

Ref: 8963

July 22, 2021

Ms. James Beyer, Chairman
Zoning Board of Appeals
Town of Bourne
24 Perry Avenue - Room 203
Buzzards Bay, MA 02532-3441

Attn: Ms. Cassie Hammond

Re: Response to Peer Review of the Transportation Impact Assessment (TIA)
Cape View Way Comprehensive Permit Project
Bourne, Massachusetts

Dear Chairman Beyer and Members of the Zoning Board of Appeals:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the July 20, 2021 Peer Review memorandum prepared by Professional Services Corporation, PC (PSC) on behalf of the Zoning Board of Appeals (ZBA) in reference to the May 2021 *Transportation Impact Assessment* (the "May 2021 TIA") prepared by VAI in support of the proposed multifamily residential development to be located off Cape View Way in Bourne, Massachusetts (hereafter referred to as the "Project"). Listed below are the comments that were identified in the subject memorandum followed by our response on behalf of the Applicant.

STUDY METHODOLOGY

Comment: *In preparing the submitted Transportation Impact Assessment (TIA) Vanasse & Associates inc (VAi) consulted the Town of Bourne and utilized the MassDOT Transportation Impact Assessment (TIA) Guidelines. The TIA includes assessment of existing and future conditions and provision of recommendations for measures to mitigate traffic impacts. Intersection operations were evaluated using the procedures of the Highway Capacity Manual using in the Synchro® 11. Computer model. Overall, we find the methodology to be consistent with the MassDOT TIA Guidelines and standard engineering practice.*

Response: No response required.

TRANSPORTATION STUDY AREA

Comment: *The Transportation Study Area encompasses 3 intersections: the signalized Meetinghouse Lane/Route 3A/Canal Street Intersection, the unsignalized Meetinghouse Lane/Scusset Beach Road/Old Plymouth Road Intersection, and the unsignalized Meetinghouse Road/Cape View Way/54 Meetinghouse Lane Driveway Intersection which provides access to the Project Site. Given the magnitude of the traffic volumes generated by the Proposed Project, we consider the extent of the Transportation Study Area to be sufficient.*

Response: No response required.

TRAFFIC VOLUMES

Comment: *VAi obtained automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs), vehicle classification counts, and vehicle speed data on Tuesday April 27th and Wednesday April 28th, which properly represent midweek conditions.*

Response: No response required.

TRAFFIC VOLUME ADJUSTMENTS

Comment: *In order to account for the reduced 2021 traffic volumes resulting from the Massachusetts Safer at Home Order and the Phased Reopening Massachusetts Plan, the counted traffic volumes were increased by 23.8%. We consider this adjustment to be sufficient.*

Traffic volume counts for the proposed project were taken in the month of April which is a below average month of the year for traffic volumes. Accordingly, the VAI increased the counted traffic volumes by 1.9% to adjust to Average Season traffic volumes based upon analysis of traffic volume data from MassDOT Continuous Count Station Number 708 located on the Mid Cape Highway in Bourne.

Although the Proposed Project falls below the threshold where compliance is required, the requirements for transportation impact assessment set forth in the Cape Cod Commission's Technical Bulletin 96-003 provides valuable guidance on methodologies appropriate for preparing transportation impact assessments in Bourne.¹ Technical Bulletin 96-003 requires an analysis of Existing, No Build, and Build traffic volumes for both Average Season and Peak Season cases.

To initially indicate the magnitude of the required Peak Season adjustment, we reviewed Monthly Traffic Volume data for MassDOT Count Station 708 on the Mid Cape Highway in Bourne. For consistency with the VAI analysis, we used 2019 traffic volume data.

The Monthly Average Daily Traffic Volume for the month of July 2019 was 80,269 vehicles. The Monthly Average Daily Traffic Volume for the month of April 2019 was 60,491 vehicles. In order to evaluate Peak Season traffic, the counted traffic volumes should be increased by an additional 31.7% or such other factor as VAI may develop. See Table 1.

¹¹Cape Cod Commission, Technical Bulletin 96-003, Guidelines for Transportation Impact Assessment.



Table 1 Recommended Traffic Volume Adjustments

	<i>Average Season</i>	<i>Peak Season</i>
<i>Seasonal Adjustment</i>	1.9%	31.7%
<i>COVID-19 Adjustment</i>	23.8%	23.8%
<i>Counted Volume</i>	6,426	6,426
<i>Adjusted Volume</i>	8,110	10,480

We recommend that Peak Season traffic volumes be developed and intersection operations be evaluated for the Peak Season traffic volumes in addition to the Average Season traffic volumes provided in the submitted TIA.

Response: As requested by PSC, an evaluation of peak-season traffic volumes and traffic operations for the roadways and intersections that were assessed in the May 2021 TIA was completed following the methodology outlined by PSC.² Figure 3A depicts 2021 Existing peak-month (July), peak-hour traffic volumes, with Figure 4A depicting 2028 No-Build (without the Project) peak-month peak-hour traffic volumes and Figure 7A depicting the corresponding 2028 Build (with the Project) peak-month peak-hour traffic volumes.

OTHER EXISTING CONDITIONS

Comment: *We find the VAI analysis of other existing conditions is consistent with the MassDOT TIA Guidelines and standard engineering practice. . A field inventory of pedestrian, bicycle, and public transportation facilities within the TSA was provided. Vehicle speed on Meetinghouse Lane was quantified from ATR data with 85th percentile speeds of 37 miles per hour eastbound and 36 miles per hour westbound. Vehicle crash rates were calculated for the three TSA intersections using data for the most recent 7-year period. The Meetinghouse Lane/Route 3A/Canal Street Intersection crash rate was below the State and District crash rates for signalized intersections and the Meetinghouse Road/Cape View Way/54 Meetinghouse Lane Driveway Intersection and Meetinghouse Lane/Scusset Beach Road/Old Plymouth Road Intersection crash rates were below the State and District crash rates for unsignalized intersections.*

Response: No response required.

FUTURE GROWTH AND NO-BUILD VOLUMES

Comment: *The VAI analysis of future growth and the 2028 No-Build Traffic Volumes is sufficient for an Average Season analysis but should be supplemented with a Peak Season analysis. VAI contacted the Town of Bourne and determined that there is no specific development by others that will impact the TSA. VAI evaluated traffic volume data from permanent counting stations located in Bourne and calculated an average traffic growth rate of 0.4%.*

²A slightly higher peak-season adjustment factor of 32.5 percent was used vs. 31.7 percent.



As a conservative analysis, VAI developed the 2028 No-Build traffic volumes using a 1% increase per year compounded annually for seven years as the background growth rate.

VAI contacted the town of Bourne and determined that there were no near-term roadway improvement projects impacting the TSA. Long term plans for replacement of the Sagamore bridge were noted.

Response: As described previously, Figure 7A depicts the 2028 No-Build (without the Project) peak-month peak-hour traffic volumes.

PROJECT GENERATED TRIPS

Comment: *The VAI trip generation calculations are consistent with the MassDOT TIA Guidelines and standard engineering practice. . For the 51 unit multifamily. residential development, trip generation was forecast using the trip generation rates for ITE Land Use Code 221 Multifamily Housing (Mid-Rise)³. The 51 residential units will generate 276 vehicle trips (138 entering 138 exiting) on a Weekday. The Project will generate 18 vehicle trips during the Weekday Morning Peak Hour (5 entering/13 exiting). The project will generate 23 vehicle trips during the Weekday Evening Peak Hour (14 entering/9 exiting).*

Response: No response required.

FUTURE BUILD TRAFFIC VOLUMES

Comment: *Trip distribution and assignment are consistent with the MassDOT TIA Guidelines and standard engineering practice. The trips generated by the Proposed Project were distributed and assigned to the roadway network in the TSA based upon analysis of US Census Journey to Work Data with the highest number of trips.(72% of entering trips/50% of exiting trips) assigned to the Scenic Highway west of the Meetinghouse Lane/Route 3A/Canal Street Intersection.*

Overall, the trips generated by the Proposed Project represent a relatively small addition to the existing traffic volumes in the TSA. Traffic volumes for the most heavily impacted roadway segment, the Scenic Highway west of the Meetinghouse Lane/Route 3A/ Canal Street Intersection increased by 7/10 of 1%.

Response: No response required.

³Institute of Transportation Engineers, Trip Generation Manual, Version 5.0 (Updates),10th Edition (September 2017)+Supplement (February 2020).



INTERSECTION OPERATIONS

Comment: *The analysis of intersection operations is sufficient for an Average Season conditions but should be supplemented with an analysis of Peak Season conditions.*

The submitted Average Season analysis is based on the methodology of the Highway Capacity Manual utilizing Synchro® 11 software and is sufficient.

VAi determined that the signalized Meetinghouse Lane/Route 3A/Canal Street Intersection operates at LOS C Weekday Morning (2021 Existing, 2028 No-Build, and the 2028 Build) and at LOS C (2021 Existing) or LOS D (2028 No-Build and 2028 Build) Weekday Evening. Comparing operations with the 2028 No-Build vs the 2028 Build traffic volumes, there is no change in level-of-service, the increase in control delay is less than 1 second, and 95th percentile queue lengths remain unchanged or increase by a maximum of 1 vehicle.

VAi determined that the Old Plymouth Road northbound approach to the unsignalized Meetinghouse Lane/Scusset Beach Road/Old Plymouth Road Intersection operates at LOS C Weekday Morning (2021 Existing, 2028 No-Build, and 2028 Build) and at LOS C (2021 Existing) or LOS D (2028 No-Build and the 2028 Build) Weekday Evening. The Old Plymouth Road southbound approach operates at LOS B during both the Weekday Morning and Weekday Evening (2021 Existing, 2028 No-Build, and 2028 Build). Comparing operations with the 2028 No-Build traffic volumes vs the 2028 Build traffic volumes, there is no change in level-of-service or 95th percentile queue lengths on either approach.

VAi determined that the Cape View Way approach to the Meetinghouse Road/Cape View Way/54 Meetinghouse Lane Driveway Intersection operates at LOS B Weekday Morning and at LOS C Weekday Evening (2021 Existing, 2028 No-Build, and 2028 Build). Comparing operations with the 2028 No-Build traffic volumes vs the 2028 Build traffic volumes, there is no change in level-of-service and the 95th percentile queues are zero.

Response: As requested, an assessment of traffic operations (motorist delays, vehicle queuing and levels of service) at the study area intersections was completed under peak-month (July) traffic volume conditions, the results of which are summarized in Tables 9A and 10A.

As can be seen in Table 9A, under peak-month conditions, the signalized intersection of Meetinghouse Lane at Canal Street and State Road was shown to operate at LOS C/D during the weekday morning peak-hour (vs. LOS C under average-month conditions) and at LOS F (vs. LOS C/D) during the weekday evening peak-hour. The addition of Project-related traffic to the intersection under peak-month conditions did not result in a change in level-of-service for any movement over No-Build conditions, with Project-related impacts defined by a predicted increase in overall average motorist delay of up to 1.2 seconds and in vehicle queuing of up to one (1) vehicle.



With the exception of the Old Plymouth Road northbound approach during the weekday evening peak-hour at the Meetinghouse Lane/Old Plymouth Road intersection, all movements at the unsignalized study area intersections were shown to operate at LOS D or better during the peak hours under peak-month conditions. Independent of the Project, the Old Plymouth Road northbound approach to Meetinghouse Lane was shown to operate over its design capacity (i.e., LOS “F”) during the weekday evening peak-hour under 2021 Existing peak-month conditions. Project-related impacts at the unsignalized study area intersections were defined as an increase in average motorist delay of up to 2.8 seconds and in vehicle queuing of up to one (1) vehicle.

SIGHT DISTANCE

Comment: *VAi correctly evaluated required Stopping Sight Distance (SSD) and desirable Intersection Sight Distance (ISD) using measured 85th percentile speed data obtained from Automatic Traffic Recorder (ATR) Counts. Measured SSD is greater than the required SSD on Meetinghouse Lane eastbound and westbound. Measured ISD is greater than the calculated ISD looking east and west from the Cape View Way approach.*

Response: No response required.

TIA RECOMMENDATIONS

Comment: *We concur with the VAI recommendations for project access including a 24-ft. pavement width, stop sign control at Meetinghouse Lane, signage, and a sidewalk.*

We also concur with the VAI recommendations for Transportation Demand Management (TDM), including designation of a transportation coordinator, posting public transportation service information, providing residents with a welcome packet that includes transportation information, constructing a sidewalk on Cape View Way, providing a central mailbox facility, and providing on site secure bicycle parking.

Response: No response required.

PEDESTRIAN AND BICYCLE ACCESS

Comment: *The site plan provides good pedestrian access with a walkway that connects the building entrance with the on-site parking areas and extends to meet the existing sidewalk on Meetinghouse Lane.*

The width of the proposed on-site walkway is not dimensioned but scales approximately 5 ft. Care must be taken not to place signposts, hydrants, and other obstructions that could restrict the accessible route. In two locations, the sidewalk is placed at the head of perpendicular parking spaces. Bumper overhang of 2 to 2½ feet can be accepted which would narrow the accessible route to an unacceptable 2½ to 3 ft. We recommend widening the sidewalk to 7½ ft. in these locations, providing parking bumper blocks, or providing a loam strip to maintain a minimum accessible route.



We concur with the VAI recommendation that secure indoor bicycle access be provided. Further, we recommend that an outdoor bicycle rack be provided for visitors.

Response: As requested by PSC, the Project proponent will review widening the sidewalk, providing parking bumper blocks, or including a loam strip to maintain a minimum accessible route. These accommodations will be shown on a subsequent revision of the Site Plans.

SITE ACCESS, CIRCULATION, AND PARKING

Comment 1: *There are 4 compact parking perpendicular parking spaces that are accessed from the pavement within the turnaround at the building entrance. The overall width of this parking bay is approximately 33 ft. (scaled) which will make accessing the parking space difficult. We recommend a minimum overall bay width of 42 ft. to ensure proper vehicle maneuvering.*

Response: As requested by PSC, the Project proponent will review the overall parking bay width and any adjustments will be reflected on a subsequent revision of the Site Plans.

Comment 2: *The turnaround with center island at the end of Cape View Way that has been adapted to serve as a drop-off at the building entrance has an outer diameter (scaled) of approximately 98 ft. and an inner diameter (scaled) of approximately 68 ft. The outer radius should be sufficient, but the inner radius should be reduced by widening the pavement in order to accommodate a fire truck or other large vehicles. An AASHTO S-BUS 40 design vehicle used by many fire departments to emulate their fire apparatus has a minimum outer turning diameter of approximately 85 ft. and a minimum inner turning diameter of approximately 50 ft. We recommend that a vehicle swept path plan be prepared to better define the required shape of the island. Consultation with the Fire Department is recommended to identify design vehicle requirements. In addition to accommodating fire apparatus, the size of the center island should be reduced as necessary in order to accommodate the largest non-emergency vehicle regularly using the turnaround.*

Response: A vehicle turning analysis will be prepared and provided by others under separate cover.

Comment 3: *Although the overall length of Cape View Way is only 650± ft., the potential to block emergency vehicle access is always a concern for a single entrance site. We recommend that signs be provided prohibiting parking along Cape View Way.*

Response: As requested by PSC, “No Parking” signs will be installed along Cape View Way. The signs will be reflected on a subsequent revision of the Site Plans.

Comment 4: *A total of 85 parking spaces (69 standard parking spaces/12 compact parking spaces/ 4 accessible parking spaces) are proposed to serve the 51 residences. We quantified peak parking demand based upon the Institute of Transportation Engineers (ITE) Parking Generation Manual⁴. For ITE Land Use 221 Multifamily Housing (Mid-Rise), peak period parking demand on a weekday in a general urban/suburban setting (no nearby rail transit)*

⁴⁴ITE Parking Generation Manual 5th Edition , January 2019, Institute of Transportation Engineers.



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for 51 dwelling units is 60 parking spaces. The proposed 85 parking spaces should be sufficient. Although not anticipated, should additional parking ever be needed there are areas on-site where additional parking spaces could be added.

Response: No response required.

CONSTRUCTION MANAGEMENT PLAN

Comment: *A draft Construction Management Plan should be submitted that provides for minimization of overall construction phase vehicle trips including single occupant vehicle trips. Prior to construction, this draft plan can be refined through consultation with the Police Department and the Department of Public Works.*

Response: A draft Construction Traffic Management Plan (TMP) is attached and will be refined in consultation with the Police Department and the Department of Public Works as the Site Plans are advanced, and will include the use of police detail officers when appropriate and required by the Police Department.

We trust that this information is responsive to the comments that were provided by PSC concerning their review of the May 2021 TIA. 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.



Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner

Professional Engineer in CT, MA, ME, NH, RI and VA

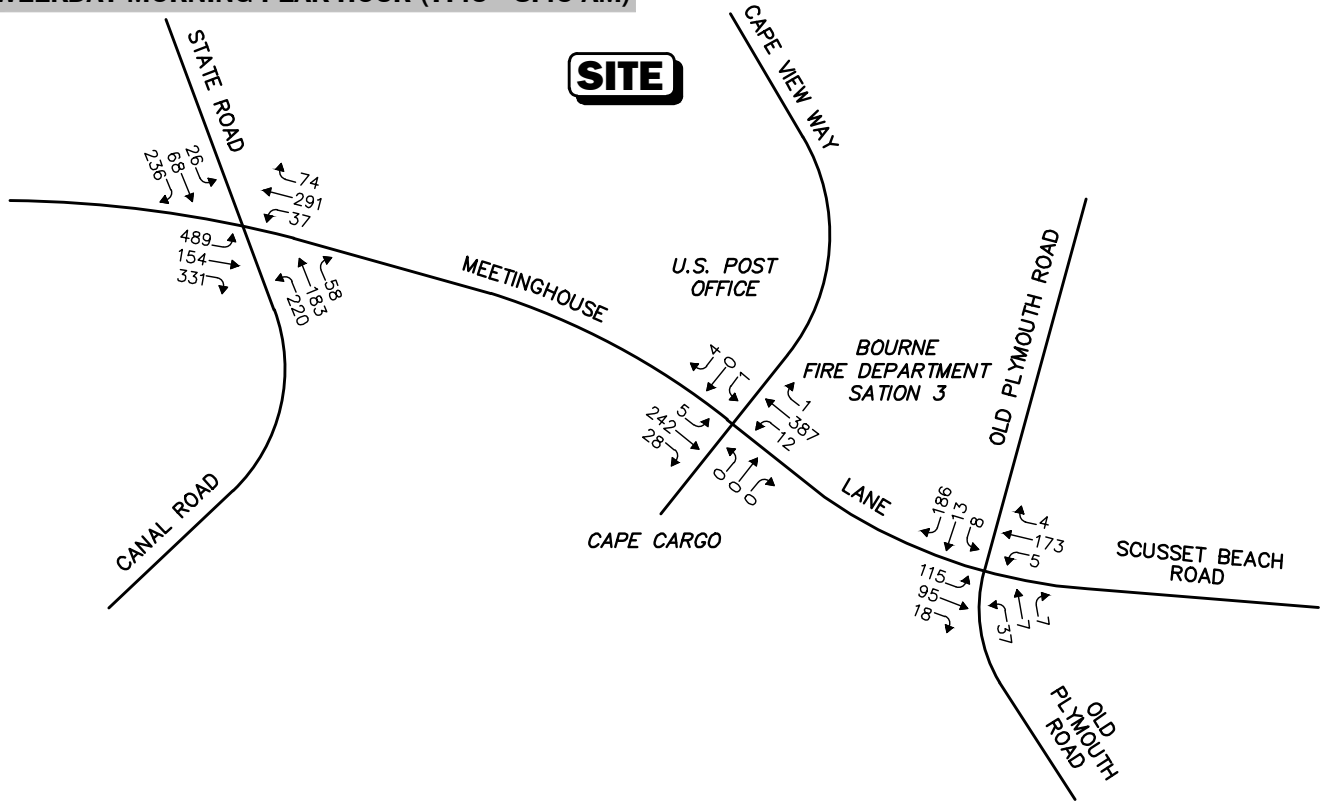
JSD/jsd

Attachments

cc: T. Houston, P.E., AICP – PSC (via email)
M. Jacob, AICP - Preservation of Affordable Housing, Inc. (via email)
P. Freeman, Esquire – Freeman Law Group (via email)



WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)



WEEKDAY EVENING PEAK HOUR (4:30 - 5:30 PM)

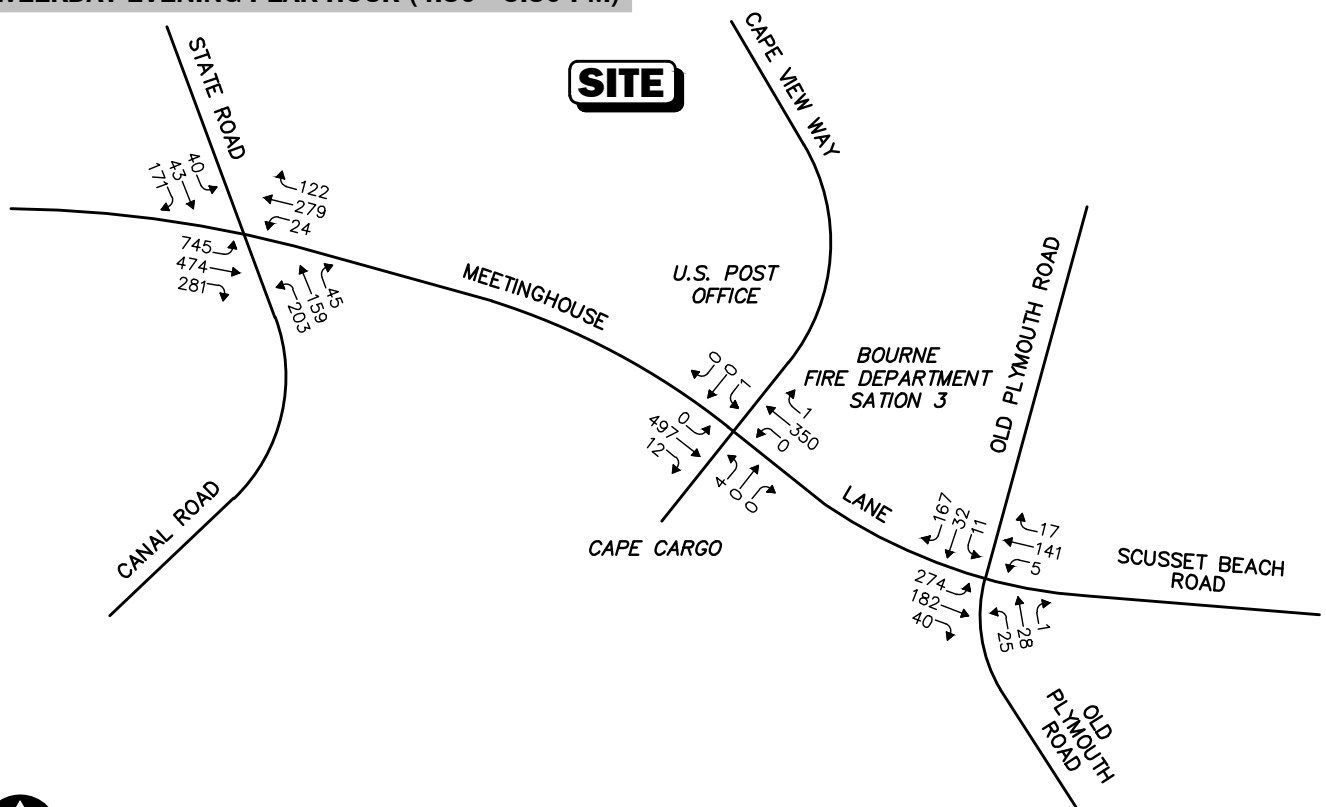
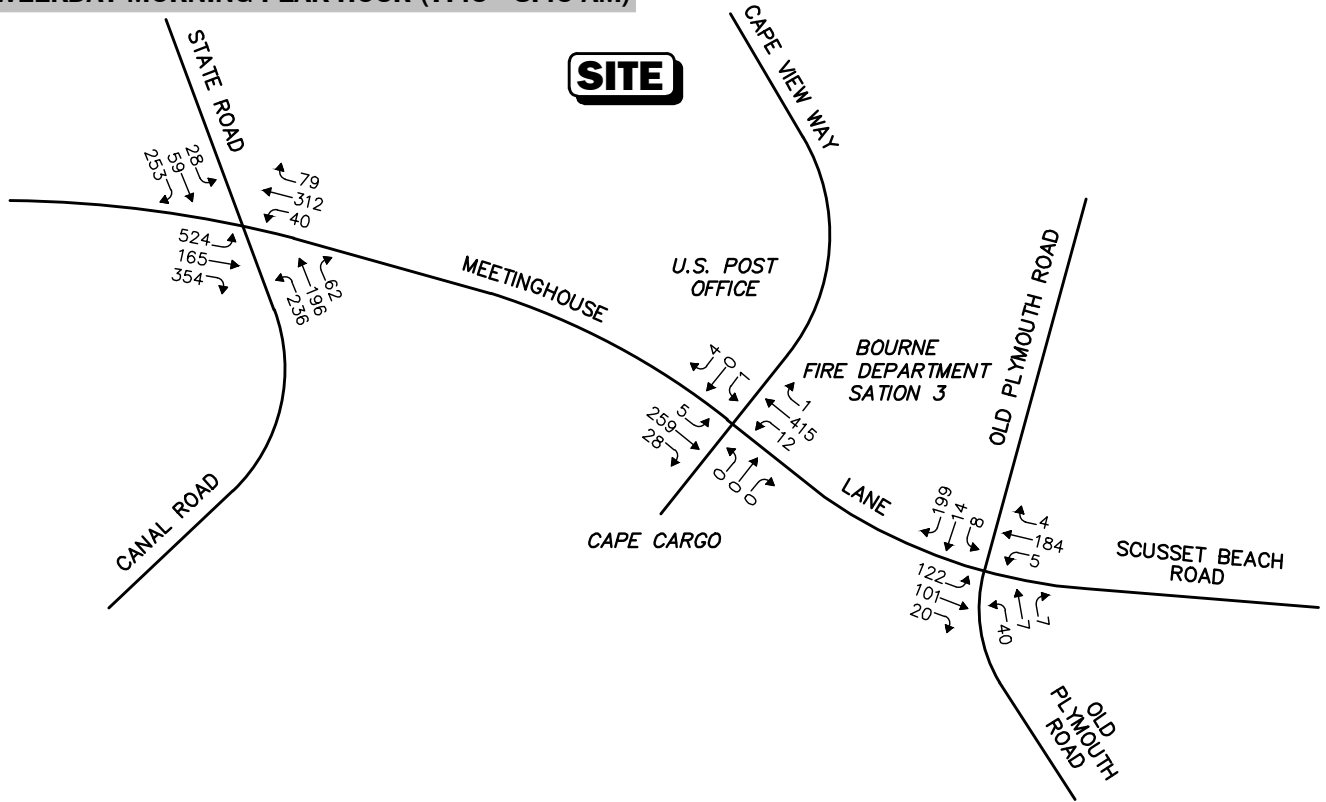


Figure 3A

2021 Existing
Peak-Month
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)



WEEKDAY EVENING PEAK HOUR (4:30 - 5:30 PM)

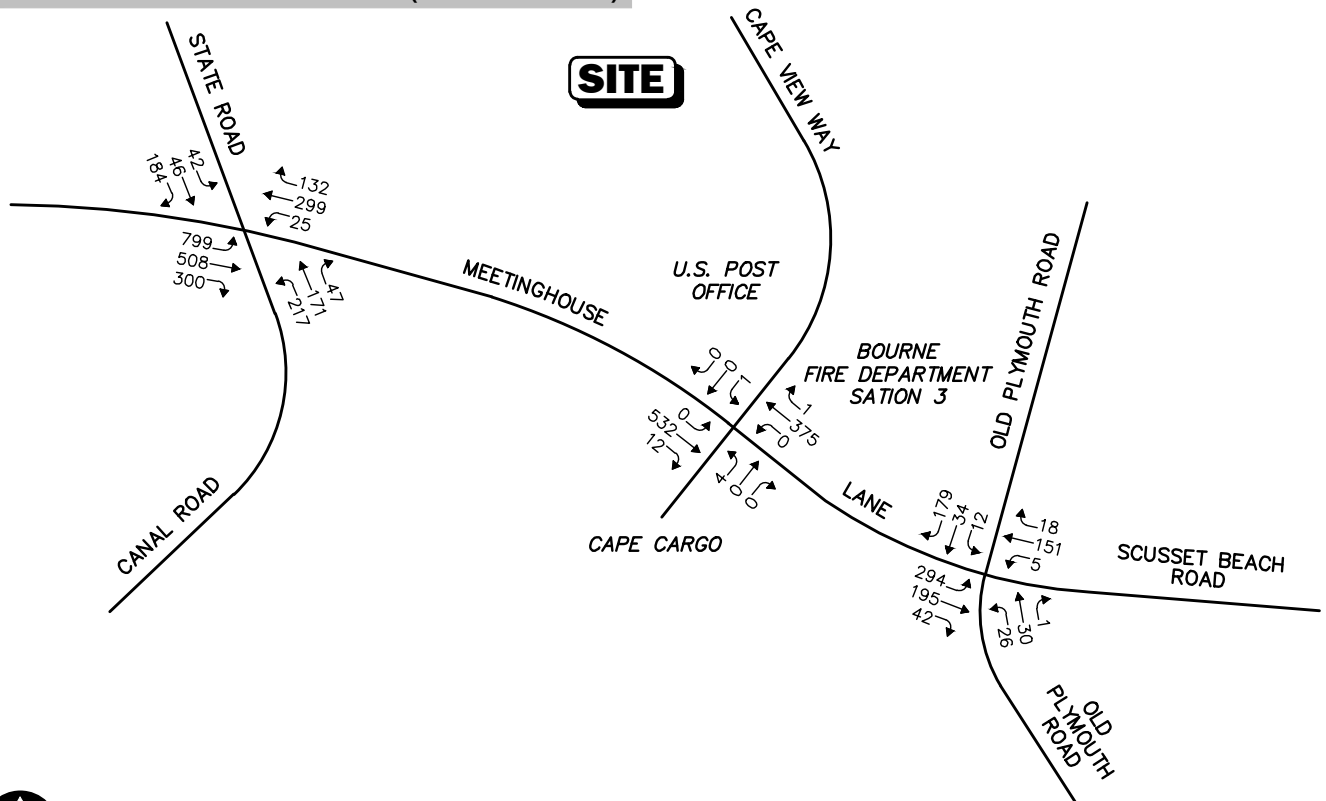
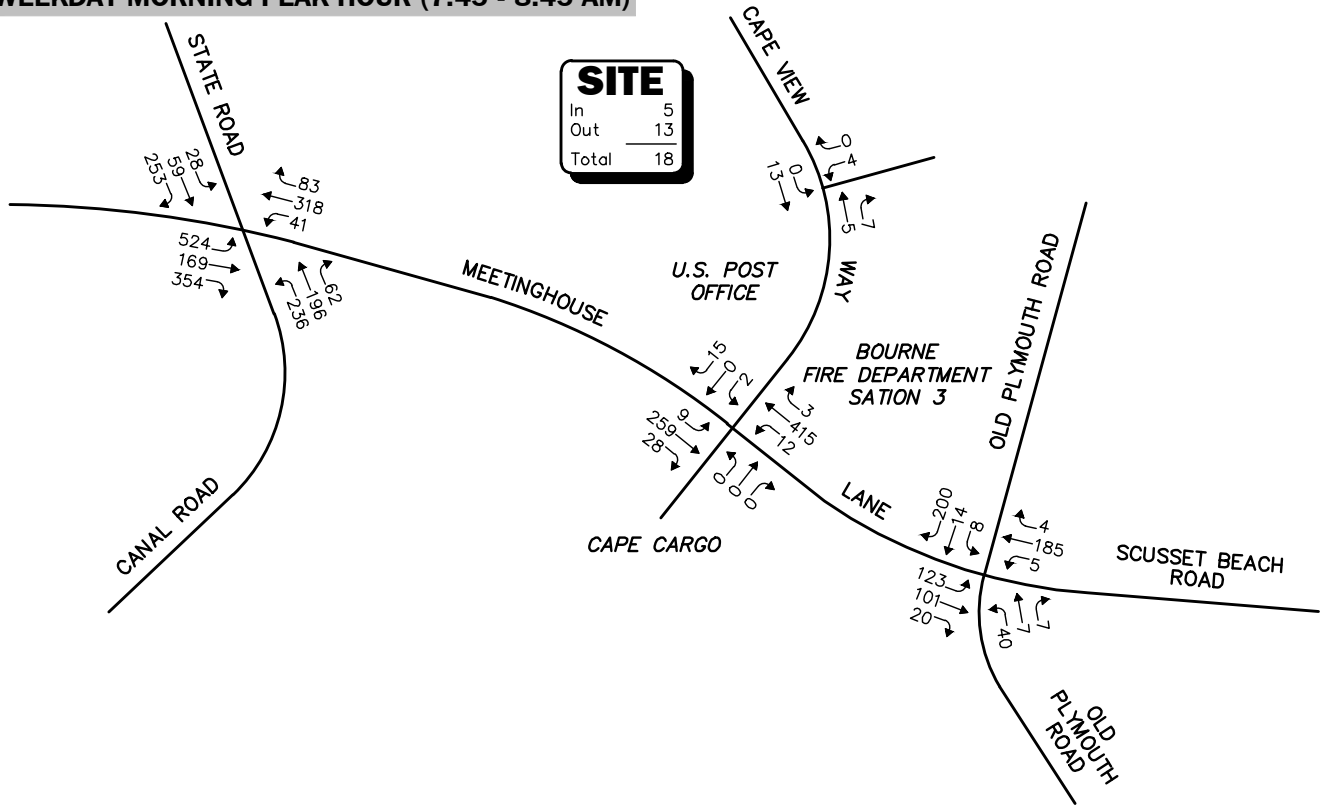


Figure 4A

2028 No-Build
Peak-Month
Peak-Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (7:45 - 8:45 AM)



WEEKDAY EVENING PEAK HOUR (4:30 - 5:30 PM)

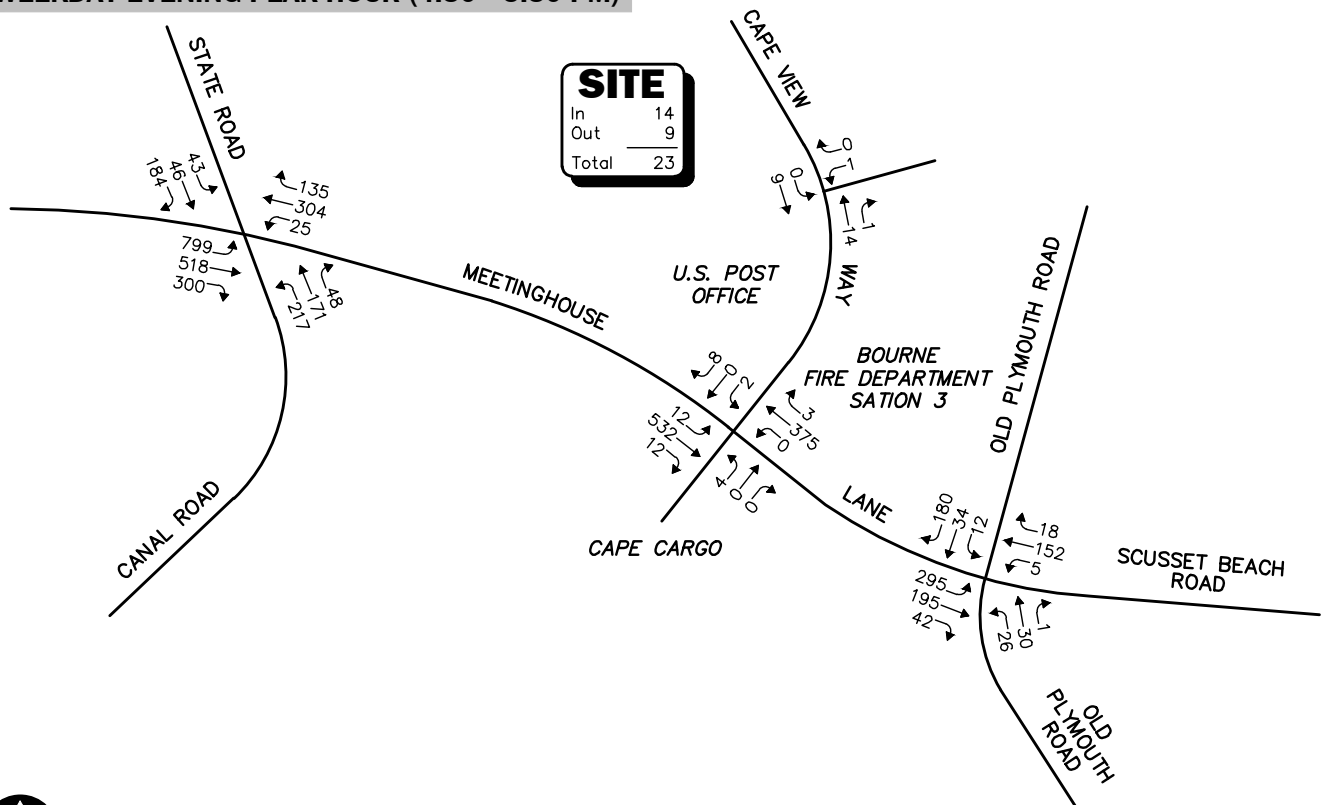


Figure 7A

2028 Build
Peak-Month
Peak-Hour Traffic Volumes

Table 9A
PEAK MONTH SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Signalized Intersection/Peak-hour/Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th	V/C	Delay	LOS	Queue 50 th /95 th
Meetinghouse Lane at Canal St at State Road												
<i>Weekday Morning:</i>												
Meetinghouse Lane EB LT	0.86	30.1	C	9/19 ^e	0.94	44.9	D	10/23 ^e	0.95	46.9	D	10/23 ^e
Meetinghouse Lane EB TH	0.15	8.2	A	2/3	0.16	8.1	A	2/4	0.16	8.0	A	2/4
Meetinghouse Lane EB RT	0.23	8.8	A	0/2	0.25	8.7	A	0/2	0.25	8.7	A	0/2
Meetinghouse Lane WB LT	0.05	7.7	A	1/1	0.06	7.5	A	1/1	0.06	7.5	A	1/1
Meetinghouse Lane WB TH/RT	0.80	42.5	D	9/14	0.82	43.1	D	10/16	0.81	42.6	D	10/16
Canal Street NB LT	0.98	85.6	F	6/13 ^e	1.06	111.9	F	7/15 ^e	1.08	116.7	F	7/16 ^e
Canal Street NB TH	0.46	32.6	C	5/8	0.50	34.1	C	5/9	0.50	34.7	C	5/9
Canal Street NB RT	0.04	28.6	C	0/1	0.04	29.6	C	0/1	0.04	30.2	C	0/1
State Road SB LT	0.12	29.4	C	1/2	0.14	30.5	C	1/2	0.14	31.1	C	1/2
State Road SB TH	0.42	43.3	D	2/4	0.38	43.8	D	2/4	0.38	44.5	D	2/4
State Road SB RT	0.18	41.2	D	0/3	0.19	42.3	D	0/3	0.19	42.9	D	0/3
Overall	--	34.8	C	--	--	41.2	D	--	--	42.1	D	--
<i>Weekday Evening:</i>												
Meetinghouse Lane EB LT	1.42	221.7	F	26/40 ^e	1.57	288.9	F	31/47 ^e	1.58	294.4	F	31/48 ^e
Meetinghouse Lane EB TH	0.46	9.9	A	7/11	0.49	10.1	B	7/12	0.49	10.1	B	8/12
Meetinghouse Lane EB RT	0.25	8.3	A	1/2	0.24	8.1	A	1/2	0.24	8.0	A	1/2
Meetinghouse Lane WB LT	0.06	7.1	A	1/1	0.06	7.1	A	1/1	0.06	7.0	A	1/1
Meetinghouse Lane WB TH/RT	0.81	41.8	D	10/16	0.83	42.2	D	11/18	0.83	42.2	D	11/18
Canal Street NB LT	0.94	76.7	E	5/12 ^e	1.02	101.3	F	6/15 ^e	1.02	104.3	F	6/15 ^e
Canal Street NB TH	0.42	33.5	C	4/8	0.46	35.3	D	5/8	0.46	35.7	D	5/8
Canal Street NB RT	0.03	29.9	C	0/1	0.03	31.2	C	0/1	0.03	31.6	C	0/1
State Road SB LT	0.18	31.3	C	1/3	0.21	32.9	C	1/3	0.22	33.4	C	1/3
State Road SB TH	0.31	43.8	D	2/3	0.33	45.2	D	2/3	0.33	45.6	D	2/3
State Road SB RT	0.13	42.4	D	0/2	0.14	43.8	D	0/2	0.14	44.2	D	0/2
Overall	--	84.2	F	--	--	107.3	F	--	--	108.5	F	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel-of-Service.

^dQueue length in vehicles.

^eVolume 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.

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

Table 10A

PEAK MONTH UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2020 Existing				2028 No-Build				2028 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
Meetinghouse Lane at Old Plymouth Road												
<i>Weekday Morning:</i>												
Meetinghouse Lane EB LT/TH/RT	228	4.0	A	1	243	4.0	A	1	244	4.0	A	1
Meetinghouse Lane WB LT/TH/RT	182	0.2	A	0	193	0.2	A	0	194	0.2	A	0
Old Plymouth Road NB LT/TH/RT	51	22.3	C	1	54	25.5	D	2	54	25.7	D	2
Old Plymouth Road SB LT/TH/RT	207	11.9	B	2	221	12.3	B	2	222	12.4	B	2
<i>Weekday Evening:</i>												
Meetinghouse Lane EB LT/TH/RT	496	4.6	A	0	531	4.6	A	1	532	4.7	A	1
Meetinghouse Lane WB LT/TH/RT	163	0.2	A	0	174	0.2	A	0	175	0.2	A	0
Old Plymouth Road NB LT/TH/RT	54	56.1	F	3	57	82.1	F	3	57	82.1	F	4
Old Plymouth Road SB LT/TH/RT	210	20.3	C	3	225	25.0	D	4	226	25.3	D	4
Meetinghouse Lane at Cape View Way at 54 Meetinghouse Lane Driveway												
<i>Weekday Morning:</i>												
Meetinghouse Lane EB LT/TH/RT	275	0.1	A	0	292	0.1	A	0	296	0.3	A	0
Meetinghouse Lane WB LT/TH/RT	400	0.3	A	0	428	0.2	A	0	430	0.2	A	0
54 Meetinghouse Lane Driveway NB LT/TH/RT	0	0.0	A	0	0	0.0	A	0	0	0.0	A	0
Cape View Way NB LT/TH/RT	5	12.0	B	1	5	12.3	B	1	18	12.5	B	1
<i>Weekday Evening:</i>												
Meetinghouse Lane EB LT/TH/RT	509	0.0	A	1	544	0.0	A	0	556	0.2	A	0
Meetinghouse Lane WB LT/TH/RT	351	0.0	A	0	376	0.0	A	0	378	0.0	A	0
54 Meetinghouse Lane Driveway NB LT/TH/RT	4	21.1	C	1	4	23.0	C	1	4	25.8	D	1
Cape View Way NB LT/TH/RT	1	21.3	C	1	1	22.0	C	1	10	22.0	C	1
Cape View Way at the Project Site Driveway												
<i>Weekday Morning:</i>												
Cape View Way WB LT/RT	--	--	--	--	--	--	--	--	4	8.6	A	0
Cape View Way NB TH/RT	--	--	--	--	--	--	--	--	12	0.0	A	0
Project Site Driveway SB LT/TH	--	--	--	--	--	--	--	--	13	0.0	A	0
<i>Weekday Evening:</i>												
Cape View Way WB LT/RT	--	--	--	--	--	--	--	--	1	8.6	A	0
Cape View Way NB TH/RT	--	--	--	--	--	--	--	--	15	0.0	A	0
Project Site Driveway SB LT/TH	--	--	--	--	--	--	--	--	9	0.0	A	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

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

ATTACHMENTS

SEASONAL ADJUSTMENT DATA
CAPACITY ANALYSIS WORKSHEETS
CONSTRUCTION MANAGEMENT PLAN

ATTACHMENTS

SEASONAL ADJUSTMENT DATA
CAPACITY ANALYSIS WORKSHEETS

SEASONAL ADJUSTMENT DATA

Massachusetts Highway Department
708: Monthly Hourly Volume for April 2019

Location ID:	708
County:	Barnstable
Functional Class	2
Location:	MID-CAPE HIGHWAY

Seasonal Factor Group: Rec - East
Daily Factor Group:
Axle Factor Group: Rec - East
Growth Factor Group:

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	236	159	141	221	548	1440	3830	4650	4443	3247	3123	3110	3147	3176	3769	4388	4768	4288	2741	1911	1345	952	569	411	56613	Accepted
2	214	171	130	212	553	1400	3820	4756	4443	3364	3072	3137	3188	3229	3886	4747	4975	4664	2974	2073	1391	1047	636	423	58505	Accepted
3	228	140	133	170	491	1192	3335	4428	4236	3284	2950	2979	3058	3229	3759	4522	4739	4408	2853	1995	1510	1071	692	415	55817	Accepted
4	242	127	147	207	523	1357	3830	4894	4541	3667	3110	3329	3335	3547	4107	5001	5146	4944	3448	2224	1633	1118	784	476	61737	Accepted
5	236	176	132	198	511	1247	3580	4629	4182	3451	3375	3621	3822	3952	4673	5633	5688	5442	4091	2576	1894	1383	980	670	66142	Accepted
6	411	230	134	179	266	536	1306	2065	2720	3331	4040	4304	4495	4422	4387	4470	4419	3936	3218	2203	1868	1428	1163	617	56148	Accepted
7	383	272	164	162	190	369	785	1489	2096	2920	3752	4268	4373	4485	4486	4588	4349	3678	2923	2165	1603	918	610	429	51457	Accepted
8	200	125	132	204	561	1394	3663	4579	4255	3230	3091	3182	3228	3331	3690	4107	4491	4128	2633	1652	1221	874	542	333	54846	Accepted
9	223	157	134	199	566	1417	3613	4986	4537	3648	3196	3107	3170	3219	3771	4441	4881	4705	3277	1982	1501	1055	601	390	58776	Accepted
10	221	128	130	198	488	1320	3711	4963	4593	3626	3099	3263	3331	3423	4010	4734	4903	4912	3247	2046	1521	1133	618	457	60075	Accepted
11	244	149	162	186	547	1349	3747	4875	4492	4003	3494	3427	3612	3721	4414	5351	5474	5221	3732	2270	1623	1193	830	548	64664	Accepted
12	340	220	174	205	482	1256	3488	4643	4190	3842	3749	3898	4205	4460	4891	5640	5797	5569	4685	3080	2019	1423	1053	610	69919	Accepted
13	389	221	170	175	267	555	1214	2070	2764	3428	3997	4504	4729	4336	4507	4544	4246	3781	2955	2149	1674	1381	979	648	55683	Accepted
14	439	248	168	163	123	412	749	1374	2133	3043	3956	4500	4498	4487	4168	4750	4435	3928	2978	2187	1467	891	696	430	52223	Accepted
15	258	164	144	209	418	1006	2541	3173	3162	3077	3397	3716	3700	3667	3829	4104	4302	3922	2728	1879	1417	934	684	387	52818	Accepted
16	237	152	150	201	506	1350	3552	4470	4322	4039	3989	4204	4243	3965	4450	5038	5505	5140	3378	2302	1750	1123	739	391	65196	Accepted
17	263	160	150	189	468	1362	3482	4538	4510																	

Massachusetts Highway Department

708: Monthly Hourly Volume for July 2019

Location ID:	708
County:	Barnstable
Functional Class	2
Location:	MID-CAPE HIGHWAY

Seasonal Factor Group:	Rec - East
Daily Factor Group:	
Axle Factor Group:	Rec - East
Growth Factor Group:	

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1																										
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10	402	202	182	266	668	1672	3521	4870	4451	4957	4810	4952	4755	4729	5093	5535	5892	5719	4213	3235	2734	2158	1371	714	77101	Accepted
11	406	261	217	281	682	1624	3454	4726	4802	4749	5104	5286	5111	5007	5444	5565	5739	5494	4571	3795	2958	2380	1652	861	80169	Accepted
12	514	270	240	266	510	1338	2682	3711	4208	4240	5203	5638	5830	5330	5423	5470	5564	5095	4591	4127	3832	3164	1981	1345	80572	Accepted
13	726	467	245	268	500	914	2280	4430	5741	6061	5692	5324	4694	4670	4758	4702	4999	4842	4188	3605	3314	2949	2108	1333	78810	Accepted
14	675	422	254	256	344	723	1528	2770	4243	5334	5614	5522	5480	5065	5218	5315	5162	5227	4967	4535	4349	3983	1937	928	79851	Accepted
15	405	291	242	363	987	2364	4399	5305	5200	5106	5600	5670	5551	4814	5187	5512	5692	5604	4486	3330	2686	1864	1192	748	82598	Accepted
16	421	265	180	324	795	1819	3643	4919	4892	4679	4802	4876	4690	4528	4966	5147	6052	5232	4298	3203	2658	1969	1310	763	76431	Accepted
17	484	244	221	255	659	1617	3486	4773	4973	4689	5127	5150	4942	4756	5058	5547	5865	5238	3911	3190	2696	1910	1157	678	76626	Accepted
18	467	267	275	273	668	1501	3175	4468	4508	4765	4798	5364	5167	5184	5389	5467	6034	5408	4541	3888	3011	2210	1731	1159	79718	Accepted
19	691	326	230	311	660	1487	3165	4380	4844	5038	5293	5375	4984	5003	4891	5355	5497	5566	5098	4582	4424	3729	2202	1512	84643	Accepted
20	784	471	328	364	555	1054	2474	4586	5697	5761	5658	5365	4821	4702	4822	5024	4850	4785	3791	3425	3405	2956	2092	1299	79069	Accepted
21	677	415	292	309	395	704	1540	2912	4352	5356	5572	5585	5237	5117	5120	5236	4903	4237	4300	4517	4385	4141	2700	955	78957	Accepted
22	395	237	236	397	1060	2524	4465	5342	5194	4953	5409	5523	5651	5523	5414	5927	6110	5381	3802	3080	2390	1791	1234	601	82639	Accepted
23	361	229	220	284	688	1665	3188	4451	4280	4316	4262	4164	4257	4585	4925	5011	5740	5225	4244	3215	2408	1917	1214	788	71637	Accepted
24	421	256	215	223	690	1669	3612	4815	4918	4812	5127	5272	4938	4869	5072	5472	5609	5625	4566	3444	3017	2432	1631	872	79577	Accepted
25	446	236	238	224	693	1684	3507	4890	5099	4914	4873	5184	5180	5135	5647	6190	6243	6122	5373	4162	3709	2722	2181	1233	85885	Accepted
26	713	323	260	321	695	1532	3305	4801	5114	5232	5390	5314	5151	5025	5235	5283	5620	5552	5230	4914	4396	3407	2298	1527	86638	Accepted
27	779	469	293	303	527	1069	2449	4863	6041	6089	6161	6070	4993	4683	4728	4928	5063	5176	4349	3777	3641	2958	2211	1510	83130	Accepted
28	729	423	274	220	378	723	1537	2821	4342	5513	5887	5606	5577	5612	5282	5216	5185	5136	5255	4908	4581	4177	2484	968	82834	Accepted
29	523	279	225	393	1012	2398	4377	5245	5203	4935	5347	5635	5595	5526	5048	3842	5573	5781	5193	3559	2773	2084	1289	678	82513	Accepted
30	351	205	219	265	744	1734	3558	4873	5025	4868	4824	5064	4849	4755	4995	5599	5543	5372	4154	3273	2735	2013	1263	735	77016	Accepted
31	499	259	218	301	697	1674	3309	4731	4731	4736	4921	5188	4827	4820	5225	5297	5537	5322	4196	3326	2633	2075	1401	845	76768	Accepted

July Average 80145

2019 Average Count Data – Sta. 708

April ADT: 60,491

July ADT: 80,269

Seasonal Adjustment

$$\frac{80,145}{60,491} = 0.325$$

CAPACITY ANALYSIS WORKSHEETS

Meetinghouse Lane at State Road at Canal Street

Meetinghouse Lane at Old Plymouth Road at Scusset Beach Road

Meetinghouse Lane at Cape View Road at 54 Meetinghouse Lane Driveway

Cape View Road at the Project Site Driveway

Meetinghouse Lane at State Road at Canal Street

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	489	154	331	37	291	74	220	183	58	26	68	236
Future Volume (vph)	489	154	331	37	291	74	220	183	58	26	68	236
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.969				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1845	1538	1805	1734	0	1752	1881	1615	1805	1845	1599
Flt Permitted	0.224			0.651			0.419			0.552		
Satd. Flow (perm)	421	1845	1538	1237	1734	0	773	1881	1615	1049	1845	1599
Satd. Flow (RTOR)			360		9				83			281
Adj. Flow (vph)	532	167	360	40	313	80	253	210	67	31	81	281
Lane Group Flow (vph)	532	167	360	40	393	0	253	210	67	31	81	281
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.86	0.15	0.33	0.05	0.81		0.98	0.46	0.15	0.12	0.43	0.67
Control Delay	33.2	8.8	1.8	8.3	46.1		89.0	36.8	5.9	32.8	50.8	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	8.8	1.8	8.3	46.1		89.0	36.8	5.9	32.8	50.8	14.2
Queue Length 50th (ft)	206	41	0	9	224		140	112	0	15	48	0
Queue Length 95th (ft)	#465	78	34	25	355		#324	197	23	41	97	58
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	617	1804	1512	1209	1251		258	572	548	319	299	494
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.09	0.24	0.03	0.31		0.98	0.37	0.12	0.10	0.27	0.57
Intersection Summary												
Cycle Length: 170												

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2021 Existing Weekday Morning Peak Hour 1: Canal Rd/State Rd & Meetinghouse Ln

Actuated Cycle Length: 99.6

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2		 Ø4				 Ø9	
37 s		111 s				22 s	
 Ø5	 Ø6	 Ø7		 Ø8			
14 s	23 s	33 s		78 s			

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	489	154	331	37	291	74	220	183	58	26	68	236
Future Volume (vph)	489	154	331	37	291	74	220	183	58	26	68	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1845	1538	1805	1734		1752	1881	1615	1805	1845	1599
Flt Permitted	0.22	1.00	1.00	0.65	1.00		0.42	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	421	1845	1538	1238	1734		774	1881	1615	1049	1845	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	532	167	360	40	313	80	253	210	67	31	81	281
RTOR Reduction (vph)	0	0	139	0	6	0	0	0	51	0	0	252
Lane Group Flow (vph)	532	167	221	40	387	0	253	210	16	31	81	29
Heavy Vehicles (%)	1%	3%	5%	0%	6%	7%	3%	1%	0%	0%	3%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	61.0	61.0	61.0	61.0	27.7		24.4	24.4	24.4	24.4	10.3	10.3
Effective Green, g (s)	61.0	61.0	61.0	61.0	27.7		24.4	24.4	24.4	24.4	10.3	10.3
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.28		0.25	0.25	0.25	0.25	0.10	0.10
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	619	1132	943	759	483		259	461	396	257	191	165
v/s Ratio Prot	c0.23	0.09			0.22		c0.07	0.11			0.04	
v/s Ratio Perm	c0.30		0.14	0.03			c0.17		0.01	0.03		0.02
v/c Ratio	0.86	0.15	0.23	0.05	0.80		0.98	0.46	0.04	0.12	0.42	0.18
Uniform Delay, d1	18.7	8.2	8.7	7.7	33.3		36.7	31.9	28.6	29.2	41.8	40.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.4	0.1	0.1	0.0	9.2		49.0	0.7	0.0	0.2	1.5	0.5
Delay (s)	30.1	8.2	8.8	7.7	42.5		85.6	32.6	28.6	29.4	43.3	41.2
Level of Service	C	A	A	A	D		F	C	C	C	D	D
Approach Delay (s)		19.4			39.3			57.4			40.7	
Approach LOS		B			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			34.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			99.4			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

2021 Existing Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	745	474	331	24	279	122	203	159	45	40	43	171
Future Volume (vph)	745	474	331	24	279	122	203	159	45	40	43	171
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1863	1599	1805	1795	0	1787	1881	1615	1805	1900	1599
Flt Permitted	0.187			0.398			0.405			0.598		
Satd. Flow (perm)	352	1863	1599	756	1795	0	762	1881	1615	1136	1900	1599
Satd. Flow (RTOR)			327		16				83			206
Adj. Flow (vph)	847	539	376	27	310	136	231	181	51	48	52	206
Lane Group Flow (vph)	847	539	376	27	446	0	231	181	51	48	52	206
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	1.42	0.46	0.33	0.06	0.82		0.94	0.42	0.12	0.18	0.31	0.63
Control Delay	221.0	11.3	2.3	7.8	44.6		82.1	37.8	3.1	35.5	50.1	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	221.0	11.3	2.3	7.8	44.6		82.1	37.8	3.1	35.5	50.1	15.7
Queue Length 50th (ft)	~640	160	11	6	251		131	99	0	25	32	0
Queue Length 95th (ft)	#1006	256	45	18	392		#307	181	11	58	70	53
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	597	1817	1568	737	1289		246	568	546	343	306	430
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.42	0.30	0.24	0.04	0.35		0.94	0.32	0.09	0.14	0.17	0.48
Intersection Summary												
Cycle Length: 170												

2021 Existing Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2021 Existing Weekday Evening Peak Hour 1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

Actuated Cycle Length: 100.3

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2 37 s		 Ø4 111 s		 Ø9 22 s	
 Ø5 14 s	 Ø6 23 s	 Ø7 33 s	 Ø8 78 s		

2021 Existing Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	745	474	331	24	279	122	203	159	45	40	43	171
Future Volume (vph)	745	474	331	24	279	122	203	159	45	40	43	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1863	1599	1805	1795		1787	1881	1615	1805	1900	1599
Flt Permitted	0.19	1.00	1.00	0.40	1.00		0.40	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	352	1863	1599	757	1795		761	1881	1615	1136	1900	1599
Peak-hour factor, PHF	0.88	0.88	0.88	0.90	0.90	0.90	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	847	539	376	27	310	136	231	181	51	48	52	206
RTOR Reduction (vph)	0	0	121	0	11	0	0	0	39	0	0	188
Lane Group Flow (vph)	847	539	255	27	435	0	231	181	12	48	52	18
Heavy Vehicles (%)	1%	2%	1%	0%	1%	1%	1%	1%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	63.1	63.1	63.1	63.1	29.8		23.0	23.0	23.0	23.0	8.9	8.9
Effective Green, g (s)	63.1	63.1	63.1	63.1	29.8		23.0	23.0	23.0	23.0	8.9	8.9
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.30		0.23	0.23	0.23	0.23	0.09	0.09
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	598	1174	1007	477	534		247	432	371	261	168	142
v/s Ratio Prot	c0.37	0.29			0.24		c0.07	0.10			0.03	
v/s Ratio Perm	c0.52		0.16	0.04			c0.15		0.01	0.04		0.01
v/c Ratio	1.42	0.46	0.25	0.06	0.81		0.94	0.42	0.03	0.18	0.31	0.13
Uniform Delay, d1	24.6	9.6	8.1	7.1	32.6		37.1	32.9	29.9	31.0	42.7	42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	197.1	0.3	0.1	0.0	9.3		39.6	0.7	0.0	0.3	1.1	0.4
Delay (s)	221.7	9.9	8.3	7.1	41.8		76.7	33.5	29.9	31.3	43.8	42.4
Level of Service	F	A	A	A	D		E	C	C	C	D	D
Approach Delay (s)		111.3			39.9			54.7			40.9	
Approach LOS		F			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			84.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.47									
Actuated Cycle Length (s)			100.1			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			101.3%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	524	165	354	40	312	79	236	196	62	28	59	253
Future Volume (vph)	524	165	354	40	312	79	236	196	62	28	59	253
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.970				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1845	1538	1805	1735	0	1752	1881	1615	1805	1845	1599
Flt Permitted	0.209			0.644			0.422			0.517		
Satd. Flow (perm)	393	1845	1538	1224	1735	0	778	1881	1615	982	1845	1599
Satd. Flow (RTOR)			385		9				83			301
Adj. Flow (vph)	570	179	385	43	335	85	271	225	71	33	70	301
Lane Group Flow (vph)	570	179	385	43	420	0	271	225	71	33	70	301
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.94	0.16	0.35	0.06	0.82		1.07	0.50	0.16	0.14	0.38	0.70
Control Delay	46.4	8.7	1.8	8.2	46.7		112.9	38.9	6.7	34.4	50.7	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	8.7	1.8	8.2	46.7		112.9	38.9	6.7	34.4	50.7	14.8
Queue Length 50th (ft)	247	43	0	10	242		~170	124	0	17	42	0
Queue Length 95th (ft)	#559	84	35	26	385		#380	217	27	44	89	60
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	605	1785	1501	1184	1231		254	562	541	293	294	508
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.10	0.26	0.04	0.34		1.07	0.40	0.13	0.11	0.24	0.59
Intersection Summary												
Cycle Length: 170												

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2021 Existing Weekday Morning Peak Hour 1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

Actuated Cycle Length: 101.4

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2	 Ø4	 Ø9
37 s	111 s	22 s
 Ø5	 Ø7	
14 s	33 s	

2021 Existing Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	524	165	354	40	312	79	236	196	62	28	59	253
Future Volume (vph)	524	165	354	40	312	79	236	196	62	28	59	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1845	1538	1805	1735		1752	1881	1615	1805	1845	1599
Flt Permitted	0.21	1.00	1.00	0.64	1.00		0.42	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	393	1845	1538	1224	1735		778	1881	1615	982	1845	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	570	179	385	43	335	85	271	225	71	33	70	301
RTOR Reduction (vph)	0	0	146	0	6	0	0	0	54	0	0	271
Lane Group Flow (vph)	570	179	239	43	414	0	271	225	17	33	70	30
Heavy Vehicles (%)	1%	3%	5%	0%	6%	7%	3%	1%	0%	0%	3%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	62.9	62.9	62.9	62.9	29.6		24.3	24.3	24.3	24.3	10.2	10.2
Effective Green, g (s)	62.9	62.9	62.9	62.9	29.6		24.3	24.3	24.3	24.3	10.2	10.2
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.29		0.24	0.24	0.24	0.24	0.10	0.10
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	606	1146	955	760	507		255	451	387	235	185	161
v/s Ratio Prot	c0.24	0.10			0.24		c0.07	0.12			0.04	
v/s Ratio Perm	c0.34		0.16	0.04			c0.18		0.01	0.03		0.02
v/c Ratio	0.94	0.16	0.25	0.06	0.82		1.06	0.50	0.04	0.14	0.38	0.19
Uniform Delay, d1	22.0	8.0	8.6	7.5	33.3		38.0	33.2	29.5	30.2	42.5	41.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.9	0.1	0.1	0.0	9.8		73.9	0.9	0.0	0.3	1.3	0.6
Delay (s)	44.9	8.1	8.7	7.5	43.1		111.9	34.1	29.6	30.5	43.8	42.3
Level of Service	D	A	A	A	D		F	C	C	C	D	D
Approach Delay (s)		26.8			39.8			70.7			41.6	
Approach LOS		C			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			41.2			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			101.2			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			90.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

2028 No Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	799	508	300	25	299	132	217	171	47	42	46	184
Future Volume (vph)	799	508	300	25	299	132	217	171	47	42	46	184
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1863	1599	1805	1795	0	1787	1881	1615	1805	1900	1599
Flt Permitted	0.173			0.375			0.410			0.563		
Satd. Flow (perm)	325	1863	1599	712	1795	0	771	1881	1615	1070	1900	1599
Satd. Flow (RTOR)			277		16				83			222
Adj. Flow (vph)	908	577	341	28	332	147	247	194	53	51	55	222
Lane Group Flow (vph)	908	577	341	28	479	0	247	194	53	51	55	222
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	1.57	0.49	0.30	0.06	0.83		1.02	0.46	0.12	0.21	0.33	0.65
Control Delay	287.1	11.6	2.5	7.7	45.1		102.6	40.2	3.5	37.8	52.1	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	287.1	11.6	2.5	7.7	45.1		102.6	40.2	3.5	37.8	52.1	15.9
Queue Length 50th (ft)	~760	178	14	6	278		~151	110	0	27	34	0
Queue Length 95th (ft)	#1172	284	48	19	432		#366	201	13	64	75	54
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	579	1791	1548	684	1252		243	552	532	314	297	437
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.57	0.32	0.22	0.04	0.38		1.02	0.35	0.10	0.16	0.19	0.51
Intersection Summary												
Cycle Length: 170												

2028 No Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2028 No Build Weekday Evening Peak Hour 1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

Actuated Cycle Length: 103.4

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2 37 s		 Ø4 111 s		 Ø9 22 s
 Ø5 14 s	 Ø6 23 s	 Ø7 33 s	 Ø8 78 s	

2028 No Build Weekday Evening Peak Hour

Peak Month Volumes

1: Canal Rd/State Rd & Meetinghouse Ln

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	799	508	300	25	299	132	217	171	47	42	46	184
Future Volume (vph)	799	508	300	25	299	132	217	171	47	42	46	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1863	1599	1805	1795		1787	1881	1615	1805	1900	1599
Flt Permitted	0.17	1.00	1.00	0.38	1.00		0.41	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	326	1863	1599	713	1795		770	1881	1615	1070	1900	1599
Peak-hour factor, PHF	0.88	0.88	0.88	0.90	0.90	0.90	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	908	577	341	28	332	147	247	194	53	51	55	222
RTOR Reduction (vph)	0	0	100	0	11	0	0	0	41	0	0	202
Lane Group Flow (vph)	908	577	241	28	468	0	247	194	12	51	55	20
Heavy Vehicles (%)	1%	2%	1%	0%	1%	1%	1%	1%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	65.9	65.9	65.9	65.9	32.6		23.3	23.3	23.3	23.3	9.2	9.2
Effective Green, g (s)	65.9	65.9	65.9	65.9	32.6		23.3	23.3	23.3	23.3	9.2	9.2
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.32		0.23	0.23	0.23	0.23	0.09	0.09
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	580	1189	1021	455	567		243	424	364	241	169	142
v/s Ratio Prot	c0.40	0.31			0.26		c0.07	0.10			0.03	
v/s Ratio Perm	c0.60		0.15	0.04			c0.16		0.01	0.05		0.01
v/c Ratio	1.57	0.49	0.24	0.06	0.83		1.02	0.46	0.03	0.21	0.33	0.14
Uniform Delay, d1	26.1	9.8	7.9	7.0	32.7		39.3	34.5	31.2	32.5	44.1	43.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	262.8	0.3	0.1	0.1	9.5		62.0	0.8	0.0	0.4	1.1	0.5
Delay (s)	288.9	10.1	8.1	7.1	42.2		101.3	35.3	31.2	32.9	45.2	43.8
Level of Service	F	B	A	A	D		F	D	C	C	D	D
Approach Delay (s)		148.3			40.3			67.9			42.3	
Approach LOS		F			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			107.3			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.62									
Actuated Cycle Length (s)			103.2			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			106.7%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

2028 Build Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	524	169	354	41	318	83	236	196	62	28	59	253
Future Volume (vph)	524	169	354	41	318	83	236	196	62	28	59	253
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.969				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1845	1538	1805	1734	0	1752	1881	1615	1805	1845	1599
Flt Permitted	0.207			0.641			0.424			0.512		
Satd. Flow (perm)	389	1845	1538	1218	1734	0	782	1881	1615	973	1845	1599
Satd. Flow (RTOR)			385		9				83			301
Adj. Flow (vph)	570	184	385	44	342	89	271	225	71	33	70	301
Lane Group Flow (vph)	570	184	385	44	431	0	271	225	71	33	70	301
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.95	0.16	0.35	0.06	0.82		1.08	0.51	0.16	0.14	0.38	0.70
Control Delay	47.9	8.6	1.8	8.1	46.2		116.3	39.8	6.8	35.3	51.7	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	8.6	1.8	8.1	46.2		116.3	39.8	6.8	35.3	51.7	14.9
Queue Length 50th (ft)	253	45	0	10	251		~177	127	0	17	43	0
Queue Length 95th (ft)	#569	85	34	27	395		#391	222	27	45	90	60
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	601	1776	1495	1173	1215		252	555	535	287	290	505
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.10	0.26	0.04	0.35		1.08	0.41	0.13	0.11	0.24	0.60
Intersection Summary												
Cycle Length: 170												

2028 Build Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2028 Build Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

Actuated Cycle Length: 102.8

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2	 Ø4	 Ø9
37 s	111 s	22 s
 Ø5	 Ø7	
14 s	33 s	
 Ø6	 Ø8	
23 s	78 s	

2028 Build Weekday Morning Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	524	169	354	41	318	83	236	196	62	28	59	253
Future Volume (vph)	524	169	354	41	318	83	236	196	62	28	59	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1845	1538	1805	1734		1752	1881	1615	1805	1845	1599
Flt Permitted	0.21	1.00	1.00	0.64	1.00		0.42	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	389	1845	1538	1219	1734		781	1881	1615	973	1845	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.87	0.87	0.87	0.84	0.84	0.84
Adj. Flow (vph)	570	184	385	44	342	89	271	225	71	33	70	301
RTOR Reduction (vph)	0	0	144	0	6	0	0	0	54	0	0	271
Lane Group Flow (vph)	570	184	241	44	425	0	271	225	17	33	70	30
Heavy Vehicles (%)	1%	3%	5%	0%	6%	7%	3%	1%	0%	0%	3%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	64.2	64.2	64.2	64.2	30.9		24.4	24.4	24.4	24.4	10.3	10.3
Effective Green, g (s)	64.2	64.2	64.2	64.2	30.9		24.4	24.4	24.4	24.4	10.3	10.3
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.30		0.24	0.24	0.24	0.24	0.10	0.10
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	601	1154	962	762	522		252	447	384	231	185	160
v/s Ratio Prot	c0.24	0.10			0.24		c0.07	0.12			0.04	
v/s Ratio Perm	c0.35		0.16	0.04			c0.18		0.01	0.03		0.02
v/c Ratio	0.95	0.16	0.25	0.06	0.81		1.08	0.50	0.04	0.14	0.38	0.19
Uniform Delay, d1	22.6	8.0	8.5	7.5	33.2		38.6	33.9	30.1	30.8	43.2	42.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.3	0.1	0.1	0.0	9.4		78.2	0.9	0.0	0.3	1.3	0.6
Delay (s)	46.9	8.0	8.7	7.5	42.6		116.7	34.7	30.2	31.1	44.5	42.9
Level of Service	D	A	A	A	D		F	C	C	C	D	D
Approach Delay (s)		27.7			39.4			73.4			42.2	
Approach LOS		C			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			42.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			102.6			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			90.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

2028 Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	799	518	300	25	304	135	217	171	48	43	46	184
Future Volume (vph)	799	518	300	25	304	135	217	171	48	43	46	184
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.954				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1863	1599	1805	1795	0	1787	1881	1615	1805	1900	1599
Flt Permitted	0.170			0.368			0.410			0.561		
Satd. Flow (perm)	320	1863	1599	699	1795	0	771	1881	1615	1066	1900	1599
Satd. Flow (RTOR)			272		16				83			222
Adj. Flow (vph)	908	589	341	28	338	150	247	194	55	52	55	222
Lane Group Flow (vph)	908	589	341	28	488	0	247	194	55	52	55	222
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Detector Phase	7	4	4	7 8	8		5	2	2	5 6	6	6
Switch Phase												
Minimum Initial (s)	1.0	1.0	1.0		1.0		1.0	1.0	1.0		1.0	1.0
Minimum Split (s)	8.0	8.0	8.0		8.0		8.0	8.0	8.0		8.0	8.0
Total Split (s)	33.0	111.0	111.0		78.0		14.0	37.0	37.0		23.0	23.0
Total Split (%)	19.4%	65.3%	65.3%		45.9%		8.2%	21.8%	21.8%		13.5%	13.5%
Maximum Green (s)	26.0	104.0	104.0		71.0		7.0	30.0	30.0		16.0	16.0
Yellow Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead				Lag		Lead				Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		None	None	None		None	None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	1.58	0.49	0.30	0.06	0.84		1.02	0.46	0.13	0.22	0.33	0.65
Control Delay	292.0	11.6	2.6	7.7	45.2		104.5	40.6	3.8	38.4	52.6	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	292.0	11.6	2.6	7.7	45.2		104.5	40.6	3.8	38.4	52.6	16.0
Queue Length 50th (ft)	~769	183	15	6	286		~153	111	0	28	35	0
Queue Length 95th (ft)	#1185	293	49	19	443		#369	203	14	65	76	54
Internal Link Dist (ft)		363			464			190			202	
Turn Bay Length (ft)	190		190	100			310		50	100		100
Base Capacity (vph)	575	1785	1543	670	1243		241	548	529	310	295	436
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.58	0.33	0.22	0.04	0.39		1.02	0.35	0.10	0.17	0.19	0.51
Intersection Summary												
Cycle Length: 170												

2028 Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

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)	22.0
Total Split (s)	22.0
Total Split (%)	13%
Maximum Green (s)	20.0
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)	13.0
Pedestrian Calls (#/hr)	0
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
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	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

2028 Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

Actuated Cycle Length: 104.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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: 1: Canal Rd/State Rd & Meetinghouse Ln

 Ø2	 Ø4	 Ø9
37 s	111 s	22 s
 Ø5	 Ø7	
14 s	33 s	
 Ø6	 Ø8	
23 s	78 s	

2028 Build Weekday Evening Peak Hour
1: Canal Rd/State Rd & Meetinghouse Ln

Peak Month Volumes

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	799	518	300	25	304	135	217	171	48	43	46	184
Future Volume (vph)	799	518	300	25	304	135	217	171	48	43	46	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	1863	1599	1805	1794		1787	1881	1615	1805	1900	1599
Flt Permitted	0.17	1.00	1.00	0.37	1.00		0.41	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	320	1863	1599	700	1794		770	1881	1615	1065	1900	1599
Peak-hour factor, PHF	0.88	0.88	0.88	0.90	0.90	0.90	0.88	0.88	0.88	0.83	0.83	0.83
Adj. Flow (vph)	908	589	341	28	338	150	247	194	55	52	55	222
RTOR Reduction (vph)	0	0	98	0	11	0	0	0	43	0	0	202
Lane Group Flow (vph)	908	589	243	28	477	0	247	194	12	52	55	20
Heavy Vehicles (%)	1%	2%	1%	0%	1%	1%	1%	1%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	custom	NA		pm+pt	NA	Perm	custom	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	7 8			2		2	5 6		6
Actuated Green, G (s)	66.7	66.7	66.7	66.7	33.4		23.3	23.3	23.3	23.3	9.2	9.2
Effective Green, g (s)	66.7	66.7	66.7	66.7	33.4		23.3	23.3	23.3	23.3	9.2	9.2
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.32		0.22	0.22	0.22	0.22	0.09	0.09
Clearance Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	576	1194	1025	448	576		241	421	361	238	168	141
v/s Ratio Prot	c0.40	0.32			0.27		c0.07	0.10			0.03	
v/s Ratio Perm	c0.61		0.15	0.04			c0.16		0.01	0.05		0.01
v/c Ratio	1.58	0.49	0.24	0.06	0.83		1.02	0.46	0.03	0.22	0.33	0.14
Uniform Delay, d1	26.4	9.8	7.9	7.0	32.6		39.7	34.9	31.6	32.9	44.5	43.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	267.7	0.3	0.1	0.1	9.6		64.6	0.8	0.0	0.5	1.1	0.5
Delay (s)	294.1	10.1	8.0	7.0	42.2		104.3	35.7	31.6	33.4	45.6	44.2
Level of Service	F	B	A	A	D		F	D	C	C	D	D
Approach Delay (s)		150.0			40.3			69.4			42.7	
Approach LOS		F			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			108.5			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.63									
Actuated Cycle Length (s)			104.0			Sum of lost time (s)			30.0			
Intersection Capacity Utilization			107.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Meetinghouse Lane at Old Plymouth Road at Scusset Beach Road

2021 Existing Weekday Morning Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	115	95	18	5	173	4	37	7	7	8	13	186
Future Vol, veh/h	115	95	18	5	173	4	37	7	7	8	13	186
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	85	85	85	68	68	68	95	95	95
Heavy Vehicles, %	1	5	0	0	2	0	5	0	50	0	0	2
Mvmt Flow	128	106	20	6	204	5	54	10	10	8	14	196
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	209	0	0	126	0	0	696	593	116	601	601	207
Stage 1	-	-	-	-	-	-	372	372	-	219	219	-
Stage 2	-	-	-	-	-	-	324	221	-	382	382	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.15	6.5	6.7	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.545	4	3.75	3.5	4	3.318
Pot Cap-1 Maneuver	1368	-	-	1473	-	-	352	421	821	415	417	833
Stage 1	-	-	-	-	-	-	642	622	-	788	726	-
Stage 2	-	-	-	-	-	-	682	724	-	645	616	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1368	-	-	1473	-	-	241	377	821	369	373	833
Mov Cap-2 Maneuver	-	-	-	-	-	-	241	377	-	369	373	-
Stage 1	-	-	-	-	-	-	577	559	-	708	722	-
Stage 2	-	-	-	-	-	-	509	720	-	562	554	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	4			0.2			22.3			11.9		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	282	1368	-	-	1473	-	-	740				
HCM Lane V/C Ratio	0.266	0.093	-	-	0.004	-	-	0.294				
HCM Control Delay (s)	22.3	7.9	0	-	7.5	0	-	11.9				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1	0.3	-	-	0	-	-	1.2				

2021 Existing Weekday Evening Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Peak Month Volumes

Intersection												
Int Delay, s/veh	10.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	274	182	40	5	141	17	25	28	1	11	32	167
Future Vol, veh/h	274	182	40	5	141	17	25	28	1	11	32	167
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	84	84	84	82	82	82	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	298	198	43	6	168	20	30	34	1	13	36	190

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	188	0	0	241	0	0	1119	1016	220	1023	1027	178
Stage 1	-	-	-	-	-	-	816	816	-	190	190	-
Stage 2	-	-	-	-	-	-	303	200	-	833	837	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1398	-	-	1337	-	-	186	240	825	216	236	870
Stage 1	-	-	-	-	-	-	374	393	-	816	747	-
Stage 2	-	-	-	-	-	-	711	739	-	366	385	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1398	-	-	1337	-	-	100	180	825	149	177	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	180	-	149	177	-
Stage 1	-	-	-	-	-	-	281	296	-	614	743	-
Stage 2	-	-	-	-	-	-	526	735	-	243	290	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	4.6			0.2			56.1			20.3		
HCM LOS							F			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	133	1398	-	-	1337	-	-	470
HCM Lane V/C Ratio	0.495	0.213	-	-	0.004	-	-	0.508
HCM Control Delay (s)	56.1	8.3	0	-	7.7	0	-	20.3
HCM Lane LOS	F	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.3	0.8	-	-	0	-	-	2.8

2021 Existing Weekday Morning Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Peak Month Volumes

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	122	101	20	5	184	4	40	7	7	8	14	199
Future Vol, veh/h	122	101	20	5	184	4	40	7	7	8	14	199
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	85	85	85	68	68	68	95	95	95
Heavy Vehicles, %	1	5	0	0	2	0	5	0	50	0	0	2
Mvmt Flow	136	112	22	6	216	5	59	10	10	8	15	209

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	221	0	0	134	0	0	738	628	123	636	637	219
Stage 1	-	-	-	-	-	-	395	395	-	231	231	-
Stage 2	-	-	-	-	-	-	343	233	-	405	406	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.15	6.5	6.7	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.545	4	3.75	3.5	4	3.318
Pot Cap-1 Maneuver	1354	-	-	1463	-	-	330	402	814	393	398	821
Stage 1	-	-	-	-	-	-	624	608	-	776	717	-
Stage 2	-	-	-	-	-	-	666	716	-	626	601	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1354	-	-	1463	-	-	217	357	814	347	353	821
Mov Cap-2 Maneuver	-	-	-	-	-	-	217	357	-	347	353	-
Stage 1	-	-	-	-	-	-	556	542	-	691	713	-
Stage 2	-	-	-	-	-	-	483	712	-	540	535	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	4			0.2			25.5			12.3		
HCM LOS							D			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	254	1354	-	-	1463	-	-	724
HCM Lane V/C Ratio	0.313	0.1	-	-	0.004	-	-	0.321
HCM Control Delay (s)	25.5	8	0	-	7.5	0	-	12.3
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.3	0.3	-	-	0	-	-	1.4

2028 No Build Weekday Evening Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Peak Month Volumes

Intersection												
Int Delay, s/veh	13.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	294	195	42	5	151	18	26	30	1	12	34	179
Future Vol, veh/h	294	195	42	5	151	18	26	30	1	12	34	179
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	84	84	84	82	82	82	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	320	212	46	6	180	21	32	37	1	14	39	203

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	201	0	0	258	0	0	1199	1088	235	1097	1101	191
Stage 1	-	-	-	-	-	-	875	875	-	203	203	-
Stage 2	-	-	-	-	-	-	324	213	-	894	898	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1383	-	-	1318	-	-	164	218	809	192	214	856
Stage 1	-	-	-	-	-	-	347	370	-	804	737	-
Stage 2	-	-	-	-	-	-	692	730	-	338	361	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1383	-	-	1318	-	-	80	158	809	125	155	856
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	158	-	125	155	-
Stage 1	-	-	-	-	-	-	253	269	-	585	733	-
Stage 2	-	-	-	-	-	-	497	726	-	212	263	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4.6	0.2	82.1	25
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	110	1383	-	-	1318	-	-	429
HCM Lane V/C Ratio	0.632	0.231	-	-	0.005	-	-	0.596
HCM Control Delay (s)	82.1	8.4	0	-	7.7	0	-	25
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	3.2	0.9	-	-	0	-	-	3.8

2028 Build Weekday Morning Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Peak Month Volumes

Intersection												
Int Delay, s/veh	7.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	123	101	20	5	185	4	40	7	7	8	14	200
Future Vol, veh/h	123	101	20	5	185	4	40	7	7	8	14	200
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	85	85	85	68	68	68	95	95	95
Heavy Vehicles, %	1	5	0	0	2	0	5	0	50	0	0	2
Mvmt Flow	137	112	22	6	218	5	59	10	10	8	15	211

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	223	0	0	134	0	0	743	632	123	640	641	221
Stage 1	-	-	-	-	-	-	397	397	-	233	233	-
Stage 2	-	-	-	-	-	-	346	235	-	407	408	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.15	6.5	6.7	7.1	6.5	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.545	4	3.75	3.5	4	3.318
Pot Cap-1 Maneuver	1352	-	-	1463	-	-	327	400	814	391	395	819
Stage 1	-	-	-	-	-	-	623	607	-	775	716	-
Stage 2	-	-	-	-	-	-	664	714	-	625	600	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1352	-	-	1463	-	-	215	354	814	344	350	819
Mov Cap-2 Maneuver	-	-	-	-	-	-	215	354	-	344	350	-
Stage 1	-	-	-	-	-	-	554	540	-	690	712	-
Stage 2	-	-	-	-	-	-	481	710	-	539	534	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	4			0.2			25.7			12.4		
HCM LOS							D			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	252	1352	-	-	1463	-	-	722
HCM Lane V/C Ratio	0.315	0.101	-	-	0.004	-	-	0.324
HCM Control Delay (s)	25.7	8	0	-	7.5	0	-	12.4
HCM Lane LOS	D	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.3	0.3	-	-	0	-	-	1.4

2028 Build Weekday Evening Peak Hour
3: Old Plymouth Rd & Meetinghouse Ln/Scusset Beach Rd

Peak Month Volumes

Intersection												
Int Delay, s/veh	13.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	295	195	42	5	152	18	26	30	1	12	34	180
Future Vol, veh/h	295	195	42	5	152	18	26	30	1	12	34	180
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	84	84	84	82	82	82	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	321	212	46	6	181	21	32	37	1	14	39	205

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	202	0	0	258	0	0	1203	1091	235	1100	1104	192
Stage 1	-	-	-	-	-	-	877	877	-	204	204	-
Stage 2	-	-	-	-	-	-	326	214	-	896	900	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1382	-	-	1318	-	-	163	217	809	191	213	855
Stage 1	-	-	-	-	-	-	346	369	-	803	737	-
Stage 2	-	-	-	-	-	-	691	729	-	338	360	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1382	-	-	1318	-	-	80	157	809	124	154	855
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	157	-	124	154	-
Stage 1	-	-	-	-	-	-	252	268	-	584	733	-
Stage 2	-	-	-	-	-	-	495	725	-	212	262	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	4.7			0.2			82.1			25.3		
HCM LOS							F			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	110	1382	-	-	1318	-	-	428
HCM Lane V/C Ratio	0.632	0.232	-	-	0.005	-	-	0.6
HCM Control Delay (s)	82.1	8.4	0	-	7.7	0	-	25.3
HCM Lane LOS	F	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	3.2	0.9	-	-	0	-	-	3.8

Meetinghouse Lane at Cape View Road at 54 Meetinghouse Lane Driveway

2021 Existing Weekday Morning Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	242	28	12	387	1	0	0	0	1	0	4
Future Vol, veh/h	5	242	28	12	387	1	0	0	0	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	91	91	91	25	25	25	50	50	50
Heavy Vehicles, %	0	3	6	57	6	0	0	0	0	0	0	0
Mvmt Flow	6	281	33	13	425	1	0	0	0	2	0	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	426	0	0	314	0	0	766	762	298	762	778	426
Stage 1	-	-	-	-	-	-	310	310	-	452	452	-
Stage 2	-	-	-	-	-	-	456	452	-	310	326	-
Critical Hdwy	4.1	-	-	4.67	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.713	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1144	-	-	992	-	-	322	337	746	324	330	633
Stage 1	-	-	-	-	-	-	705	663	-	591	574	-
Stage 2	-	-	-	-	-	-	588	574	-	705	652	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1144	-	-	992	-	-	312	329	746	318	322	633
Mov Cap-2 Maneuver	-	-	-	-	-	-	312	329	-	318	322	-
Stage 1	-	-	-	-	-	-	701	659	-	587	564	-
Stage 2	-	-	-	-	-	-	571	564	-	701	648	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.3			0			12		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	1144	-	-	992	-	-	528				
HCM Lane V/C Ratio	-	0.005	-	-	0.013	-	-	0.019				
HCM Control Delay (s)	0	8.2	0	-	8.7	0	-	12				
HCM Lane LOS	A	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1				

2021 Existing Weekday Evening Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Peak Month Volumes

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	497	12	0	350	1	4	0	0	1	0	0
Future Vol, veh/h	0	497	12	0	350	1	4	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	90	90	90	25	25	25	25	25	25
Heavy Vehicles, %	0	0	71	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	558	13	0	389	1	16	0	0	4	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	390	0	0	571	0	0	955	955	565	955	961	390
Stage 1	-	-	-	-	-	-	565	565	-	390	390	-
Stage 2	-	-	-	-	-	-	390	390	-	565	571	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1180	-	-	1012	-	-	240	260	528	240	258	663
Stage 1	-	-	-	-	-	-	513	511	-	638	611	-
Stage 2	-	-	-	-	-	-	638	611	-	513	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1180	-	-	1012	-	-	240	260	528	240	258	663
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	260	-	240	258	-
Stage 1	-	-	-	-	-	-	513	511	-	638	611	-
Stage 2	-	-	-	-	-	-	638	611	-	513	508	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			21.1			20.3		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	240	1180	-	-	1012	-	-	240				
HCM Lane V/C Ratio	0.067	-	-	-	-	-	-	0.017				
HCM Control Delay (s)	21.1	0	-	-	0	-	-	20.3				
HCM Lane LOS	C	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1				

2021 Existing Weekday Morning Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Peak Month Volumes

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	259	28	12	415	1	0	0	0	1	0	4
Future Vol, veh/h	5	259	28	12	415	1	0	0	0	1	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	91	91	91	25	25	25	50	50	50
Heavy Vehicles, %	0	3	6	57	6	0	0	0	0	0	0	0
Mvmt Flow	6	301	33	13	456	1	0	0	0	2	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	457	0	0	334	0	0	817	813	318	813	829	457
Stage 1	-	-	-	-	-	-	330	330	-	483	483	-
Stage 2	-	-	-	-	-	-	487	483	-	330	346	-
Critical Hdwy	4.1	-	-	4.67	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.713	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1114	-	-	973	-	-	298	315	727	299	308	608
Stage 1	-	-	-	-	-	-	687	649	-	569	556	-
Stage 2	-	-	-	-	-	-	566	556	-	687	639	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1114	-	-	973	-	-	288	307	727	293	300	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	288	307	-	293	300	-
Stage 1	-	-	-	-	-	-	682	644	-	565	546	-
Stage 2	-	-	-	-	-	-	548	546	-	682	635	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	0	12.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1114	-	-	973	-	-	500
HCM Lane V/C Ratio	-	0.005	-	-	0.014	-	-	0.02
HCM Control Delay (s)	0	8.2	0	-	8.8	0	-	12.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

2028 No Build Weekday Evening Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Peak Month Volumes

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	532	12	0	375	1	4	0	0	1	0	0
Future Vol, veh/h	0	532	12	0	375	1	4	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	90	90	90	25	25	25	25	25	25
Heavy Vehicles, %	0	0	71	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	598	13	0	417	1	16	0	0	4	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	418	0	0	611	0	0	1023	1023	605	1023	1029	418
Stage 1	-	-	-	-	-	-	605	605	-	418	418	-
Stage 2	-	-	-	-	-	-	418	418	-	605	611	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1152	-	-	978	-	-	216	238	501	216	236	639
Stage 1	-	-	-	-	-	-	488	491	-	616	594	-
Stage 2	-	-	-	-	-	-	616	594	-	488	487	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1152	-	-	978	-	-	216	238	501	216	236	639
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	238	-	216	236	-
Stage 1	-	-	-	-	-	-	488	491	-	616	594	-
Stage 2	-	-	-	-	-	-	616	594	-	488	487	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	23	22
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	216	1152	-	-	978	-	-	216
HCM Lane V/C Ratio	0.074	-	-	-	-	-	-	0.019
HCM Control Delay (s)	23	0	-	-	0	-	-	22
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

2028 Build Weekday Morning Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Peak Month Volumes

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	259	28	12	415	3	0	0	0	3	0	15
Future Vol, veh/h	9	259	28	12	415	3	0	0	0	3	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	91	91	91	25	25	25	50	50	50
Heavy Vehicles, %	0	3	6	57	6	0	0	0	0	0	0	0
Mvmt Flow	10	301	33	13	456	3	0	0	0	6	0	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	459	0	0	334	0	0	837	823	318	822	838	458
Stage 1	-	-	-	-	-	-	338	338	-	484	484	-
Stage 2	-	-	-	-	-	-	499	485	-	338	354	-
Critical Hdwy	4.1	-	-	4.67	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.713	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1113	-	-	973	-	-	288	311	727	295	305	607
Stage 1	-	-	-	-	-	-	681	644	-	568	555	-
Stage 2	-	-	-	-	-	-	557	555	-	681	634	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1113	-	-	973	-	-	268	302	727	289	296	607
Mov Cap-2 Maneuver	-	-	-	-	-	-	268	302	-	289	296	-
Stage 1	-	-	-	-	-	-	674	637	-	562	545	-
Stage 2	-	-	-	-	-	-	520	545	-	674	627	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.2			0			12.5		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1113	-	-	973	-	-	513
HCM Lane V/C Ratio	-	0.009	-	-	0.014	-	-	0.07
HCM Control Delay (s)	0	8.3	0	-	8.8	0	-	12.5
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2

2028 Build Weekday Evening Peak Hour
2: Driveway/Cape View Way & Meetinghouse Ln

Peak Month Volumes

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	532	12	0	375	3	4	0	0	2	0	8
Future Vol, veh/h	12	532	12	0	375	3	4	0	0	2	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	90	90	90	25	25	25	25	25	25
Heavy Vehicles, %	0	0	71	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	598	13	0	417	3	16	0	0	8	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	420	0	0	611	0	0	1066	1051	605	1050	1056	419
Stage 1	-	-	-	-	-	-	631	631	-	419	419	-
Stage 2	-	-	-	-	-	-	435	420	-	631	637	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1150	-	-	978	-	-	202	229	501	207	227	638
Stage 1	-	-	-	-	-	-	472	477	-	616	593	-
Stage 2	-	-	-	-	-	-	604	593	-	472	475	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1150	-	-	978	-	-	189	225	501	204	223	638
Mov Cap-2 Maneuver	-	-	-	-	-	-	189	225	-	204	223	-
Stage 1	-	-	-	-	-	-	464	469	-	606	593	-
Stage 2	-	-	-	-	-	-	574	593	-	464	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	25.8	13.8
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	189	1150	-	-	978	-	-	448
HCM Lane V/C Ratio	0.085	0.012	-	-	-	-	-	0.089
HCM Control Delay (s)	25.8	8.2	0	-	0	-	-	13.8
HCM Lane LOS	D	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.3

Cape View Road at the west Project Site Driveway

2028 Build Weekday Morning Peak Hour
4: Cape View Way & Driveway

Peak Month Volumes

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	0	5	7	0	13
Future Vol, veh/h	4	0	5	7	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	5	8	0	14
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	23	9	0	0	13	0
Stage 1	9	-	-	-	-	-
Stage 2	14	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	993	1073	-	-	1606	-
Stage 1	1014	-	-	-	-	-
Stage 2	1009	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	993	1073	-	-	1606	-
Mov Cap-2 Maneuver	993	-	-	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	1009	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.6	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 993		1606	-	
HCM Lane V/C Ratio	-	- 0.004		-	-	
HCM Control Delay (s)	-	- 8.6		0	-	
HCM Lane LOS	-	- A		A	-	
HCM 95th %tile Q(veh)	-	- 0		0	-	

2028 Build Weekday Evening Peak Hour
4: Cape View Way & Driveway

Peak Month Volumes

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	14	1	0	9
Future Vol, veh/h	1	0	14	1	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	15	1	0	10
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	26	16	0	0	16	0
Stage 1	16	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	989	1063	-	-	1602	-
Stage 1	1007	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	989	1063	-	-	1602	-
Mov Cap-2 Maneuver	989	-	-	-	-	-
Stage 1	1007	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	8.6	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	989	1602	-	
HCM Lane V/C Ratio	-	-	0.001	-	-	
HCM Control Delay (s)	-	-	8.6	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

CONSTRUCTION MANAGEMENT PLAN

**CONSTRUCTION MANAGEMENT PLAN
MULTIFAMILY RESIDENTIAL DEVELOPMENT
CAPE VIEW WAY
BOURNE, MASSACHUSETTS**

The Project proponent will implement a Construction Management Plan (CMP) in coordination with Town of Bourne in order to facilitate the safe and efficient access to the Project site during construction activities. Summarized below are several measures which will be undertaken during the construction phase of the Project.

- Prior to construction activities, a Temporary Traffic Control Plan (TTCP) will be submitted to the Department of Public Works (DPW) and the Police Department for review and approval. The TTCP will depict the location of the construction entrance, traffic and sediment control measures, traffic control devices and the location of any construction activities that will occur with the public right-of-way.
- A pre-construction meeting will be held with the DPW and the Police Department prior to the initiation of construction activities.
- The contact information for the general contractor or construction superintendent will be provided to the DPW and the Police Department.
- Hours of construction will be as defined by the Zoning By Laws of the Town or as established in the Comprehensive Permit Decision.
- Police details will be used when construction activities will occur that may disrupt travel along Meetinghouse Lane.
- Truck routes will be established that will avoid travel through residential areas and will be included in all construction contracts.
- Employees will be encouraged to car/vanpool in order to reduce construction-related traffic.
- Secure on-site storage will be provided for tools and equipment in an effort to minimize construction-related vehicle trips to the site.
- Full or partial street closures will be avoided to the extent possible. Should a partial street closure be necessary in order to off-load construction materials and/or complete construction-related activities, the closure will be limited to off-peak periods as defined by the DPW and the Police Department so as to minimize the impact of vehicular and pedestrian flow.
- Construction worker parking will be expressly prohibited along Meetinghouse Lane and the paved portion of Cape View Way. Construction contracts for the project will include notification of this prohibition.