TENW
Transportation Engineering NorthWest

MEMORANDUM

DATE: April 8, 2019

TO: Kendra Dedinsky, PE, City of Shoreline Traffic Engineer
Jamas Gwillam, Merlone Geier Partners

FROM: Michael J. Read, PE, Principal, TENW

SUBJECT: Shoreline Place - Transportation Consistency/Traffic Impact Analysis
Expanded Study

This memorandum documents both a transportation consistency analysis of specific transportation evaluations and land use assumptions documented in the *Aurora Square Community Renewal Area (CRA)* and project-level EIS analysis, as well as a traffic impact analysis to ensure functionality of existing and proposed site access roadways and operations of intersections consistent with the City of Shoreline Concurrency requirements based upon the proposed *Shoreline Place* redevelopment project. As one of the first redevelopment projects within the Aurora Square CRA, this consistency and traffic impact analysis provides the following transportation-related items:

- A comparative trip generation analysis of the *Shoreline Place* project in contrast to existing commercial retail uses within the Sears property using trip generation rates published by ITE in the *Trip Generation Manual, 10th, Edition*, 2017. A comparative analysis with the EIS assumptions and conclusions document the remaining trip entitlements within the overall Aurora Square CRA.
- A review of traffic operations and vehicle queueing at existing or proposed future driveways (two existing on N 160th Street and two onto Westminster Way) as well as several off site intersections with buildout of *Shoreline Place* to ensure City Transportation Concurrency standards are met. Traffic forecasts consider growth rates applied in the *Aurora Square Planned Action EIS*, buildout of the adjacent Alexan Apartment project, and employment growth expected at the WSDOT Headquarters building.
- A review of existing/proposed truck access driveways to ensure no impacts to adjacent existing retail owners/tenants within the Aurora Square CRA and an identification of truck access driveways and routing to ensure goods mobility and freight deliveries.
- An overview of a designated bikeway through the *Shoreline Place* project site.
- An overview of transportation improvements necessitated as a result of frontage along public rights-of-way and contributions towards specific projects determined as Priority Renewal projects within the Aurora Square CRA.

Project Trip Generation

Using the latest edition of the *Trip Generation Manual, 10th Edition,* 2017, TENW prepared the estimated vehicle trip generation as a result of the *Shoreline Place* project within the Aurora Square CRA. A site vicinity map with study intersections is provided in Figure 1, while a conceptual site plan is provided in Attachment A. For trip generation/traffic analysis purposes, a total of 1,358

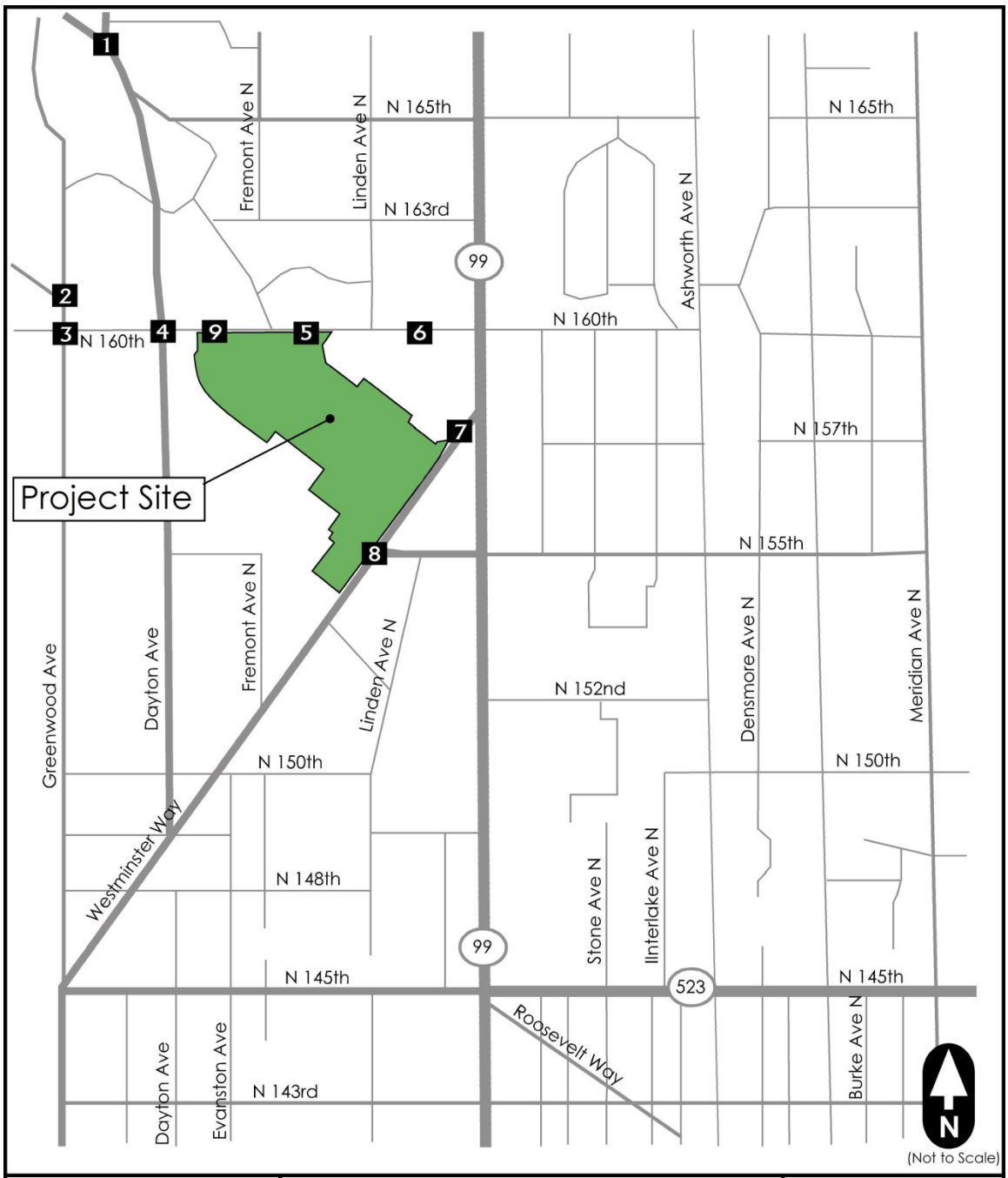

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Figure 1
Project Site Vicinity

Shoreline Place
Transportation Consistency Analysis

residential apartments with 59,160 square-feet of new retail and 13,000 square-feet of sit-down quality restaurant were assumed. An existing bank with drive-thru within the property boundary (3,450 square feet) would remain.

The primary retail center that would be removed as part of the *Shoreline Place* project is a former Sears Retail complex. For the purposes of the transportation analysis, the series of buildings comprised approximately 143,753 square-feet of net retail space, 72,193 square-feet of net warehouse/storage (appliance distribution center), 20,000 square-feet of office (administrative/call-center), and 50,042 square-feet in auto center/tire store services. It should be noted that approximately 286,000 square feet of existing commercial building space was assumed to be removed as part of the *Shoreline Place* project for traffic analysis purposes (with a total floor area of up to 333,600 square-feet determined as of March 2019).

As shown in Table 1, a total of approximately 505 new a.m. peak hour (142 entering and 363 exiting), and 651 new p.m. peak hour vehicular trips (392 entering and 259 exiting) would be generated at full buildout of *Shoreline Place*. It should be noted that these net vehicle trips do not account for removal of the Sears retail complex or pass-by trips. Detailed trip generation tables are provided in Attachment B, and where appropriate, fitted curve equations were applied. Consistent with the CRA EIS assumptions, NCHRP 684 methodology was applied to estimate internal trips that would remain within the development.

Table 1: Shoreline Place Net Trip Generation Summary

Time Period	In	Out	Total
Standard ITE Rates with Pass-By/Internal Adjustments			
Weekday AM Peak Hour	142	363	505
Weekday PM Peak Hour	392	259	651

Source: Trip Generation Manual, 10th Edition, ITE, 2017.

Comparative Trip Generation Analysis with the CRA EIS

The *Aurora Square Planned Action EIS* modeled three redevelopment scenarios, with redevelopment that would include remove and replace approximately 433,000 square-feet of existing retail uses and construct up to 1,000 new apartment units, 250,000 square-feet of additional retail and 250,000 square-feet of new office uses under the highest approved land use scenario (Alternative 3).

As summarized in Table 2, the relative increase in vehicle trip generation contemplated within the *Aurora Square Planned Action EIS* would range from zero (0) under the No Action Alternative to approximately 808 new p.m. peak hour trips under Alternative 3 (City adopted Alternative 3 as referenced in the Addendum to the *Aurora Square Planned Action Draft Environmental Impact Statement* (December 12, 2014) and *Final Environmental Impact Statement* (July 24, 2015), issued on March 8, 2019.

Under the *Shoreline Place* redevelopment scenario (accounting for removal of existing Sears retail complex and internal/pass-by trips), a net increase of 99 new p.m. peak hour trips (132 new entering trips and 33 fewer existing trips) would be generated in comparison to existing land uses. When considering Shoreline Place, the adjacent Alexan Apartment complex, and WSDOT employment growth, the net change is estimated at 264 new trips in total, well below

the EIS threshold of 808 new p.m. peak hour trips under a cumulative comparison. A detailed summary of land use and vehicle trip generation assumptions of the EIS trip thresholds is provided in Attachment C. As such, the proposed Shoreline Place project is consistent with the traffic analysis and land use assumptions of the *Aurora Square Planned Action EIS*.

Table 2: EIS PM Trip Threshold Comparisons

Scenario	In	Out	Total	Net Change
No Action	453	594	1,047	**0**
Alternative 2	633	812	1,445	**+398**
Alternative 3	817	1,038	1,855	**+808**
Shoreline Place (only)	585	561	1,146	**+99**
Shoreline Place + Alexan Apts (+85)+ WSDOT Growth (+80)	+87=672	+78=629	+165=1,311	**+264**

Source: Aurora Square CRA EIS and the Trip Generation Manual, 10th Edition, ITE, 2017.

Traffic Impact Analysis

To ensure compliance with the City's Transportation Concurrency standards and to evaluate consistency with the traffic operational results of the *Aurora Square Planned Action EIS* transportation analysis, intersection level of service (LOS) analyses were conducted at all site driveways and additional off-site intersections northwest of the Shoreline Place project per the direction of the City Traffic Engineer. Intersection level of service analysis reviewed future baseline conditions under a 20-year buildout horizon year (2039) and with new project traffic generated at full buildout of the *Shoreline Place* project.

2039 Baseline Traffic Forecasts

To evaluate project traffic operations at full buildout of *Shoreline Place*, review of the traffic projections within the *Aurora Square Planned Action EIS* was conducted by TENW. As provided in Attachment D, the average annual growth rate between 2013 and 2030 determined in the EIS was 1.2 percent per year of total entering volumes at study intersections (see Figure 1) that immediately serve the site. As such, to prepare 2039 forecasts under the buildout horizon year for Shoreline Place, this average annual growth rate was applied to all study intersections for a 21-year period using an extrapolation method of 21-years growth on traffic counts collected in 2018.

In addition to these background traffic growth rates, known pipeline traffic associated with the Alexan Apartment complex and additional employment expected at the adjacent WSDOT Headquarters building (200 new employees from the Department of Ecology) within the Aurora Square CRA area were added to these forecasts. The resultant cumulative total growth factor applied to study intersections and site driveways ranged from approximately 25 percent to 33 percent between 2018 and 2039.

To evaluate project traffic impacts, the total net increase in vehicle trip generation from the Shoreline Place project were added to the baseline 2039 traffic forecasts with additional adjustments for pass-by trips associated with proposed retail land uses. As the 2018 traffic counts did not account for any significant vehicle trip generation associated with the Sears retail complex, no adjustments to existing counts were made as a conservative approach. Adjustments were made however, to

account for removal of the off-site student parking/shuttle service that currently occurs on-site to support the Shoreline Community College. Attachment D also provides existing 2018 traffic counts and the resultant p.m. peak hour traffic forecasts for 2039 under future baseline and with project conditions.

Consistency

As part of the consistency review, a comparative analysis of detailed EIS forecasts at the intersection-level was completed with additional factoring to 2039 to ensure growth projections used in evaluation of traffic impacts associated with Shoreline Place were consistent with assumptions within the CRA EIS. As provided in Attachment E, totaling entering volumes at each study intersection within the CRA is documented and factored to 2039 under the No Action Scenario. Net increases in vehicle trips associated with known buildout within the CRA including the Alexan Apartment complex, new WSDOT trips, and Shoreline Place are identified. The resultant intersection-level total entering volumes in 2039 "with known CRA buildout" were then compared with the adopted Alternative 3 forecasts (representing a 2030 horizon year), and on an aggregate basis totaling entering traffic at all study intersections is approximately 3.7 percent lower than those levels evaluated in the CRA EIS.

At an intersection level, those study intersections that were slightly higher than EIS forecasts were forecasted at no more than 2.7 percent or less, and at those intersections within Shoreline's jurisdiction, were projected to operate at LOS D or better. At those intersections where EIS forecasts are higher using these methods, projected level of service is better than that documented in the CRA EIS. This is primarily due to the fact that the overall net increase in traffic generated by uses within the CRA is significantly lower than EIS assumptions.

Project Trip Distribution

To estimate vehicle trip distribution, existing traffic patterns at regional intersections and site access driveways as well as the distribution of land uses and proposed parking facilities on-site were all considered. As provided in Figure 2 portrays off-site trip distribution patterns as well as general site driveway trip distribution patterns. Detailed trip assignments of turning movements and directional flows are provided in Attachment D as part of 2039 Traffic Forecasts.

Intersection Level of Service Analysis

LOS refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes LOS. At signalized intersections, LOS A represents free-flow conditions-motorists experience little or no delays, and LOS F represents forced-flow conditions-motorists experience an average delay in excess of 80 seconds per vehicle. The LOS reported for signalized intersections represents the average control delay per vehicle entering the intersection. The LOS reported at stop-controlled intersections is also based on the average control delay (sec/veh) and is reported for each movement. Therefore, the reported LOS at unsignalized intersections does not represent a measure of the overall operations of the intersection.

LOS calculations for both signalized and stop-controlled intersections were calculated using the methodologies and procedures outlined in the 2010 *Highway Capacity Manual (HCM)*, Special

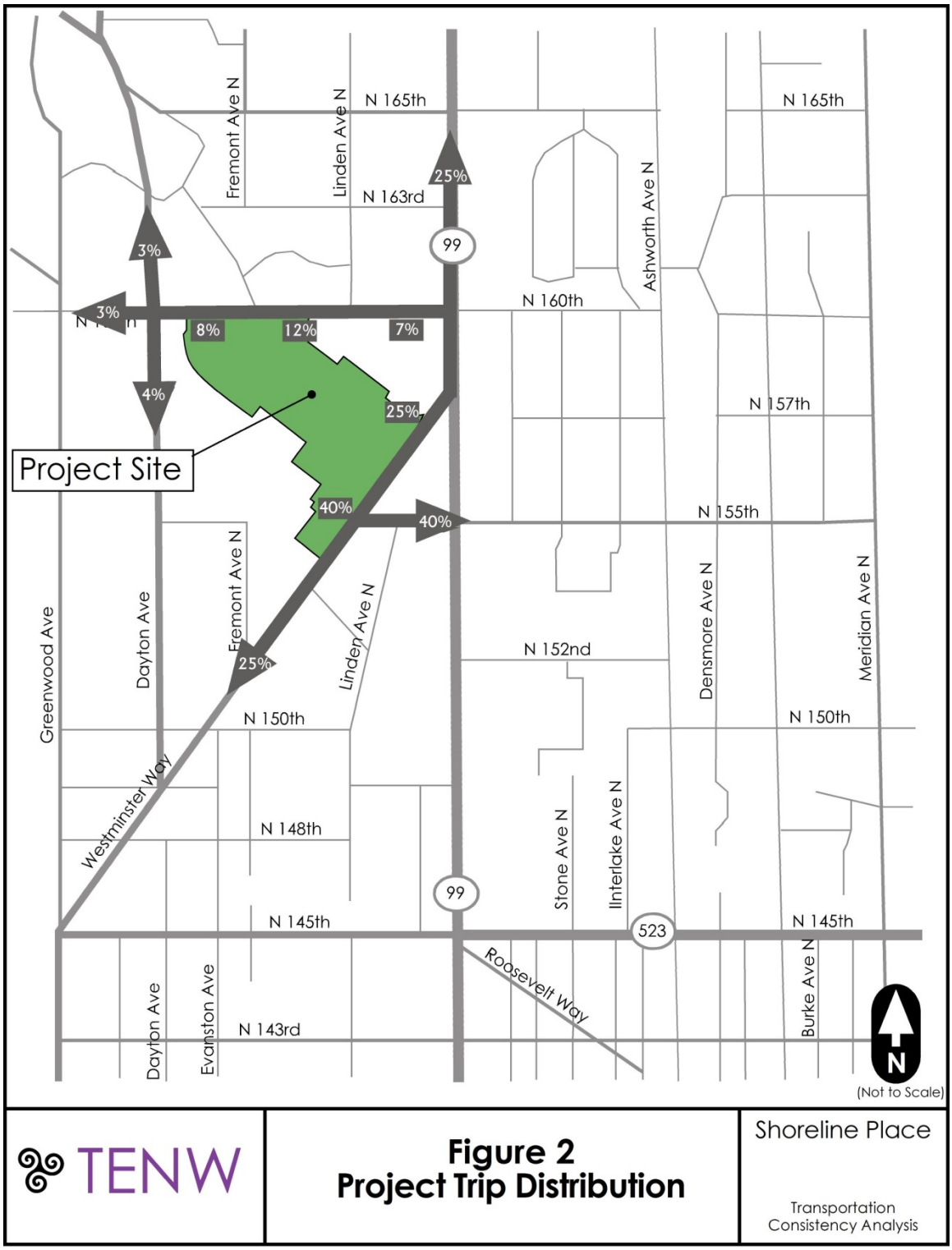

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Figure 2
Project Trip Distribution

Shoreline Place
Transportation Consistency Analysis

Report 209, Transportation Research Board (TRB). Table 3 outlines the LOS criteria for signalized and unsignalized intersections based on these methodologies.

Table 3: Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Average Delay Range (sec)	Unsignalized Intersection Delay Range (sec)
A	≤ 10	≤ 10
B	> 10 to ≤ 20	> 10 to ≤ 15
C	> 20 to ≤ 35	> 15 to ≤ 25
D	> 35 to ≤ 55	> 25 to ≤ 35
E	> 55 to ≤ 80	> 35 to ≤ 50
F	> 80	> 50

Source: "Highway Capacity Manual", Special Report 209, Transportation Research Board, 2010.

To evaluate consistency with the Aurora Square CRA EIS, intersection LOS were calculated using HCM 2010 procedures with the *Synchro 8* software program at all primary access intersections and off-site vicinity intersections northwest of the site that would serve the site. Baseline and With Project forecasts in 2039 during the p.m. peak hour are summarized in Table 4. In December 2018, the City of Shoreline and Shoreline Community College (SCC) executed a Transportation Mitigation Agreement in support of the College's buildout of student housing and Master Plan. As part of this effort, detailed modeling of transportation mitigation alternatives was completed by SCC and approved by the City of Shoreline. As the net increase in new trips generated by Shoreline Place is negligible at Study Intersections 1, 2, and 3, and as the Transportation Mitigation Agreement identifies long range transportation improvements and proportional share contributions from new development, the traffic analysis and long range improvements at these off-site intersections are documented in *Shoreline Community College Transportation Technical Report*, October 2018, Transpo Group, Inc.

Figure 3 overviews p.m. peak hour traffic forecasts in 2039 at study intersections 4 through 9, also denoting the net increase in p.m. peak hour vehicle trips that would be generated by the project. As shown, all intersections or critical stopped controlled movements are forecast to operate at LOS D or better with or without Shoreline Place in 2039. Detailed level of service summary sheets are also included in Attachment F. As reported in the *Shoreline Community College Transportation Technical Report*, October 2018, Transpo Group, Inc., Study Intersections 1, 2, and 3 would operate at LOS D or better with planned transportation mitigation by SCC and the City of Shoreline (traffic forecasts and level of service results are provided in Attachment G).

Queuing Analysis at Site Driveways

Using HCM 2010 procedures, Table 4 also includes 95th-percentile vehicle queuing estimates of critical entering/existing lanes or flows at site driveways or relevant study intersections. As shown, all exiting site driveways are estimated to experience vehicle queues of no more than 2 vehicles at stop controlled approaches and up to 6 vehicles (less than 150 feet) at the signalized approach of Westminster Way and N 155th Street. Supporting total entering and exiting traffic associated with Shoreline Place development are also summarized in Table 4 for disclosure of trip assignments that were used in the evaluation of project-level traffic impacts.

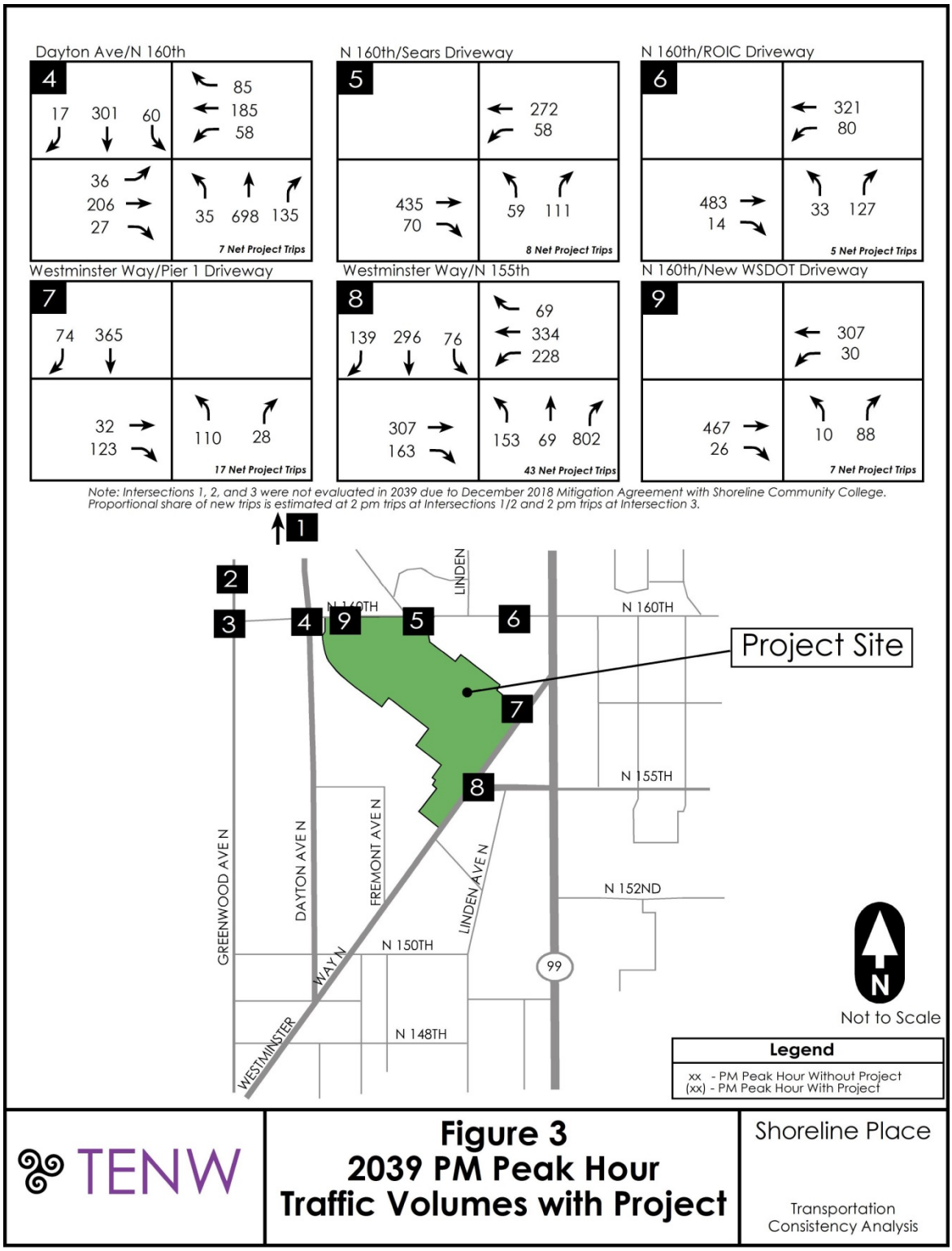

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Figure 3
2039 PM Peak Hour
Traffic Volumes with Project

Shoreline Place

Transportation Consistency Analysis

Table 4
Shoreline Place 2039 LOS/Queuing Summary Analysis

ID#	Intersection	Analysis Method	PM Peak 2039 Baseline	PM Peak 2039 With Project	With Project Vehicle Queues Enter/Exit (95th Percentile)
4	Dayton Ave/N 160th St	HCM	B	B	WB LT - 50 feet WB TH - 150 feet
5	Sears West Dr/N 160th St	HCM	C	C	NB LT - 25 feet NB RT - 25 feet
6	ROIC Dr/N 160th St	HCM	C	C	NB LT/RT - 50 feet
7	Westminster Wy/Pier 1 Dr	HCM	A	B	EB TH/RT - 25 feet
8	Westminster Wy/N 155th St	HCM	B	B	EB TH/RT - 125 feet NB LT - 250 feet EB TH - 150 feet
9	New SP NW Dr/N 160th St	HCM	--	B	NB LT/RT - 25 feet

As noted in the study document, Study Intersections 1 through 3 are not reported in this analysis, but by reference are reported in the Shoreline Community College Transportation Technical Report, Transpo Group, October 2018.

	Enter	Exit	Total
Project Trip Generation (Gross Trips)			
AM Peak Hour	166	388	554
PM Peak Hour	477	348	825
Project Trip Generation (Net New Trips)			
AM Peak Hour	142	363	505
PM Peak Hour	392	259	651
Pass-By Trips Reassigned at Driveways			
AM Peak Hour	5	5	10
PM Peak Hour	24	25	49

Net New Trips Removes Internal Trips between Uses within Shoreline Place and within the Aurora Square CRA and Removes Pass-by Trips. These figures do not account for removal of the existing Sears retail complex.

Truck Routes

Large wheel-based vehicles (semi-truck/trailer combinations) currently make regular deliveries to four separate loading docks throughout the retail core of the existing Aurora Square CRA properties. With removal of the Sears retail complex, deliveries by these large vehicles are not expected as a result of the small retail shops proposed within the Shoreline Place development. However, continued truck deliveries using WB-62 combinations would require access to Marshal's, Central Market (2 separate locations), and the Salvation Army Family Store. Figure 4 identifies these four loading dock locations and outlines existing/proposed truck entry/exit points around the Shoreline Place development. To continue truck accessibility, the planned relocated WSDOT access onto N 160th Street within the northwest quadrant of the site would provide a majority of this accessibility, while a proposed new driveway to serve truck "entering vehicles only" at the Marshall's loading dock from N 160th Street immediately east of the primary Shoreline Place driveway is proposed.

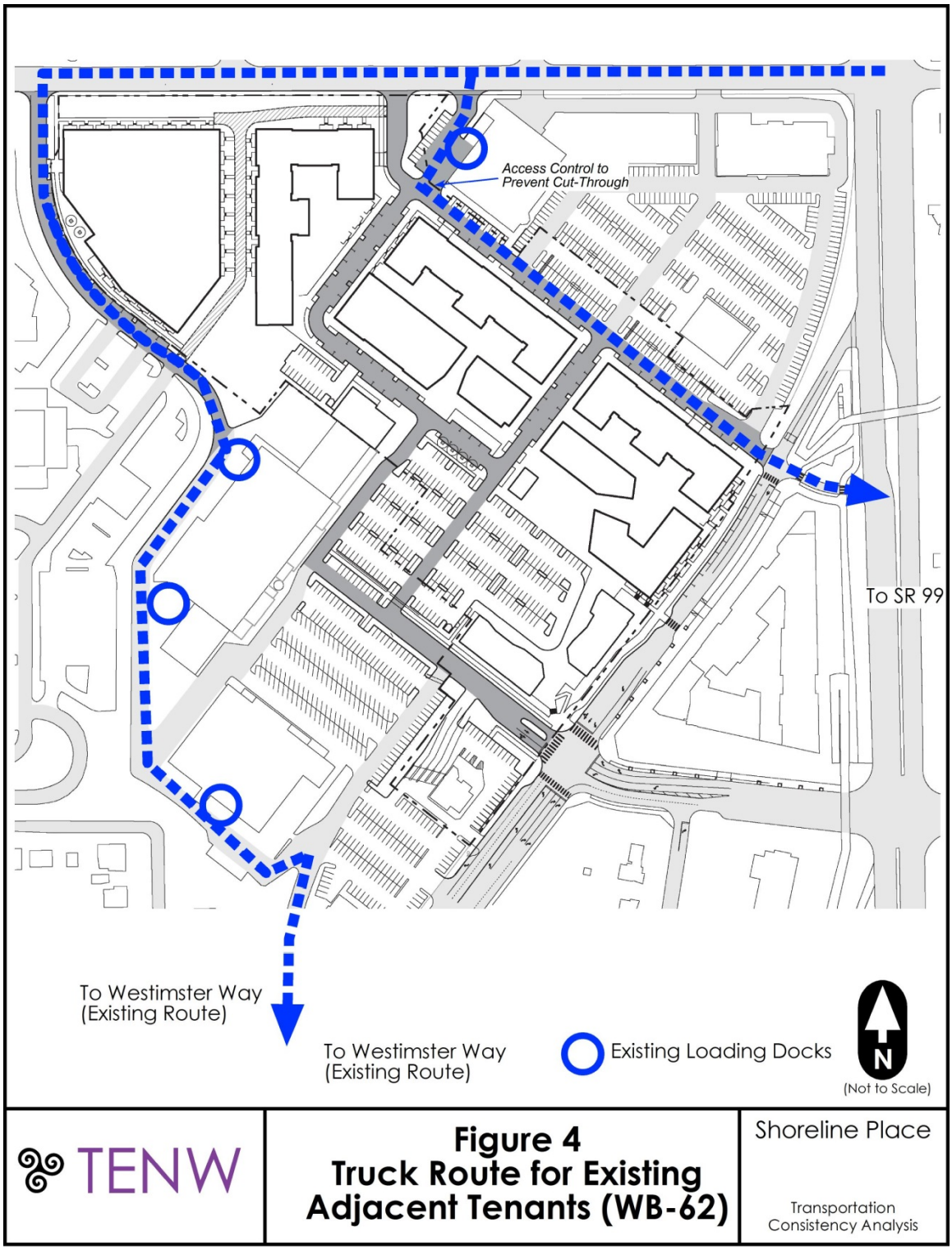
Interior Bike Routes

Given the mixed use nature of the *Shoreline Place* project and the overall Aurora Square CRA community priorities and redevelopment goals, bike circulation "through the site" would be accommodated for advanced/commuter riders along the northern property boundary controlled by *Shoreline Place* diagonally through the project in a sharrow lane, while other bicycle circulation through the site for residents, children, and recreational bicyclists would be provided through a wide multipurpose raised sidewalk. Figure 5 overviews these two bicycle routes through the site.

Transportation Mitigation

With establishment of the *Aurora Square CRA* and Renewal Plan, the City master planning identified a number of projects that the City of Shoreline can accomplish in partnership with redevelopment. The transportation improvements identified through the Planned Action EIS process were prioritized to support economic renewal of the Aurora Square CRA area. Of the eleven transportation improvements identified in Table A-1. Renewal Priority of Aurora Square CRA Transportation Improvements, six were a high priority, including:

- Project 1. Rechannelization of N 160th St from Dayton Avenue to Aurora Avenue to a 3-lane section with bike lanes and transition back to signalized approaches.
- Project 2. Midblock pedestrian crossing of N 160th Street with a refuge to provide for safe pedestrian crossings given the distance between Dayton Avenue and Aurora Avenue N.
- Project 3. Provide a new bicycle connection between the Interurban Trail and N 160th Street along Westminster Way.
- Project 4. Redevelop Westminster Way N from N 155th Street to N 160th Street to provide a more pedestrian and bicycle friendly section with street parking.
- Project 5. Construct N 157th Street from Westminster Way N to Aurora Ave N.
- Project 6. Reconstruct the signalized intersection at N 155th St and Westminster Way N in conjunction with the Westminster Way N project to increase safety for pedestrians and bicycles. Includes improvements to the section of N 155th St between Westminster Way N and Aurora Ave.


Access Control to Prevent Cut-Through
To SR 99
To Westimster Way (Existing Route)
To Westimster Way (Existing Route)
Existing Loading Docks
N
(Not to Scale)
TENW
Figure 4
Truck Route for Existing Adjacent Tenants (WB-62)
Shoreline Place
Transportation Consistency Analysis

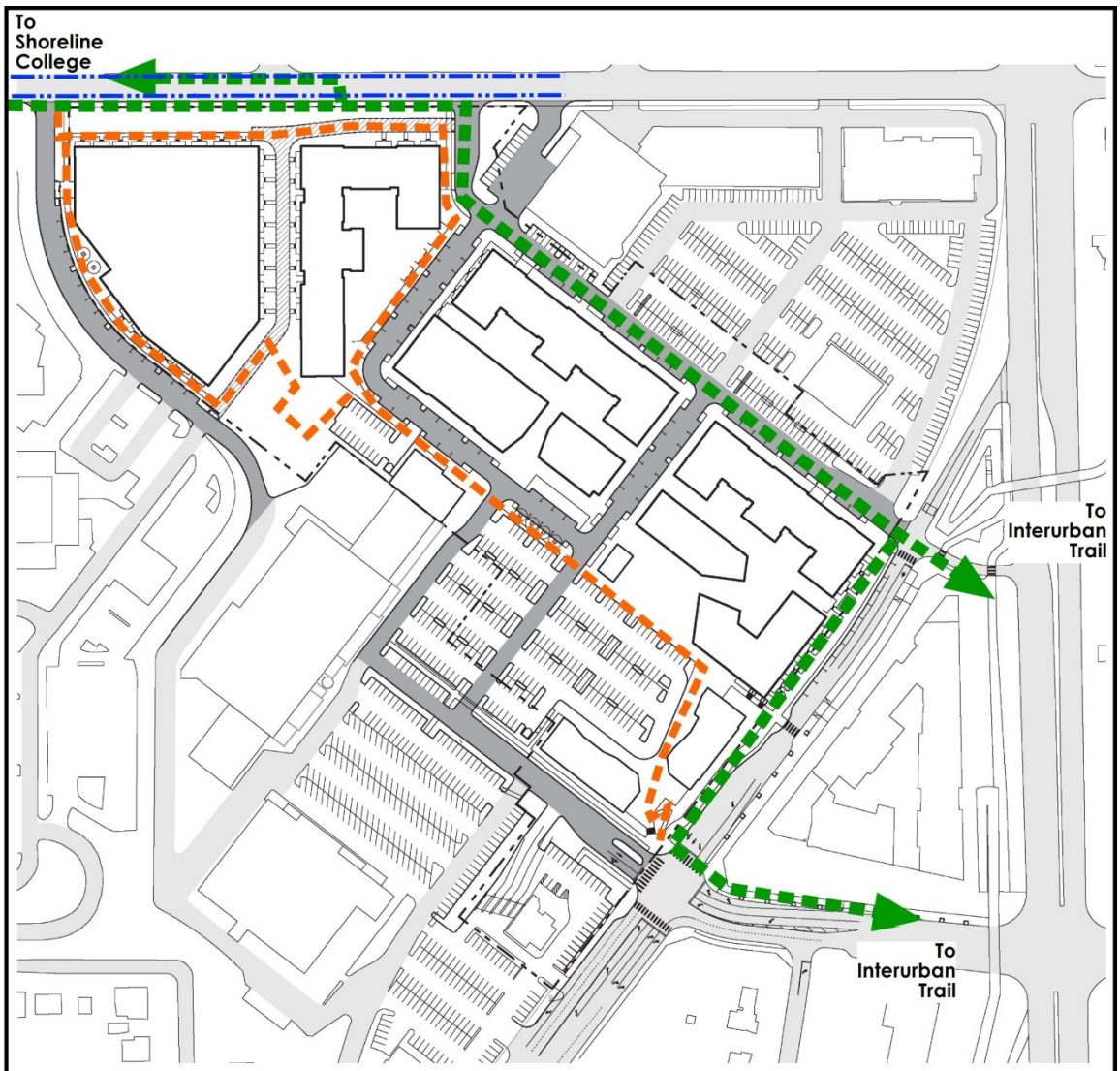


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Figure 5
Shoreline Place
Bike Routes

Shoreline Place

Transportation Consistency Analysis

As part of the project, through construction of frontage improvements, contributions towards the City's Westminster Way N and Westminster Way N/N 155th Street intersection project, and construction of Project 2, Shoreline Place would be a major contributor to these high priority transportation improvements:

Project 1. Shoreline Place would be responsible for rechannelization of N 160th Street for approximately 1,200-lineal feet of frontage (with transitions beyond) to provide 3 travel lanes and bike lanes on both sides of the street (see Attachment H of N 160th Street roadway section) with appropriate transition back to Linden Avenue N and Dayton Avenue N. This channelization improvement replaces the previously identified "cycle track" project along N 160th Street.

Project 2. Shoreline Place would construct this mid-block pedestrian crossing treatment (Rectangular Rapid Flash Beacon or RRFB) on the east leg of the N 160th Street and Fremont Place N.

Project 3. Completed with contributions by *Shoreline Place* towards the City's Westminster Way N and Westminster Way N/N 155th Street intersection project.

Project 4. Completed with contributions by *Shoreline Place* towards the City's Westminster Way N and Westminster Way N/N 155th Street intersection project.

Project 6. Completed with contributions by *Shoreline Place* towards the City's Westminster Way N and Westminster Way N/N 155th Street intersection project.

To mitigate *Shoreline Place* impacts at off-site study intersections beyond the CRA study area, as part of the City's executed Transportation Mitigation Agreement with SCC, a proportional share basis of 3 new p.m. peak hour trips is estimated for *Shoreline Place* towards transportation improvements required by the SCC campus at the intersections of Dayton Avenue N/Carlyle Hill Road (out of a total of 21 p.m. peak hour by SCC), and 3 new p.m. peak hour trips at the adjacent intersections of Greenwood Avenue N/Innis Arden, and Greenwood Avenue N/N 160th Street (out of a total of 58 p.m. peak hour by SCC).

Development Phasing

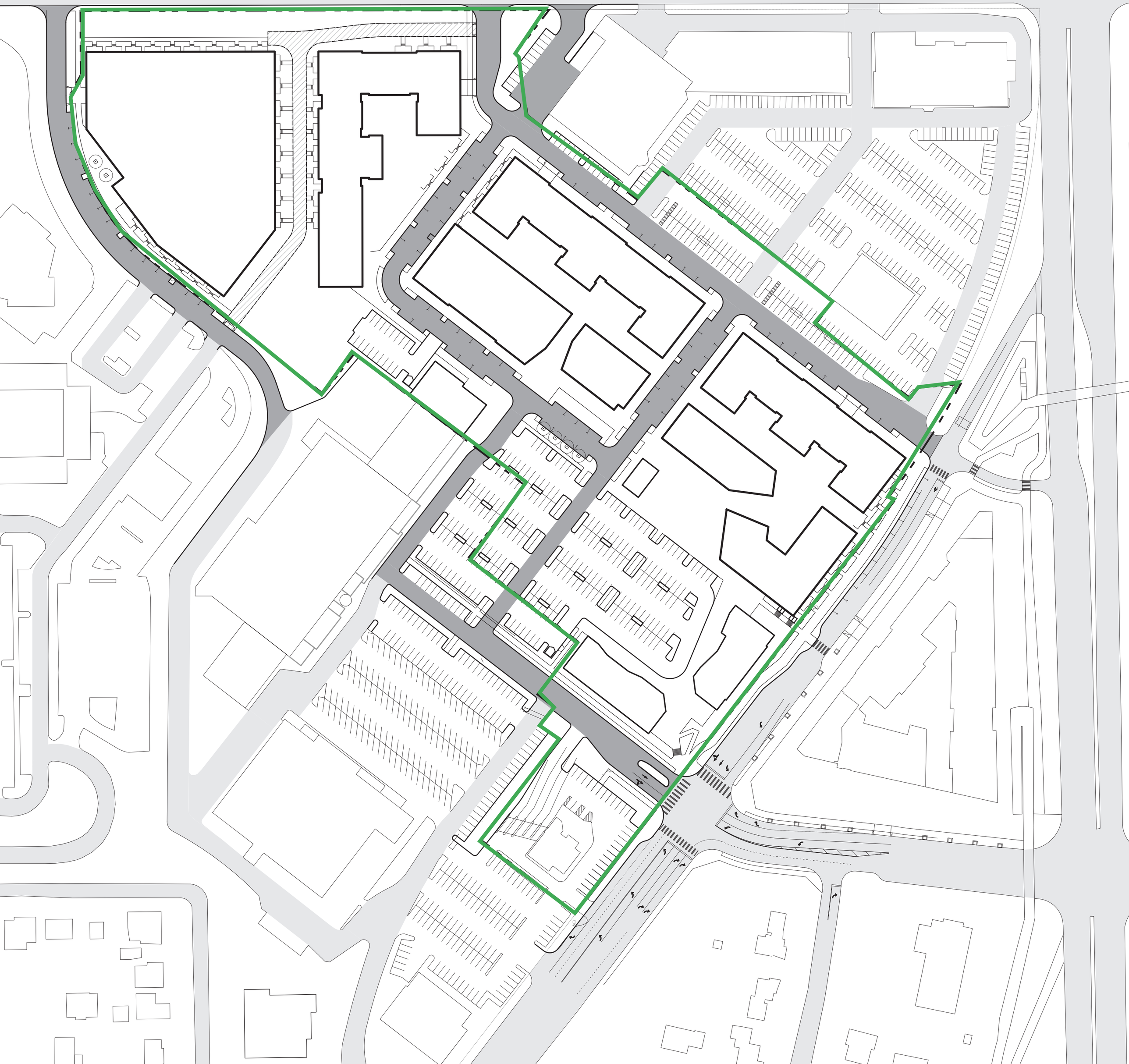
Given the likely development of the site, individual blocks or groups of buildings would be constructed as existing buildings are removed or undeveloped parking lots are redeveloped. Under a worse-case scenario, a majority of the site could be redeveloped with the exception of the primary Sears Retail building. Under this scenario, the net increase in vehicle trip generation from the overall Shoreline Place development area is estimated to generate up to 160 new p.m. peak hour vehicle trips (in contrast to 99 new p.m. peak hour trips under full redevelopment). This scenario would also fall well below the overall CRA upper threshold of 808 new p.m. peak hour trips, and would be consistent on an interim basis under this worse-case scenario

Conclusions

Based upon the review of comparative trip generation and land use assumptions, traffic operational and vehicle queueing analysis, and the transportation improvements planned or required, the proposed Shoreline Place project was found to be consistent with the overall assumptions, findings, and conclusions of the Aurora Square CRA and underlying EIS documents, and therefore, no other transportation review is warranted. If you have any questions, comments, or concerns, please do not hesitate to contact me at (206) 361-7333 ext. 101.

ATTACHMENT A

Conceptual Site Plan



ATTACHMENT B

Detailed Trip Generation Estimates

Shoreline Sears Redevelopment
AM Peak Hour Trip Generation

Shoreline Place - Preliminary Trip Generation Analysis
(Program April 2019 with 1,358 Apts & 72,160K Total Commercial Retail)

A.M. Peak Hour Trip Generation

Land Use	Area	Units [1]	ITE LUC [2]	Trip Rates *******AM Peak Hour******* In	Out	Total	Trips Generated *******AM Peak Hour******* In	Out	Total
Subarea A (Proposed Residential Core)									
RETAIL	19,625	GFA	820	62%	38%	0.94	11	7	18
Internal Trips	*From Residential/Retail*						*(6)*	*(2)*	*(8)*
Passby [3]	*34%*						*(1)*	*(2)*	*(3)*
						Subtotal =	**4**	**3**	**7**
MULTIFAMILY	1,358	UNITS	221	26%	74%	0.36	127	362	489
Internal Trips	*Residential-Retail (15%)*						*(6)*	*(18)*	*(24)*
						Subtotal =	**121**	**344**	**464**
						Subarea A Subtotal =	**125**	**347**	**471**
Subarea B (Proposed Retail Core)									
RETAIL	39,535	GFA	820	62%	38%	0.94	23	14	37
Internal Trips	*From Residential Above/Below*						*(12)*	*(4)*	*(16)*
Passby [3]	*34%*						*(3)*	*(4)*	*(7)*
						Subtotal =	**8**	**6**	**14**
RESTAURANT (2 Sit-Down)	13,000	GFA	931	50%	50%	0.73	5	5	10
						Subtotal =	**5**	**5**	**10**
						Subarea B Subtotal =	**13**	**11**	**24**
Removal of Existing Uses									
RETAIL	143,753	GFA	820	62%	38%	0.94	84	51	135
Internal Trips	*From Auto/Tire Center Below*						*(15)*	*(8)*	*(23)*
Passby [3]	*34%*						*(28)*	*(17)*	*(37)*
						Subtotal =	**41**	**26**	**75**
WAREHOUSE/STORAGE	72,193	GFA	150	77%	23%	0.17	9	3	12
						Subtotal =	**9**	**3**	**12**
OFFICE [4]	20,000	GFA	710	86%	14%	1.16	20	3	23
						Subtotal =	**20**	**3**	**23**
AUTO/TIRE CENTER	50,042	UNITS	942	66%	34%	2.25	74	38	112
Internal Trips	*Retail Above (25%)*						*(15)*	*(8)*	*(23)*
						Subtotal =	**59**	**30**	**89**
						Existing Subtotal =	**129**	**62**	**191**
						Gross A.M. Peak Hour Trips Generated from Redevelopment Area =	**166**	**388**	**554**
						Less Total Internal Trips =	*(24)*	*(24)*	*(50)*
						Less Total Passby Trips =	*(5)*	*(5)*	*(10)*
						Less Total Existing Trips =	*(129)*	*(62)*	*(191)*
						Net A.M. Peak Hour Trips Generated from Redevelopment Area =	**7**	**296**	**303**
						Net New Project Trips	**142**	**363**	**505**
						Project Pass-by Trips	**5**	**5**	**10**

Notes:

[1] GFA is Gross Floor Area, GLA is Gross Leasable Area.

[2] Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 Land Use Codes.

[3] Passby percent existing/proposed retail use based on documented average rate from ITE Trip Generation Handbook.

[4] Trip generation for proposed office use based on ITE, with minimum rate of 1.20 trips per 1,000 sf.

Shoreline Sears Redevelopment
PM Peak Hour Trip Generation

Shoreline Place - Preliminary Trip Generation Analysis
(Program April 2019 with 1,358 Apts & 72,160K Total Commercial Retail)

P.M. Peak Hour Trip Generation

Land Use	Area	Units [1]	ITE LUC [2]	Trip Rates *******PM Peak Hour******* In	Out	Total	Trips Generated *******PM Peak Hour******* In	Out	Total
Subarea A (Proposed Residential Core)									
RETAIL	19,625	GFA	820	48%	52%	3.81	36	39	75
Internal Trips	*From Residential/Retail*						*(11)*	*(16)*	*(27)*
Passby [3]	*34%*						*(8)*	*(8)*	*(16)*
						Subtotal =	**18**	**14**	**32**
MULTIFAMILY	1,358	UNITS	221	61%	39%	0.40	331	211	542
Internal Trips	*Residential-Retail (15%)*						*(50)*	*(32)*	*(81)*
	From Restaurant Below						*(4)*	*(8)*	*(12)*
						Subtotal =	**277**	**172**	**449**
						Subarea A Subtotal =	**294**	**186**	**480**
Subarea B (Proposed Retail Core)									
RETAIL	39,535	GFA	820	48%	52%	3.81	72	79	151
Internal Trips	*From Residential/Hotel Above/Below*						*(21)*	*(33)*	*(54)*
Passby [3]	*34%*						*(16)*	*(17)*	*(33)*
						Subtotal =	**34**	**29**	**63**
RESTAURANT	13,000	GFA	931	67%	33%	4.37	38	19	57
	Residential-Restaurant (20%)						*(8)*	*(4)*	*(12)*
						Subtotal =	**30**	**15**	**45**
						Subarea B Subtotal =	**64**	**44**	**108**
Removal of Existing Uses									
RETAIL	143,753	GFA	820	48%	52%	3.81	263	285	548
Internal Trips	*From Auto/Tire Center Below*						*(16)*	*(15)*	*(31)*
Passby [3]	*34%*						*(79)*	*(97)*	*(176)*
						Subtotal =	**168**	**173**	**341**
WAREHOUSE/STORAGE	72,193	GFA	150	27%	73%	0.19	4	10	14
						Subtotal =	**4**	**10**	**14**
OFFICE [4]	20,000	GFA	710	16%	84%	1.15	4	19	23
						Subtotal =	**4**	**19**	**23**
AUTO/TIRE CENTER	50,042	UNITS	942	48%	52%	3.11	75	81	156
Internal Trips	*Retail Above (20%)*						*(15)*	*(16)*	*(31)*
						Subtotal =	**60**	**65**	**125**
						Existing Subtotal =	**235**	**267**	**502**
						Gross P.M. Peak Hour Trips Generated from Redevelopment Area =	**477**	**348**	**825**
						Less Total Internal Trips =	*(85)*	*(89)*	*(175)*
						Less Total Passby Trips =	*(24)*	*(25)*	*(49)*
						Less Total Existing Trips =	*(235)*	*(267)*	*(502)*
						Net P.M. Peak Hour Trips Generated from Redevelopment Area =	**132**	**(33)**	**99**
						Net New Project Trips	**392**	**259**	**650**
						Project Pass-by Trips	**24**	**25**	**49**

Notes:

[1] GFA is Gross Floor Area, GLA is Gross Leasable Area.

[2] Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, 2017 Land Use Codes.

[3] Passby percent existing/proposed retail use based on documented average rate from ITE Trip Generation Handbook.

[4] Trip generation for proposed office use based on ITE, with minimum rate of 1.20 trips per 1,000 sf.

Shoreline Place DA - Att. F, Ex. A - Transportation Consistency Analysis

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Shoreline Place	**Organization:**	TENW
Project Location:	Aurora Square CRA	**Performed By:**	MJR
Scenario Description:	Buildout	**Date:**	28-Jan-19
Analysis Year:	2039	**Checked By:**	
Analysis Period:	**PM Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820	59,160		226	108	118
Restaurant	931	13,000		57	38	19
Cinema/Entertainment				0		
Residential	221	1,400		558	340	218
Hotel				0		
All Other Land Uses[2]				0		
Total				841	486	355

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail	1.90	10%	2%	1.90	10%	2%
Restaurant	2.40	5%	4%	2.40	5%	4%
Cinema/Entertainment						
Residential	1.20	10%	7%	1.20	10%	7%
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		29	0	8	0
Restaurant	0	6		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	3	18	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,236	704	532
Internal Capture Percentage	11%	9%	12%
External Vehicle-Trips[3]	651	383	268
External Transit-Trips[4]	107	62	45
External Non-Motorized Trips[4]	56	34	22

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	4%	17%
Restaurant	52%	17%
Cinema/Entertainment	N/A	N/A
Residential	2%	8%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

ATTACHMENT C

Aurora Square Planned Action EIS

Land Use and Trip Generation Comparative Analysis

Project Trip Generation Summary with Planned Action Trip Threshold Assumptions

Alternative	Land Use Assumptions	PM Peak Enter	PM Peak Exit	PM Peak Trips
No Action Alternative (All Existing Uses)	WSDOT, Westminster Place & Triangle Property	453	594	1,047
Planned Action - Alternative 2	Remove & Replace Sears Complexes (~286,000 SF of var retail/office) Construct New 500 Apt units, 125,000 SF retail, and 125,000 SF office	633	812	1,445
Net Increase with Alternative 2 from Existing		**180**	**218**	**398**
Planned Action - Alternative 3	Remove & Replace Sears Complexes & Central Market & Mervyns Shopping (~433,000 SF of var retail) Construct New 1,000 Apt units, 250,000 SF retail, and 250,000 SF office	817	1,038	1,855
Net Increase with Alternative 3 from Existing		**364**	**444**	**808**
Shoreline Place - February 2019 Program	Remove Sears Complexes (~286,000 SF of var retail/office) Construct 1,400 Apt units, 59,160 SF retail, and 13,000 SF restaurant	585	561	1,146
Net Increase with Alternative 3 from Existing		**132**	**(33)**	**99**

Shoreline Place is only 24.9% of total new trips from Alt 2 and 12.3% of total new trips from Alt 3.

Source: ITE Trip Generation, 10th Edition & Aurora Square DEIS/FEIS.
Shoreline Place - April 2019 Program with a total of 72,160 commercial retail and 1,358 residential apartment units.
Note: Existing Buildings Removed under the Shoreline Place are Estimated to Generate Approximately 477 PM Peak Hour Trips (37% of total Existing).

Addendum

Addendum to: City of Shoreline, Aurora Square Planned Action Draft Environmental Impact Statement (December 12, 2014) and Final Environmental Impact Statement (July 24, 2015).

Date Issued: March 8, 2019

Introduction

This document addends the City of Shoreline, Aurora Square Planned Action Draft Environmental Impact Statement (EIS) and Final Environmental Impact Statement.

The Draft EIS is available at this website:

http://www.shorelinewa.gov/Home/ShowDocument?id=19087

The Final EIS is available at this website:

http://www.shorelinewa.gov/Home/ShowDocument?id=21489

Consistent with the State Environmental Policy Act (SEPA), this addendum has been prepared to correct a reporting error in the trip generation numbers of the Draft EIS and the Final EIS. The trip generation numbers were reported incorrectly in the documents and have been corrected to match the trip generation numbers used in the analysis. There is no change to the analysis of alternatives, significant impacts, or mitigation measures. A notice of this Addendum has been circulated to those receiving the Final EIS.

Discussion

The Draft EIS identified the PM peak hour trips generated for each of the three alternatives in Chapter 3.3, Table 3-13 on page 3-51.

Table 0-1. PM Peak Hour Trip Generation by Alternative

	No Action Alternative 1	Phased Growth Alternative 2	Planned Growth Alternative 3
Inbound Trips	553	933	1,313
Outbound Trips	737	1,159	1,581
Total Trips	1,289	2,092	2,894

Source: KPG 2014

Table 3-13 (above) shows the trip generation numbers without a reduction for trips occurring within a site that has multiple land uses. The *National Cooperative Highway Research Program (NCHRP) Report 684* methodology estimates the number of trips between land uses within the site

(internal capture), which decreases the total vehicle trips external to the site. The transportation analysis in the EIS used trip generation numbers with a reduction for internal capture to evaluate traffic operations for the alternatives. The data in the Table 3-13 incorrectly reports the trip generation numbers without the internal caputure reduction.

EIS Corrections

Based on the above review, make the following changes to the Draft EIS and the Final EIS.

1. In the Draft EIS, amend Table 3-13 on page 3-51 as corrected below:

Table 0-1. PM Peak Hour Trip Generation by Alternative

	No Action Alternative 1	Phased Growth Alternative 2	Planned Growth Alternative 3
Inbound Trips	~~553~~ 453	~~933~~ 633	~~1,313~~ 817
Outbound Trips	~~737~~ 594	~~1,159~~ 812	~~1,581~~ 1,038
Total Trips	~~1,289~~ 1,047	~~2,092~~ 1,445	~~2,894~~ 1,855

Source: KPG ~~2014~~2019

2. In the Draft EIS, amend Appendix D: Draft Planned Action Ordinance, Section III D (3) (a) Trip Ranges & Thresholds on page 4 as corrected below:

Peak Hour Inbound and Outbound trips during the PM Peak Hour by Alternative

	No Action Alternative 1	Phased Growth Alternative 2	Alternative 2 Net Trips	Planned Growth Alternative 3	Alternative 3 Net Trips
Inbound Trips	~~553~~ 453	~~933~~ 633	~~380~~ 180	~~1,313~~ 817	~~760~~ 364
Outbound Trips	~~737~~ 594	~~1,159~~ 812	~~422~~ 218	~~1,581~~ 1,038	~~844~~ 444
Total Trips	~~1,289~~ 1,047	~~2,092~~ 1,445	~~803~~ 398	~~2,894~~ 1,855	~~1,605~~ 808

Source: KPG ~~2014~~2019

3. In the Final EIS, amend Appendix B: Proposed Planned Action Ordinance, Section 3 C (3) Transportation Thresholds as corrected below:

(a) Trip Ranges and Thresholds. The number of new PM Peak hour ~~and daily~~ trips anticipated within the Planned Action Area and reviewed in the FEIS for 2035 are as follows:

	No Action Alternative 1	**Phased <u>Growth</u> Alternative 2**	**Net Trips Alternative 2**	**~~Phased~~ <u>Planned Growth</u> Alternative 3**	**Net Trips Alternative 3**
Inbound Trips	~~553~~ <u>453</u>	~~933~~ <u>633</u>	~~380~~ <u>180</u>	~~1,313~~ <u>817</u>	~~760~~ <u>364</u>
Outbound Trips	~~737~~ <u>594</u>	~~1,159~~ <u>812</u>	~~422~~ <u>218</u>	~~1,581~~<u>1,038</u>	~~844~~ ~~<u>444</u>~~
Total Trips	~~1,289~~ <u>1,047</u>	~~2,092~~ <u>1,445</u>	~~803~~ <u>398</u>	~~2,894~~ <u>1,855</u>	~~1,605~~ <u>808</u>

ATTACHMENT D

Comparative Traffic Volume Forecasts at Study Intersections

2018 Turning Movement Counts

2039 PM Peak Hour Turning Movement Forecasts with Shoreline Place

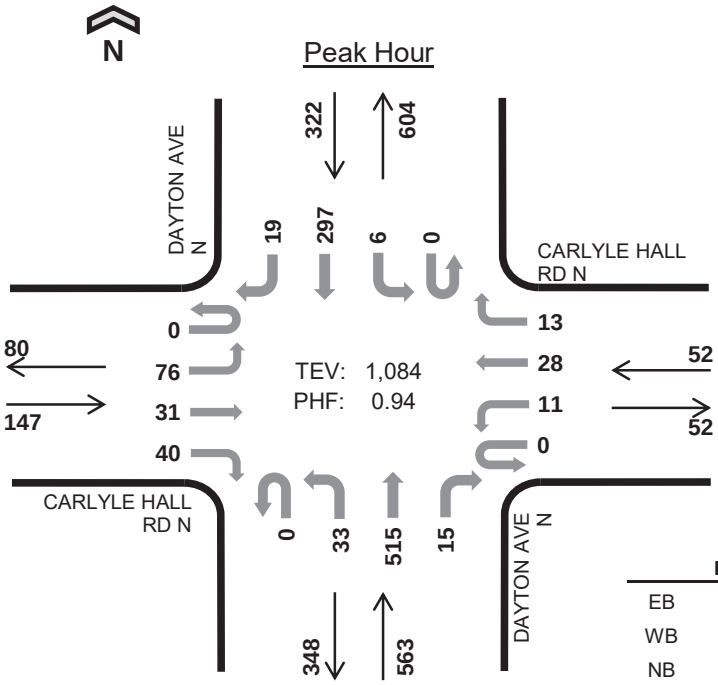
Total Entering Volume Analysis

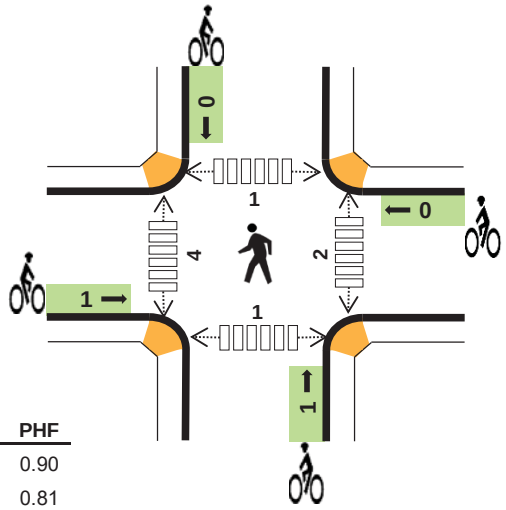
CRA EIS	2013	2030	Annual Growth Factor
Greenwood/N 160 Street	970	1,215	1.3%
Dayton Ave/N 160th Street	1,182	1,550	1.4%
Westminster Wy/N 155th St	1,708	2,045	1.1%
Aurora Ave/N 160th Street	3,672	4,505	1.2%
Aurora Ave/N 155th Street	3,946	4,850	1.2%
			1.2%

Shoreline Place Consistency Anal	2018	2039	Annual Growth Factor	Project Traffic	TEV 2039 with Shoreline Place
Greenwood/N 160 Street	917	1,184	1.2%	20	1,204
Dayton Ave/N 160th Street	1,387	1,793	1.2%	65	1,858
Westminster Wy/N 155th St	1,665	2,089	1.1%	443	2,532
Dayton Ave/Carlyle Hall Rd	1,084	1,394	1.2%	15	1,409
Sears West Dr/N 160th St	717	956	1.4%	126	1,082
			1.2%		

DAYTON AVE N
CARLYLE HALL RD N

Date: Thu, Apr 12, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	0.7%	0.90
WB	5.8%	0.81
NB	1.1%	0.94
SB	0.9%	0.88
TOTAL	1.2%	0.94

Two-Hour Count Summaries

Interval Start	CARLYLE HALL RD N Eastbound				CARLYLE HALL RD N Westbound				DAYTON AVE N Northbound				DAYTON AVE N Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	17	5	12	0	0	3	3	0	14	132	5	0	2	56	4	253	0
4:15 PM	0	11	5	16	0	3	9	3	0	6	136	2	0	1	51	4	247	0
4:30 PM	**0**	**21**	**12**	**8**	**0**	**1**	**6**	**6**	**0**	**8**	**132**	**4**	**0**	**2**	**84**	**4**	**288**	0
4:45 PM	**0**	**20**	**8**	**11**	**0**	**2**	**7**	**1**	**0**	**10**	**116**	**2**	**0**	**2**	**89**	**1**	**269**	1,057
5:00 PM	**0**	**19**	**4**	**9**	**0**	**5**	**7**	**4**	**0**	**6**	**137**	**6**	**0**	**0**	**54**	**6**	**257**	1,061
5:15 PM	**0**	**16**	**7**	**12**	**0**	**3**	**8**	**2**	**0**	**9**	**130**	**3**	**0**	**2**	**70**	**8**	**270**	**1,084**
5:30 PM	0	13	11	6	0	5	4	4	0	11	140	6	0	0	48	8	256	1,052
5:45 PM	0	18	20	8	0	2	9	2	0	13	121	6	0	1	50	12	262	1,045
Count Total	0	135	72	82	0	21	53	25	0	77	1,044	34	0	10	502	47	2,102	0
Peak Hour	**0**	**76**	**31**	**40**	**0**	**11**	**28**	**13**	**0**	**33**	**515**	**15**	**0**	**6**	**297**	**19**	**1,084**	**0**

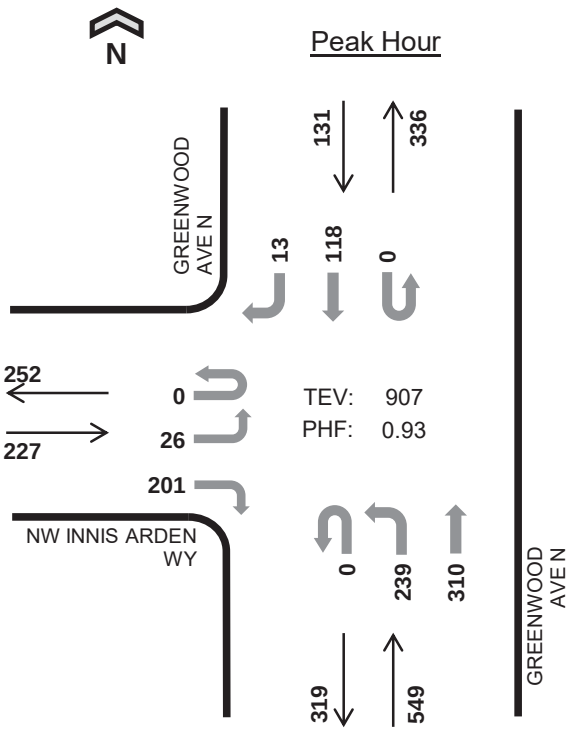
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	3	0	1	1	*5*	0	0	0	1	*1*	0	0	0	0	*0*
4:15 PM	1	1	1	1	*4*	0	0	0	0	*0*	0	2	2	0	*4*
4:30 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**0**	**1**	*4*
4:45 PM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**1**	**1**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**1**	**0**	*3*
5:15 PM	**0**	**1**	**3**	**0**	***4***	**1**	**0**	**0**	**0**	***1***	**1**	**0**	**0**	**0**	***1***
5:30 PM	1	0	0	0	*1*	0	0	1	0	*1*	0	0	0	0	*0*
5:45 PM	1	1	1	0	*3*	0	0	0	0	*0*	0	0	0	1	*1*
Count Total	7	5	9	5	*26*	1	0	2	1	*4*	2	6	3	2	*13*
Peak Hour	**1**	**3**	**6**	**3**	***13***	**1**	**0**	**1**	**0**	***2***	**2**	**4**	**1**	**1**	***8***

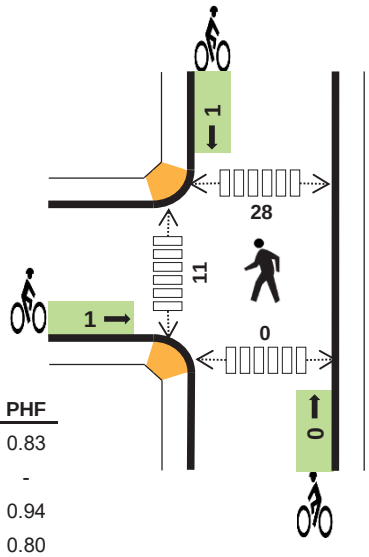
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

GREENWOOD AVE N
NW INNIS ARDEN WY

Date: Thu, Apr 12, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	5.7%	0.83
WB	-	-
NB	1.6%	0.94
SB	3.1%	0.80
TOTAL	2.9%	0.93



Two-Hour Count Summaries

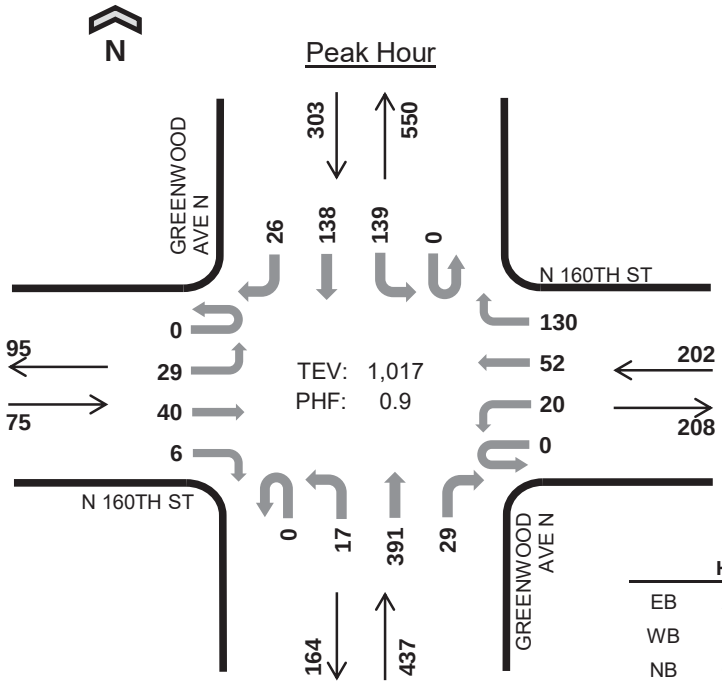
Interval Start	NW INNIS ARDEN WY				0				GREENWOOD AVE N				GREENWOOD AVE N				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	5	0	43	0	0	0	0	0	46	51	0	0	0	25	6	176	0
4:15 PM	0	7	0	30	0	0	0	0	0	48	75	0	0	0	19	2	181	0
4:30 PM	0	8	0	51	0	0	0	0	0	36	67	0	0	0	31	2	195	0
4:45 PM	1	3	0	43	0	0	0	0	0	51	80	0	0	0	24	1	203	755
5:00 PM	**0**	**6**	**0**	**51**	**0**	**0**	**0**	**0**	**0**	**54**	**92**	**0**	**0**	**0**	**39**	**2**	**244**	823
5:15 PM	**0**	**5**	**0**	**46**	**0**	**0**	**0**	**0**	**0**	**54**	**86**	**0**	**0**	**0**	**26**	**4**	**221**	863
5:30 PM	**0**	**6**	**0**	**45**	**0**	**0**	**0**	**0**	**0**	**52**	**81**	**0**	**0**	**0**	**29**	**5**	**218**	886
5:45 PM	**0**	**9**	**0**	**59**	**0**	**0**	**0**	**0**	**0**	**79**	**51**	**0**	**0**	**0**	**24**	**2**	**224**	**907**
Count Total	1	49	0	368	0	0	0	0	0	420	583	0	0	0	217	24	1,662	0
Peak Hour	**0**	**26**	**0**	**201**	**0**	**0**	**0**	**0**	**0**	**239**	**310**	**0**	**0**	**0**	**118**	**13**	**907**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

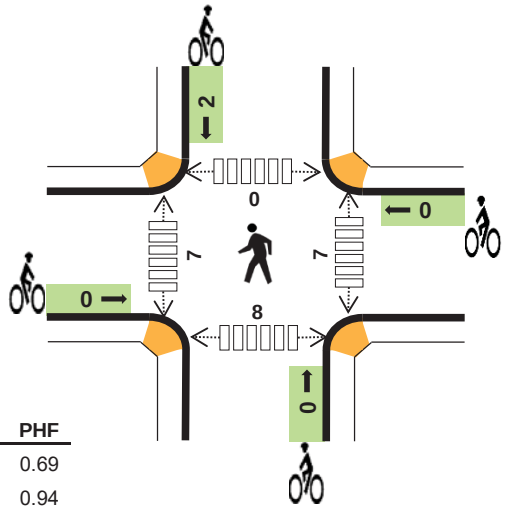
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	4	10	2	*16*
4:15 PM	3	0	4	3	*10*	0	0	0	0	*0*	0	0	5	0	*5*
4:30 PM	2	0	3	0	*5*	0	0	1	0	*1*	0	0	1	0	*1*
4:45 PM	2	0	3	1	*6*	0	0	0	0	*0*	0	0	1	0	*1*
5:00 PM	**2**	**0**	**2**	**2**	***6***	**1**	**0**	**0**	**1**	***2***	**0**	**1**	**4**	**0**	*5*
5:15 PM	**3**	**0**	**3**	**1**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**7**	**0**	*9*
5:30 PM	**3**	**0**	**2**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**5**	**8**	**0**	*13*
5:45 PM	**5**	**0**	**2**	**1**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**3**	**9**	**0**	***12***
Count Total	21	0	20	8	*49*	1	0	1	1	*3*	0	15	45	2	*62*
Peak Hr	**13**	**0**	**9**	**4**	***26***	**1**	**0**	**0**	**1**	***2***	**0**	**11**	**28**	**0**	***39***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

GREENWOOD AVE N
N 160TH ST



Date: Thu, Apr 12, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM



	HV %:	PHF
EB	2.7%	0.69
WB	5.0%	0.94
NB	0.5%	0.94
SB	3.3%	0.84
TOTAL	2.4%	0.90

Two-Hour Count Summaries

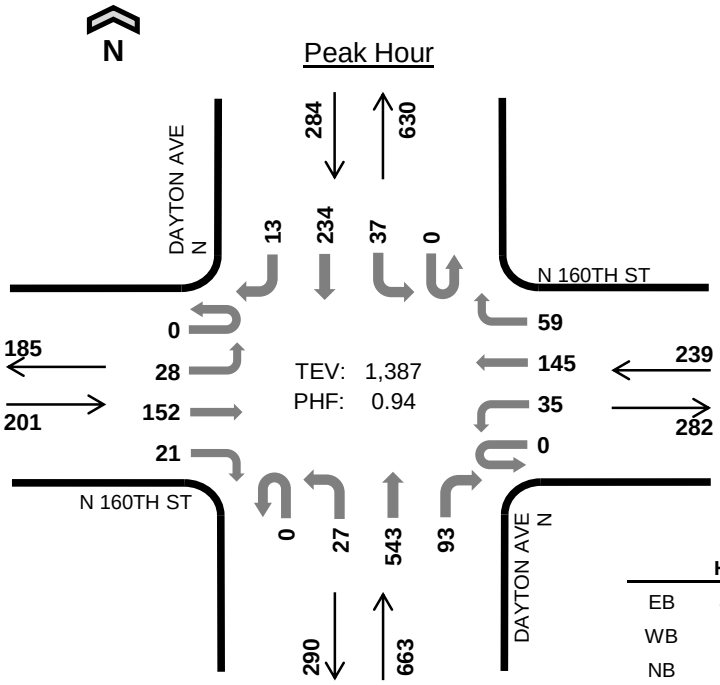
Interval Start	N 160TH ST Eastbound				N 160TH ST Westbound				GREENWOOD AVE N Northbound				GREENWOOD AVE N Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	7	2	0	4	7	27	0	1	68	2	0	35	29	4	188	0
4:15 PM	0	5	18	2	0	3	8	35	0	4	83	5	0	27	21	1	212	0
4:30 PM	0	3	7	0	0	5	6	28	0	3	72	11	0	35	44	3	217	0
4:45 PM	**0**	**8**	**13**	**3**	**0**	**4**	**17**	**33**	**0**	**8**	**90**	**5**	**0**	**22**	**31**	**14**	**248**	865
5:00 PM	**0**	**12**	**14**	**1**	**0**	**10**	**11**	**27**	**0**	**5**	**107**	**4**	**0**	**43**	**39**	**8**	**281**	958
5:15 PM	**0**	**7**	**6**	**1**	**0**	**4**	**13**	**35**	**0**	**2**	**98**	**11**	**0**	**37**	**31**	**4**	**249**	995
5:30 PM	**0**	**2**	**7**	**1**	**0**	**2**	**11**	**35**	**0**	**2**	**96**	**9**	**0**	**37**	**37**	**0**	**239**	**1,017**
5:45 PM	0	0	3	1	0	7	6	44	0	3	86	5	0	51	30	2	238	1,007
Count Total	0	39	75	11	0	39	79	264	0	28	700	52	0	287	262	36	1,872	0
Peak Hour	**0**	**29**	**40**	**6**	**0**	**20**	**52**	**130**	**0**	**17**	**391**	**29**	**0**	**139**	**138**	**26**	**1,017**	**0**

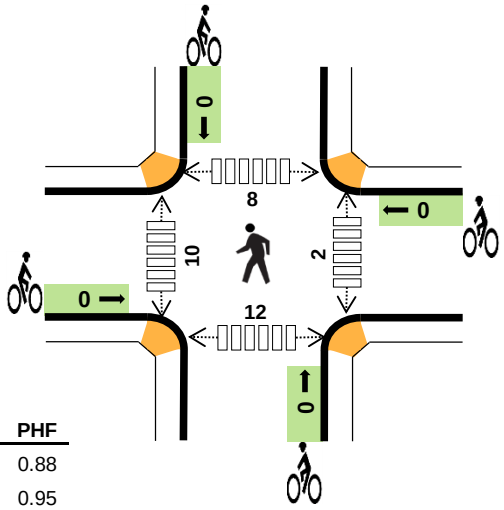
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	0	1	*3*	0	0	0	0	*0*	2	13	2	13	*30*
4:15 PM	1	4	1	4	*10*	0	1	0	0	*1*	2	1	0	1	*4*
4:30 PM	0	3	0	2	*5*	0	1	0	0	*1*	1	3	0	6	*10*
4:45 PM	**1**	**3**	**1**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**1**	*4*
5:00 PM	**1**	**2**	**0**	**3**	***6***	**0**	**0**	**0**	**2**	***2***	**3**	**3**	**0**	**3**	*9*
5:15 PM	**0**	**3**	**1**	**3**	***7***	**0**	**0**	**0**	**0**	***0***	**1**	**4**	**0**	**4**	*9*
5:30 PM	**0**	**2**	**0**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:45 PM	0	2	0	4	*6*	0	0	0	0	*0*	4	4	0	5	*13*
Count Total	3	21	3	21	*48*	0	2	0	2	*4*	16	28	2	33	*79*
Peak Hour	**2**	**10**	**2**	**10**	***24***	**0**	**0**	**0**	**2**	***2***	**7**	**7**	**0**	**8**	***22***

DAYTON AVE N
N 160TH ST

Date: Wed, Jan 31, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	4.5%	0.88
WB	1.7%	0.95
NB	2.1%	0.86
SB	1.1%	0.95
TOTAL	2.2%	0.94

Two-Hour Count Summaries

Interval Start	N 160TH ST Eastbound				N 160TH ST Westbound				DAYTON AVE N Northbound				DAYTON AVE N Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	8	52	3	0	6	39	18	0	5	123	16	0	17	65	6	358	0
4:15 PM	0	5	49	4	0	9	23	16	0	3	138	34	0	10	61	3	355	0
4:30 PM	**0**	**5**	**40**	**3**	**0**	**8**	**37**	**18**	**0**	**4**	**130**	**29**	**0**	**7**	**64**	**4**	**349**	0
4:45 PM	**0**	**1**	**38**	**7**	**0**	**5**	**33**	**16**	**0**	**7**	**128**	**16**	**0**	**12**	**56**	**3**	**322**	1,384
5:00 PM	**0**	**12**	**41**	**4**	**0**	**13**	**37**	**11**	**0**	**10**	**125**	**22**	**0**	**10**	**61**	**3**	**349**	1,375
5:15 PM	**0**	**10**	**33**	**7**	**0**	**9**	**38**	**14**	**0**	**6**	**160**	**26**	**0**	**8**	**53**	**3**	**367**	**1,387**
5:30 PM	0	3	27	1	0	8	45	17	0	5	130	18	0	8	67	1	330	1,368
5:45 PM	0	5	33	7	0	3	50	22	0	9	118	22	0	8	51	1	329	1,375
Count Total	0	49	313	36	0	61	302	132	0	49	1,052	183	0	80	478	24	2,759	0
Peak Hour	**0**	**28**	**152**	**21**	**0**	**35**	**145**	**59**	**0**	**27**	**543**	**93**	**0**	**37**	**234**	**13**	**1,387**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	2	3	2	*11*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	3	0	3	1	*7*	0	0	0	0	*0*	0	2	3	7	*12*
4:30 PM	**2**	**1**	**3**	**1**	***7***	**0**	**0**	**0**	**0**	***0***	**1**	**3**	**3**	**2**	*9*
4:45 PM	**3**	**0**	**4**	**2**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**1**	**3**	*6*
5:00 PM	**2**	**2**	**2**	**0**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**4**	**3**	**4**	*11*
5:15 PM	**2**	**1**	**5**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**1**	**1**	**1**	**3**	***6***
5:30 PM	2	1	3	0	*6*	0	0	0	0	*0*	2	1	4	3	*10*
5:45 PM	3	1	3	0	*7*	0	0	0	0	*0*	0	0	1	5	*6*
Count Total	21	8	26	6	*61*	0	0	0	0	*0*	4	13	16	27	*60*
Peak Hour	**9**	**4**	**14**	**3**	***30***	**0**	**0**	**0**	**0**	***0***	**2**	**10**	**8**	**12**	***32***

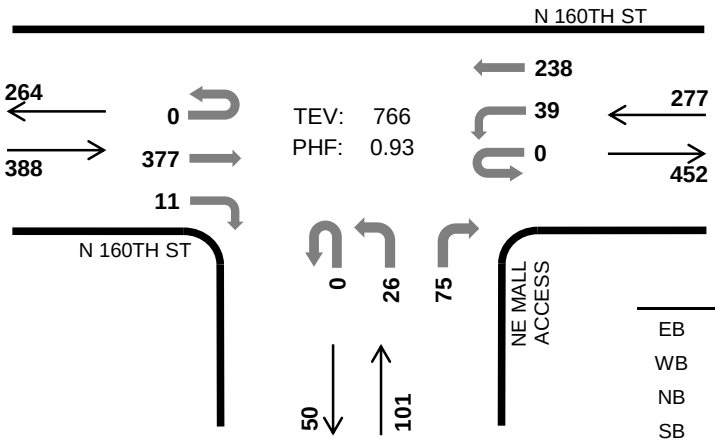
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

NE MALL ACCESS
N 160TH ST

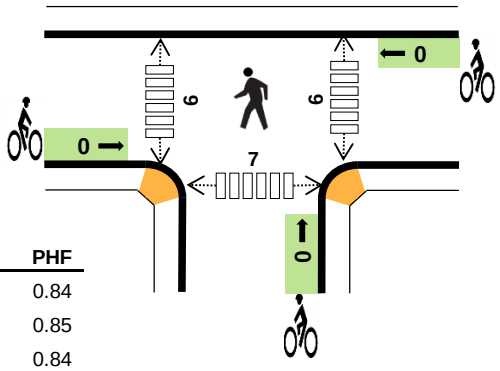
N

Peak Hour

Date: Thu, Sep 13, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	2.3%	0.84
WB	0.7%	0.85
NB	3.0%	0.84
SB	-	-
TOTAL	1.8%	0.93



Two-Hour Count Summaries

Interval Start	N 160TH ST Eastbound				N 160TH ST Westbound				NE MALL ACCESS Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**99**	**2**	**0**	**16**	**40**	**0**	**0**	**8**	**0**	**22**	**0**	**0**	**0**	**0**	**187**	0
4:15 PM	**0**	**0**	**84**	**2**	**0**	**9**	**61**	**0**	**0**	**7**	**0**	**23**	**0**	**0**	**0**	**0**	**186**	0
4:30 PM	**0**	**0**	**112**	**4**	**0**	**7**	**63**	**0**	**0**	**4**	**0**	**16**	**0**	**0**	**0**	**0**	**206**	0
4:45 PM	**0**	**0**	**82**	**3**	**0**	**7**	**74**	**0**	**0**	**7**	**0**	**14**	**0**	**0**	**0**	**0**	**187**	**766**
5:00 PM	0	0	87	0	0	6	67	0	0	6	0	14	0	0	0	0	180	759
5:15 PM	0	0	86	4	0	9	52	0	0	3	0	17	0	0	0	0	171	744
5:30 PM	0	0	86	2	0	10	49	0	0	7	0	21	0	0	0	0	175	713
5:45 PM	0	0	69	6	0	13	82	0	0	10	0	16	0	0	0	0	196	722
Count Total	0	0	705	23	0	77	488	0	0	52	0	143	0	0	0	0	1,488	0
Peak Hour	**0**	**0**	**377**	**11**	**0**	**39**	**238**	**0**	**0**	**26**	**0**	**75**	**0**	**0**	**0**	**0**	**766**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**0**	**1**	*4*
4:15 PM	**2**	**1**	**1**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**0**	**1**	*4*
4:30 PM	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**4**	**1**	**0**	**4**	*9*
4:45 PM	**3**	**1**	**0**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**1**	***2***
5:00 PM	1	2	0	0	*3*	0	0	1	0	*1*	1	3	0	2	*6*
5:15 PM	3	0	0	0	*3*	0	0	4	0	*4*	0	0	0	1	*1*
5:30 PM	0	1	0	0	*1*	0	0	2	0	*2*	0	0	0	0	*0*
5:45 PM	3	1	1	0	*5*	0	0	0	0	*0*	0	1	0	0	*1*
Count Total	16	6	4	0	*26*	0	0	7	0	*7*	7	10	0	10	*27*
Peak Hr	**9**	**2**	**3**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**6**	**6**	**0**	**7**	***19***

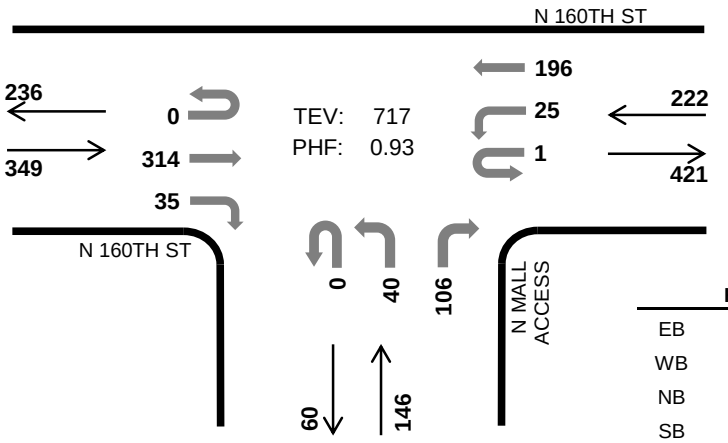
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

N MALL ACCESS
N 160TH ST

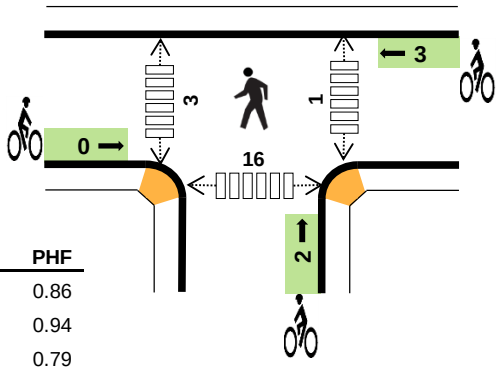
N

Peak Hour

Date: Tue, Sep 18, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	3.2%	0.86
WB	1.8%	0.94
NB	2.1%	0.79
SB	-	-
TOTAL	2.5%	0.93



Two-Hour Count Summaries

Interval Start	N 160TH ST Eastbound				N 160TH ST Westbound				N MALL ACCESS Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**89**	**12**	**0**	**8**	**51**	**0**	**0**	**7**	**0**	**25**	**0**	**0**	**0**	**0**	**192**	0
4:15 PM	**0**	**0**	**77**	**10**	**0**	**6**	**53**	**0**	**0**	**13**	**0**	**23**	**0**	**0**	**0**	**0**	**182**	0
4:30 PM	**0**	**0**	**83**	**6**	**1**	**6**	**40**	**0**	**0**	**10**	**0**	**36**	**0**	**0**	**0**	**0**	**182**	0
4:45 PM	**0**	**0**	**65**	**7**	**0**	**5**	**52**	**0**	**0**	**10**	**0**	**22**	**0**	**0**	**0**	**0**	**161**	**717**
5:00 PM	0	0	74	8	0	3	65	0	0	15	0	21	0	0	0	0	186	711
5:15 PM	0	0	59	6	0	3	46	0	0	6	0	19	0	0	0	0	139	668
5:30 PM	0	0	57	8	0	1	47	0	0	8	0	22	0	0	0	0	143	629
5:45 PM	0	0	55	5	0	4	73	0	0	12	0	9	0	0	0	0	158	626
Count Total	0	0	559	62	1	36	427	0	0	81	0	177	0	0	0	0	1,343	0
Peak Hour	**0**	**0**	**314**	**35**	**1**	**25**	**196**	**0**	**0**	**40**	**0**	**106**	**0**	**0**	**0**	**0**	**717**	**0**

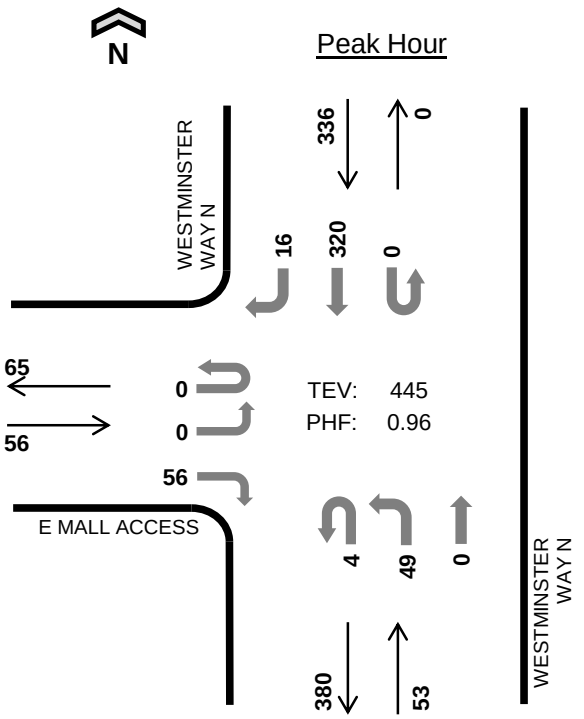
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**3**	**0**	**0**	**0**	***3***	**0**	**1**	**0**	**0**	***1***	**0**	**2**	**0**	**2**	*4*
4:15 PM	**6**	**2**	**0**	**0**	***8***	**0**	**0**	**1**	**0**	***1***	**1**	**1**	**0**	**2**	*4*
4:30 PM	**2**	**0**	**0**	**0**	***2***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**4**	*4*
4:45 PM	**0**	**2**	**3**	**0**	***5***	**0**	**1**	**1**	**0**	***2***	**0**	**0**	**0**	**8**	***8***
5:00 PM	1	2	0	0	*3*	0	0	0	0	*0*	0	0	0	1	*1*
5:15 PM	1	1	0	0	*2*	0	0	1	0	*1*	1	3	0	4	*8*
5:30 PM	2	0	0	0	*2*	1	0	0	0	*1*	1	0	0	5	*6*
5:45 PM	2	2	0	0	*4*	0	0	0	0	*0*	0	0	0	9	*9*
Count Total	17	9	3	0	*29*	1	3	3	0	*7*	3	6	0	35	*44*
Peak Hr	**11**	**4**	**3**	**0**	***18***	**0**	**3**	**2**	**0**	***5***	**1**	**3**	**0**	**16**	***20***

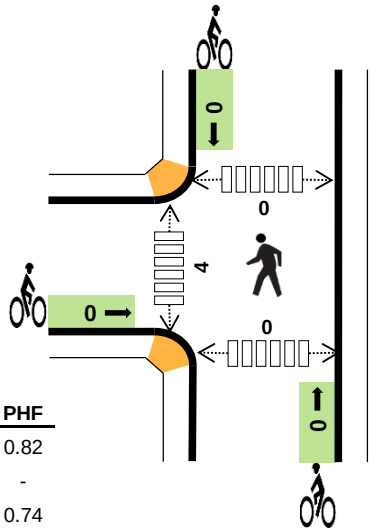
Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

WESTMINSTER WAY N
E MALL ACCESS

Date: Thu, Sep 13, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	7.1%	0.82
WB	-	-
NB	0.0%	0.74
SB	0.6%	0.92
TOTAL	1.3%	0.96



Two-Hour Count Summaries

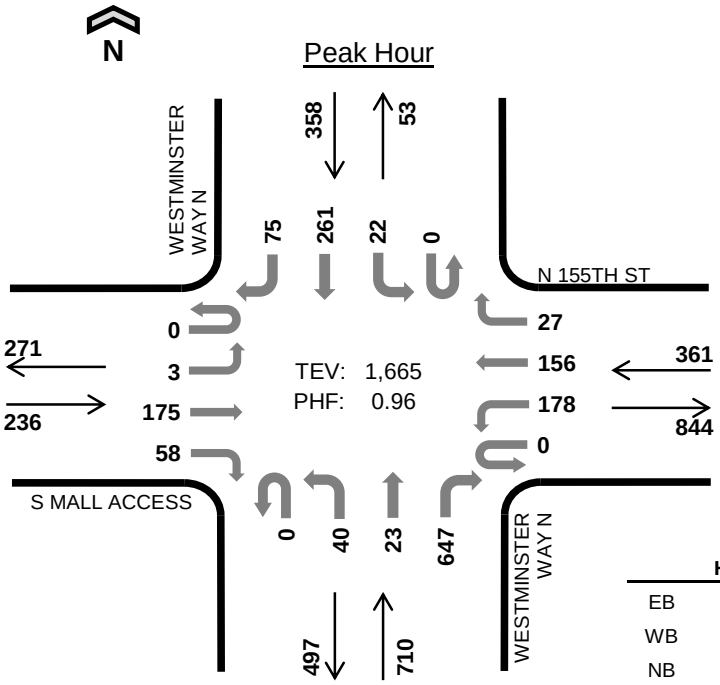
Interval Start	E MALL ACCESS				0				WESTMINSTER WAY N				WESTMINSTER WAY N				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**0**	**1**	**10**	**0**	**0**	**0**	**0**	**81**	**5**	**111**	0
4:15 PM	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**3**	**15**	**0**	**0**	**0**	**0**	**67**	**7**	**103**	0
4:30 PM	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**0**	**0**	**88**	**3**	**115**	0
4:45 PM	**0**	**0**	**0**	**17**	**0**	**0**	**0**	**0**	**0**	**14**	**0**	**0**	**0**	**0**	**84**	**1**	**116**	**445**
5:00 PM	0	0	0	9	0	0	0	0	0	10	0	0	0	0	78	3	100	434
5:15 PM	0	0	0	9	0	0	0	0	1	12	0	0	0	0	80	1	103	434
5:30 PM	0	0	0	10	0	0	0	0	2	11	0	0	0	0	81	0	104	423
5:45 PM	0	0	0	5	0	0	0	0	0	16	0	0	0	0	84	4	109	416
Count Total	0	0	0	89	0	0	0	0	7	98	0	0	0	0	643	24	861	0
Peak Hour	**0**	**0**	**0**	**56**	**0**	**0**	**0**	**0**	**4**	**49**	**0**	**0**	**0**	**0**	**320**	**16**	**445**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

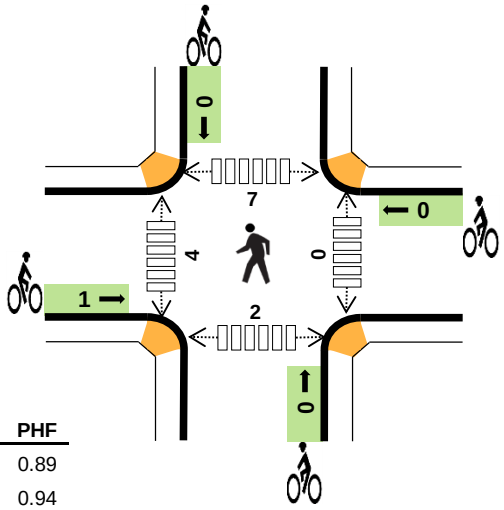
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**3**	**0**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
4:30 PM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	*2*
4:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***
5:00 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	1	0	0	*1*
5:45 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	4	0	1	4	*9*	0	0	0	0	*0*	0	5	0	0	*5*
Peak Hr	**4**	**0**	**0**	**2**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**4**	**0**	**0**	***4***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

WESTMINSTER WAY N
N 155TH ST



Date: Thu, Sep 13, 2018
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM



	HV %:	PHF
EB	0.4%	0.89
WB	0.6%	0.94
NB	1.4%	0.90
SB	0.6%	0.90
TOTAL	0.9%	0.96

Two-Hour Count Summaries

Interval Start	S MALL ACCESS				N 155TH ST				WESTMINSTER WAY N				WESTMINSTER WAY N				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	56	8	0	29	49	7	0	10	4	143	0	6	66	27	406	0
4:15 PM	0	2	51	16	0	39	33	9	0	7	7	150	0	5	50	22	391	0
4:30 PM	0	0	50	14	0	37	30	6	0	16	4	158	0	11	76	11	413	0
4:45 PM	0	1	38	10	0	41	39	10	0	9	3	150	0	10	83	12	406	1,616
5:00 PM	**0**	**0**	**41**	**14**	**0**	**43**	**47**	**6**	**0**	**9**	**4**	**161**	**0**	**4**	**53**	**18**	**400**	1,610
5:15 PM	**0**	**0**	**41**	**15**	**0**	**46**	**43**	**6**	**0**	**17**	**6**	**145**	**0**	**5**	**75**	**19**	**418**	1,637
5:30 PM	**0**	**2**	**50**	**14**	**0**	**43**	**31**	**8**	**0**	**6**	**3**	**161**	**0**	**9**	**66**	**20**	**413**	1,637
5:45 PM	**0**	**1**	**43**	**15**	**0**	**46**	**35**	**7**	**0**	**8**	**10**	**180**	**0**	**4**	**67**	**18**	**434**	**1,665**
Count Total	0	7	370	106	0	324	307	59	0	82	41	1,248	0	54	536	147	3,281	0
Peak Hour	**0**	**3**	**175**	**58**	**0**	**178**	**156**	**27**	**0**	**40**	**23**	**647**	**0**	**22**	**261**	**75**	**1,665**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	1	2	*3*
4:15 PM	1	0	3	2	*6*	0	1	0	0	*1*	0	1	0	0	*1*
4:30 PM	0	0	1	1	*2*	1	0	0	0	*1*	0	3	6	3	*12*
4:45 PM	0	1	1	0	*2*	0	0	0	0	*0*	0	4	4	6	*14*
5:00 PM	**0**	**1**	**5**	**1**	***7***	**1**	**0**	**0**	**0**	***1***	**0**	**1**	**3**	**1**	*5*
5:15 PM	**1**	**0**	**2**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**1**	**0**	*2*
5:30 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**1**	**3**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**3**	**1**	***6***
Count Total	2	3	16	8	*29*	2	1	0	0	*3*	0	12	18	13	*43*
Peak Hour	**1**	**2**	**10**	**2**	***15***	**1**	**0**	**0**	**0**	***1***	**0**	**4**	**7**	**2**	***13***

Mark Skaggs: (425) 250-0777 mark.skaggs@idaxdata.com

Shoreline Place DA - Att. F, Ex. A - Transportation Consistency Analysis

Shoreline Place

2039 Full Buildout PM Peak Hour Turning Movement Volumes

Growth Rate =	1.20%
Seasonality =	1
Count Year =	2018
Future Year =	2039

21

Enter Exit
392 259

2018 Count Year	Pipeline #1	Pipeline #2	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
	Alexan Apts	Ecology @ WSDOT HQ					

1 Dayton Ave/Carlyle Hall Rd

2018 Count Year	Pipeline #1	Pipeline #2	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
322 / 19 297 6 / 604 80 76 31 40 1,084 13 28 11 52 52 147 / 33 515 15 / 348 563	1 / 1 0 0 0 1 0 0 1 / 0	0 / 0 0 0 0 0 0 0 0 / 0	415 / 24 383 8 / 776 103 98 40 189 51 1,394 17 36 14 67 67 42 662 19 / 448 723	0 / 0 0 0 0 0 0 0 0 / 0	3% / 3% 3% 0% 0% 6% 0% 0% 3% / 3% 3%	12 / 12 8 0 0 20 0 0 12 / 8	426 / 24 394 8 / 784 103 98 40 189 51 1,413 17 36 14 67 67 42 669 19 / 460 731
			% Increase = 28.6%				Project Share = 1.4%

2 Greenwood Ave/Innis Arden Wy

2018 Count Year	Pipeline #1	Pipeline #2	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
131 / 13 118 / 336 252 26 0 227 201 907 0 0 239 310 / 319 549	1 / 1 0 0 0 2 0 0 1 1 / 2 0	0 / 0 0 0 0 0 0 0 0 / 0	169 / 17 153 0 / 432 324 33 0 293 259 1,167 0 0 0 0 307 398 0 / 412 705	0 / 0 0 -10 -5 -5 -15 0 0 -10 / -5 -10	2% / 2% 2% 1% 1% 6% 0% 0% 1% 2% / 3% 3%	8 / 8 5 3 4 20 0 0 3 5 / 12 8	177 / 17 160 0 / 437 316 33 0 292 258 1,172 0 0 0 0 300 403 0 / 419 703
			% Increase = 28.7%				Project Share = 1.7%

3 Greenwood Ave/N 160th St

2018 Count Year	Pipeline #1	Pipeline #2	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
303 / 26 138 139 / 450 95 29 40 75 6 917 130 52 20 202 208 17 291 29 / 164 337	2 / 2 0 1 1 2 5 1 1 4 0 0 / 0	0 / 0 0 1 1 1 1 1 0 0 / 0	391 / 33 177 181 / 578 124 37 53 98 8 1,184 167 69 26 262 271 22 374 37 / 211 433	-5 -10 / -5 -10 0 -15 -10 -10 -5 0 / 0	3% / 3% 3% 0% 0% 6% 3% 3% 0% 0% / 0% 0%	12 / 0 0 12 0 0 20 8 8 0 0 / 0 0	398 / 33 177 187 / 576 124 37 53 98 8 1,189 165 69 26 259 278 22 374 37 / 211 433
			% Increase = 29.1%				Project Share = 1.6%

4 Dayton Ave/N 160th St

2018 Count Year	Pipeline #1	Pipeline #2	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
284 / 13 234 37 / 630 185 28 152 201 21 1,387 59 145 35 239 282 27 543 93 / 290 663	0 / 0 0 1 1 4 5 1 1 4 0 0 / 0	1 / 1 1 1 0 1 6 1 5 1 3 / 0	366 / 17 301 49 / 810 240 36 199 262 27 1,793 77 188 48 313 367 35 698 119 / 376 852	0 / 0 0 -10 -5 -5 -15 -10 -10 -5 0 / 0	3% / 3% 3% 3% 3% 20% 3% 10% 4% 4% / 4% 4%	12 / 8 12 8 12 65 8 26 10 16 / 10 16	378 / 17 301 60 / 818 237 36 206 269 27 1,843 85 186 58 329 401 35 698 135 / 386 867
			% Increase = 29.3%				Project Share = 3.5%

Shoreline Place DA - Att. F, Ex. A - Transportation Consistency Analysis

Shoreline Place
2039 Full Buildout PM Peak Hour Turning Movement Volumes

Growth Rate =	1.20%
Seasonality =	1
Count Year =	2018
Future Year =	2039

21

Enter Exit
392 259

2018 Count Year	Pipeline #1 (Alexan Apts)	Pipeline #2 (Ecology @ WSDOT HQ)	2039 Baseline	Removal of SCC On-Site Parking	Trip Distribution	Project Trips	2039 With Project
5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St	5 Sears West Dr/N 160th St
0 0 236 314 717 196 222 349 35 26 420 40 106 61 146	0 0 1 4 5 1 1 4 4 0 0	0 0 5 25 30 5 5 25 25 0 0	0 0 309 0 0 0 291 432 956 258 477 45 33 569 51 0 136 78 188	0 0 -10 -86 -5 -5 -5 -66 -10 -66 -10 -76	0% 0% 10% 5% 35% 5% 10% 10% 5% 5% 15% 10% 5% 10% 10% 15%	0 0 33 3 126 15 39 33 30 25 39 18 36 54 54	0 0 332 0 0 0 330 435 1,006 272 505 70 58 546 59 0 111 128 170
% Increase = 33.3%						Pass-by Adjustments #DIV/0!	Project Share = 12.5%
6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St	6 ROCI Dr/N 160th St
0 0 264 377 766 238 277 388 11 39 452 26 75 50 101	0 0 1 4 5 1 1 4 4 0 0	0 0 5 25 30 5 5 25 25 0 0	0 0 345 0 0 0 362 513 1,019 312 527 14 50 610 33 0 96 64 130	0 0 -5 -71 -5 -66 -66 0 0	0% 0% 10% 15% 40% 10% 15% 15% 5% 25% 5% 10% 10%	0 0 15 36 96 15 34 36 20 62 26 20 26	0 0 355 0 0 0 401 483 1,059 321 497 14 80 610 33 0 127 94 161
% Increase = 33.0%						#DIV/0!	Project Share = 9.1%
7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr	7 Westminster Wy/Pier 1 Dr
336 0 16 320 70 446 0 56 56 0 54 376 54	16 0 16 0 4 48 0 4 32 28 16 28	0 0 0 0 0 0 0 0 0 0	399 0 21 379 0 82 0 0 4 556 0 67 63 32 61 0 28 442 89	0 0 -10 -20 0 -10 -10 0 -10 -10 -10	10% 0% 10% 25% 5% 50% 0% 25% 20% 5% 15% 20% 15%	39 0 49 -10 108 13 173 0 75 62 13 59 52 59	438 0 74 365 0 184 0 0 0 32 732 0 155 123 60 110 0 28 488 138
Pass-by Adjustments #DIV/0!			% Increase = 24.6%				Project Share = 23.6%
8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St	8 Westminster Wy/N 155th St
358 53 75 261 22 271 3 1,665 27 361 175 156 236 58 178 844 40 23 647 497 710	34 25 7 27 0 66 7 0 7 27 25 14 25	0 0 0 0 0 0 0 0 0 0	443 93 85 303 55 307 3 35 447 198 177 267 66 236 1,085 45 55 831 604 931	-10 -10 -5 -5 0 -20 -5 -5 -5 -5 -5	20% 15% 10% 10% 50% 10% 40% 30% 30% 45% 15% 130% 40% 20% 5% 25% 25%	82 59 40 16 26 246 68 39 157 147 79 483 118 84 88 20 -10 95 98	511 138 139 296 76 626 69 631 307 2,636 334 470 163 228 1,185 153 69 802 686 ####
% Increase = 25.5%						Pass-by Adjustments #DIV/0!	Project Share = 18.3%

Shoreline Place DA - Att. F, Ex. A - Transportation Consistency Analysis

Shoreline Place

2039 Full Buildout PM Peak Hour Turning Movement Volumes

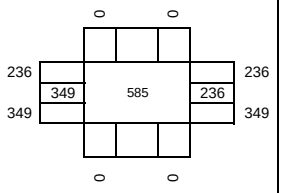
Growth Rate =	1.20%
Seasonality =	1
Count Year =	2018
Future Year =	2039

21

Enter Exit
392 259

2018 Count Year

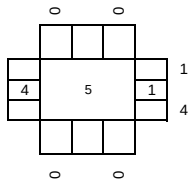
9 New SP NW Dr/N 160th St



Pipeline #1

Alexan Apts

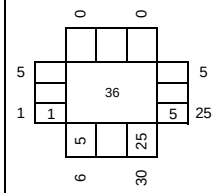
9 New SP NW Dr/N 160th St



Pipeline #2

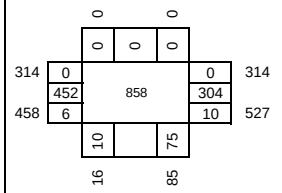
Ecology @ WSDOT HQ

9 New SP NW Dr/N 160th St



2039 Baseline

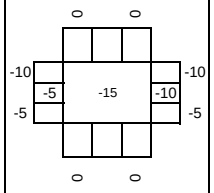
9 New SP NW Dr/N 160th St



% Increase = 46.6%

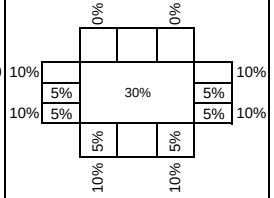
Removal of SCC On-Site Parking

9 New SP NW Dr/N 160th St



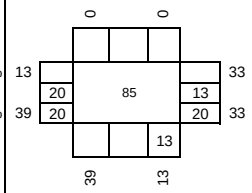
Trip Distribution

9 New SP NW Dr/N 160th St



Project Trips

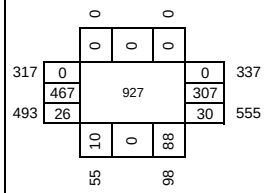
9 New SP NW Dr/N 160th St



#DIV/0!

2039 With Project

9 New SP NW Dr/N 160th St



Project Share = 9.1%

ATTACHMENT E

Consistency Analysis between CRA EIS and Shoreline Place Traffic Forecasts

CRA EIS - Comparative Total Entering Volume Analysis Using Shoreline Place TIS Methods and EIS Forecasts

Net New Trips Only

	CRA EIS Study Intersections	2013	No Action (EIS)	2039 No Action[1]	Alexan Trips	WSDOT Trips	Shoreline Place Trips	2039 with Buildout	FEIS 2030 Alternative 3	% Difference to 2039 Buildout	2039 LOS
1	Greenwood/N 160 Street	970	1,215	1,274	2	1	3	1,280	1,268	-0.9%	D[2]
2	Dayton Ave/N 160th Street	1,182	1,550	1,626	4	6	8	1,644	1,839	11.9%	C[2]
3	Aurora Ave/N 160th Street	3,672	4,505	4,725	21	30	25	4,801	4,780	-0.4%	B[2]
4	Aurora Ave/N 155th Street	3,946	4,850	5,087	51	16	39	5,193	5,675	9.3%	F[3]
5	Westminster Wy/N 155th St	1,708	2,045	2,145	28	0	64	2,237	2,583	15.5%	B
6	Westminster Wy/Dayton Ave	2,116	2,416	2,534	17	35	25	2,611	2,578	-1.3%	B[3]
7	Westminster Wy/Greenwood Ave	2,400	2,880	3,021	17	35	25	3,098	3,037	-2.0%	C[3]
8	Greenwood/N 145 Street	3,204	3,790	3,975	17	35	25	4,052	3,943	-2.7%	E[3]
							Average Difference at EIS Study Intersections			3.7%	

1 - Factored to 2039 through application of EIS annual average growth rate of 1.2% compounded annually for 4 years given that no growth has occurred in the last 5 years.
It should be noted that factoring 2013 counts (which included both Sears retail complex and retailers within the "triangle" property, i.e., the Alexan site) annually over 20 years factors 2013 site-generated trips by over 30 percent in addition to those trips throughout the vicinity at study intersections.

2 - Source: Shoreline Community College Transportation Technical Report, Transpo Group, October 2018.

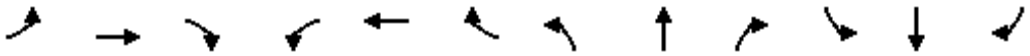
3 - Source: Aurora Square DEIS, December 2014.

ATTACHMENT F

LOS/Vehicle Queuing Summary Sheets

Lanes, Volumes, Timings
4: Dayton Ave & N 160th St

4/5/2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	206	27	58	186	85	35	698	135	60	301	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	645		0	250		0	100		0
Storage Lanes	1		0	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	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.953			0.976			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1831	0	1770	1775	0	1770	1818	0	1770	1848	0
Flt Permitted	0.423			0.497			0.538			0.144		
Satd. Flow (perm)	788	1831	0	926	1775	0	1002	1818	0	268	1848	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			37			29			8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		704			284			543			1479	
Travel Time (s)		13.7			5.5			12.3			33.6	
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)	39	224	29	63	202	92	38	759	147	65	327	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	253	0	63	294	0	38	906	0	65	345	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			16	
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
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	

Lanes, Volumes, Timings
4: Dayton Ave & N 160th St

4/5/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		40.0	40.0		40.0	40.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		66.7%	66.7%		66.7%	66.7%	
Maximum Green (s)	16.0	16.0		16.0	16.0		36.0	36.0		36.0	36.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
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	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	12.4	12.4		12.4	12.4		29.7	29.7		29.7	29.7	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.59	0.59		0.59	0.59	
v/c Ratio	0.20	0.55		0.28	0.63		0.06	0.84		0.41	0.32	
Control Delay	20.0	22.5		20.9	23.0		5.2	17.8		16.0	6.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.0	22.5		20.9	23.0		5.2	17.8		16.0	6.3	
LOS	B	C		C	C		A	B		B	A	
Approach Delay		22.1			22.7			17.2			7.8	
Approach LOS		C			C			B			A	

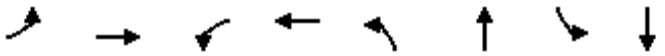
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.5			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 17.0		Intersection LOS: B	
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Dayton Ave & N 160th St

Queues

4: Dayton Ave & N 160th St

4/5/2019



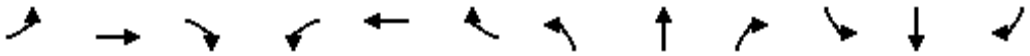
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	253	63	294	38	906	65	345
v/c Ratio	0.20	0.55	0.28	0.63	0.06	0.84	0.41	0.32
Control Delay	20.0	22.5	20.9	23.0	5.2	17.8	16.0	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	22.5	20.9	23.0	5.2	17.8	16.0	6.3
Queue Length 50th (ft)	10	70	17	76	4	187	9	45
Queue Length 95th (ft)	33	135	47	149	15	#472	43	90
Internal Link Dist (ft)		624		204		463		1399
Turn Bay Length (ft)	150		645		250		100	
Base Capacity (vph)	263	618	308	617	734	1341	196	1357
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	0.15	0.41	0.20	0.48	0.05	0.68	0.33	0.25

Intersection Summary

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

Intersection Capacity Utilization
4: Dayton Ave & N 160th St

4/5/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	206	27	58	186	85	35	698	135	60	301	17
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90	90	90	90	90	90	90
Volume Combined (vph)	36	233	0	58	271	0	35	833	0	60	318	0
Lane Utilization 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 Factor (vph)	0.95	0.98	0.85	0.95	0.95	0.85	0.95	0.98	0.85	0.95	0.99	0.85
Saturated Flow (vph)	1805	1867	0	1805	1811	0	1805	1854	0	1805	1885	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	1.8	11.2	0.0	2.9	13.5	0.0	1.7	40.4	0.0	3.0	15.2	0.0
Adj Reference Time (s)	8.0	15.2	0.0	8.0	17.5	0.0	8.0	44.4	0.0	8.0	19.2	0.0
Permitted Option												
Adj Saturation A (vph)	160	1867		160	1811		160	1854		160	1885	
Reference Time A (s)	20.2	11.2		32.5	13.5		19.6	40.4		33.7	15.2	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		20.2			32.5			40.4			33.7	
Adj Reference Time (s)		24.2			36.5			44.4			37.7	
Split Option												
Ref Time Combined (s)	1.8	11.2		2.9	13.5		1.7	40.4		3.0	15.2	
Ref Time Seperate (s)	1.8	9.9		2.9	9.2		1.7	33.9		3.0	14.4	
Reference Time (s)	11.2	11.2		13.5	13.5		40.4	40.4		15.2	15.2	
Adj Reference Time (s)	15.2	15.2		17.5	17.5		44.4	44.4		19.2	19.2	

Summary	EB WB	NB SB	Combined
Protected Option (s)	25.5	52.4	
Permitted Option (s)	36.5	44.4	
Split Option (s)	32.7	63.6	
Minimum (s)	25.5	44.4	69.9

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	77.7%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

HCM 2010 Signalized Intersection Summary
4: Dayton Ave & N 160th St

4/5/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	206	27	58	186	85	35	698	135	60	301	17
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	39	224	29	63	202	92	38	759	147	65	327	18
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	396	51	269	297	135	667	926	179	265	1067	59
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	1081	1617	209	1122	1213	552	1031	1517	294	613	1749	96
Grp Volume(v), veh/h	39	0	253	63	0	294	38	0	906	65	0	345
Grp Sat Flow(s),veh/h/ln	1081	0	1826	1122	0	1765	1031	0	1811	613	0	1846
Q Serve(g_s), s	1.9	0.0	6.7	2.9	0.0	8.3	1.0	0.0	21.6	5.1	0.0	4.9
Cycle Q Clear(g_c), s	10.2	0.0	6.7	9.6	0.0	8.3	6.0	0.0	21.6	26.7	0.0	4.9
Prop In Lane	1.00		0.11	1.00		0.31	1.00		0.16	1.00		0.05
Lane Grp Cap(c), veh/h	232	0	447	269	0	432	667	0	1105	265	0	1126
V/C Ratio(X)	0.17	0.00	0.57	0.23	0.00	0.68	0.06	0.00	0.82	0.25	0.00	0.31
Avail Cap(c_a), veh/h	280	0	529	319	0	511	710	0	1181	291	0	1203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	0.0	18.3	22.5	0.0	18.9	6.6	0.0	8.4	18.8	0.0	5.2
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.4	0.0	2.9	0.0	0.0	4.5	0.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.6	0.0	3.5	0.9	0.0	4.3	0.3	0.0	11.9	0.9	0.0	2.5
LnGrp Delay(d),s/veh	23.8	0.0	19.4	22.9	0.0	21.8	6.6	0.0	12.9	19.3	0.0	5.3
LnGrp LOS	C		B	C		C	A		B	B		A
Approach Vol, veh/h		292			357			944			410	
Approach Delay, s/veh		20.0			22.0			12.6			7.5	
Approach LOS		B			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		37.7		17.5		37.7		17.5
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		36.0		16.0		36.0		16.0
Max Q Clear Time (g_c+I1), s		23.6		12.2		28.7		11.6
Green Ext Time (p_c), s		7.6		1.3		5.0		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Lanes, Volumes, Timings
5: Sears West Dr & N 160th St

4/5/2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	435	70	58	272	59	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.981					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1827	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1827	0	1770	1863	1770	1583
Link Speed (mph)	35			35	30	
Link Distance (ft)	460			770	202	
Travel Time (s)	9.0			15.0	4.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	473	76	63	296	64	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	549	0	63	296	64	121
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	1.00	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 49.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection Capacity Utilization
5: Sears West Dr & N 160th St

4/5/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	435	70	58	272	59	111
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90
Volume Combined (vph)	505	0	58	272	59	111
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.98	0.85	0.95	1.00	0.95	0.85
Saturated Flow (vph)	1860	0	1805	1900	1805	1615
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	Yes			Yes	No	
Reference Time (s)	24.4	0.0	2.9	12.9		6.2
Adj Reference Time (s)	28.4	0.0	8.0	16.9		10.2
Permitted Option						
Adj Saturation A (vph)	1860		160	1900	160	
Reference Time A (s)	24.4		32.5	12.9	33.1	
Adj Saturation B (vph	NA		NA	NA	NA	
Reference Time B (s)	NA		NA	NA	NA	
Reference Time (s)	24.4			32.5		
Adj Reference Time (s)	28.4			36.5		
Split Option						
Ref Time Combined (s)	24.4		2.9	12.9	2.9	
Ref Time Seperate (s)	21.0		2.9	12.9	2.9	
Reference Time (s)	24.4		12.9	12.9	2.9	
Adj Reference Time (s)	28.4		16.9	16.9	8.0	

Summary	EB WB	NB	Combined
Protected Option (s)	36.4	NA	
Permitted Option (s)	36.5	Err	
Split Option (s)	45.3	8.0	
Minimum (s)	36.4	8.0	44.4

Right Turns	NBR
Adj Reference Time (s)	10.2
Cross Thru Ref Time (s)	28.4
Oncoming Left Ref Time (s)	0.0
Combined (s)	38.6

Intersection Summary			
Intersection Capacity Utilization	49.4%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

Intersection	
Int Delay, s/veh	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	435	70	58	272	59	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	0	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	473	76	63	296	64	121

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	549	0	933	511
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	422	-
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	-	-	1021	-	295	563
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	662	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	277	563
Mov Cap-2 Maneuver	-	-	-	-	277	-
Stage 1	-	-	-	-	602	-
Stage 2	-	-	-	-	621	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	277	563	-	-	1021	-
HCM Lane V/C Ratio	0.232	0.214	-	-	0.062	-
HCM Control Delay (s)	21.9	13.1	-	-	8.8	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.9	0.8	-	-	0.2	-

Lanes, Volumes, Timings
6: ROCI East Dr & N 160th St

4/5/2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	483	14	80	321	33	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	1.00
Frt	0.996				0.893	
Flt Protected				0.990	0.990	
Satd. Flow (prot)	1855	0	0	3504	1647	0
Flt Permitted				0.990	0.990	
Satd. Flow (perm)	1855	0	0	3504	1647	0
Link Speed (mph)	35			35	30	
Link Distance (ft)	770			357	181	
Travel Time (s)	15.0			7.0	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	525	15	87	349	36	138
Shared Lane Traffic (%)						
Lane Group Flow (vph)	540	0	0	436	174	0
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
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection Capacity Utilization
6: ROCI East Dr & N 160th St

4/5/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	483	14	80	321	33	127
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90
Volume Combined (vph)	497	0	0	401	160	0
Lane Utilization Factor	1.00	1.00	1.00	0.95	1.00	1.00
Turning Factor (vph)	1.00	0.85	0.95	0.99	0.87	0.85
Saturated Flow (vph)	1892	0	0	3582	1657	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	1892		0	159	147	
Reference Time A (s)	23.6		0.0	45.2	97.8	
Adj Saturation B (vph	NA		NA	NA	NA	
Reference Time B (s)	NA		NA	NA	NA	
Reference Time (s)	23.6			45.2		
Adj Reference Time (s)	27.6			49.2		
Split Option						
Ref Time Combined (s)	23.6		0.0	10.1	8.7	
Ref Time Seperate (s)	23.0		4.0	8.0	1.8	
Reference Time (s)	23.6		10.1	10.1	8.7	
Adj Reference Time (s)	27.6		14.1	14.1	12.7	

Summary	EB WB	NB	Combined
Protected Option (s)	NA	NA	
Permitted Option (s)	49.2	Err	
Split Option (s)	41.7	12.7	
Minimum (s)	41.7	12.7	54.4

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	60.5%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	483	14	80	321	33	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	525	15	87	349	36	138

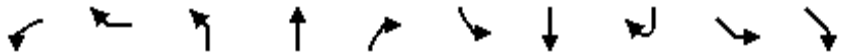
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	540	0	881	533
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	348	-
Critical Hdwy	-	-	4.12	-	6.63	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.83	-
Follow-up Hdwy	-	-	2.218	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1028	-	301	546
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	687	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1028	-	269	546
Mov Cap-2 Maneuver	-	-	-	-	269	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	615	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	18
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	1028	-
HCM Lane V/C Ratio	0.386	-	-	0.085	-
HCM Control Delay (s)	18	-	-	8.8	0.3
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.8	-	-	0.3	-

Lanes, Volumes, Timings
7: Westminster Way N & Pier 1 Dr

4/5/2019



Lane Group	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Volume (vph)	0	0	110	0	28	0	365	74	32	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0		100	100		0	0	0
Storage Lanes	0	0	1		1	0		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	1.00	1.00	1.00
Frt					0.850		0.977			0.850
Flt Protected			0.950						0.950	
Satd. Flow (prot)	0	0	1593	0	1425	0	1638	0	1593	1425
Flt Permitted			0.950						0.950	
Satd. Flow (perm)	0	0	1593	0	1425	0	1638	0	1593	1425
Link Speed (mph)	30			35			35		15	
Link Distance (ft)	179			244			339		204	
Travel Time (s)	4.1			4.8			6.6		9.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	120	0	30	0	397	80	35	134
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	120	0	30	0	477	0	35	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right
Median Width(ft)	0			12			12		12	
Link Offset(ft)	0			0			0		0	
Crosswalk Width(ft)	16			16			16		16	
Two way Left Turn Lane										
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15		9	15		9	15	9
Sign Control	Stop			Free			Free		Stop	

Intersection Summary			
Area Type:	CBD		
Control Type: Unsignalized			
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Capacity Utilization

7: Westminster Way N & Pier 1 Dr

4/5/2019

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Volume (vph)	0	0	110	0	28	0	365	74	32	123
Pedestrians										
Ped Button										
Pedestrian Timing (s)										
Free Right		No			No			No		No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90	90	90	90	90
Volume Combined (vph)	0	0	110	0	28	0	439	0	32	123
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.85	0.95	1.00	0.85	0.95	0.97	0.85	0.95	0.85
Saturated Flow (vph)	0	0	1625	0	1454	0	1667	0	1625	1454
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00			0.00		0.00	
Protected Option Allowed	No			Yes			Yes		No	
Reference Time (s)		0.0	6.1	0.0	1.7	0.0	23.7	0.0		7.6
Adj Reference Time (s)		0.0	10.1	0.0	8.0	0.0	27.7	0.0		11.6
Permitted Option										
Adj Saturation A (vph)	0		144	0		0	1667		144	
Reference Time A (s)	0.0		68.6	0.0		0.0	23.7		19.9	
Adj Saturation B (vph	NA		NA	NA		0	1667		NA	
Reference Time B (s)	NA		NA	NA		0.0	23.7		NA	
Reference Time (s)				68.6			23.7			
Adj Reference Time (s)				72.6			27.7			
Split Option										
Ref Time Combined (s)	0.0		6.1	0.0		0.0	23.7		1.8	
Ref Time Seperate (s)	0.0		6.1	0.0		0.0	19.7		1.8	
Reference Time (s)	0.0		6.1	6.1		23.7	23.7		1.8	
Adj Reference Time (s)	0.0		10.1	10.1		27.7	27.7		8.0	

Summary	WB	NB SB	SE	Combined
Protected Option (s)	NA	37.8	NA	
Permitted Option (s)	Err	72.6	Err	
Split Option (s)	0.0	37.8	8.0	
Minimum (s)	0.0	37.8	8.0	45.8

Right Turns	NBR	SER
Adj Reference Time (s)	8.0	11.6
Cross Thru Ref Time (s)	0.0	27.7
Oncoming Left Ref Time (s)	0.0	0.0
Combined (s)	8.0	39.3

Intersection Summary			
Intersection Capacity Utilization	50.9%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Vol, veh/h	0	0	110	0	28	0	365	74	32	123
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	-	0	-	100	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	120	0	30	0	397	80	35	134

Major/Minor	Major1			Major2			Minor2	
Conflicting Flow All	477	0	0	0	0	0	437	437
Stage 1	-	-	-	-	-	-	437	-
Stage 2	-	-	-	-	-	-	0	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1085	-	-	-	-	-	577	620
Stage 1	-	-	-	-	-	-	651	-
Stage 2	-	-	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-		
Mov Cap-1 Maneuver	1085	-	-	-	-	-	513	620
Mov Cap-2 Maneuver	-	-	-	-	-	-	513	-
Stage 1	-	-	-	-	-	-	651	-
Stage 2	-	-	-	-	-	-	-	-

Approach	NB	SB	SE
HCM Control Delay, s	7	0	
HCM LOS			-

Minor Lane/Major Mvmt	NBL	NBT	NBR	SELn1	SELn2	SBL	SBT	SBR
Capacity (veh/h)	1085	-	-	-	620	-	-	-
HCM Lane V/C Ratio	0.11	-	-	-	0.216	-	-	-
HCM Control Delay (s)	8.7	-	-	-	12.4	0	-	-
HCM Lane LOS	A	-	-	-	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-	0.8	-	-	-

Lanes, Volumes, Timings

8: Westminster Way N & N 155th St

4/5/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	307	163	228	334	69	153	69	802	76	296	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		50	175		0	300		0	100		500
Storage Lanes	0		0	1		1	1		2	1		0
Taper Length (ft)	25			25			50			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Ped Bike Factor		0.99		1.00		0.97	1.00		0.98	1.00	0.99	
Frt		0.948				0.850			0.850		0.952	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	0	3034	0	1608	1693	1439	1608	1693	2533	1608	1600	0
Flt Permitted				0.248			0.260			0.709		
Satd. Flow (perm)	0	3034	0	419	1693	1395	440	1693	2476	1199	1600	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		116				78			397		28	
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		483			515			1441			349	
Travel Time (s)		13.2			10.0			28.1			6.8	
Confl. Peds. (#/hr)	5		3	3		5	1		1	1		1
Peak Hour Factor	0.87	0.87	0.87	0.89	0.89	0.89	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	0	353	187	256	375	78	163	73	853	81	315	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	540	0	256	375	78	163	73	853	81	463	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			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1		1	1	1	1	1	1	1	1	
Detector Template												
Leading Detector (ft)		50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)		0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)		0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)		50		50	50	50	50	50	50	50	50	
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type		NA		pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases				8		8	2		2	6		
Detector Phase		4		3	8	8	2	2	3	6	6	
Switch Phase												
Minimum Initial (s)		5.0		5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	

Lanes, Volumes, Timings
8: Westminster Way N & N 155th St 4/5/2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)		28.0		26.0	26.0	26.0	21.0	21.0	26.0	28.0	28.0	
Total Split (s)		29.0		27.0	56.0	56.0	29.0	29.0	27.0	29.0	29.0	
Total Split (%)		34.1%		31.8%	65.9%	65.9%	34.1%	34.1%	31.8%	34.1%	34.1%	
Maximum Green (s)		24.0		22.0	52.0	52.0	24.0	24.0	22.0	24.0	24.0	
Yellow Time (s)		4.0		4.0	3.5	3.5	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)		1.0		1.0	0.5	0.5	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		-1.3		-1.3	-1.3	0.0	-1.5	-1.5	0.0	-1.5	-1.5	
Total Lost Time (s)		3.7		3.7	2.7	4.0	3.5	3.5	5.0	3.5	3.5	
Lead/Lag		Lag		Lead					Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)		3.5		3.5	3.0	3.0	2.0	2.0	3.5	2.0	2.0	
Recall Mode		None		None	None	None	Max	Max	None	Max	Max	
Walk Time (s)					7.0	7.0	5.0	5.0		7.0	7.0	
Flash Dont Walk (s)					12.0	12.0	11.0	11.0		14.0	14.0	
Pedestrian Calls (#/hr)					0	0	0	0		0	0	
Act Effct Green (s)		17.7		38.6	39.6	38.3	25.9	25.9	40.1	25.9	25.9	
Actuated g/C Ratio		0.25		0.54	0.55	0.53	0.36	0.36	0.56	0.36	0.36	
v/c Ratio		0.65		0.50	0.40	0.10	1.03	0.12	0.54	0.19	0.78	
Control Delay		22.9		12.3	10.2	2.2	111.1	19.3	5.4	20.6	32.9	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		22.9		12.3	10.2	2.2	111.1	19.3	5.4	20.6	32.9	
LOS		C		B	B	A	F	B	A	C	C	
Approach Delay		22.9			10.1			22.2			31.1	
Approach LOS		C			B			C			C	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 85			
Actuated Cycle Length: 71.8			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 21.0		Intersection LOS: C	
Intersection Capacity Utilization 83.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: Westminster Way N & N 155th St

Queues

8: Westminster Way N & N 155th St

4/5/2019

Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	540	256	375	78	163	73	853	81	463
v/c Ratio	0.65	0.50	0.40	0.10	1.03	0.12	0.54	0.19	0.78
Control Delay	22.9	12.3	10.2	2.2	111.1	19.3	5.4	20.6	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	12.3	10.2	2.2	111.1	19.3	5.4	20.6	32.9
Queue Length 50th (ft)	86	56	86	0	~80	21	45	24	170
Queue Length 95th (ft)	141	93	133	15	#230	60	107	68	#413
Internal Link Dist (ft)	403		435			1361			269
Turn Bay Length (ft)		175			300			100	
Base Capacity (vph)	1160	617	1276	1046	159	610	1768	432	595
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	0.47	0.41	0.29	0.07	1.03	0.12	0.48	0.19	0.78

Intersection Summary

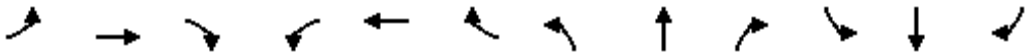
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Intersection Capacity Utilization

8: Westminster Way N & N 155th St

4/5/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	307	163	228	334	69	153	69	802	76	296	139
Pedestrians	5		3	3		5	1		1	1		1
Ped Button		Yes			Yes			No			No	
Pedestrian Timing (s)		16.0			19.0			16.0			21.0	
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	2.7	3.7	2.7	3.7	2.7	4.0	3.5	3.5	5.0	3.5	3.5	2.5
Minimum Green (s)	4.0	5.0	4.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90	90	90	90	90	90	90
Volume Combined (vph)	0	470	0	228	334	69	153	69	802	76	435	0
Lane Utilization Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	1.00
Turning Factor (vph)	0.95	0.95	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.95	0.85
Saturated Flow (vph)	0	3086	0	1625	1710	1454	1625	1710	2573	1625	1628	0
Ped Intf Time (s)	0.0	0.1	0.3	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.0	0.1
Pedestrian Frequency (%)		0.07			0.12			1.00			1.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	0.0	13.8	0.0	12.6	17.6	4.8	8.5	3.6	28.2	4.2	24.1	0.0
Adj Reference Time (s)	0.0	17.8	0.0	16.6	21.7	10.4	12.5	20.0	33.2	9.0	28.1	0.0
Permitted Option												
Adj Saturation A (vph)	0	1543		144	1710		144	1710		144	1628	
Reference Time A (s)	0.0	13.8		142.1	17.6		95.4	3.6		47.4	24.1	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		0	1628	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		12.2	24.1	
Reference Time (s)		13.8			142.1			95.4			24.1	
Adj Reference Time (s)		17.8			146.1			99.4			28.1	
Split Option												
Ref Time Combined (s)	0.0	13.8		12.6	17.6		8.5	3.6		4.2	24.1	
Ref Time Seperate (s)	0.0	9.1		12.6	17.6		8.5	3.6		4.2	16.4	
Reference Time (s)	13.8	13.8		17.6	17.6		8.5	8.5		24.1	24.1	
Adj Reference Time (s)	17.8	17.8		21.7	21.7		20.0	20.0		28.1	28.1	

Summary	EB WB	NB SB	Combined
Protected Option (s)	34.4	40.6	
Permitted Option (s)	146.1	99.4	
Split Option (s)	39.6	48.1	
Minimum (s)	34.4	40.6	75.0

Right Turns	WBR	NBR
Adj Reference Time (s)	10.4	33.2
Cross Thru Ref Time (s)	20.0	17.8
Oncoming Left Ref Time (s)	0.0	9.0
Combined (s)	30.4	60.0

Intersection Summary			
Intersection Capacity Utilization	83.3%	ICU Level of Service	E

Reference Times and Phasing Options do not represent an optimized timing plan.

HCM 2010 Signalized Intersection Summary
8: Westminster Way N & N 155th St

4/5/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	307	163	228	334	69	153	69	802	76	296	139
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1693	1710	1693	1693	1693	1693	1693	1693	1693	1693	1710
Adj Flow Rate, veh/h	0	353	187	256	375	78	163	73	853	81	315	148
Adj No. of Lanes	0	2	0	1	1	1	1	1	2	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.89	0.89	0.89	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	0	549	286	467	833	675	239	671	1313	314	432	203
Arrive On Green	0.00	0.27	0.27	0.17	0.49	0.47	0.40	0.40	0.37	0.40	0.40	0.40
Sat Flow, veh/h	0	2130	1064	1612	1693	1431	841	1693	2529	547	1090	512
Grp Volume(v), veh/h	0	276	264	256	375	78	163	73	853	81	0	463
Grp Sat Flow(s),veh/h/ln	0	1608	1501	1612	1693	1431	841	1693	1265	547	0	1602
Q Serve(g_s), s	0.0	9.8	10.0	6.5	9.3	2.0	9.7	1.8	15.8	7.1	0.0	15.8
Cycle Q Clear(g_c), s	0.0	9.8	10.0	6.5	9.3	2.0	25.5	1.8	15.8	8.8	0.0	15.8
Prop In Lane	0.00		0.71	1.00		1.00	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	0	431	403	467	833	675	239	671	1313	314	0	635
V/C Ratio(X)	0.00	0.64	0.65	0.55	0.45	0.12	0.68	0.11	0.65	0.26	0.00	0.73
Avail Cap(c_a), veh/h	0	632	590	784	1403	1157	239	671	1313	314	0	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	20.8	20.9	12.6	10.7	9.5	28.4	12.3	11.2	15.0	0.0	16.5
Incr Delay (d2), s/veh	0.0	1.9	2.2	1.2	0.4	0.1	14.7	0.3	2.5	2.0	0.0	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	0.0	4.5	4.3	2.9	4.4	0.8	3.8	0.9	5.9	1.2	0.0	8.2
LnGrp Delay(d),s/veh	0.0	22.7	23.1	13.8	11.1	9.6	43.1	12.6	13.7	17.0	0.0	23.7
LnGrp LOS		C	C	B	B	A	D	B	B	B		C
Approach Vol, veh/h		540			709			1089			544	
Approach Delay, s/veh		22.9			11.9			18.1			22.7	
Approach LOS		C			B			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6		8
Phs Duration (G+Y+Rc), s		29.0	14.4	21.0		29.0		35.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0		* 5
Max Green Setting (Gmax), s		24.0	22.0	24.0		24.0		* 52
Max Q Clear Time (g_c+I1), s		27.5	8.5	12.0		17.8		11.3
Green Ext Time (p_c), s		0.0	1.0	3.9		3.3		5.5

Intersection Summary	
HCM 2010 Ctrl Delay	18.3
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
9: SP NW Dr & N 160th St

4/5/2019

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	467	26	30	307	10	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.879	
Flt Protected				0.996	0.995	
Satd. Flow (prot)	1850	0	0	1855	1629	0
Flt Permitted				0.996	0.995	
Satd. Flow (perm)	1850	0	0	1855	1629	0
Link Speed (mph)	35			35	30	
Link Distance (ft)	284			460	207	
Travel Time (s)	5.5			9.0	4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	508	28	33	334	11	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	536	0	0	367	107	0
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	1.00	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 49.8%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection Capacity Utilization
9: SP NW Dr & N 160th St

4/5/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	467	26	30	307	10	88
Pedestrians						
Ped Button						
Pedestrian Timing (s)						
Free Right		No				No
Ideal Flow	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	90	90	90	90	90	90
Volume Combined (vph)	493	0	0	337	98	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.99	0.85	0.95	1.00	0.86	0.85
Saturated Flow (vph)	1885	0	0	1892	1636	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)	0.00			0.00	0.00	
Protected Option Allowed	No			No	No	
Reference Time (s)		0.0				0.0
Adj Reference Time (s)		0.0				0.0
Permitted Option						
Adj Saturation A (vph)	1885		0	966	145	
Reference Time A (s)	23.5		0.0	31.4	60.7	
Adj Saturation B (vph	NA		NA	NA	NA	
Reference Time B (s)	NA		NA	NA	NA	
Reference Time (s)	23.5			31.4		
Adj Reference Time (s)	27.5			35.4		
Split Option						
Ref Time Combined (s)	23.5		0.0	16.0	5.4	
Ref Time Seperate (s)	22.3		1.5	14.5	0.6	
Reference Time (s)	23.5		16.0	16.0	5.4	
Adj Reference Time (s)	27.5		20.0	20.0	9.4	

Summary	EB WB	NB	Combined
Protected Option (s)	NA	NA	
Permitted Option (s)	35.4	Err	
Split Option (s)	47.6	9.4	
Minimum (s)	35.4	9.4	44.8

Right Turns
Adj Reference Time (s)
Cross Thru Ref Time (s)
Oncoming Left Ref Time (s)
Combined (s)

Intersection Summary			
Intersection Capacity Utilization	49.8%	ICU Level of Service	A

Reference Times and Phasing Options do not represent an optimized timing plan.

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	467	26	30	307	10	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	508	28	33	334	11	96

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	536	0	921	522
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	399	-
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	-	-	1032	-	300	555
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	678	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1032	-	288	555
Mov Cap-2 Maneuver	-	-	-	-	288	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	652	-

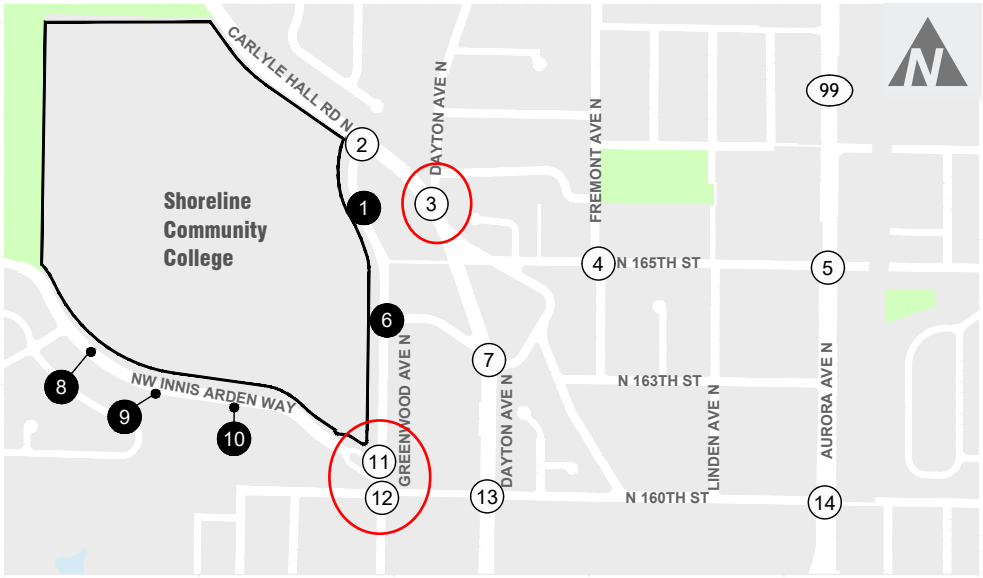
Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	14
HCM LOS			B

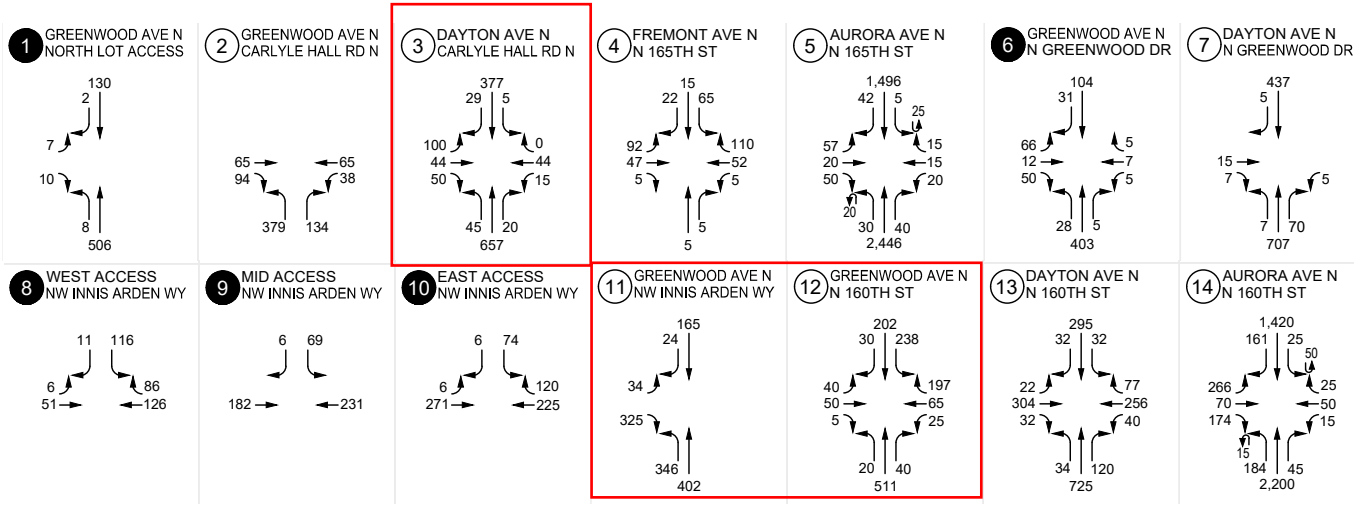
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	507	-	-	1032	-
HCM Lane V/C Ratio	0.21	-	-	0.032	-
HCM Control Delay (s)	14	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-

ATTACHMENT G

Shoreline Community College Traffic Forecasts at Study Intersections 1, 2, & 3

Figure 16: Future (2040) With-Project PM Peak Hour Traffic Volumes





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	106	101	40	15	44	15	20	283	5	5	252	59
Future Volume (veh/h)	106	101	40	15	44	15	20	283	5	5	252	59
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1759	1900	1900	1863	1900	1900	1881	1900
Adj Flow Rate, veh/h	138	131	52	19	57	19	26	368	6	6	327	77
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Percent Heavy Veh, %	1	1	1	8	8	8	2	2	2	1	1	1
Cap, veh/h	168	159	63	28	85	28	90	856	13	64	725	168
Arrive On Green	0.22	0.22	0.22	0.09	0.09	0.09	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	763	724	288	333	1000	333	53	1729	27	7	1464	340
Grp Volume(v), veh/h	321	0	0	95	0	0	400	0	0	410	0	0
Grp Sat Flow(s),veh/h/ln	1775	0	0	1667	0	0	1809	0	0	1811	0	0
Q Serve(g_s), s	10.3	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	10.3	0.0	0.0	3.3	0.0	0.0	8.3	0.0	0.0	8.8	0.0	0.0
Prop In Lane	0.43		0.16	0.20		0.20	0.06		0.01	0.01		0.19
Lane Grp Cap(c), veh/h	390	0	0	142	0	0	959	0	0	957	0	0
V/C Ratio(X)	0.82	0.00	0.00	0.67	0.00	0.00	0.42	0.00	0.00	0.43	0.00	0.00
Avail Cap(c_a), veh/h	473	0	0	445	0	0	959	0	0	957	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.3	0.0	0.0	26.6	0.0	0.0	9.8	0.0	0.0	9.9	0.0	0.0
Incr Delay (d2), s/veh	9.5	0.0	0.0	5.3	0.0	0.0	1.3	0.0	0.0	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.0	1.7	0.0	0.0	4.6	0.0	0.0	4.7	0.0	0.0
LnGrp Delay(d),s/veh	31.8	0.0	0.0	32.0	0.0	0.0	11.1	0.0	0.0	11.3	0.0	0.0
LnGrp LOS	C			C			B			B		
Approach Vol, veh/h		321			95			400			410	
Approach Delay, s/veh		31.8			32.0			11.1			11.3	
Approach LOS		C			C			B			B	

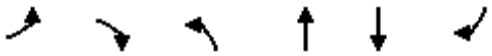
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		33.7		17.2		33.7		9.1
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s		10.3		12.3		10.8		5.3
Green Ext Time (p_c), s		2.5		0.6		2.3		0.3

Intersection Summary	
HCM 2010 Ctrl Delay	18.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	42	51	13	42	19	45	657	19	6	377	29
Future Volume (veh/h)	100	42	51	13	42	19	45	657	19	6	377	29
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1881	1900	1900	1792	1900	1900	1881	1900	1900	1881	1900
Adj Flow Rate, veh/h	106	45	54	14	45	20	48	699	20	6	401	31
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	6	6	6	1	1	1	1	1	1
Cap, veh/h	132	56	67	20	64	29	92	1073	30	50	1087	83
Arrive On Green	0.15	0.15	0.15	0.07	0.07	0.07	0.64	0.64	0.64	0.64	0.64	0.64
Sat Flow, veh/h	895	380	456	299	961	427	70	1688	47	6	1710	131
Grp Volume(v), veh/h	205	0	0	79	0	0	767	0	0	438	0	0
Grp Sat Flow(s),veh/h/ln	1731	0	0	1687	0	0	1805	0	0	1848	0	0
Q Serve(g_s), s	9.2	0.0	0.0	3.7	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	0.0	3.7	0.0	0.0	20.4	0.0	0.0	9.0	0.0	0.0
Prop In Lane	0.52		0.26	0.18		0.25	0.06		0.03	0.01		0.07
Lane Grp Cap(c), veh/h	255	0	0	113	0	0	1195	0	0	1220	0	0
V/C Ratio(X)	0.80	0.00	0.00	0.70	0.00	0.00	0.64	0.00	0.00	0.36	0.00	0.00
Avail Cap(c_a), veh/h	346	0	0	337	0	0	1195	0	0	1220	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.0	0.0	0.0	36.5	0.0	0.0	9.0	0.0	0.0	6.9	0.0	0.0
Incr Delay (d2), s/veh	9.4	0.0	0.0	7.6	0.0	0.0	2.7	0.0	0.0	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	0.0	2.0	0.0	0.0	11.1	0.0	0.0	4.8	0.0	0.0
LnGrp Delay(d),s/veh	42.4	0.0	0.0	44.1	0.0	0.0	11.7	0.0	0.0	7.8	0.0	0.0
LnGrp LOS	D			D			B			A		
Approach Vol, veh/h		205			79			767			438	
Approach Delay, s/veh		42.4			44.1			11.7			7.8	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		54.9		15.8		54.9		9.4
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		36.0		16.0		36.0		16.0
Max Q Clear Time (g_c+I1), s		22.4		11.2		11.0		5.7
Green Ext Time (p_c), s		7.0		0.5		9.8		0.2

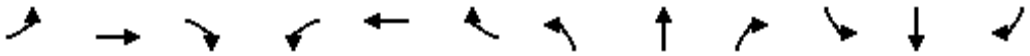
Intersection Summary	
HCM 2010 Ctrl Delay	16.5
HCM 2010 LOS	B



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	28	276	698	128	175	91
Future Volume (vph)	28	276	698	128	175	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	0.95	
Flpb, ped/bikes	0.87	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1424	1412	1736	1827	1686	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1424	1412	1736	1827	1686	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	37	368	931	171	233	121
RTOR Reduction (vph)	0	310	0	0	19	0
Lane Group Flow (vph)	37	58	931	171	335	0
Confl. Peds. (#/hr)	49	7	7			49
Heavy Vehicles (%)	10%	10%	4%	4%	2%	2%
Turn Type	Perm	Perm	Split	NA	NA	
Protected Phases			2 8	2 8	6	
Permitted Phases	4	4				
Actuated Green, G (s)	15.3	15.3	51.0	51.0	19.0	
Effective Green, g (s)	15.3	15.3	51.0	51.0	19.0	
Actuated g/C Ratio	0.16	0.16	0.52	0.52	0.20	
Clearance Time (s)	4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	223	222	909	957	329	
v/s Ratio Prot			c0.54	0.09	c0.20	
v/s Ratio Perm	0.03	c0.04				
v/c Ratio	0.17	0.26	1.02	0.18	1.02	
Uniform Delay, d1	35.5	36.0	23.1	12.2	39.1	
Progression Factor	1.00	1.00	0.85	0.98	1.00	
Incremental Delay, d2	0.4	0.6	31.9	0.1	54.7	
Delay (s)	35.8	36.7	51.5	12.0	93.9	
Level of Service	D	D	D	B	F	
Approach Delay (s)	36.6			45.4	93.9	
Approach LOS	D			D	F	

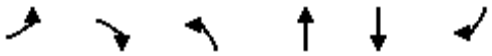
Intersection Summary			
HCM 2000 Control Delay	52.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	75	15	15	115	456	20	350	40	154	241	45
Future Volume (vph)	26	75	15	15	115	456	20	350	40	154	241	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		0.98			1.00	0.99		0.99			0.99	
Flpb, ped/bikes		0.99			0.99	1.00		1.00			1.00	
Frt		0.98			1.00	0.85		0.99			0.99	
Flt Protected		0.99			0.99	1.00		1.00			0.98	
Satd. Flow (prot)		1670			1769	1509		1812			1717	
Flt Permitted		0.90			0.96	1.00		1.00			0.98	
Satd. Flow (perm)		1528			1715	1509		1812			1717	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	32	91	18	18	140	556	24	427	49	188	294	55
RTOR Reduction (vph)	0	5	0	0	0	46	0	4	0	0	4	0
Lane Group Flow (vph)	0	136	0	0	158	510	0	496	0	0	533	0
Confl. Peds. (#/hr)	35		60	37		11	60		37	11		35
Confl. Bikes (#/hr)						2			2			
Heavy Vehicles (%)	7%	7%	7%	6%	6%	6%	2%	2%	2%	6%	6%	6%
Turn Type	Perm	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases		8			8	4 6	2	2		4 6	4 6	
Permitted Phases	8			8		8						
Actuated Green, G (s)		18.0			18.0	56.3		29.0			38.3	
Effective Green, g (s)		18.0			18.0	56.3		29.0			38.3	
Actuated g/C Ratio		0.18			0.18	0.58		0.30			0.39	
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		282			317	935		540			675	
v/s Ratio Prot						c0.21		c0.27			c0.31	
v/s Ratio Perm		0.09			0.09	0.12						
v/c Ratio		0.48			0.50	0.55		0.92			0.79	
Uniform Delay, d1		35.5			35.6	12.6		33.0			26.0	
Progression Factor		1.00			1.00	1.00		1.00			0.60	
Incremental Delay, d2		1.3			1.2	0.7		20.5			3.6	
Delay (s)		36.8			36.8	13.3		53.5			19.1	
Level of Service		D			D	B		D			B	
Approach Delay (s)		36.8			18.5			53.5			19.1	
Approach LOS		D			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	97.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	71	538	490	157	181	44
Future Volume (vph)	71	538	490	157	181	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	0.96	
Flpb, ped/bikes	0.83	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1437	1496	1752	1845	1697	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1437	1496	1752	1845	1697	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	88	664	605	194	223	54
RTOR Reduction (vph)	0	485	0	0	9	0
Lane Group Flow (vph)	88	179	605	194	268	0
Confl. Peds. (#/hr)	62	6	6			62
Heavy Vehicles (%)	4%	4%	3%	3%	5%	5%
Turn Type	Perm	Perm	Split	NA	NA	
Protected Phases			2 8	2 8	6	
Permitted Phases	4	4				
Actuated Green, G (s)	27.0	27.0	43.0	43.0	18.0	
Effective Green, g (s)	27.0	27.0	43.0	43.0	18.0	
Actuated g/C Ratio	0.27	0.27	0.43	0.43	0.18	
Clearance Time (s)	4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	387	403	753	793	305	
v/s Ratio Prot			c0.35	0.11	c0.16	
v/s Ratio Perm	0.06	c0.12				
v/c Ratio	0.23	0.44	0.80	0.24	0.88	
Uniform Delay, d1	28.4	30.3	24.8	18.2	39.9	
Progression Factor	1.00	1.00	0.82	0.95	1.00	
Incremental Delay, d2	0.3	0.8	4.3	0.1	28.2	
Delay (s)	28.7	31.1	24.7	17.4	68.1	
Level of Service	C	C	C	B	E	
Approach Delay (s)	30.8			22.9	68.1	
Approach LOS	C			C	E	

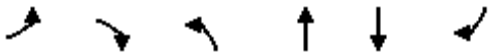
Intersection Summary			
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	30	5	15	25	342	5	305	25	438	275	16
Future Volume (vph)	5	30	5	15	25	342	5	305	25	438	275	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		0.99			1.00	0.98		0.99			1.00	
Flpb, ped/bikes		1.00			0.95	1.00		1.00			1.00	
Frt		0.98			1.00	0.85		0.99			1.00	
Flt Protected		0.99			0.98	1.00		1.00			0.97	
Satd. Flow (prot)		1780			1691	1507		1839			1766	
Flt Permitted		0.98			0.90	1.00		1.00			0.97	
Satd. Flow (perm)		1747			1557	1507		1839			1766	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	6	37	6	19	31	422	6	377	31	541	340	20
RTOR Reduction (vph)	0	5	0	0	0	17	0	3	0	0	1	0
Lane Group Flow (vph)	0	44	0	0	50	405	0	411	0	0	900	0
Confl. Peds. (#/hr)	13		24	50		39	24		50	39		13
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	1%	1%	1%	4%	4%	4%
Turn Type	Perm	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases		8			8	4 6	2	2		4 6	4 6	
Permitted Phases	8			8		8						
Actuated Green, G (s)		18.0			18.0	67.0		21.0			49.0	
Effective Green, g (s)		18.0			18.0	67.0		21.0			49.0	
Actuated g/C Ratio		0.18			0.18	0.67		0.21			0.49	
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		314			280	1069		386			865	
v/s Ratio Prot						c0.19		c0.22			c0.51	
v/s Ratio Perm		0.03			0.03	0.08						
v/c Ratio		0.14			0.18	0.38		1.06			1.04	
Uniform Delay, d1		34.5			34.7	7.3		39.5			25.5	
Progression Factor		1.00			1.00	1.00		1.00			0.81	
Incremental Delay, d2		0.2			0.3	0.2		63.9			35.3	
Delay (s)		34.7			35.0	7.5		103.4			55.9	
Level of Service		C			D	A		F			E	
Approach Delay (s)		34.7			10.4			103.4			55.9	
Approach LOS		C			B			F			E	

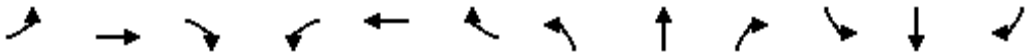
Intersection Summary			
HCM 2000 Control Delay	54.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	36	324	346	401	163	23
Future Volume (vph)	36	324	346	401	163	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.94	1.00	1.00	0.98	
Flpb, ped/bikes	0.89	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1510	1435	1770	1863	1783	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1510	1435	1770	1863	1783	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	39	348	372	431	175	25
RTOR Reduction (vph)	0	296	0	0	5	0
Lane Group Flow (vph)	39	52	372	431	195	0
Confl. Peds. (#/hr)	43	13	13			43
Confl. Bikes (#/hr)		2				2
Heavy Vehicles (%)	6%	6%	2%	2%	3%	3%
Turn Type	Perm	Perm	Split	NA	NA	
Protected Phases			2 8	2 8	6	
Permitted Phases	4	4				
Actuated Green, G (s)	14.2	14.2	50.6	50.6	18.1	
Effective Green, g (s)	14.2	14.2	50.6	50.6	18.1	
Actuated g/C Ratio	0.15	0.15	0.53	0.53	0.19	
Clearance Time (s)	4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	225	214	943	993	340	
v/s Ratio Prot			0.21	c0.23	c0.11	
v/s Ratio Perm	0.03	c0.04				
v/c Ratio	0.17	0.24	0.39	0.43	0.57	
Uniform Delay, d1	35.2	35.6	13.1	13.5	34.9	
Progression Factor	1.00	1.00	0.60	0.59	1.00	
Incremental Delay, d2	0.4	0.6	0.1	0.2	6.9	
Delay (s)	35.6	36.2	8.0	8.1	41.8	
Level of Service	D	D	A	A	D	
Approach Delay (s)	36.1			8.0	41.8	
Approach LOS	D			A	D	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	94.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



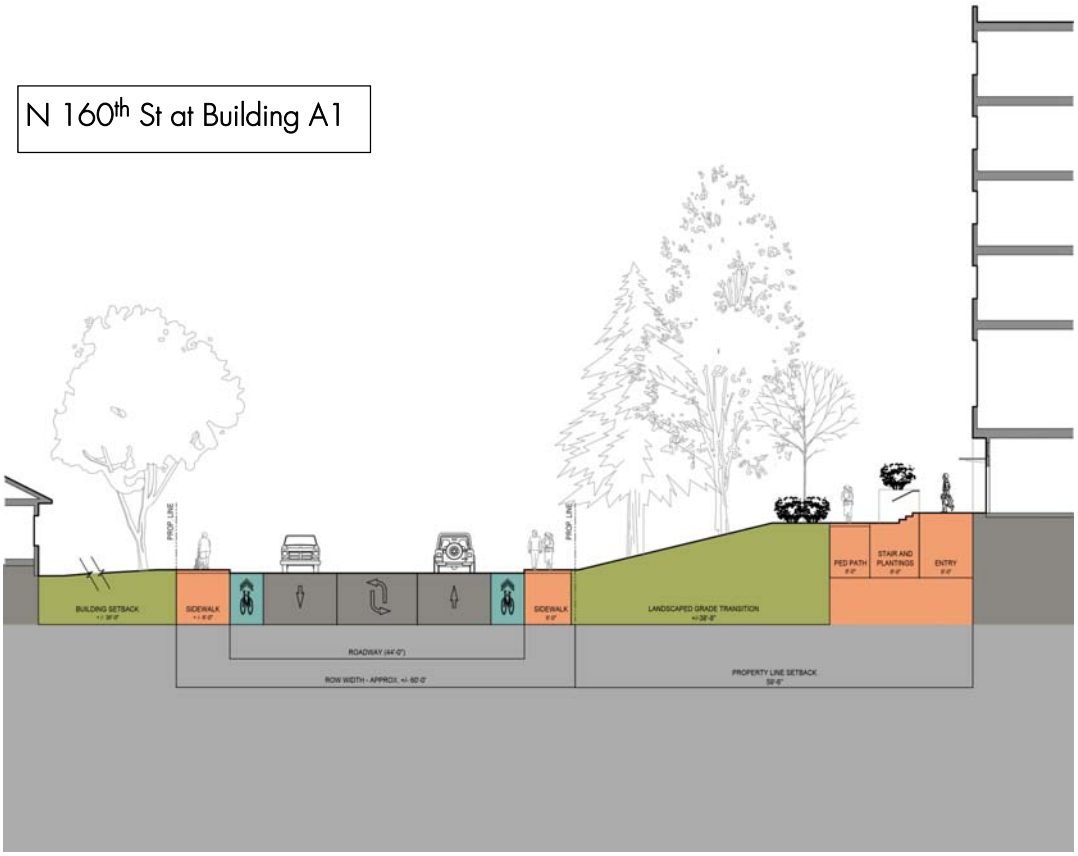
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	51	6	25	64	197	19	512	38	236	200	32
Future Volume (vph)	38	51	6	25	64	197	19	512	38	236	200	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes		1.00			1.00	0.99		1.00			1.00	
Flpb, ped/bikes		1.00			0.99	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.99			0.99	
Flt Protected		0.98			0.99	1.00		1.00			0.98	
Satd. Flow (prot)		1777			1767	1526		1853			1777	
Flt Permitted		0.85			0.92	1.00		1.00			0.98	
Satd. Flow (perm)		1548			1641	1526		1853			1777	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	42	57	7	28	71	219	21	569	42	262	222	36
RTOR Reduction (vph)	0	2	0	0	0	33	0	3	0	0	2	0
Lane Group Flow (vph)	0	104	0	0	99	186	0	629	0	0	518	0
Confl. Peds. (#/hr)	8		17	17		8	17		17	8		8
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	1%	1%	1%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases		8			8	4 6	2	2		4 6	4 6	
Permitted Phases	8			8		8						
Actuated Green, G (s)		16.4			16.4	52.7		30.2			36.3	
Effective Green, g (s)		16.4			16.4	52.7		30.2			36.3	
Actuated g/C Ratio		0.17			0.17	0.56		0.32			0.38	
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		267			283	911		589			679	
v/s Ratio Prot						0.08		c0.34			c0.29	
v/s Ratio Perm		c0.07			0.06	0.04						
v/c Ratio		0.39			0.35	0.20		1.07			0.76	
Uniform Delay, d1		34.8			34.6	10.6		32.4			25.5	
Progression Factor		1.00			1.00	1.00		1.00			0.63	
Incremental Delay, d2		0.9			0.8	0.1		56.7			4.0	
Delay (s)		35.7			35.3	10.7		89.0			20.2	
Level of Service		D			D	B		F			C	
Approach Delay (s)		35.7			18.4			89.0			20.2	
Approach LOS		D			B			F			C	

Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	94.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

ATTACHMENT H

N 160th Street Roadway Cross Section

N 160th St at Building A1



N 160th St at Building B1