

January 14, 2015

Ms. Emilie A. Cademartori, Coordinator
Wenham Zoning Board of Appeals
Wenham Town Hall, 2nd Floor
138 Main Street
Wenham, MA 01938

Re: Response to Transportation Peer Review Comments
Proposed Age-Restricted Residential Development – Maple Woods
62 Maple Street – Wenham, Massachusetts

Dear Ms. Cademartori:

MDM Transportation Consultants, Inc. (MDM) has prepared the following response to transportation-related peer review comments for the above-referenced project, as issued in a letter by Weston & Sampson (W&S) dated December 30, 2014. To facilitate review, W&S comments are paraphrased or truncated with corresponding MDM responses. For reference purposes, the entire W&S review letter is provided in the **Attachments**.

Response to December 30, 2014 Letter from Weston & Sampson

Trip Generation and Traffic Growth

Comment 1: “Both the Trip Generation and the Growth Rate calculations are reasonable for this development. We concur with the LUC chosen for this project and the Growth rate utilized.”

Response: No response required.

Maple Street Travel Speed

Comment 2: “...the 85th percentile speed is approximately 39 MPH in both directions versus the posted speed limit of 30 MPH. As a result the proponent has spoken with the Wenham Police Department and has recommended the installation of speed radar assemblies along Maple Street. We concur with this recommendation.”

Response: While W&S concurs with the travel speed data, the ZBA had requested that new traffic data be collected as Maple Street was repaved subsequent to the initial survey in May 2014. The data is summarized below in **Table 1** with detailed results provided in the **Attachments**. As shown below, the supplemental data collected in November 2014 is highly consistent with data collected in May 2014. As November is typically a below average travel month, it is normal for November traffic volumes to be lower compared to traffic volumes collected in May, an above average travel month.

TABLE 1
Supplemental Traffic Data Comparison

Maple Street Travel Direction	Daily Traffic Volume ¹ (Vehicles per weekday)		85 th Percentile Travel Speed ² (Miles per hour)	
	May 2014	November 2014	May 2014	November 2014
Eastbound	2,186	1,986	39	39
Westbound	<u>2,375</u>	<u>2,038</u>	39	39
TOTAL	4,561	4,024	--	--

¹ Two-way daily traffic volume expressed in vehicles per day without seasonal adjustment.

² The speed at or below which 85 percent of the vehicles are traveling.

Traffic Volume Seasonal Adjustment

Comment 3: "As is standard procedure for a MassDOT type study, traffic volumes at the nearest MassDOT permanent count stations to the project site were reviewed for seasonal variations. It was determined that the traffic volumes at the nearest permanent count stations, during the latest four years of published counts, showed that the counts in May and June (period when counts were taken for this study) of those years were above average traffic months. As a result there was no seasonal adjustment made to bring the recently gathered counts down. We concur with this decision."

Response: No response required.

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Traffic Operations Analysis

Comment 4: "We have reviewed the LOS evaluation performed and concur with the results."

Response: No response required.

Entrance/Exit Traffic Evaluation

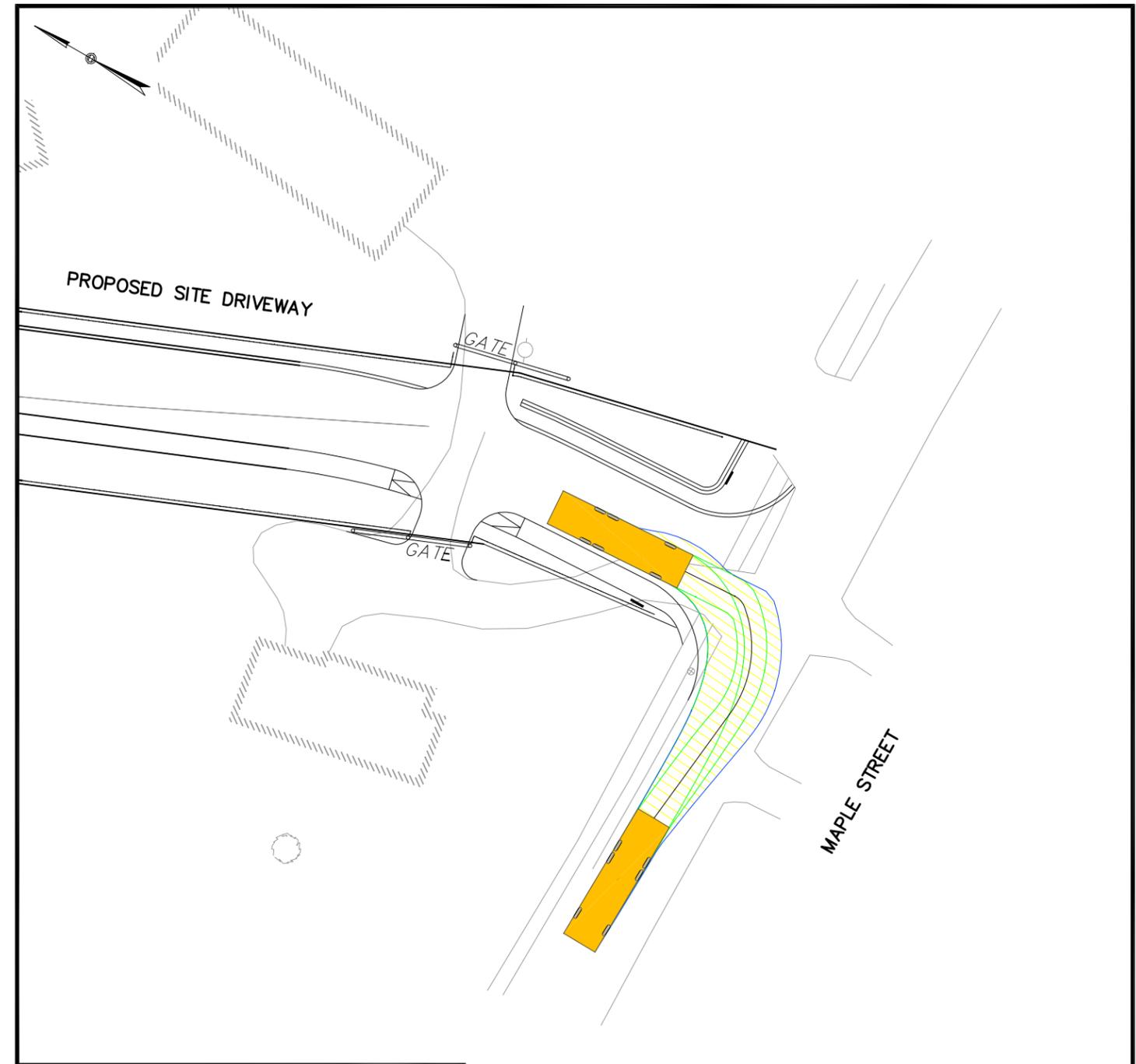
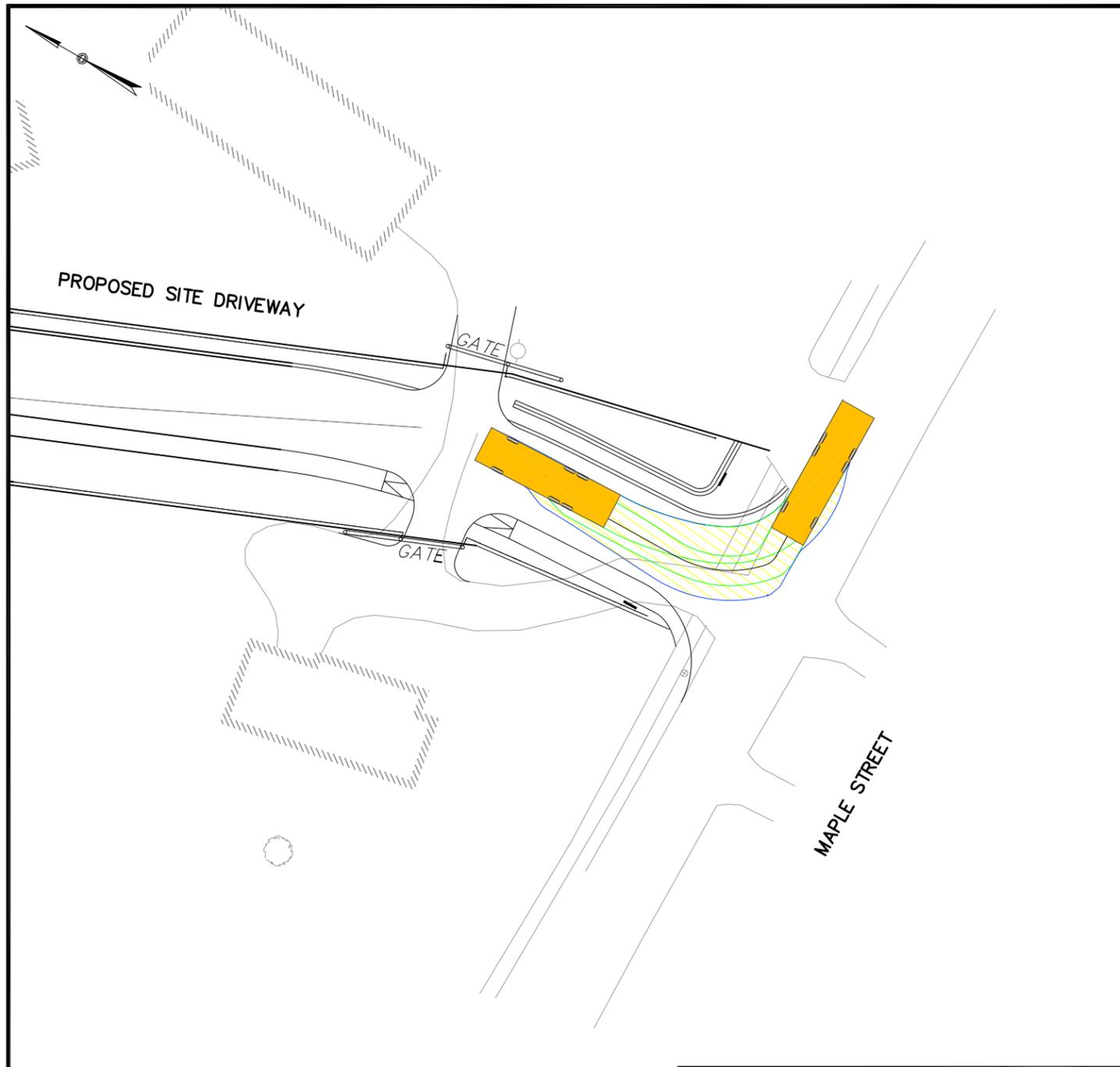
Comment 5: "In general, the circulation works for passenger car vehicles and single unit trucks (SU-30) and appears tight for tractor trailer movements (WB-50). The entrance driveway appears to work for passenger car vehicles and single unit trucks (SU-30) but the right turns into the site and the right turns out of the site do not appear to work for tractor trailer movements (WB- 50). The Proponent should confirm with AutoTurn templates that tractor trailers, that may be making deliveries to the site, and appropriate Town of Wenham emergency apparatus can safely make the required turns into and exiting the site as well as within the confines of the site circulation."

Response: The driveway entrance has been modified to include larger corner radii to accommodate turning movements for larger vehicles accessing the site. A vehicle turn analysis using AutoTurn® software for Wenham's largest fire apparatus and a tractor trailer type vehicle (WB-50) has been conducted to confirm that the new layout will support turning movements from the larger vehicles specified. As shown in **Exhibits 1 through 4**, tractor-trailer type vehicles and Wenham's ladder truck can circulate through the site and access/egress the site to/from Maple Street within the existing and proposed paved areas. It should be noted that the ladder truck is expected to enter the site on an infrequent basis and tractor-trailer trips will only be made during construction periods. Smaller single-unit trucks (SU-30), which are expected to make regular deliveries to the site, can also be accommodated by the revised driveway layout.

Sight Line Evaluation

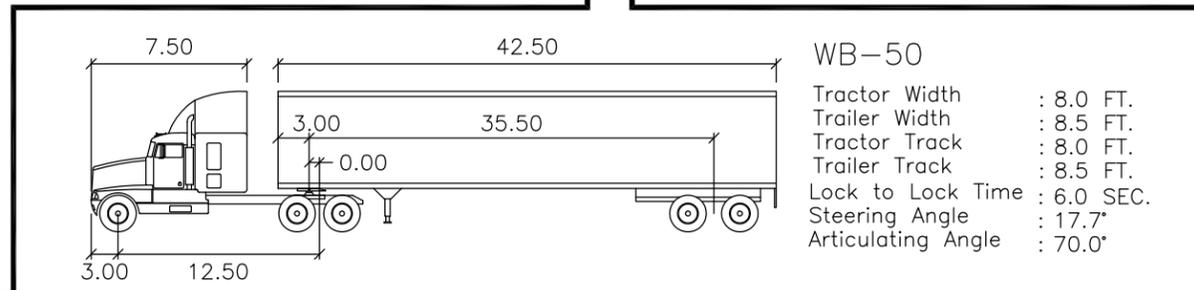
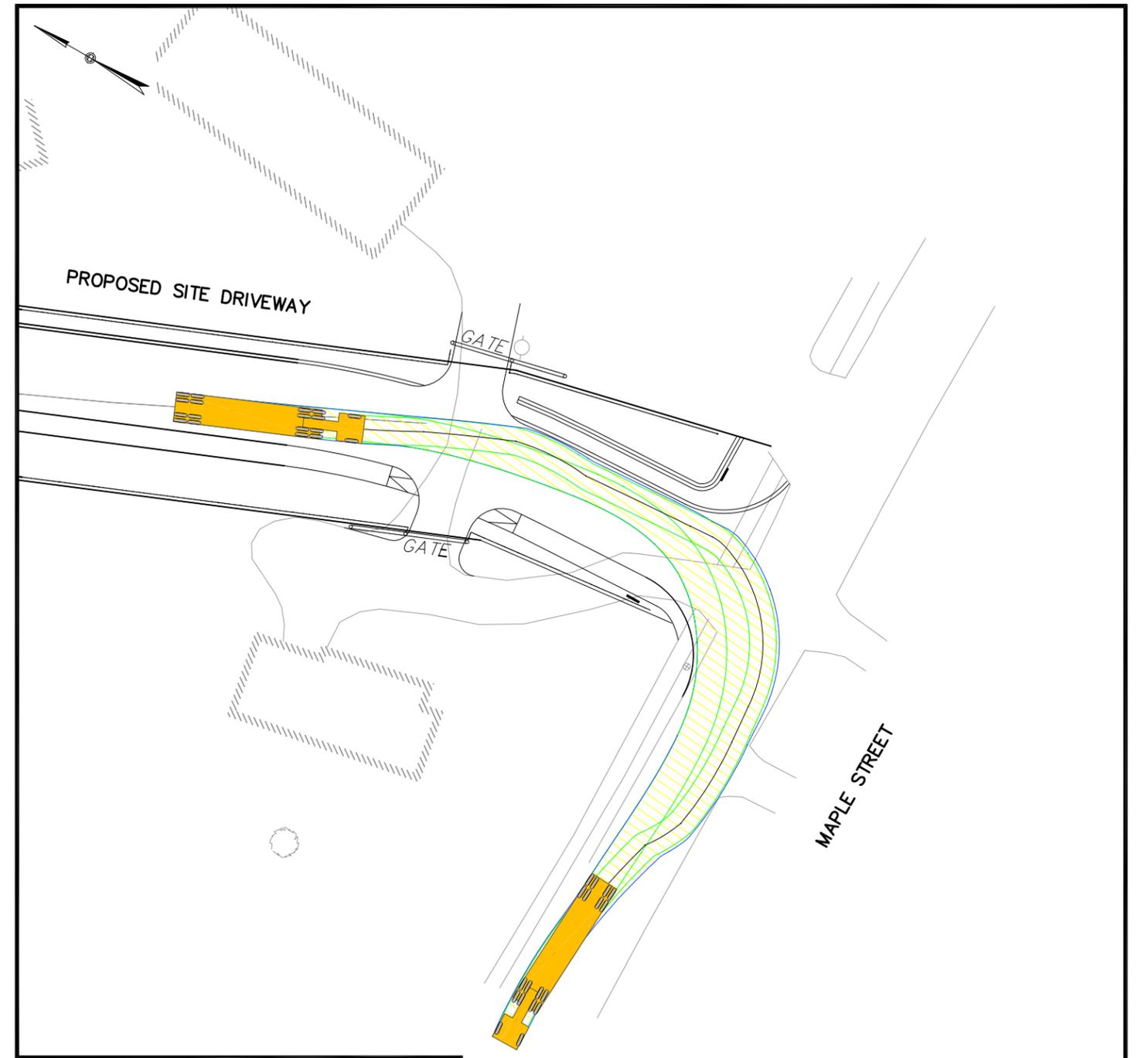
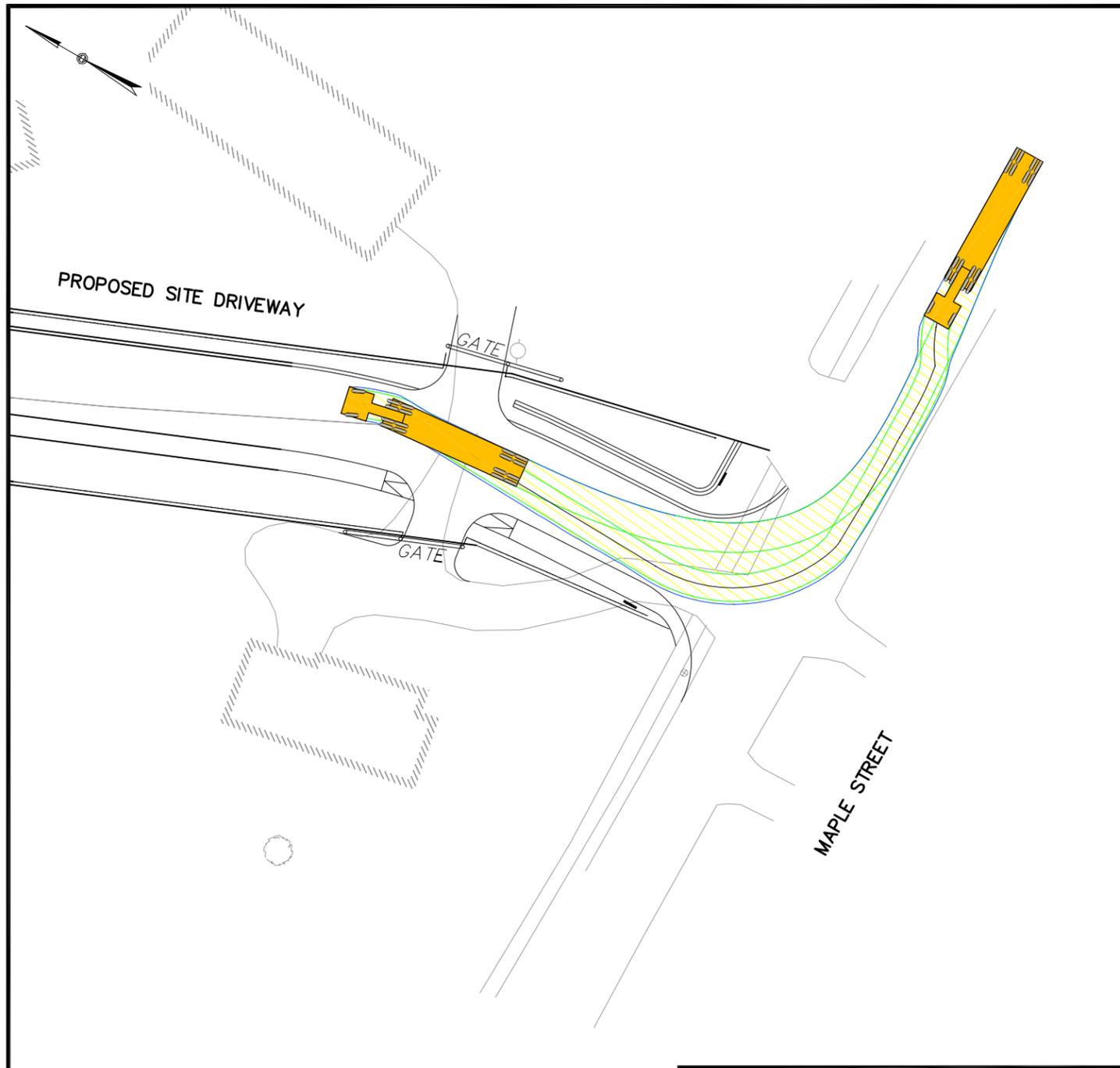
Comment 6: "We have been to the site and concur with the available lines of sight noted by the Proponent and also concur with their requirement to selectively clear some of the vegetation at the site driveway and the need for any proposed plantings to be under two feet in height to conserve the sight distances."

Response: No response required.



Wenham Quint 405 Sutphen 75'
 Width : 10.46 FT.
 Track : 10.46 FT.
 Lock to Lock Time : 6.0 SEC.
 Steering Angle : 39.6°

Site Plan Source: Siemasko & Verbridge



Site Plan Source: Siemasko & Verbridge

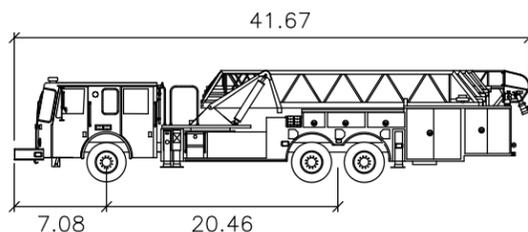
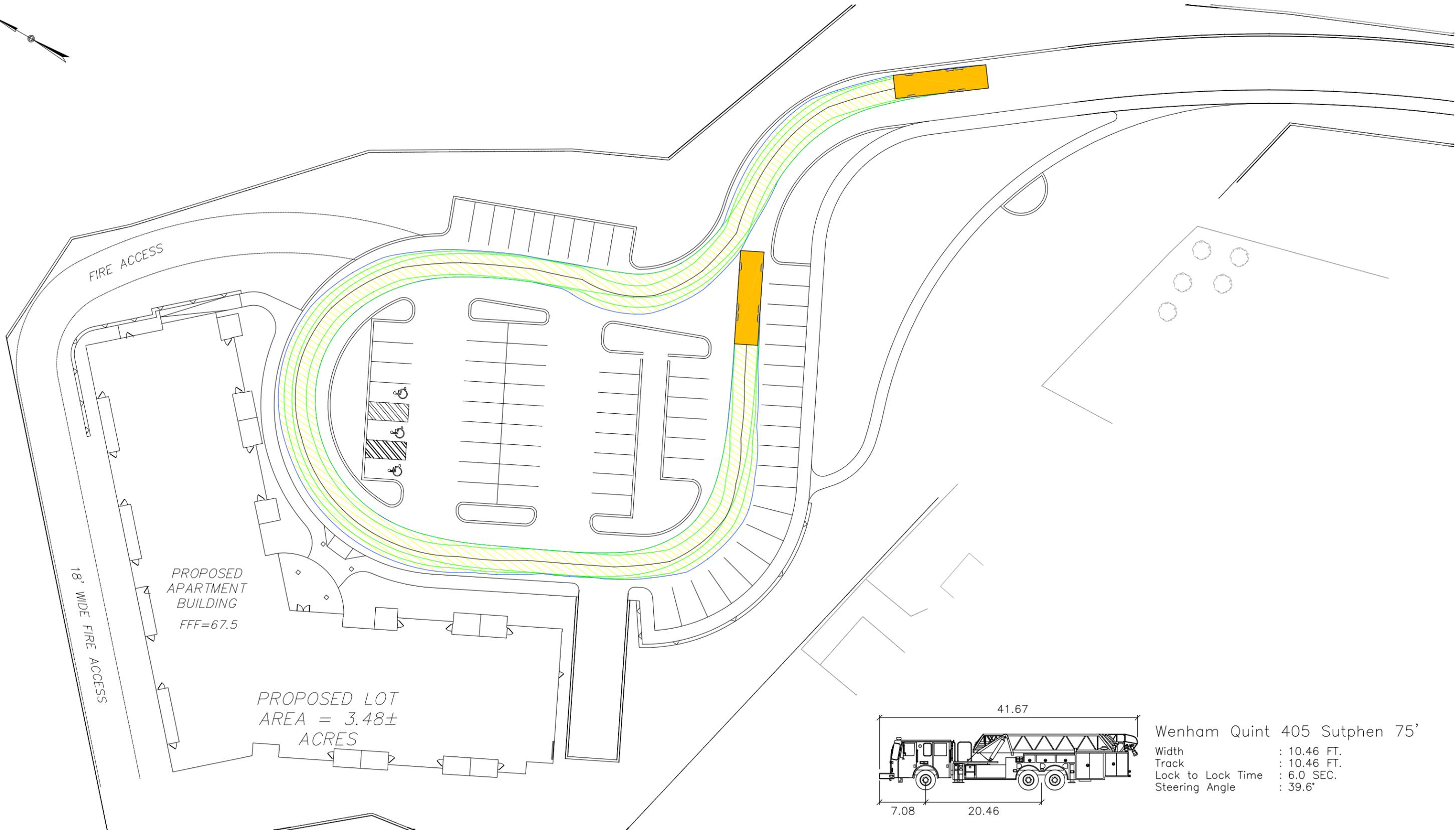
MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Proposed Residential Development
Wenham, Massachusetts



Exhibit 2
Autoturn Analysis
WB-50 Truck



Wenham Quint 405 Sutphen 75'
 Width : 10.46 FT.
 Track : 10.46 FT.
 Lock to Lock Time : 6.0 SEC.
 Steering Angle : 39.6°

Site Plan Source: Siemasko & Verbridge

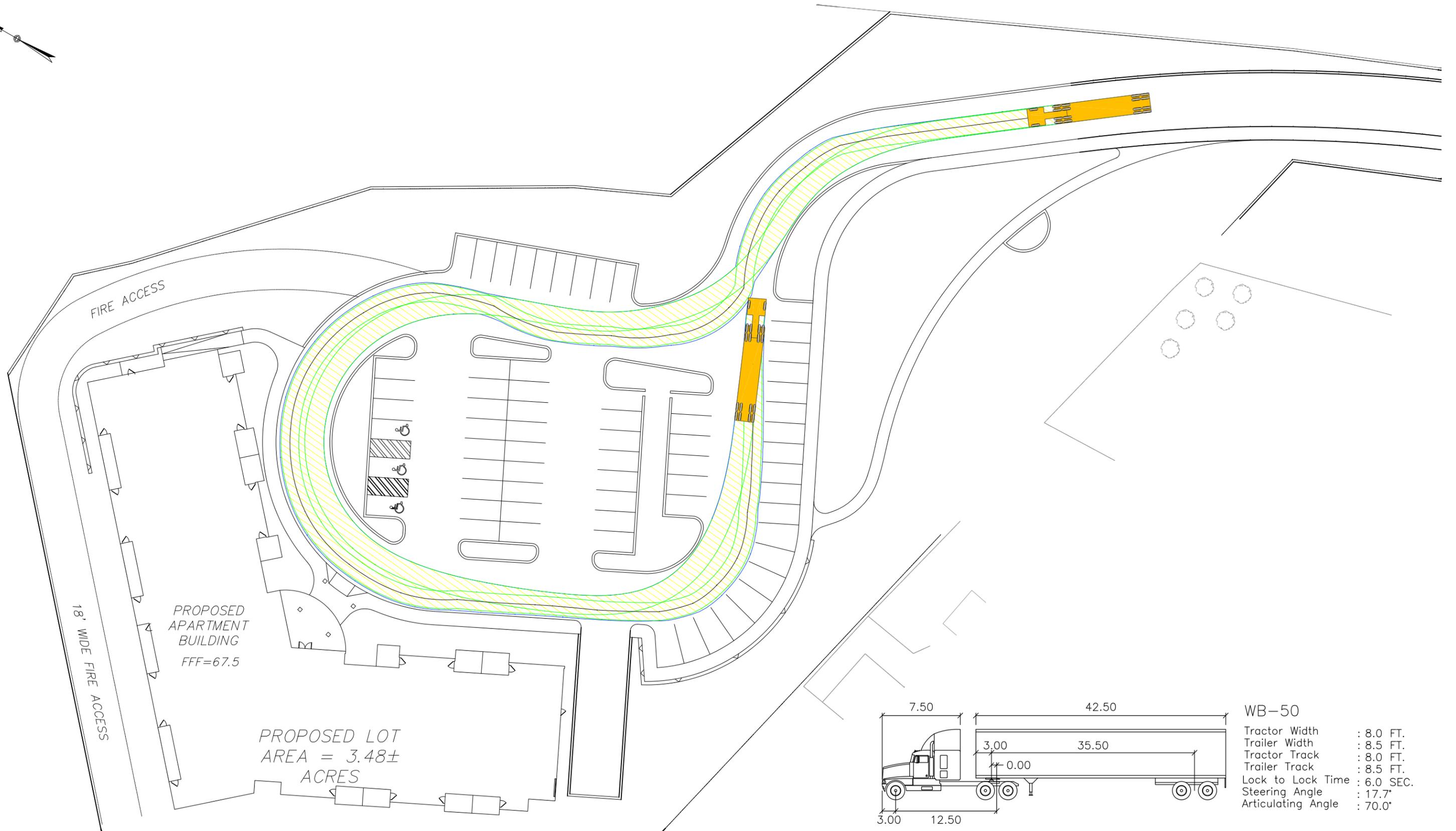
MDM TRANSPORTATION CONSULTANTS, INC.
 Planners & Engineers

28 Lord Road, Suite 280
 Marlborough, MA 01752

Proposed Residential Development
 Wenham, Massachusetts



Exhibit 3
Autoturn Analysis
Ladder Truck

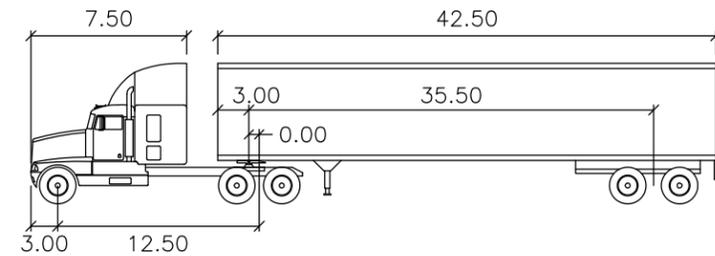


FIRE ACCESS

18' WIDE FIRE ACCESS

PROPOSED APARTMENT BUILDING
FFF=67.5

PROPOSED LOT AREA = 3.48± ACRES



WB-50
 Tractor Width : 8.0 FT.
 Trailer Width : 8.5 FT.
 Tractor Track : 8.0 FT.
 Trailer Track : 8.5 FT.
 Lock to Lock Time : 6.0 SEC.
 Steering Angle : 17.7°
 Articulating Angle : 70.0°

Site Plan Source: Siemasko & Verbridge

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

28 Lord Road, Suite 280
Marlborough, MA 01752

Proposed Residential Development
Wenham, Massachusetts



Exhibit 4
Autoturn Analysis
WB-50 Truck

Ms. Emilie A. Cademartori
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Parking Supply

Comment 7: "The proposed development of 60 units is proposing 66 parking spaces. This equates to a parking space rate of approximately 1.1 spaces per unit. It has been our experience that a typical 40B apartment complex utilizes approximately 1.5 spaces per unit. An average rate for senior housing is reported to be less than 1.0 space per unit including staff and visitor parking. Therefore, we concur with the 66 parking spaces being supplied for this 60 unit development."

Response: No response required.

SUMMARY

In summary, W&S is in agreement with the analysis methodology, results and the overall finding that traffic generated by the proposed development will not significantly impact traffic conditions along Maple Street. W&S has also indicated that the proposed 66 space parking supply is adequate for the proposed development.

Based on the W&S review, the proposed site driveway entrance has been modified to better accommodate the infrequent use by larger vehicle types, including tractor-trailers and the Town of Wenham emergency vehicles.

I trust this information will be useful in your continued review of the project. Please contact me with any questions.

MDM TRANSPORTATION CONSULTANTS, INC.

Sincerely,



Daniel J. Mills, P.E., PTOE
Principal

cc: Mr. Andrew DeFranza – Harborlight Community Partners

Attachments

- May and November 2014 Traffic Data
- Revised Site Driveway Design
- Weston & Sampson Review Letter Dated 12/30/2014

MDM Transportation Consultants, Inc.

E/W: Maple Street
at 62 Maple Street
Wenham, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 00768001

768 maple street (volume)

Start Time	21-May-14 Wed	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	46			1	36				
12:15		4	27			2	34				
12:30		0	21			1	26				
12:45		1	41	5	135	0	50	4	146	9	281
01:00		1	32			0	44				
01:15		0	37			0	34				
01:30		0	30			0	44				
01:45		0	32	1	131	0	45	0	167	1	298
02:00		0	43			0	36				
02:15		2	45			1	27				
02:30		1	36			0	38				
02:45		0	52	3	176	1	42	2	143	5	319
03:00		0	59			0	49				
03:15		0	49			1	45				
03:30		2	51			1	47				
03:45		1	47	3	206	0	36	2	177	5	383
04:00		2	40			0	47				
04:15		1	39			1	61				
04:30		0	45			0	53				
04:45		4	46	7	170	0	46	1	207	8	377
05:00		1	60			5	59				
05:15		3	75			8	43				
05:30		3	61			5	67				
05:45		4	53	11	249	6	70	24	239	35	488
06:00		10	42			15	64				
06:15		5	47			28	41				
06:30		22	39			21	36				
06:45		12	30	49	158	32	35	96	176	145	334
07:00		39	23			38	22				
07:15		33	29			34	34				
07:30		33	17			53	19				
07:45		33	21	138	90	70	27	195	102	333	192
08:00		54	16			53	13				
08:15		39	14			36	18				
08:30		42	22			45	11				
08:45		29	11	164	63	43	19	177	61	341	124
09:00		21	22			34	17				
09:15		29	14			27	4				
09:30		23	5			36	7				
09:45		25	5	98	46	36	8	133	36	231	82
10:00		30	9			27	5				
10:15		31	6			41	5				
10:30		18	2			28	2				
10:45		35	4	114	21	25	4	121	16	235	37
11:00		29	6			35	4				
11:15		39	2			30	2				
11:30		31	1			37	2				
11:45		38	2	137	11	40	0	142	8	279	19
Total		730	1456			897	1478			1627	2934
Percent		33.4%	66.6%			37.8%	62.2%			35.7%	64.3%
Combined Total		2186				2375				4561	

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA 01752
508-303-0370
www.mdmtrans.com

EW: Maple Street
at 62 Maple Street
Wenham, MA

Site Code: 00768001
Station ID:

768 Maple Street (Speed)

Eastbound	1	16	21	26	31	36	41	46	51	56	61	66	71	76	76	85th
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total	Percent
05/21/14	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5	39
01:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	39
02:00	0	0	0	1	0	0	2	0	0	0	0	0	0	0	3	44
03:00	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3	37
04:00	0	0	0	1	2	4	0	0	0	0	0	0	0	0	7	38
05:00	0	0	0	1	3	4	3	0	0	0	0	0	0	0	11	42
06:00	0	0	0	4	19	22	2	2	0	0	0	0	0	0	49	39
07:00	1	1	1	5	62	56	11	1	0	0	0	0	0	0	138	39
08:00	0	2	4	15	55	70	17	1	0	0	0	0	0	0	164	39
09:00	1	2	0	12	44	31	8	0	0	0	0	0	0	0	98	39
10:00	3	1	2	22	39	42	4	1	0	0	0	0	0	0	114	38
11:00	0	0	0	18	64	45	7	3	0	0	0	0	0	0	137	38
12 PM	1	2	0	17	69	43	0	3	0	0	0	0	0	0	135	37
13:00	2	3	1	11	44	62	8	0	0	0	0	0	0	0	131	39
14:00	5	8	6	9	76	60	10	2	0	0	0	0	0	0	176	38
15:00	0	2	5	25	78	86	9	1	0	0	0	0	0	0	206	38
16:00	0	0	1	11	57	83	18	0	0	0	0	0	0	0	170	40
17:00	1	0	2	24	122	89	11	0	0	0	0	0	0	0	249	38
18:00	0	1	1	9	66	66	13	2	0	0	0	0	0	0	158	39
19:00	0	0	2	5	38	37	8	0	0	0	0	0	0	0	90	39
20:00	0	0	0	5	27	25	6	0	0	0	0	0	0	0	63	39
21:00	0	0	0	3	18	24	1	0	0	0	0	0	0	0	46	38
22:00	0	0	0	0	9	10	2	0	0	0	0	0	0	0	21	39
23:00	0	0	0	0	5	4	2	0	0	0	0	0	0	0	11	41
Total	14	22	25	198	899	870	142	16	0	0	0	0	0	0	2186	

Percentiles
 15th Percentile : 29 MPH
 50th Percentile : 34 MPH
 85th Percentile : 39 MPH
 95th Percentile : 41 MPH

Statistics
 Mean Speed(Average) : 35 MPH
 10 MPH Pace Speed : 31-40 MPH
 Number in Pace : 1581
 Percent in Pace : 72.3%
 Number of Vehicles > 30 MPH : 1927
 Percent of Vehicles > 30 MPH : 88.2%

Summary
 15th Percentile : 29 MPH
 50th Percentile : 34 MPH
 85th Percentile : 39 MPH
 95th Percentile : 41 MPH

Statistics
 Mean Speed(Average) : 35 MPH

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
 Marlborough, MA 01752
 508-303-0370
 www.mdmtrans.com

E/W: Maple Street
 at 62 Maple Street
 Wenham, MA

Site Code: 00768001
 Station ID:

768 Maple Street (Speed)

Westbound	1	16	21	26	31	36	41	46	51	56	61	66	71	76	85th		
Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	999	Total	Percent	
05/21/14	0	0	1	0	2	1	0	0	0	0	0	0	0	0	4	36	
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2	43	
03:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	39	
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	39	
05:00	0	0	0	2	2	11	9	0	0	0	0	0	0	0	24	43	
06:00	0	1	0	5	29	44	16	1	0	0	0	0	0	0	96	41	
07:00	0	1	2	7	69	106	9	1	0	0	0	0	0	0	195	39	
08:00	4	2	4	14	62	80	9	2	0	0	0	0	0	0	177	39	
09:00	3	5	2	11	57	41	12	2	0	0	0	0	0	0	133	39	
10:00	0	2	0	18	37	53	11	0	0	0	0	0	0	0	121	39	
11:00	1	4	3	15	57	53	8	0	1	0	0	0	0	0	142	38	
12 PM	1	2	2	15	56	59	10	1	0	0	0	0	0	0	146	39	
13:00	4	3	1	22	70	60	7	0	0	0	0	0	0	0	167	38	
14:00	1	4	6	18	57	42	15	0	0	0	0	0	0	0	143	39	
15:00	1	2	2	15	64	75	16	2	0	0	0	0	0	0	177	39	
16:00	1	2	3	8	78	94	18	2	1	0	0	0	0	0	207	39	
17:00	0	1	2	10	72	128	25	1	0	0	0	0	0	0	239	40	
18:00	1	0	4	7	40	90	28	6	0	0	0	0	0	0	176	41	
19:00	0	1	2	9	43	39	8	0	0	0	0	0	0	0	102	39	
20:00	0	1	0	2	25	29	4	0	0	0	0	0	0	0	61	39	
21:00	0	1	0	8	11	13	3	0	0	0	0	0	0	0	36	39	
22:00	0	0	0	1	5	8	1	1	0	0	0	0	0	0	16	40	
23:00	0	0	0	2	2	2	2	0	0	0	0	0	0	0	8	41	
Total	17	33	34	189	838	1031	212	19	2	0	0	0	0	0	2375		

Percentiles
 15th Percentile : 29 MPH
 50th Percentile : 35 MPH
 85th Percentile : 39 MPH
 95th Percentile : 42 MPH

Statistics
 Mean Speed(Average) : 35 MPH
 10 MPH Pace Speed : 31-40 MPH
 Number in Pace : 1672
 Percent in Pace : 70.4%
 Number of Vehicles > 30 MPH : 2102
 Percent of Vehicles > 30 MPH : 88.5%

Summary
 15th Percentile : 29 MPH
 50th Percentile : 35 MPH
 85th Percentile : 39 MPH
 95th Percentile : 42 MPH

Statistics
 Mean Speed(Average) : 35 MPH

MDM Transportation Consultants, Inc.

E/W: Maple Street
at 62 Maple Street
Wenham, MA

28 Lord Road, Suite 280
Marlborough, MA 01752

Site Code: 07680002

768 MAPLE STREET (NOVEMBER VOLUMES)

Start Time	13-Nov-14 Thu	Eastbound		Hour Totals		Westbound		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	23			0	29				
12:15		0	24			3	31				
12:30		2	29			1	30				
12:45		1	29	4	105	1	42	5	132	9	237
01:00		1	30			0	31				
01:15		1	32			0	19				
01:30		0	33			0	35				
01:45		0	27	2	122	0	23	0	108	2	230
02:00		2	25			1	26				
02:15		0	40			1	28				
02:30		1	43			0	40				
02:45		0	59	3	167	2	44	4	138	7	305
03:00		0	35			0	32				
03:15		1	43			0	45				
03:30		0	41			1	43				
03:45		1	42	2	161	0	35	1	155	3	316
04:00		2	54			1	49				
04:15		1	58			2	56				
04:30		2	47			0	63				
04:45		4	60	9	219	2	45	5	213	14	432
05:00		2	40			2	57				
05:15		1	60			5	41				
05:30		3	43			3	50				
05:45		5	34	11	177	8	50	18	198	29	375
06:00		6	33			22	35				
06:15		7	51			22	19				
06:30		16	41			23	33				
06:45		14	30	43	155	29	26	96	113	139	268
07:00		36	25			46	22				
07:15		34	21			47	17				
07:30		35	24			49	15				
07:45		37	23	142	93	57	11	199	65	341	158
08:00		40	13			36	10				
08:15		37	15			39	3				
08:30		30	10			39	9				
08:45		32	9	139	47	32	7	146	29	285	76
09:00		21	20			37	13				
09:15		30	9			27	12				
09:30		22	9			21	7				
09:45		32	9	105	47	25	8	110	40	215	87
10:00		15	7			17	6				
10:15		19	9			38	3				
10:30		26	3			37	4				
10:45		29	2	89	21	36	5	128	18	217	39
11:00		27	1			23	2				
11:15		27	3			21	0				
11:30		34	0			32	1				
11:45		28	3	116	7	36	2	112	5	228	12
Total		665	1321			824	1214			1489	2535
Percent		33.5%	66.5%			40.4%	59.6%			37.0%	63.0%
Combined Total		1986				2038				4024	

MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280
Marlborough, MA
www.mdmtrans.com

E/W: Maple Street
at 62 Maple Street
Wenham, MA
Then Click the Comments Tab

Site Code: 07680002
Station ID:

Latitude: 0' 0.0000 Undefined

Eastbound	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	85th
Start	15	20	25	30	35	40	45	50	55	60	65	70	75	999		Percent
11/13/14	0	0	0	0	0	0	3	1	0	0	0	0	0	0	4	47
01:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	38
02:00	0	0	0	0	1	1	0	1	0	0	0	0	0	0	3	47
03:00	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	43
04:00	0	0	0	0	3	4	1	1	0	0	0	0	0	0	9	43
05:00	0	0	0	1	5	3	2	0	0	0	0	0	0	0	11	40
06:00	1	2	0	4	16	14	6	0	0	0	0	0	0	0	43	39
07:00	1	1	0	8	38	67	25	2	0	0	0	0	0	0	142	41
08:00	0	0	2	9	54	52	19	3	0	0	0	0	0	0	139	40
09:00	0	3	5	5	42	38	11	1	0	0	0	0	0	0	105	39
10:00	0	0	0	14	36	33	6	0	0	0	0	0	0	0	89	38
11:00	3	1	6	7	56	40	3	0	0	0	0	0	0	0	116	38
12 PM	0	0	1	10	45	36	12	1	0	0	0	0	0	0	105	39
13:00	1	2	1	12	37	58	10	1	0	0	0	0	0	0	122	39
14:00	2	0	3	19	58	76	9	0	0	0	0	0	0	0	167	38
15:00	4	3	3	10	64	68	8	1	0	0	0	0	0	0	161	38
16:00	1	2	1	12	91	89	21	2	0	0	0	0	0	0	219	39
17:00	1	2	3	14	59	76	22	0	0	0	0	0	0	0	177	39
18:00	0	0	1	7	63	67	17	0	0	0	0	0	0	0	155	39
19:00	1	2	2	6	33	41	8	0	0	0	0	0	0	0	93	39
20:00	0	0	0	3	13	26	5	0	0	0	0	0	0	0	47	39
21:00	0	1	0	3	20	20	3	0	0	0	0	0	0	0	47	38
22:00	0	0	0	0	8	10	3	0	0	0	0	0	0	0	21	39
23:00	0	0	0	1	2	2	1	0	1	0	0	0	0	0	7	44
Total	15	19	28	145	746	822	196	14	1	0	0	0	0	0	1986	

Statistics	10 MPH Pace Speed :	31-40 MPH
85th Percentile :	39 MPH	
95th Percentile :	42 MPH	
Number of Vehicles > 35 MPH :	1033	
Percent of Vehicles > 35 MPH :	52.0%	
Mean Speed(Average) :	35 MPH	

MDM TRANSPORTATION CONSULTANTS, INC.

E/W: Maple Street
at 62 Maple Street
Wenham, MA
Then Click the Comments Tab

28 Lord Road, Suite 280
Marlborough, MA
www.mdmtrans.com

Site Code: 07680002
Station ID:

Latitude: 0' 0.0000 Undefined

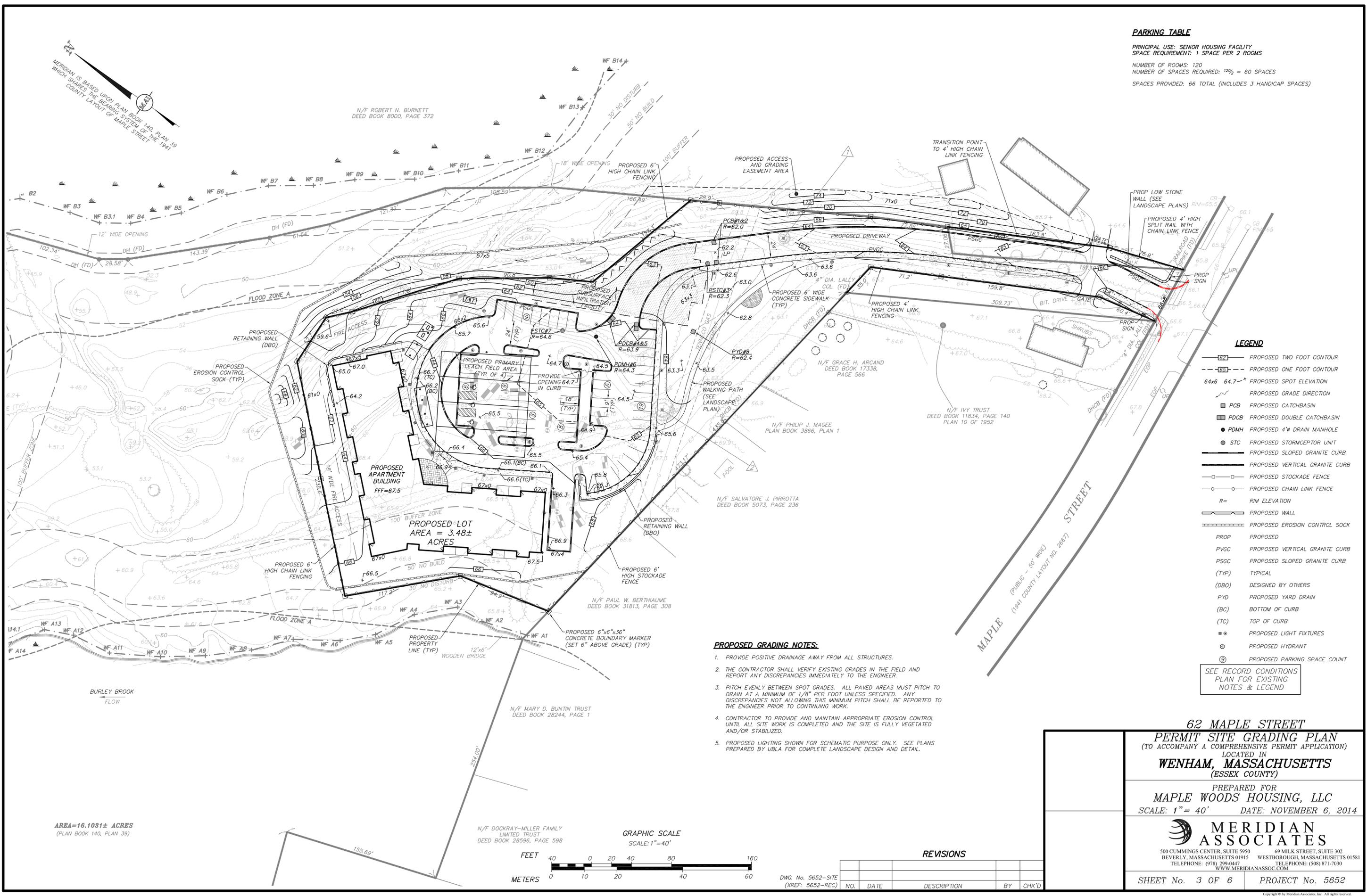
Westbound	1	15	16	20	21	25	26	30	31	36	41	45	46	50	51	55	56	60	61	65	66	70	71	75	76	999	Total	85th Percent		
11/13/14	0	0	0	0	0	0	0	0	1	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	46	
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
02:00	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	38	
03:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	44		
04:00	0	0	1	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	41		
05:00	0	0	0	0	0	0	3	3	3	11	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	39		
06:00	0	0	1	3	3	3	5	37	37	38	9	9	3	3	0	0	0	0	0	0	0	0	0	0	0	0	96	39		
07:00	1	0	0	0	0	0	3	60	60	86	46	46	2	1	1	0	0	0	0	0	0	0	0	0	0	0	199	42		
08:00	2	0	0	2	2	2	3	50	50	64	21	21	4	1	0	0	0	0	0	0	0	0	0	0	0	0	146	40		
09:00	2	2	2	6	6	6	7	30	30	56	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	110	39		
10:00	4	1	1	1	1	1	9	51	51	48	11	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	128	39		
11:00	3	1	1	1	1	1	7	41	41	42	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112	40		
12 PM	0	0	0	2	2	2	12	44	44	53	16	16	5	0	0	0	0	0	0	0	0	0	0	0	0	0	132	40		
13:00	1	2	2	3	3	3	8	31	31	50	11	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	108	39		
14:00	0	0	4	4	4	4	14	52	52	44	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	40		
15:00	4	4	2	4	4	4	9	65	65	56	14	14	0	0	0	0	1	1	0	0	0	0	0	0	0	0	155	39		
16:00	3	0	0	5	5	5	24	82	82	74	19	19	5	0	1	0	0	0	0	0	0	0	0	0	0	0	213	39		
17:00	0	0	1	1	1	1	30	93	93	62	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	198	38		
18:00	0	0	0	2	2	2	3	28	28	60	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	40		
19:00	0	0	0	0	0	0	2	17	17	36	8	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	65	40		
20:00	0	0	0	0	0	0	0	8	8	13	5	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	29	43		
21:00	0	0	0	1	1	1	4	18	18	11	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	40	39		
22:00	0	0	0	0	0	0	2	8	8	6	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	39		
23:00	0	0	0	0	0	0	1	1	1	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	46		
Total	20	15	15	34	34	34	146	722	722	818	244	244	35	35	3	3	1	1	0	0	0	0	0	0	0	0	2038			

Statistics	10 MPH Pace Speed :	31-40 MPH
85th Percentile :	39 MPH	
95th Percentile :	43 MPH	
Number of Vehicles > 35 MPH :	1101	
Percent of Vehicles > 35 MPH :	54.0%	
Mean Speed(Average) :	36 MPH	

MERIDIAN IS BASED UPON PLAN BOOK 140, PLAN 39 WHICH SHARES THE BEARING SYSTEM OF THE 1941 WHICH COUNTY LAYOUT OF MAPLE STREET

PARKING TABLE

PRINCIPAL USE: SENIOR HOUSING FACILITY
 SPACE REQUIREMENT: 1 SPACE PER 2 ROOMS
 NUMBER OF ROOMS: 120
 NUMBER OF SPACES REQUIRED: 120/2 = 60 SPACES
 SPACES PROVIDED: 66 TOTAL (INCLUDES 3 HANDICAP SPACES)



LEGEND

- 62 — PROPOSED TWO FOOT CONTOUR
- 65 --- PROPOSED ONE FOOT CONTOUR
- 64x6 64.7x PROPOSED SPOT ELEVATION
- PROPOSED GRADE DIRECTION
- PCB PROPOSED CATCHBASIN
- PDCB PROPOSED DOUBLE CATCHBASIN
- PDMH PROPOSED 4" DRAIN MANHOLE
- ⊙ STC PROPOSED STORMCEPTOR UNIT
- PROPOSED SLOPED GRANITE CURB
- PROPOSED VERTICAL GRANITE CURB
- PROPOSED STOCKADE FENCE
- PROPOSED CHAIN LINK FENCE
- R= RIM ELEVATION
- PROPOSED WALL
- PROPOSED EROSION CONTROL SOCK
- PROP PROPOSED
- PVGC PROPOSED VERTICAL GRANITE CURB
- PSGC PROPOSED SLOPED GRANITE CURB
- (TYP) TYPICAL
- (DBO) DESIGNED BY OTHERS
- PYD PROPOSED YARD DRAIN
- (BC) BOTTOM OF CURB
- (TC) TOP OF CURB
- PROPOSED LIGHT FIXTURES
- ⊙ PROPOSED HYDRANT
- ⊙ PROPOSED PARKING SPACE COUNT

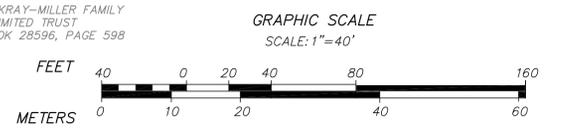
SEE RECORD CONDITIONS
 PLAN FOR EXISTING
 NOTES & LEGEND

PROPOSED GRADING NOTES:

1. PROVIDE POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES.
2. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
3. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM OF 1/8" PER FOOT UNLESS SPECIFIED. ANY DISCREPANCIES NOT ALLOWING THIS MINIMUM PITCH SHALL BE REPORTED TO THE ENGINEER PRIOR TO CONTINUING WORK.
4. CONTRACTOR TO PROVIDE AND MAINTAIN APPROPRIATE EROSION CONTROL UNTIL ALL SITE WORK IS COMPLETED AND THE SITE IS FULLY VEGETATED AND/OR STABILIZED.
5. PROPOSED LIGHTING SHOWN FOR SCHEMATIC PURPOSE ONLY. SEE PLANS PREPARED BY UBLA FOR COMPLETE LANDSCAPE DESIGN AND DETAIL.

AREA=16.1031± ACRES
 (PLAN BOOK 140, PLAN 39)

N/F DOCKRAY-MILLER FAMILY LIMITED TRUST
 DEED BOOK 28596, PAGE 598



DWG. No. 5652-SITE
 (XREF: 5652-REC)

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D

62 MAPLE STREET

PERMIT SITE GRADING PLAN
 (TO ACCOMPANY A COMPREHENSIVE PERMIT APPLICATION)
 LOCATED IN
WENHAM, MASSACHUSETTS
 (ESSEX COUNTY)

PREPARED FOR
MAPLE WOODS HOUSING, LLC
 SCALE: 1"= 40' DATE: NOVEMBER 6, 2014



500 CUMMINGS CENTER, SUITE 5950 BEVERLY, MASSACHUSETTS 01915
 69 MILK STREET, SUITE 302 WESTBOROUGH, MASSACHUSETTS 01581
 TELEPHONE: (978) 299-0447 TELEPHONE: (508) 871-7030
 WWW.MERIDIANASSOC.COM

SHEET No. 3 OF 6 PROJECT No. 5652

December 30, 2014

Ms. Emilie Cademartori, Coordinator
Town of Wenham
Zoning Board of Appeals
Wenham Town Hall, 2nd Floor
138 Main Street
Wenham, Massachusetts 01984

**Re: Traffic Impact Study Peer Review
Maple Woods Age Restricted (+55) 40B Development
Wenham, MA**

Ms. Cademartori:

Weston & Sampson is pleased to provide this letter report related to our peer review of the Traffic Impact Study performed by MDM Transportation Consultants, Inc. (MDM) in November of 2014 for the Maple Woods Age Restricted 40B Development at 62 Maple Street in Wenham, MA. The Study was performed to determine if the traffic analysis for the development is appropriate for the given use and that the development has no adverse effects on this location due to traffic generated by the proposed use.

We began our preliminary review of the following materials as submitted to the Board of the following major documents provided by the Town of Wenham:

- Traffic Impact Study by MDM Transportation Consultants, Inc.
- ZBA Application and Plans by Meridian Associates, Inc.

The Proponent generated the anticipated traffic volumes for the proposed 60 unit facility utilizing the ITE Trip Generation Manual, 9th Edition, based on Land Use Code (LUC) 251 – Senior Adult Housing – Detached. After review of local MassDOT permanent counting stations the Proponent noted that the Average Yearly Growth calculated to -1.2% per year. A 1% Growth Rate was utilized per year as a conservative approach to the evaluation. Both the Trip Generation and the Growth Rate calculations are reasonable for this development. **We concur with the LUC chosen for this project and the Growth Rate utilized.**

Existing observed traffic speeds were taken by radar recorder to determine the average travelling speed of vehicles during the study period. The results show that the 85th percentile speed is approximately 39 MPH in both directions versus the posted speed limit of 30 MPH. As a result the proponent has spoken with the Wenham Police Department and has recommended the installation of speed radar assemblies along Maple Street. **We concur with this recommendation.**

The Proponent gathered turning movement counts (TMC's) at the existing driveway at 68 Maple Street (location of proposed site entrance), the two driveways for Burnett's Garage (east and west) and the signalized intersection of Maple Street/Route 97/Cherry Street on weekday peak hours in May and June 2014. As is standard procedure for a MassDOT type study, traffic volumes at the nearest MassDOT permanent count stations to the project site were reviewed for seasonal variations. It was determined that the traffic volumes at the nearest permanent count stations, during the latest four years of published counts, showed that the counts in May and June (period when counts were taken for this study) of those years were above average traffic months. As a result there was no seasonal adjustment made to bring the recently gathered counts down. **We concur with this decision.**

The actual TMC's were evaluated to determine the Level of Service (LOS) of the intersections for the AM and PM Peak Hours of the day, typically between 7-9 AM and 4-6 PM. The signalized intersection and the existing/proposed Tee intersections representing the driveway of the proposed development and the existing Burnett driveways were evaluated for the following conditions:

- Existing Conditions (AM/PM)
- Future NO BUILD (AM/PM of existing volumes with 1.0% growth rate added for 5 years)
- Future BUILD (AM/PM of Future NO BUILD plus anticipated site generated traffic)

The LOS for the signalized intersection of Maple Street/Route 97/Cherry Street indicates a LOS C for all the scenarios listed above with little difference in the seconds of delay in each scenario. The evaluations of the proposed tee intersections at the site driveway and the east and west driveways at Burnett's indicate that the proposed site driveway will operate at a LOS B for the AM and PM peak hours while the east Burnett driveway operates at a LOS A for the AM and PM peak hours and the west Burnett driveway operates at a LOS B for the AM peak hour and a LOS A for the PM peak hour. It should be noted that all LOS B locations above are borderline LOS A with one second of delay difference. See the table below for results of the LOS evaluation. **We have reviewed the LOS evaluation performed and concur with the results.**

INTERSECTION PEAK HOUR	2014 EXISTING		2019 NO BUILD		2019 BUILD	
	LOS	DELAY	LOS	DELAY	LOS	DELAY
ROUTE 97/MAPLE/CHERRY						
AM PEAK HOUR	C	22	C	24	C	25
PM PEAK HOUR	C	24	C	25	C	26
MAPLE/BURNETT EAST DRIVEWAY						
AM PEAK HOUR	A	10	A	10	A	10
PM PEAK HOUR	A	<5	A	<5	A	<5
MAPLE/BURNETT WEST DRIVEWAY						
AM PEAK HOUR	B	11	B	11	B	11
PM PEAK HOUR	A	9	A	9	A	10
MAPLE @ SINGLE SITE DRIVE (68 MAPLE ST)						
AM PEAK HOUR	N/A	N/A	N/A	N/A	B	11
PM PEAK HOUR	N/A	N/A	N/A	N/A	B	12

In addition to the entrance/exit traffic evaluation we looked at the **site circulation** as a part of the traffic peer review. In general, the circulation works for passenger car vehicles and single unit trucks (SU-30) and appears tight for tractor trailer movements (WB-50). The **entrance driveway** appears to work for passenger car vehicles and single unit trucks (SU-30) but the right turns into the site and the right turns out of the site do not appear to work for tractor trailer movements (WB-50). **The Proponent should confirm with AutoTurn templates that tractor trailers, that may be making deliveries to the site, and appropriate Town of Wenham emergency apparatus can safely make the required turns into and exiting the site as well as within the confines of the site circulation.**

The proponent has investigated the site distance as it relates to the proposed site driveway. Sight distance for vehicles approaching the site are recommended based on safe Stopping Sight Distance (SSD) or the amount of distance required to see an obstruction or vehicle at the driveway, react and be able to stop before hitting the object. AASHTO sets the SSD requirements from the site driveway based on the travel speed of the vehicles on Maple Street. The recommended safe Stopping Sight Distance (SSD) for 30 MPH (posted speed) is approximately 205 feet, for 35 MPH (average observed speed) approximately 255 feet and for 39 MPH (85th percentile observed speed) a distance of approximately 300 feet. The available sight distance is approximately 400 feet in both directions. Sight distance for vehicles leaving the site is based on Intersection Site Distance (ISD) or the distance required for the stopped driver at the driveway to see the oncoming vehicle on Maple Street and be able to safely perform a left or right turn onto Maple Street. AASHTO also sets the ISD requirements from the site driveway based on the travel speed of the vehicles on Maple Street. The recommended ISD for 30 MPH (posted speed) is approximately 205 feet, for 35 MPH (average observed speed) approximately 255 feet and for 39 MPH (85th percentile observed speed) a distance of approximately 295 feet. The available sight distance is approximately 400 feet in both directions. **We have been to the site and concur with the available lines of sight noted by the Proponent and also concur with their requirement to selectively clear some of the vegetation at the site driveway and the need for any proposed plantings to be under two feet in height to conserve the sight distances.**

The proposed development of 60 units is proposing 66 parking spaces. This equates to a parking space rate of approximately 1.1 spaces per unit. It has been our experience that a typical 40B apartment complex utilizes approximately 1.5 spaces per unit. An average rate for senior housing is reported to be less than 1.0 space per unit including staff and visitor parking. **Therefore, we concur with the 66 parking spaces being supplied for this 60 unit development.**

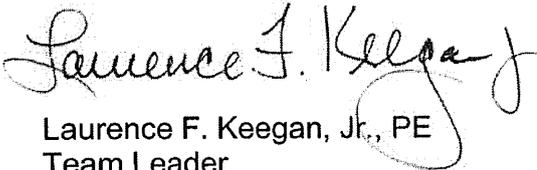
In conclusion, it is our opinion that the traffic evaluation for the site was performed according to appropriate criteria (MassDOT procedures for traffic studies) and that the traffic generated by the proposed site will not deteriorate the background traffic appreciably beyond what should be anticipated in a NO Build scenario for a 5-year window of time. We are also in agreement that the reduced parking rate of 1.1 vehicles per unit is appropriate for this site given the type of development and documented historic data available through ITE and local developers. We also recommend that the Proponent review the site driveway and site circulation for turning movements by appropriate vehicles to ensure they will be able to circulate within the site confines and access/egress the site within the proposed curbed limits of the driveway and are able to access/egress the site within the paved limits of Maple Street.

Ms. Emilie Cademartori, Coordinator
Town of Wenham
Zoning Board of Appeals
December 30, 2014
Page 4

Weston & Sampson appreciates the opportunity to present our findings. If you have any questions or require additional information please call me. I may be reached at 978-977-0110 x7456.

Very truly yours,

WESTON & SAMPSON



Laurence F. Keegan, Jr., PE
Team Leader

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Cc: File