Memorandum

To: City of Somerville
Attn: Sarah Lewis
93 Highland Avenue
Somerville, MA 02143

Date: February 6, 2023

Project #: 14877.01

From: Patrick Dunford, PE
Kathleen Keen, PE
Ashley Domogala, EIT

Re: 200 McGrath Highway
Gateway Innovation Center
Master Plan Special Permit Application
Supplemental Transportation Memorandum

VHB, on behalf of US McGrath Owner, LLC, prepared and submitted a Mobility Management Plan (MMP)[1], Transportation Impact Study (TIS)[2], and Transportation Access Plan (TAP)[3] to support the 200 McGrath Highway (Gateway Innovation Center) Master Plan Special Permit (MPSP) application. Between the preparation of the aforementioned documents and the MPSP submittal, the build program was reduced from 1,194,000 square feet (SF) to 980,000 SF and the corresponding parking supply was reduced from 900/700[4] to 588 off-street spaces. At the request of the Mobility Division, certain portions of the TAP have been updated and are included in a revised TAP document. The information in this memorandum serves as an update to the MMP and TIS. The following sections outline the changes made since the preparation of the transportation documents prepared in October 2021 and January 2022.

Reduced Build Program

The updated site plan is included in the Attachments and supersedes all site plans included in the documents prepared in October 2021 and January 2022.

As summarized in Table 1, the revised build program results in a reduction of 214,000 SF of commercial space and a reduction of 312/112 off-street parking spaces. The reduced parking supply of 588 off-street spaces is consistent with the maximum parking ratio of 0.6 spaces per 1,000 SF specified in the Final MMP Approval dated April 13, 2022 and consistent with the Urban Design Framework (UDF) for Milk Square / Union Square East.

In addition, 16 on-street parking spaces are proposed on Somerville Avenue Extension adjacent to the Site, consistent with the TIS and TAP.

1 *Mobility Management Plan: 200 McGrath Highway Master Plan*, VHB, October 5, 2021.
2 *Transportation Impact Study: Gateway Innovation Center*, VHB, January 2022.
3 *Transportation Access Plan: Gateway Innovation Center,* VHB, January 31, 2022.
4 *The MMP, TIS, and TAP reflect the previous Project proposal for parking, which was an initial 900-space parking supply (made up of a combination of striped and stacker spaces), which would be reduced to a 700-space parking supply in the future with the stacker spaces phased out of use after the completion of the McGrath Boulevard project.*

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Table 1 Program Use Table

Use/Element	Proposed Program (MMP, TIS, TAP)[1]	Proposed Program (Revised)[1]	Difference
Lab/R&D/Office	1,127,250 SF[2]	926,500 SF[3]	-200,750 SF
Arts/Creative Enterprise	59,700 SF	49,000 SF	-10,700 SF
Retail	7,050 SF	4,500 SF	-2,550 SF
Total	**1,194,000 SF**	**980,000 SF**	**-214,000 SF**
Below-Grade Parking	900/700 spaces[4]	588 spaces	-312/-112 spaces

1 Gross Floor Area is inclusive of all building space, including interior mechanical spaces, but excludes below-grade parking, and mechanical penthouse space.
2 Includes approximately 30,000 SF of mid-level mechanical space to support the upper level laboratory uses.
3 Includes approximately 24,450 SF of mid-level mechanical space to support the upper level laboratory uses.
4 While the initial parking supply was proposed to be 900 spaces, approximately 200 of these would be provided as stacker spaces which would be phased out, ultimately resulting in a future parking supply of 700 striped spaces.

Reduced Trip Generation

As summarized in Table 2, the revised Project is projected to generate 3,591 daily net new vehicle trips (1,796 entering, 1,795 exiting), 418 morning peak hour net new vehicle trips (360 entering, 58 exiting), and 382 evening peak hour net new vehicle trips (48 entering, 334 exiting). This represents 821 fewer daily vehicle trips, 72 fewer morning peak hour vehicle trips, and 75 fewer evening peak hour vehicle trips. Detailed trip generation calculations are included in the Attachments.

Table 2 Project Trip Generation – Net New Vehicle Trips

Time Period	Net New Vehicle Trips [a] (MMP, TIS, TAP)	Net New Vehicle Trips [a] (Revised)	Difference
Weekday Daily			
Enter	2,207	1,796	-411
Exit	2,205	1,795	-410
Total	4,412	3,591	-821
Weekday Morning			
Enter	424	360	-64
Exit	66	58	-8
Total	490	418	-72
Weekday Evening			
Enter	58	48	-10
Exit	399	334	-65
Total	457	382	-75

Note Vehicle trip generation estimates by land use with internal capture credits and pass-by applied. Based on ITE Trip Generation Manual, 10th Edition, for consistency with previous estimates.
a Does not include pass-by trips.

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Truck Trips

As truck trip data for LUC 760 (Research & Development Center) is not available and data for LUC 820 (Shopping Center) is for retail centers well outside the Project retail size, the estimated number of truck trips were calculated based on LUC 710 (General Office Building) for the total development of 980,000 SF. As summarized in Table 3, the revised Project is projected to generate 52 daily truck trips (26 entering, 26 exiting), 10 morning peak hour truck trips (7 entering, 3 exiting), and 10 evening peak hour truck trips (3 entering, 7 exiting). These estimates are likely overstated as the Project building size is larger than those included in the ITE database. Accordingly, the available data may not accurately reflect how much the trip generation rate decreases as the building size increases. Weekend truck trips are expected to be minimal. Detailed truck trip data are included in the Attachments.

Table 3 Project Trip Generation – Truck Trips

Time Period	Proposed [a]
Weekday Daily	
Enter	26
Exit	26
Total	52
Weekday Morning	
Enter	7
Exit	3
Total	10
Weekday Evening	
Enter	3
Exit	7
Total	10

a Based on LUC 710 (General Office Building) for 980,000 SF. Weekday morning distribution assumed to be opposite weekday evening distribution. *ITE Trip Generation Manual, 10th Edition* defines truck trip as "the movement of a commercial cargo transport vehicle that transports cargo across a site cordon line. A vehicle parked off-site that is loaded or unloaded with cargo destined from or to a study site is considered a truck trip generated by that site. Commercial cargo is typically transported in either medium-duty or heavy-duty trucks. A service vehicle entering or exiting a site is not considered a truck trip."

As discussed in the TIS, a total of 72 daily truck trips and 5 peak hour truck trips in both the weekday morning and evening peak hours were counted at Site driveways in January 2021. Truck trips included heavy construction vehicles associated with the MBTA Green Line Extension work and trash haulers at FW Russell. FW Russell vacated the Site in Summer 2021. To provide a conservative analysis, no credit was taken for elimination of these uses.

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Transportation Mitigation Program

Despite the reduction in the build program/parking supply and subsequent reduction in Project trip generation, the Proponent is still committed to implementing all elements of the robust transportation mitigation program outlined in the MMP[5] and conditions specified in the Final MMP Approval dated April 13, 2022.

5 *Mobility Management Plan: 200 McGrath Highway Master Plan*, VHB, October 5, 2021.

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Attachments

- Site Plan
- Trip Generation Calculations
- Truck Trip Data

Source: Stantec

PROPERTY LINE
NEW LOT LINES
DEVELOPMENT SITE BOUNDARY

Figure 21

Site Plan (updated January 2023)

Gateway Innovation Center
Somerville, Massachusetts

Source: Stantec

PROPERTY LINE
NEW LOT LINES
DEVELOPMENT SITE BOUNDARY

Figure 21

Site Plan

Gateway Innovation Center
Somerville, Massachusetts

TRIP GENERATION INPUTS

Land Use	Size	Units
R&D	2260	employees
Retail	4.500	ksf

TRIP GENERATION SUMMARY

	Gross Trips	Person Trips [3]	Internal Capture [4]	Net Person Trips	R&D [1] Vehicle Trips [5]	Transit Trips	Bike Trips	Walk Trips	WFH Trips
		1.18			1.16				
Weekday Daily									
Enter	3,291	3,883	20	3,863	1,665	1,198	232	348	155
Exit	3,291	3,883	27	3,856	1,662	1,195	231	347	154
Total	6,582	7,766	47	7,719	3,327	2,393	463	695	309
Weekday Morning Peak Hour									
Enter	675	797	31	766	330	237	46	69	31
Exit	119	140	39	101	44	31	6	9	4
Total	794	937	70	867	374	268	52	78	35
Weekday Evening Peak Hour									
Enter	79	93	1	92	40	29	6	8	4
Exit	640	755	4	751	324	233	45	68	30
Total	719	848	5	843	364	262	51	76	34

1 Trip generation estimate based on ITE LUC 760 (Research & Development Center), using regression equations. Peak hour of generator used. Employees used as
2 Trip generation estimate based on ITE LUC 820 (Shopping Center), using regression equations.
3 VOR rates based on 2017 NHTS Average Vehicle Occupancy for Selected Trip Purpose (Table 16).
4 Internal capture rates based on NCHRP Report 684.
5 VOR rates based on census data for R&D. Assumed to be the same as national rates for retail.
6 Pass-by rates based on ITE LUC 820 (Shopping Center), 25-percent pass-by rate assumed for time periods with no available data.

TRIP GENERATION INPUTS

Land Use	Size	Units
R&D	2260	employees
Retail	4.500	ksf

TRIP GENERATION SUMMAR'

	Gross Trips	Person Trips [3]	Internal Capture [4]	Net Person Trips	Vehicle Trips [5]	Retail [2] Pass-by [6]	Net Vehicle Trips	Transit Trips	Bike Trips	Walk Trips	WFH Trips
		1.82			1.82						
Weekday Daily						25%					
Enter	365	664	27	637	175	44	131	197	38	57	25
Exit	365	664	20	644	177	44	133	200	39	58	26
Total	730	1,328	47	1,281	352	88	264	397	77	115	51
Weekday Morning Peak Hour						25%					
Enter	95	173	39	134	37	7	30	42	8	12	5
Exit	59	107	31	76	21	7	14	24	5	7	3
Total	154	280	70	210	58	14	44	66	13	19	8
Weekday Evening Peak Hour						34%					
Enter	26	47	4	43	12	4	8	13	3	4	2
Exit	29	53	1	52	14	4	10	16	3	5	2
Total	55	100	5	95	26	8	18	29	6	9	4

1 Trip generation estimate based on ITE LUC 760 (Research & Development Center), using regression equations. Peak hour of generator used. Employees used as independent variable.
2 Trip generation estimate based on ITE LUC 820 (Shopping Center), using regression equations.
3 VOR rates based on 2017 NHTS Average Vehicle Occupancy for Selected Trip Purpose (Table 16).
4 Internal capture rates based on NCHRP Report 684.
5 VOR rates based on census data for R&D. Assumed to be the same as national rates for retail.
6 Pass-by rates based on ITE LUC 820 (Shopping Center), 25-percent pass-by rate assumed for time periods with no available data.

TRIP GENERATION INPUTS

Land Use	Size	Units
R&D	2260	employees
Retail	4.500	ksf

TRIP GENERATION SUMMAR'

	Total								
	Gross Trips	Net Person Trips	Vehicle Trips	Pass-by Trips	Net Vehicle Trips	Transit Trips	Bike Trips	Walk Trips	WFH Trips
Weekday Daily									
Enter	3,656	4,500	1,840	44	1,796	1,395	270	405	180
Exit	3,656	4,500	1,839	44	1,795	1,395	270	405	180
Total	7,312	9,000	3,679	88	3,591	2,790	540	810	360
Weekday Morning Peak Hour									
Enter	770	900	367	7	360	279	54	81	36
Exit	178	177	65	7	58	55	11	16	7
Total	948	1,077	432	14	418	334	65	97	43
Weekday Evening Peak Hour									
Enter	105	135	52	4	48	42	9	12	6
Exit	669	803	338	4	334	249	48	73	32
Total	774	938	390	8	382	291	57	85	38

SHARED TRIPS [1]

RETAIL - OFFICE

WEEKDAY DAILY

RETAIL	%	#	BALANCED	#	%	OFFICE
EXIT ->	3%	664	**20**	3,883	15%	-> ENTER
ENTER <-	4%	664	**27**	3,883	22%	<- EXIT

TOTAL SHARED TRIPS - WEEKDAY DAILY

	ENTER	EXIT	TOTAL
R&D	20	27	47
RETAIL	27	20	47
TOTAL	47	47	94

WEEKDAY MORNING

RETAIL	%	#	BALANCED	#	%	OFFICE
EXIT ->	29%	107	**31**	797	4%	-> ENTER
ENTER <-	32%	173	**39**	140	28%	<- EXIT

TOTAL SHARED TRIPS - WEEKDAY MORNING

	ENTER	EXIT	TOTAL
R&D	31	39	70
RETAIL	39	31	70
TOTAL	70	70	140

WEEKDAY EVENING

RETAIL	%	#	BALANCED	#	%	OFFICE
EXIT ->	2%	53	**1**	93	31%	-> ENTER
ENTER <-	8%	47	**4**	755	20%	<- EXIT

TOTAL SHARED TRIPS - WEEKDAY EVENING

	ENTER	EXIT	TOTAL
R&D	1	4	5
RETAIL	4	1	5
TOTAL	5	5	10

Note: Shared trips based off of person trips for each land use.

1 Weekday morning and evening internal captures based on NCHRP 684. Weekday daily rates based on ITE Trip Generation Handbook, 2nd Edition.

ITE TRIP GENERATION WORKSHEET
(10th Edition, Updated 2017)

LANDUSE: Research & Development Center
LANDUSE CODE: 760 Independent Variable --- Employees
SETTING/LOCATION: General Urban/Suburban
JOB NAME: **Gateway Innovation Center** **EMPLOYEES:** 2260
JOB NUMBER: **14877.00**

WEEKDAY

RATES:

	# Studies	R^2	Total Trip Ends Average	Low	High	Independent Variable Range Average	Low	High	Directional Distribution Enter	Exit
DAILY	21	0.87	3.29	1.60	10.63	658	26	2,333	50%	50%
AM PEAK OF GENERATOR	31	0.90	0.41	0.20	0.88	518	25	2,333	85%	15%
PM PEAK OF GENERATOR	31	0.91	0.38	0.18	1.11	518	25	2,333	11%	89%
AM PEAK (ADJACENT ST)	9	0.58	0.51	0.28	0.88	92	25	180	72%	28%
PM PEAK (ADJACENT ST)	3	--	0.52	0.36	1.07	122	43	180	14%	86%

TRIPS:

	BY AVERAGE Total	Enter	Exit	BY REGRESSION Total	Enter	Exit
DAILY	7,435	3,718	3,718	6,582	3,291	3,291
AM PEAK OF GENERATOR	927	788	139	794	675	119
PM PEAK OF GENERATOR	859	94	764	719	79	640
AM PEAK (ADJACENT ST)	1,153	830	323	428	308	120
PM PEAK (ADJACENT ST) #	1,175	165	1,011	N/A	N/A	N/A

SATURDAY

RATES:

	# Studies	R^2	Total Trip Ends Average	Low	High	Independent Variable Range Average	Low	High	Directional Distribution Enter	Exit
DAILY	19	0.55	0.56	0.03	2.97	600	26	2,333	50%	50%
PEAK OF GENERATOR	12	0.55	0.06	0.01	0.30	558	175	2,100	*Peak Distribution Not Availble*	

TRIPS:

	BY AVERAGE Total	Enter	Exit	BY REGRESSION Total	Enter	Exit
DAILY	1,266	633	633	852	426	426
PEAK OF GENERATOR	136	N/A	N/A	104	N/A	N/A

SUNDAY

RATES:

	# Studies	R^2	Total Trip Ends Average	Low	High	Independent Variable Range Average	Low	High	Directional Distribution Enter	Exit
DAILY	19	--	0.33	0.02	1.78	600	26	2,333	50%	50%
PEAK OF GENERATOR	12	--	0.04	0.01	0.23	558	175	2,100	*Peak Distribution Not Availble*	

TRIPS:

	BY AVERAGE Total	Enter	Exit	BY REGRESSION Total	Enter	Exit
DAILY	746	373	373	N/A	N/A	N/A
PEAK OF GENERATOR	90	N/A	N/A	N/A	N/A	N/A

ITE TRIP GENERATION WORKSHEET
(10th Edition, Updated 2017)

LANDUSE: Shopping Center
LANDUSE CODE: 820
SETTING/LOCATION: General Urban/Suburban
JOB NAME: **Gateway Innovation Center**
JOB NUMBER: **14877.00**

Independent Variable ---
FLOOR AREA (KSF): 4.500

WEEKDAY

RATES:

	# Studies	R^2	Total Trip Ends: Average	Low	High	Independent Variable Range: Average	Low	High	Directional Distribution: Enter	Exit
DAILY	147	0.76	37.75	7.42	207.98	453	9	1,510	50%	50%
AM PEAK (ADJACENT ST)	84	0.90	0.94	0.18	23.74	351	9	1,510	62%	38%
PM PEAK (ADJACENT ST)	261	0.82	3.81	0.74	18.69	327	2	2,200	48%	52%

TRIPS:

	BY AVERAGE: Total	Enter	Exit	BY REGRESSION: Total	Enter	Exit
DAILY	170	85	85	730	365	365
AM PEAK OF GENERATOR	14	7	6	90	48	41
PM PEAK OF GENERATOR	19	9	9	61	30	30
AM PEAK (ADJACENT ST)	4	3	2	154	95	59
PM PEAK (ADJACENT ST)	17	8	9	55	26	29

SATURDAY

RATES:

	# Studies	R^2	Total Trip Ends: Average	Low	High	Independent Variable Range: Average	Low	High	Directional Distribution: Enter	Exit
DAILY	58	0.71	46.12	13.07	167.89	602	56	1,510	50%	50%
PEAK OF GENERATOR	119	0.87	4.50	1.42	15.10	416	4	1,510	52%	48%

TRIPS:

	BY AVERAGE: Total	Enter	Exit	BY REGRESSION: Total	Enter	Exit
DAILY	208	104	104	1,303	652	652
PEAK OF GENERATOR	20	11	10	53	28	26

SUNDAY

RATES:

	# Studies	R^2	Total Trip Ends: Average	Low	High	Independent Variable Range: Average	Low	High	Directional Distribution: Enter	Exit
DAILY	30	–	21.10	4.15	148.15	509	47	1,510	50%	50%
PEAK OF GENERATOR	24	–	2.79	0.39	12.40	382	47	1,268	49%	51%

TRIPS:

	BY AVERAGE: Total	Enter	Exit	BY REGRESSION: Total	Enter	Exit
DAILY	95	47	47	N/A	N/A	N/A
PEAK OF GENERATOR	13	6	6	N/A	N/A	N/A

General Office Building
(710)

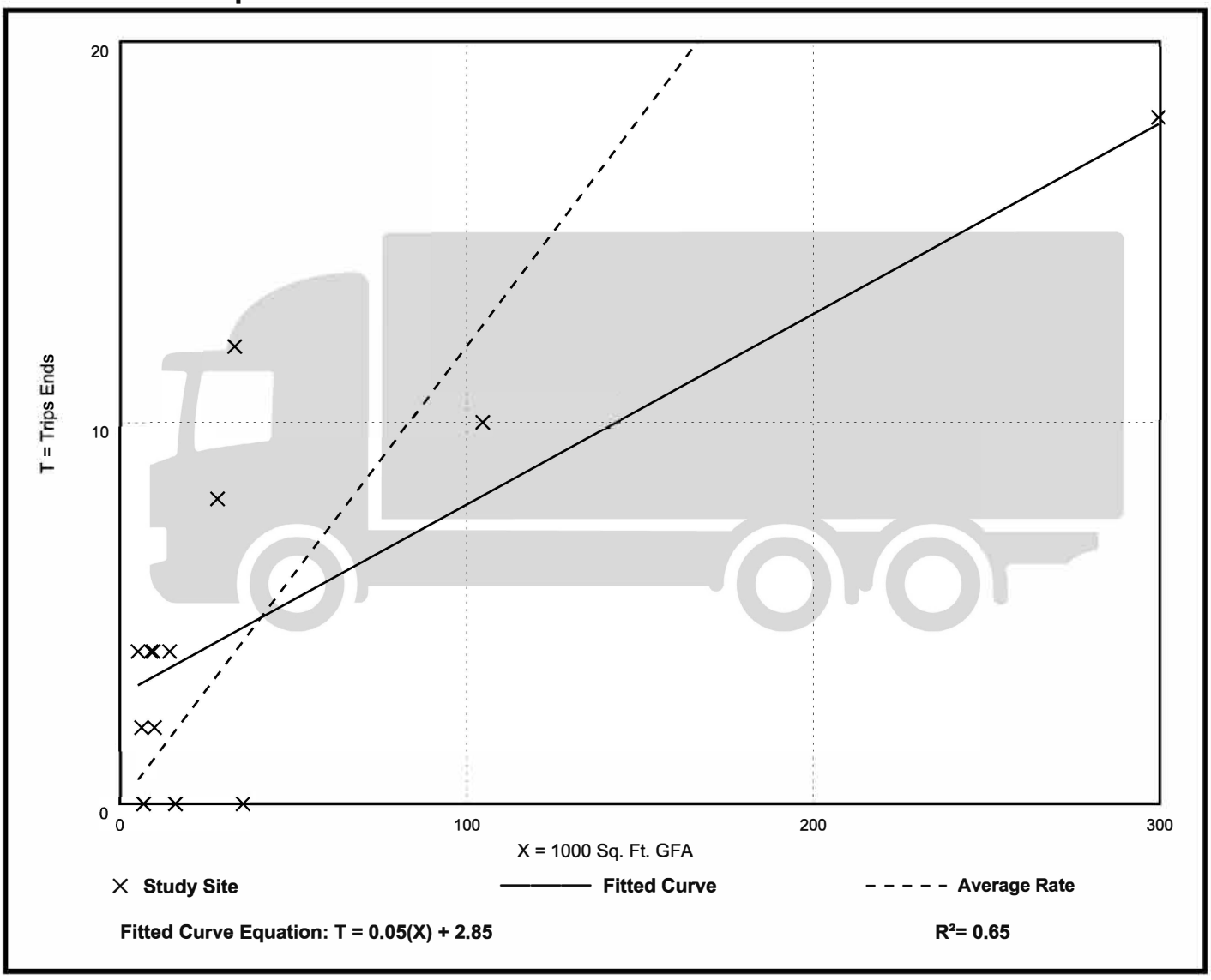
Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GFA: 44
Directional Distribution: 50% entering, 50% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.12	0.00 - 0.76	0.13

Data Plot and Equation



Fitted Curve Equation: T = 0.05(X) + 2.85

R^2= 0.65

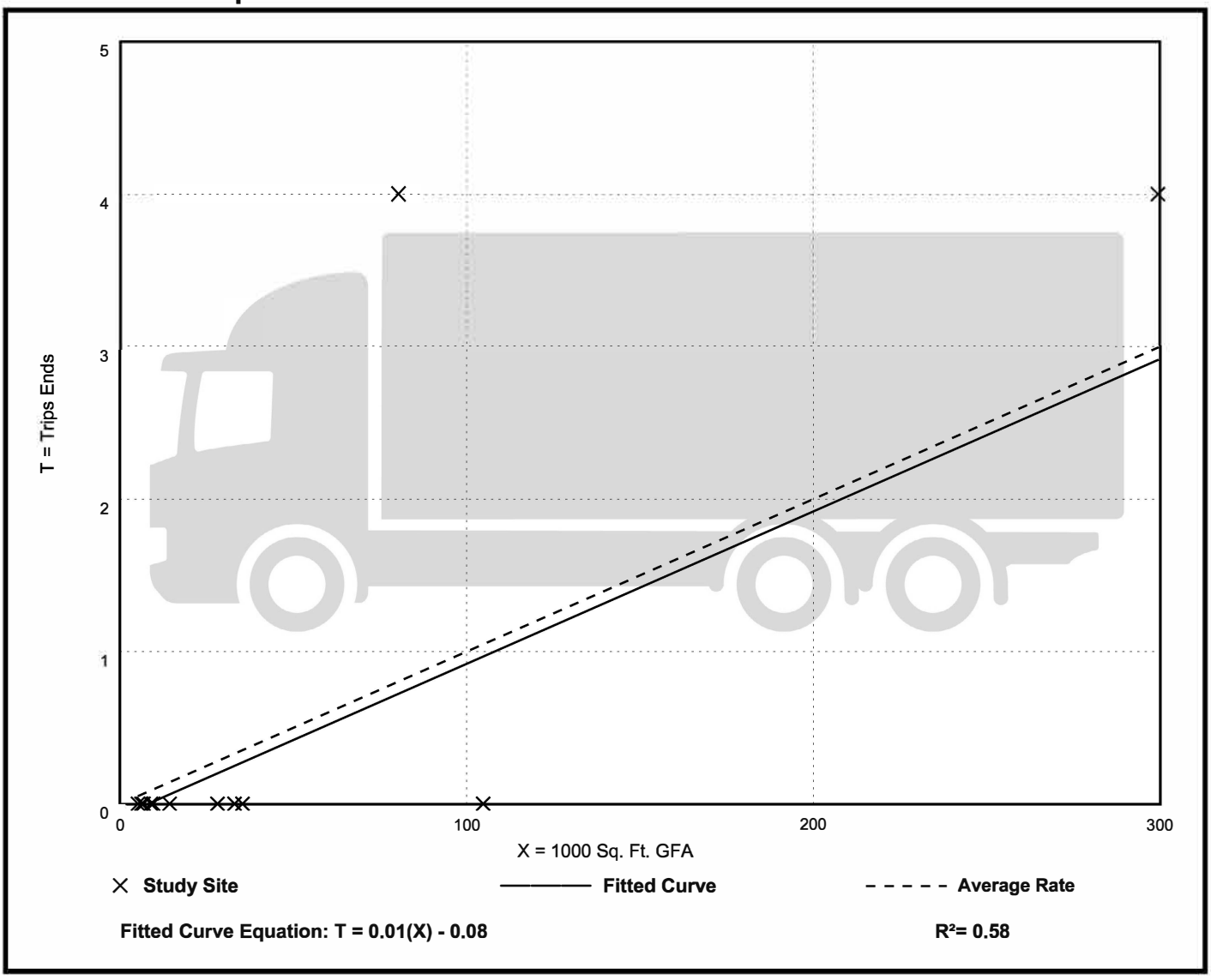
General Office Building
(710)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. 1000 Sq. Ft. GFA: 53
Directional Distribution: Not Available

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.05	0.02

Data Plot and Equation



General Office Building
(710)

Truck Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 13
Avg. 1000 Sq. Ft. GFA: 50
Directional Distribution: 33% entering, 67% exiting

Truck Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.01	0.00 - 0.04	0.01

Data Plot and Equation