

April 1, 2021

NEX-2020159.00

Ms. Nicole Y. Huang
Wan Yan, LLC
53 Mayflower Drive
North Andover, Massachusetts 01845

SUBJECT: Trip Generation Letter
Proposed Ye's Table Asian Cuisine Restaurant
125 Merrimack Street (Route 110)
Methuen, Massachusetts

Dear Ms. Huang:

Greenman-Pedersen, Inc. (GPI) has prepared this letter to evaluate the expected trips associated with the proposed redevelopment of the property at 125 Merrimack Street in Methuen, Massachusetts. The site is currently occupied by a ±2,475 square foot (SF) bank with a ±2,475 SF basement. The project consists of expanding the existing building to be a ±4,640 SF restaurant with a ±2,475 SF basement. Access and egress to the site is currently provided via two curb-cuts on Merrimack Street; one enter-only driveway and one exit-only driveway shared with the adjacent restaurant. As part of redevelopment, the curb cuts will not change, however, the enter-only driveway will be modified to provide full access and egress. The redevelopment project does not include any work to be performed within the State Highway Layout. The site is bounded by Giovanni's Roast Beef and Pizza restaurant to the north, Sunoco Gas Station to the south, Merrimack Street to the west, and vacant land/residential homes to the east. The site location in relation to the surrounding roadways is shown on the map on Figure A-1 within the Attachments.

Trip Generation

To estimate the volume of traffic to be generated by the proposed redevelopment, trip-generation rates published by the ITE *Trip Generation Manual*¹ were researched. Land Use Code (LUC) 912 (Drive-In Bank) was used to estimate the existing trip generation and LUC 932 (High-Turnover [Sit-Down] Restaurant) was used to estimate the proposed trip generation.

Not all of the vehicle trips expected to be generated by the proposed redevelopment represent *new* trips on the study area roadway system. Studies have shown that for developments such as the one proposed, a substantial portion of the site-generated vehicle trips are already present in the adjacent passing stream of traffic or are diverted from another route to the proposed site. For example, some vehicles which are already on the roadways may decide to visit the site on their way to another destination. Based on information published in the ITE *Trip Generation Handbook*,² the average *pass-by* trip percentage is 43 percent during the weekday PM peak hour for the proposed restaurant (LUC 932). Additionally, the average *pass-by* trip percentage is 29 percent during the weekday AM peak hour, 35 percent during the weekday PM peak hour, and 38 percent during the Saturday midday peak hour for the existing bank use (LUC 912). Table 1 summarizes the results of the trip-generation estimates. The trip generation and pass-by data are attached to this letter.

¹ *Trip Generation, 10th Edition*. Institute of Transportation Engineers; Washington, DC; 2017.

² *Trip Generation Handbook*; 3rd Edition; Institute of Transportation Engineers; Washington, DC; August 2014.

TABLE 1
Trip Generation Summary

Time Period/Direction	New Trips		
	Existing ^a	Proposed ^b	Difference ^c
Weekday Daily	374	454	80
Weekday PM Peak Hour:			
Enter	33	28	(5)
Exit	<u>32</u>	<u>12</u>	<u>(20)</u>
Total	65	40	(25)
Saturday Daily	266	496	230
Saturday Midday Peak Hour:			
Enter	41	24	(17)
Exit	<u>39</u>	<u>22</u>	<u>(17)</u>
Total	80	46	(-34)

^a ITE LUC 912 (Drive-In Bank) for 4,950 SF.

^b ITE LUC 932 (High-Turnover [Sit-Down] Restaurant) for 7,115 SF.

^c Proposed Trips minus Existing Trips.

As shown in Table 1, the proposed redevelopment is expected to generate 25 fewer new vehicle trips (5 fewer entering and 20 fewer exiting) during the weekday PM peak hour and 34 fewer new trips (17 fewer entering and 17 fewer exiting) during the Saturday midday peak hour. It should be noted that the volume of *pass-by* traffic does not reduce the total volume of traffic generated by the redevelopment and the external trips will still be realized as turning movements at the site driveways.

The proposed redevelopment will result in increases in traffic on the study area roadways over the entirety of the weekday and Saturday. The redevelopment is expected to result in a decrease of traffic on the proposed site during the peak hours. Traffic-volume increases beyond the study area during a full day are expected to be in the range of 40 to 115 vehicles. Merrimack Street carries approximately 17,700 vehicles per day (vpd)³, resulting in a negligible increase (less than one percent). The traffic-count data is attached to this letter.

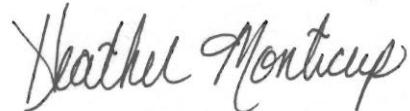
³ Massachusetts Transportation Data Management System; Station 5026 – Merrimack Street, east of Route I-495 (Methuen).

Ms. Nicole Y. Huang
April 1, 2021
Page 3

Should you have any questions, require additional information, or if I can be of any assistance during the review process, please feel free contact me at (978) 570-2968.

Sincerely,

GREENMAN-PEDERSEN, INC.

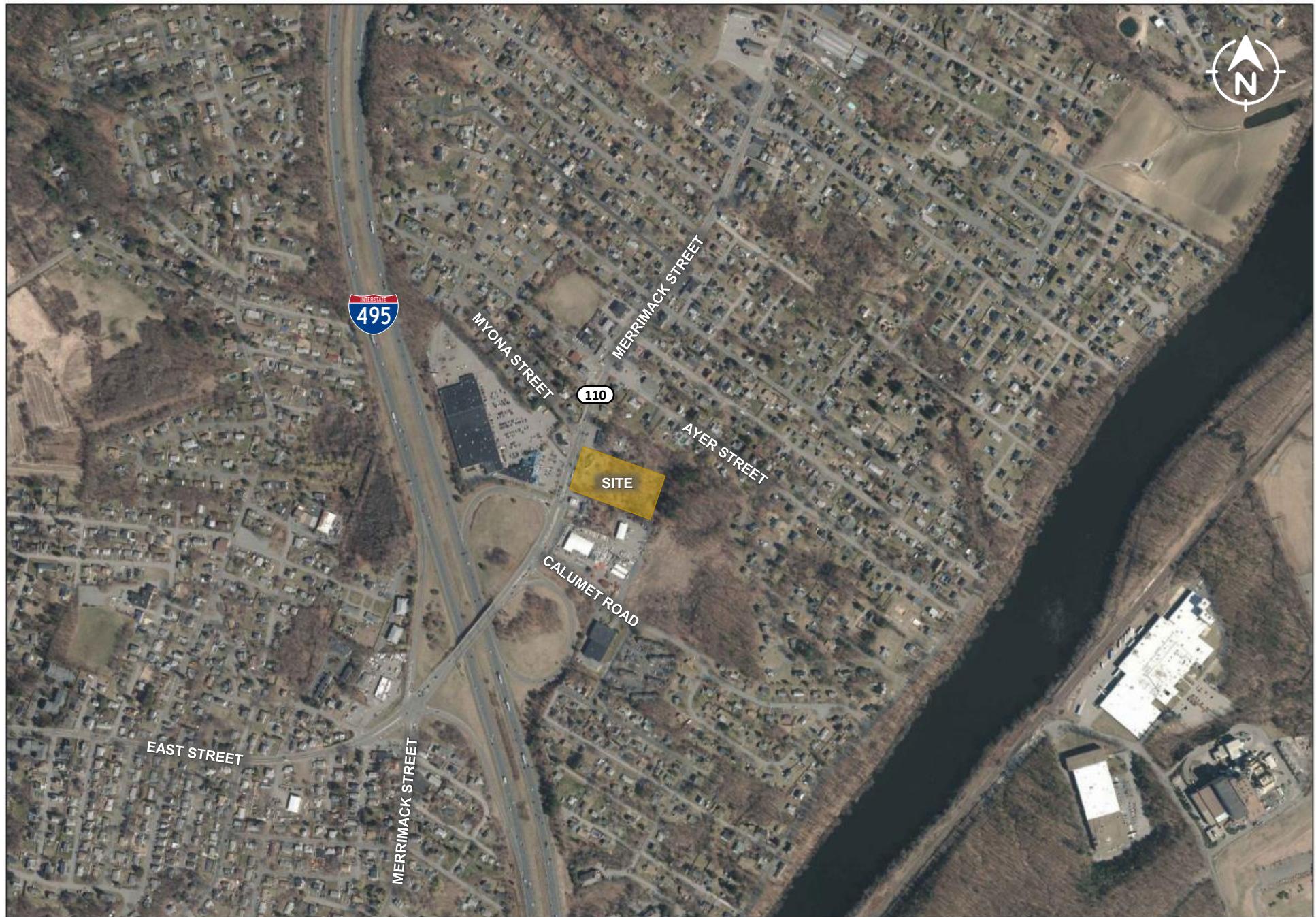


Heather L. Monticup, P.E.
Assistant Vice President / Director of Land Development Traffic

Attachments:

1. Figure A-1 – Site Location Map
2. Trip Generation Data
3. MassDOT Traffic-Count Data

cc: David R. Jordan, GPI



Trip Generation Data

	Existing Trips			Proposed Trips			Additional Trips		
	Bank		LUC 912	Restaurant		LUC 932			
	Total	Pass-By		New	Pass-By		Total	Pass-By	New
Weekday Daily									
In	264	77	187		399	172	227	135	95
<u>Out</u>	<u>264</u>	<u>77</u>	<u>187</u>		<u>399</u>	<u>172</u>	<u>227</u>	<u>135</u>	<u>95</u>
Total	528	154	374		798	344	454	270	190
Weekday PM									
In	51	18	33		43	15	28	-8	-3
<u>Out</u>	<u>50</u>	<u>18</u>	<u>32</u>		<u>27</u>	<u>15</u>	<u>12</u>	<u>-23</u>	<u>-3</u>
Total	101	36	65		70	30	40	-31	-6
Saturday Daily									
In	214	81	133		435	187	248	221	106
<u>Out</u>	<u>214</u>	<u>81</u>	<u>133</u>		<u>435</u>	<u>187</u>	<u>248</u>	<u>221</u>	<u>106</u>
Total	428	162	266		870	374	496	442	212
Saturday Midday									
In	66	25	41		41	17	24	-25	-8
<u>Out</u>	<u>64</u>	<u>25</u>	<u>39</u>		<u>39</u>	<u>17</u>	<u>22</u>	<u>-25</u>	<u>-8</u>
Total	130	50	80		80	34	46	-50	-16
	Weekday Daily	29%			Weekday Daily	43%			
	AM Peak	29%			AM Peak	43%			
	PM Peak	35%			PM Peak	43%			
	Saturday Daily	38%			Saturday Daily	43%			
	SAT Peak	38%			SAT Peak	43%			

Institute of Transportation Engineers (ITE)
Land Use Code (LUC) 912 - Drive-In Bank
General Urban/Suburban

Average Vehicle Trips Ends vs: 1,000 Sq. Ft. Gross Floor Area
Independent Variable (X): 4.950

AVERAGE WEEKDAY DAILY

$T = 82.87 * (X) + 117.10$
 $T = 82.87 * 4.950 + 117.10$
 $T = 527.31$
 $T = 528$ vehicle trips
with 50% (264 vpd) entering and 50% (264 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 9.50 * (X)$
 $T = 9.5 * 4.950$
 $T = 47.03$
 $T = 47$ vehicle trips
with 58% (27 vph) entering and 42% (20 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 20.45 * (X)$
 $T = 20.45 * 4.950$
 $T = 101.23$
 $T = 101$ vehicle trips
with 50% (51 vph) entering and 50% (50 vph) exiting.

SATURDAY DAILY

$T = 86.48 * (X)$
 $T = 86.48 * 4.950$
 $T = 428.08$
 $T = 428$ vehicle trips
with 50% (214 vpd) entering and 50% (214 vpd) exiting.

SATURDAY PEAK HOUR OF GENERATOR

$T = 26.35 * (X)$
 $T = 26.35 * 4.950$
 $T = 130.43$
 $T = 130$ vehicle trips
with 51% (66 vph) entering and 49% (64 vph) exiting.

Institute of Transportation Engineers (ITE)

Land Use Code (LUC) 932 - High-Turnover (Sit-Down) Restaurant

General Urban/Suburban

Average Vehicle Trips Ends vs: 1,000 Sq. Ft. Gross Floor Area

Independent Variable (X): 7.115

AVERAGE WEEKDAY DAILY

T = 112.18 * (X)

T = 112.18 * 7.115

T = 798.16

T = 798 vehicle trips

with 50% (399 vpd) entering and 50% (399 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 9.94 * (X)

T = 9.94 * 7.115

T = 70.72

T = 71 vehicle trips

with 55% (39 vph) entering and 45% (32 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 9.77 * (X)

T = 9.77 * 7.115

T = 69.51

T = 70 vehicle trips

with 62% (43 vph) entering and 38% (27 vph) exiting.

SATURDAY DAILY

T = 122.40 * (X)

T = 122.40 * 7.115

T = 870.88

T = 870 vehicle trips

with 50% (435 vpd) entering and 50% (435 vpd) exiting.

SATURDAY PEAK HOUR OF GENERATOR

T = 11.19 * (X)

T = 11.19 * 7.115

T = 79.62

T = 80 vehicle trips

with 51% (41 vph) entering and 49% (39 vph) exiting.

**Table F.24 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 890—Furniture Store**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
41	Altamonte Springs, FL	1995	212	2:00–6:00 p.m.	49	20	31	51	—	TPD Inc.
17	Daytona Beach, FL	1994	39	2:00–6:00 p.m.	69	—	—	31	—	TPD Inc.
24	Orlando, FL	1991	103	2:00–6:00 p.m.	42	—	—	58	—	TPD Inc.

Average Pass-By Trip Percentage: 53

“—” means no data were provided

**Table F.25 Pass-By and Non-Pass-By Trips Weekday, AM Peak Period
Land Use Code 912—Drive-in Bank**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
3.8	Camp Hill Mall, PA	March 2005	11	7:45–8:45 a.m.	27	—	—	73	—	McMahon Associates, Inc.
3.8	Exeter Twp, PA	March 2005	9	8:00–9:00 a.m.	24	—	—	76	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	22	7:45–8:45 a.m.	34	—	—	66	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	30	8:00–9:00 a.m.	27	—	—	73	—	McMahon Associates, Inc.
3.8	Mountain Road, PA	March 2005	34	7:30–8:30 a.m.	40	—	—	60	—	McMahon Associates, Inc.
3.8	Muhlenberg, PA	March 2005	7	8:00–9:00 a.m.	27	—	—	73	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	15	8:00–9:00 a.m.	16	—	—	84	—	McMahon Associates, Inc.
3.8	Derry Street, PA	March 2005	27	8:00–9:00 a.m.	36	—	—	64	—	McMahon Associates, Inc.

Average Pass-By Trip Percentage: 29

“—” means no data were provided

**Table F.26 Pass-By and Non-Pass-By Trips Weekday, Mid-Day Peak Period
Land Use Code 912—Drive-in Bank**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
3.6	Arlington, WA	Sept. 2007	—	11:00 a.m.–2:00 p.m.	34	42	24	66	—	657
2.7	Lynnwood, WA	Sept. 2007	—	11:00 a.m.–2:00 p.m.	26	58	16	74	—	657
2.8	Redmond, WA	Sept. 2007	—	11:00 a.m.–2:00 p.m.	30	53	17	70	—	657
3.6	Snohomish, WA	July 2007	—	11:00 a.m.–2:00 p.m.	15	—	—	65	—	657

Average Pass-By Trip Percentage: 26

“—” means no data were provided

**Table F.27 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 912—Drive-in Bank**

SIZE (1,000 SQ FT, GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
16.0	Overland Park, KS	Dec. 1988	20	4:30–5:30 p.m.	15	55	30	85	—	—
3.3	Louisville area, KY	July 1993	—	4:00–6:00 p.m.	48	22	30	52	2,570	Barton-Aschman Assoc.
3.4	Louisville area, KY	July 1993	—	4:00–6:00 p.m.	64	22	14	36	2,266	Barton-Aschman Assoc.
3.4	Louisville area, KY	July 1993	75	4:00–6:00 p.m.	57	11	32	43	1,955	Barton-Aschman Assoc.
3.5	Louisville area, KY	June 1993	53	4:00–6:00 p.m.	47	32	21	53	2,785	Barton-Aschman Assoc.
6.4	Louisville area, KY	June 1993	66	4:00–6:00 p.m.	53	20	27	47	2,610	Barton-Aschman Assoc.
3.8	Colonial Park, PA	March 2005	56	4:00–5:00 p.m.	43	—	—	57	—	McMahon Associates, Inc.
3.8	Camp Hill Mall, PA	March 2005	38	4:15–5:15 p.m.	41	—	—	59	—	McMahon Associates, Inc.
3.8	Exeter Twp, PA	March 2005	14	4:00–5:00 p.m.	24	—	—	76	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	63	4:00–5:00 p.m.	29	—	—	71	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	70	4:00–5:00 p.m.	29	—	—	71	—	McMahon Associates, Inc.
3.8	Palmyra, PA	March 2005	29	4:15–5:15 p.m.	27	—	—	73	—	McMahon Associates, Inc.
3.8	Mountain Road, PA	March 2005	41	4:00–5:00 p.m.	25	—	—	75	—	McMahon Associates, Inc.
3.8	Hummelstown, PA	March 2005	37	4:00–6:00 p.m.	31	—	—	69	—	McMahon Associates, Inc.
3.8	Muhlenberg, PA	March 2005	19	4:00–6:00 p.m.	29	—	—	71	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	34	4:00–6:00 p.m.	21	—	—	79	—	McMahon Associates, Inc.
3.8	Derry Street, PA	March 2005	36	4:00–6:00 p.m.	29	—	—	71	—	McMahon Associates, Inc.
3.6	Arlington, WA	Sept. 2007	—	4:00–6:00 p.m.	42	50	8	58	—	McMahon Associates, Inc.
2.7	Lynnwood, WA	Sept. 2007	—	4:00–6:00 p.m.	26	66	8	74	—	657
2.8	Redmond, WA	Sept. 2007	—	4:00–6:00 p.m.	21	55	24	79	—	657
3.6	Snohomish, WA	July 2007	—	4:00–6:00 p.m.	29	—	—	71	—	657

Average Pass-By Trip Percentage: 35

“—” means no data were provided

Figure F.15 Drive-in Bank (912)

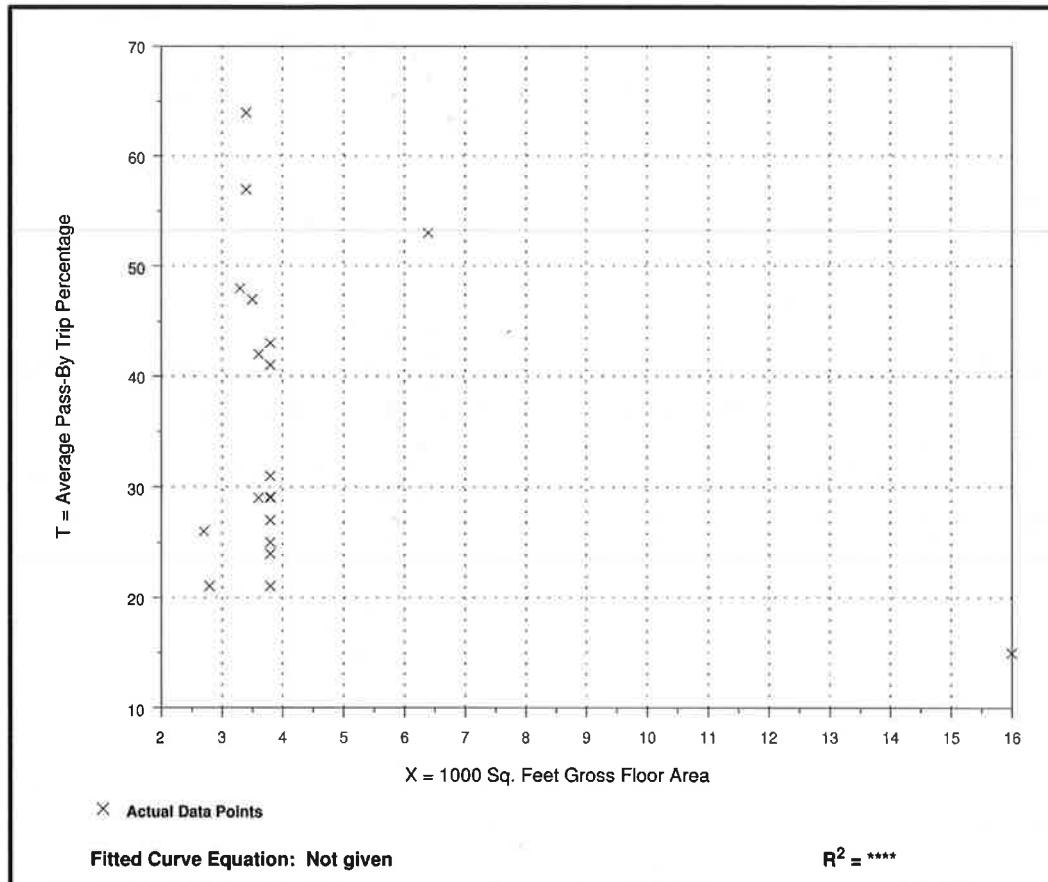
Average Pass-By Trip Percentage vs: 1000 Sq. Feet Gross Floor Area

On a: Weekday, P.M. Peak Period

Number of Studies: 21

Average 1000 Sq. Feet GFA: 4

Data Plot



**Table F.28 Pass-By and Non-Pass-By Trips Saturday, Mid-Day Peak Period
Land Use Code 912—Drive-in Bank**

SIZE (1,000 SQ. FT GFA)	LOCATION	SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
3.8	Colonial Park, PA	March 2005	63	11:15 a.m.–12:15 p.m.	33	—	—	67	—	McMahon Associates, Inc.
3.8	Camp Hill Mall, PA	March 2005	103	11:00 a.m.–12:00 p.m.	77	—	—	23	—	McMahon Associates, Inc.
3.8	Exeter Twp, PA	March 2005	34	10:30–11:30 a.m.	37	—	—	63	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	53	10:15–11:15 a.m.	33	—	—	67	—	McMahon Associates, Inc.
3.8	York, PA	March 2005	25	10:45–11:45 a.m.	12	—	—	88	—	McMahon Associates, Inc.

Average Pass-By Trip Percentage: 38
“—” means no data were provided

**Table F.29 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 931—Quality Restaurant**

SEATS	SIZE (1,000 SQ. FT GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
240	12	Louisville area, KY	July 1993	38	4:00–6:00 p.m.	26	36	38	74	4,145	Barton-Ashman Assoc.
—	8	Orlando, FL	1992	168	4:00–8:00 p.m.	45	—	—	55	—	TPD Inc.
—	8.8	Orlando, FL	1992	84	2:00–6:00 p.m.	44	40	16	56	—	TPD Inc.
—	6.5	Orlando, FL	1995	173	2:00–6:00 p.m.	62	—	—	38	—	TPD Inc.

Average Pass-By Trip Percentage: 44
“—” means no data were provided

**Table F.30 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 932—High-Turnover (Sit-Down) Restaurant**

SEATS	SIZE (1,000 SQ. FT GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS- BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
—	5.8	Orlando, FL	1992	150	2:00–6:00 p.m.	32	—	—	68	—	TPD Inc.
—	5	Casselberry, FL	1992	65	2:00–6:00 p.m.	58	—	—	42	—	TPD Inc.
168	5.3	Louisville area, KY	1993	24	4:00–6:00 p.m.	50	37	13	50	1,615	Barton- Aschman Assoc.
169	2.9	Louisville area, KY	1993	41	4:00–6:00 p.m.	37	27	36	63	3,935	Barton- Aschman Assoc
150	3.1	Louisville area, KY	1993	21	4:00–6:00 p.m.	38	29	33	62	2,580	Barton- Aschman Assoc.
250	7.1	New Albany, IN	1993	—	4:00–6:00 p.m.	23	23	54	77	1,565	Barton- Aschman Assoc.
—	8	Kissimmee, FL	1995	664	2:00–6:00 p.m.	40	39	21	60	—	TPD Inc.
—	11	Orlando, FL	1996	267	2:00–6:00 p.m.	38	43	19	62	—	TPD Inc.
—	12	Orlando, FL	1996	317	2:00–6:00 p.m.	29	51	20	71	—	TPD Inc.
—	4.6	Orlando, FL	1992	276	2:00–6:00 p.m.	63	—	—	37	—	TPD Inc.
—	5.7	Orlando, FL	1994	308	2:00–6:00 p.m.	57	—	—	43	—	TPD Inc.
—	6.2	Orlando, FL	1995	521	2:00–6:00 p.m.	46	43	11	54	—	TPD Inc.

Average Pass-By Trip Percentage: 43

“—” means no data were provided

Figure F.16 High-Turnover (Sit-Down) Restaurant (932)

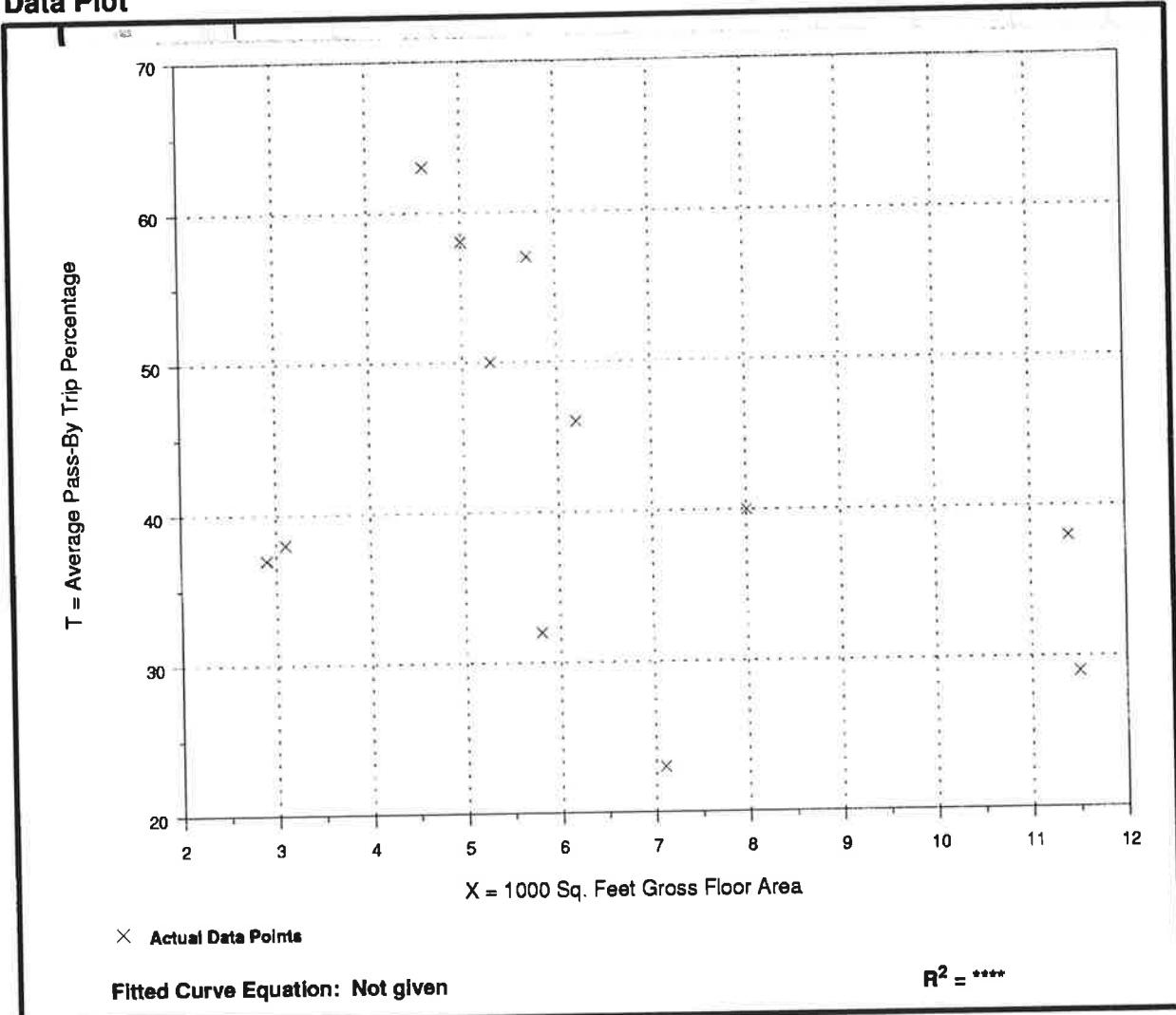
Average Pass-By Trip Percentage vs: 1,000 Sq. Ft. Gross Floor Area

On a: Weekday, PM Peak Period

Number of Studies: 12

Average 1,000 Sq. Ft. GFA: 6.4

Data Plot



[Home](#) [TMC](#) [TCLS](#) [TTDS](#) [PMS](#) [PMDS](#) [RSMS](#) [NMDS](#) [WOTS](#) [RTTV](#)

[Login](#) [+Locate](#) [+Locate All](#)

[Email This](#)

[Auto-Locate OFF](#)

Disclaimer: MassDOT has a wide range of traffic volume data. What is displayed here is data that has been captured within the past 10 years. [...more](#)

[List View](#) [All DIRs](#)

[Report Center](#)

Record		◀◀	◀	1	▶	▶▶	of 1	Goto Record	go
Location ID	5026							MPO ID	
Type	SPOT							HPMS ID	181007302540
On NHS								On HPMS	Yes
LRS ID	SR110 EB							LRS Loc Pt.	49.74125
SF Group	U4-7					▶		Route Type	SR
AF Group	U4-7					▶		Route	110
GF Group	U4-7					▶		Active	Yes
Class Dist Grp	U4-7					▶		Category	HPMS
Seas Clss Grp	MHD Statewide					▶			
WIM Group									
QC Group	Default								
Fnct'l Class	(4) Minor Arterial							Milepost	
Located On	MERRIMACK STREET								
Loc On Alias									
EAST OF	RTE.I-495								
More Detail ▶									

STATION DATA

Directions: [2-WAY](#) [EB](#) [WB](#) [?](#)

AADT 								
	Year	AADT	DHV-30	K %	D %	PA	BC	Src
	2020	16,204						
	2019	17,608 ³	1,868	11	65	16,855 (96%)	753 (4%)	Grown from 2018
	2018	17,679	1,876	11	65	16,707 (95%)	972 (5%)	
	2017	16,988 ³				16,206 (95%)	782 (5%)	Grown from 2016
	2016	16,704 ³		11	62	15,785 (94%)	919 (6%)	Grown from 2015

|<< < > >>| 1-5 of 25