

Ref: 9474

March 8, 2024

Franklin Zoning Board of Appeals  
Bruce Hunchard, Chair  
355 East Central Street  
Franklin, MA 02038

Re: Response to 2<sup>nd</sup> Transportation Peer Review  
121 Grove Street  
Franklin, Massachusetts

Dear Mr. Hunchard:

Vanasse & Associates, Inc. (VAI) is pleased to provide responses to comments raised in the February 14, 2024 *Transportation Peer Review – Response to Comments* letter prepared by Howard Stein Hudson (HSH) concerning their review of the February 8, 2024 Response to Comments letter that was prepared by VAI in support of the proposed residential development to be located along Grove Street in Franklin, Massachusetts (hereafter referred to as the “Project”). Listed below are the comments that were identified by HSH in the subject letter that pertain to the February 8, 2024 letter, with the comment followed by a response from VAI.

### **Traffic Impact Assessment Comments**

**Comment 1:** *Based on the American Community Survey (ACS) table provided, a discrepancy was found with the trip distribution at the intersection of Route 140/Beaver Street. HSH request the Applicant clarify why the percentages in the Transportation Impact Assessment (TIA) differ from the provided ACS table and revise the analysis at this intersection accordingly.*

**Response:** VAI concurs. The distribution was corrected and the analysis was revised. The overall delay increased by 0.2 seconds during the weekday morning peak hour and decreased by 1.2 seconds compared to the previous 2030 Build analysis. The revised analysis Table 10R and the analysis worksheets are provided in the appendix.

**Comment 2:** *The Applicant did not provide the breakdown of the number of units per building to confirm if the number of parking spaces is adequate for each building. HSH requests the Applicant update the TIA to represent the number of units and parking spaces as well as confirm if the Project will meet the parking demand for each building.*

**Response:** According to estimated parking demand for this development, there is ample parking for residents. Residents may have to walk a short distance but the parking is provided, and property management will otherwise manage the parking supply.

**Comment 3:** *The turning movements provided confirm that moving and trash/recycling trucks can safely access all buildings; although the Applicant did not specify the areas where move-in/move-out will take place, the Applicant asserts that property management will facilitate*

*parking for moving trucks as needed. We generally agree with this approach. No further action is required.*

**Response:** VAI concurs, no response required.

**Comment 4:** *HSH agrees with the locations of the accessible ramps and details provided. The Applicant asserts that indoor and outdoor bike storage will be provided; however, no bike accommodations were provided on the site plans. We recommend that as part of the order of conditions of any approvals that may be granted for the Project, the Applicant provide the number of indoor and outdoor bike spaces, and its locations.*

**Response:** Fairfield provides indoor and outdoor bike storage. The concept architectural plans show the bike storage rooms which can accommodate a minimum of 20 bicycles per room. Final landscape design will include outdoor storage racks, typically one at the clubhouse and one at each of the residential buildings.



*Typical Indoor Bike Storage (Dean Ave project)*

**Comment 5:** *The Applicant explained and conducted a satisfactory sight distance analysis. We generally agree with the Applicant's sight distance measurement approach. No further action required.*

**Response:** VAI concurs, no response required

**Comment 6:** *The AutoTURN analysis confirms that the fire trucks can enter and exit the proposed driveway safely from both the north and south on Grove Street. No further action is required.*

**Response:** VAI concurs, no response required

**Comment 7:** *The Applicant provided a revised Parking and Traffic Control Plan with the locations of the accessible ramps. We agree with the locations of the accessible ramps and corresponding details provided. No further action is required.*

**Response:** VAI concurs, no response required

**Comment 8:** *The Applicant agrees to assign a transportation coordinator, an Uber waiting area at the clubhouse building, and electric vehicle (EV) parking spaces for residents. We generally agree with the additional TDM measures but request the Applicant provide a plan that shows the designated rideshare pick-up/drop-off area as well as the number of EV parking spaces for residents.*



**Response:** Specific areas for rideshare pickups and similar are typically determined on an as-needed basis by the on-site management staff. EV parking quantities are an evolving demand and based on recent experience any number of spaces estimated at this time are likely to be short of the demand quantity at the time of occupancy. Shown here is a typical EV charging station at a Fairfield project recently constructed.



**Comment 9:** *As part of the order of conditions of any approvals that may be granted for the Project, we request the Applicant provide to the Board the overall construction schedule, working hours, number of construction workers, worker transportation and parking plan, number of construction vehicles, and routes to and from the Project site as part of the Construction Plan to be submitted prior to any construction activities taking place*

**Response:** Fairfield acknowledges that this information might be a typical requirement as a condition of approval, to be met prior to a Building Permit and will provide upon request.

We trust that this information is responsive to the comments that were identified by Howard Stein Hudson concerning their review of the VAI February 8, 2024 letter. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

*Scott W. Thornton*

Scott W. Thornton, P.E.  
Principal

*Professional Engineer in CT, MA, NH*

Attachments

Cc: R. Hewitt, Fairfield Residential  
J. Shipe, Shipe Consulting  
B. McCarthy, RJOC



## APPENDIX

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TRIP DISTRIBUTION DATA  
REVISED ANALYSIS SUMMARY TABLE



## TRIP DISTRIBUTION DATA



Proposed Residential Development  
Franklin, Massachusetts

**Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2011-2015**

For more information on sampling and estimation methods, confidentiality protection, and sampling and nonsampling errors, see <[http://www2.census.gov/programs-surveys/acs/tech\\_docs/accuracy/MultiyearACSAccuracyofData2015.pdf](http://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/MultiyearACSAccuracyofData2015.pdf)>.

Universe: Workers 16 years and over.

Commuting flows are sorted by residence state, residence county, and residence minor civil division.

Residence	Workplace	Number	I-495 (North)		Beaver Street (North)		I-495 (South)		Route 140 (East)		Washington Street (East)		Route 140 (West)		Washington Street (West)	
Franklin Town city	Franklin Town city	4,085	17%	694	9%	368	15%	613	19%	776	13%	531	11%	449	16%	654
Franklin Town city	Boston city	1,832	55%	1008		0	45%	824		0		0		0		0
Franklin Town city	Framingham town	804	100%	804		0		0		0		0		0		0
Franklin Town city	Milford town	495	100%	495		0		0		0		0		0		0
Franklin Town city	Norwood town	433		0	25%	108	75%	325		0		0		0		0
Franklin Town city	Wellesley town	406	30%	122	70%	284		0		0		0		0		0
Franklin Town city	Natick town	376	30%	113	70%	263		0		0		0		0		0
Franklin Town city	Wrentham town	348		0		0	34%	118	33%	115	33%	115		0		0
Franklin Town city	Cambridge city	275	50%	138		0	50%	138		0		0		0		0
Franklin Town city	Providence city	270		0		0	50%	135		0		0		0	50%	135
Franklin Town city	Mansfield town	254		0		0	100%	254		0		0		0		0
Franklin Town city	Bellingham town	248		0		0		0		0		0	100%	248		0
Franklin Town city	Hopkinton town	246	100%	246		0		0		0		0		0		0
Franklin Town city	Norfolk town	243		0	100%	243		0		0		0		0		0
Franklin Town city	Foxborough town	242		0		0	100%	242		0		0		0		0
Franklin Town city	Needham town	238		0	70%	167	30%	71		0		0		0		0
Franklin Town city	Walpole town	235		0	34%	80	33%	78	33%	78		0		0		0
Franklin Town city	Medway town	234		0	100%	234		0		0		0		0		0
Franklin Town city	Braintree Town city	219		0	40%	88	60%	131		0		0		0		0
Franklin Town city	Marlborough city	214	100%	214		0		0		0		0		0		0
Franklin Town city	Quincy city	211		0	40%	84	60%	127		0		0		0		0
Franklin Town city	Worcester city	205	100%	205		0		0		0		0		0		0
Franklin Town city	Canton town	194		0	25%	49	75%	146		0		0		0		0
Franklin Town city	Waltham city	190	50%	95		0	50%	95		0		0		0		0
Franklin Town city	Westborough town	183	100%	183		0		0		0		0		0		0
Franklin Town city	Woonsocket city	176		0		0		0		0		0		0	100%	176
Franklin Town city	Smithfield town	172		0		0		0		0		0	40%	69	60%	103
Franklin Town city	Newton city	151	35%	53	35%	53	30%	45		0		0		0		0
Franklin Town city	Westwood town	150		0	100%	150		0		0		0		0		0
Franklin Town city	Dedham town	144		0	30%	43	40%	58	30%	43		0		0		0
Franklin Town city	Burlington town	121	100%	121		0		0		0		0		0		0
Franklin Town city	Weymouth Town city	121		0	45%	54	55%	67		0		0		0		0
Franklin Town city	Holliston town	105	70%	74	30%	32		0		0		0		0		0
Franklin Town city	Brockton city	101		0		0	100%	101		0		0		0		0
Franklin Town city	Watertown Town city	100	40%	40	25%	25	35%	35		0		0		0		0
Franklin Town city	Medfield town	100		0	100%	100		0		0		0		0		0
Franklin Town city	Brookline town	98	35%	34	30%	29	35%	34		0		0		0		0
Franklin Town city	Bridgewater town	93		0		0	70%	65	30%	28		0		0		0
Franklin Town city	Taunton city	86		0		0	70%	60	30%	26		0		0		0
Franklin Town city	Shrewsbury town	72	100%	72		0		0		0		0		0		0
Franklin Town city	North Attleborough town	70		0		0	30%	21		0		0		0	70%	49
Franklin Town city	Littleton town	70	100%	70		0		0		0		0		0		0
Franklin Town city	Sudbury town	69	100%	69		0		0		0		0		0		0
Franklin Town city	Northborough town	63	100%	63		0		0		0		0		0		0
Franklin Town city	Warwick city	62		0		0	50%	31		0		0		0	50%	31
Franklin Town city	Lincoln town	62		0		0		0		0		0		0	100%	62
Franklin Town city	Ashland town	60	100%	60		0		0		0		0		0		0
Franklin Town city	Mendon town	60	33%	20		0		0	34%	20	33%	20		0		0
				0		0		0		0		0		0		0
		14,986		4,992		2,454		3,813		1,086		666		766		1,210
				33.3%		16.4%		25.4%		7.2%		4.4%		5.1%		8.1%
	<u>SAY</u>			<b>33%</b>		<b>16%</b>		<b>26%</b>		<b>7%</b>		<b>5%</b>		<b>5%</b>		<b>8%</b>

## REVISED ANALYSIS SUMMARY TABLE



**Table 10R**  
**SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY**

Signalized Intersection/ Peak Hour/Movement	2030 No-Build				2030 Build				2030 Revised Build			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>	V/C	Delay	LOS	Queue Avg/95 <sup>th</sup>
<b>Route 140 at Beaver Street</b>												
<i>Weekday Morning:</i>												
Route 140 EB LT	0.91	72.2	E	7/18	0.91	72.4	E	7/18	0.91	72.6	E	7/18
Route 140 EB TH/RT	0.75	46.0	D	6/12	0.75	46.1	D	6/12	0.75	46.1	D	6/12
Route 140 WB LT	0.22	33.8	C	2/4	0.23	34.1	C	2/4	0.22	34.0	C	2/4
Route 140 WB TH	0.79	48.6	D	9/15	0.79	48.6	D	9/15	0.79	48.7	D	9/15
Route 140 WB RT	0.01	0.0	A	0/0	0.01	0.0	A	0/0	0.01	0.0	A	0/0
Beaver Street NB LT/TH/RT	0.81	58.7	E	7/14	0.89	68.6	E	8/16	0.90	69.1	E	8/16
Beaver Street SB LT/TH	0.59	55.4	E	4/8	0.60	55.6	E	4/8	0.60	55.8	E	4/8
Beaver Street SB RT	0.45	4.5	A	0/2	0.45	4.5	A	0/2	0.44	4.5	A	0/2
<b>Overall</b>	--	<b>45.1</b>	<b>D</b>	--	--	<b>46.9</b>	<b>D</b>	--	--	<b>47.1</b>	<b>D</b>	--
<i>Weekday Evening:</i>												
Route 140 EB LT	1.02	>80.0	F	8/23	1.02	>80.0	F	8/19	1.03	>80.0	F	9/23
Route 140 EB TH/RT	0.61	41.7	D	8/16	0.77	48.9	D	8/16	0.61	42.2	D	9/16
Route 140 WB LT	0.17	30.4	C	1/4	0.18	31.1	C	2/4	0.18	31.0	C	2/4
Route 140 WB TH	0.87	50.7	D	15/25	0.87	50.9	D	15/25	0.87	51.1	D	15/25
Route 140 WB RT	0.02	0.1	A	0/0	0.02	0.1	A	0/0	0.02	0.1	A	0/0
Beaver Street NB LT/TH/RT	0.87	70.6	E	8/22	0.91	77.0	E	8/23	0.92	79.5	E	9/23
Beaver Street SB LT/TH	0.51	61.3	E	3/7	0.53	61.8	E	3/7	0.56	62.5	E	3/7
Beaver Street SB RT	0.50	5.5	A	0/2	0.50	5.5	A	0/2	0.50	5.4	A	0/2
<b>Overall</b>	--	<b>49.1</b>	<b>D</b>	--	--	<b>52.3</b>	<b>D</b>	--	--	<b>51.1</b>	<b>D</b>	--

<sup>a</sup>Volume-to-capacity ratio.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level of service.





















<sup>d</sup>Queue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.



2030 Build Weekday Morning Peak Hour  
5: Beaver Street & Route 140

02/14/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	264	395	72	73	313	2	61	107	63	3	132	301
Future Volume (vph)	264	395	72	73	313	2	61	107	63	3	132	301
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977				0.850		0.963				0.850
Flt Protected	0.950			0.950				0.987			0.999	
Satd. Flow (prot)	1703	3233	0	1770	1949	1830	0	1817	0	0	1880	1636
Flt Permitted	0.615			0.615				0.987			0.999	
Satd. Flow (perm)	1102	3233	0	1146	1949	1830	0	1817	0	0	1880	1636
Satd. Flow (RTOR)		12				101		10				350
Adj. Flow (vph)	293	439	80	95	406	3	87	153	90	3	153	350
Lane Group Flow (vph)	293	519	0	95	406	3	0	330	0	0	156	350
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases	2			6		6						
Detector Phase	5	2		1	6	6	3	3		4	4	4 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	10.0	10.0		10.0	10.0	
Total Split (s)	21.0	47.0		41.0	67.0	67.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.0%	29.0%		25.3%	41.4%	41.4%	15.4%	15.4%		15.4%	15.4%	
Maximum Green (s)	15.0	41.0		35.0	61.0	61.0	20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0		5.0			5.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	22.2	22.1		27.5	27.5	27.5		20.7			14.4	35.5
Actuated g/C Ratio	0.21	0.21		0.26	0.26	0.26		0.20			0.14	0.34
v/c Ratio	0.91	0.75		0.22	0.79	0.01		0.90			0.60	0.44
Control Delay	72.6	46.1		34.0	48.7	0.0		69.1			55.8	4.5
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	72.6	46.1		34.0	48.7	0.0		69.1			55.8	4.5
LOS	E	D		C	D	A		E			E	A
Approach Delay		55.7			45.7			69.1			20.3	
Approach LOS		E			D			E			C	
Queue Length 50th (ft)	175	156		46	234	0		195			91	0
Queue Length 95th (ft)	#453	298		96	375	0		#400			210	46
Internal Link Dist (ft)		1991			447			2470			1228	
Turn Bay Length (ft)	330			115		40						115
Base Capacity (vph)	323	1322		687	1179	1147		368			373	781
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0

Lanes, Volumes, Timings

S:\Jobs\9474\Analysis\From Peer Review\2030 Build Weekday Morning.syn

Synchro 11 Report

Page 1

2030 Build Weekday Morning Peak Hour  
5: Beaver Street & Route 140













02/14/2024

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	15%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	3
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	

# 2030 Build Weekday Morning Peak Hour

## 5: Beaver Street & Route 140

02/14/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.91	0.39		0.14	0.34	0.00		0.90			0.42	0.45

### Intersection Summary

Cycle Length: 162

Actuated Cycle Length: 104.5

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 47.1

Intersection LOS: D

Intersection Capacity Utilization 69.4%








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: 5: Beaver Street & Route 140

 Ø2	 Ø1	 Ø3	 Ø4	 Ø9
47 s	41 s	25 s	25 s	24 s
 Ø5	 Ø6			
21 s	67 s			

Lane Group	Ø9
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2030 Build Weekday Evening Peak Hour  
5: Beaver Street & Route 140

02/14/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	509	70	71	491	12	80	107	83	5	99	321
Future Volume (vph)	283	509	70	71	491	12	80	107	83	5	99	321
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982				0.850		0.958				0.850
Flt Protected	0.950			0.950				0.985			0.998	
Satd. Flow (prot)	1770	3368	0	1805	1968	1830	0	1899	0	0	1878	1652
Flt Permitted	0.202			0.413				0.985			0.998	
Satd. Flow (perm)	376	3368	0	785	1968	1830	0	1899	0	0	1878	1652
Satd. Flow (RTOR)		9				101		11				382
Adj. Flow (vph)	308	553	76	86	592	14	94	126	98	6	118	382
Lane Group Flow (vph)	308	629	0	86	592	14	0	318	0	0	124	382
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	pt+ov
Protected Phases	5	2		1	6		3	3		4	4	4 5
Permitted Phases	2			6		6						
Detector Phase	5	2		1	6	6	3	3		4	4	4 5
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	10.5	10.5		10.0	10.0	
Total Split (s)	21.0	47.0		41.0	67.0	67.0	25.0	25.0		25.0	25.0	
Total Split (%)	13.0%	29.0%		25.3%	41.4%	41.4%	15.4%	15.4%		15.4%	15.4%	
Maximum Green (s)	15.0	41.0		35.0	61.0	61.0	20.0	20.0		20.0	20.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0		5.0			5.0	
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effect Green (s)	35.4	35.4		40.5	40.5	40.5		20.8			13.9	35.0
Actuated g/C Ratio	0.30	0.30		0.35	0.35	0.35		0.18			0.12	0.30
v/c Ratio	1.03	0.61		0.18	0.87	0.02		0.92			0.56	0.50
Control Delay	100.2	42.2		31.0	51.1	0.1		79.5			62.5	5.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	100.2	42.2		31.0	51.1	0.1		79.5			62.5	5.4
LOS	F	D		C	D	A		E			E	A
Approach Delay		61.3			47.6			79.5			19.4	
Approach LOS		E			D			E			B	
Queue Length 50th (ft)	~214	214		41	384	0		216			83	0
Queue Length 95th (ft)	#569	394		93	637	0		#577			183	44
Internal Link Dist (ft)		1904			667			2500			727	
Turn Bay Length (ft)	330			115		40						115
Base Capacity (vph)	299	1273		644	1064	1036		346			333	757
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0

2030 Build Weekday Evening Peak Hour  
5: Beaver Street & Route 140






02/14/2024

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Satd. Flow (RTOR)	
Adj. Flow (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	24.0
Total Split (s)	24.0
Total Split (%)	15%
Maximum Green (s)	22.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	15.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	

# 2030 Build Weekday Evening Peak Hour

## 5: Beaver Street & Route 140

02/14/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	1.03	0.49		0.13	0.56	0.01		0.92			0.37	0.50

### Intersection Summary

Cycle Length: 162

Actuated Cycle Length: 117.1

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 51.1

Intersection LOS: D

Intersection Capacity Utilization 77.5%

ICU Level of Service D

Analysis Period (min) 15








~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 5: Beaver Street & Route 140

 Ø2	 Ø1	 Ø3	 Ø4	 Ø9
47 s	41 s	25 s	25 s	24 s
 Ø5	 Ø6			
21 s	67 s			

Lane Group	Ø9
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	