



February 1, 2023

Mr. Jon Lee, Chairman,
Zoning Board of Appeals
Town of Walpole
135 School Street
Walpole, MA 02081

Re: Proposed 20-Unit Single Family Home Project
Brook Lane, Walpole, Traffic Summary Review

Dear Mr. Chairman,

On behalf of the applicant, Wall Street Development Corp., Kimley-Horn and Associates, Inc. (Kimley-Horn) is submitting this traffic summary report for the proposed 20 dwelling-unit, single-family home subdivision off Brook Lane. This traffic summary report follows the guidelines of the Zoning Board of Appeals (ZBA) for traffic analyses of small residential 40B projects.

The project consists of 20 single family homes with access to the development being provided via an extension from Brook Lane. As currently proposed, the street including its extension to Brook Lane, will continue to accommodate two-way travel. The existing cul-de-sac on Brook Lane would be eliminated with this modification resulting in a reduction in paved surface area. The home at 7 Brook Lane would be removed to facilitate the proposed change. The access drive was designed with a 22-foot-wide street with a one-foot cape cod berm on each side that would have a turnaround at its end for large vehicles including fire apparatus. A sidewalk is proposed along one side of the street. The project in total would then have an access point to the area's road network via Brook Lane's intersection with Union Street.

Union Street in Project Area

Union Street is classified as an "urban collector" roadway and is owned and maintained by the Town of Walpole. Union Street, a two-way, two lane street, generally follows an east-west alignment connecting Washington Street to the west and Route 1 and the Norwood town line to the east. The alignment is straight and level. The sidewalk on the south side connects Brook Lane with Pleasant Street. The sidewalk is separated from the street by approximately 4 feet of grass. The posted speed limit is 35 mph in the vicinity of Brook Lane.

Brook Lane

Brook Lane is a public way with direct access onto Union Street. It is a local residential street that is currently 250 feet in length and ends with a cul-de-sac. The street is 22 feet in width and a sidewalk exists along the eastern side of the street with a berm and small grass strip separating it from the street. It intersects with Union Street on a level, tangent alignment and its approach operates as a STOP controlled leg of the intersection. Brook Lane is approximately 1,100 feet east of Pleasant Street and 1,500 feet west of Route 1. There are four homes directly served by Brook Lane. With the proposed modification, the home at 7 Brook Lane will be eliminated as noted above.



It is expected the future roadway extension of Brook Lane to accommodate the 20-Lot Modification will also be dedicated as a public way. The 20-Lot project calls for the extension of Brook Lane an additional 600 +/- feet. The combined length of the new Brook Lane would be 850 +/- feet. The existing cul-de-sac on Brook Lane will be eliminated as part of this project and the paved area converted to lawn area for the

existing homeowners. The extension of Brook Lane will provide a single-entrance, 40-foot right-of-way from Union Street, including a 22-foot paved travel width with cape-cod berms on each side and one sidewalk.

Project Related Trip Generation

As part of this limited traffic review, the anticipated vehicle trip generation of the development was estimated of the project. The proposed project is to construct twenty (20) single family homes. The project will remove one existing single-family home located at 7 Brook Lane to accommodate the road extension from Brook Lane. An estimate of expected trip generation related to the additional project was completed using the latest models and statistics published by the Institute of Transportation Engineers (ITE) in Trip Generation Manual¹ for similar land uses were examined. Trip forecast models are developed by ITE from actual observations and empirical data collected as part of transportation studies. Land Use Code (LUC) 210-Single-Family was selected for this project. The trip forecasts were completed for the proposed development and the results are presented in Table 1. As can be seen, this project is expected to be a relatively low generator of traffic. During the AM peak hour, it is estimated that a total of 17 vehicle trips would be generated with the majority (13) of them exiting the site. During the PM peak hour, it is estimated that 22 vehicle trips will be generated with the majority (14) of these entering trips. The calculation sheets are attached to this letter.

**Table 1 – Summary of Site Trip Generation
Proposed 20 Single Family Home Subdivision**

	ENTER	EXIT	TOTAL
Weekday 24 Hour	115	115	230
Weekday AM Peak Hour	4	13	17
Weekday PM Peak Hour	14	8	22

ITE LUC 210 Single Family Land Use, 11th Edition

The removal of the single family home at 7 Brook Lane to accommodate the road extension would result in a small reduction in the estimates shown in Table 1 including a vehicle trip during each peak hour and up to 12 vehicle trips over the day.

Sight Distances/Site Drive Visibility

As part of this review, sight distance analysis was reviewed at the intersection of Union Street with Brook Lane. The minimum criteria for establishing adequate stopping and intersection sight distances are defined by the American Association of State Highway and Transportation Officials (AASHTO).² Stopping sight distance (SSD) represents the distance required for a driver traveling at a specified speed to come to a complete stop and therefore relates specifically to safety. Intersection sight distance (ISD) relates to an exiting driver’s view of approaching traffic and represents the distance an approaching vehicle travels during a specified time gap. As indicated by AASHTO, if the available ISD meets or exceeds the minimum SSD criteria, then there is adequate safe sight distance available for motorists to avoid collisions. Minimum required sight distances are calculated based on operating speeds of approaching drivers and the grade of the roadway.

¹ Institute of Transportation Engineers, Trip Generation Manual, 11th Edition, Washington, D.C., 2021.

² American Association of State Highway Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, Washington, D.C., 2018.

For 35 mph speeds, the minimum SSD and ISD required for safe movement would be 250 feet. For 40 mph, which exceeds the observed 85th percentile speed in the historical data, 305 feet would be required. Field measurements shown in Table 2 have indicated that there is at least 500 feet in both directions available for visibility. Based on this analysis, it is clear that the proposed site drive location is properly situated with respect to safe sight distances. The available sightlines will be more than adequate to ensure safe traffic operations. Visibility along the sidewalk that runs along the south side of Union Street at Brook Lane will remain clearly visible as well.



Table 2 – Summary of Sight Distance Review

UNION STREET AT BROOK LANE	SIGHT DISTANCE		
	MEASURED (FT)	35 MPH	
		MINIMUM REQUIRED (FT)	40 MPH
		MINIMUM REQUIRED (FT)	
Union Street Eastbound Approach	500+	250	305
Union Street Westbound Approach	500+	250	305
INTERSECTION SIGHT DISTANCE			
Brook Lane, looking east (Union Street WB traffic)	500+	250	305
Brook Lane, looking west (Union Street EB traffic)	500+	250	305

Fire Apparatus/Large Vehicle Movement

With the project as proposed that incorporates a cul-de-sac turnaround, an evaluation of fire truck access was completed. The cul-de-sac has been designed to meet the local design standards. The analysis demonstrated that fire apparatus could access as well as egress the proposed development. These diagrams are attached.

Conclusion

As a result of this traffic review for the proposed development to construct 20 homes, it can be concluded that the project will result in a small increase in traffic to the area roadway system. However, to encourage safe traffic movement to and from the project, the following measures are suggested:

- Install a STOP sign and markings on the Brook Lane approach to Union Street.
- Install a NOT A THRU WAY sign on Brook Lane within 150 feet of Union Street,
- Consider installing a raised pedestrian crossing across Brook Lane at Union Street. At minimum, if any modifications are done on the corner roundings at Union Street, the curb ramps will need to be reconstructed to be ADA compliant.

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All traffic control signage and markings should conform to the MUTCD³.

If you have any questions or need additional information, please do not hesitate to contact me at 508-395-3334.

Very truly yours,
KIMLEY-HORN & ASSOCIATES, INC.

William J Scully

William J. Scully, P.E.
(MA 33298)

WJS/-

Attachments

Trip Generation Calculation Sheets
Fire Truck Movement diagrams
Historical Traffic and Speed Data

³ U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), Washington, D.C., 2009.



PRECISION
D A T A
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Union Street
Just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin

165334 A Speed
Site Code: 16082

Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th %ile	Ave Speed
10/26/16	14	19	24	29	34	39	44	49	54	59	64	69	9999			
01:00	0	0	0	2	1	5	2	0	0	0	0	0	0	10	40	36
02:00	0	0	0	0	2	4	0	0	0	0	0	0	0	8	37	35
03:00	0	0	0	0	3	2	0	0	0	0	0	0	0	5	37	34
04:00	0	0	0	2	4	3	2	1	0	0	0	0	0	12	41	35
05:00	0	0	0	5	8	7	6	3	1	0	0	0	0	30	43	36
06:00	0	0	1	6	18	27	18	2	0	0	0	0	0	72	41	36
07:00	3	1	12	4	13	47	17	3	0	0	0	0	0	130	39	35
08:00	0	1	2	19	63	91	26	1	0	0	0	0	0	177	38	33
09:00	0	1	1	27	69	64	24	3	0	0	0	0	0	203	38	35
10:00	0	1	4	10	45	66	23	7	0	0	0	0	0	178	39	34
11:00	0	1	4	19	50	58	26	4	0	0	0	0	0	156	40	36
12 PM	0	0	1	19	68	90	23	3	1	0	0	0	0	162	40	35
13:00	0	1	5	12	58	65	17	1	0	0	0	0	0	205	38	35
14:00	1	2	5	16	74	65	24	5	0	0	0	0	0	159	38	34
15:00	2	3	3	18	64	83	20	2	0	0	0	0	0	192	39	34
16:00	0	0	5	19	58	94	35	1	0	0	0	0	0	195	38	34
17:00	0	5	4	10	77	91	23	3	2	0	0	0	1	212	39	35
18:00	0	0	6	11	52	64	14	1	0	1	0	0	0	216	38	35
19:00	0	2	3	9	28	41	15	2	1	1	0	1	0	149	38	35
20:00	0	1	2	6	14	20	9	2	0	0	0	0	0	103	40	35
21:00	1	0	0	3	12	10	6	1	0	1	0	0	0	54	40	35
22:00	1	1	0	0	8	7	2	0	0	0	0	0	0	34	41	35
23:00	0	0	0	2	5	7	0	0	1	0	0	0	0	19	38	33
Total	8	20	62	252	882	1063	347	49	6	3	0	1	1	2694		
%	0.3%	0.7%	2.3%	9.4%	32.7%	39.5%	12.9%	1.8%	0.2%	0.1%	0.0%	0.0%	0.0%			
AM Peak	07:00	07:00	07:00	09:00	07:00	08:00	08:00	10:00	04:00					08:00		
Vol.	3	1	12	27	65	91	26	7	1					203		
PM Peak	15:00	17:00	18:00	12:00	17:00	16:00	16:00	14:00	17:00	18:00		19:00	17:00	17:00		
Vol.	2	5	6	19	77	94	35	5	2	1		1	1	216		

State

15th Percentile : 29 MPH
 50th Percentile : 34 MPH
 85th Percentile : 39 MPH
 95th Percentile : 42 MPH

Mean Speed(Average) : 35 MPH
 10 MPH Pace Speed : 30-39 MPH
 Number In Pace : 1945
 Percent In Pace : 72.2%
 Number of Vehicles > 35 MPH : 1257
 Percent of Vehicles > 35 MPH : 46.7%



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Union Street
Just west of Brook Lane
City, State: Walpole, MA
Client: Green International / J. Gauvin

165334 A Speed
Site Code: 16082

Start Time	14	15	20	25	30	35	40	45	50	65	60	65	70	Total	85th %ile	Ave Speed
10/27/16	0	0	3	0	2	1	2	0	0	0	0	0	0	8	41	31
01:00	0	0	0	0	2	2	1	0	0	0	0	0	0	5	40	36
02:00	0	0	0	0	1	2	0	0	0	0	0	0	0	3	37	35
03:00	0	0	0	1	2	2	1	1	0	0	0	0	0	7	43	38
04:00	0	0	0	3	9	10	4	1	2	0	0	0	0	29	42	36
05:00	0	0	0	1	10	31	18	2	0	0	0	0	0	62	41	38
06:00	0	0	1	22	37	32	14	2	0	0	0	0	0	108	38	34
07:00	1	6	9	17	65	68	13	4	0	0	0	0	0	183	38	33
08:00	15	18	10	18	59	69	17	1	0	0	0	0	0	207	38	31
09:00	8	10	25	32	58	34	16	2	0	0	0	0	0	185	37	30
10:00	0	2	9	22	50	44	17	1	0	0	0	0	0	145	38	33
11:00	0	1	3	24	72	69	23	1	0	0	0	0	0	193	38	34
12 PM	1	0	4	21	69	68	17	5	0	0	0	0	0	185	38	34
13:00	0	1	5	18	58	65	17	0	0	0	0	0	0	162	38	34
14:00	3	1	5	13	71	89	17	1	0	0	0	0	0	200	38	34
15:00	2	1	8	23	69	68	23	3	0	0	0	0	0	197	38	34
16:00	0	2	4	12	70	72	16	1	0	0	0	0	0	177	38	34
17:00	0	1	13	24	78	71	9	2	0	0	0	0	0	198	37	33
18:00	0	0	6	28	58	46	1	1	0	0	0	0	0	140	38	32
19:00	1	1	5	11	30	35	7	2	0	0	0	0	0	82	38	33
20:00	1	0	1	10	22	13	5	0	0	0	0	0	0	52	37	33
21:00	0	0	4	5	10	16	5	2	0	0	0	0	0	42	39	34
22:00	2	0	0	2	6	9	3	1	0	0	0	0	0	23	39	33
23:00	0	0	0	2	3	8	2	0	0	0	0	0	0	15	38	35
Total	34	44	115	309	909	924	248	33	2	0	0	0	0	2618		
%	1.3%	1.7%	4.4%	11.8%	34.7%	35.3%	9.5%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	09:00	09:00	11:00	08:00	11:00	07:00	04:00					08:00		
Vol.	15	18	25	32	72	69	23	4	2					207		
PM Peak	14:00	16:00	17:00	18:00	17:00	14:00	15:00	12:00						14:00		
Vol.	3	2	13	28	78	89	23	5						200		

Stats	15th Percentile :	27 MPH
	50th Percentile :	33 MPH
	85th Percentile :	38 MPH
	95th Percentile :	42 MPH
	Mean Speed(Average) :	33 MPH
	10 MPH Pace Speed :	30-39 MPH
	Number in Pace :	1833
	Percent in Pace :	70.0%
	Number of Vehicles > 35 MPH :	1022
	Percent of Vehicles > 35 MPH :	39.0%



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Start Time	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th %ile	Ave Speed
10/26/10	14	19	24	29	34	39	44	49	54	59	64	69	9999			
10:15	0	0	0	0	7	4	1	1	0	0	0	0	0	13	39	35
01:00	0	0	0	0	4	2	0	0	0	0	0	0	0	6	38	34
02:00	0	0	2	1	3	0	0	2	0	0	0	0	0	8	46	33
03:00	0	0	3	3	1	3	2	0	0	0	0	0	0	12	39	31
04:00	0	0	1	4	4	3	4	0	0	0	0	0	0	16	41	34
05:00	0	2	3	13	9	21	4	1	0	0	0	0	0	53	38	33
06:00	0	0	4	34	62	45	6	1	0	0	0	0	0	152	37	33
07:00	0	1	6	43	144	70	11	0	1	0	0	0	0	278	36	33
08:00	0	1	2	40	96	85	16	1	1	0	0	0	0	242	37	34
09:00	1	3	3	39	87	63	8	0	0	0	0	0	0	204	37	32
10:00	0	2	3	20	80	69	13	2	0	0	0	0	0	189	36	34
11:00	0	0	4	20	108	72	10	2	0	0	0	0	0	214	37	34
12 PM	0	1	6	31	123	83	7	0	0	0	0	0	0	251	37	33
13:00	0	0	3	61	128	79	10	0	0	0	0	0	0	261	36	33
14:00	0	1	4	32	99	82	16	0	0	0	0	0	0	234	37	34
15:00	0	2	7	44	108	76	18	4	0	1	0	0	1	281	37	33
16:00	0	0	2	25	114	108	15	5	0	0	0	0	0	269	38	34
17:00	0	0	5	36	174	116	19	1	0	0	0	0	0	351	37	34
18:00	0	2	18	27	117	80	16	1	1	0	0	0	0	282	37	33
19:00	1	2	2	15	83	71	13	1	0	0	0	0	0	188	38	34
20:00	0	1	3	13	46	39	13	4	2	0	0	0	0	121	39	35
21:00	1	0	0	5	47	25	8	1	0	0	0	0	0	87	38	34
22:00	1	1	1	5	17	23	5	0	0	0	0	0	0	53	38	34
23:00	0	0	0	3	5	10	5	0	2	0	0	0	0	25	42	37
Total	4	19	82	514	1664	1229	220	27	7	1	0	0	1	3788		
%	0.1%	0.5%	2.2%	13.6%	44.2%	32.6%	5.8%	0.7%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	09:00	07:00	07:00	07:00	08:00	08:00	02:00	07:00					07:00		
Vol.	1	3	6	43	144	85	16	2	1					276		
PM Peak	19:00	15:00	18:00	13:00	17:00	17:00	17:00	16:00	20:00	15:00			15:00	17:00		
Vol.	1	2	18	61	174	116	19	5	2	1			1	351		

Stats

- 15th Percentile : 28 MPH
- 50th Percentile : 32 MPH
- 85th Percentile : 37 MPH
- 95th Percentile : 40 MPH

Mean Speed(Average) : 33 MPH

10 MPH Pace Speed : 30-39 MPH

Number in Pace : 2893

Percent in Pace : 76.8%

Number of Vehicles > 35 MPH : 1239

Percent of Vehicles > 35 MPH : 32.9%



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WB	1	15	20	25	30	35	40	45	50	55	60	65	70	Total	85th %ile	Ave Speed
Start Time	14	19	24	29	34	39	44	49	54	59	64	69	9999			
10/27/16	0	0	0	1	3	3	3	1	0	0	0	0	0	11	42	37
01:00	0	0	0	0	3	3	1	0	0	0	0	0	0	7	38	36
02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
03:00	0	0	2	0	1	4	1	0	0	0	0	0	0	8	38	33
04:00	0	0	1	2	7	4	0	0	0	0	0	0	0	14	36	32
05:00	0	1	1	10	18	11	5	0	0	0	0	0	0	46	38	33
06:00	0	0	2	29	78	54	8	2	0	0	0	0	0	173	37	33
07:00	0	0	10	42	132	73	16	1	0	0	0	0	0	274	37	33
08:00	4	28	31	50	95	46	9	0	0	0	0	0	0	263	35	29
09:00	1	0	7	56	72	30	9	0	1	0	0	0	0	176	36	31
10:00	3	8	27	38	55	49	8	0	0	0	0	0	0	188	38	30
11:00	3	1	9	34	92	71	12	1	0	1	0	0	0	224	37	33
12 PM	0	3	6	35	132	79	7	0	0	0	0	0	0	262	36	33
13:00	1	1	6	36	108	71	13	0	0	0	0	0	0	236	37	33
14:00	0	1	2	26	125	83	24	2	0	0	0	0	0	263	38	34
15:00	1	1	4	33	90	90	22	1	0	0	0	0	0	242	38	34
16:00	0	0	2	38	119	82	15	2	0	0	0	0	0	258	37	33
17:00	0	1	11	58	155	73	4	1	0	0	0	0	0	304	36	32
18:00	1	1	13	77	120	40	4	2	0	0	0	0	0	258	34	31
19:00	3	0	3	28	79	48	11	1	0	0	0	0	0	173	37	33
20:00	0	1	1	13	71	55	10	0	0	1	0	0	0	152	37	34
21:00	0	0	1	14	36	31	4	1	0	0	0	0	0	87	37	33
22:00	0	0	0	6	19	17	5	1	0	0	0	0	0	48	38	34
23:00	0	0	0	1	5	11	5	0	1	0	0	0	0	23	41	37
Total	17	47	139	628	1616	1028	196	16	2	2	0	0	0	3691		
%	0.5%	1.3%	3.8%	17.0%	43.8%	27.9%	5.3%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	08:00	09:00	07:00	07:00	07:00	08:00	09:00	11:00				07:00		
Vol.	4	28	31	56	132	73	16	2	1	1				274		
PM Peak	19:00	12:00	16:00	18:00	17:00	15:00	14:00	14:00	23:00	20:00				17:00		
Vol.	3	3	13	77	156	90	24	2	1	1				304		

State	15th Percentile :	26 MPH
	50th Percentile :	32 MPH
	85th Percentile :	37 MPH
	95th Percentile :	39 MPH
	Mean Speed(Average) :	32 MPH
	10 MPH Pace Speed :	30-39 MPH
	Number In Pace :	2644
	Percent In Pace :	71.6%
	Number of Vehicles > 35 MPH :	1038
	Percent of Vehicles > 35 MPH :	28.1%

Single-Family Detached Housing (210)

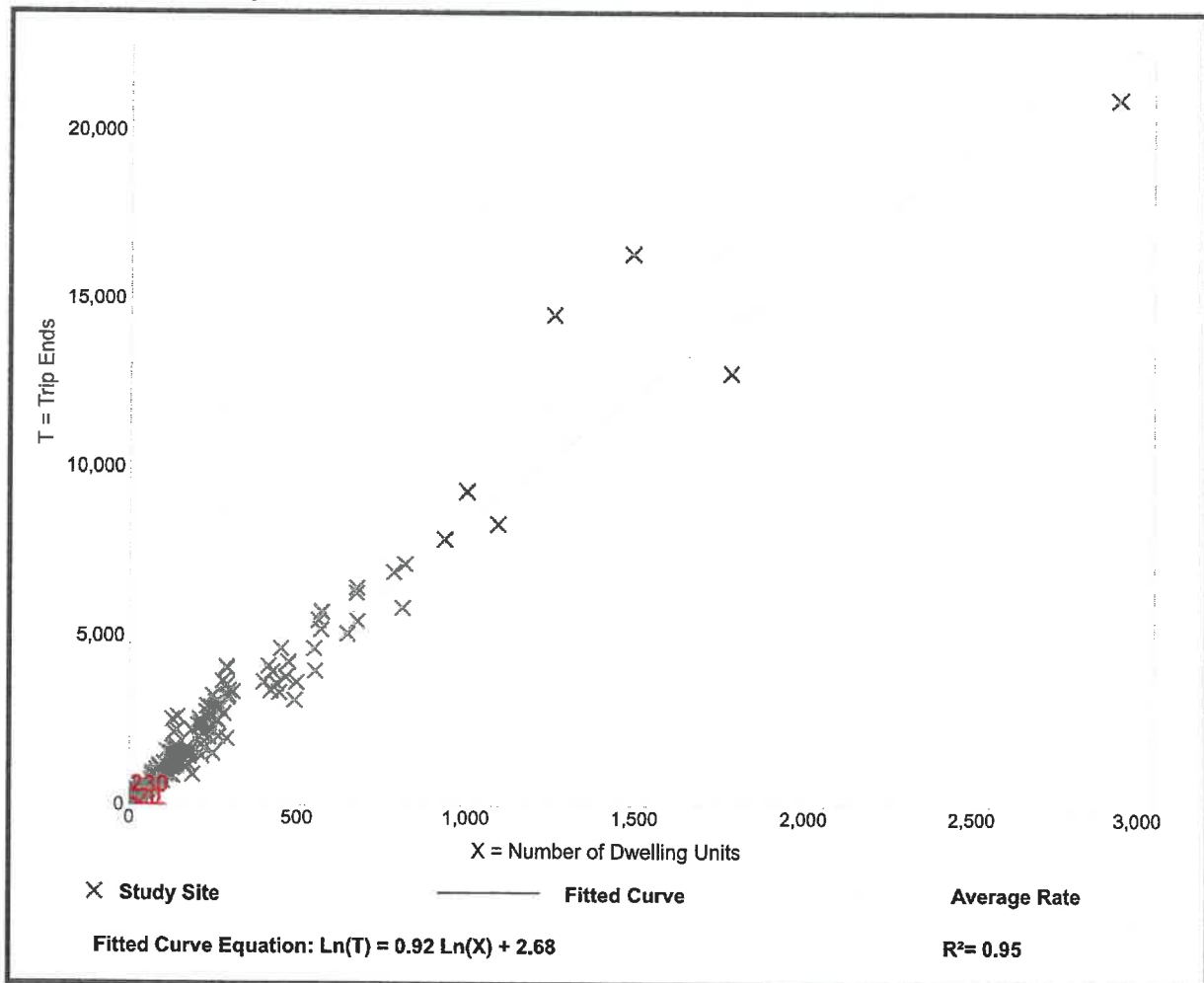
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Single-Family Detached Housing (210)

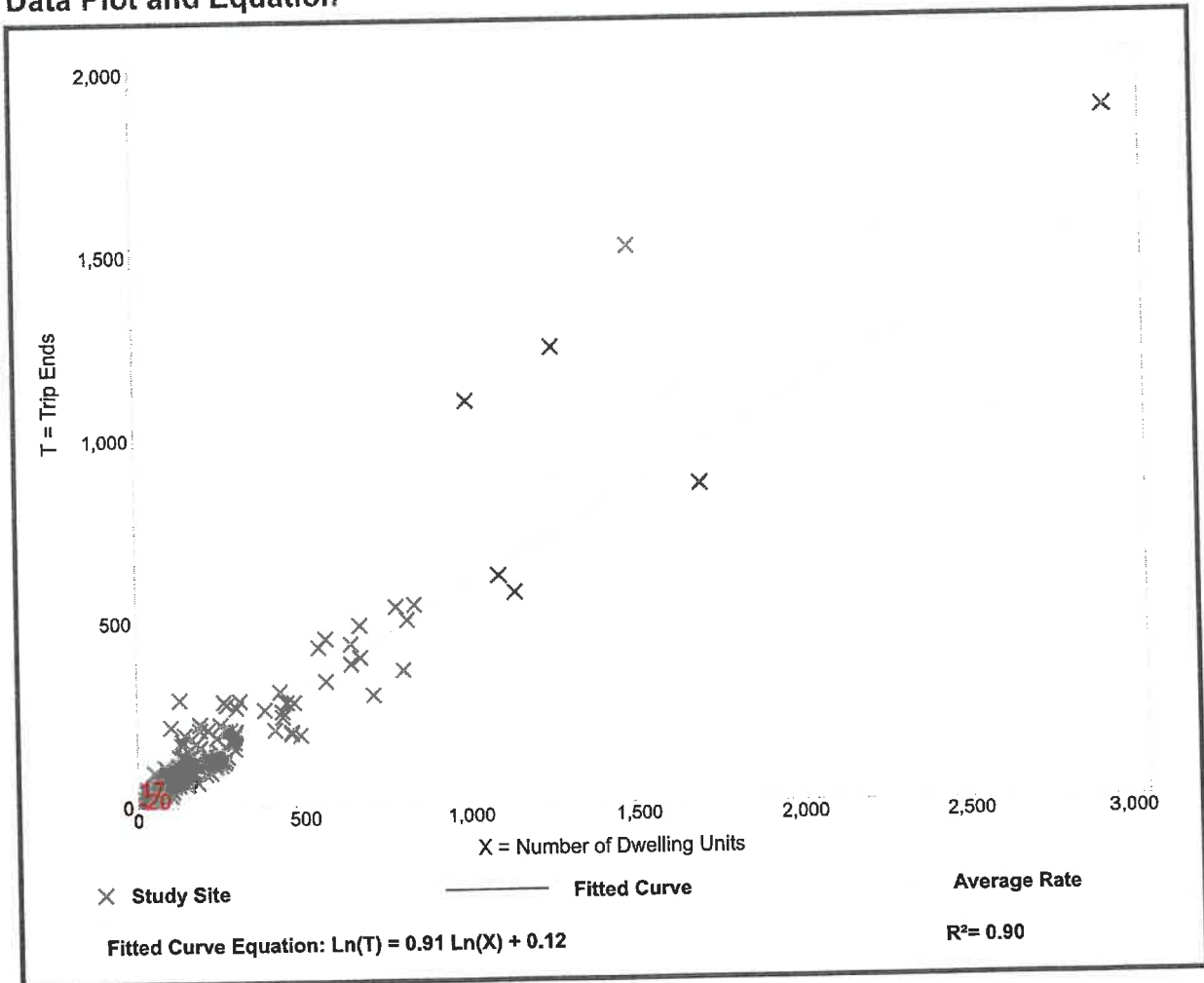
Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 192
 Avg. Num. of Dwelling Units: 226
 Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

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: 208

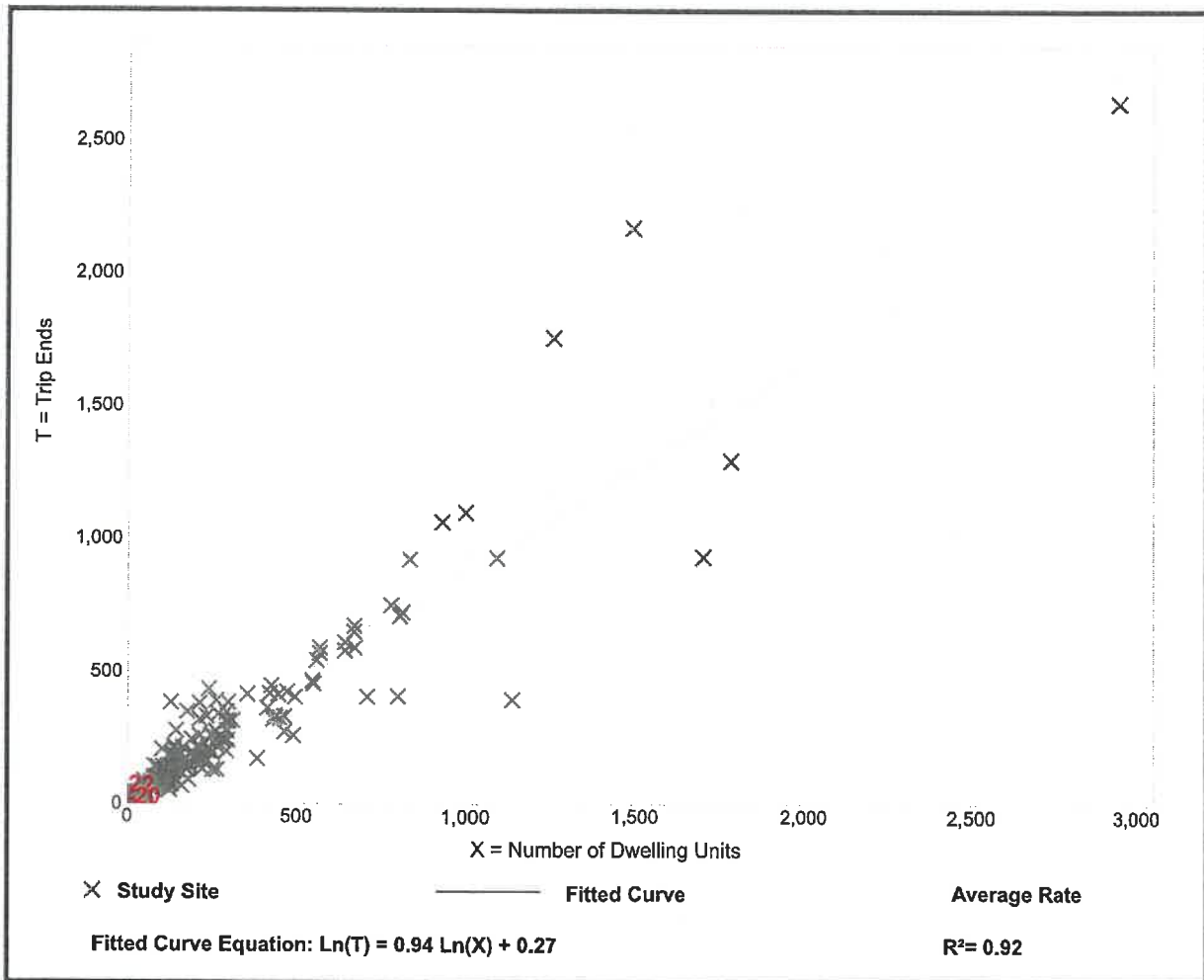
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation





SCENARIO 2

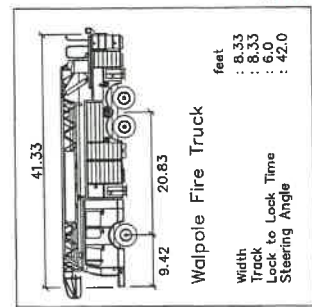
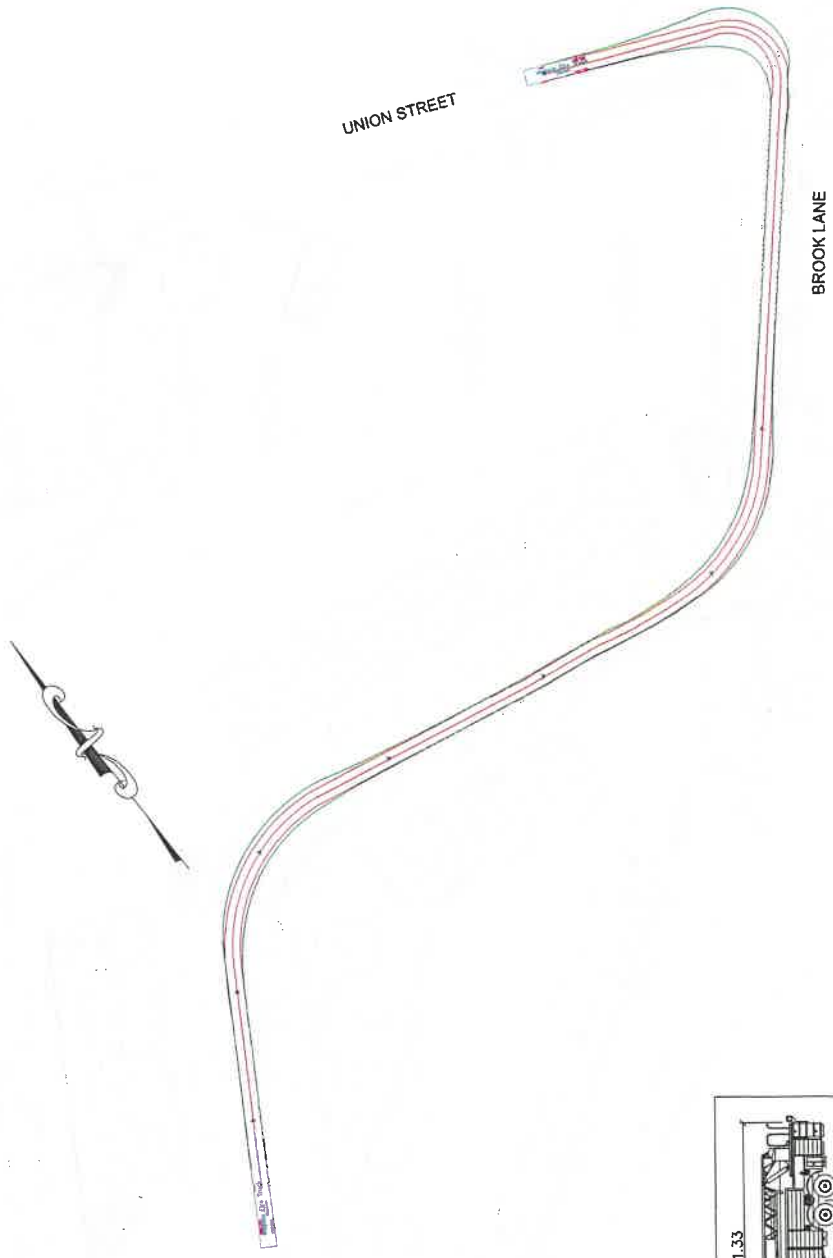
EXITING FROM WEST

Kimley-Horn
400 WINDHAM STREET, SUITE 200, WALTHAM, MA 02451
PHONE: 781-234-0000
WWW.KIMLEY-HORN.COM

AUTOTURN
FIRE TRUCK PATH
BROOK LANE TO
UNION ST

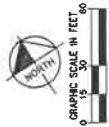
THE TOWN OF BURNHAM
AVENUE
1000 BURNHAM AVENUE
BURNHAM, MA 01901
PLANNING DEPARTMENT

BURNS AVE.

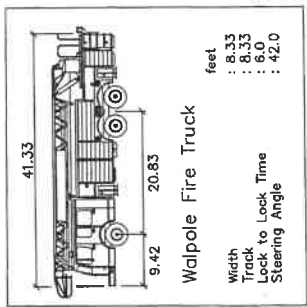
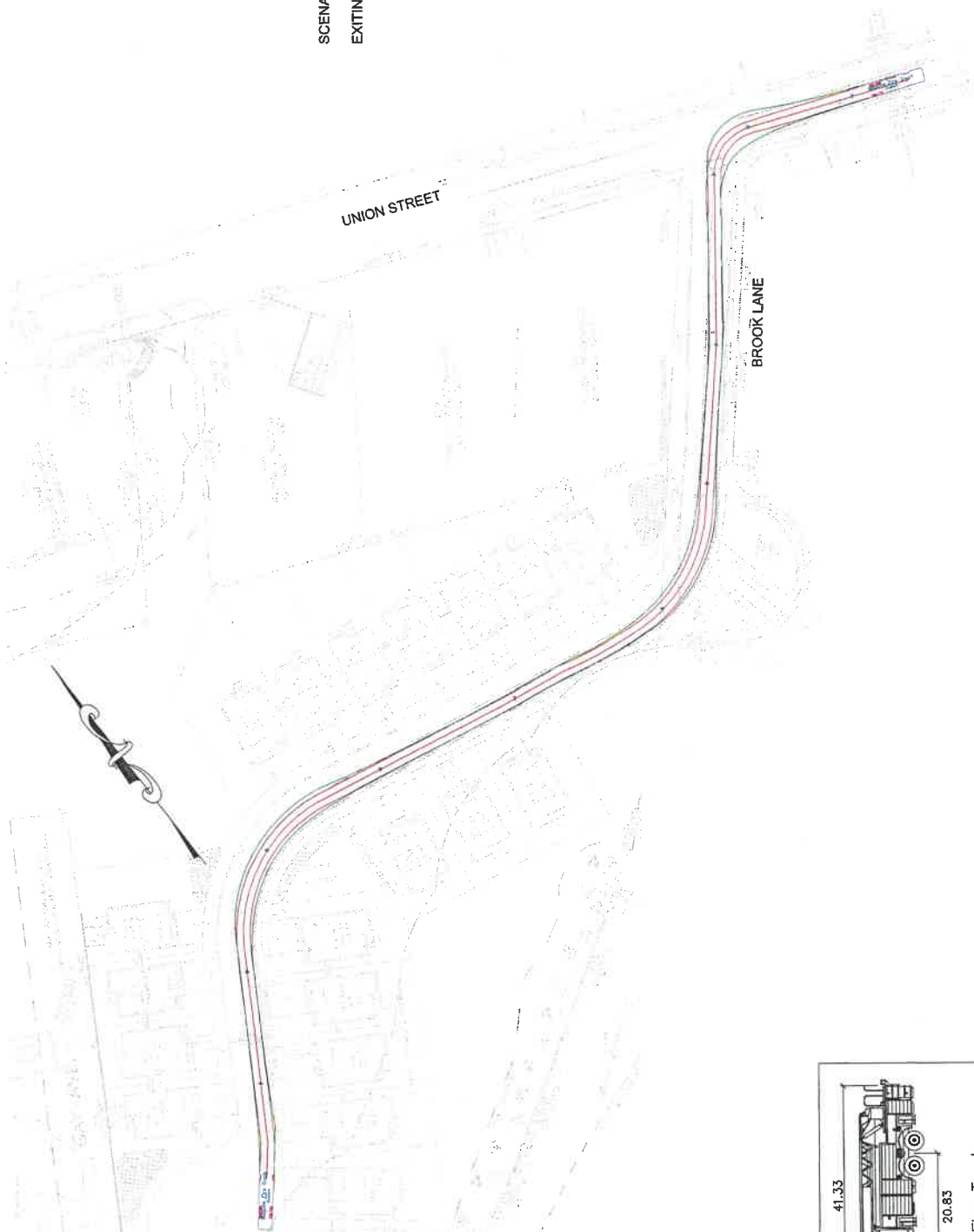


TURNING MOMENTS LEGEND:
— TIRE LINES
— FRONT BUMPER LINES

REFERENCE:
GLM Engineering Consultants, Inc.
AMENDED SITE DEVELOPMENT PLAN
A COMPREHENSIVE PERMIT M.G.L.c. 40B

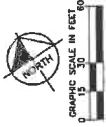


SCENARIO 3
EXITING TO EAST



TURNING MOMENTS LEGEND:
 TIRE LINES
 FRONT BUMPER LINES

REFERENCE:
GLM Engineering Consultants, Inc.
 AMENDED SITE DEVELOPMENT PLAN
 A COMPREHENSIVE PERMIT M.G.L.c. 40B

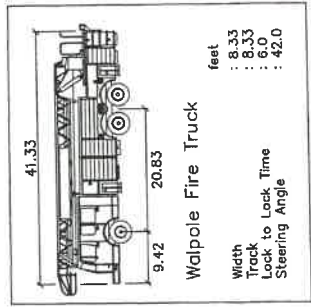


SCENARIO 4
ENTERING FROM WEST

BURNS AVE.

UNION STREET

BROOK LANE



TURNING MOMENTS LEGEND:
THE LINES
FRONT BUMPER LINES

REFERENCE:
GLM Engineering Consultants, Inc.
AMENDED SITE DEVELOPMENT PLAN
A COMPREHENSIVE PERMIT M.G.L.C. 40B