

## APPENDIX

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MANUAL TURNING MOVEMENT COUNT DATA  
SEASONAL ADJUSTMENT DATA  
PUBLIC TRANSPORTATION SCHEDULES  
CRASH DATA  
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BACKGROUND DEVELOPMENT NETWORKS  
TRIP-GENERATION CALCULATIONS  
CAPACITY ANALYSIS WORKSHEETS  
HCS SIGNAL WARRANT ANALYSIS

## PROJECT SITE PLAN

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AUTOMATIC TRAFFIC RECORDER COUNT DATA

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PRECISION  
DATA  
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702  
Office: 508-875-0118 Fax: 508-875-0118  
Email: datarequest@pdinc.com

Hopping Brook Road  
Approx 450' south of Washington Street  
City, State: Holliston, MA  
Client: EDC/P. Bemis

197374 B Volume  
Site Code: TBA  
Date Start: 12/16/19  
Date End: 12/19/19

Start Time	12/16/19		12/17/19		12/18/19		12/19/19		12/20/19		12/21/19		12/22/19		Week Average	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	0	0	6	0	3	2	5	0	*	*	*	*	*	*	4	0
01:00	2	1	12	1	8	2	8	0	*	*	*	*	*	*	8	1
02:00	2	1	4	2	13	0	8	2	*	*	*	*	*	*	1	1
03:00	1	1	2	1	2	6	1	1	*	*	*	*	*	*	7	1
04:00	1	17	1	17	4	22	1	18	*	*	*	*	*	*	2	2
05:00	7	84	16	95	15	102	13	90	*	*	*	*	*	*	2	18
06:00	20	239	34	237	45	256	41	241	*	*	*	*	*	*	13	93
07:00	52	263	39	260	59	240	48	219	*	*	*	*	*	*	35	243
08:00	54	184	60	169	43	195	40	179	*	*	*	*	*	*	50	246
09:00	53	102	27	91	41	106	43	97	*	*	*	*	*	*	49	182
10:00	52	74	51	59	62	69	75	95	*	*	*	*	*	*	99	140
11:00	96	67	61	60	93	69	97	85	*	*	*	*	*	*	60	74
12:00 PM	175	128	92	79	193	143	211	145	*	*	*	*	*	*	87	70
01:00	86	138	79	84	106	139	99	140	*	*	*	*	*	*	168	124
02:00	128	100	104	73	101	115	122	101	*	*	*	*	*	*	92	125
03:00	189	56	218	53	174	64	176	53	*	*	*	*	*	*	114	97
04:00	221	45	224	38	232	32	212	38	*	*	*	*	*	*	189	56
05:00	231	27	194	28	260	32	223	27	*	*	*	*	*	*	222	38
06:00	52	21	67	21	69	23	58	26	*	*	*	*	*	*	227	28
07:00	34	6	26	9	11	10	26	15	*	*	*	*	*	*	62	23
08:00	20	5	12	12	15	6	10	3	*	*	*	*	*	*	24	10
09:00	8	5	10	1	5	2	6	4	*	*	*	*	*	*	14	6
10:00	7	4	6	4	11	6	10	4	*	*	*	*	*	*	7	3
11:00	5	1	4	0	4	1	6	1	*	*	*	*	*	*	8	4
Total	1496	1569	1349	1394	1569	1642	1539	1584	0	0	0	0	0	0	1490	1544
Day	3065		2743		3211		3123		0		0		0		3034	
AM Peak	11:00	07:00	11:00	07:00	11:00	06:00	11:00	06:00	-	-	-	-	-	-	11:00	07:00
Vol.	96	263	61	260	93	256	97	241	-	-	-	-	-	-	87	246
PM Peak	17:00	13:00	16:00	13:00	17:00	12:00	17:00	12:00	-	-	-	-	-	-	17:00	13:00
Vol.	231	138	224	84	260	143	223	145	-	-	-	-	-	-	227	125



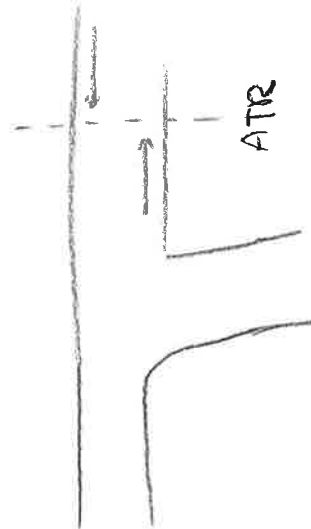
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46 Morton Street, Framingham, MA 01702  
Office: 508-875-0100 Fax: 508-875-0118  
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Washington Street (Route 16)  
approx 500' east of Hopping Brook Road  
City, State: Holliston, MA  
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Start Time	12/16/19		12/17/19		12/18/19		12/19/19		12/20/19		12/21/19		12/22/19		Week Average	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	19	18	17	18	35	16	29	28							25	20
01:00	16	12	13	20	22	20	22	16							18	17
02:00	4	13	5	16	12	20	5	17							6	16
03:00	6	18	14	25	21	30	13	24							14	24
04:00	16	44	30	68	28	61	25	42							25	54
05:00	89	312	80	284	93	268	81	296							86	290
06:00	244	620	225	502	238	573	249	590							239	571
07:00	426	609	368	507	434	574	416	575							411	566
08:00	489	577	394	446	502	624	426	560							453	552
09:00	457	428	345	330	409	487	429	434							410	420
10:00	438	443	311	333	412	423	410	408							393	402
11:00	465	421	303	332	464	426	457	405							422	396
12:00 PM	509	466	356	293	530	437	486	465							470	415
01:00	504	457	371	376	533	444	492	441							430	430
02:00	607	534	472	339	615	493	597	503							573	467
03:00	705	496	542	375	699	536	687	472							658	470
04:00	670	567	570	408	681	564	681	591							650	532
05:00	694	612	572	412	704	637	706	612							669	568
06:00	590	412	354	226	587	418	596	438							532	374
07:00	318	302	214	189	447	262	365	304							336	264
08:00	221	222	161	130	265	242	257	221							226	204
09:00	182	142	122	83	232	165	211	183							187	143
10:00	91	106	81	72	107	145	119	132							100	114
11:00	62	49	82	32	88	69	104	66							84	54
Total	7822	7880	6002	5816	8158	7934	7863	7823	0	0	0	0	0	0	7462	7363
Day	15702		11818		16092		15686		0		0		0		14825	
AM Peak	08:00	06:00	08:00	07:00	08:00	08:00	11:00	06:00	-	-	-	-	-	-	08:00	06:00
Vol.	489	620	394	507	502	624	457	590	-	-	-	-	-	-	453	571
PM Peak	15:00	17:00	17:00	17:00	17:00	17:00	17:00	17:00	-	-	-	-	-	-	17:00	17:00
Vol.	705	612	572	412	704	637	706	612	-	-	-	-	-	-	669	568



## MANUAL TURNING MOVEMENT COUNT DATA

# TURNING MOVEMENT COUNT REDUCTION WORKSHEET

INTERSECTION: Washington Street at Hopping Brook Drive  
COUNT DATE: 7AM-9AM Wednesday 12/18/19 3PM-6PM Thursday 12/12/19

Counted By: ZRB  
Weather Conditions: Clear 20-30 deg F

TIME:	Washington Street WB				Washington Street EB					Hopping Brook Drive NB					SB				TOTAL (15 Min.)	TOTAL (Hour)
	L	T	R	Total	L	T	R	RR	Total	L	T	R	RR	Total	L	T	R	Total		
6:30 - 6:45				0					0					0				0	0	<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>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## PEAK HOUR VOLUMES:

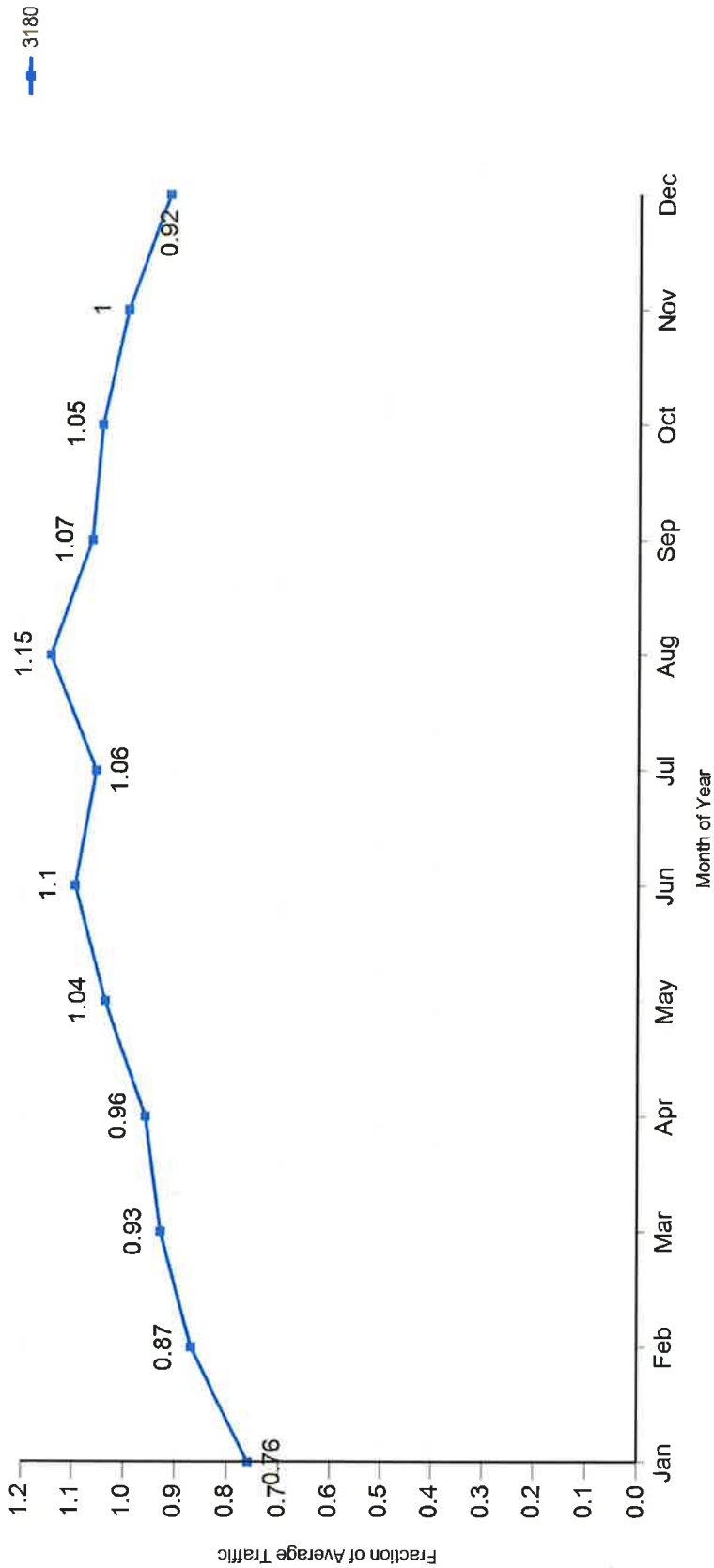
TIME: MORNING PEAK PERIOD	Washington Street WB				Washington Street EB					Hopping Brook Drive NB					0 SB				TOTAL (Hour)	
	L	T	R	Total	L	T	R	RR	Total	L	T	R	RR	Total	L	T	R	Total		
7:30 - 7:45	9	119		128		114	52		166	22		7		29				0	323	<div></div>
7:45 - 8:00	15	130		145		151	43		194	12		1		13				0	352	
8:00 - 8:15	13	122		135		149	54		203	13		6		19				0	357	
8:15 - 8:30	8	103		111		172	30		202	4		4		8				0	321	
	45	474	0	519	0	586	179	0	765	51	0	18	0	69	0	0	0	0	1353	
PHF	0.89				0.94					0.59					0.95				PHF	

TIME: EVENING PEAK PERIOD	Washington Street WB				Washington Street EB					Hopping Brook Drive NB					0 SB				TOTAL (Hour)		
	L	T	R	Total	L	T	R	RR	Total	L	T	R	RR	Total	L	T	R	Total			
	16:30 - 16:45	6	185		191		124	7		131	42		19		61				0	383	383
	16:45 - 17:00	3	156		159		113	13		126	45		17		62				0	347	730
	17:00 - 17:15	5	178		183		126	5		131	57		26		83				0	397	1127
	17:15 - 17:30	3	185		188		137	1		138	38		11		49				0	375	1502
	17	704	0	721	0	500	26	0	526	182	0	73	0	255	0	0	0	0	1502	<div></div>	
PHF		0.94				0.95				0.77				####				0.95		PHF	



## SEASONAL ADJUSTMENT DATA

Traffic Pattern by Month for 1/1/2017 - 12/31/2017



Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2017 - 12/31/2017

Factor Group	Station	Weight	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
U1-Boston	3180	0	0.756	0.867	0.927	0.962	1.042	1.097	1.062	1.149	1.073	1.048	1.000	0.918
Average of Weighted Factors			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

## PUBLIC TRANSPORTATION SCHEDULES

### Fare Information

Adult fare: \$1.50 cash / \$1.25 with a Charlie Card.

Student fare: \$1.00 cash with valid Student ID.

Children under 6 ride free when accompanied by an adult.

Children under 12 may not ride unaccompanied.

Elderly (65 years of age or older): \$0.75 cash with photo ID indicating date of birth or \$0.70 with an MWRTA Senior TAP Pass.

Individuals with disabilities: \$0.75 cash or \$0.70 with a valid MBTA Access Card, Medicare Card or MWRTA Disabled TAP Pass.

Charlie Cards are available free of charge at the Blandin Hub or on the bus. Value can be added to existing cards onboard, online at [mbta.com](http://mbta.com), or at an MBTA kiosk.

### Transfer/Connections

Transfer coupons are available on all buses and are good for transfers going in the same direction within the MWRTA system only. Transfers are not compatible within the MBTA system. One transfer per paid fare is issued upon request and must be presented to the next driver within 90 minutes.

Riders can access MBTA Commuter Rail Service in Downtown Framingham, Ashland, Southborough, and Natick. For MBTA schedule and service information call 617.222.3200.

Scan the QR code below with your smartphone to be directed to the MWRTA Routes and Schedules website.



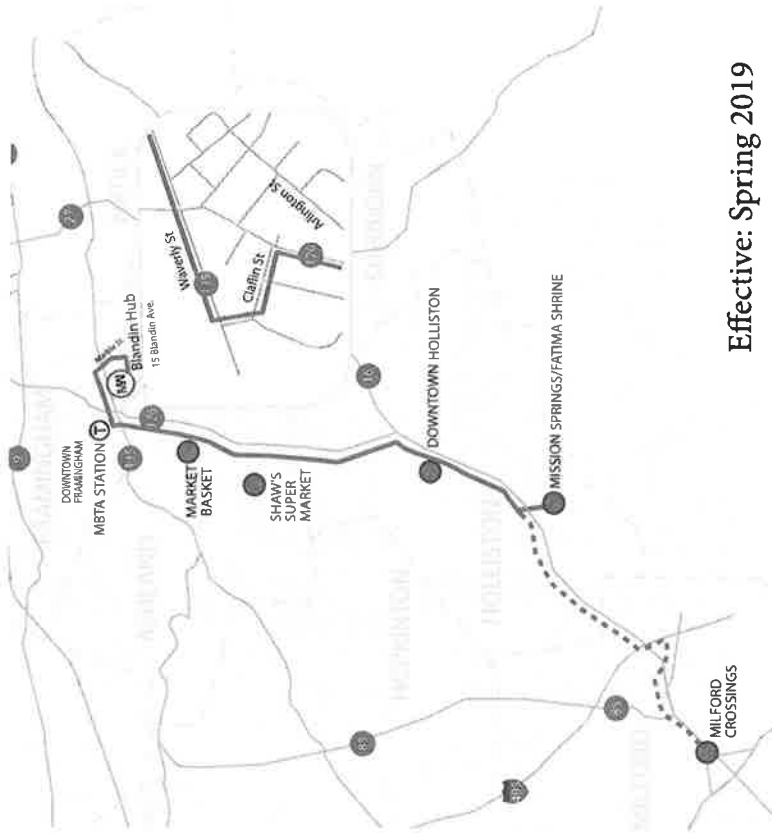
No service provided on the following Holidays:

New Year's Day  
Patriot's Day  
Memorial Day  
Independence Day  
Thanksgiving Day  
Christmas Day



**MetroWest Regional  
Transit Authority**  
Public Transportation System

## Route 6 (Monday-Friday Service)



Effective: Spring 2019

### MWRTA Customer Service:

(508) 935-2222

Blandin Hub: 15 Blandin Ave.  
Framingham, MA 01702

[www.mwrtta.com](http://www.mwrtta.com)



Follow Us: @mwrtta

# ROUTE 6 Weekday (Monday-Friday Service)

## AM

## PM

v. 5.19

OUTBOUND	Blandin Hub (15 Blandin Ave.)	5:51	7:14	8:30	9:40	10:54	12:03	1:11	2:03	3:24	4:42	5:58	7:12
	Framingham MBTA	5:57	7:17	8:33	9:43	10:57	12:06	1:14	2:07	3:28	4:46	6:02	7:15
	Winthrop / Hollis Sts.	---	7:19	8:35	9:45	11:00	12:09	1:17	2:09	3:31	4:49	6:04	7:18
	Market Basket	---	7:24	8:39	9:49	11:03	12:12	1:20	2:12	3:36	4:51	6:08	7:21
	Shaw's	---	7:29	8:43	9:53	11:07	12:16	1:24	2:17	3:42	4:57	6:12	7:25
	Washington St. at Cong. Church	6:16	7:35	8:50	10:00	11:13	12:22	1:30	2:24	3:49	5:05	6:19	7:32
	Milford Crossings	---	7:55	9:04	10:14	11:27	12:36	1:45	2:46	4:04	5:20	6:34	7:47
	Spruce St.	6:31	---	---	---	---	---	---	---	---	---	---	---
	Beaver St.	6:42	---	---	---	---	---	---	---	---	---	---	---
	Mission Springs*	---	8:00	9:14	10:24	11:37	12:46	1:55	2:58	4:14	5:30	6:44	7:57
	Holliston Public Library	---	8:05	9:19	10:29	11:42	12:51	1:59	3:02	4:18	5:32	6:48	8:02
	Shaw's	---	8:11	9:25	10:35	11:48	12:57	2:04	3:07	4:23	5:37	6:53	8:08
	Market Basket	---	8:16	9:30	10:40	11:53	1:02	2:09	3:12	4:28	5:42	6:58	8:13
	Winthrop / Hollis Sts.	---	8:19	9:33	10:43	11:55	1:04	2:11	3:14	4:30	5:44	7:00	8:15
INBOUND	Framingham MBTA	7:06	8:22	9:36	10:46	11:59	1:08	2:15	3:18	4:34	5:50	7:04	8:19
	Blandin Hub (15 Blandin Ave.)	7:09	8:25	9:39	10:49	12:02P	1:11	2:18	3:21	4:37	5:56	7:07	8:22

## Scheduled Times

Scheduled times are only approximate; please wait for the MWRTA ten minutes in advance of scheduled times to assure not missing the bus. For up to the minute bus information call the MWRTA at 508.935.2222 or visit [www.mwrtat.com](http://www.mwrtat.com) for GPS tracking.

The MWRTA uses the Flag Down System which allows buses to stop anywhere along their routes to pick up passengers, where it is safe to do so. Passengers can hail MWRTA buses by waving.

## Transfers

Route 6 passengers can make the following transfers:

\*\*Route 14 at Milford Crossings (Stop & Shop)  
Route 4S & 5 at the Framingham MBTA station  
Routes 4N, 4S, 5, 10, and 11 at the Blandin Hub.

Times: P - PM

\*Stop may NOT be serviced due to snow/ice.

CRASH DATA

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Crash Number	City/Town Name	Crash Location	Crash Date	Crash Time	Crash Year	No. Injury-Non-Incapacitating	No. Injury-Non-Fatal	No. Injury-Fatal	Number of Vehicles	Police Agency	Speed Limit	Posted Speed Limit	Time of Day	Day of Week	Driver Contributing Circumstances (All Drivers)	Explainable Cause	Is Governor's Office	Light Conditions	Manner of Collision	Motorist's Description	Weather Conditions	Roadway Description	RPA Distance (m)	Total Fatalities	Total Non-Fatal Injuries	Traffic Control Device Type	Vehicle Towed From Scene (All Vehicles)	Vehicle Used (Description)	Weather Conditions
3803351	HOLLISTON	Property damage only (none injured)		1:11 PM	2014		2	No injury	2	Local police		45-54	55-64	01:00PM to 01:59PM	D1: (Unknown) / D2: (Unknown)	Collision with motor vehicle in traffic	Yes	Daylight	Side-swipe - same direction	3 PW20141 4000211	Dry	T-Intersection	MAPC	0	0	Stop signs	V1: (Yes, vehicle or trailer disabled) / V2: (No)	V1: N / V2: N	Cloudy
3803355	HOLLISTON	Non-fatal injury		7:31 AM	2014		1	Non-fatal injury - Non-Incapacitating	1	Local police		25-34	25-34	07:00AM to 07:59AM	D1: (Physical impairment), (Unknown)	Collision with car	Yes	Daylight	Single vehicle crash	3 PW20141 4000215	Dry	Not at junction	MAPC	0	1	No controls	V1: (Yes, vehicle or trailer disabled) / V2: (No)	V1: E	Clear/Unknown
3875931	HOLLISTON	Non-fatal injury		12:40 PM	2014		2	Non-fatal injury - Non-Incapacitating	2	Local police		45-54	55-64	12:00PM to 12:59PM	D1: (No improper driving) / D2: (Velocity obstructed)	Collision with motor vehicle in traffic	Yes	Daylight	Angle	3 PW20150 8802029	Dry	T-Intersection	MAPC	0	1	Stop signs	V1: (Yes, vehicle or trailer disabled) / V2: (No)	V1: E / V2: N	Clear
3990139	HOLLISTON	Property damage only (none injured)		7:12 PM	2015		1	No injury	1	Local police		21-24	21-24	07:00PM to 07:59PM	D1: (Driving too fast for conditions)	Collision with utility pole	Yes	Dark - lighted roadway	Single vehicle crash	3 PW20150 0602026	Snow	Not at junction	MAPC	0	0	No controls	V1: (Yes, vehicle or trailer disabled) / V2: (No)	V1: E	Snow
4054743	HOLLISTON	Property damage only (none injured)		11:52 AM	2015		2	No injury	2	Local police		45-54	75-84	11:00AM to 11:59AM	D1: (Failed to yield right of way) / D2: (No improper driving)	Collision with motor vehicle in traffic	Yes	Daylight	Side-swipe - opposite direction	3 PW20151 7500108	Dry	Not at junction	MAPC	0	0	No controls	V1: (No) / V2: (No)	V1: E / V2: W	Clear
4147716	HOLLISTON	Property damage only (none injured)		4:34 PM	2015		2	No injury	2	Local police		35-44	55-64	04:00PM to 04:59PM	D1: (Failed to yield right of way), (Inattention) / D2: (No improper driving)	Collision with motor vehicle in traffic	Yes	Dark - lighted roadway	Angle	3 PW20153 3400215	Dry	Four-way intersection	MAPC	0	0	Stop signs	V1: (Yes, vehicle or trailer disabled) / V2: (No)	V1: S / V2: W	Cloudy
4352416	HOLLISTON	Property damage only (none injured)		12:58 PM	2017		2	No injury	2	Local police		21-24	25-34	12:00PM to 12:59PM	D1: (No improper driving), (Inattention)	Collision with motor vehicle in traffic	Yes	Daylight	Angle	3 PW20171 0802153	Dry	T-Intersection	MAPC	0	0	No controls	V1: (No) / V2: (No)	V1: E / V2: W	Cloudy

Data Level: CRASH  
Query Type: Spatial  
Criteria: If you conducted an Advanced Query your SQL statement will be listed here



## MASSDOT CRASH RATE WORKSHEETS

## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Holliston, MA COUNT DATE : Dec-19

DISTRICT : \_\_\_\_\_ UNSIGNALIZED : ☒ SIGNALIZED : ☐

### ~ INTERSECTION DATA ~

MAJOR STREET : Washington Street

MINOR STREET(S) : Hopping Brook Road

**INTERSECTION  
DIAGRAM**  
(Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NEB	SWB	NB			
PEAK HOURLY VOLUMES (PM) :	571	785	255			1,611

" K " FACTOR : **0.092** INTERSECTION ADT ( V ) = TOTAL DAILY APPROACH VOLUME : **17,511**

TOTAL # OF CRASHES : **7** # OF YEARS : **5** AVERAGE # OF CRASHES PER YEAR ( A ) : **1.40**

**CRASH RATE CALCULATION :**

**0.22**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : Below Statewide and District Crash Rates

Project Title & Date: Proposed Warehouse Development

## GENERAL BACKGROUND TRAFFIC GROWTH

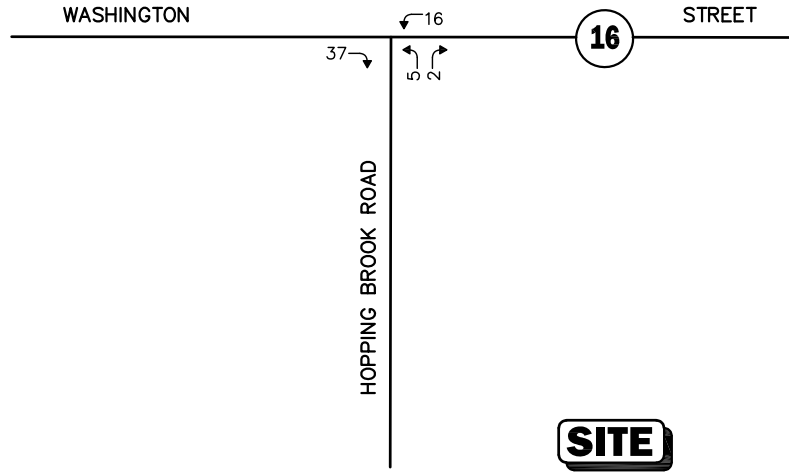
Proposed Warehouse  
Holliston, MA

# General Background Traffic Growth - Daily Traffic Volumes

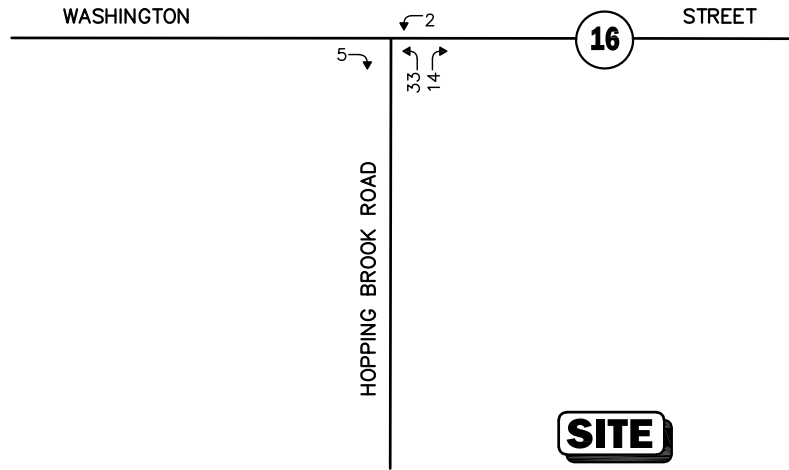
CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Annual
Medfield	Route 27	NORTH MEADOWS ROAD	7,500	7,500	19,659	20,893	21,023	22,179	19,653	19,908	20,127	8,513	8,547	1.2%
Holliston	Route 16	WASHINGTON STREET	19,300	19,368	19,659	20,893	21,023	22,179	19,653	19,908	20,127	20,409	20,491	0.47%
														0.81%

## BACKGROUND DEVELOPMENT NETWORKS

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



Not To Scale

Figure A-1

## TRIP-GENERATION CALCULATIONS

---

# Warehousing (150)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 34

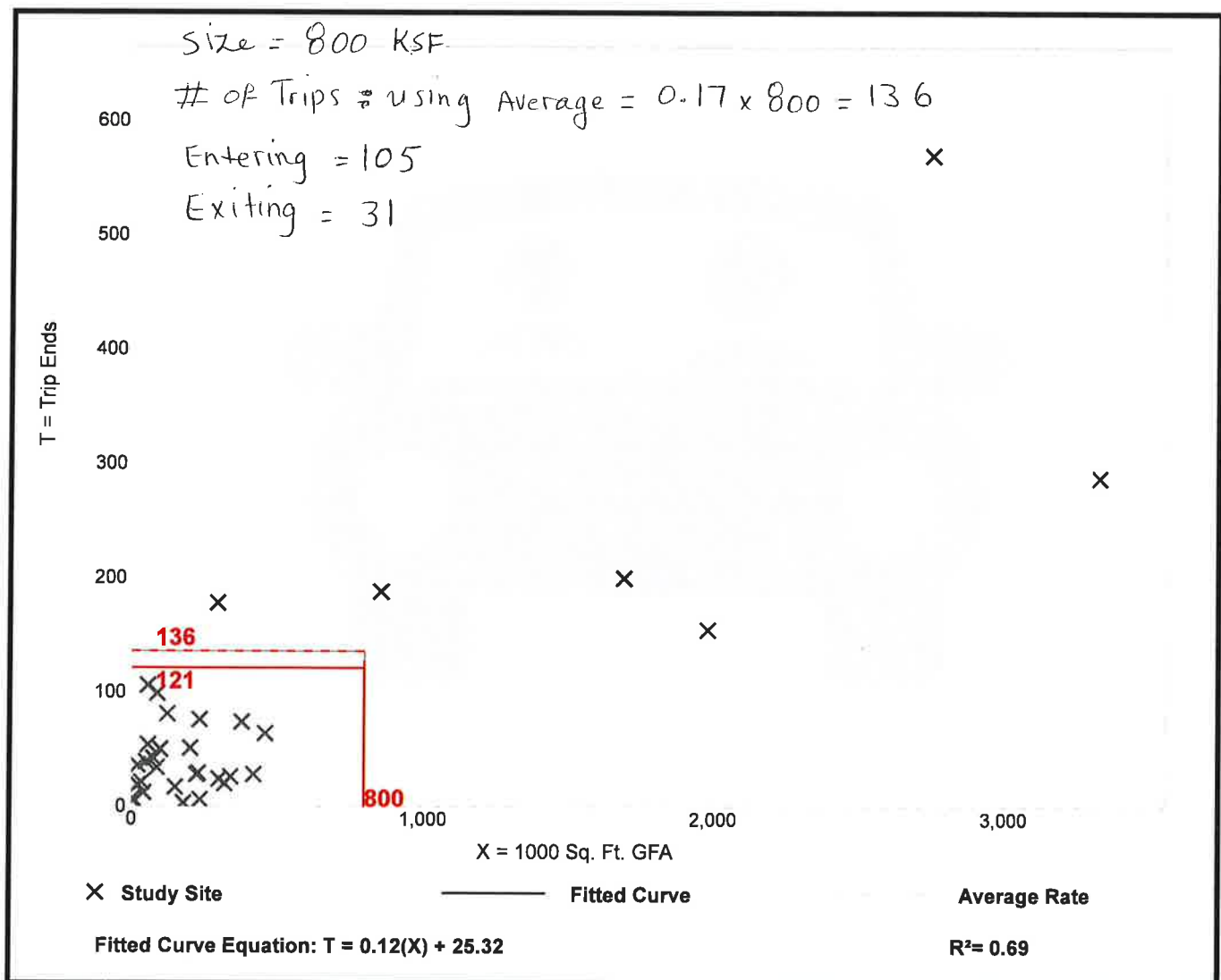
Avg. 1000 Sq. Ft. GFA: 451

Directional Distribution: 77% entering, 23% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
<u>0.17</u>	0.02 - 1.93	0.20

## Data Plot and Equation





# Warehousing (150)

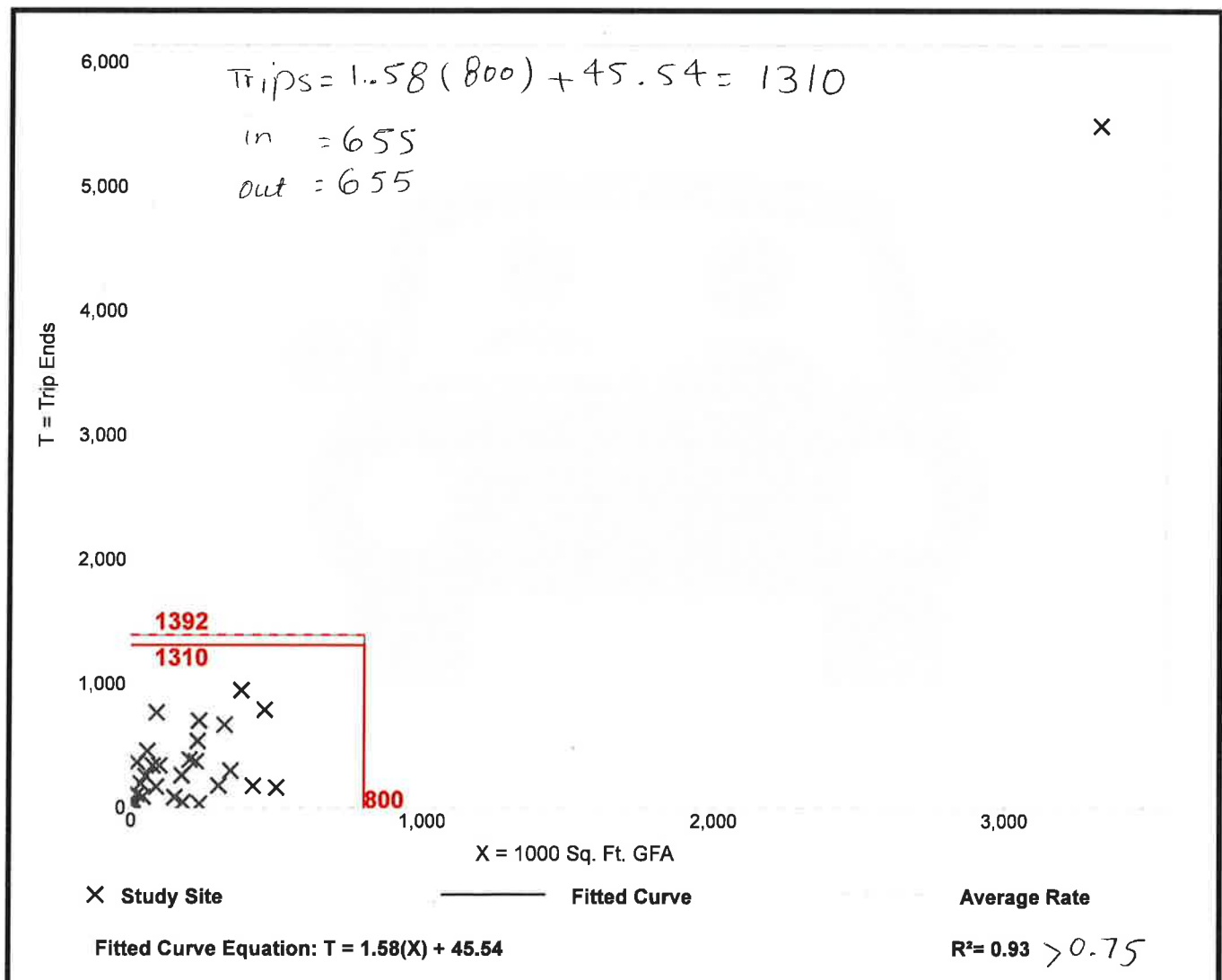
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 29  
Avg. 1000 Sq. Ft. GFA: 285  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.74	0.15 - 16.93	1.55

## Data Plot and Equation



# Warehousing (150)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**

**On a: Weekday,**

**Peak Hour of Adjacent Street Traffic,  
One Hour Between 4 and 6 p.m.**

**Setting/Location: General Urban/Suburban**

**Number of Studies: 47**

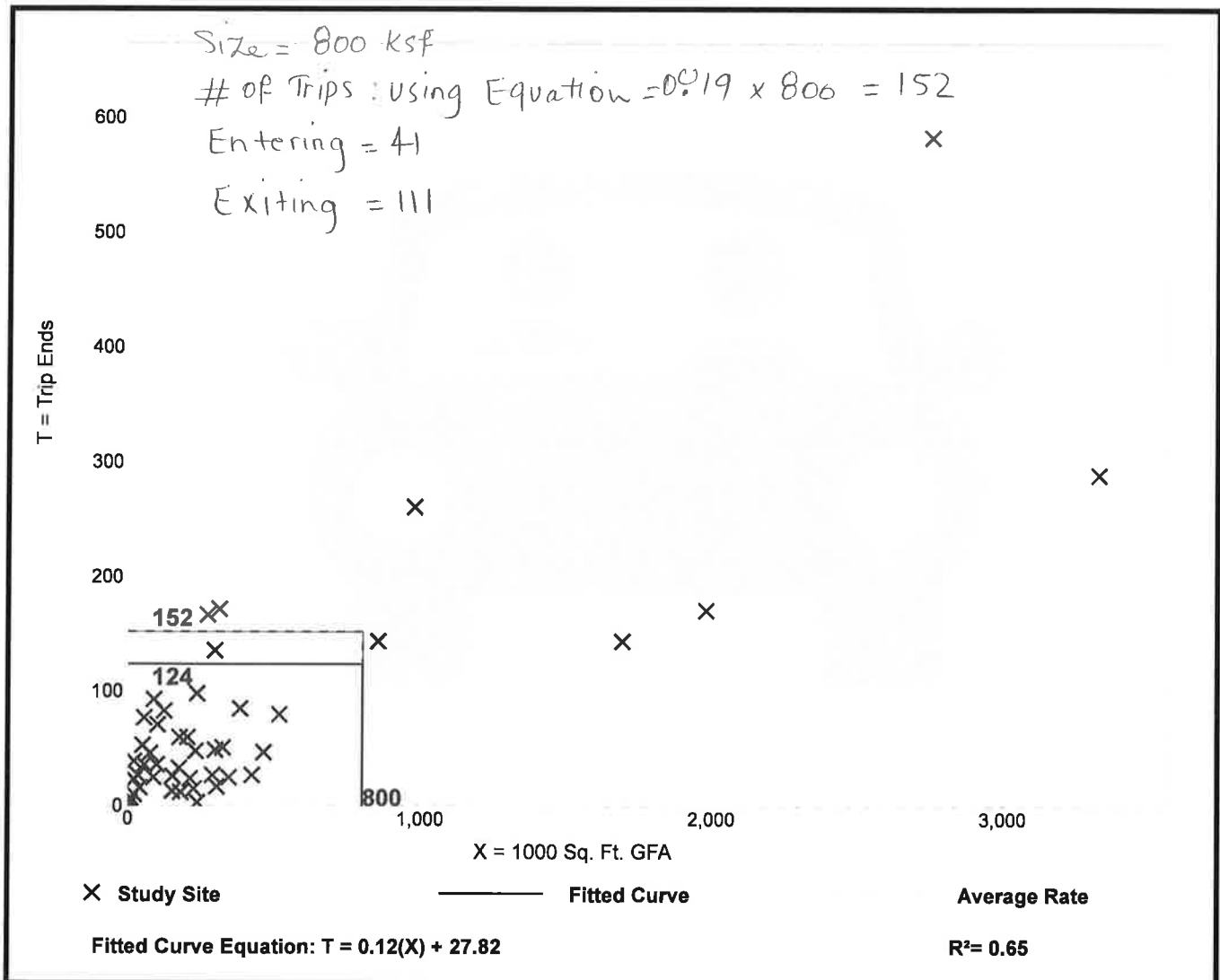
**Avg. 1000 Sq. Ft. GFA: 400**

**Directional Distribution: 27% entering, 73% exiting**

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

## Data Plot and Equation



# General Light Industrial (110)

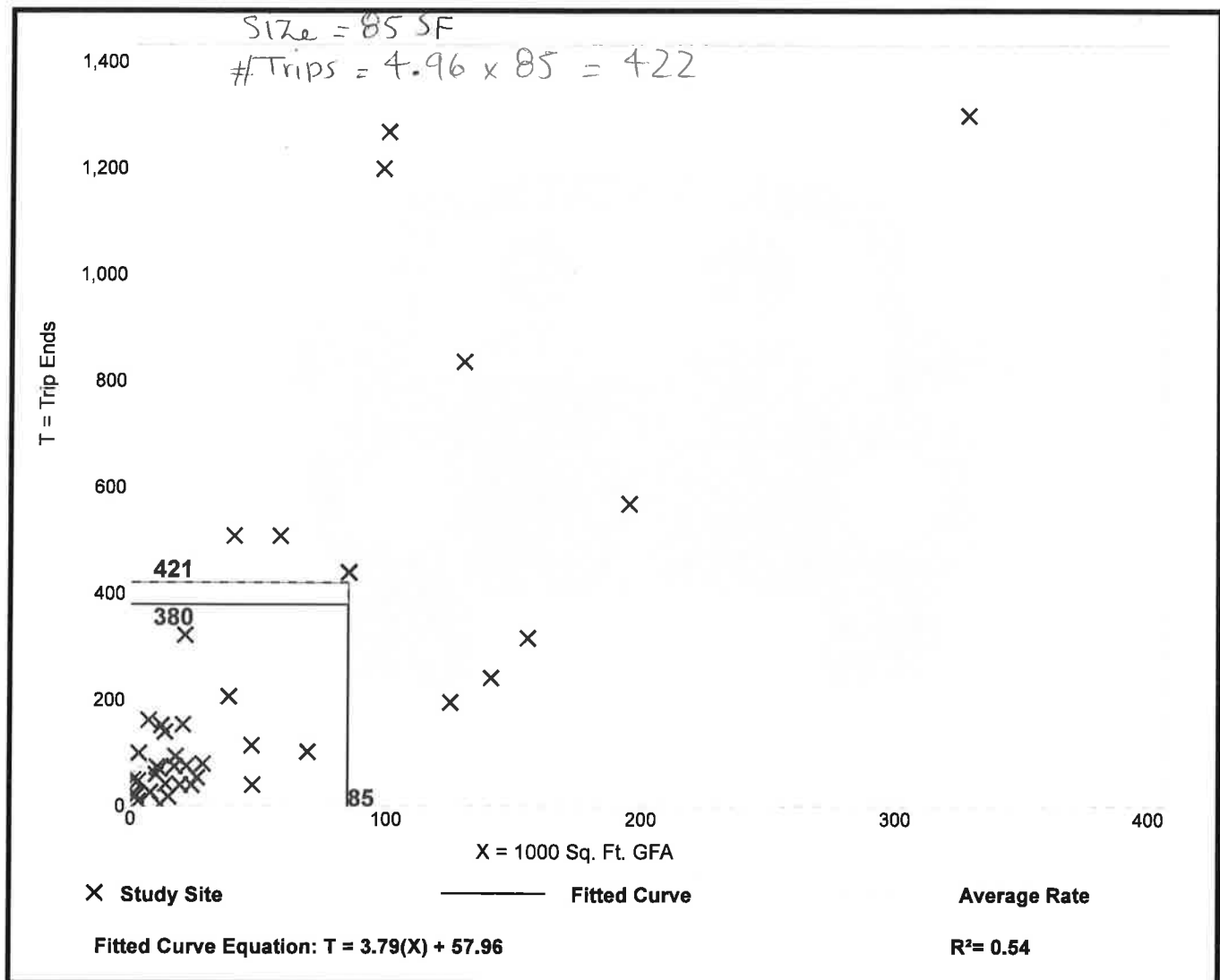
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 40  
Avg. 1000 Sq. Ft. GFA: 49  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.96	0.34 - 43.86	4.20

## Data Plot and Equation



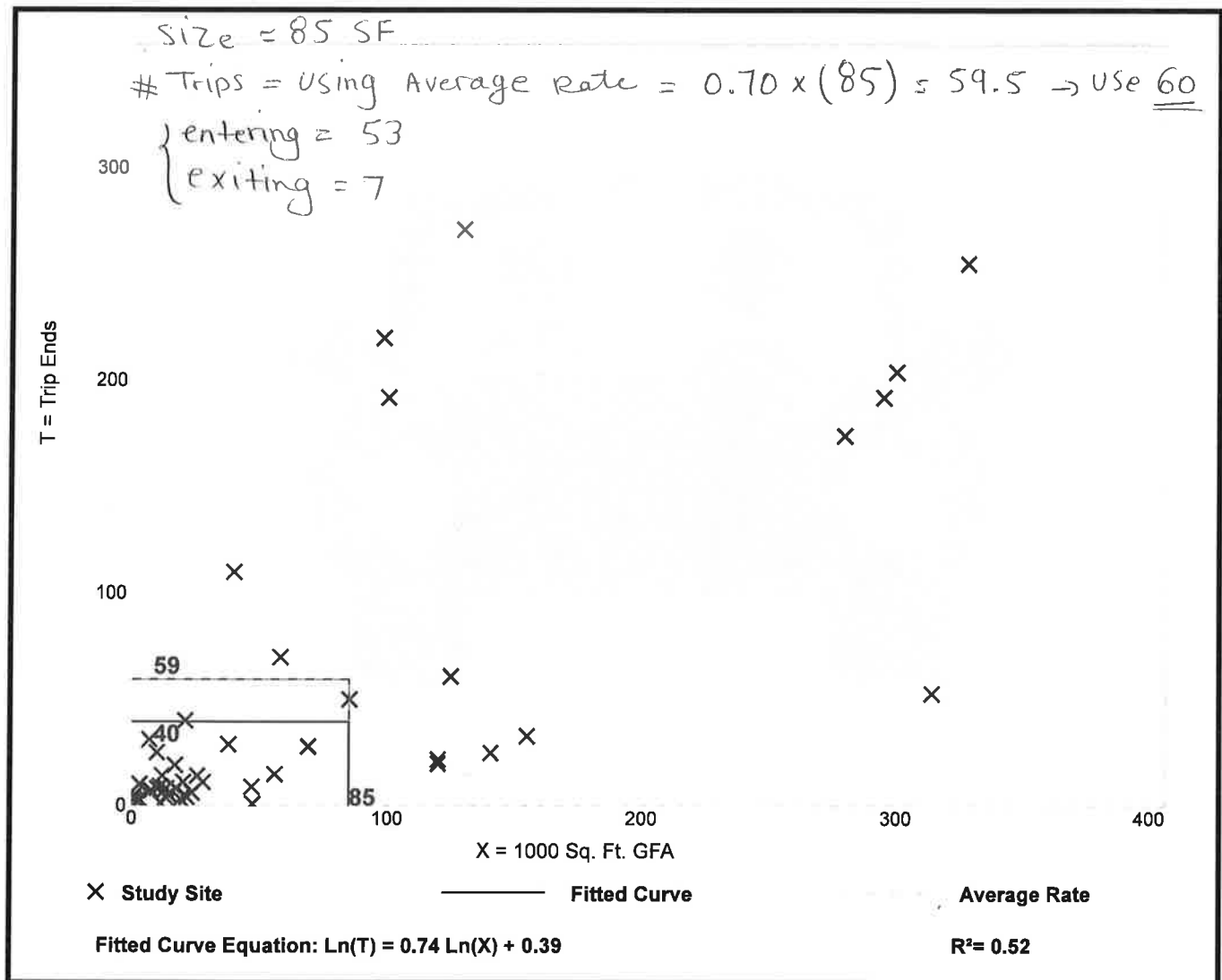
# General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 7 and 9 a.m.  
 Setting/Location: General Urban/Suburban  
 Number of Studies: 45  
 Avg. 1000 Sq. Ft. GFA: 73  
 Directional Distribution: 88% entering, 12% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.70	0.02 - 4.46	0.65

## Data Plot and Equation



# General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 44

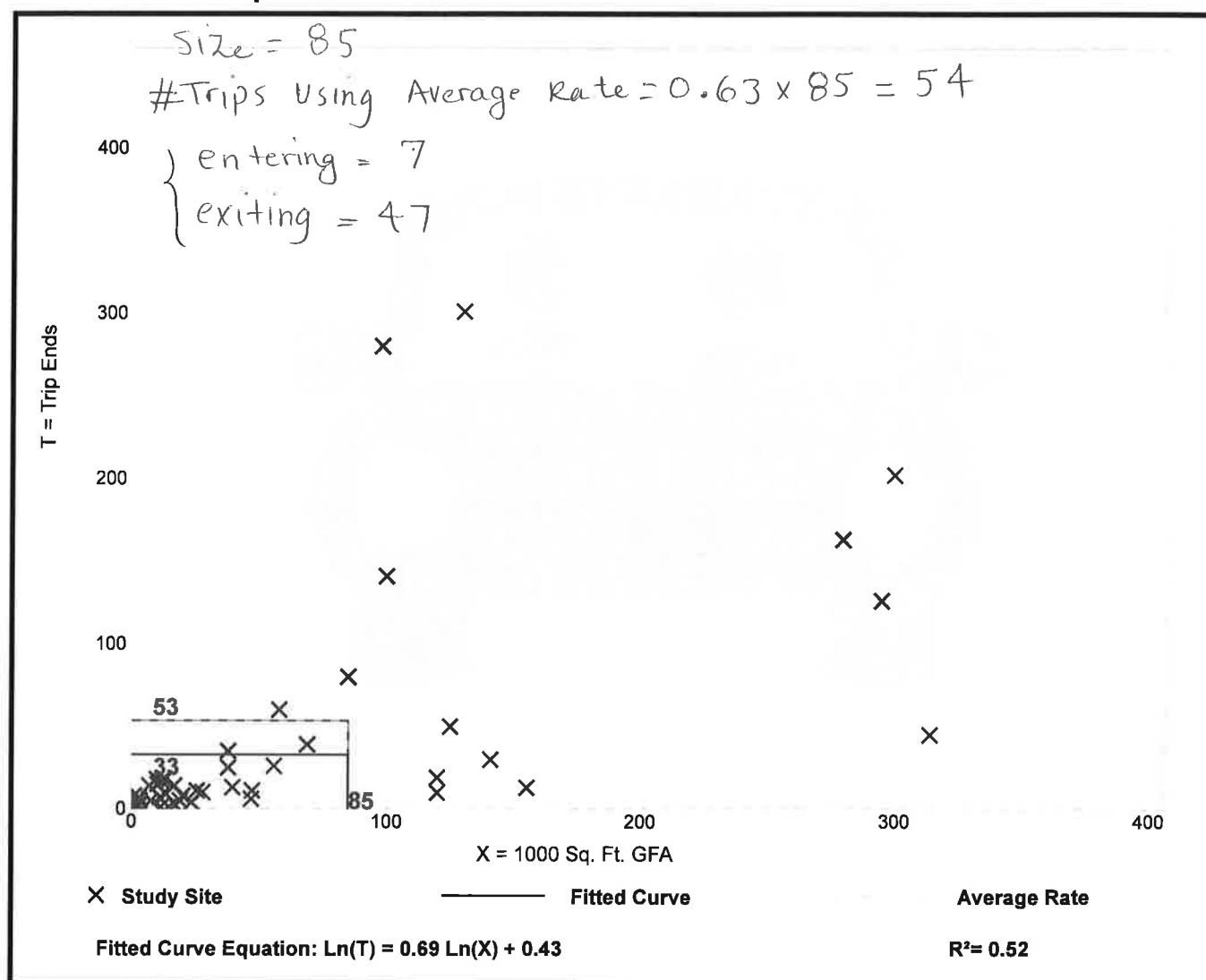
Avg. 1000 Sq. Ft. GFA: 67

Directional Distribution: 13% entering, 87% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.63	0.07 - 7.02	0.68

## Data Plot and Equation



# Ultimate Buildout

## Warehousing

### (150)

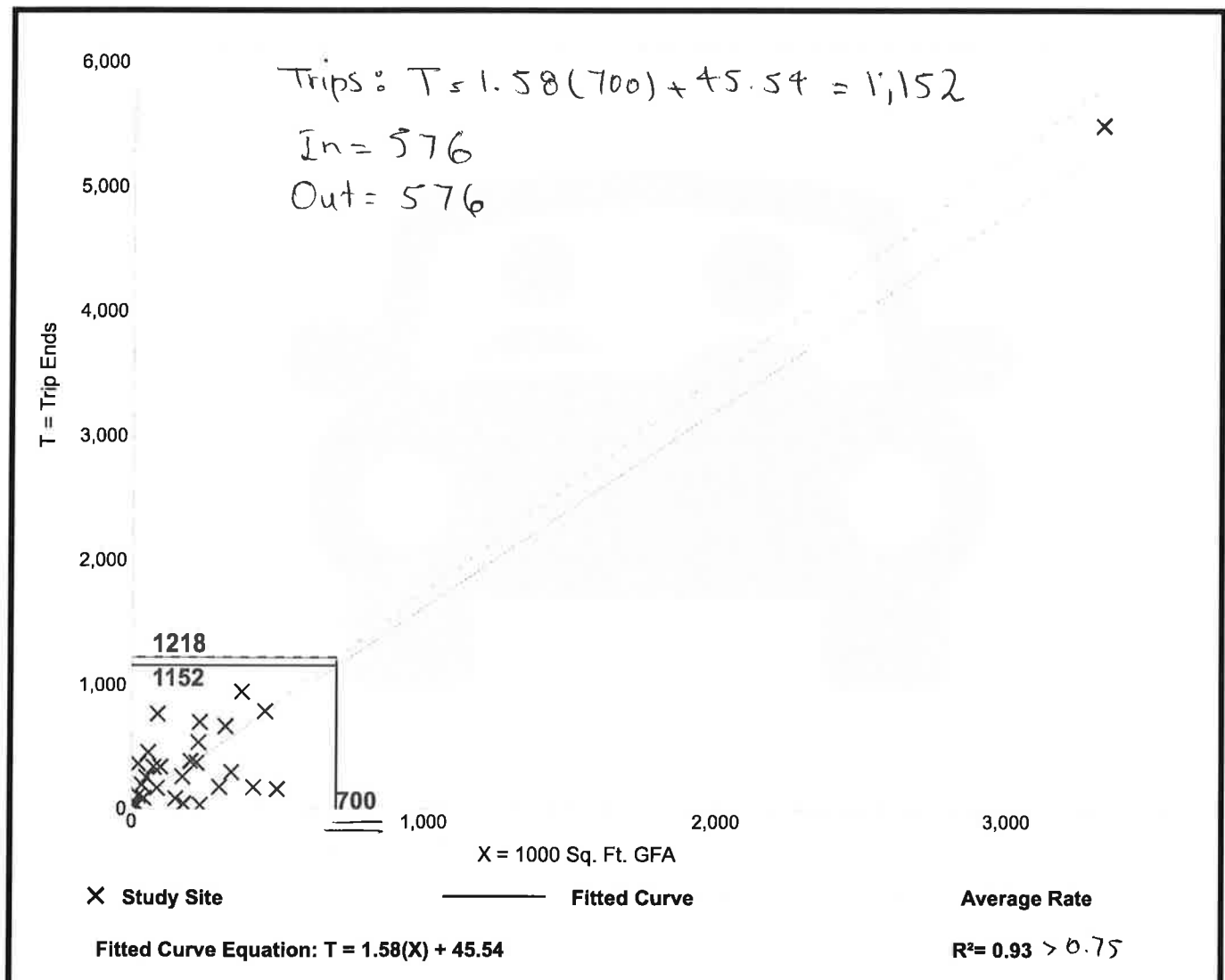
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 29 > 20  
 Avg. 1000 Sq. Ft. GFA: 285  
 Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.74	0.15 - 16.93	1.55

### Data Plot and Equation



## Ultimate Buildout Warehousing (150)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**

**On a: Weekday,**

**Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**

**Number of Studies: 34**

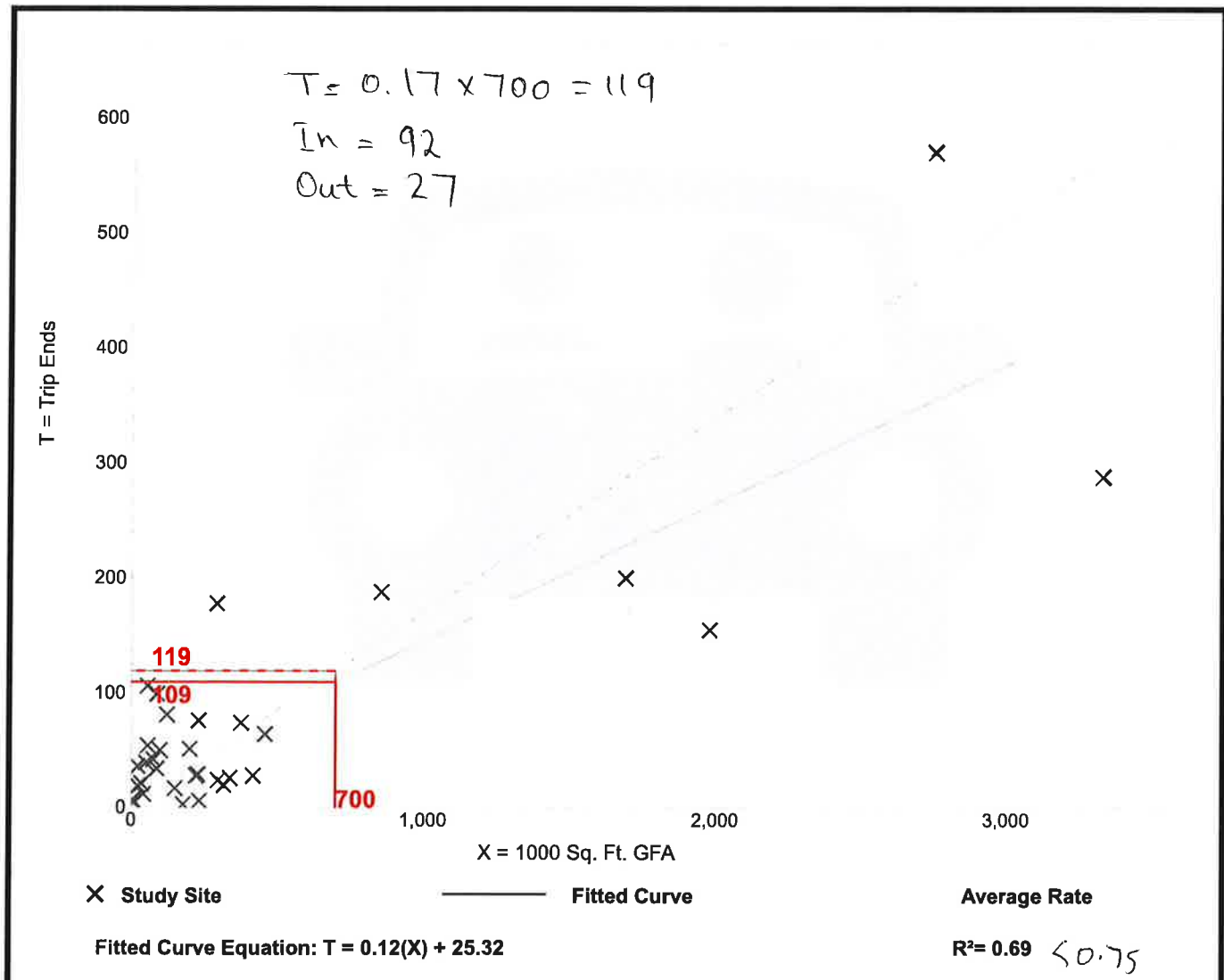
**Avg. 1000 Sq. Ft. GFA: 451**

**Directional Distribution: 77% entering, 23% exiting**

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.20

### Data Plot and Equation



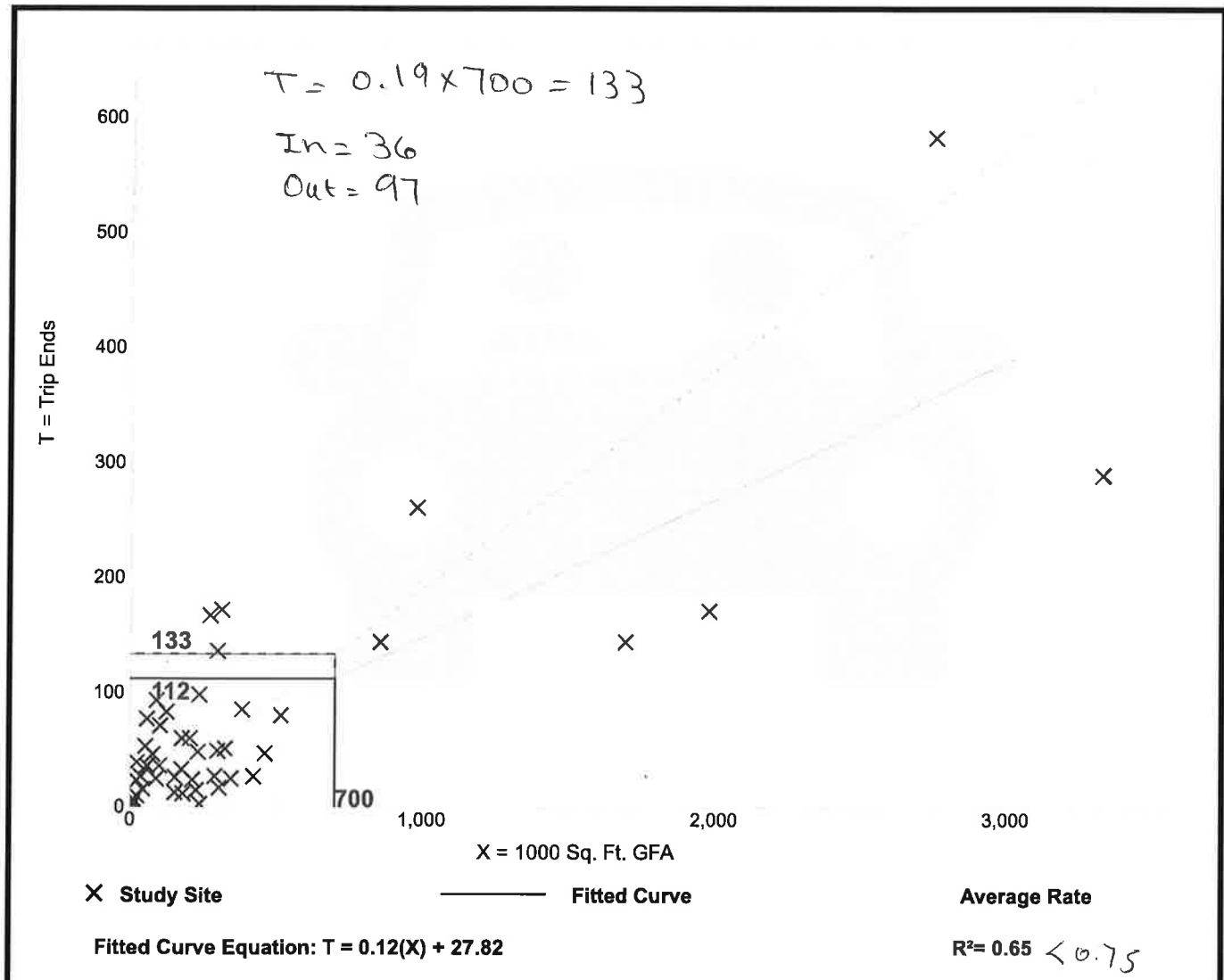
Ultimate Buildout  
**Warehousing**  
 (150)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 47  
 Avg. 1000 Sq. Ft. GFA: 400  
 Directional Distribution: 27% entering, 73% exiting

### Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

### Data Plot and Equation





## CAPACITY ANALYSIS WORKSHEETS

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## CAPACITY ANALYSIS WORKSHEETS

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Washington Street at Hopping Brook Road

Washington Street at Hopping Brook Road

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Intersection						
Int Delay, s/veh	4.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	↑
Traffic Vol, veh/h	639	179	45	512	51	18
Future Vol, veh/h	639	179	45	512	51	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	89	89	60	60
Heavy Vehicles, %	0	0	2	0	5	2
Mvmt Flow	680	190	51	575	85	30

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	870
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	775
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	775
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	60.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	128	398	-	-	775	-
HCM Lane V/C Ratio	0.664	0.075	-	-	0.065	-
HCM Control Delay (s)	76.4	14.8	-	-	10	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	3.6	0.2	-	-	0.2	-

Intersection						
Int Delay, s/veh	52.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Vol, veh/h	545	26	17	768	182	73
Future Vol, veh/h	545	26	17	768	182	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	77	77
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	574	27	18	817	236	95





Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	601
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	986
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	986
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	281.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	141	509	-	-	986	-
HCM Lane V/C Ratio	1.676	0.186	-	-	0.018	-
HCM Control Delay (s)	\$ 388.7	13.7	-	-	8.7	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	17.1	0.7	-	-	0.1	-

Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						



Intersection						
Int Delay, s/veh	9.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	685	216	61	554	56	20
Future Vol, veh/h	685	216	61	554	56	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	89	89	60	60
Heavy Vehicles, %	0	0	2	0	5	2
Mvmt Flow	729	230	69	622	93	33
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	959	0	1604	844
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	760	-
Critical Hdwy	-	-	4.12	-	6.45	6.22
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.218	-	3.545	3.318
Pot Cap-1 Maneuver	-	-	717	-	114	363
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	456	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	717	-	97	363
Mov Cap-2 Maneuver	-	-	-	-	97	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	389	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	1		122.6		
HCM LOS	F					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	97	363	-	-	717	-
HCM Lane V/C Ratio	0.962	0.092	-	-	0.096	-
HCM Control Delay (s)	160.7	15.9	-	-	10.6	0
HCM Lane LOS	F	C	-	-	B	A
HCM 95th %tile Q(veh)	5.7	0.3	-	-	0.3	-

HCM 2010 TWSC  
3: Hopping Brook Road & Washington Street

2027 No Build Weekday Evening Peak Hour

09/30/2020

Intersection						
Int Delay, s/veh	97.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Vol, veh/h	584	31	19	823	215	87
Future Vol, veh/h	584	31	19	823	215	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	77	77
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	615	33	20	876	279	113





Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	648
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	947	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	947	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	\$ 482.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	121	480	-	-	947	-
HCM Lane V/C Ratio	2.308	0.235	-	-	0.021	-
HCM Control Delay (s)	\$ 671.7	14.8	-	-	8.9	0
HCM Lane LOS	F	B	-	-	A	A
HCM 95th %tile Q(veh)	24.1	0.9	-	-	0.1	-





Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Intersection						
Int Delay, s/veh	12.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	685	294	88	554	79	28
Future Vol, veh/h	685	294	88	554	79	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	89	89	92	92
Heavy Vehicles, %	0	5	2	0	9	4
Mvmt Flow	729	313	99	622	86	30
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	1042	0	1706	886
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	820	-
Critical Hdwy	-	-	4.12	-	6.49	6.24
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.218	-	3.581	3.336
Pot Cap-1 Maneuver	-	-	667	-	96	341
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	421	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	667	-	~ 74	341
Mov Cap-2 Maneuver	-	-	-	-	~ 74	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	325	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	1.6		191.3		
HCM LOS	F					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	74	341	-	-	667	-
HCM Lane V/C Ratio	1.16	0.089	-	-	0.148	-
HCM Control Delay (s)	253.2	16.6	-	-	11.3	0
HCM Lane LOS	F	C	-	-	B	A
HCM 95th %tile Q(veh)	6.5	0.3	-	-	0.5	-
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						



Intersection						
Int Delay, s/veh	157.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Traffic Vol, veh/h	584	62	29	823	298	115
Future Vol, veh/h	584	62	29	823	298	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	92	92
Heavy Vehicles, %	0	11	0	0	8	2
Mvmt Flow	615	65	31	876	324	125
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0		0		680	
Stage 1	-		-		-	
Stage 2	-		-		-	
Critical Hdwy	-		-		4.1	
Critical Hdwy Stg 1	-		-		-	
Critical Hdwy Stg 2	-		-		-	
Follow-up Hdwy	-		-		2.2	
Pot Cap-1 Maneuver	-		-		922	
Stage 1	-		-		-	
Stage 2	-		-		-	
Platoon blocked, %	-		-		-	
Mov Cap-1 Maneuver	-		-		922	
Mov Cap-2 Maneuver	-		-		-	
Stage 1	-		-		-	
Stage 2	-		-		-	
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		\$ 715.4	
HCM LOS					F	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	108	470	-	-	922	-
HCM Lane V/C Ratio	2.999	0.266	-	-	0.033	-
HCM Control Delay (s)	\$ 985.5	15.4	-	-	9	0
HCM Lane LOS	F	C	-	-	A	A
HCM 95th %tile Q(veh)	30.9	1.1	-	-	0.1	-
Notes						
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon						

Intersection						
Int Delay, s/veh	31					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	685	362	112	554	99	35
Future Vol, veh/h	685	362	112	554	99	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	89	89	92	92
Heavy Vehicles, %	0	8	2	0	12	3
Mvmt Flow	729	385	126	622	108	38
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1114	0	1796	922
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	874	-
Critical Hdwy	-	-	4.12	-	6.52	6.23
Critical Hdwy Stg 1	-	-	-	-	5.52	-
Critical Hdwy Stg 2	-	-	-	-	5.52	-
Follow-up Hdwy	-	-	2.218	-	3.608	3.327
Pot Cap-1 Maneuver	-	-	627	-	~ 83	326
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	392	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	627	-	~ 58	326
Mov Cap-2 Maneuver	-	-	-	-	~ 58	-
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	272	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2		\$ 416.5	
HCM LOS					F	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	58	326	-	-	627	-
HCM Lane V/C Ratio	1.855	0.117	-	-	0.201	-
HCM Control Delay (s)	\$ 557.6	17.5	-	-	12.2	0
HCM Lane LOS	F	C	-	-	B	A
HCM 95th %tile Q(veh)	10.2	0.4	-	-	0.7	-
Notes						
~: Volume exceeds capacity     \$: Delay exceeds 300s     +: Computation Not Defined     *: All major volume in platoon						



Intersection						
Int Delay, s/veh	272					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	↑
Traffic Vol, veh/h	584	89	38	823	370	140
Future Vol, veh/h	584	89	38	823	370	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	94	94	92	92
Heavy Vehicles, %	0	14	0	0	11	5
Mvmt Flow	615	94	40	876	402	152

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	709
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	4.1	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	2.2	-
Pot Cap-1 Maneuver	-	899	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	899	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	\$ 1068.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	99	457	-	-	899	-
HCM Lane V/C Ratio	4.062	0.333	-	-	0.045	-
HCM Control Delay (s)	\$ 1466.1	16.8	-	-	9.2	0
HCM Lane LOS	F	C	-	-	A	A
HCM 95th %tile Q(veh)	41.5	1.4	-	-	0.1	-

Notes			
~: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (vph)	685	294	88	554	79	28
Future Volume (vph)	685	294	88	554	79	28
Satd. Flow (prot)	2017	0	1770	1900	1612	1568
Flt Permitted			0.092		0.950	
Satd. Flow (perm)	2017	0	171	1900	1612	1568
Satd. Flow (RTOR)	53					30
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	8%	2%	0%	12%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1065	0	96	602	86	30
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		9.5	23.5	23.0	23.0
Total Split (s)	56.0		10.0	66.0	14.0	14.0
Total Split (%)	70.0%		12.5%	82.5%	17.5%	17.5%
Yellow Time (s)	3.0		3.5	3.5	3.0	3.0
All-Red Time (s)	2.0		1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		4.5	5.5	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None		None	None	Min	Min
Act Effct Green (s)	39.3		47.1	46.0	8.3	8.3
Actuated g/C Ratio	0.60		0.71	0.70	0.13	0.13
v/c Ratio	0.87		0.36	0.45	0.42	0.13
Control Delay	20.0		6.7	5.0	38.8	14.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	20.0		6.7	5.0	38.8	14.2
LOS	B		A	A	D	B
Approach Delay	20.0			5.2	32.5	
Approach LOS	B			A	C	
Queue Length 50th (ft)	339		9	83	37	0
Queue Length 95th (ft)	535		24	126	85	24
Internal Link Dist (ft)	435			455	753	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1544		269	1640	243	262
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.69		0.36	0.37	0.35	0.11

**Intersection Summary**

Cycle Length: 80

Actuated Cycle Length: 65.9

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

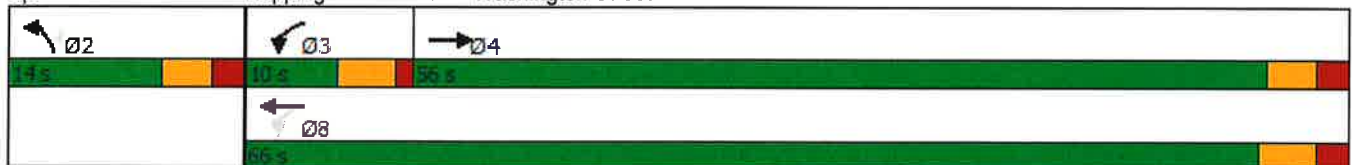
Intersection Signal Delay: 15.3

Intersection LOS: B












Intersection Capacity Utilization 75.3%

ICU Level of Service D

Analysis Period (min) 15

**Splits and Phases: 3: Hopping Brook Road & Washington Street**



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	584	62	29	823	298	115
Future Volume (vph)	584	62	29	823	298	115
Satd. Flow (prot)	1856	0	1805	1900	1671	1583
Flt Permitted			0.180		0.950	
Satd. Flow (perm)	1856	0	342	1900	1671	1583
Satd. Flow (RTOR)	9					125
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	11%	0%	0%	8%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	702	0	32	895	324	125
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		9.5	23.5	23.0	23.0
Total Split (s)	43.5		6.5	50.0	30.0	30.0
Total Split (%)	54.4%		8.1%	62.5%	37.5%	37.5%
Yellow Time (s)	3.0		3.5	3.5	3.0	3.0
All-Red Time (s)	2.0		1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		4.5	5.5	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None		None	None	Min	Min
Act Effct Green (s)	33.8		36.4	35.4	18.0	18.0
Actuated g/C Ratio	0.52		0.56	0.55	0.28	0.28
v/c Ratio	0.72		0.13	0.86	0.70	0.24
Control Delay	18.6		8.2	23.4	31.2	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	18.6		8.2	23.4	31.2	5.7
LOS	B		A	C	C	A
Approach Delay	18.6			22.9	24.1	
Approach LOS	B			C	C	
Queue Length 50th (ft)	179		5	279	122	0
Queue Length 95th (ft)	422		18	#607	223	36
Internal Link Dist (ft)	435			455	753	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1186		241	1361	688	725
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.59		0.13	0.66	0.47	0.17

**Intersection Summary**

Cycle Length: 80

Actuated Cycle Length: 64.5

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 21.7

Intersection LOS: C

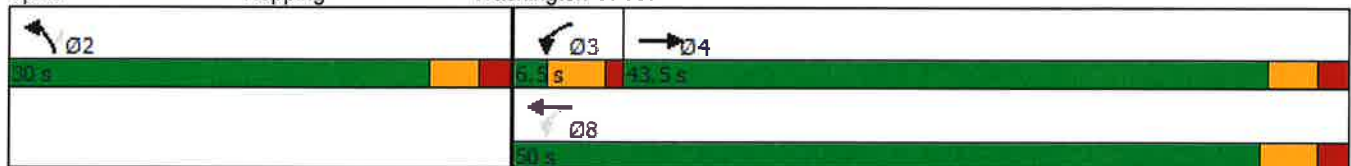
Intersection Capacity Utilization 68.6%

ICU Level of Service C












Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

**Splits and Phases: 3: Hopping Brook Road & Washington Street**

Lanes, Volumes, Timings      2027 Ultimate Build Weekday Morning Peak Hour W/Mitigation  
 3: Hopping Brook Road & Washington Street 10/21/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	685	362	112	554	99	35
Future Volume (vph)	685	362	112	554	99	35
Satd. Flow (prot)	1997	0	1770	1900	1612	1568
Flt Permitted			0.084		0.950	
Satd. Flow (perm)	1997	0	156	1900	1612	1568
Satd. Flow (RTOR)	65					38
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	8%	2%	0%	12%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1138	0	122	602	108	38
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		9.5	23.5	23.0	23.0
Total Split (s)	56.0		10.0	66.0	14.0	14.0
Total Split (%)	70.0%		12.5%	82.5%	17.5%	17.5%
Yellow Time (s)	3.0		3.5	3.5	3.0	3.0
All-Red Time (s)	2.0		1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		4.5	5.5	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None		None	None	Min	Min
Act Effct Green (s)	43.4		51.2	50.1	8.7	8.7
Actuated g/C Ratio	0.62		0.73	0.71	0.12	0.12
v/c Ratio	0.90		0.49	0.44	0.54	0.17
Control Delay	23.0		13.0	4.9	45.0	13.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.0		13.0	4.9	45.0	13.5
LOS	C		B	A	D	B
Approach Delay	23.0			6.2	36.8	
Approach LOS	C			A	D	
Queue Length 50th (ft)	394		11	83	52	0
Queue Length 95th (ft)	#739		50	126	#117	27
Internal Link Dist (ft)	435			455	753	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1465		250	1563	223	250
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.78		0.49	0.39	0.48	0.15

#### Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 70.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 18.0

Intersection LOS: B

Intersection Capacity Utilization 81.9%

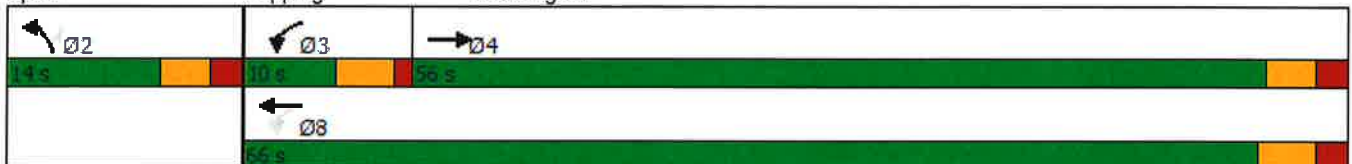
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.












Queue shown is maximum after two cycles.

#### Splits and Phases: 3: Hopping Brook Road & Washington Street



Lanes, Volumes, Timings      2027 Ultimate Build Weekday Evening Peak Hour W/Mitigation  
 3: Hopping Brook Road & Washington Street

10/21/2020

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	584	89	38	823	370	140
Future Volume (vph)	584	89	38	823	370	140
Satd. Flow (prot)	1832	0	1805	1900	1626	1538
Flt Permitted			0.143		0.950	
Satd. Flow (perm)	1832	0	272	1900	1626	1538
Satd. Flow (RTOR)	13					152
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	14%	0%	0%	11%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	732	0	41	895	402	152
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases			8			2
Detector Phase	4		3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	23.0		9.5	23.5	23.0	23.0
Total Split (s)	45.5		6.5	52.0	30.0	30.0
Total Split (%)	55.5%		7.9%	63.4%	36.6%	36.6%
Yellow Time (s)	3.0		3.5	3.5	3.0	3.0
All-Red Time (s)	2.0		1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		4.5	5.5	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	None		None	None	Min	Min
Act Effct Green (s)	35.3		39.3	38.2	21.4	21.4
Actuated g/C Ratio	0.50		0.56	0.54	0.30	0.30
v/c Ratio	0.79		0.21	0.87	0.82	0.27
Control Delay	23.6		9.9	25.4	39.9	5.5
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.6		9.9	25.4	39.9	5.5
LOS	C		A	C	D	A
Approach Delay	23.6			24.7	30.5	
Approach LOS	C			C	C	
Queue Length 50th (ft)	294		8	347	179	0
Queue Length 95th (ft)	#467		21	#561	#337	40
Internal Link Dist (ft)	435			455	753	
Turn Bay Length (ft)			150			
Base Capacity (vph)	1108		196	1312	604	667
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.66		0.21	0.68	0.67	0.23

#### Intersection Summary

Cycle Length: 82  
 Actuated Cycle Length: 70.6  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 25.8      Intersection LOS: C  
 Intersection Capacity Utilization 72.6%      ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

#### Splits and Phases: 3: Hopping Brook Road & Washington Street

Ø2 	Ø3       Ø4 
	Ø8 

## HCS SIGNAL WARRANT ANALYSIS

# HCS7 Warrants Report

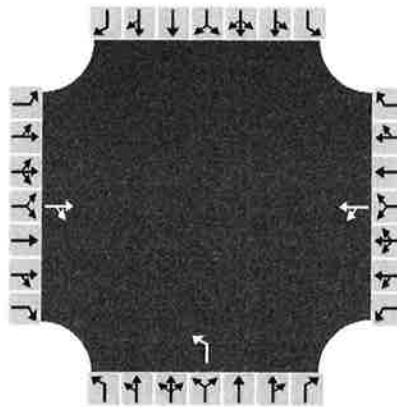
## Project Information

Analyst	RE	Date	9/30/2020
Agency	VAI	Analysis Year	2020 Existing- RT removed
Jurisdiction	MassDOT/Holliston	Time Period Analyzed	
Project Description	Warehouse		

## General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	42	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	9000		

## Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	1	0	0	0	0	0
Lane Usage		TR			LT		L					
Vehicle Volumes Averages (veh/h)	0	482	0	0	466	0	102	0	0	0	0	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

## School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

## Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	0

## HCS7 Warrants Report

### Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A ( 70% )	1A ( 56% )	1B ( 70% )	1B ( 56% )	2 ( 70% )	3A ( 70% )	3B ( 70% )	4A ( 70% )	4B ( 70% )
07 - 08	947	45	992	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	976	44	1020	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	804	37	841	0	0	No	No	No	No	No	No	No	No	No
10 - 11	772	54	826	0	0	No	No	Yes	Yes	No	No	No	No	No
11 - 12	795	79	874	0	0	No	No	Yes	Yes	Yes	No	No	No	No
12 - 13	866	152	1018	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	879	83	962	0	0	No	No	Yes	Yes	Yes	No	No	No	No
14 - 15	1009	103	1112	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1098	171	1269	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1155	201	1356	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1209	205	1414	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	873	56	929	0	0	No	No	Yes	Yes	No	No	No	No	No
Total	11383	1230	12613	0	0	4	5	9	11	7	0	5	0	0

### Warrants

#### Warrant 1: Eight-Hour Vehicular Volume



A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--

B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--



56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)

#### Warrant 2: Four-Hour Vehicular Volume



Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)



#### Warrant 3: Peak Hour



A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--

B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)



#### Warrant 4: Pedestrian Volume

A. Four Hour Volumes --or--

B. One-Hour Volumes

#### Warrant 5: School Crossing

Gaps Same Period --and--

Student Volumes

Nearest Traffic Control Signal (optional)



#### Warrant 6: Coordinated Signal System

Degree of Platooning (Predominant direction or both directions)

#### Warrant 7: Crash Experience

A. Adequate trials of alternatives, observance and enforcement failed --and--

B. Reported crashes susceptible to correction by signal (12-month period) --and--

C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied



#### Warrant 8: Roadway Network

A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--

B. Weekend Volume (Five hours total)

#### Warrant 9: Grade Crossing

A. Grade Crossing within 140 ft --and--

B. Peak-Hour Vehicular Volumes



# HCS7 Warrants Report

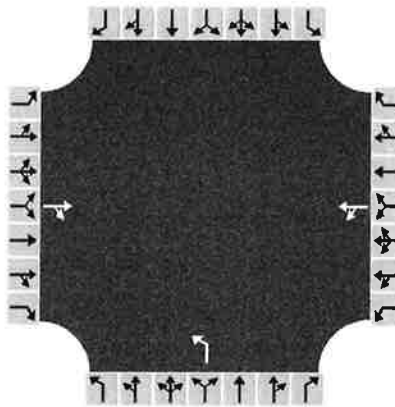
## Project Information

Analyst	RE	Date	9/30/2020
Agency	VAI	Analysis Year	2027 Build
Jurisdiction	MassDOT/Holliston	Time Period Analyzed	
Project Description	Warehouse		

## General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	42	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	9000		

## Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	1	0	0	0	0	0
Lane Usage		TR			LT		L					
Vehicle Volumes Averages (veh/h)	0	525	0	0	508	0	129	0	0	0	0	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

## School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

## Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	0

# HCS7 Warrants Report

## Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A ( 70% )	1A ( 56% )	1B ( 70% )	1B ( 56% )	2 ( 70% )	3A ( 70% )	3B ( 70% )	4A ( 70% )	4B ( 70% )
07 - 08	1041	73	1114	0	0	No	No	Yes	Yes	Yes	No	No	No	No
08 - 09	1061	65	1126	0	0	No	No	Yes	Yes	Yes	No	No	No	No
09 - 10	879	60	939	0	0	No	No	Yes	Yes	No	No	No	No	No
10 - 11	844	77	921	0	0	No	No	Yes	Yes	Yes	No	No	No	No
11 - 12	873	108	981	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	949	186	1135	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	958	107	1065	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1102	134	1236	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1197	207	1404	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1260	239	1499	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1308	233	1541	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	935	60	995	0	0	No	No	Yes	Yes	No	No	No	No	No
Total	12407	1549	13956	0	0	7	7	12	12	10	0	7	0	0

## Warrants

### Warrant 1: Eight-Hour Vehicular Volume



A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--

B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--



56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)

### Warrant 2: Four-Hour Vehicular Volume



Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)



### Warrant 3: Peak Hour



A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--

B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)



### Warrant 4: Pedestrian Volume

A. Four Hour Volumes --or--

B. One-Hour Volumes

### Warrant 5: School Crossing

Gaps Same Period --and--

Student Volumes

Nearest Traffic Control Signal (optional)



### Warrant 6: Coordinated Signal System

Degree of Platooning (Predominant direction or both directions)

### Warrant 7: Crash Experience

A. Adequate trials of alternatives, observance and enforcement failed --and--

B. Reported crashes susceptible to correction by signal (12-month period) --and--

C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied



### Warrant 8: Roadway Network

A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--

B. Weekend Volume (Five hours total)

### Warrant 9: Grade Crossing

A. Grade Crossing within 140 ft --and--

B. Peak-Hour Vehicular Volumes



# HCS7 Warrants Report

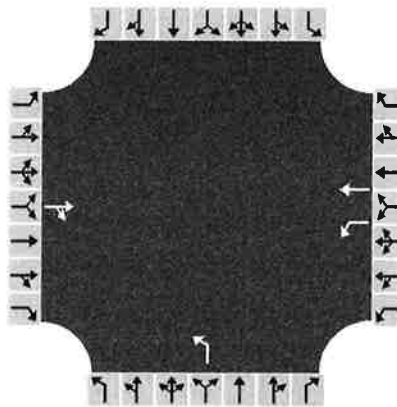
## Project Information

Analyst	RE	Date	9/30/2020
Agency	VAI	Analysis Year	2027 Ultimate build-RT removed
Jurisdiction	MassDOT/Holliston	Time Period Analyzed	
Project Description	Warehouse		

## General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	42	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	9000		

## Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	1	1	0	1	0	0	0	0	0
Lane Usage		TR		L	T		L					
Vehicle Volumes Averages (veh/h)	0	529	0	0	512	0	138	0	0	0	0	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

## School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	0

## Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)		Tractor-Trailer Trucks (%)	0

# HCS7 Warrants Report

## Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A ( 70% )	1A ( 56% )	1B ( 70% )	1B ( 56% )	2 ( 70% )	3A ( 70% )	3B ( 70% )	4A ( 70% )	4B ( 70% )
07 - 08	1051	83	1134	0	0	No	No	Yes	Yes	Yes	No	No	No	No
08 - 09	1068	72	1140	0	0	No	No	Yes	Yes	Yes	No	No	No	No
09 - 10	888	70	958	0	0	No	No	Yes	Yes	Yes	No	No	No	No
10 - 11	852	87	939	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
11 - 12	883	119	1002	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
12 - 13	958	197	1155	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	966	117	1083	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
14 - 15	1111	146	1257	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1207	219	1426	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1270	251	1521	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	1313	239	1552	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	937	60	997	0	0	No	No	Yes	Yes	Yes	No	No	No	No
Total	12504	1660	14164	0	0	7	8	12	12	12	0	5	0	0

## Warrants

### Warrant 1: Eight-Hour Vehicular Volume



A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--

B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--



56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)



### Warrant 2: Four-Hour Vehicular Volume



Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)



### Warrant 3: Peak Hour



A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--

B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)



### Warrant 4: Pedestrian Volume

A. Four Hour Volumes --or--

B. One-Hour Volumes

### Warrant 5: School Crossing

Gaps Same Period --and--

Student Volumes

Nearest Traffic Control Signal (optional)



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Degree of Platooning (Predominant direction or both directions)

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A. Adequate trials of alternatives, observance and enforcement failed --and--

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### Warrant 8: Roadway Network

A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--

B. Weekend Volume (Five hours total)

### Warrant 9: Grade Crossing

A. Grade Crossing within 140 ft --and--

B. Peak-Hour Vehicular Volumes