



Traffic Impact Analysis COSTCO at Evergreen Walk

**Buckland Road
South Windsor, Connecticut**

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EXECUTIVE SUMMARY

Evergreen Walk is an ongoing mixed use, master planned development located along the westerly side of Buckland Road, north of the Interstate 84 interchange in the Town of South Windsor, Connecticut. This section of South Windsor and Manchester is generally known as the Buckland Hills area and includes a regional mall, numerous smaller shopping centers, residential developments and other intense uses.

The Evergreen Walk master plan has been partially built out and allows for 1,500,000± square feet of retail, office, other commercial and residential space

The COSTCO development program will include a membership warehouse building with a 24-position fueling facility. This will replace about 170,000 square feet of general retail space in the approved master plan.

This study investigated the potential impact on traffic operations during the weekday afternoon and Saturday mid-day peak traffic periods. Capacity analyses were prepared for the study area intersections using the currently approved Evergreen Walk build out and the revised COSTCO scenarios.

Based on the analyses described in this report, recommendations were made, where appropriate, to address some of the current and potential future traffic operational issues associated with ongoing development in the corridor.

The Buckland area was the subject of a transportation study completed about 10 years ago for the Connecticut Department of Transportation (CTDOT) and the Capitol Region Council of Governments (CRCOG). Several hundred million dollars of improvements were recommended to address concerns that unless significant transportation infrastructure improvements were made in this rapidly growing area, gridlock would result. Very few of those improvements have been implemented or are likely to be any time soon.

The net change in peak hour traffic volumes above the current master plan were conservatively estimated at 170 new weekday afternoon and 265 new Saturday mid-day peak hour trips, significantly fewer than the combined impact of the other approved projects, pending or under construction, in the corridor. These were assigned to the roadway network and superimposed onto projected base build out traffic volumes.

The Buckland Road/Buckland Street corridor has longstanding traffic operational deficiencies which will continue into the foreseeable future, as the remainder of Evergreen Walk and other approved and potential projects come on line. Under “background” conditions, which reflect the build out of the current Evergreen Walk master plan, there are 17 individual traffic movements projected to operate at an “E” or “F” level of service. This should not be surprising, as the last detailed study for Evergreen Walk (AECOM, 2016), projected 5 individual traffic movements would operate at an “E” level of service

upon the Evergreen Walk build out, without the traffic from four (4) additional development projects since approved and included in this study, and the addition of pedestrian phases. Under “COSTCO-build” conditions during the two time periods analyzed, 19 individual traffic movements projected to operate at an “E” or “F” level of service.

The implementation of an adaptive traffic signal system at several intersections in Manchester, as required under the current Evergreen Walk certificate of operation from the Office of State Traffic Administration (OSTA), should improve operations at the I-84 interchange somewhat, but the extent is unknown. The safety improvement at the Buckland Street/Pleasant Valley Road/Buckland Hills Drive intersection, under construction, will likely not improve vehicular delays. Capacity improvements at other intersections are limited by the available right of way. While there are no specific recommendations for the COSTCO project, the following is suggested for consideration:

- The Town should reestablish the coordinated traffic signal system along Buckland Road in South Windsor, with enhancements, as recommended in the March 2020 VHB signal system study. The five (5) traffic signals along Buckland Road from Tamarack Avenue to Terry Office Park were designed, and once operated as a coordinated system. It appeared that this is was no longer the case, when operations were reviewed by this office late last year. This was confirmed in the recent signal system study prepared for the Town (VHB, March 2020). After the signal system is upgraded, a reevaluation of traffic operations should be performed, as improved signalization may minimize the need for any further action.

- construct a southbound Buckland Road right turn lane at the Hemlock Avenue intersection, if right of way permits. Right turn volumes are projected to be substantial and the southbound through traffic volume may exceed capacity otherwise. This potential deficiency does not result from the COSTCO project.
- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road left turn lane at Cedar Avenue by cutting into the median.
- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road left turn lane at Hemlock Avenue by cutting into the median. This potential deficiency does not result from the COSTCO project.
- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road double left turn into Tamarack Avenue by cutting into the median and possible other roadway widening. This potential deficiency does not result from the COSTCO project.

Regardless of the status of the COSTCO project, the following are recommended:

- Provide appropriate signing and pavement markings on the wide Tamarack Avenue approach to Deming Street to establish two travel lanes, as is operationally the condition.
- Install “Keep Right” signs at both ends of the Tamarack Avenue median at the Deming Street end.
- Install a “Keep Right” sign at the Buckland Road end of the Hemlock Avenue median.

I. INTRODUCTION

Evergreen Walk is an ongoing mixed use, master planned development located on 243± acres along the westerly side of Buckland Road, north of the Interstate 84, Exit 60&62 interchange in the Town of South Windsor, Connecticut. This section of South Windsor and Manchester is generally known as the Buckland Hills area and includes a regional mall, numerous smaller shopping centers, residential developments and other intense uses.

The Evergreen Walk master plan has been partially built out, and the last major change (OSTA Certificate #1533-B, revised March 6, 2018) downsized the original approval and allowed for 1,456,400± square feet of building area consisting of:

- 600,480 square feet of retail space
- 45,000 square feet of recreational space
- 251,170 square feet of office space
- 72,000 square foot hotel (108 rooms)
- 246,550 square feet of residential space (200 units)
- 245,200 square feet of assisted/independent living (290 units)

Subsequent changes to the master plan, which were of minor traffic impact, included a day care facility and another independent living building, replacing some of the commercial space.

The COSTCO development program will include a 161,200± square foot COSTCO warehouse building with a 24-position fueling facility. This will replace 170,500± square feet of approved master plan retail space.

This study investigated the potential change in traffic operations during the peak traffic periods associated with the proposed COSTCO development. Those peak periods typically occur on weekday afternoons and Saturday midday. Capacity analyses were prepared for the study area intersections for the peak hours of the currently approved build out and revised COSTCO scenarios. Much of the base data was extracted from an August 22, 2016 letter report to the Office of State Traffic Administration (OSTA) prepared by AECOM, hereinafter referred to as the AECOM study, for a significant downsizing of Evergreen Walk, and the resulting March 6, 2018 revision to the Evergreen Walk certificate of operation (#1533-B). Further minor revisions to the traffic projections were made by AECOM in January of 2019 in conjunction with the day care center and by TranSystems in April of 2019 for the independent living facility.

Based on the analyses described in this report, recommendations were made, where appropriate, to address some of the current and potential future traffic operational issues associated with ongoing development in the corridor.

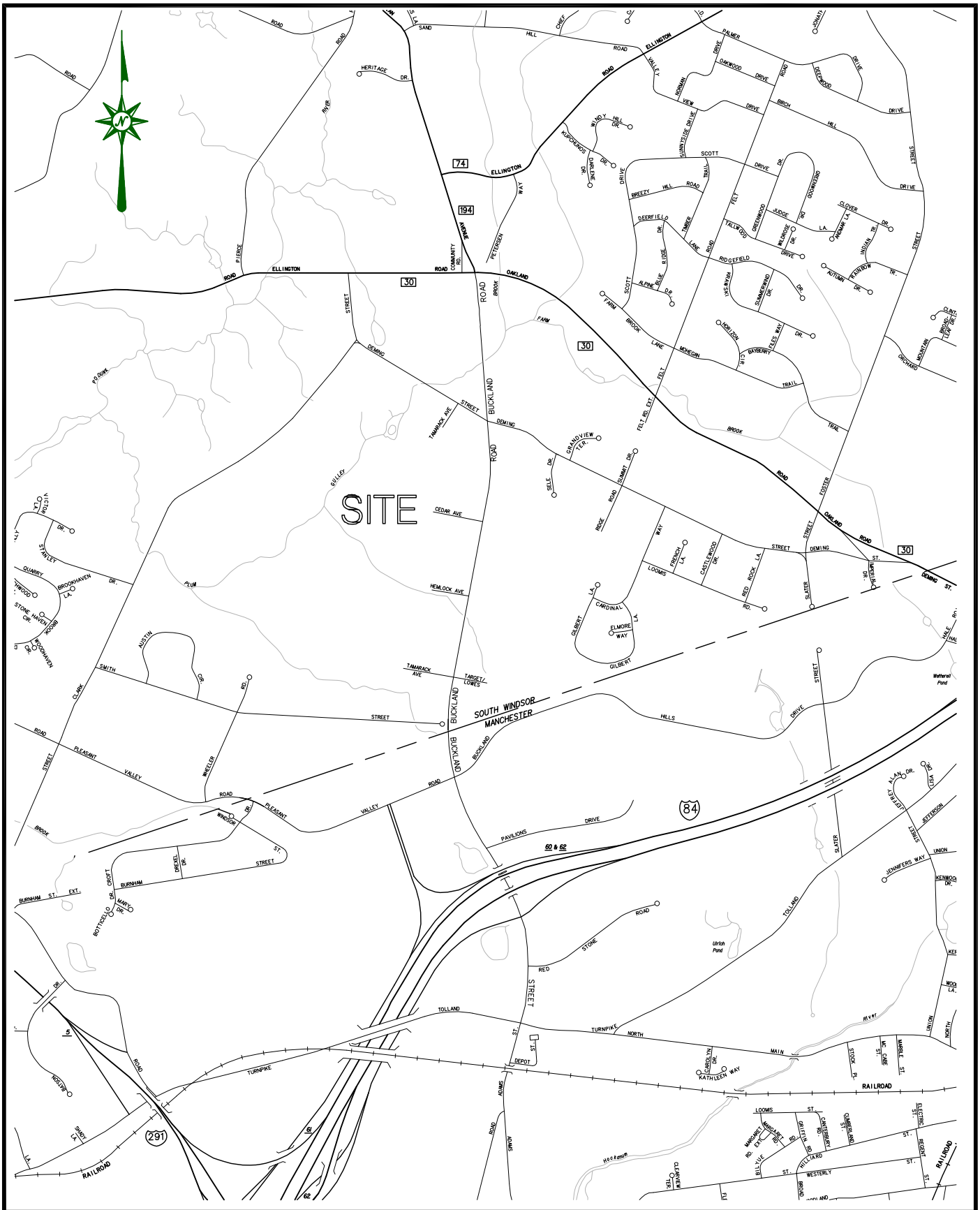
II. BASE CONDITIONS

An investigation of the conditions previously anticipated along the adjacent roadway network due to the approved Evergreen Walk build out formed the basis for determining the traffic impacts of the proposed master plan revision. This investigation included a field reconnaissance and research of pertinent planning and traffic data at local and State agencies.

Access Network

As illustrated in Figure 1, the site is located along the westerly side of Buckland Road, north of the Interstate 84, Exit 60&62 interchange (in Manchester). The interchange is full service, with the I-84 eastbound on/off ramps located on Buckland Street, as it is known in Manchester, and the I-84 westbound ramps on Pleasant Valley Road. High occupancy vehicle (HOV) access to and from the west on I-84 is provided at a separate signalized intersection on Buckland Street.

The Buckland area was the subject of a transportation study prepared for the Connecticut Department of Transportation (CTDOT) and the Capitol Region Council of Governments (CRCOG). Completed just about 10 years ago, it addressed the concerns that unless significant transportation infrastructure improvements were made in this rapidly growing area, gridlock would result. Several hundred million dollars of improvements were recommended, very little of which have been implemented, or are likely to be any time soon.



LOCATION PLAN PROPOSED COSTCO AT EVERGREEN WALK SOUTH WINDSOR, CONNECTICUT

FIGURE 1

Interstate Route 84 is a six-lane limited access facility. There is also a high occupancy vehicle (HOV) lane in each direction. As noted, there is a full interchange (Exit 60&62) with Buckland Street and Pleasant Valley Road about one mile south of the site. Interstate Route 84 carries about 122,000 daily trips in this area.

Buckland Road in South Windsor is a north-south oriented, Town owned, four-lane minor arterial (CTDOT classification). The posted speed limit is 40 miles per hour. The roadway is illuminated and there are sections with sidewalks, primarily along recently developed frontage. The Town is currently adding sidewalks along northerly portions of Buckland Road. There is a raised, landscaped median from the Manchester town line, northerly about 3,500' to north of Cedar Avenue, only broken by three signalized intersections, where auxiliary turn lanes are provided. There are three more signalized intersections to the north of Cedar Avenue, including Routes 30/194. The roadway geometry has gentle curvature and slope. Adjacent land uses are mostly commercial or retail in nature. The most recent 24-hour traffic count in this area, conducted by CTDOT in 2016 showed an average daily traffic volume of 19,600 trips south of Deming Street, somewhat lower than the previous count (taken in 2010) of 21,300. The Connecticut Transit #92 bus, Tower Avenue crosstown route, passes the site along Buckland Road on about an hourly basis, Mondays through Saturdays.

Buckland Street in Manchester is a north-south oriented, Town owned, multi-lane minor arterial (CTDOT classification). The posted speed limit is 40 miles per hour and there is a raised, landscaped median. The roadway is illuminated and there are sidewalks,

primarily along the easterly side. Adjacent land uses are mostly commercial or retail in nature, including the Buckland Hills area, a regional retail attraction.

The primary COSTCO access would likely be at the **Buckland Road intersection with Cedar Avenue**. This is a “T” type signalized intersection. The northbound Buckland Road approach provides a left turn lane, and two through lanes, while the southbound approach provides two through lanes and a right turn lane. The Cedar Avenue approach provides a left turn lane and right turn lane. The traffic signal operates with a protected/permitted left turn phase for northbound Buckland Road traffic. A hotel was approved in 2016 on the site opposite Cedar Avenue. That project has been replaced by Gateway, a retail and medical office project. The traffic signal will have to be modified/replaced to accommodate the Gateway project.

Secondary COSTCO access is available via Tamarack Avenue/Deming Street to the north, and via Hemlock Avenue to the south.

Base Current Peak Hour Traffic Volumes

The Base current peak hour traffic volume data consists of then current information from the aforementioned AECOM study, supplemented at the Clark Street intersection with Route 30 by this office. The following intersections were included:

- Buckland Road at Route 30 (Ellington/Oakland Roads) and Route 194 (Sullivan Ave.)
- Buckland Road at Deming Street
- Buckland Road at Cedar Avenue
- Buckland Road at Hemlock Avenue.
- Buckland Road at Tamarack Avenue and Target/Lowes
- Deming Road at Tamarack Avenue
- Route 30 (Ellington Road) at Clark Street

Except for the intersection of Deming Street with Tamarack Avenue, all the above intersections are signalized. The Route 30/194/Buckland Road and Route 30/Clark Street traffic signals belong to CTDOT, all signals on Buckland Road belong to the Town of South Windsor.

The Base current peak hour traffic volumes are illustrated in Figure 2.



LEGEND

PM PEAK HOUR: XXX
SAT PEAK HOUR: (XXX)

JULY 2020

Ref: AECOM, BL Companies



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BASE CURRENT TRAFFIC VOLUMES

COSTCO AT EVERGREEN WALK
BUCKLAND ROAD
SOUTH WINDSOR, CT

FIG. 2

III. PROJECTED TRAFFIC CONDITIONS

The net change in peak hour traffic volumes for the COSTCO plan were estimated, assigned to the roadway network, and superimposed onto projected base build out traffic volumes. This methodology provides a year of completion estimate for analysis.

Base Build out Traffic Volumes

The Base Current peak hour traffic volumes were increased in the AECOM study to reflect the completion of the downsized Evergreen Walk master plan, as amended in their 2018 OSTA submission. The weekday afternoon and Saturday midday peak hour base build out traffic volumes are depicted in Figure 3.

In addition, for the purpose of this study, peak period traffic volumes anticipated from four nearby projects were added. The projected traffic volumes were compiled from the traffic impact studies prepared for those projects by others, except for Buckland Commons, which was estimated by this office. The four projects were projected to generate a total of 600± new peak hour trips. Note that the resulting generated traffic volumes of several projects added together, as well as the expansion of existing developments, may be a gross overestimation as the pass-by limitation for retail uses and the cross patronage along a heavily developed corridor should result in significantly fewer “new” trips. These projects are:

- Residences at Oakland Road – 78 units under construction along Route 30, near Felt Road.
- Buckland Commons – a 17,232± square foot mixed use building recently completed along Buckland Road, just south of the Farmington Bank
- Aldi’s grocery and a bank – along Buckland Street, opposite Hemlock Avenue, currently under construction.



LEGEND

PM PEAK HOUR: XXX
SAT PEAK HOUR: (XXX)

JULY 2020

Ref: AECOM, BL Companies



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BASE BUILDOUT TRAFFIC VOLUMES

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BUCKLAND ROAD
SOUTH WINDSOR, CT

FIG. 3

- Gateway- a proposed development of 38,000 square feet of retail space and 85,700 square feet of medical office located along Buckland Street. Gateway essentially incorporates the Aldi's, bank and existing package store. Primary access points will be opposite Cedar Avenue and Hemlock Drive.

The resulting information is designated the weekday afternoon and Saturday midday peak hour Background Traffic Volumes and depicted in Figure 3.1.

General Plan of Development Modifications

The proposed COSTCO will replace/revise several of the previously approved Evergreen Walk master plan buildings and land uses. Those consist of 170,500± square feet of retail space, located in several buildings, parts of Unit 12/13, 7C and 4.

Trip Distribution

Trip distribution is the projected percentage of the site traffic oriented along specific directions and routes to arrive at and depart the site. The trip distribution of the site traffic was based on the AECOM study, adjusted to provide an increased I-84 orientation due to the nature of the development, and current volumes in the area, as depicted in Figure 4.



LEGEND

PM PEAK HOUR: XXX
SAT PEAK HOUR: (XXX)

JULY 2020

Note: Includes Evergreen Buildout, Residences at Oakland Road, Buckland Commons, Gateway, Bank and Aldi's



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BACKGROUND TRAFFIC VOLUMES

COSTCO AT EVERGREEN WALK
BUCKLAND ROAD
SOUTH WINDSOR, CT

FIG. 3.1



LEGEND

PERCENT ARRIVING: XX
PERCENT DEPARTING: [XX]

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TRIP DISTRIBUTION COSTCO AT EVERGREEN WALK BUCKLAND ROAD SOUTH WINDSOR, CT

FIG. 4

Site Traffic Volumes

Trip generation defines the volume of traffic oriented to and from a particular land use. Typically, trip generation rates generally quantify a per unit relationship between the size of a specific land use and the number of vehicle trips generated per unit of time.

The Institute of Transportation Engineers (ITE) Trip Generation, 10th edition, rates for Discount Club, adjusted as prescribed by CTDOT for the fueling facility, were utilized to develop the trip generation for the project, in accordance with CTDOT procedures and prior analyses at Evergreen Walk.

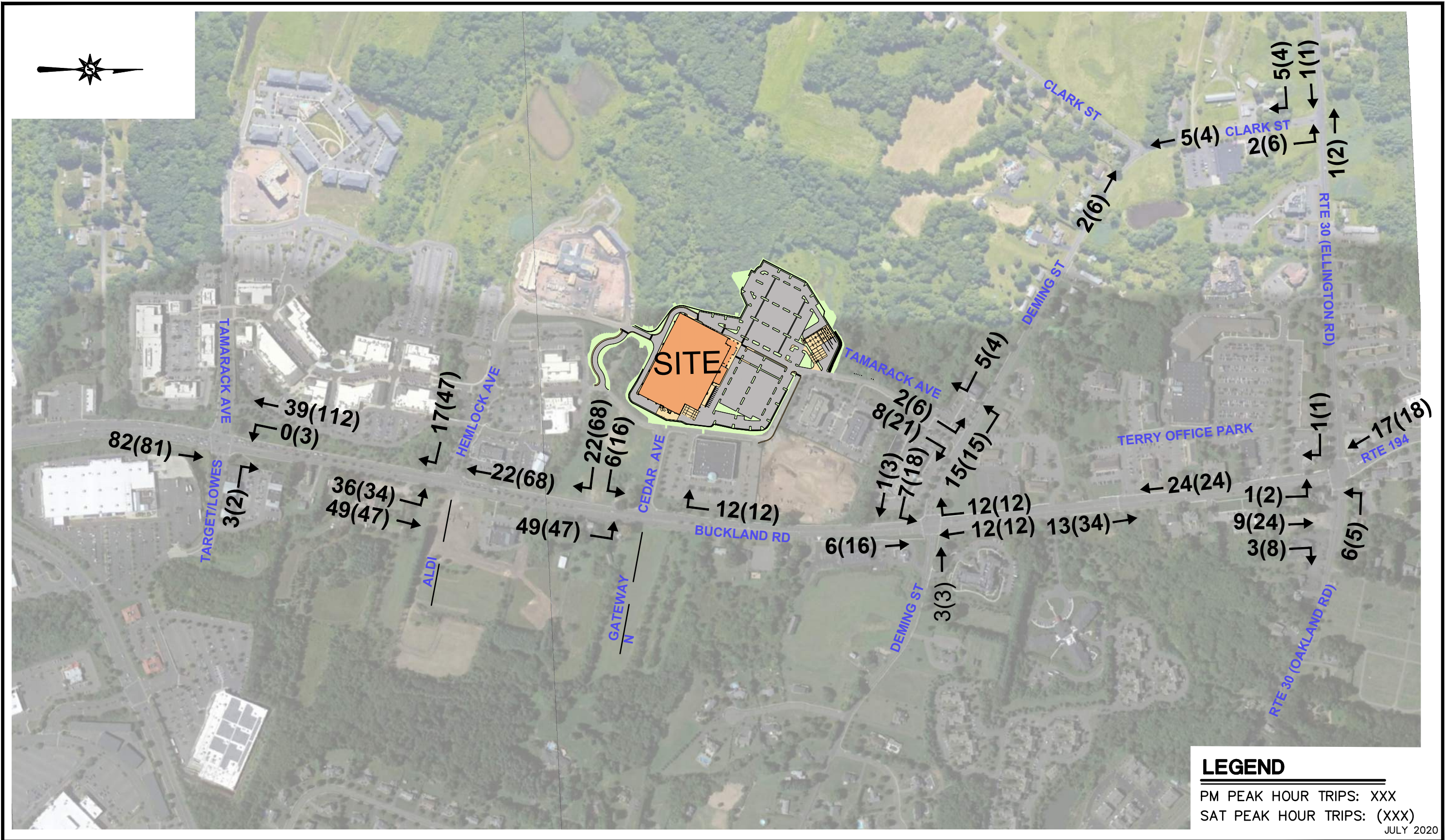
Some COSTCO patrons will come from traffic already on the Evergreen Walk site, living, working or shopping nearby. These internal captured trips will not be seen on the surrounding public street system and were estimated at 11% of the total for the weekday PM peak period and 10% for the Saturday peak period, per prior analyses by AECOM.

Table 1 summarizes the trip generation for both the weekday afternoon and Saturday midday peak hours. The table also accounts for the master plan base volume changes associated with the daycare and independent living, not previously accounted for, as well as the uses replaced by COSTCO, by adding or subtracting from the gross COSTCO trips as appropriate.

**Table 1
Trip Generation**

COSTCO- Evergreen Walk - South Windsor							
Land Use	Size (ksf)	Peak Hour Trips					
		PM Peak			SAT Peak		
		Total	In	Out	Total	In	Out
Discount Club ³	161.2	674	337	337	1027	503	524
Gas Station ³	24 (fuel. posit)	336	168	168	306	153	153
Less 45% Internal Gas Capture ¹		-152	-76	-76	-138	-69	-69
Gross COSTCO Trips		858	429	429	1195	587	608
Land Uses Replaced by COSTCO²	-						
Retail	170.5	632	303	329	821	427	394
Gross Change Due To COSTCO	-9.3	226	126	100	374	160	214
Master Plan Daycare Change ⁴	-	48	27	21	13	9	4
Independent Living Change ⁵	-	-36	0	-36	-17	-7	-10
Gross Change from 2017 Master Plan		238	153	85	370	162	208
Less Internal Capture ⁶		-26	-17	-9	-37	-16	-21
Gross External Trips Above 2017 Plan	-	212	136	76	333	146	187
Less 20% Passby ¹	-	-42	-21	-21	-66	-33	-33
Net New Trips from 2017 Plan	-	170	115	55	267	113	154
Notes:							
1 – Per CTDOT allowance							
2 – Land use trip generation rates per AECOM study, August 2016, Table B-3; Retail at 3.71 and 4.28 trips/ksf							
Weekday and Saturday peak hours.							
3- ITE Trip generation, 10 th Edition							
4-January 28, 2019 AECOM letter							
5-April 5, 2019 TranSystems letter							
6-11% Weekday and 10% Saturday per AECOM							

The net new site traffic volumes of 170 weekday afternoon and 267 Saturday peak hour trips were assigned to the adjacent roadway network, given the trip distribution percentages shown previously in Figure 4. These additional trips are significantly less than the combined traffic expected from the other approved projects in the corridor and represent about a 4%-7% maximum peak hour traffic increase on Buckland Road, right at the site. The new site traffic generated volume is depicted in Figure 5. The pass-by traffic volumes, which are distributed at the site driveways, are shown in Figure 6. Note that the pass-by component used was 20% of site traffic per CTDOT guidelines, which



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FIG. 5



PASS BY TRAFFIC VOLUMES

COSTCO AT EVERGREEN WALK
 BUCKLAND ROAD
 SOUTH WINDSOR, CT

FIG. 6



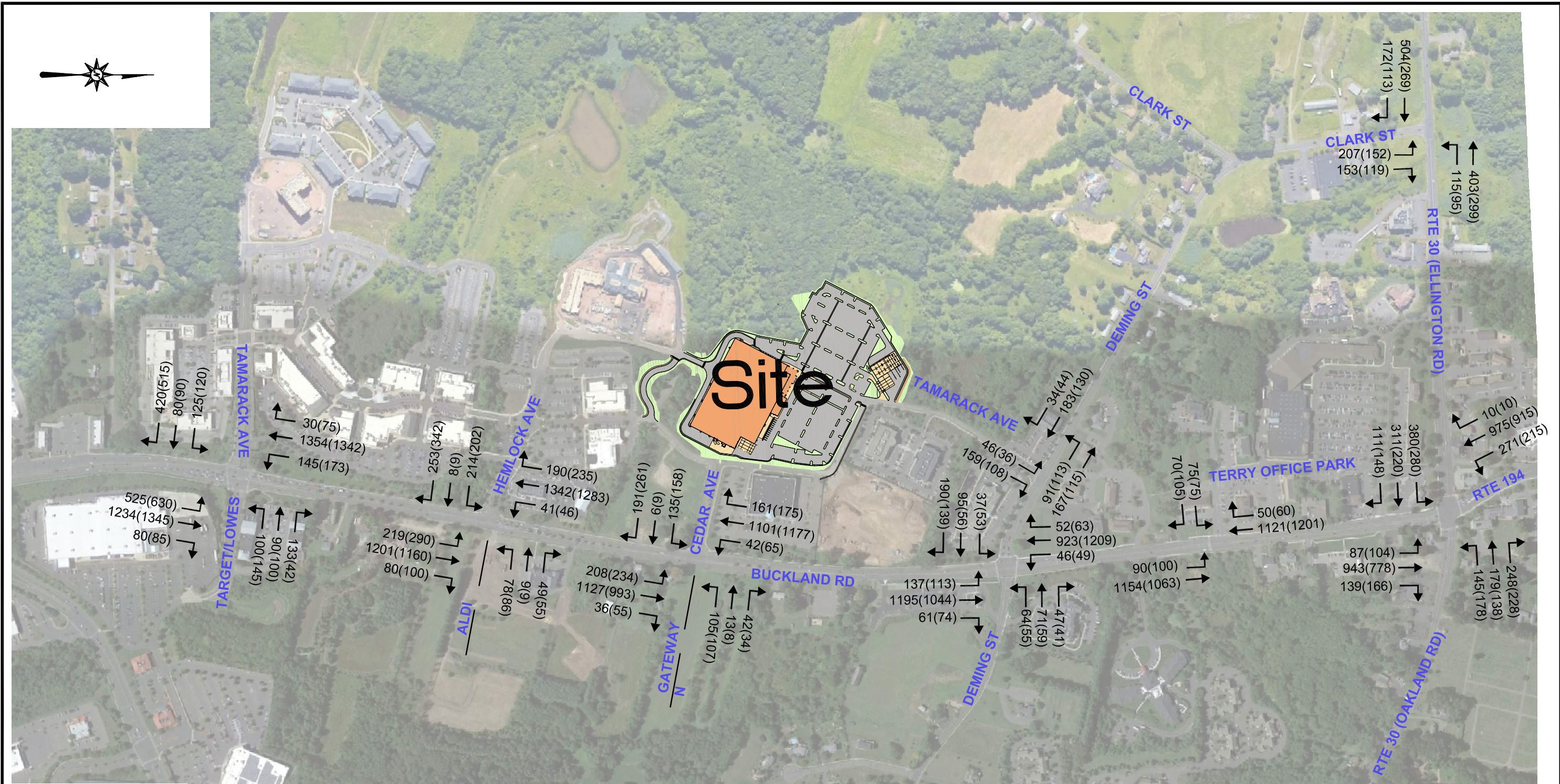
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are very dated and obtained from dissimilar uses. This is more conservative than the ITE “Trip Generation Handbook” average figure from empirical studies for this specific use, of 37% for the weekday afternoon and 30% for the Saturday peak. In addition, the Buckland area is already an intensely developed regional draw, so one might question how much “new” traffic will really be generated.

Build Traffic Volumes

The added traffic volumes generated by the COSTCO development were superimposed onto the Background Traffic Volumes to establish the Build Traffic Volumes as depicted in Figure 7.



Note: Includes Evergreen Buildout, Residences at Oakland Road, Buckland Commons, Gateway, Bank and Aldi's

LEGEND

PM PEAK HOUR: XXX
 SAT PEAK HOUR: (XXX)

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BUILD TRAFFIC VOLUMES

COSTCO AT EVERGREEN WALK
 BUCKLAND ROAD
 SOUTH WINDSOR, CT

FIG. 7

IV. ROADWAY ADEQUACY

Roadway adequacy determinations were performed for the background and COSTCO build traffic conditions to assess the traffic impact of the proposed plan revision on the adjacent roadway network. These roadway adequacy determinations were based on the methodology described in the Highway Capacity Manual (HCM), published by the Transportation Research Board. The background conditions are those projected for the build out of the approved Evergreen master plan, with the addition of traffic projected from the four nearby developments. The COSTCO build conditions reflect the changes associated with that project.

Unsignalized Intersections

Unsignalized intersections are generally evaluated in terms of average side street delay, as well as the capacity of the roadway approach. This analysis is based on the random arrival of vehicles and the associated gaps generated by this random arrival within the traffic stream. There is no overall level of service for unsignalized intersections. The relationship between levels of service and average side street delay are summarized in Table 2 below:

Table 2
Unsignalized Intersection
Level of Service Criteria

<u>Level of Service</u>	<u>Control Delay per Vehicle</u> (seconds)
A	≤ 10.0
B	10.1-15.0
C	15.1-25.0
D	25.1-35.0
E	35.1-50.0
F	> 50.0

Signalized Intersections

Signalized intersections are analyzed in terms of vehicle capacity and motorist delay. Capacity is the maximum rate of vehicle flow through an intersection given typical operating conditions. The number of vehicles traveling through an intersection is divided by the capacity of the intersection to determine an overall volume to capacity ratio (v/c). A v/c value under 1.00 indicates that the number of vehicles traveling through an intersection is less than capacity.

As stated in the HCM, level of service for signalized intersections is defined in terms of control delay. This delay is the difference between actual travel time and that which would be experienced under free flow, uncontrolled conditions. The associated levels of service are summarized in Table 3 below.

Table 3
Signalized Intersection
Level of Service Criteria

<u>Level of Service</u>	<u>Control Delay per Vehicle</u> (seconds)
A	≤ 10.0
B	10.1-20.0
C	20.1-35.0
D	35.1-55.0
E	55.1-80.0
F	> 80.0

Level of service A represents the optimum level where most motorists arrive at the subject intersection during the green phase and thus experience virtually no delay. Conversely, level of service F indicates that motorists are delayed at least 80 seconds, on average, while traveling through the intersection, and can imply a complete breakdown of individual movements at that location. Level of service D is usually considered the limit of acceptable motorist delay.

Table 4 and the capacity calculations contained in the Appendix, provide detailed information on level of service, volume to capacity ratio, average delay in seconds per vehicle, and 95% queue lengths for each of the intersections and their lane groups. The five (5) traffic signals along Buckland Road in South Windsor, from the Tamarack Road/Target intersection to Terry Office Park, about 4,800 feet to the north, were originally designed as a coordinated system (closed-loop). It appears that over the years, conditions have changed, and that signal system is no longer operating. Isolated operation was assumed in the analyses.

Under “background” conditions during the two time periods analyzed, Table 4 indicates there are a total of 17 individual traffic movements projected to operate at an “E” or “F” level of service, primarily at the Tamarack Avenue intersection. This should not be surprising, as the AECOM study, which assumed coordinated signals along Buckland Road in South Windsor, projected 5 individual traffic movements would operate at an “E” level of service upon the Evergreen Walk build out, without the traffic from the four (4) additional development projects since approved, and included in this study, and the addition of pedestrian phases. Under “COSTCO-build” conditions during the two time periods analyzed, there 19 individual traffic movements projected to operate at an “E” or “F” level of service with the current signalization.

Table 4
Peak Hour Traffic Operations Summary

Intersection/Lane Group	Background		COSTCO-Build	
	PM	SAT	PM	SAT
Buckland Road at Rte 30 and Rte 194¹	E (73" delay)	D (53" delay)	E (74" delay)	E (58" delay)
Buckland Rd NB Left (175')	C/.50/33"/110'	C/0.48/27"/115"	C/.51/33"/115'	C/.49/27"/115'
Buckland Rd NB Through	F/1.15/121"/1030'	F/1.06/81"/735'	F/1.17/126"/1045'	F/1.09/93"/770'
Rte 194 SB Left (170')	F/1.04/96"/555'	D/.84/49"/355'	F/1.04/96"/555'	D/.84/49"/355'
Rte 194 SB Through	D/.86/48"/885'	D/.94/52"/735'	D/.88/49"/910'	E/.96/55"/755'
Rte 30 EB Left (640')	D/.85/47"/440'	C/.61/30"/285'	D/.85/47"/450'	C/.61/30"/285'
Rte 30 EB Through (850')	D/.51/43"/290'	D/.53/37"/210'	D/.52/43"/290'	D/.54/37"/210'
Rte 30 WB Left (240')	C/.42/29"/155'	C/.47/26"/175'	C/.43/29"/170'	C/.49/26"/180'
Rte 30 WB Through	D/.55/53"/265'	D/.37/37"/175'	D/.55/53"/265'	D/.37/36"/175'
Rte 30 WB Right (240')	F/.90/81"/400'	D/.73/50"/290'	F/.90/81"/400'	D/.73/49"/290'
Buckland Road at Deming Street¹	B (19" delay)	B (19" delay)	B (19" delay)	B (19" delay)
Buckland Rd NB Left (150')	B/.42/11"/95'	B/.44/13"/85'	B/.43/11"/95'	B/.45/14"/90'
Buckland Rd NB Through	B/.68/18"/685'	B/.57/15"/495'	B/.68/18"/690'	B/.58/16"/555'
Buckland Rd SB Left (140')	A/.20/10"/40'	A/.17/8"/40'	A/.20/10"/40'	A/.17/9"/40'
Buckland Rd SB Through	B/.61/19"/440'	B/.74/21"/680'	B/.63/19"/455'	C/.76/21"/720'
Deming St EB Left (150')	D/.18/36"/55'	D/.23/39"/60'	D/.22/36"/60'	D/.35/41"/80'
Deming St EB Through	D/.38/37"/120'	D/.25/37"/80'	D/.38/37"/125'	D/.25/37"/80'
Deming St EB Right (375')	B/.52/11"/70'	B/.44/12"/60'	B/.51/11"/70'	B/.45/11"/60'
Deming St WB Left (100')	D/.37/39"/95'	D/.35/41"/85'	D/.37/39"/95'	D/.34/40"/85'
Deming St WB Through	C/.40/31"/125'	C/.38/31"/105'	C/.41/31"/130'	C/.38/31"/110'
Deming Street at Tamarack Ave²	-	-	-	-
Tamarack NB Left	B/.09/14"/25'	B/.05/13"/25'	B/.12/15"/25'	B/.09/14"/25'
Tamarack NB Right (155')	B/.19/11"/25'	A/.10/10"/25'	B/.21/11"/25'	A/.13/10"/25'
Deming Street WB Left (200')	A/.06/8"/25'	A/.07/8"/25'	A/.07/8"/25'	A/.09/8"/25'
Buckland Street at Cedar Ave and Gateway¹	C (24" delay)	C (23" delay)	C (25" delay)	C (24" delay)
Buckland St NB Left (275')	C/.62/24"/150'	C/.64/26"/235'	C/.74/34"/260'	D/.82/40"/345'
Buckland St NB Through	C/.71/22"/770'	B/.64/19"/530'	C/.66/21"/715'	B/.61/18"/495'
Buckland St SB Left ³ (50')	B/.21/13"/45'	B/.26/12"/55'	B/.19/13"/45'	B/.25/11"/55'
Buckland St SB Through	C/.74/26"/745'	C/.80/26"/680'	C/.76/28"/745'	C/.80/26"/675'
Buckland St SB Right (150')	A/.20/8"/80'	A/.21/7"/70'	A/.23/9"/95'	A/.24/7"/80'
Cedar Ave EB Left (200')	D/.53/41"/200'	D/.53/43"/210'	D/.59/44"/220'	D/.61/45"/260'
Cedar Ave EB Through (410')	B/.59/16"/80'	B/.66/19"/115'	B/.63/17"/85'	B/.74/19"/140'
Gateway WB Left ³	D/.53/42"/140'	D/.55/46"/145'	D/.55/44"/140'	D/.54/46"/145'
Gateway WB Through ³	C/.30/22"/55'	C/.26/23"/50'	C/.30/22"/55'	C/.26/23"/50'

Notes: X/0.0/00 - Level of Service/V/C ratio/Average Delay/95% Q length

¹ – Signalized intersection

² – Unsignalized

Table 4 (con't)
Peak Hour Traffic Operations Summary

Intersection/Lane Group	Background		COSTCO-Build	
	PM	SAT	PM	SAT
Buckland Road at Hemlock Ave and Aldi's driveway¹	F (96" delay)	F (98" delay)	F (100" delay)	F (113" delay)
Buckland Rd NB Left (210')	C/.67/30"/245'	E/.97/69"/380'	D/.82/41"/315'	F/1.12/114"/450'
Buckland Rd NB Through	C/.88/32"/825'	D/.92/36"/835'	C/.91/35"/865'	D/.95/40"/865'
Buckland Rd SB Left (60')	B/.18/15"/45'	B/0.20/16"/50'	B/.18/15"/45'	B/.20/15"/50'
Buckland Rd SB Through	F/1.34/185"/1050'	F/1.36/190"/1020'	F/1.37/194"/1065'	F/1.42/218"/1075'
Hemlock Ave EB Left (250')	D/.70/40"/265'	D/.64/36"/240'	D/.72/41"/270'	D/.66/37"/250'
Hemlock Ave EB Through/Right (105')	B/.66/15"/105'	B/.72/16"/125'	B/.67/15"/110'	B/.75/16"/140'
Aldi WB Left	D/.49/46"/140'	D/.53/48"/150'	D/.49/46"/140'	D/.53/48"/150'
Aldi WB Through/Right	B/.28/18"/50'	B/.30/17"/50'	B/.28/18"/50'	B/.30/17"/50'
Buckland Road at Tamarack Ave/Lowes¹	D (50" delay)	E (71" delay)	D (53" delay)	E (77" delay)
Buckland Rd NB Double Left (300')	F/1.19/145"/540'	F/1.42/237"/700'	F/1.19/145"/540'	F/1.42/237"/700'
Buckland Rd NB Through	C/.81/33"/895'	D/.91/43"/1095'	D/.86/36"/985'	D/.97/51"/1195'
Buckland Rd NB Right (175')	A/.09/6"/45'	A/.10/7"/50'	A/.09/6"/45'	A/.10/7"/55'
Buckland Rd SB Left (140')	E/.67/62"/295'	E/.74/69"/375'	E/.67/62"/295'	E/.76/70"/385'
Buckland Rd SB Through	D/.95/45"/1125'	D/.95/48"/1155'	D/.98/51"/1170'	E/1.03/65"/1295'
Lowes WB Left (300')	E/.63/63"/170'	E/.70/68"/235'	E/.58/63"/170'	E/.70/67"/235'
Lowes WB Through	E/.60/58"/155'	E/.46/56"/170'	E/.49/58"/155'	E/.46/56"/170'
Lowes WB Right (200')	A/.28/5"/30'	A/.09/4"/25'	A/.29/5"/30'	A/.10/4"/25'
Tamarack Ave EB Left/Through (575')	E/.63/58"/160'	E/.58/58"/175'	E/.63/58"/160'	E/.58/58"/175'
Tamarack Ave EB Right (125')	A/.60/7"/65'	B/.76/17"/270'	A/.60/7"/65'	B/.76/16"/270'
Route 30 (Ellington Road) at Clark Street¹	C (24" delay)	B (13" delay)	C (24" delay)	B (13" delay)
Route 30 EB	B/.72/18"/450'	B/.58/15"/165'	B/.72/18"/450'	B/.57/15"/165'
Route 30 WB	C/.89/31"/345'	A/.52/9"/120'	C/.89/31"/350'	A/.53/9"/120'
Clark St Left	D/.66/40"/175'	C/.47/22"/90'	D/.66/40"/175'	C/.48/23"/90'
Clark St Right (100')	A/.38/8"/50'	A/.31/7"/35'	A/.38/7"/50'	A/.32/7"/35'

Notes: X/0.0/00 - Level of Service/V/C ratio/Average Delay/95% Q length

¹ – Signalized intersection

² – Unsignalized

V. CONCLUSIONS AND RECOMMENDATIONS

The COSTCO development at Evergreen Walk is very conservatively projected to generate approximately 170 new vehicle trips during the weekday afternoon and 265 during the Saturday midday peak hours, over the currently approved master plan. The Buckland Road/Buckland Street corridor has longstanding traffic operational deficiencies which will continue into the foreseeable future, as the remainder of Evergreen Walk and other approved and potential projects come on line. Capacity improvements at intersections are limited by the available right of way. While there are no specific recommendations for the COSTCO project, the following is suggested for consideration, independent of COSTCO:

- The Town should reestablish the coordinated traffic signal system along Buckland Road in South Windsor, with enhancements, as recommended in the March 2020 VHB signal system study. The five (5) traffic signals along Buckland Road from Tamarack Avenue to Terry Office Park were designed, and once operated as a coordinated system. It appeared that this is was no longer the case, when operations were reviewed by this office late last year. This was confirmed in the recent signal system study prepared for the Town (VHB, March 2020). After the signal system is upgraded, a reevaluation of traffic operations should be performed, as improved signalization may minimize the need for any further action.
- Construct a southbound Buckland Road right turn lane at the Hemlock Avenue intersection, if right of way permits. Right turn volumes are projected to be

substantial and the southbound through traffic volume may exceed capacity otherwise. This potential deficiency does not result from the COSTCO project.

- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road left turn lane at Cedar Avenue by cutting into the median.
- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road left turn lane at Hemlock Avenue by cutting into the median. This potential deficiency does not result from the COSTCO project.
- If future traffic operations warrant after the signal system is upgraded and operations evaluated, extend the northbound Buckland Road double left turn into Tamarack Avenue by cutting into the median and possible other roadway widening. This potential deficiency does not result from the COSTCO project.

Regardless of the status of the COSTCO project, the following are recommended:

- Provide appropriate signing and pavement markings on the wide Tamarack Avenue approach to Deming Street to establish two travel lanes, as is operationally the condition.
- Install “Keep Right” signs at both ends of the Tamarack Avenue median at the Deming Street end.
- Install a “Keep Right” sign at the Buckland Road end of the Hemlock Avenue median.

APPENDIX

CAPACITY ANALYSES

Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	80	420	100	90	130	525	1155	80	145	1315	30
Future Volume (vph)	125	80	420	100	90	130	525	1155	80	145	1315	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	0		0	340		250	200		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.997	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Flt Permitted		0.970		0.950			0.950			0.950		
Satd. Flow (perm)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			447			141			67		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		711			519			462			1264	
Travel Time (s)		16.2			11.8			7.0			19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	87	457	109	98	141	571	1255	87	158	1429	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	457	109	98	141	571	1255	87	158	1462	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	9.0	9.0	6.0	6.0	15.0	9.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	10.5	13.0	13.0	10.5	10.5	20.0	13.0	10.5	20.0	
Total Split (s)	19.0	19.0	18.1	29.0	29.0	18.1	18.1	53.0	29.0	18.1	53.0	
Total Split (%)	12.2%	12.2%	11.6%	18.6%	18.6%	11.6%	11.6%	33.9%	18.6%	11.6%	33.9%	
Maximum Green (s)	15.0	15.0	15.0	25.0	25.0	15.0	15.0	48.0	25.0	15.0	48.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	1.0	1.0	0.1	0.1	2.0	1.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	4.0	4.0	3.1	3.1	5.0	4.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5	2.0	2.0	3.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%
Maximum Green (s)	33.0
Yellow Time (s)	4.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	0.2

Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		11.5	30.6	11.6	11.6	27.3	15.4	50.0	66.7	14.8	49.3	
Actuated g/C Ratio		0.10	0.28	0.11	0.11	0.25	0.14	0.46	0.61	0.13	0.45	
v/c Ratio		0.63	0.60	0.58	0.49	0.28	1.19	0.81	0.09	0.67	0.95	
Control Delay		57.7	6.5	62.4	58.1	4.9	144.6	33.0	5.4	61.9	45.0	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		57.7	6.5	62.4	58.1	4.9	144.6	33.0	5.4	61.9	45.0	
LOS		E	A	E	E	A	F	C	A	E	D	
Approach Delay		23.3				37.9		65.1			46.6	
Approach LOS		C				D		E			D	
Queue Length 50th (ft)		72	5	68	60	0	~218	337	4	96	435	
Queue Length 95th (ft)		160	65	168	152	28	#539	#894	42	#292	#1122	
Internal Link Dist (ft)		631				439		382			1184	
Turn Bay Length (ft)			250				340		250	200		
Base Capacity (vph)		476	758	415	437	509	481	1556	956	248	1532	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.47	0.60	0.26	0.22	0.28	1.19	0.81	0.09	0.64	0.95	

Intersection Summary

Area Type: Other

Cycle Length: 156.2

Actuated Cycle Length: 109.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 50.2

Intersection LOS: D

Intersection Capacity Utilization 81.6%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Buckland Rd & Tamarack Ave/Lowes/Target

				
Ø1	Ø2	Ø3	Ø4	Ø9
18.1 s	53 s	29 s	19 s	37.1 s
				
Ø5	Ø6			
18.1 s	53 s			

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (Fut)

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	8	236	78	9	49	180	1155	80	41	1320	190
Future Volume (vph)	211	8	236	78	9	49	180	1155	80	41	1320	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.874			0.990			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1711	1574	0	1770	3504	0	1711	3472	0
Flt Permitted	0.476			0.950			0.133			0.154		
Satd. Flow (perm)	882	1585	0	1711	1574	0	248	3504	0	277	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		257			53			6			14	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		311			128			1264			1034	
Travel Time (s)		8.5			3.5			19.2			15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	9	257	85	10	53	196	1255	87	45	1435	207
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	266	0	85	63	0	196	1342	0	45	1642	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3			1	6		5	2	
Permitted Phases	4				8		6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	
Maximum Green (s)	7.0	9.0		7.0	9.0		7.0	23.0		7.0	23.0	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	3.0	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	33.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (Fut)

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.3	7.8		7.0	7.8		36.6	30.1		32.4	24.2	
Actuated g/C Ratio	0.22	0.11		0.10	0.11		0.53	0.43		0.47	0.35	
v/c Ratio	0.70	0.66		0.49	0.28		0.67	0.88		0.18	1.34	
Control Delay	39.7	14.8		45.6	17.3		29.3	31.6		14.8	184.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.7	14.8		45.6	17.3		29.3	31.6		14.8	184.8	
LOS	D	B		D	B		C	C		B	F	
Approach Delay		26.3			33.5			31.3			180.3	
Approach LOS		C			C			C			F	
Queue Length 50th (ft)	70	3		31	4		32	259		7	~442	
Queue Length 95th (ft)	#261	#102		#136	47		#244	#825		44	#1046	
Internal Link Dist (ft)		231			48			1184			954	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	325	438		181	260		292	1527		288	1221	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.70	0.61		0.47	0.24		0.67	0.88		0.16	1.34	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 69.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.34

Intersection Signal Delay: 95.7

Intersection LOS: F

Intersection Capacity Utilization 88.1%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 18: Buckland Rd & Hemlock Ave/Aldi (Fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
11 s	29.4 s	11 s	14.1 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8	
11 s	29.4 s	11 s	14.1 s	

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	6	165	105	13	42	155	1195	36	42	1105	145
Future Volume (vph)	125	6	165	105	13	42	155	1195	36	42	1105	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		100	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.856			0.885			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1587	0	1770	1649	0	1770	3525	0	1761	3522	1575
Flt Permitted	0.504			0.606			0.100			0.108		
Satd. Flow (perm)	934	1587	0	1129	1649	0	186	3525	0	200	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		179			46			2				117
Link Speed (mph)		25			25			45				45
Link Distance (ft)		470			164			1034				1566
Travel Time (s)		12.8			4.5			15.7				23.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	7	179	114	14	46	168	1299	39	46	1201	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	186	0	114	60	0	168	1338	0	46	1201	158
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.5	12.0		9.5	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	10.0	20.0		10.0	20.0		19.1	42.0		19.1	42.0	42.0
Total Split (%)	7.9%	15.7%		7.9%	15.7%		15.0%	33.0%		15.0%	33.0%	33.0%
Maximum Green (s)	5.5	15.0		5.5	15.0		16.0	37.0		16.0	37.0	37.0
Yellow Time (s)	3.5	3.0		3.5	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
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)	4.5	5.0		4.5	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	36.0
Total Split (s)	36.0
Total Split (%)	28%
Maximum Green (s)	32.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.5	8.2		12.7	8.2		51.9	44.9		46.5	38.7	38.7
Actuated g/C Ratio	0.18	0.10		0.15	0.10		0.62	0.53		0.55	0.46	0.46
v/c Ratio	0.53	0.59		0.53	0.30		0.62	0.71		0.21	0.74	0.20
Control Delay	40.9	16.2		41.9	21.7		24.1	21.4		13.0	25.4	7.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	40.9	16.2		41.9	21.7		24.1	21.4		13.0	25.4	7.9
LOS	D	B		D	C		C	C		B	C	A
Approach Delay		26.6			35.0			21.7			23.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	52	3		43	6		25	231		6	208	9
Queue Length 95th (ft)	#196	77		139	53		149	#770		43	#741	79
Internal Link Dist (ft)		390			84			954			1486	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	255	441		214	344		429	1879		432	1616	786
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.42		0.53	0.17		0.39	0.71		0.11	0.74	0.20

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 84.3

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 70.9%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 20: Buckland Rd & Cedar Ave/Gateway (fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
19.1 s	42 s	10 s	20 s	36 s
 Ø5	 Ø6	 Ø7	 Ø8	
19.1 s	42 s	10 s	20 s	

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	25.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	94	195	64	68	47	137	1189	61	46	916	35
Future Volume (vph)	30	94	195	64	68	47	137	1189	61	46	916	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.939			0.993			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1982	0	1719	3532	0	1752	3483	0
Flt Permitted	0.671			0.691			0.174			0.128		
Satd. Flow (perm)	1237	1844	1567	1287	1982	0	315	3532	0	236	3483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			212		26			5			4	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		491			1149			1566			1041	
Travel Time (s)		11.2			26.1			23.7			15.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	102	212	70	74	51	149	1292	66	50	996	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	102	212	70	125	0	149	1358	0	50	1034	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0		10.0	40.0		10.0	40.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
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)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.0	2.5		2.0	2.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%
Maximum Green (s)	25.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Background
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	11.0	11.0	11.0	11.0	11.0		49.4	42.4		44.0	36.0	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.66	0.57		0.59	0.48	
v/c Ratio	0.18	0.38	0.52	0.37	0.40		0.42	0.68		0.20	0.61	
Control Delay	35.5	37.0	10.5	39.1	30.3		10.9	17.7		9.6	18.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.5	37.0	10.5	39.1	30.3		10.9	17.7		9.6	18.8	
LOS	D	D	B	D	C		B	B		A	B	
Approach Delay		20.7			33.5			17.0			18.3	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	13	41	0	28	39		14	187		4	136	
Queue Length 95th (ft)	51	119	66	91	122		94	#681		38	438	
Internal Link Dist (ft)		411			1069			1486			961	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	349	520	594	363	578		409	2010		368	1968	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.20	0.36	0.19	0.22		0.36	0.68		0.14	0.53	

Intersection Summary

Area Type: Other

Cycle Length: 114.2

Actuated Cycle Length: 74.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 61.0%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 22: Buckland Rd & Deming St

 Ø1	 Ø2	 Ø4	 Ø9
14 s	46.2 s	25 s	29 s
 Ø5	 Ø6		
14 s	46.2 s		

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk

Background

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	311	110	139	179	248	86	934	136	271	958	10
Future Volume (vph)	380	311	110	139	179	248	86	934	136	271	958	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		300	435		0	200		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.961				0.850		0.981			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3401	0	1770	1863	1583	1770	3472	0	1770	3532	0
Flt Permitted	0.425			0.488			0.112			0.101		
Satd. Flow (perm)	792	3401	0	909	1863	1583	209	3472	0	188	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								9			1	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		708			584			1156			721	
Travel Time (s)		12.1			10.0			17.5			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	338	120	151	195	270	93	1015	148	295	1041	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	413	458	0	151	195	270	93	1163	0	295	1052	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Detector Phase	1	6		5	2	2	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	22.4		9.0	22.4	22.4	9.0	18.2		9.0	18.2	
Total Split (s)	24.0	42.4		24.0	42.4	42.4	19.0	43.2		19.0	43.2	
Total Split (%)	15.0%	26.6%		15.0%	26.6%	26.6%	11.9%	27.1%		11.9%	27.1%	
Maximum Green (s)	20.0	35.0		20.0	35.0	35.0	15.0	35.0		15.0	35.0	
Yellow Time (s)	3.0	4.4		3.0	4.4	4.4	3.0	4.2		3.0	4.2	
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	4.0		1.0	4.0	
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)	4.0	7.4		4.0	7.4	7.4	4.0	8.2		4.0	8.2	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.5		1.5	2.5	2.5	1.5	2.0		1.5	2.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	19%
Maximum Green (s)	27.0
Yellow Time (s)	4.0
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

Costco at Evergreen Walk

Background

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	51.1	32.6		38.4	23.6	23.6	48.2	35.7		58.9	42.7	
Actuated g/C Ratio	0.41	0.26		0.31	0.19	0.19	0.39	0.29		0.48	0.35	
v/c Ratio	0.85	0.51		0.42	0.55	0.90	0.50	1.15		1.04	0.86	
Control Delay	46.8	42.8		28.8	52.4	81.0	32.4	120.5		96.1	47.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	46.8	42.8		28.8	52.4	81.0	32.4	120.5		96.1	47.4	
LOS	D	D		C	D	F	C	F		F	D	
Approach Delay		44.7			59.2			114.0			58.0	
Approach LOS		D			E			F			E	
Queue Length 50th (ft)	225	151		69	133	198	36	~523		167	373	
Queue Length 95th (ft)	#439	288		161	265	#399	109	#1029		#555	#884	
Internal Link Dist (ft)		628			504			1076			641	
Turn Bay Length (ft)				300		300	435			200		
Base Capacity (vph)	488	988		489	536	456	285	1007		285	1219	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.85	0.46		0.31	0.36	0.59	0.33	1.15		1.04	0.86	

Intersection Summary

Area Type: Other

Cycle Length: 159.6

Actuated Cycle Length: 123.7

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 72.6

Intersection LOS: E

Intersection Capacity Utilization 98.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

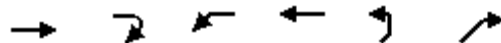
Splits and Phases: 25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
24 s	42.4 s	19 s	43.2 s	31 s
 Ø5	 Ø6	 Ø7	 Ø8	
24 s	42.4 s	19 s	43.2 s	

Lane Group	Ø9
Flash Dont Walk (s)	20.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
37: Tamarack Ave & Deming St

Background
Timing Plan: PM



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	184	25	70	168	40	145
Future Volume (vph)	184	25	70	168	40	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2077	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2077	0	1770	1863	1770	1583
Link Speed (mph)	45			45	45	
Link Distance (ft)	1140			491	573	
Travel Time (s)	17.3			7.4	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	27	76	183	43	158
Shared Lane Traffic (%)						
Lane Group Flow (vph)	227	0	76	183	43	158
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.4% ICU Level of Service A

Analysis Period (min) 15

Intersection							
Int Delay, s/veh	4.1						
Movement	EBT	EBR	WBL	WBT	NEL	NER	
Lane Configurations							
Traffic Vol, veh/h	184	25	70	168	40	145	
Future Vol, veh/h	184	25	70	168	40	145	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	235	-	0	200	
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	200	27	76	183	43	158	
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	227	0	549	214	
Stage 1	-	-	-	-	214	-	
Stage 2	-	-	-	-	335	-	
Critical Hdwy	-	-	4.12	-	6.42	6.22	
Critical Hdwy Stg 1	-	-	-	-	5.42	-	
Critical Hdwy Stg 2	-	-	-	-	5.42	-	
Follow-up Hdwy	-	-	2.218	-	3.518	3.318	
Pot Cap-1 Maneuver	-	-	1341	-	497	826	
Stage 1	-	-	-	-	822	-	
Stage 2	-	-	-	-	725	-	
Platoon blocked, %	-	-		-			
Mov Cap-1 Maneuver	-	-	1341	-	469	826	
Mov Cap-2 Maneuver	-	-	-	-	469	-	
Stage 1	-	-	-	-	822	-	
Stage 2	-	-	-	-	684	-	
Approach	EB		WB		NE		
HCM Control Delay, s	0		2.3		11.1		
HCM LOS	B						
Minor Lane/Major Mvmt	NELn1		NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	469		826	-	-	1341	-
HCM Lane V/C Ratio	0.093		0.191	-	-	0.057	-
HCM Control Delay (s)	13.5		10.4	-	-	7.8	-
HCM Lane LOS	B		B	-	-	A	-
HCM 95th %tile Q(veh)	0.3		0.7	-	-	0.2	-

Costco at Evergreen Walk
46: Clark St & Rte 30

Background
Timing Plan: PM

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	506	170	115	402	205	150
Future Volume (vph)	506	170	115	402	205	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966					0.850
Flt Protected				0.989	0.950	
Satd. Flow (prot)	1799	0	0	1842	1770	1583
Flt Permitted				0.479	0.950	
Satd. Flow (perm)	1799	0	0	892	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	27					163
Link Speed (mph)	40			40	30	
Link Distance (ft)	396			389	1672	
Travel Time (s)	6.8			6.6	38.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	550	185	125	437	223	163
Shared Lane Traffic (%)						
Lane Group Flow (vph)	735	0	0	562	223	163
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	18.0		3.0	18.0	7.0	7.0
Minimum Split (s)	24.5		7.0	24.5	11.0	11.0
Total Split (s)	51.5		9.0	60.5	29.0	29.0
Total Split (%)	57.5%		10.1%	67.6%	32.4%	32.4%
Maximum Green (s)	45.0		5.0	54.0	25.0	25.0
Yellow Time (s)	4.4		3.0	4.4	3.0	3.0
All-Red Time (s)	2.1		1.0	2.1	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.5			6.5	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		Max	Min	None	None
Act Effect Green (s)	45.1			54.1	15.2	15.2

Costco at Evergreen Walk
46: Clark St & Rte 30

Background
Timing Plan: PM

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.56			0.68	0.19	0.19
v/c Ratio	0.72			0.89	0.66	0.38
Control Delay	18.1			30.4	39.7	7.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	18.1			30.4	39.7	7.3
LOS	B			C	D	A
Approach Delay	18.1			30.4	26.0	
Approach LOS	B			C	C	
Queue Length 50th (ft)	237			111	104	0
Queue Length 95th (ft)	446			#341	174	46
Internal Link Dist (ft)	316			309	1592	
Turn Bay Length (ft)						100
Base Capacity (vph)	1027			634	555	608
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.72			0.89	0.40	0.27

Intersection Summary

Area Type: Other

Cycle Length: 89.5

Actuated Cycle Length: 79.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 24.0

Intersection LOS: C

Intersection Capacity Utilization 90.0%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 46: Clark St & Rte 30



Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	90	515	145	100	40	630	1264	85	170	1230	75
Future Volume (vph)	120	90	515	145	100	40	630	1264	85	170	1230	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	250		200	340		250	200		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.991	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	3406	1567	1778	1872	1591	3433	3539	1583	1770	3507	0
Flt Permitted		0.972		0.950			0.950			0.950		
Satd. Flow (perm)	0	3406	1567	1778	1872	1591	3433	3539	1583	1770	3507	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			424			56			63		4	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		711			519			462			1264	
Travel Time (s)		16.2			11.8			7.0			19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	98	560	158	109	43	685	1374	92	185	1337	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	560	158	109	43	685	1374	92	185	1419	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			16			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	
Protected Phases	4	4	4	3	3	3	5	2	2	1	6	
Permitted Phases			5			1			3			
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0	9.0	6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	12.1	20.0	20.0	9.1	20.0	
Total Split (s)	19.0	19.0	19.0	29.0	29.0	29.0	19.0	53.0	53.0	19.0	53.0	
Total Split (%)	12.1%	12.1%	12.1%	18.5%	18.5%	18.5%	12.1%	33.7%	33.7%	12.1%	33.7%	
Maximum Green (s)	15.0	15.0	15.0	25.0	25.0	25.0	15.9	48.0	48.0	15.9	48.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.1	2.0	2.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0	3.1	5.0	5.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5	3.5	2.0	3.5	
Recall Mode	None	None	None	Min	Min	Min	None	Min	Min	None	Min	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%
Maximum Green (s)	35.1
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

Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		13.3	32.3	14.8	14.8	30.3	16.4	49.4	68.3	16.4	49.4	
Actuated g/C Ratio		0.11	0.28	0.13	0.13	0.26	0.14	0.43	0.59	0.14	0.43	
v/c Ratio		0.58	0.76	0.70	0.46	0.09	1.42	0.91	0.10	0.74	0.95	
Control Delay		58.1	16.3	67.3	55.8	3.9	237.0	43.1	6.3	68.7	47.7	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		58.1	16.3	67.3	55.8	3.9	237.0	43.1	6.3	68.7	47.7	
LOS		E	B	E	E	A	F	D	A	E	D	
Approach Delay	28.4					54.5					103.3	50.1
Approach LOS	C					D					F	D
Queue Length 50th (ft)	78	74	107	72	0	~327	452	8	125	478		
Queue Length 95th (ft)	172	#270	235	169	12	#698	#1093	49	#374	#1153		
Internal Link Dist (ft)	631					439					1184	
Turn Bay Length (ft)		250	250		200	340		250	200			
Base Capacity (vph)	452	739	393	414	599	483	1504	956	249	1493		
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.76	0.40	0.26	0.07	1.42	0.91	0.10	0.74	0.95		

Intersection Summary

Area Type: Other

Cycle Length: 157.1

Actuated Cycle Length: 116.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.42

Intersection Signal Delay: 70.4

Intersection LOS: E

Intersection Capacity Utilization 87.1%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Buckland Rd & Tamarack Ave/Lowes/Target

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
19 s	53 s	29 s	19 s	37.1 s
 Ø5	 Ø6			
19 s	53 s			

Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	30.1
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (fut)

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	9	295	86	9	55	250	1119	100	46	1215	235
Future Volume (vph)	196	9	295	86	9	55	250	1119	100	46	1215	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.871			0.988			0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1622	0	1770	3497	0	1770	3454	0
Flt Permitted	0.493			0.950			0.135			0.156		
Satd. Flow (perm)	914	1585	0	1770	1622	0	251	3497	0	291	3454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		321			60			8			20	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		311			128			1264			1034	
Travel Time (s)		8.5			3.5			19.2			15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	213	10	321	93	10	60	272	1216	109	50	1321	255
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	331	0	93	70	0	272	1325	0	50	1576	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			16			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			40			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3			1	6		5	2	
Permitted Phases	4				8		6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	
Maximum Green (s)	7.0	9.0		7.0	9.0		7.0	23.0		7.0	23.0	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	35.0
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)	1.0
Recall Mode	None

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (fut)

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	17.0	7.9		7.1	7.9		36.2	29.6		32.1	23.9	
Actuated g/C Ratio	0.24	0.11		0.10	0.11		0.50	0.41		0.45	0.33	
v/c Ratio	0.64	0.72		0.53	0.30		0.97	0.92		0.20	1.36	
Control Delay	36.2	15.5		47.6	17.0		68.8	35.4		15.4	189.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.2	15.5		47.6	17.0		68.8	35.4		15.4	189.4	
LOS	D	B		D	B		E	D		B	F	
Approach Delay	23.6			34.5			41.1			184.1		
Approach LOS	C			C			D			F		
Queue Length 50th (ft)	65	4		34	4		57	253		8	~412	
Queue Length 95th (ft)	#238	#124		#150	50		#378	#831		49	#1018	
Internal Link Dist (ft)	231			48			1184			954		
Turn Bay Length (ft)	100						225					70
Base Capacity (vph)	332	485		179	263		280	1447		286	1163	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.64	0.68		0.52	0.27		0.97	0.92		0.17	1.36	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 71.8

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 97.6

Intersection LOS: F

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 18: Buckland Rd & Hemlock Ave/Aldi (fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
11 s	29.4 s	11 s	14.1 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8	
11 s	29.4 s	11 s	14.1 s	

Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	30.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	9	185	107	8	34	180	1038	55	65	1185	155
Future Volume (vph)	135	9	185	107	8	34	180	1038	55	65	1185	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	265		0	0		0	285		100	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.857			0.879			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1596	0	1770	1637	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.500						0.095			0.161		
Satd. Flow (perm)	931	1596	0	1863	1637	0	177	3511	0	300	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		201			37			5				129
Link Speed (mph)		25			45			45				45
Link Distance (ft)		470			206			1034				1566
Travel Time (s)		12.8			3.1			15.7				23.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	10	201	116	9	37	196	1128	60	71	1288	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	211	0	116	46	0	196	1188	0	71	1288	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.0	12.0		9.0	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	9.0	12.0		9.0	12.0		13.0	53.0		9.0	49.0	49.0
Total Split (%)	7.5%	10.0%		7.5%	10.0%		10.8%	44.2%		7.5%	40.8%	40.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		9.9	48.0		5.9	44.0	44.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
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)	4.0	5.0		4.0	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		3.0	3.0		2.0	2.0		3.0	2.0	2.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	31%
Maximum Green (s)	35.0
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

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.3	7.3		9.8	7.3		53.7	44.6		46.5	38.4	38.4
Actuated g/C Ratio	0.18	0.09		0.12	0.09		0.64	0.53		0.55	0.46	0.46
v/c Ratio	0.53	0.66		0.55	0.26		0.64	0.64		0.26	0.80	0.21
Control Delay	42.3	18.7		45.9	23.1		26.0	18.8		11.6	25.9	6.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	42.3	18.7		45.9	23.1		26.0	18.8		11.6	25.9	6.4
LOS	D	B		D	C		C	B		B	C	A
Approach Delay	28.4			39.4			19.8			23.1		
Approach LOS	C			D			B			C		
Queue Length 50th (ft)	59	4		46	4		34	190		9	244	9
Queue Length 95th (ft)	#210	#112		144	46		#233	526		55	#679	68
Internal Link Dist (ft)	390			126			954			1486		
Turn Bay Length (ft)	265						285				75	235
Base Capacity (vph)	277	321		211	175		308	2083		273	1923	794
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.53	0.66		0.55	0.26		0.64	0.57		0.26	0.67	0.21

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 83.9

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 75.6%

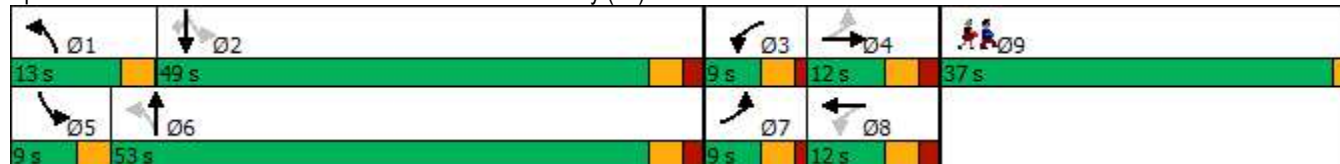
ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 20: Buckland Rd & Cedar Ave/Gateway (fut)



Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	28.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	53	133	55	56	41	113	1028	74	49	1203	45
Future Volume (vph)	35	53	133	55	56	41	113	1028	74	49	1203	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.936			0.990			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1976	0	1778	3521	0	1752	3486	0
Flt Permitted	0.689			0.719			0.101			0.189		
Satd. Flow (perm)	1271	1844	1567	1339	1976	0	189	3521	0	349	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			145		28			7			4	
Link Speed (mph)		30			25			45			45	
Link Distance (ft)		491			1149			1566			1041	
Travel Time (s)		11.2			31.3			23.7			15.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	58	145	60	61	45	123	1117	80	53	1308	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	58	145	60	106	0	123	1197	0	53	1357	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		25			16			25			25	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0		10.0	40.0		10.0	40.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
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)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.5		2.0	2.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%
Maximum Green (s)	27.0
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

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Background
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	10.0	10.0	10.0	10.0	10.0		53.8	46.9		49.1	41.2	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.69	0.60		0.63	0.52	
v/c Ratio	0.23	0.25	0.44	0.35	0.38		0.44	0.57		0.17	0.74	
Control Delay	38.3	36.9	11.7	40.7	30.5		13.0	14.9		8.1	20.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.3	36.9	11.7	40.7	30.5		13.0	14.9		8.1	20.6	
LOS	D	D	B	D	C		B	B		A	C	
Approach Delay		22.0			34.2			14.7			20.1	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	15	23	0	25	32		11	153		5	204	
Queue Length 95th (ft)	57	77	57	81	104		83	#492		37	#680	
Internal Link Dist (ft)		411			1069			1486			961	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	333	483	518	350	538		339	2106		422	1829	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.12	0.28	0.17	0.20		0.36	0.57		0.13	0.74	

Intersection Summary

Area Type: Other

Cycle Length: 114.2

Actuated Cycle Length: 78.5

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 18.7

Intersection LOS: B

Intersection Capacity Utilization 63.9%

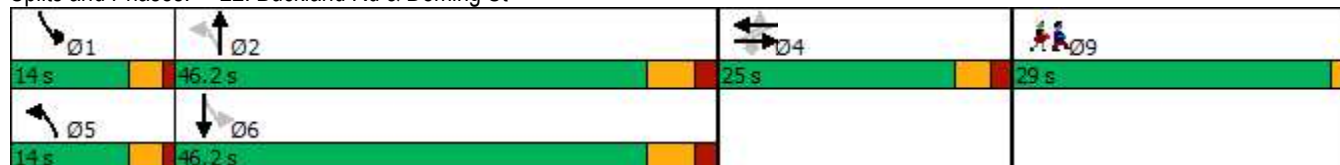
ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 22: Buckland Rd & Deming St



Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	20.0
Pedestrian Calls (#/hr)	3
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk

Background

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	220	147	173	138	228	102	754	158	215	897	10
Future Volume (vph)	280	220	147	173	138	228	102	754	158	215	897	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		300	435		0	200		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.940				0.850		0.974			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3327	0	1770	1863	1583	1770	3447	0	1770	3532	0
Flt Permitted	0.634			0.476			0.156			0.141		
Satd. Flow (perm)	1181	3327	0	887	1863	1583	291	3447	0	263	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								17			1	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		708			584			1156			721	
Travel Time (s)		12.1			10.0			17.5			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	239	160	188	150	248	111	820	172	234	975	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	399	0	188	150	248	111	992	0	234	986	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Detector Phase	1	6		5	2	2	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	22.4		9.0	22.4	22.4	14.0	18.2		14.0	18.2	
Total Split (s)	14.0	37.4		14.0	37.4	37.4	14.0	33.2		14.0	33.2	
Total Split (%)	10.8%	28.9%		10.8%	28.9%	28.9%	10.8%	25.6%		10.8%	25.6%	
Maximum Green (s)	10.0	30.0		10.0	30.0	30.0	10.0	25.0		10.0	25.0	
Yellow Time (s)	3.0	4.4		3.0	4.4	4.4	3.0	4.2		3.0	4.2	
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	4.0		1.0	4.0	
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)	4.0	7.4		4.0	7.4	7.4	4.0	8.2		4.0	8.2	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	5.5		1.5	5.5	5.5	1.5	5.0		1.5	2.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	24%
Maximum Green (s)	29.0
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

Costco at Evergreen Walk

Background

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: SAT



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	35.3	21.5		33.6	20.7	20.7	37.6	25.7		42.8	28.4	
Actuated g/C Ratio	0.37	0.22		0.35	0.22	0.22	0.39	0.27		0.45	0.30	
v/c Ratio	0.61	0.53		0.47	0.37	0.73	0.48	1.06		0.84	0.94	
Control Delay	29.6	36.7		25.8	36.3	49.3	26.5	80.9		48.9	51.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	29.6	36.7		25.8	36.3	49.3	26.5	80.9		48.9	51.8	
LOS	C	D		C	D	D	C	F		D	D	
Approach Delay		33.6			38.4			75.4			51.3	
Approach LOS		C			D			E			D	
Queue Length 50th (ft)	115	103		66	71	128	32	~285		73	272	
Queue Length 95th (ft)	282	208		173	171	289	113	#734		#355	#732	
Internal Link Dist (ft)		628			504			1076			641	
Turn Bay Length (ft)				300		300	435			200		
Base Capacity (vph)	498	1071		413	599	509	281	937		279	1047	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.37		0.46	0.25	0.49	0.40	1.06		0.84	0.94	

Intersection Summary

Area Type: Other

Cycle Length: 129.6

Actuated Cycle Length: 95.7

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 53.1

Intersection LOS: D

Intersection Capacity Utilization 85.5%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

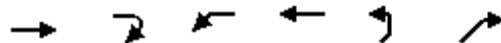
Splits and Phases: 25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30)

Ø1	Ø2	Ø3	Ø4	Ø9
14 s	37.4 s	14 s	33.2 s	31 s
Ø5	Ø6	Ø7	Ø8	
14 s	37.4 s	14 s	33.2 s	

Lane Group	Ø9
Flash Dont Walk (s)	22.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
37: Tamarack Ave & Deming St

Background
Timing Plan: SAT



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↻		↻	↻	↻	↻
Traffic Volume (vph)	131	35	90	117	25	80
Future Volume (vph)	131	35	90	117	25	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Storage Length (ft)		0	235		0	175
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.971					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2050	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2050	0	1770	1863	1770	1583
Link Speed (mph)	35			35	25	
Link Distance (ft)	1140			491	573	
Travel Time (s)	22.2			9.6	15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	142	38	98	127	27	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	0	98	127	27	87
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 27.3% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	3.7					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	131	35	90	117	25	80
Future Vol, veh/h	131	35	90	117	25	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	175
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	142	38	98	127	27	87
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	180	0	484	161
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	323	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1396	-	542	884
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	734	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1396	-	504	884
Mov Cap-2 Maneuver	-	-	-	-	504	-
Stage 1	-	-	-	-	868	-
Stage 2	-	-	-	-	683	-
Approach	EB		WB		NE	
HCM Control Delay, s	0		3.4		10.2	
HCM LOS	B					
Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	884	-	-	1396	-
HCM Lane V/C Ratio	0.054	0.098	-	-	0.07	-
HCM Control Delay (s)	12.6	9.5	-	-	7.8	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	0.3	-	-	0.2	-

Costco at Evergreen Walk
46: Clark St & Rte 30

Background
Timing Plan: SAT

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	272	113	95	297	146	115
Future Volume (vph)	272	113	95	297	146	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.960					0.850
Flt Protected				0.988	0.950	
Satd. Flow (prot)	1788	0	0	1840	1770	1583
Flt Permitted				0.719	0.950	
Satd. Flow (perm)	1788	0	0	1339	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	34					125
Link Speed (mph)	40			40	30	
Link Distance (ft)	428			566	1653	
Travel Time (s)	7.3			9.6	37.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	296	123	103	323	159	125
Shared Lane Traffic (%)						
Lane Group Flow (vph)	419	0	0	426	159	125
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	18.0		3.0	18.0	7.0	7.0
Minimum Split (s)	24.5		7.0	24.5	11.0	11.0
Total Split (s)	51.5		9.0	60.5	29.0	29.0
Total Split (%)	57.5%		10.1%	67.6%	32.4%	32.4%
Maximum Green (s)	45.0		5.0	54.0	25.0	25.0
Yellow Time (s)	4.4		3.0	4.4	3.0	3.0
All-Red Time (s)	2.1		1.0	2.1	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.5			6.5	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	2.0
Recall Mode	Min		Max	Min	None	None
Act Effect Green (s)	18.8			27.8	9.1	9.1

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.40			0.59	0.19	0.19
v/c Ratio	0.58			0.52	0.47	0.31
Control Delay	14.4			8.9	22.2	6.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	14.4			8.9	22.2	6.5
LOS	B			A	C	A
Approach Delay	14.4			8.9	15.3	
Approach LOS	B			A	B	
Queue Length 50th (ft)	75			50	38	0
Queue Length 95th (ft)	165			117	87	33
Internal Link Dist (ft)	348			486	1573	
Turn Bay Length (ft)						100
Base Capacity (vph)	1702			1363	937	897
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.25			0.31	0.17	0.14

Intersection Summary

Area Type: Other

Cycle Length: 89.5

Actuated Cycle Length: 47.4

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 12.6

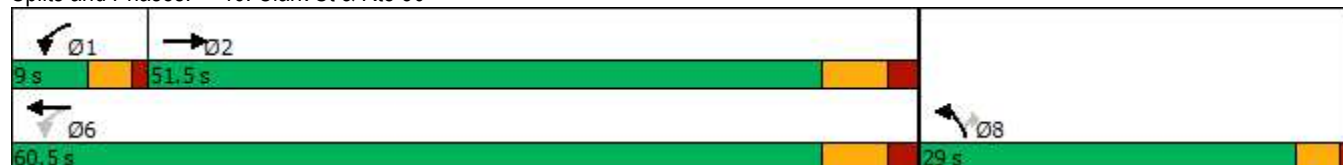
Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 46: Clark St & Rte 30



Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	80	420	100	90	133	525	1234	80	145	1354	30
Future Volume (vph)	125	80	420	100	90	133	525	1234	80	145	1354	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	11	12	11	12
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	0		0	340		250	200		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.997	
Flt Protected		0.970		0.950			0.950			0.950		
Satd. Flow (prot)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Flt Permitted		0.970		0.950			0.950			0.950		
Satd. Flow (perm)	0	3399	1567	1778	1872	1591	3433	3421	1531	1770	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			447			145			62		1	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		711			519			462			1264	
Travel Time (s)		16.2			11.8			7.0			19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	87	457	109	98	145	571	1341	87	158	1472	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	223	457	109	98	145	571	1341	87	158	1505	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			20			25			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.04	1.04	1.00	1.04	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	4	4	5	3	3	1	5	2	3	1	6	
Permitted Phases			4			3			2			
Detector Phase	4	4	5	3	3	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	6.0	9.0	9.0	6.0	6.0	15.0	9.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	10.5	13.0	13.0	10.5	10.5	20.0	13.0	10.5	20.0	
Total Split (s)	19.0	19.0	18.1	29.0	29.0	18.1	18.1	53.0	29.0	18.1	53.0	
Total Split (%)	12.2%	12.2%	11.6%	18.6%	18.6%	11.6%	11.6%	33.9%	18.6%	11.6%	33.9%	
Maximum Green (s)	15.0	15.0	15.0	25.0	25.0	15.0	15.0	48.0	25.0	15.0	48.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	0.1	1.0	1.0	0.1	0.1	2.0	1.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	3.1	4.0	4.0	3.1	3.1	5.0	4.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5	2.0	2.0	3.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%
Maximum Green (s)	33.0
Yellow Time (s)	4.0
All-Red Time (s)	0.1
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	0.2

Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		11.5	30.6	11.6	11.6	27.3	15.4	50.0	66.7	14.8	49.3	
Actuated g/C Ratio		0.10	0.28	0.11	0.11	0.25	0.14	0.46	0.61	0.13	0.45	
v/c Ratio		0.63	0.60	0.58	0.49	0.29	1.19	0.86	0.09	0.67	0.98	
Control Delay		57.7	6.5	62.4	58.1	4.9	144.6	35.6	5.9	61.9	50.2	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		57.7	6.5	62.4	58.1	4.9	144.6	35.6	5.9	61.9	50.2	
LOS		E	A	E	E	A	F	D	A	E	D	
Approach Delay		23.3				37.5		65.5			51.3	
Approach LOS		C				D		E			D	
Queue Length 50th (ft)		72	5	68	60	0	~218	375	6	96	458	
Queue Length 95th (ft)		160	65	168	152	28	#539	#985	45	#292	#1168	
Internal Link Dist (ft)		631				439		382			1184	
Turn Bay Length (ft)			250				340		250	200		
Base Capacity (vph)		476	758	415	437	513	481	1556	954	248	1532	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.47	0.60	0.26	0.22	0.28	1.19	0.86	0.09	0.64	0.98	

Intersection Summary

Area Type: Other

Cycle Length: 156.2

Actuated Cycle Length: 109.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 52.2

Intersection LOS: D

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Buckland Rd & Tamarack Ave/Lowes/Target

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
18.1 s	53 s	29 s	19 s	37.1 s
 Ø5	 Ø6			
18.1 s	53 s			

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (Fut)

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	8	253	78	9	49	219	1201	80	41	1342	190
Future Volume (vph)	214	8	253	78	9	49	219	1201	80	41	1342	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	12	12	12	12	11	12	12
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	65		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.855			0.874			0.991			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1711	1574	0	1770	3507	0	1711	3472	0
Flt Permitted	0.476			0.950			0.133			0.154		
Satd. Flow (perm)	882	1585	0	1711	1574	0	248	3507	0	277	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		275			53			6			14	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		311			128			1264			1034	
Travel Time (s)		8.5			3.5			19.2			15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	233	9	275	85	10	53	238	1305	87	45	1459	207
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	284	0	85	63	0	238	1392	0	45	1666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			30			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.04	1.04	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3			1	6		5	2	
Permitted Phases	4				8		6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	
Maximum Green (s)	7.0	9.0		7.0	9.0		7.0	23.0		7.0	23.0	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	3.0	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	33.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (Fut)

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.3	7.8		7.0	7.8		36.6	30.1		32.4	24.2	
Actuated g/C Ratio	0.22	0.11		0.10	0.11		0.53	0.43		0.47	0.35	
v/c Ratio	0.72	0.67		0.49	0.28		0.82	0.91		0.18	1.37	
Control Delay	40.3	14.8		45.6	17.3		41.1	34.3		14.8	193.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.3	14.8		45.6	17.3		41.1	34.3		14.8	193.7	
LOS	D	B		D	B		D	C		B	F	
Approach Delay		26.3			33.5			35.3			189.0	
Approach LOS		C			C			D			F	
Queue Length 50th (ft)	72	3		31	4		42	~285		7	~453	
Queue Length 95th (ft)	#268	#106		#136	47		#314	#862		44	#1065	
Internal Link Dist (ft)		231			48			1184			954	
Turn Bay Length (ft)	100						225			65		
Base Capacity (vph)	325	453		181	260		292	1528		288	1220	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.63		0.47	0.24		0.82	0.91		0.16	1.37	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 69.3

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.37

Intersection Signal Delay: 99.7

Intersection LOS: F

Intersection Capacity Utilization 91.9%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 18: Buckland Rd & Hemlock Ave/Aldi (Fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
11 s	29.4 s	11 s	14.1 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8	
11 s	29.4 s	11 s	14.1 s	

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	26.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	6	191	105	13	42	208	1127	36	42	1101	161
Future Volume (vph)	135	6	191	105	13	42	208	1127	36	42	1101	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Grade (%)		1%			0%			0%			1%	
Storage Length (ft)	265		0	0		0	285		100	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.855			0.885			0.995				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1585	0	1770	1649	0	1770	3522	0	1761	3522	1575
Flt Permitted	0.506			0.597			0.093			0.142		
Satd. Flow (perm)	938	1585	0	1112	1649	0	173	3522	0	263	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		208			46			2				117
Link Speed (mph)		25			25			45				45
Link Distance (ft)		470			164			1034				1566
Travel Time (s)		12.8			4.5			15.7				23.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	7	208	114	14	46	226	1225	39	46	1197	175
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	215	0	114	60	0	226	1264	0	46	1197	175
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			35	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.5	12.0		9.5	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	10.0	20.0		10.0	20.0		19.1	42.0		19.1	42.0	42.0
Total Split (%)	7.9%	15.7%		7.9%	15.7%		15.0%	33.0%		15.0%	33.0%	33.0%
Maximum Green (s)	5.5	15.0		5.5	15.0		16.0	37.0		16.0	37.0	37.0
Yellow Time (s)	3.5	3.0		3.5	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
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)	4.5	5.0		4.5	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		3.0	3.0		2.0	2.0		2.0	2.0	2.0

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	36.0
Total Split (s)	36.0
Total Split (%)	28%
Maximum Green (s)	32.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.6	8.3		12.8	8.3		54.5	47.1		46.3	38.5	38.5
Actuated g/C Ratio	0.18	0.10		0.15	0.10		0.63	0.54		0.53	0.44	0.44
v/c Ratio	0.59	0.63		0.55	0.30		0.74	0.66		0.19	0.76	0.23
Control Delay	44.1	16.3		43.8	22.0		33.7	20.3		12.7	27.2	9.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.1	16.3		43.8	22.0		33.7	20.3		12.7	27.2	9.3
LOS	D	B		D	C		C	C		B	C	A
Approach Delay		27.6			36.3			22.3			24.5	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	60	3		45	6		52	212		6	225	14
Queue Length 95th (ft)	#216	83		139	53		#258	#711		43	#745	95
Internal Link Dist (ft)		390			84			954			1486	
Turn Bay Length (ft)	265						285			75		235
Base Capacity (vph)	250	456		208	335		416	1916		452	1567	765
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.59	0.47		0.55	0.18		0.54	0.66		0.10	0.76	0.23

Intersection Summary

Area Type: Other

Cycle Length: 127.1

Actuated Cycle Length: 86.6

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 24.5

Intersection LOS: C

Intersection Capacity Utilization 75.3%

ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 20: Buckland Rd & Cedar Ave/Gateway (fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
19.1 s	42 s	10 s	20 s	36 s
 Ø5	 Ø6	 Ø7	 Ø8	
19.1 s	42 s	10 s	20 s	

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	25.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	95	190	64	71	47	137	1195	61	46	923	52
Future Volume (vph)	37	95	190	64	71	47	137	1195	61	46	923	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	11	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.940			0.993			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1984	0	1719	3532	0	1752	3476	0
Flt Permitted	0.661			0.690			0.165			0.127		
Satd. Flow (perm)	1219	1844	1567	1285	1984	0	299	3532	0	234	3476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207		25			5			6	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		491			1149			1566			1041	
Travel Time (s)		11.2			26.1			23.7			15.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	103	207	70	77	51	149	1299	66	50	1003	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	103	207	70	128	0	149	1365	0	50	1060	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			20			20	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	1.04	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0		10.0	40.0		10.0	40.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
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)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5	2.5	2.5	2.5		2.0	2.5		2.0	2.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%
Maximum Green (s)	25.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Build Costco
Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	11.0	11.0	11.0	11.0	11.0		49.4	42.4		43.9	35.9	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.66	0.57		0.59	0.48	
v/c Ratio	0.22	0.38	0.51	0.37	0.41		0.43	0.68		0.20	0.63	
Control Delay	36.2	37.0	10.5	39.0	30.7		11.2	17.8		9.7	19.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.2	37.0	10.5	39.0	30.7		11.2	17.8		9.7	19.1	
LOS	D	D	B	D	C		B	B		A	B	
Approach Delay		21.2			33.7			17.2			18.7	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	16	41	0	28	41		14	191		4	142	
Queue Length 95th (ft)	59	121	66	91	126		95	#688		38	453	
Internal Link Dist (ft)		411			1069			1486			961	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	343	520	590	362	577		400	2008		367	1964	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.20	0.35	0.19	0.22		0.37	0.68		0.14	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 114.2

Actuated Cycle Length: 74.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 19.2

Intersection LOS: B

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 22: Buckland Rd & Deming St

 Ø1	 Ø2	 Ø4	 Ø9
14 s	46.2 s	25 s	29 s
 Ø5	 Ø6		
14 s	46.2 s		

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk

Build Costco

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	311	111	145	179	248	87	943	139	271	975	10
Future Volume (vph)	380	311	111	145	179	248	87	943	139	271	975	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		300	435		0	200		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.960				0.850		0.981			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3398	0	1770	1863	1583	1770	3472	0	1770	3532	0
Flt Permitted	0.425			0.488			0.112			0.101		
Satd. Flow (perm)	792	3398	0	909	1863	1583	209	3472	0	188	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								9			1	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		708			584			1156			721	
Travel Time (s)		12.1			10.0			17.5			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	338	121	158	195	270	95	1025	151	295	1060	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	413	459	0	158	195	270	95	1176	0	295	1071	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Detector Phase	1	6		5	2	2	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	22.4		9.0	22.4	22.4	9.0	18.2		9.0	18.2	
Total Split (s)	24.0	42.4		24.0	42.4	42.4	19.0	43.2		19.0	43.2	
Total Split (%)	15.0%	26.6%		15.0%	26.6%	26.6%	11.9%	27.1%		11.9%	27.1%	
Maximum Green (s)	20.0	35.0		20.0	35.0	35.0	15.0	35.0		15.0	35.0	
Yellow Time (s)	3.0	4.4		3.0	4.4	4.4	3.0	4.2		3.0	4.2	
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	4.0		1.0	4.0	
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)	4.0	7.4		4.0	7.4	7.4	4.0	8.2		4.0	8.2	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	2.5		1.5	2.5	2.5	1.5	2.0		1.5	2.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	19%
Maximum Green (s)	27.0
Yellow Time (s)	4.0
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

Costco at Evergreen Walk

Build Costco

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	51.0	32.2		38.7	23.6	23.6	48.3	35.7		58.8	42.6	
Actuated g/C Ratio	0.41	0.26		0.31	0.19	0.19	0.39	0.29		0.48	0.34	
v/c Ratio	0.85	0.52		0.43	0.55	0.90	0.51	1.17		1.04	0.88	
Control Delay	46.9	43.2		29.0	52.4	81.0	32.6	125.4		96.3	48.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	46.9	43.2		29.0	52.4	81.0	32.6	125.4		96.3	48.7	
LOS	D	D		C	D	F	C	F		F	D	
Approach Delay		45.0			58.9			118.5			59.0	
Approach LOS		D			E			F			E	
Queue Length 50th (ft)	225	153		72	133	198	36	~534		167	382	
Queue Length 95th (ft)	#446	290		168	265	#399	112	#1045		#555	#907	
Internal Link Dist (ft)		628			504			1076			641	
Turn Bay Length (ft)				300		300	435			200		
Base Capacity (vph)	487	984		489	536	456	285	1007		284	1216	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.85	0.47		0.32	0.36	0.59	0.33	1.17		1.04	0.88	

Intersection Summary

Area Type: Other

Cycle Length: 159.6

Actuated Cycle Length: 123.7

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.17

Intersection Signal Delay: 74.3

Intersection LOS: E

Intersection Capacity Utilization 98.7%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

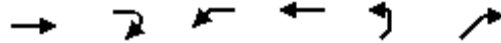
Splits and Phases: 25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30)

Ø1	Ø2	Ø3	Ø4	Ø9
24 s	42.4 s	19 s	43.2 s	31 s
Ø5	Ø6	Ø7	Ø8	
24 s	42.4 s	19 s	43.2 s	

Lane Group	Ø9
Flash Dont Walk (s)	20.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
37: Tamarack Ave & Deming St

Build Costco
Timing Plan: PM



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	183	34	91	167	46	159
Future Volume (vph)	183	34	91	167	46	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Storage Length (ft)		0	235		0	200
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.979					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2067	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2067	0	1770	1863	1770	1583
Link Speed (mph)	45			45	45	
Link Distance (ft)	1140			491	573	
Travel Time (s)	17.3			7.4	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	37	99	182	50	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	236	0	99	182	50	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 30.1% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	4.5					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	183	34	91	167	46	159
Future Vol, veh/h	183	34	91	167	46	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	200
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	199	37	99	182	50	173
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	236	0	598	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	380	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1331	-	465	822
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1331	-	431	822
Mov Cap-2 Maneuver	-	-	-	-	431	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	640	-
Approach	EB	WB		NE		
HCM Control Delay, s	0	2.8		11.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	431	822	-	-	1331	-
HCM Lane V/C Ratio	0.116	0.21	-	-	0.074	-
HCM Control Delay (s)	14.4	10.5	-	-	7.9	-
HCM Lane LOS	B	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.8	-	-	0.2	-

Costco at Evergreen Walk
46: Clark St & Rte 30

Build Costco
Timing Plan: PM

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	504	172	115	403	207	153
Future Volume (vph)	504	172	115	403	207	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966					0.850
Flt Protected				0.989	0.950	
Satd. Flow (prot)	1799	0	0	1842	1770	1583
Flt Permitted				0.477	0.950	
Satd. Flow (perm)	1799	0	0	889	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	28					166
Link Speed (mph)	40			40	30	
Link Distance (ft)	396			389	1672	
Travel Time (s)	6.8			6.6	38.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	548	187	125	438	225	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	735	0	0	563	225	166
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	18.0		3.0	18.0	7.0	7.0
Minimum Split (s)	24.5		7.0	24.5	11.0	11.0
Total Split (s)	51.5		9.0	60.5	29.0	29.0
Total Split (%)	57.5%		10.1%	67.6%	32.4%	32.4%
Maximum Green (s)	45.0		5.0	54.0	25.0	25.0
Yellow Time (s)	4.4		3.0	4.4	3.0	3.0
All-Red Time (s)	2.1		1.0	2.1	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.5			6.5	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	Min		Max	Min	None	None
Act Effect Green (s)	45.1			54.1	15.4	15.4

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.56			0.68	0.19	0.19
v/c Ratio	0.72			0.89	0.66	0.38
Control Delay	18.2			31.2	39.6	7.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	18.2			31.2	39.6	7.3
LOS	B			C	D	A
Approach Delay	18.2			31.2	25.9	
Approach LOS	B			C	C	
Queue Length 50th (ft)	238			112	105	0
Queue Length 95th (ft)	448			#347	175	47
Internal Link Dist (ft)	316			309	1592	
Turn Bay Length (ft)						100
Base Capacity (vph)	1026			631	554	609
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.72			0.89	0.41	0.27

Intersection Summary

Area Type: Other

Cycle Length: 89.5

Actuated Cycle Length: 80

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 90.2%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 46: Clark St & Rte 30



Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	90	515	145	100	42	630	1345	85	173	1342	75
Future Volume (vph)	120	90	515	145	100	42	630	1345	85	173	1342	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		2%			-1%			0%			0%	
Storage Length (ft)	0		250	250		200	340		250	200		0
Storage Lanes	0		1	1		1	2		1	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.992	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	3406	1567	1778	1872	1591	3433	3539	1583	1770	3511	0
Flt Permitted		0.972		0.950			0.950			0.950		
Satd. Flow (perm)	0	3406	1567	1778	1872	1591	3433	3539	1583	1770	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			424			56			59		4	
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		711			519			462			1264	
Travel Time (s)		16.2			11.8			7.0			19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	98	560	158	109	46	685	1462	92	188	1459	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	228	560	158	109	46	685	1462	92	188	1541	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		20			16			16			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Split	NA	custom	Split	NA	custom	Prot	NA	custom	Prot	NA	
Protected Phases	4	4	4	3	3	3	5	2	2	1	6	
Permitted Phases			5			1			3			
Detector Phase	4	4	4	3	3	3	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0	9.0	6.0	15.0	15.0	6.0	15.0	
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	12.1	20.0	20.0	9.1	20.0	
Total Split (s)	19.0	19.0	19.0	29.0	29.0	29.0	19.0	53.0	53.0	19.0	53.0	
Total Split (%)	12.1%	12.1%	12.1%	18.5%	18.5%	18.5%	12.1%	33.7%	33.7%	12.1%	33.7%	
Maximum Green (s)	15.0	15.0	15.0	25.0	25.0	25.0	15.9	48.0	48.0	15.9	48.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	0.1	2.0	2.0	0.1	2.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0	3.1	5.0	5.0	3.1	5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5	3.5	2.0	3.5	
Recall Mode	None	None	None	Min	Min	Min	None	Min	Min	None	Min	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.1
Total Split (s)	37.1
Total Split (%)	24%
Maximum Green (s)	35.1
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

Costco at Evergreen Walk
16: Buckland Rd & Tamarack Ave/Lowes/Target

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		13.3	32.3	14.8	14.8	30.3	16.4	49.4	68.3	16.4	49.4	
Actuated g/C Ratio		0.11	0.28	0.13	0.13	0.26	0.14	0.43	0.59	0.14	0.43	
v/c Ratio		0.58	0.76	0.70	0.46	0.10	1.42	0.97	0.10	0.76	1.03	
Control Delay		58.1	16.3	67.3	55.8	4.4	237.0	51.3	6.8	69.6	65.3	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		58.1	16.3	67.3	55.8	4.4	237.0	51.3	6.8	69.6	65.3	
LOS		E	B	E	E	A	F	D	A	E	E	
Approach Delay		28.4			54.0			106.3			65.8	
Approach LOS		C			D			F			E	
Queue Length 50th (ft)		78	74	107	72	0	~327	502	9	127	551	
Queue Length 95th (ft)		172	#270	235	169	13	#698	#1192	51	#383	#1291	
Internal Link Dist (ft)		631			439			382			1184	
Turn Bay Length (ft)			250	250		200	340		250	200		
Base Capacity (vph)		452	739	393	414	599	483	1504	955	249	1494	
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio		0.50	0.76	0.40	0.26	0.08	1.42	0.97	0.10	0.76	1.03	

Intersection Summary

Area Type: Other

Cycle Length: 157.1

Actuated Cycle Length: 116.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.42

Intersection Signal Delay: 77.1

Intersection LOS: E

Intersection Capacity Utilization 90.2%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 16: Buckland Rd & Tamarack Ave/Lowes/Target

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
19 s	53 s	29 s	19 s	37.1 s
 Ø5	 Ø6			
19 s	53 s			

Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	30.1
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (fut)

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	9	342	86	9	55	290	1160	100	46	1283	235
Future Volume (vph)	202	9	342	86	9	55	290	1160	100	46	1283	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			0%			0%	
Storage Length (ft)	100		0	0		0	225		0	70		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			50			50		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.854			0.871			0.988			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	1583	0	1770	1622	0	1770	3497	0	1770	3458	0
Flt Permitted	0.495			0.950			0.135			0.156		
Satd. Flow (perm)	917	1583	0	1770	1622	0	251	3497	0	291	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		372			60			8			19	
Link Speed (mph)		25			25			45			45	
Link Distance (ft)		311			128			1264			1034	
Travel Time (s)		8.5			3.5			19.2			15.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	220	10	372	93	10	60	315	1261	109	50	1395	255
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	382	0	93	70	0	315	1370	0	50	1650	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			16			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			40			30	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3			1	6		5	2	
Permitted Phases	4				8		6			2		
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	9.0	12.1		9.0	12.1		9.0	21.4		9.0	21.4	
Total Split (s)	11.0	14.1		11.0	14.1		11.0	29.4		11.0	29.4	
Total Split (%)	10.7%	13.8%		10.7%	13.8%		10.7%	28.7%		10.7%	28.7%	
Maximum Green (s)	7.0	9.0		7.0	9.0		7.0	23.0		7.0	23.0	
Yellow Time (s)	3.0	3.3		3.0	3.3		3.0	4.4		3.0	4.4	
All-Red Time (s)	1.0	1.8		1.0	1.8		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	5.1		4.0	5.1		4.0	6.4		4.0	6.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	36%
Maximum Green (s)	35.0
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)	1.0
Recall Mode	None

Costco at Evergreen Walk
18: Buckland Rd & Hemlock Ave/Aldi (fut)

Build
Timing Plan: SAT



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	17.1	8.0		7.1	8.0		36.2	29.6		32.1	23.9	
Actuated g/C Ratio	0.24	0.11		0.10	0.11		0.50	0.41		0.45	0.33	
v/c Ratio	0.66	0.75		0.53	0.30		1.12	0.95		0.20	1.42	
Control Delay	37.0	15.7		47.7	16.9		113.9	39.5		15.4	217.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.0	15.7		47.7	16.9		113.9	39.5		15.4	217.6	
LOS	D	B		D	B		F	D		B	F	
Approach Delay		23.5			34.5			53.4			211.6	
Approach LOS		C			C			D			F	
Queue Length 50th (ft)	67	4		34	4		~88	267		8	~445	
Queue Length 95th (ft)	#249	#140		#150	50		#448	#865		49	#1075	
Internal Link Dist (ft)		231			48			1184			954	
Turn Bay Length (ft)	100						225			70		
Base Capacity (vph)	334	529		179	263		280	1445		286	1162	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.66	0.72		0.52	0.27		1.13	0.95		0.17	1.42	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 71.9

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.42

Intersection Signal Delay: 113.1

Intersection LOS: F

Intersection Capacity Utilization 101.7%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 18: Buckland Rd & Hemlock Ave/Aldi (fut)

Ø1	Ø2	Ø3	Ø4	Ø9
11 s	29.4 s	11 s	14.1 s	37 s
Ø5	Ø6	Ø7	Ø8	
11 s	29.4 s	11 s	14.1 s	

Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	30.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	9	261	107	8	34	234	993	55	65	1177	175
Future Volume (vph)	158	9	261	107	8	34	234	993	55	65	1177	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	12	12	12	12	12	12	12	12
Storage Length (ft)	265		0	0		0	285		100	75		235
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.855			0.879			0.992				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1593	0	1770	1637	0	1770	3511	0	1770	3539	1583
Flt Permitted	0.500						0.097			0.177		
Satd. Flow (perm)	931	1593	0	1863	1637	0	181	3511	0	330	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		284			37			6				139
Link Speed (mph)		25			45			45				45
Link Distance (ft)		470			206			1034				1566
Travel Time (s)		12.8			3.1			15.7				23.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	10	284	116	9	37	254	1079	60	71	1279	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	294	0	116	46	0	254	1139	0	71	1279	190
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		16			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8			6			2		2
Detector Phase	7	4		3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	7.0		5.0	7.0		4.0	10.0		4.0	10.0	10.0
Minimum Split (s)	9.0	12.0		9.0	12.0		7.1	15.0		7.1	15.0	15.0
Total Split (s)	9.0	12.0		9.0	12.0		13.0	53.0		9.0	49.0	49.0
Total Split (%)	7.5%	10.0%		7.5%	10.0%		10.8%	44.2%		7.5%	40.8%	40.8%
Maximum Green (s)	5.0	7.0		5.0	7.0		9.9	48.0		5.9	44.0	44.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	2.0		1.0	2.0		0.1	2.0		0.1	2.0	2.0
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)	4.0	5.0		4.0	5.0		3.1	5.0		3.1	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		3.0	3.0		2.0	2.0		3.0	2.0	2.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	37.0
Total Split (s)	37.0
Total Split (%)	31%
Maximum Green (s)	35.0
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

Costco at Evergreen Walk
20: Buckland Rd & Cedar Ave/Gateway (fut)

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.4	7.3		9.8	7.3		53.0	43.9		45.6	37.6	37.6
Actuated g/C Ratio	0.19	0.09		0.12	0.09		0.64	0.53		0.55	0.45	0.45
v/c Ratio	0.61	0.74		0.54	0.26		0.82	0.61		0.25	0.80	0.24
Control Delay	45.3	18.8		45.5	23.0		40.2	18.4		11.3	26.2	6.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	45.3	18.8		45.5	23.0		40.2	18.4		11.3	26.2	6.8
LOS	D	B		D	C		D	B		B	C	A
Approach Delay	28.6			39.1			22.4			23.1		
Approach LOS	C			D			C			C		
Queue Length 50th (ft)	70	4		45	4		62	177		9	242	12
Queue Length 95th (ft)	#260	#137		144	46		#342	494		55	#672	78
Internal Link Dist (ft)	390			126			954			1486		
Turn Bay Length (ft)	265						285				75	235
Base Capacity (vph)	280	398		213	177		311	2106		287	1944	790
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.61	0.74		0.54	0.26		0.82	0.54		0.25	0.66	0.24

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 83.2

Natural Cycle: 125

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 83.0%

ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 20: Buckland Rd & Cedar Ave/Gateway (fut)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
13 s	49 s	9 s	12 s	37 s
 Ø5	 Ø6	 Ø7	 Ø8	
9 s	53 s	9 s	12 s	

Lane Group	Ø9
Walk Time (s)	7.0
Flash Dont Walk (s)	28.0
Pedestrian Calls (#/hr)	1
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	56	139	55	59	41	113	1044	74	49	1209	63
Future Volume (vph)	53	56	139	55	59	41	113	1044	74	49	1209	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Grade (%)		2%			0%			-1%			2%	
Storage Length (ft)	150		0	110		0	195		0	340		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.938			0.990			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1844	1567	1770	1980	0	1778	3521	0	1752	3479	0
Flt Permitted	0.687			0.717			0.095			0.182		
Satd. Flow (perm)	1267	1844	1567	1336	1980	0	178	3521	0	336	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151		27			7			5	
Link Speed (mph)		30			25			45			45	
Link Distance (ft)		491			1149			1566			1041	
Travel Time (s)		11.2			31.3			23.7			15.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	61	151	60	64	45	123	1135	80	53	1314	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	61	151	60	109	0	123	1215	0	53	1382	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		25			16			25			25	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.00	0.85	1.00	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4	4		2			6		
Detector Phase	4	4	4	4	4		5	2		1	6	
Switch Phase												
Minimum Initial (s)	9.0	9.0	9.0	9.0	9.0		4.0	15.0		4.0	15.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0		8.0	21.2		8.0	21.2	
Total Split (s)	25.0	25.0	25.0	25.0	25.0		14.0	46.2		14.0	46.2	
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%		12.3%	40.5%		12.3%	40.5%	
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0		10.0	40.0		10.0	40.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	4.2		3.0	4.2	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		1.0	2.0		1.0	2.0	
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)	5.0	5.0	5.0	5.0	5.0		4.0	6.2		4.0	6.2	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.5		2.0	2.5	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Grade (%)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	29.0
Total Split (s)	29.0
Total Split (%)	25%
Maximum Green (s)	27.0
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

Costco at Evergreen Walk
22: Buckland Rd & Deming St

Build
Timing Plan: SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	10.4	10.4	10.4	10.4	10.4		53.8	46.9		49.2	41.3	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13		0.68	0.59		0.62	0.52	
v/c Ratio	0.35	0.25	0.45	0.34	0.38		0.45	0.58		0.17	0.76	
Control Delay	40.5	36.5	11.3	40.0	30.5		14.4	15.5		8.5	21.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.5	36.5	11.3	40.0	30.5		14.4	15.5		8.5	21.3	
LOS	D	D	B	D	C		B	B		A	C	
Approach Delay		23.3			33.9			15.4			20.8	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	24	25	0	25	33		11	157		5	210	
Queue Length 95th (ft)	79	79	58	81	106		89	#554		39	#720	
Internal Link Dist (ft)		411			1069			1486			961	
Turn Bay Length (ft)	150			110			195			340		
Base Capacity (vph)	331	482	521	349	537		332	2096		414	1821	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.13	0.29	0.17	0.20		0.37	0.58		0.13	0.76	

Intersection Summary

Area Type: Other

Cycle Length: 114.2

Actuated Cycle Length: 78.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 19.4

Intersection LOS: B

Intersection Capacity Utilization 65.0%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 22: Buckland Rd & Deming St

 Ø1	 Ø2	 Ø4	 Ø9
14 s	46.2 s	25 s	29 s
 Ø5	 Ø6		
14 s	46.2 s		

Lane Group	Ø9
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	20.0
Pedestrian Calls (#/hr)	3
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	220	148	178	138	228	104	778	166	215	915	10
Future Volume (vph)	280	220	148	178	138	228	104	778	166	215	915	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	300		300	435		0	200		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			75			75			75		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.940				0.850		0.974			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3327	0	1770	1863	1583	1770	3447	0	1770	3532	0
Flt Permitted	0.637			0.472			0.156			0.141		
Satd. Flow (perm)	1187	3327	0	879	1863	1583	291	3447	0	263	3532	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								17			1	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		708			584			1156			721	
Travel Time (s)		12.1			10.0			17.5			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	239	161	193	150	248	113	846	180	234	995	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	304	400	0	193	150	248	113	1026	0	234	1006	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			30	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Detector Phase	1	6		5	2	2	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	15.0		5.0	15.0	15.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	9.0	22.4		9.0	22.4	22.4	14.0	18.2		14.0	18.2	
Total Split (s)	14.0	37.4		14.0	37.4	37.4	14.0	33.2		14.0	33.2	
Total Split (%)	10.8%	28.9%		10.8%	28.9%	28.9%	10.8%	25.6%		10.8%	25.6%	
Maximum Green (s)	10.0	30.0		10.0	30.0	30.0	10.0	25.0		10.0	25.0	
Yellow Time (s)	3.0	4.4		3.0	4.4	4.4	3.0	4.2		3.0	4.2	
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	1.0	4.0		1.0	4.0	
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)	4.0	7.4		4.0	7.4	7.4	4.0	8.2		4.0	8.2	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	5.5		1.5	5.5	5.5	1.5	5.0		1.5	2.0	
Recall Mode	None	Min		None	Min	Min	None	None		None	None	
Walk Time (s)												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	24%
Maximum Green (s)	29.0
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

Costco at Evergreen Walk

Build

25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30) Timing Plan: SAT



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	35.2	21.5		33.6	20.7	20.7	37.6	25.7		42.7	28.3	
Actuated g/C Ratio	0.37	0.22		0.35	0.22	0.22	0.39	0.27		0.45	0.30	
v/c Ratio	0.61	0.54		0.49	0.37	0.73	0.49	1.09		0.84	0.96	
Control Delay	29.6	36.8		26.1	36.3	49.3	26.6	92.8		48.9	55.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	29.6	36.8		26.1	36.3	49.3	26.6	92.8		48.9	55.4	
LOS	C	D		C	D	D	C	F		D	E	
Approach Delay		33.7			38.4			86.3			54.2	
Approach LOS		C			D			F			D	
Queue Length 50th (ft)	115	104		68	71	128	33	~322		73	281	
Queue Length 95th (ft)	282	208		178	171	289	115	#767		#355	#752	
Internal Link Dist (ft)		628			504			1076			641	
Turn Bay Length (ft)				300		300	435			200		
Base Capacity (vph)	499	1071		411	599	509	281	937		279	1045	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.37		0.47	0.25	0.49	0.40	1.09		0.84	0.96	

Intersection Summary

Area Type: Other

Cycle Length: 129.6

Actuated Cycle Length: 95.7

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 57.7

Intersection LOS: E

Intersection Capacity Utilization 86.4%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

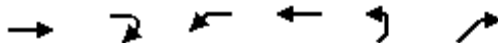
Splits and Phases: 25: Buckland Rd/Sullivan Ave (Rte 194) & Ellington Rd (Rte 30)/Oakland Rd (Rte 30)

 Ø1	 Ø2	 Ø3	 Ø4	 Ø9
14 s	37.4 s	14 s	33.2 s	31 s
 Ø5	 Ø6	 Ø7	 Ø8	
14 s	37.4 s	14 s	33.2 s	

Lane Group	Ø9
Flash Dont Walk (s)	22.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Costco at Evergreen Walk
37: Tamarack Ave & Deming St

Build
Timing Plan: SAT



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↻		↻	↻	↻	↻
Traffic Volume (vph)	130	44	113	115	36	108
Future Volume (vph)	130	44	113	115	36	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	12	12	12	12
Storage Length (ft)		0	235		0	175
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	2039	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	2039	0	1770	1863	1770	1583
Link Speed (mph)	35			35	25	
Link Distance (ft)	1140			491	573	
Travel Time (s)	22.2			9.6	15.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	48	123	125	39	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	123	125	39	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.85	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 29.1% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	4.5					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	130	44	113	115	36	108
Future Vol, veh/h	130	44	113	115	36	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	235	-	0	175
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	141	48	123	125	39	117
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	189	0	536	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1385	-	505	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	698	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1385	-	460	879
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	636	-
Approach	EB	WB		NE		
HCM Control Delay, s	0	3.9		10.7		
HCM LOS	B					
Minor Lane/Major Mvmt	NELn1	NELn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	460	879	-	-	1385	-
HCM Lane V/C Ratio	0.085	0.134	-	-	0.089	-
HCM Control Delay (s)	13.6	9.7	-	-	7.9	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.5	-	-	0.3	-

Costco at Evergreen Walk
46: Clark St & Rte 30

Build
Timing Plan: SAT

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	113	95	299	152	119
Future Volume (vph)	269	113	95	299	152	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	0		0	100
Storage Lanes		0	0		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.960					0.850
Flt Protected				0.988	0.950	
Satd. Flow (prot)	1788	0	0	1840	1770	1583
Flt Permitted				0.722	0.950	
Satd. Flow (perm)	1788	0	0	1345	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	34					129
Link Speed (mph)	40			40	30	
Link Distance (ft)	428			566	1653	
Travel Time (s)	7.3			9.6	37.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	123	103	325	165	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	415	0	0	428	165	129
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	18.0		3.0	18.0	7.0	7.0
Minimum Split (s)	24.5		7.0	24.5	11.0	11.0
Total Split (s)	51.5		9.0	60.5	29.0	29.0
Total Split (%)	57.5%		10.1%	67.6%	32.4%	32.4%
Maximum Green (s)	45.0		5.0	54.0	25.0	25.0
Yellow Time (s)	4.4		3.0	4.4	3.0	3.0
All-Red Time (s)	2.1		1.0	2.1	1.0	1.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.5			6.5	4.0	4.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	2.0
Recall Mode	Min		Max	Min	None	None
Act Effect Green (s)	18.8			27.8	9.2	9.2

Costco at Evergreen Walk
46: Clark St & Rte 30

Build
Timing Plan: SAT

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Actuated g/C Ratio	0.39			0.58	0.19	0.19
v/c Ratio	0.57			0.53	0.48	0.32
Control Delay	14.5			9.0	22.4	6.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	14.5			9.0	22.4	6.4
LOS	B			A	C	A
Approach Delay	14.5			9.0	15.4	
Approach LOS	B			A	B	
Queue Length 50th (ft)	75			51	40	0
Queue Length 95th (ft)	164			119	90	33
Internal Link Dist (ft)	348			486	1573	
Turn Bay Length (ft)						100
Base Capacity (vph)	1698			1367	935	896
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.24			0.31	0.18	0.14

Intersection Summary

Area Type: Other

Cycle Length: 89.5

Actuated Cycle Length: 47.6

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 64.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 46: Clark St & Rte 30

