of the site, on-street parking along Albany Street is limited by wide-open curb cuts, overhead doors fronting on the street, and parking restrictions. To the east of Casco Street, on-street parking is allowed, but was observed to be mostly occupied by existing businesses along that section of the road.

PROPOSED CONDITIONS

Based on the current CCOD off-street zoning requirements, the existing restaurants on site require one parking space for every 4 occupants, or a total of 104 parking spaces for the 413 total allowed occupancy. The dental office requires 33 parking spaces (3 spaces per treatment room for 11 rooms, after accounting for an allowed 25 percent reduction for uses defined in the General Use category). The Digital Federal Credit Union will be moved to the new building construction on site, with the existing space to be retrofitted with a new retail use. The existing 5,100 square foot bank space with six tellers and two ATMs requires one space per 400 square feet and an additional 0.75 spaces per teller/ATM (after accounting for an allowed 25 percent reduction for uses defined in All Other Allowed Business Uses category), for a total of 19 parking spaces. The existing warehouse space located in a separate building on the site is proposed to be razed as part of the development project and therefore will not require additional parking. In total, the existing Shrewsbury Street Marketplace would require 156 parking spaces based on zoning. A total of 146 parking spaces are currently provided on site.

As part of the proposed project, a new retail/bank building will be constructed next to the existing building. The two 4,750 square foot new retail spaces and the retrofitted 5,100 square foot former bank would require one space per 500 square feet for a total of 31 spaces. The new 5,100 square foot bank space would require one space per 400 square feet and an additional 0.75 space for each teller station or ATM. The proposed bank will have a total of seven tellers and three ATMs for a total of 21 spaces. The new bank space would therefore result in a net increase of two additional spaces over the old bank space. Therefore, the parking demand for the new building addition would be 33 spaces per zoning. Additionally, a parking credit of one space per two bicycle spaces is allowed from Article IV, Section 7.C.1. A total of six bicycle spaces are provided on site, therefore three spaces can be credited for, meaning the total parking requirement would be 30 spaces for the building addition, or 186 spaces for the entire site.

Parking requirements for the proposed development based on information from the Institute of Transportation Engineers (ITE) *Parking Generation Manual* were also evaluated to determine whether the required parking reduction from industry-standard rates (versus zoning requirements) would still fall within the allowable CCOD parking reduction. Land Use Code (LUC) 936

(Coffee/donut Shop without Drive-Through Window) was used for the In-House Coffee shop that has a parking rate of 10.36 spaces/ksf (thousand square feet) on a weekday and 14.44 spaces/ksf on a Saturday. LUC 932 (High Turnover Restaurant with Bar) was used for Mexicali as well as the All Systems Go restaurant and these uses have a parking rate of 8.97 spaces/ksf on a weekday and 11.53 spaces/ksf on a Saturday. LUC 912 (Drive-in Bank) was used for the DCU Bank that has a parking rate of 3.4 spaces/ksf on a weekday and 3.19 spaces/ksf on a Saturday. LUC 720 (Medical-Dental Office Building) was used for Gentle Dental that has a parking rate of 2.63 spaces/ksf on a weekday and 0.56 spaces/ksf on a Saturday. LUC 822 (Strip Retail Plaza less than 40KSF) was used for the proposed retail space that has a parking rate of 2.79 spaces/ksf on a weekday and 2.77 spaces/ksf on a Saturday. As stated previously, the ITE provides hourly parking demand data (as a percentage of the peak demand) for each of these land uses. The hourly parking demand for each use was then calculated to determine the maximum demand in parking by hour of the day while also accounting for the known operating hours of the existing businesses (Mexicali operates from 11:00AM to 10:00 PM, All Systems Go operates from 4:00 PM to 12:00 AM, DCU Bank operates from 9:00 AM to 7:00 PM and until 3:00 PM on Saturday, In House Coffee operates 7:00 AM to 8:00 PM and until 5:00 PM on a Saturday, Gentle Dental operates 9:00 AM to 7:00 PM and until 5:00 PM on Saturday). The parking demand data based on the ITE information is provided in the Appendix. Based on this information, the maximum parking demand was found to be during the 7:00 PM hour on both weekdays and weekends, where parking demand was calculated to be 168 spaces during the weekday and 187 spaces during a Saturday.

COMPLIANCE WITH ZONING

Based on Observed Parking Demand

After site redevelopment, there will be a total of 125 parking spaces to accommodate the existing uses, the future occupancy of the Digital Federal Credit Union space with retail, and the proposed retail and bank spaces. However, 16 spaces will be leased out to a proposed residential development located at 224 Shrewsbury Street, leaving a total supply of 109 spaces. Based on the parking demand study, the existing retail and restaurant uses have a peak parking demand of 69 spaces, leaving 40 parking spaces available for the proposed bank and retail uses. Per current zoning requirements, the proposed building addition will require 30 parking spaces. Therefore, the 109 spaces available for the existing and proposed uses can accommodate the expected demand of 99 spaces without requiring any reduction from zoning as allowed within the CCOD.

Based on Zoning Requirements

Based on current zoning requirements, the total development would require 186 parking spaces (156 spaces for the existing uses plus 30 spaces for the proposed uses). Therefore, the 109 spaces

available for the development represents a 41 percent reduction from zoning, which is within the maximum of 50 percent allowed for uses within the CCOD.

As documented in this report, there is an existing supply of on-street parking that is also available for the existing and proposed uses. Based on the parking study, 17 spaces that have no time limitations are available along Albany Street and 8 spaces limited to 1-hour parking are available along Casco Street. Although the City of Worcester zoning requirements do not allow any credit for on-street parking, the total available on and off-site parking spaces (109 on-site spaces plus 25 on-street spaces = 134 spaces) would result in adequate supply to meet demand with an approximate 28 percent reduction from the zoning requirements.

Based on Industry Standards

Based on ITE *Parking Generation Manual* parking demand data, the Shrewsbury Street Marketplace, after the proposed building expansion, would require 187 parking spaces. The 109 spaces available for the development therefore represent a 42 percent reduction from zoning, which is also still within the maximum of 50 percent allowed for uses within the CCOD.

CONCLUSION

The existing peak parking demand for the uses within the Shrewsbury Street Marketplace is significantly lower than zoning requirements, likely due to the number of uses on a shared site as well as the availability of on-street parking, public transportation, and pedestrian accommodations on the area roadway network. These considerations can also be applied to the proposed retail/bank expansion parking demand and therefore support the reduction in the required number of on-site parking spaces for these uses. Based on the observed existing parking demand, sufficient parking will be available to accommodate the proposed expansion without requiring any reduction in zoning.

Without taking credit for the existing observed parking demand and evaluating parking demand strictly based on zoning requirements, then the proposed expansion project would require a 41 percent reduction from zoning, which is within the maximum of 50 percent allowed for uses within the CCOD. When considering the availability of on-street parking in the area, the total reduction from zoning would only be 28 percent. Using parking demand data based on industry standard parking requirements, the proposed development would require a 42 percent reduction from zoning, which is also still within the maximum of 50 percent allowed.

APPENDIX

Ron Müller & Associates
Traffic Engineering and Consulting Services
56 Teresa Road, Hopkinton, MA 01748
(508) 395-1576

Parking Demand Count

225 Shrewsbury Street, Worcester, MA

Counted By: JL

Weather: Rainy

	Saturday March 19, 2022 (12:00 to 3:00 PM)			
	Number of Cars Parked in Parking Lot	Number of Cars Parked along Site frontage		
Time		Shrewsbury St. (site side only)	Casco Street (both sides)	Albany Street (both sides)
12:00 - 12:15	60	4	4	2
12:15 - 12:30	57	5	4	2
12:30 - 12:45	61	4	4	2
12:45 - 1:00	64	1	3	2
1:00 - 1:15	55	5	1	2
1:15 - 1:30	62	4	1	2
1:30 - 1:45	68	4	1	2
1:45 - 2:00	62	4	2	2
2:00 - 2:15	64	8	1	2
2:15 - 2:30	61	5	4	2
2:30 - 2:45	54	6	5	2
2:45 - 3:00	44	6	6	2

Ron Müller & Associates
Traffic Engineering and Consulting Services
56 Teresa Road, Hopkinton, MA 01748
(508) 395-1576

Parking Demand Count

225 Shrewsbury Street, Worcester, MA

Counted By: SL

Weather: Clear

	Saturday April 9, 2022 (6:00 to 9:00 PM)			
	Number of Cars Parked in Parking Lot	Number of Cars Parked along Site frontage		
Time		Shrewsbury St. (site side only)	Casco Street (both sides)	Albany Street (both sides)
6:00 - 6:15	52	7	8	0
6:15 - 6:30	50	6	13	0
6:30 - 6:45	58	7	11	0
6:45 - 7:00	66	8	11	0
7:00 - 7:15	66	5	13	0
7:15 - 7:30	66	5	13	0
7:30 - 7:45	69	7	16	0
7:45 - 8:00	68	6	13	0
8:00 - 8:15	67	6	12	0
8:15 - 8:30	66	8	12	0
8:30 - 8:45	57	8	11	0
8:45 - 9:00	43	6	12	0

ITE *Parking Generation Manual*, 6th Edition, January 2022

Weekday Parking Requirements

	Existing Shrewsbury Marketplace Uses																	
	In House Coffee [a]		Restaurants [b1]		Restaurants [b2]		DCU Bank [c]		Gentle Dental [d]		Total	Existing	Proposed Retail [f]		Proposed Bank [g]		**Total Required**	**Total Required**
	Peak Demand:	21	Peak Demand:	84	Peak Demand:	56	Peak Demand:	17	Peak Demand:	8	Required	Peak Parking	Peak Demand:	41	Peak Demand:	19	**Based on Observed**	**Based on ITE**
Hour	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Per ITE	Observed [e]	Percent	# Spaces	Percent	# Spaces	**Retail/Rest. Demand**	**Projections**
7:00	73%	15	0%	0	0%	0	0%	0	17%	1	16	11	0%	0	0%	0	**11**	**16**
8:00	100%	21	0%	0	0%	0	25%	4	47%	4	29	20	19%	8	25%	5	**29**	**38**
9:00	63%	13	0%	0	0%	0	62%	11	82%	7	31	21	33%	14	62%	12	**36**	**46**
10:00	57%	12	0%	0	0%	0	87%	15	96%	8	35	24	47%	19	87%	17	**45**	**56**
11:00	42%	9	28%	24	0%	0	92%	16	100%	8	57	39	55%	23	92%	17	**63**	**81**
12:00	39%	8	96%	81	0%	0	90%	15	88%	7	111	77	89%	36	90%	17	**115**	**149**
1:00	27%	6	100%	84	0%	0	94%	16	87%	7	113	78	100%	41	94%	18	**121**	**156**
2:00	27%	6	51%	43	0%	0	93%	16	92%	7	72	50	73%	30	93%	18	**82**	**104**
3:00	27%	6	37%	31	0%	0	100%	17	90%	7	61	42	73%	30	100%	19	**74**	**93**
4:00	27%	6	34%	29	34%	19	86%	15	86%	7	76	52	66%	27	86%	16	**80**	**104**
5:00	27%	6	56%	47	56%	31	69%	12	55%	4	100	69	70%	29	69%	13	**99**	**130**
6:00	27%	6	87%	73	87%	49	34%	6	0%	0	134	92	75%	31	34%	6	**123**	**165**
7:00	27%	6	91%	76	91%	51	34%	6	0%	0	139	96	70%	29	34%	6	**125**	**168**

Saturday Parking Requirements

	Existing Shrewsbury Marketplace Uses																	
	In House Coffee [a]		Restaurants [b1]		Restaurants [b2]		DCU Bank [c]		Gental Dental [d]		Total	Existing	Proposed Retail [f]		Proposed Bank [g]		**Total Required**	**Total Required**
	Peak Demand:	29	Peak Demand:	108	Peak Demand:	71	Peak Demand:	16	Peak Demand:	2	Required	Peak Parking	Peak Demand:	40	Peak Demand:	18	**Based on Observed**	**Based on ITE**
Hour	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Percent	# Spaces	Per ITE	Observed [e]	Percent	# Spaces	Percent	# Spaces	**Retail/Rest. Demand**	**Projections**
7:00	100%	29	0%	0	0%	0	0%	0	17%	0	29	13	0%	0	0%	0	**13**	**29**
8:00	90%	26	0%	0	0%	0	25%	4	47%	1	31	13	0%	0	25%	5	**14**	**32**
9:00	80%	23	0%	0	0%	0	62%	10	82%	2	35	15	38%	15	62%	11	**31**	**51**
10:00	65%	19	0%	5	0%	0	87%	14	96%	2	40	17	55%	22	87%	16	**41**	**64**
11:00	62%	18	33%	9	0%	0	92%	15	100%	2	44	19	66%	26	92%	17	**47**	**72**
12:00	40%	12	56%	15	0%	0	90%	14	88%	2	43	19	85%	34	90%	16	**55**	**79**
1:00	32%	9	69%	19	0%	0	94%	15	87%	2	45	20	100%	40	94%	17	**62**	**87**
2:00	32%	9	58%	63	0%	0	93%	15	92%	2	89	39	96%	38	93%	17	**79**	**129**
3:00	32%	9	49%	53	0%	0	0%	0	90%	2	64	28	79%	32	0%	0	**60**	**96**
4:00	32%	9	63%	68	34%	19	0%	0	86%	2	98	43	66%	26	0%	0	**69**	**124**
5:00	0%	0	77%	83	56%	31	0%	0	55%	1	115	50	64%	26	0%	0	**76**	**141**
6:00	0%	0	100%	108	87%	49	0%	0	0%	0	157	68	67%	27	0%	0	**95**	**184**
7:00	0%	0	100%	108	91%	51	0%	0	0%	0	159	69	70%	28	0%	0	**97**	**187**

[a] ITE LUC 936 (Coffee/Donut Shop without Drive-Through Window). Peak demand of 10.36 spaces/ksf weekday and 14.44 spaces/ksf Saturday. Assumes 2,015 sf.

[b1] ITE LUC 932 (High Turnover Restaurant with Bar). Peak demand of 8.97 spaces/ksf weekday and 11.53 spaces/ksf Saturday. Assumes 9,375 total sf for Mexicali.

[b2] ITE LUC 932 (High Turnover Restaurant with Bar). Peak demand of 8.97 spaces/ksf weekday and 11.53 spaces/ksf Saturday. Assumes 6,200 total sf for All Systems Go.

[c] ITE LUC 912 (Drive-In Bank). Peak demand of 3.4 spaces/ksf weekday and 3.19 spaces/ksf Saturday. Assumes 5,100 sf for EX. Saturday hourly distribution assumed same as weekday.

[d] ITE LUC 720 (Medical-Dental Office Building). Peak demand of 2.63 spaces/ksf weekday and 0.56 spaces/ksf Saturday. Assumes 3,122 sf. Saturday distribution assumed same as weekday.

[e] Based on parking counts conducted between 12:00 and 3:00 PM Friday June 8, 2018 and between 6:00 and 9:00 PM Saturday April 9, 2022. Hourly distribution for other times assumed same as ITE projections.

[f] ITE LUC 822 (Strip Retail Plaza Less than 40K SF). Peak demand of 2.79 spaces/ksf weekday and 2.77 spaces/ksf Saturday. Assumes 15,160 sf.

[g] ITE LUC 912 (Drive-In Bank). Peak demand of 3.4 spaces/ksf weekday and 3.19 spaces/ksf Saturday. Assumes 5,700 for PROP. Saturday hourly distribution assumed same as weekday.

Note: Numbers in red are estimated. No data provided in the ITE Parking Generation report.

Hours of Operation					
		EX	SF	Weekday	Saturday
7Am to 8 PM	In House	LUC 936	2.015	10.36	14.44
11AM to 10 PM	Mexicali	LUC 932	9.375	8.97	11.53
4PM to 12 AM	All Systems Go	LUC 932	6.2	8.97	11.53
9AM to 7PM	DCU	LUC 912	5.1	3.4	3.19
9AM to 7PM	Gentle Dental	LUC 720	3.122	2.63	0.56
		PROP			
		LUC 822	14.6	2.79	2.77
		LUC 912	5.7	3.4	3.19

Land Use: 720 Medical-Dental Office Building

Description

A medical-dental office building is a facility or clinic with one or more tenants that provide diagnoses and outpatient care on a routine basis. Tenants range from individual private physicians and dentists to large medical practices. Patient visits are by appointment only. Walk-in clinic (Land Use 630) and urgent care center (Land Use 660) are related uses.

Land Use Subcategory

Data are separated into two subcategories for this land use:

- Located within or adjacent to a hospital campus
- Located in a standalone setting

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday at 14 standalone study sites and five study sites located within or adjacent to a hospital campus.

Hour Beginning	Percent of Weekday Peak Parking Demand	
	Standalone	Hospital Campus
12:00–4:00 a.m.	—	—
5:00 a.m.	—	—
6:00 a.m.	—	—
7:00 a.m.	17	—
8:00 a.m.	47	65
9:00 a.m.	82	79
10:00 a.m.	96	100
11:00 a.m.	100	73
12:00 p.m.	88	48
1:00 p.m.	87	71
2:00 p.m.	92	98
3:00 p.m.	90	90
4:00 p.m.	86	81
5:00 p.m.	55	65
6:00 p.m.	—	—
7:00 p.m.	—	—
8:00 p.m.	—	—
9:00 p.m.	—	—
10:00 p.m.	—	—
11:00 p.m.	—	—

Additional Data

The average parking supply ratio for the 15 study sites with parking supply information and located within a hospital campus is 4.7 spaces per 1,000 square feet GFA. The average peak parking occupancy at these 15 sites is 76 percent.

The average parking supply ratio for the 33 study sites with parking supply information and located as a standalone building is 4.6 spaces per 1,000 square feet GFA. The average peak parking occupancy at these 33 sites is 49 percent.

For four study sites, parking demand data were collected on a Saturday as well as a weekday. For those sites, peak Saturday parking demand averages 22 percent of the peak weekday parking demand.

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in California, Georgia, Hawaii, Maine, Maryland, Minnesota, New Jersey, New York, North Carolina, Oregon, Tennessee, Texas, Virginia, and Washington.

Source Numbers

120, 121, 173, 217, 218, 224, 310, 315, 428, 433, 527, 530, 531, 532, 553, 555, 564, 618, 619, 620, 621, 624, 634

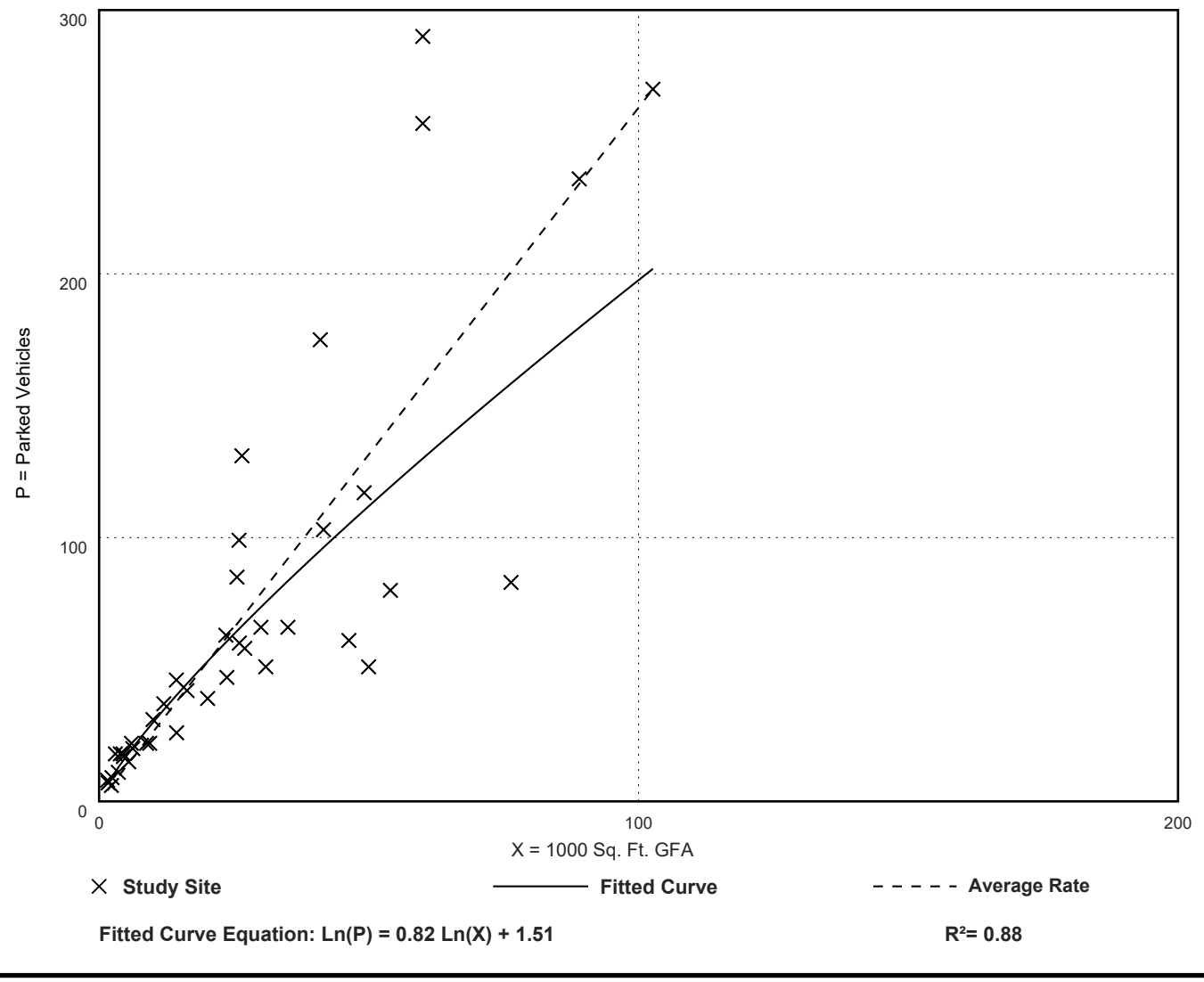
Medical-Dental Office Building - Standalone (720)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Number of Studies: 41
Avg. 1000 Sq. Ft. GFA: 27

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)
2.63	1.02 - 5.97	2.38 / 4.28	2.28 - 2.98	1.15 (44%)

Data Plot and Equation



Fitted Curve Equation: Ln(P) = 0.82 Ln(X) + 1.51

R^2= 0.88

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.	—	—	—

Additional Data

The average parking supply ratios for the study sites with parking supply information are the following:

- 5.7 spaces per 1,000 square feet GLA (24 sites) in a general urban/suburban setting
- 3.3 spaces per 1,000 square feet GLA (3 sites) in a dense multi-use urban setting

The average peak parking occupancy is 50 percent at the general urban/suburban sites and 76 percent at the dense multi-use urban sites.

The sites were surveyed in the 1990s, the 2010s, and the 2020s in Alberta (CAN), British Columbia (CAN), California, Colorado, Kansas, Maine, Manitoba (CAN), Maryland, Michigan, Minnesota, Missouri, New York, Texas, Virginia, and Washington.

Future data submissions should attempt to provide information on the composition of each study site (types and number of stores, restaurants, or other tenants within the shopping center).

Source Numbers

89, 209, 219, 297, 511, 601, 605, 606, 618, 619, 621, 635

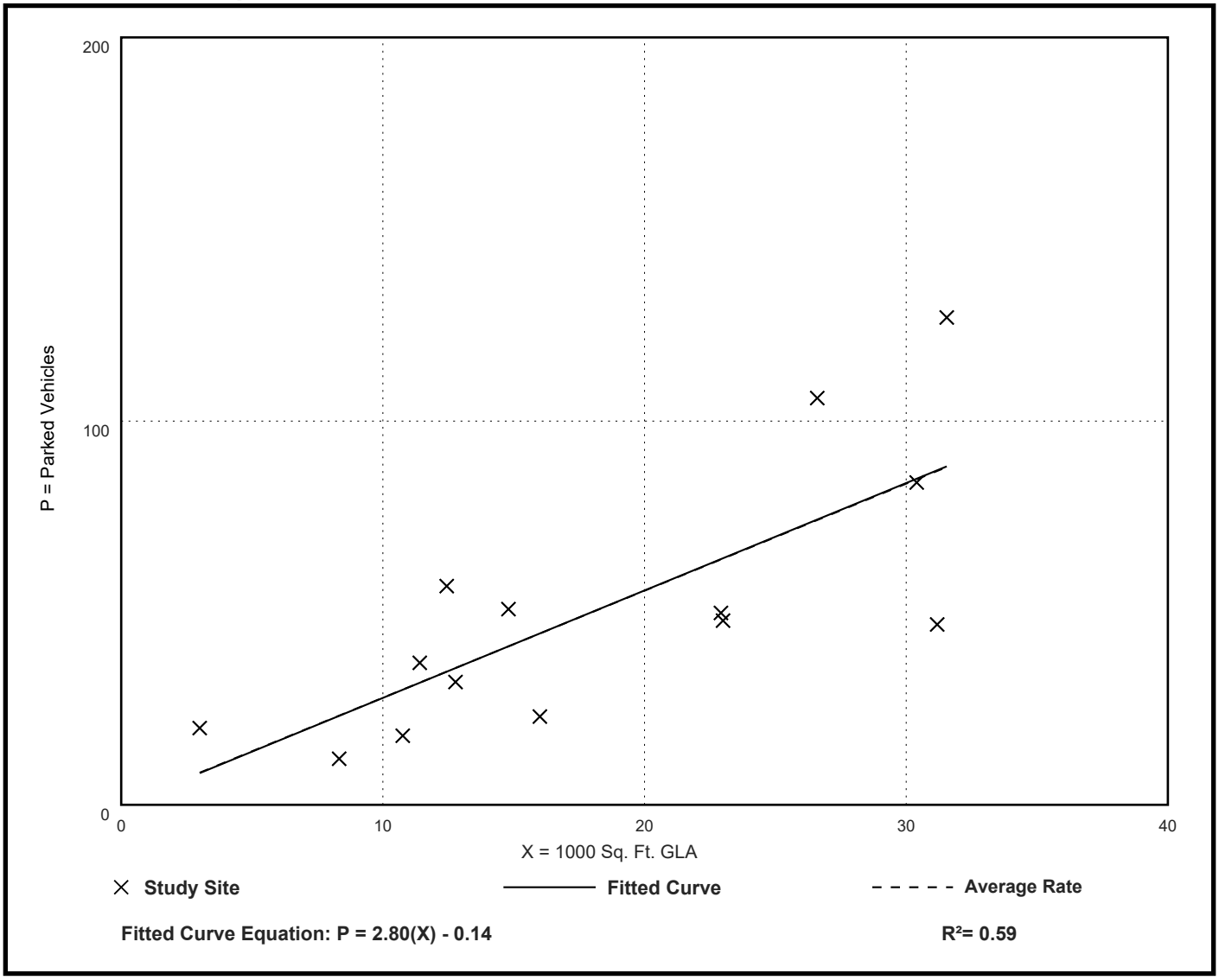
Strip Retail Plaza (< 40k)
(822)

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



Fitted Curve Equation: P = 2.80(X) - 0.14

R^2= 0.59

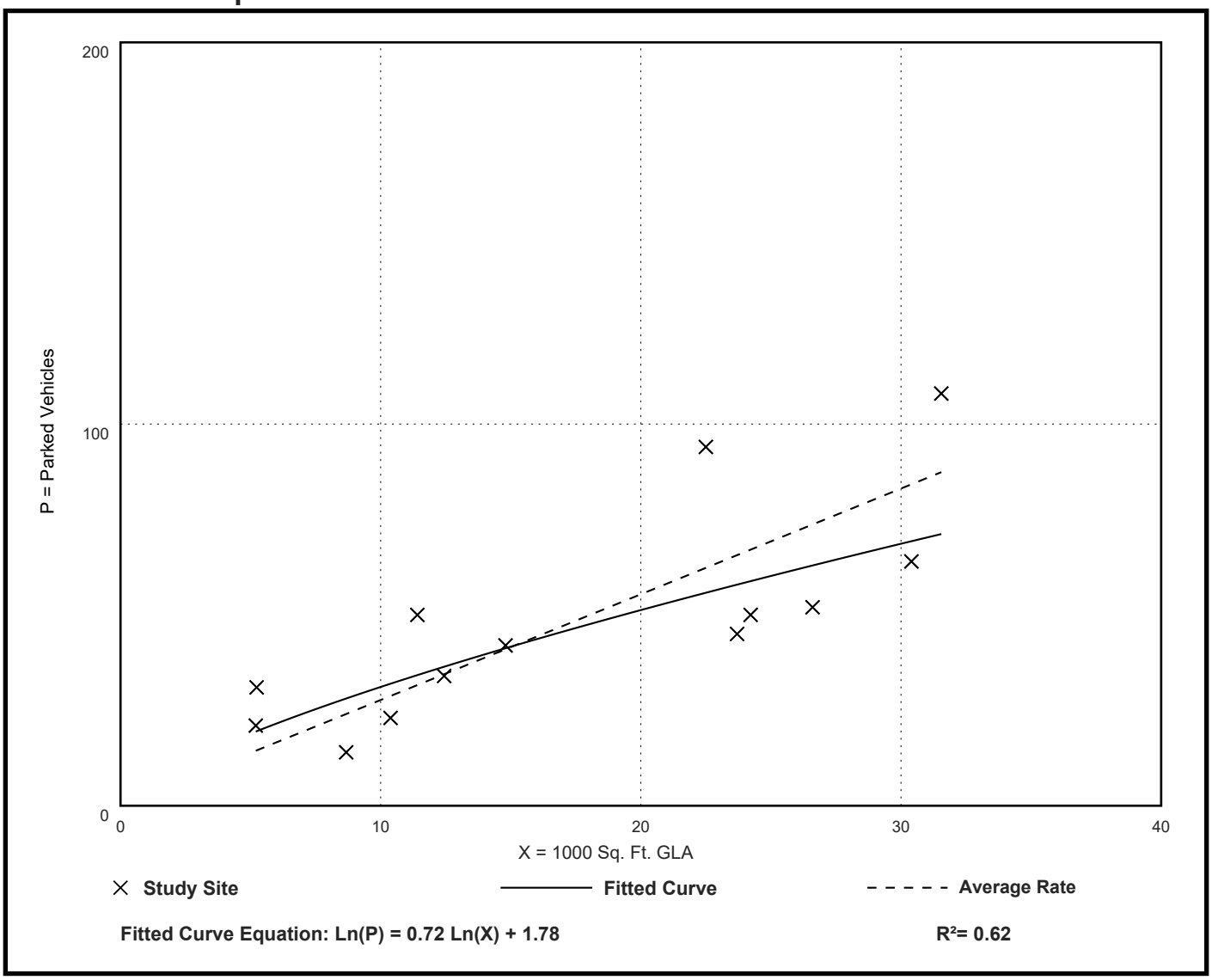
Strip Retail Plaza (< 40k)
(822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GLA: 17

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)
2.77	1.61 - 5.93	2.09 / 4.36	***	1.03 (37%)

Data Plot and Equation



Fitted Curve Equation: Ln(P) = 0.72 Ln(X) + 1.78

R^2= 0.62

Land Use: 912 Drive-In Bank

Description

A bank is a financial institution that can offer a wide variety of financial services. A drive-in bank provides banking services for a motorist through a teller station. A drive-in bank may also serve patrons who walk into the building. The drive-in lanes may or may not provide an automatic teller machine (ATM).

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday at 21 study sites in a general urban/suburban setting.

Hour Beginning	Percent of Weekday Peak Parking Demand
12:00–4:00 a.m.	—
5:00 a.m.	—
6:00 a.m.	—
7:00 a.m.	—
8:00 a.m.	25
9:00 a.m.	62
10:00 a.m.	87
11:00 a.m.	92
12:00 p.m.	90
1:00 p.m.	94
2:00 p.m.	93
3:00 p.m.	100
4:00 p.m.	86
5:00 p.m.	69
6:00 p.m.	34
7:00 p.m.	—
8:00 p.m.	—
9:00 p.m.	—
10:00 p.m.	—
11:00 p.m.	—

Additional Data

Parking demand does not include vehicles queued in drive-in lanes.

The average parking supply ratio for the 33 study sites in a general urban/suburban setting with parking supply information is 7.8 spaces per 1,000 square feet GFA. The average peak parking occupancy at these 33 study sites is 42 percent.

The sites were surveyed in the 2000s, the 2010s, and the 2020s in California, Maine, Maryland, Missouri, New Jersey, New York, Pennsylvania, Tennessee, Texas, Virginia, and Washington.

Source Numbers

411, 445, 503, 527, 530, 567, 605, 618, 619, 626, 636

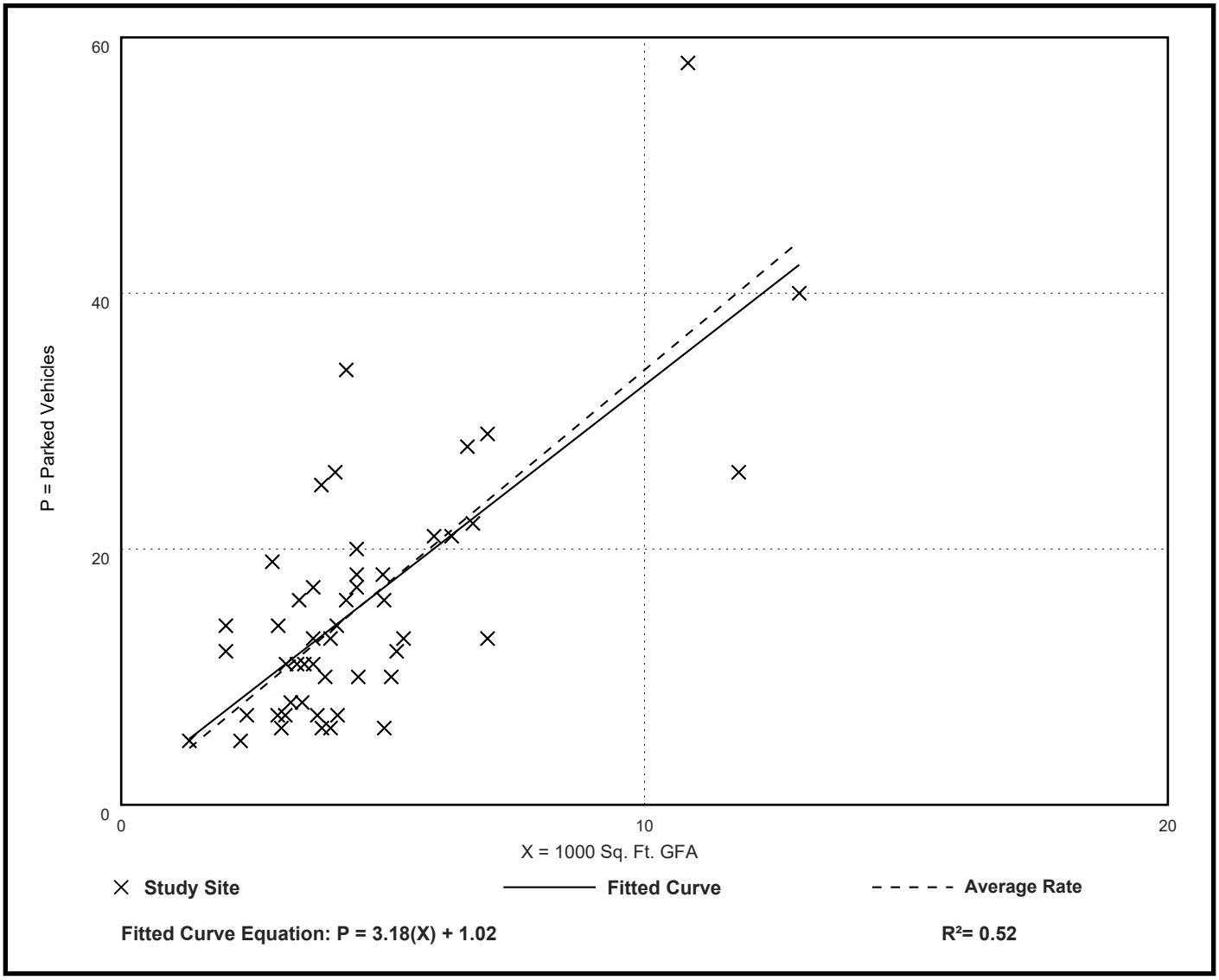
Drive-In Bank
(912)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Number of Studies: 49
Avg. 1000 Sq. Ft. GFA: 4.6

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)
3.40	1.19 - 7.91	2.44 / 5.03	2.99 - 3.81	1.46 (43%)

Data Plot and Equation



Fitted Curve Equation: P = 3.18(X) + 1.02

R^2= 0.52

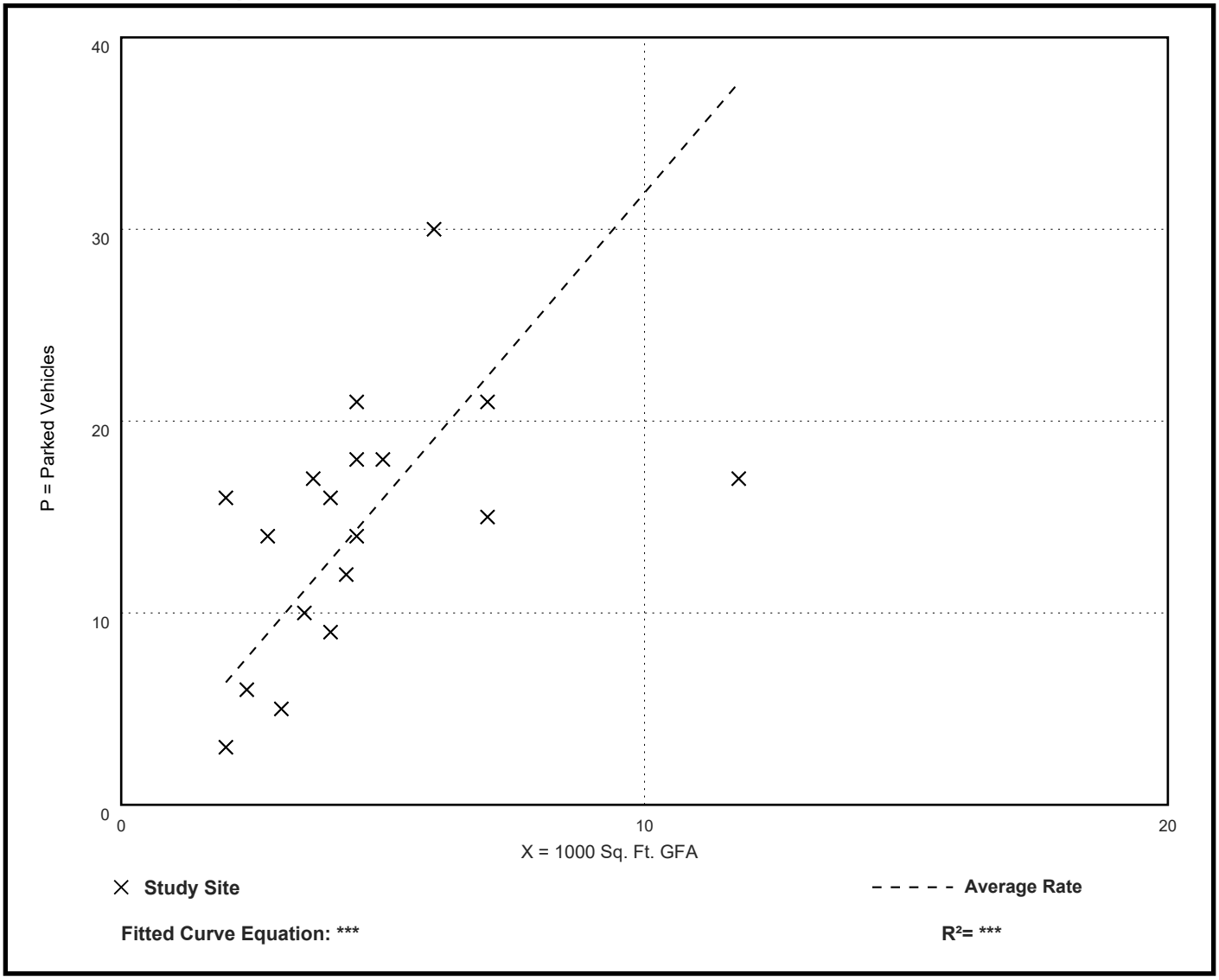
Drive-In Bank
(912)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 4.6

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)
3.19	1.44 - 8.00	2.58 / 5.00	***	1.45 (45%)

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.	–	–	–	–

Additional Data

If the restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may have a more direct relationship to site-generated parking demand than GFA.

The average parking supply ratio for the 55 study sites with parking supply information in a general urban/suburban setting is 16 spaces per 1,000 square feet GFA. The average parking supply ratio for the five study sites with parking supply information in a dense multi-use urban setting is 11 spaces per 1,000 square feet GFA. The average peak parking occupancy is 74 percent at the general urban/suburban sites and 88 percent at the dense multi-use urban sites.

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Arizona, British Columbia (CAN), California, Florida, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Texas, Virginia, Washington, and Wisconsin.

Source Numbers

168, 218, 274, 276, 299, 527, 531, 556, 557, 567, 568, 618, 619, 620, 622, 626, 628, 637

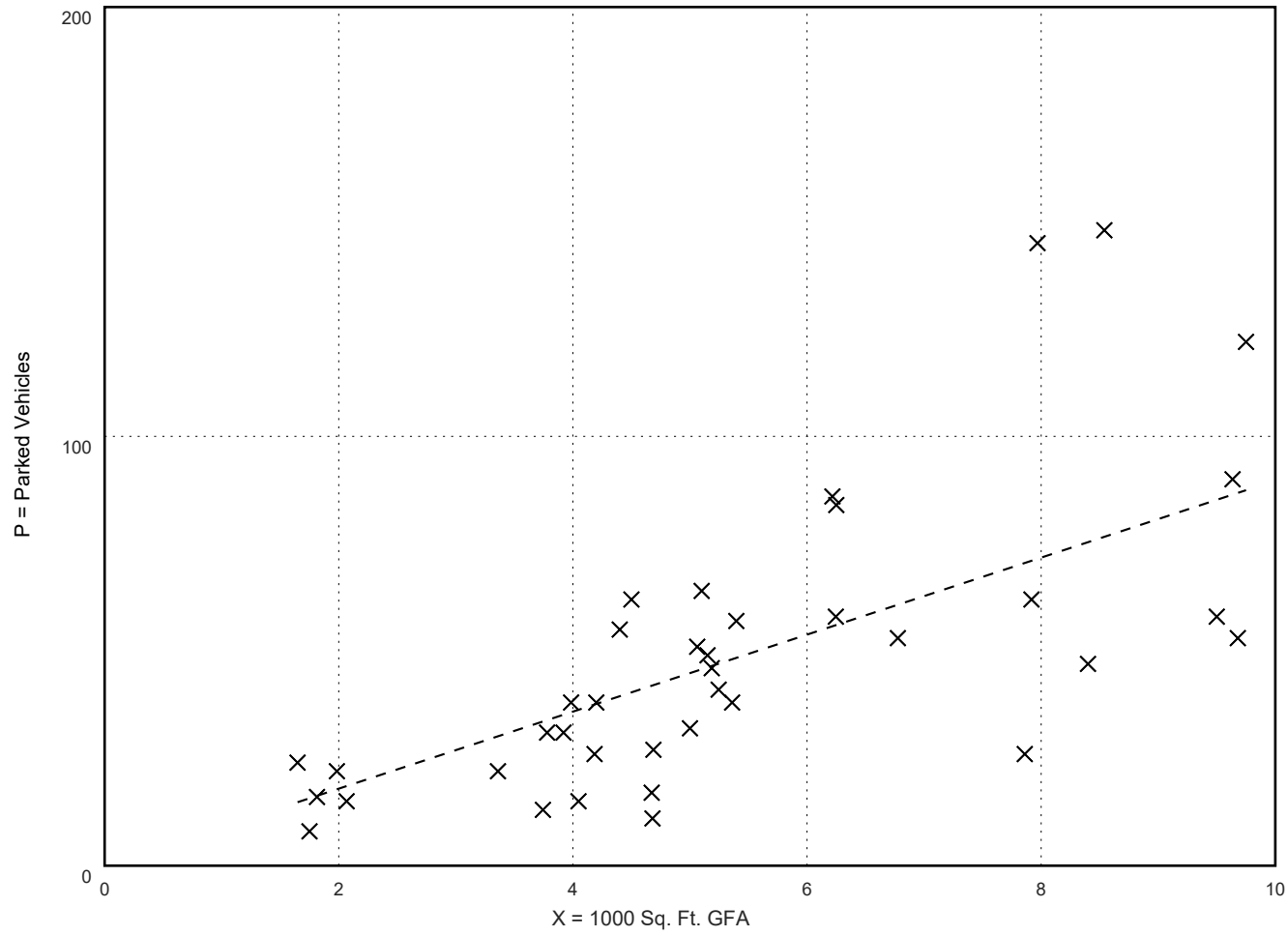
High-Turnover (Sit Down) Restaurant
Does Not Serve Breakfast (932)

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



Fitted Curve Equation: *

R^2= *

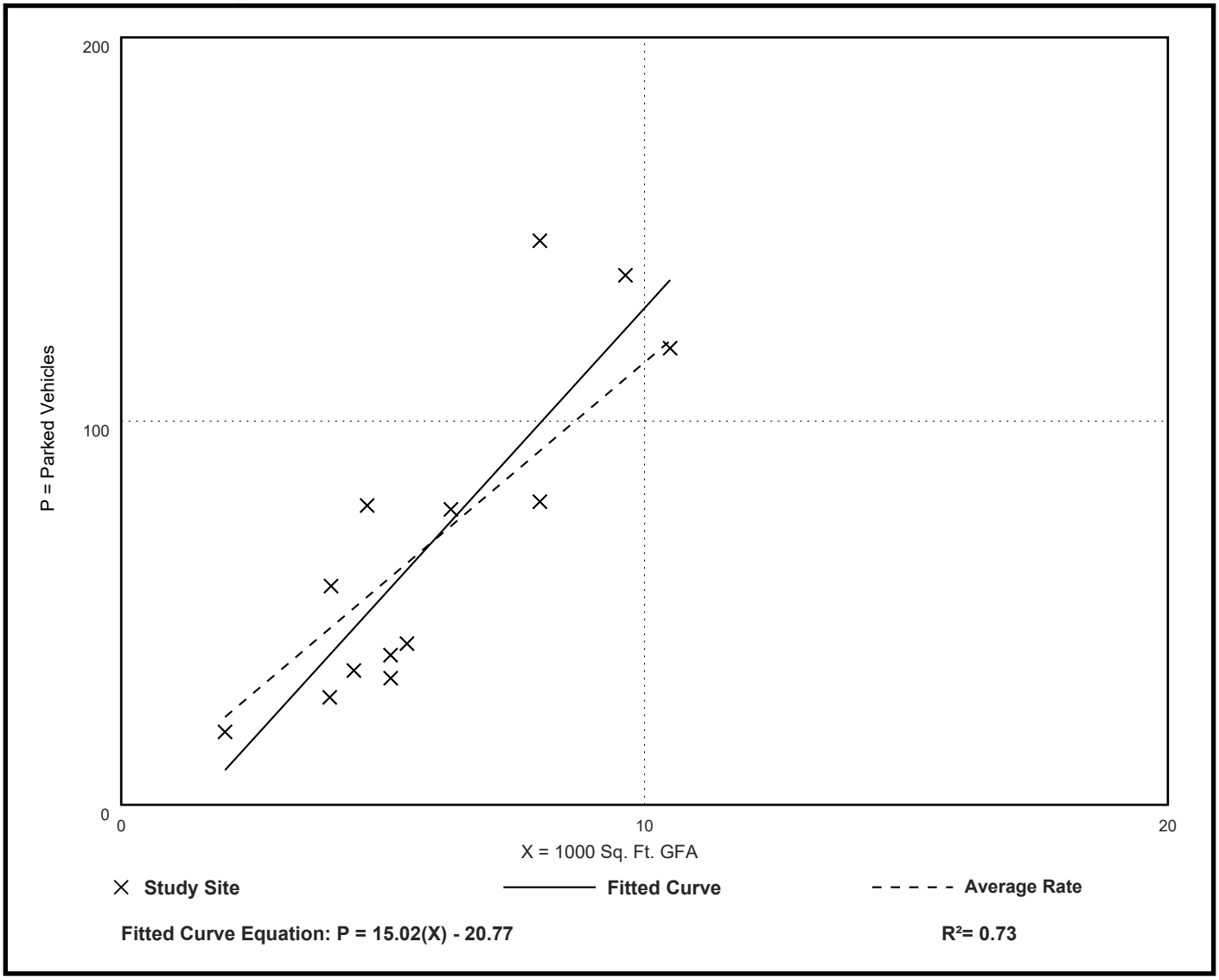
High-Turnover (Sit Down) Restaurant
Does Not Serve Breakfast (932)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GFA: 6.0

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)
11.53	6.41 - 18.38	7.80 / 16.37	***	3.87 (34%)

Data Plot and Equation



Fitted Curve Equation: P = 15.02(X) - 20.77

R^2= 0.73

Land Use: 936 Coffee/Donut Shop without Drive-Through Window

Description

This land use includes any coffee and donut restaurant that does not have a drive-through window. The restaurant sells freshly brewed coffee (along with coffee-related accessories) and a variety of food/drink products such as donuts, bagels, breads, muffins, cakes, sandwiches, wraps, salads, and other hot and cold beverages. The restaurant marketing and sales may emphasize coffee beverages over food (or vice versa). A coffee/donut shop typically holds long store hours (more than 15 hours) with an early morning opening. Limited indoor seating is generally provided for patrons and table service is not provided.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand at three study sites on a weekday (Monday–Thursday) and three study sites on a Saturday in a general urban/suburban setting.

Hour Beginning	Percent of Peak Parking Demand	
	Monday–Thursday	Saturday
12:00–4:00 a.m.	–	–
5:00 a.m.	–	–
6:00 a.m.	–	–
7:00 a.m.	73	100
8:00 a.m.	100	90
9:00 a.m.	63	80
10:00 a.m.	57	65
11:00 a.m.	42	62
12:00 p.m.	39	40
1:00 p.m.	27	32
2:00 p.m.	–	–
3:00 p.m.	–	–
4:00 p.m.	–	–
5:00 p.m.	–	–
6:00 p.m.	–	–
7:00 p.m.	–	–
8:00 p.m.	–	–
9:00 p.m.	–	–
10:00 p.m.	–	–
11:00 p.m.	–	–

Additional Data

The average parking supply ratio for the six study sites with parking supply information is 16 spaces per 1,000 square feet GFA. The average peak parking occupancy at these six sites is 46 percent.

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in California, New Jersey, Oregon, Pennsylvania, Virginia, and Washington.

Source Numbers

298, 399, 428, 431, 433, 531, 626, 637

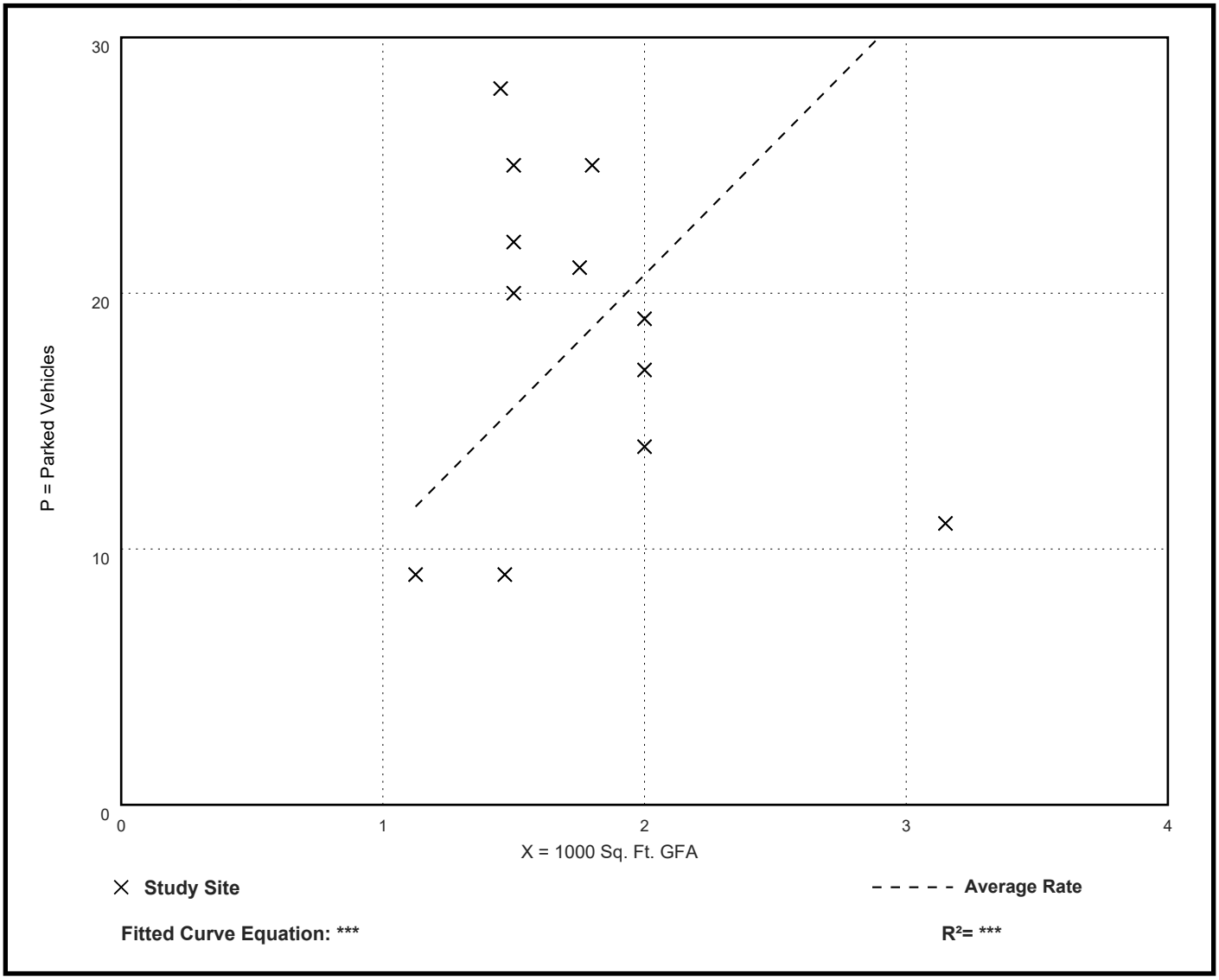
Coffee/Donut Shop without Drive-Through Window (936)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Weekday (Monday - Friday)
Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 1.8

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)
10.36	3.49 - 19.31	8.15 / 16.80	***	4.84 (47%)

Data Plot and Equation



Fitted Curve Equation: *

R^2= *

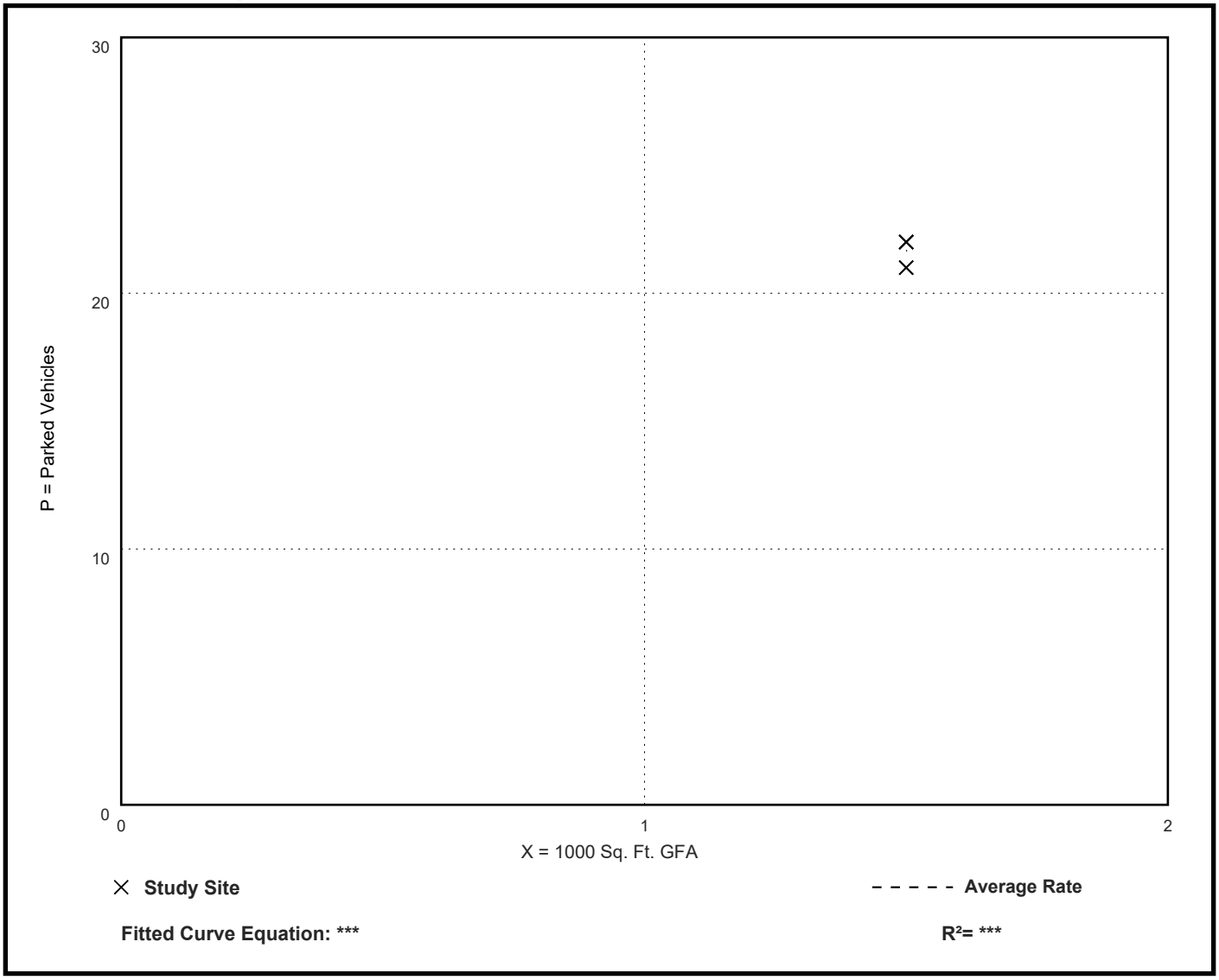
Coffee/Donut Shop without Drive-Through Window (936)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA
On a: Saturday
Setting/Location: General Urban/Suburban
Number of Studies: 3
Avg. 1000 Sq. Ft. GFA: 1.5

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)
14.44	14.00 - 14.67	14.21 / 14.67	***	0.38 (3%)

Data Plot and Equation



Fitted Curve Equation: *

R^2= *