



March 15, 2022

Ms. Jacki Bylerly
Planner
Town of Andover
36 Bartlett Street
Andover, MA 01810

RE: Response to Peer Review of Traffic Impact and Access Study
Proposed Commonwealth Detox/Topsail Facility
140 Haverhill Street, Andover, MA

Dear Jacki:

On behalf of 140 Medico Inc., Bayside Engineering (Bayside) is providing the following responses to the second peer review letter prepared by Environmental Partners (EP) dated March 11, 2022 of the Traffic Impact and Access Study (TIAS) and first set of peer review responses prepared for the project. The comments are italicized and listed, and the Bayside response follows each comment. Only those comments requiring further response or clarification are included.

EP Initial Comment No. 11:

- *No-Build and Build conditions are mislabeled as 2026.*
- *Analysis results indicate that the Haverhill Street eastbound approach is at or near capacity presently in the weekday evening peak hour and in need of mitigation to support additional traffic load. Traffic signal timing optimization should be considered.*
- *Verify that yellow and all red clearance times are accurately reported for the signalized intersection. Recommended modifications to signal timing should include conformance to MUTCD standards for vehicle and pedestrian clearance times.*
- *EP recommends excluding Synchro-reported LOS and Delay results from the “Lanes, Volumes, Timings” report presented in the Appendix, which presents conflicting results when compared to the HCM 2010 reports. It is understood that the HCM 2010 results were compiled in Table 13.*
- *Verify peak hour factors for 2021 Existing weekday evening peak hour analysis.*
- *Verify heavy vehicle percentages for the Haverhill Street eastbound left entering the site driveway in both the weekday morning and weekday evening peak hours.*

Applicant Initial Response: The headings on Table 13 were mis-labeled. ‘2028’ should have been used instead of ‘2026’. The analysis results were for the 2028 No-Build and Build conditions.

Updated capacity analyses were performed using the updated traffic volumes. The signal timings, peak hour factors and heavy vehicle percentages were re-verified. The Synchro-reported LOS and Delay results from the “Lanes, Volumes, Timings” report presented in the Appendix have been excluded from the capacity analysis reports in this response. The results of the signalized analyses are shown in Table 4 and the results of the unsignalized analyses are shown in Table 5. The

capacity analysis reports are included in the Appendix.

The updated analysis results indicate that the Haverhill Street eastbound approach is near, but below capacity presently during the weekday evening peak hour. Under future No-Build and Build conditions, this approach will continue to be below capacity presently during the weekday evening peak hour. The addition of the site generated traffic has minimal impact on this approach.

Bayside concurs that traffic signal timing optimization should be considered. This should be considered now by the Town of Andover as it is dictated by current traffic conditions.

**TABLE 4
 SIGNALIZED LEVEL-OF-SERVICE SUMMARY HAVERHILL STREET AND HIGH STREET**

Peak Hour/Lane Group	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<i>Weekday Morning</i>												
Eastbound Lt/Th/Rt	0.62	13.6	B	178/287	0.65	14.4	B	198/321	0.65	14.4	B	198/321
Westbound Lt/Th/Rt	0.53	12.0	B	142/233	0.56	12.5	B	153/253	0.57	12.6	B	154/255
Northbound Lt/Th/Rt	0.34	22.7	C	51/92	0.35	22.9	C	53/94	0.37	23.1	C	55/98
Southbound Lt/Th/Rt	0.51	25.8	C	86/134	0.53	26.2	C	90/139	0.53	26.2	C	90/139
Overall	--	16.1	B	--	--	16.6	B	--	--	16.7	B	--
<i>Weekday Evening</i>												
Eastbound Lt/Th/Rt	0.80	20.4	C	258/502	0.89	28.1	C	302/559	0.89	28.8	C	307/564
Westbound Lt/Th/Rt	0.64	14.1	B	183/275	0.71	15.9	B	201/304	0.71	16.0	B	202/305
Northbound Lt/Th/Rt	0.54	26.3	C	107/185	0.56	26.8	C	112/193	0.56	26.8	C	112/193
Southbound Lt/Th/Rt	0.64	28.9	C	120/189	0.67	30.0	C	128/222	0.69	30.8	C	134/236
Overall	--	20.7	C	--	--	24.3	C	--	--	24.8	C	--

^aMaximum volume-to-capacity ratio.

^bDelay in seconds per vehicle.

^cLevel of service.

^dAverage Queue (ft)/95th %tile Queue (ft)

Lt = Left; Th = Through; Rt = Right.

EP Supplemental Response 3/11/2022:

Clarification provided; updated materials have been reviewed and are acceptable. EP notes that revisions in adjustment factors addressed through comments 2 and 3 result in reductions in future volumes, resulting in improved LOS and delay when compared to the summary table in the initial TIAS.

EP recommends that the Applicant provide analysis for traffic signal optimization to be considered by the Town.

Applicant Response: Additional intersection capacity analyses were performed to identify the optimal signal timing to be considered by the Town for the weekday morning and weekday evening peak hours. The results are summarized in Table 4A, and the capacity analysis worksheets are attached.

**TABLE 4A
 SIGNALIZED LEVEL-OF-SERVICE SUMMARY HAVERHILL STREET AND HIGH STREET –
 OPTIMAL TIMING**

Peak Hour/Lane Group	2028 No-Build				2028 Build				2028 Build – Optimal Timing			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
<i>Weekday Morning</i>												
Eastbound Lt/Th/Rt	0.65	14.4	B	198/321	0.65	14.4	B	198/321	0.67	14.4	B	182/306
Westbound Lt/Th/Rt	0.56	12.5	B	153/253	0.57	12.6	B	154/255	0.58	12.4	B	142/243
Northbound Lt/Th/Rt	0.35	22.9	C	53/94	0.37	23.1	C	55/98	0.36	20.9	C	48/89
Southbound Lt/Th/Rt	0.53	26.2	C	90/139	0.53	26.2	C	90/139	0.52	23.9	C	78/125
Overall	--	16.6	B	--	--	16.7	B	--	--	16.0	B	--
<i>Weekday Evening</i>												
Eastbound Lt/Th/Rt	0.89	28.1	C	302/559	0.89	28.8	C	307/564	0.85	24.0	C	316/586
Westbound Lt/Th/Rt	0.71	15.9	B	201/304	0.71	16.0	B	202/305	0.67	14.4	B	210/308
Northbound Lt/Th/Rt	0.56	26.8	C	112/193	0.56	26.8	C	112/193	0.61	31.5	C	131/221
Southbound Lt/Th/Rt	0.67	30.0	C	128/222	0.69	30.8	C	134/236	0.74	37.5	D	159/277
Overall	--	24.3	C	--	--	24.8	C	--	--	24.4	C	--

^aMaximum volume-to-capacity ratio.

^bDelay in seconds per vehicle.

^cLevel of service.

^dAverage Queue (ft)/95th %tile Queue (ft)

Lt = Left; Th = Through; Rt = Right.

Comparing the resulting levels-of-service with the optimal signal timing shows that there is a small overall improvement in the calculated delay by using the optimal timing compared to the current timing.

EP Initial Comment No. 12:

- *Parking assumptions for the Topsail facility assume 10 patients drive themselves, while trip generation and distribution estimates assumed 20 patients drive themselves. It should be noted that the worst case is stated where all patients drive themselves, and that proposed parking supply exceeds this worst case demand of 52 parking spaces.*
- *The stated parking supply for the Commonwealth Detox and Topsail facilities are based on lot lines as shown on the site plans and include splitting the parking area to the west of the Haverhill Street site drive. Although these spaces are more directly adjacent to the Commonwealth Detox facility, 25 of the spaces in the area are counted towards*

Commonwealth Detox, while 31 are counted towards Topsail, in addition to the 44 spaces more directly adjacent to the proposed Topsail facility. While both individual facilities have a parking supply which exceeds expected demand, the Applicant should confirm that all parking spaces on site will be available to staff, patients, and visitors to either facility.

- *One additional accessible space is required for the Topsail facility to meet the requirements of 521 CMR. EP recommends designating all three spaces along the east side of the building as accessible.*
- *The Zoning Bylaws include a requirement of four parking spaces for each “doctor or dentist”. While the parking table in the site plans identifies five doctors per site in their parking space calculations, it is unclear how this correlates to the staff list provided in the TIAS.*
- *The Zoning Bylaws require “an adequate number” of off-street loading areas for any use which may be served by delivery vehicles. The TIAS includes a description of expected deliveries for linens, food items, and other medical deliveries or pickups for the Commonwealth Detox facility. The site plans should identify the loading area, as well as the trash pick up area.*
- *A loading area should similarly be identified on the plan if deliveries are expected for the Topsail facility.*

Applicant Initial Response: Bayside concurs that the worst case parking demand (if all patients drove to the Topsail facility) is 52 parking spaces. Seventy-five (75) spaces have been provided.

Both individual facilities have a parking supply which exceeds expected demand. One hundred and fifty-three (153) total spaces are provided and all parking spaces on site are available to staff, patients, and visitors to either facility.

One additional accessible space will be provided for the Topsail facility to meet the requirements of 521 CMR.

The Andover Zoning Bylaws do include a requirement of four (4) parking spaces for each “doctor or dentist”. The parking table on the Site Plans was prepared and attempted to ‘meld’ the Bylaws with the proposed use in the parking space calculations. This assessment was performed as there are several small offices on the second floor. This does not correlate with the staff list provided in the TIAS.

There is a loading area for the Commonwealth Detox facility near the northwest corner of the proposed building. A note will be added to the Site Plans designating this area. The dumpsters are also located within this area.

A loading area has not been provided for the Topsail building as they will not be getting any large deliveries. The Topsail building will use the dumpsters at the Commonwealth Detox building.

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EP Response 3/11/2022:

Information provided; EP recommends verification by the Town of site plan modifications as part of site plan approval.

EP requests clarification of the response related to parking space calculations, stating that “there are several small offices on the second floor”. It is unclear if this use is supplemental to or in addition to the proposed use.

Applicant Response: The sight lines have been added to the Site Plans.

The offices on the second floor are not for external use. These offices are designed to be able to accommodate private ‘one on one’ counseling sessions within the facility.

Please do not hesitate to contact me if you have any questions or require additional information.

Sincerely,

BAYSIDE ENGINEERING, INC.

A handwritten signature in blue ink, appearing to read 'KPC', with a long horizontal flourish extending to the right.

Kenneth P. Cram, P.E.
Director, Traffic Engineering

cc: P. Kneeland
M. Bobrowski, Esq.
B. Osgood

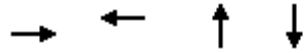
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Appendix

Capacity Analysis Worksheets

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














Capacity Analysis Worksheets

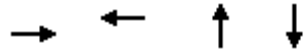


Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	658	563	186	277
v/c Ratio	0.75	0.65	0.43	0.58
Control Delay	18.4	14.9	19.3	22.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.4	14.9	19.3	22.7
Queue Length 50th (ft)	182	142	48	78
Queue Length 95th (ft)	306	243	89	125
Internal Link Dist (ft)	200	1348	728	277
Turn Bay Length (ft)				
Base Capacity (vph)	878	869	433	478
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.75	0.65	0.43	0.58
Intersection Summary				

3: High Street & Haverhill Street
 HCM 2010 Signalized Intersection Summary

2028 Build AM Peak Hour
 Optimal Timing

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	490	25	67	428	29	40	66	47	42	100	79
Future Volume (veh/h)	70	490	25	67	428	29	40	66	47	42	100	79
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1857	1900	1900	1869	1900	1900	1822	1900	1900	1868	1900
Adj Flow Rate, veh/h	79	551	28	72	460	31	49	80	57	52	125	99
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	10	0	2	0	3	6	3	3	1	2
Cap, veh/h	139	807	39	140	785	50	152	231	138	123	238	165
Arrive On Green	0.54	0.54	0.54	0.54	0.54	0.54	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	143	1499	73	145	1459	93	296	833	499	205	860	596
Grp Volume(v), veh/h	658	0	0	563	0	0	186	0	0	276	0	0
Grp Sat Flow(s),veh/h/ln	1715	0	0	1697	0	0	1628	0	0	1661	0	0
Q Serve(g_s), s	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	17.3	0.0	0.0	13.4	0.0	0.0	5.7	0.0	0.0	9.1	0.0	0.0
Prop In Lane	0.12		0.04	0.13		0.06	0.26		0.31	0.19		0.36
Lane Grp Cap(c), veh/h	985	0	0	976	0	0	521	0	0	526	0	0
V/C Ratio(X)	0.67	0.00	0.00	0.58	0.00	0.00	0.36	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	985	0	0	976	0	0	521	0	0	526	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.8	0.0	0.0	10.0	0.0	0.0	19.0	0.0	0.0	20.2	0.0	0.0
Incr Delay (d2), s/veh	3.6	0.0	0.0	2.5	0.0	0.0	1.9	0.0	0.0	3.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	0.0	7.4	0.0	0.0	3.0	0.0	0.0	4.8	0.0	0.0
LnGrp Delay(d),s/veh	14.4	0.0	0.0	12.4	0.0	0.0	20.9	0.0	0.0	23.9	0.0	0.0
LnGrp LOS	B			B			C			C		
Approach Vol, veh/h		658			563			186			276	
Approach Delay, s/veh		14.4			12.4			20.9			23.9	
Approach LOS		B			B			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.0		41.0		24.0		41.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		18.0		35.0		18.0		35.0				
Max Q Clear Time (g_c+I1), s		7.7		19.3		11.1		15.4				
Green Ext Time (p_c), s		0.7		4.2		0.9		3.8				
Intersection Summary												
HCM 2010 Ctrl Delay				16.0								
HCM 2010 LOS				B								



















Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	764	673	311	361
v/c Ratio	0.93	0.70	0.69	0.90
Control Delay	36.1	16.2	34.0	54.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.1	16.2	34.0	54.3
Queue Length 50th (ft)	316	210	131	159
Queue Length 95th (ft)	#586	308	#221	#277
Internal Link Dist (ft)	200	1348	728	277
Turn Bay Length (ft)				
Base Capacity (vph)	819	963	453	400
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.93	0.70	0.69	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

3: High Street & Haverhill Street
 HCM 2010 Signalized Intersection Summary

2028 Build PM Peak Hour
 Optimal Timing

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	539	24	59	465	54	29	195	71	54	138	108
Future Volume (veh/h)	140	539	24	59	465	54	29	195	71	54	138	108
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1886	1900	1900	1900	1900	1900	1900	1900	1900	1891	1900
Adj Flow Rate, veh/h	152	586	26	69	541	63	31	205	75	65	166	130
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.95	0.95	0.95	0.83	0.83	0.83
Percent Heavy Veh, %	0	1	0	0	0	0	0	0	0	0	1	0
Cap, veh/h	198	677	29	115	795	89	76	325	112	111	219	156
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	245	1152	49	112	1353	151	101	1239	426	219	835	593
Grp Volume(v), veh/h	764	0	0	673	0	0	311	0	0	361	0	0
Grp Sat Flow(s),veh/h/ln	1446	0	0	1616	0	0	1766	0	0	1648	0	0
Q Serve(g_s), s	16.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
Cycle Q Clear(g_c), s	37.6	0.0	0.0	21.3	0.0	0.0	12.3	0.0	0.0	16.3	0.0	0.0
Prop In Lane	0.20		0.03	0.10		0.09	0.10		0.24	0.18		0.36
Lane Grp Cap(c), veh/h	904	0	0	999	0	0	513	0	0	486	0	0
V/C Ratio(X)	0.85	0.00	0.00	0.67	0.00	0.00	0.61	0.00	0.00	0.74	0.00	0.00
Avail Cap(c_a), veh/h	904	0	0	999	0	0	513	0	0	486	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.4	0.0	0.0	10.8	0.0	0.0	26.3	0.0	0.0	27.6	0.0	0.0
Incr Delay (d2), s/veh	9.6	0.0	0.0	3.6	0.0	0.0	5.2	0.0	0.0	9.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.0	0.0	0.0	10.9	0.0	0.0	6.9	0.0	0.0	8.9	0.0	0.0
LnGrp Delay(d),s/veh	24.0	0.0	0.0	14.4	0.0	0.0	31.5	0.0	0.0	37.5	0.0	0.0
LnGrp LOS	C			B			C			D		
Approach Vol, veh/h	764			673			311			361		
Approach Delay, s/veh	24.0			14.4			31.5			37.5		
Approach LOS	C			B			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.0		53.0		27.0		53.0				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		21.0		47.0		21.0		47.0				
Max Q Clear Time (g_c+I1), s		14.3		39.6		18.3		23.3				
Green Ext Time (p_c), s		1.0		3.3		0.6		5.1				
Intersection Summary												
HCM 2010 Ctrl Delay				24.4								
HCM 2010 LOS				C								