Transportation Impact Analysis

MERCER ISLAND CENTER FOR THE ARTS (MICA)

Prepared for:
MICA

June 2016

Prepared by:

12131 113th Avenue NE, Suite 203
Kirkland, WA 98034
Phone: 425-821-3665
Fax: 425-825-8434
www.transpogroup.com

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Executive Summary

This section provides an executive summary of the Transportation Impact Analysis through a set of frequently asked questions (FAQs).

Where is the project located and what would be developed?

The project is adjacent to Mercerdale Park, at the SE 32nd Street/77th Avenue SE intersection in Mercer Island, Washington. Development would include a performing arts center, containing a mainstage auditorium, theatre lab, recital studio, dance studio, and several classrooms and practice rooms. Outside the building structure, an outdoor theater, café, and performance plaza/drop-off area are included within the property's perimeter.

How is parking to be accommodated for the site?

It is anticipated that on-street parking and parking committed by adjacent businesses will be shared to satisfy the project parking demand, based on studies of existing supply and utilization. Proposed changes to the town center area include the addition of on-street parking on both east and west sides of 77th Avenue SE, as well as along other roadways surrounding the site. No on-site parking is proposed for this project.

How many daily vehicular trips would the project generate and when would peak traffic volumes occur?

The peak traffic volumes would occur during the weekday PM peak hour and the project would generate approximately 166 total trips with approximately 86 inbound trips and 80 outbound trips.

What transportation impacts are anticipated, if any?

Pick-up and drop-off queuing activity is anticipated to occur during class start and dismissal times; however, the site will be designed such that this activity will be accommodated within on-street curb space for minimal impact to the adjacent roadway network. Traffic generated by daytime classes and nighttime performances is anticipated to be low enough as to not impact levels of service on surrounding roadways and intersections.

What measures are proposed to reduce or control traffic impacts?

The site access area for pick-up and drop-off trips will be designed to manage queuing. In addition, curb-side management and the use of MICA staff to supervise drop-off and pick-up trips would reduce or control project-generated impacts. Additional mitigation measures for parking demand during High Activity times will be addressed in a Parking Management Plan.

Introduction

The purpose of this transportation impact analysis (TIA) is to evaluate transportation conditions and identify potential impacts associated with the proposed Mercer Island Center for the Arts (MICA). As necessary, mitigation measures are identified that would offset or reduce significant impacts.

Project Description

The proposed project is located adjacent to Mercerdale Park, at the SE 32nd Street/77th Avenue SE intersection. The Mercer Island Center for the Arts includes a 300-person mainstage, 100-person theatre lab, 100-person recital studio, as well as a dance studio, three classrooms, and four practice rooms. Dance studio and classroom activities vary in size: practice rooms accommodate individual students, while a classroom may fit up to 20 students at once. Outside the building structure, an outdoor theater, café, performance plaza, and pick-up/drop-off area are included within the property's perimeter. The project site vicinity is shown in Figure 1, and the site plan is found in Figure 2.

One vehicular access point would be provided to the site. This would include an access at the intersection of SE 32nd Street and 77th Avenue SE, which would provide access for deliveries and service vehicles. A drop-off/pick-up area will on-street adjacent.

No on-site parking is proposed for this project, and it is anticipated that on-street parking and parking available at local businesses will be shared to satisfy the project parking demand. A parking management plan will be developed to include strategies for accommodating the variety of events and activities at MICA.

Study Area and Approach

The analysis focuses on the weekday PM peak period (one busiest hour between 4:00 and 6:00 p.m.) operations at four study intersections as coordinated with the City. This period represents the highest cumulative total traffic for the adjacent street system providing a conservative timeframe for level of service (LOS) analysis. The study intersections include (also see Figure 1):

1. 77th Avenue SE / SE 27th Street
2. 78th Avenue SE / SE 28th Street
3. Island Crest Way / SE 28th Street
4. 78th Avenue SE / SE 32nd Street

The TIA begins by describing background conditions in the site vicinity including the roadway network, existing and future (2019) weekday PM peak hour traffic volumes, traffic operations, traffic safety, non-motorized facilities, and transit. Future conditions, with the proposed project constructed and occupied, were evaluated by adding site-generated traffic to future baseline traffic volumes. Analysis of future conditions addresses cumulative impacts of the proposed project and traffic growth in the study area. Site-generated impacts are identified based on differences in transportation conditions between future with- and without-project conditions.

Site Vicinity

Mercer Island Center for the Arts (MICA)

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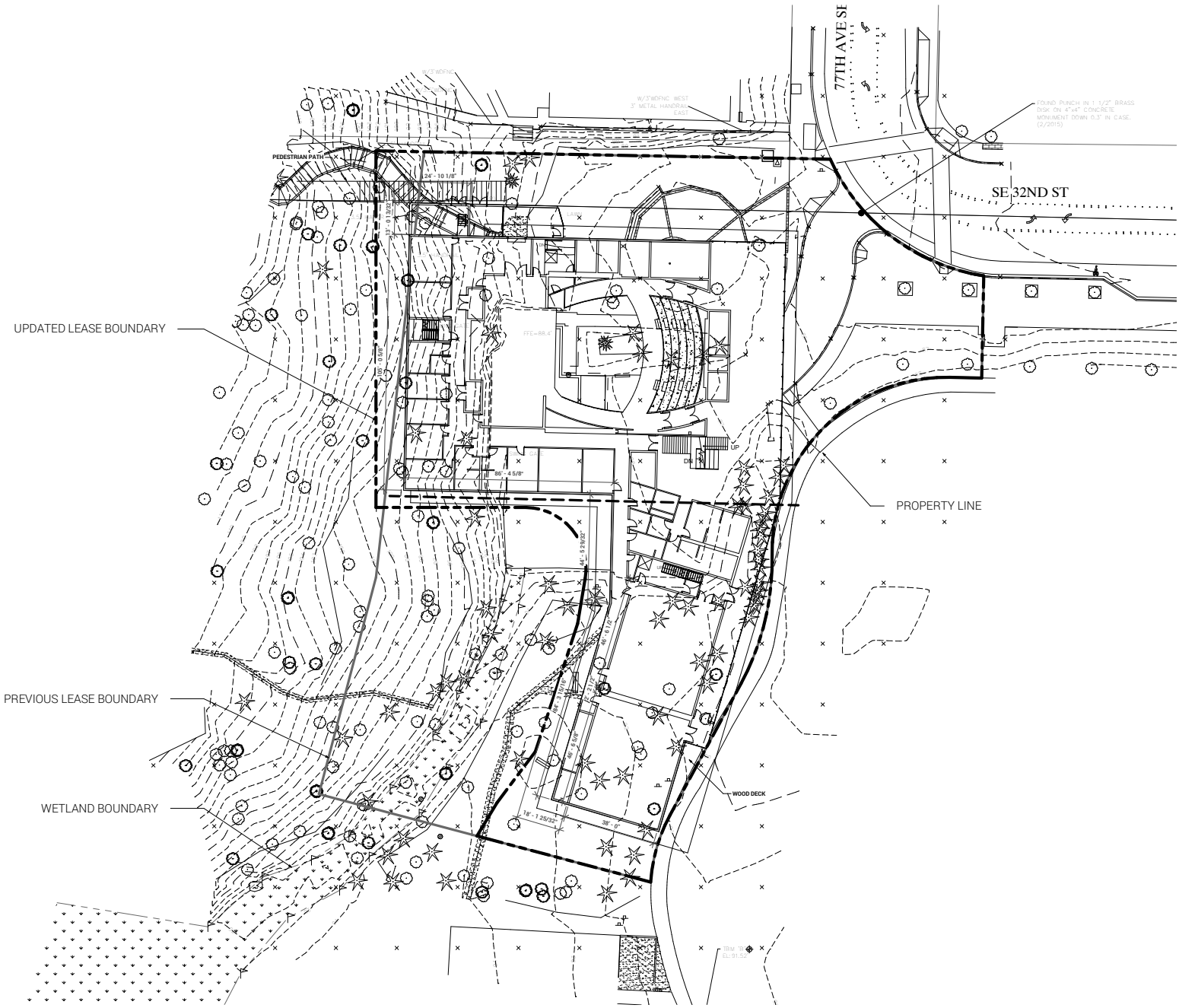

Site Plan

Mercer Island Center for the Arts (MICA)

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Existing & Future Without-Project Conditions

This section describes existing and future conditions within the identified study area without construction of the project. Characteristics are provided for the roadway network, planned roadway improvements, non-motorized facilities, transit service, existing and future without-project traffic volumes, traffic operations, and traffic safety.

Roadway Network

The project site is located in north Mercer Island, adjacent to the bottom of the Town Center area, and is bound by 77th Avenue SE to the east and SE 32nd Street to the north. Mercerdale Park acts as a boundary to the south and west of the site. The major roadways within the study area include:

77th Avenue SE is a three-lane roadway classified as a secondary arterial with sidewalks and a center two-way left-turn lane. This north-south roadway serves as a connection between the Mercer Island town center area and Interstate 90 (I-90). The posted speed limit is 25 miles per hour (mph).

78th Avenue SE is a two-lane north-south roadway classified as a collector arterial with sidewalks and a raised median. This roadway provides north-south access within the town center area. The posted speed limit is 25 mph.

SE 27th Street is a three-lane east-west roadway with sidewalks and a center two-way left-turn lane. The roadway is classified as a primary arterial and provides east-west access within the town center area. The posted speed limit is 25 mph.

SE 28th Street is a two-lane roadway with sidewalks. This roadway provides east-west access within the town center area. The posted speed limit is 25 mph.

SE 32nd Street is an east-west secondary arterial with sidewalks. The road provides one lane in each direction and a center two-way left-turn lane. Access to the project site would be via the 77th Avenue SE/ SE 32nd Street intersection. The posted speed limit is 25 mph.

Island Crest Way is a five-lane roadway classified as a primary arterial. This north-south roadway serves as one of the primary accesses to and from I-90, especially to reach areas east of the project site. Island Crest Way also serves as a primary access to southern Mercer Island neighborhoods. The posted speed limit is 35 mph.

Planned Roadway Improvements

Based on a review of the City's 2016-2021 Six-Year Transportation Improvement Program (TIP) and the recently-completed Town Center visioning process, future improvements by the City include narrowing 77th Avenue SE and adding on-street parking to both sides. These improvements are assumed as part of the future (2019) without-project conditions. In addition, the planned 2019 resurfacing program will repave 80th Avenue from SE 28th Street to SE 32nd Street, SE 32nd Street from 80th Avenue SE to 78th Avenue SE, and SE 29th Street from 76th Avenue SE to 77th Avenue SE. The resurfacing program will also repair sidewalks and upgrade sidewalk ramps to meet ADA requirements.

Non-Motorized Facilities

Sidewalks are provided along all of the nearby streets with crosswalks located at major intersections allowing safe pedestrian mobility throughout the area. Signalized crossings are

provided at the 77th Avenue SE/SE 27th Street and Island Crest Way/SE 28th Street intersections. Unsignalized pedestrian crossings are provided at the 78th Avenue SE/SE 32nd Street and 78th Avenue SE/SE 28th Street intersections. Pedestrian routes to the project site are clearly marked and accessible from all directions.

Transit Service

Three nearby transit stops are within walking distance from the project site. These stops are located at the southwest and northeast corners of the 78th Avenue SE/SE 32nd Street intersection, as well as at the Island Crest Way/SE 32nd Street intersection. Six transit routes access these stops, providing service throughout the King County area, primarily to Mercer Island and Seattle. The service areas, operating hours, and headways for these routes are summarized in Table 1.

Table 1. Existing Transit Service[1]

Routes	Area Served	Approximate Operating Hours	PM Peak Vehicle Trips		PM Peak Headways (minutes)
			Eastbound	Westbound	
201	Downtown Seattle – Mercer Island Park & Ride	7:00 a.m. to 8:30 a.m. 6:00 p.m. to 7:00 p.m.	1	1	40-60
204	Downtown Seattle – Mercer Island	6:00 a.m. to 7:30 p.m.	2	2	30
630	Downtown Seattle – Mercer Island	6:00 a.m. to 9:00 a.m. 4:00 p.m. to 7:30 p.m.	2	0	30
891, 892	Mercer Island – Mercer Island High School	7:00 a.m. to 8:00 a.m. 2:00 p.m. to 4:00 p.m.	1	1	60
894	Mercer Village Shopping Center – Mercer Island High School	7:00 a.m. to 8:00 a.m. 2:00 p.m. to 4:00 p.m.	1	1	60
		Total	**7**	**5**	30-60

1. Based on data provided by, King County Metro Transit (April 2016).

As shown in the table, most of the service is provided to Downtown Seattle and other areas of Mercer Island. Headways range from 30-60 minutes.

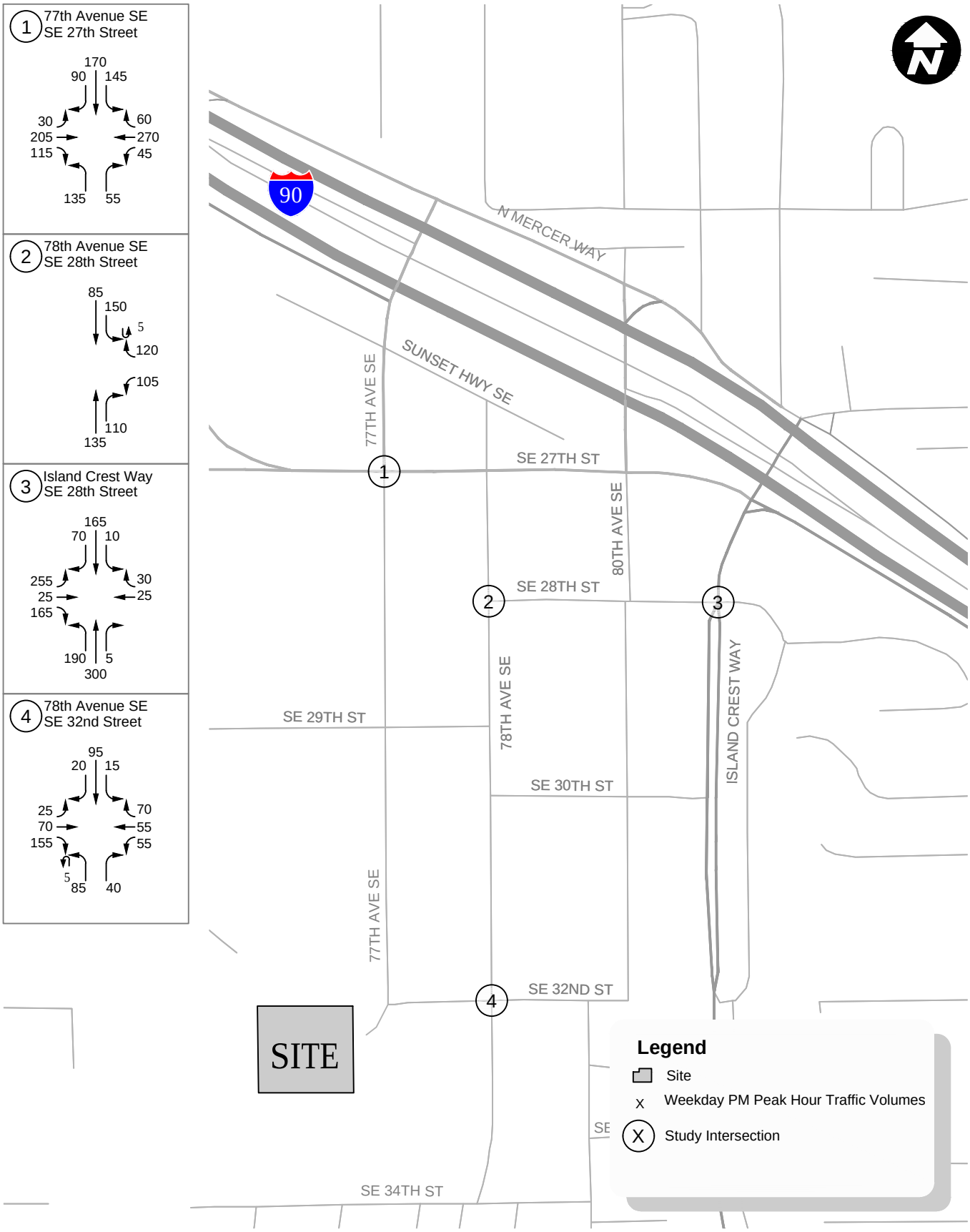
Traffic Volumes

Existing Conditions

This transportation analysis focuses on the weekday PM peak hour when traffic volumes would be greatest. Existing turning movement counts at the study intersections were counted in April 2016. The detailed intersection turning movement traffic volumes are provided in Appendix A. Existing weekday PM peak hour traffic volumes are summarized in Figure 3 and were used to establish existing traffic conditions.

Future Traffic Volume Forecasts

Future (2019) without-project traffic volumes were forecasted using an annual background growth rate of 0.5 percent. These volumes were forecasted using the information from the City of Mercer Island's background growth rate for areas outside the Town Center boundary, as defined by the City of Mercer Island Comprehensive Plan. Project trips from the known pipeline development, Keeler Mixed Use (The Hadley), were also applied. Future (2019) without-project traffic volumes are shown in Figure 4.



Existing (2016) Weekday PM Peak Hour Volumes

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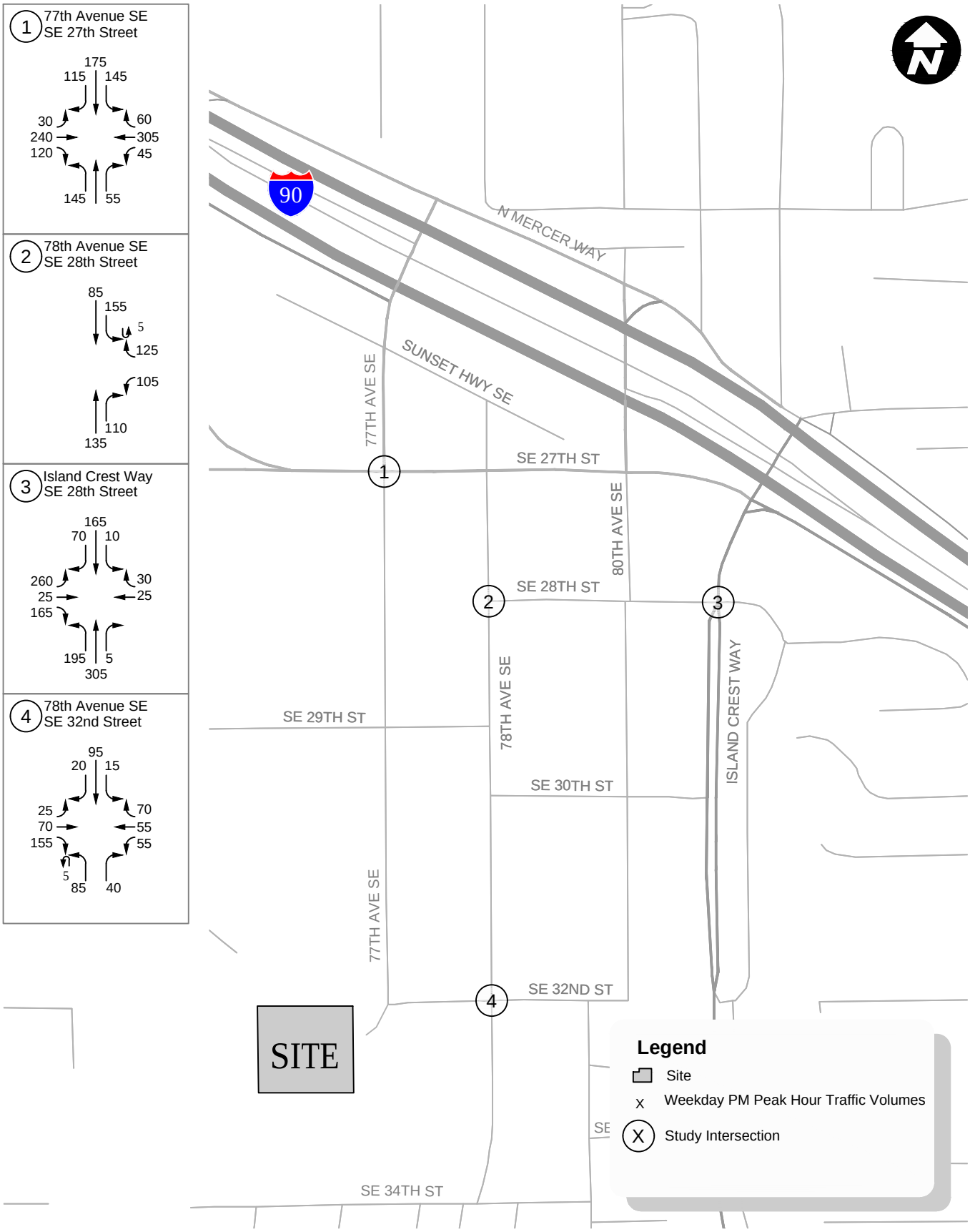

Future (2019) Without-Project Weekday PM Peak Hour Volumes

FIGURE 4

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Traffic Operations

PM peak hour traffic operations were evaluated at the study intersections based on level of service (LOS). The LOS analysis method was based on procedures identified in the *Highway Capacity Manual* (2010), and evaluated using Synchro version 9.0.

At signalized intersections, LOS is measured in average control delay per vehicle and is typically reported using the intersection delay and volume-to-capacity ratio (V/C). At stop-sign-controlled intersections, LOS is measured in delay per vehicle. Traffic operations for an intersection can be described alphabetically with a range of levels of service (LOS A through F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Appendix B contains a detailed explanation of LOS criteria and definitions.

Based on the Transportation Element of the City's Comprehensive Plan (2005), the City has adopted an LOS C standard within the city boundary. Washington State Department of Transportation (WSDOT) has set an LOS D standard. Table 2 summarizes the existing and future (2019) without-project weekday PM peak hour LOS at study intersections. The detailed LOS worksheets are included in Appendix C.

Table 2. Existing and Future (2019) Without-Project Weekday PM Peak Hour Level of Service

		2016 Existing			2019 Without-Project		
Intersections	**Jurisdiction**	**LOS[1]**	**Delay[2]**	**WM[3]**	**LOS[1]**	**Delay[2]**	**WM[3]**
1. 77th Avenue SE / SE 27th Street	Mercer Island	B	15.9		B	17.2	
2. 78th Avenue SE / SE 28th Street	Mercer Island	B	11.1	SB	B	11.3	SB
3. Island Crest Way / SE 28th Street	WSDOT	C	20.7		C	21.0	
4. 78th Avenue SE / SE 32nd Street	Mercer Island	B	12.3	EB	B	12.3	EB

1. Level of service (LOS), based on 2010 *Highway Capacity Manual* methodology.
2. Average delay in seconds per vehicle.
3. Worst movement reported for unsignalized intersections where EB = eastbound and SB = southbound

As shown in Table 2, all of the study intersections currently operate at LOS C or better during the weekday PM peak hour, meeting the respective City and WSDOT LOS standards. Under future without-project conditions, all intersections continue to meet the respective City and WSDOT standards, operating at LOS C or better. Increases in delay between existing and 2019 without-project conditions are approximately one second or less at all study intersections.

Traffic Safety

WSDOT provided the collision data for the most recent three-year period for intersections and roadway segments within the study area. Specifically, the data was summarized between January 1, 2013 and December 31, 2015. Table 3 provides a summary of collision history within the study area.

Table 3. Three-Year Collision Summary – 2013 to 2015

Location	Number of Collisions			Total	Annual Average	Collisions per MEV[1]
	2013	2014	2015			
1. 77th Avenue SE/ SE 27th Street	1	3	3	7	2.3	0.46
2. 78th Avenue SE/ SE 28th Street	0	0	3	3	1.0	0.39
3. Island Crest Way/ SE 28th Street	0	0	0	0	0.0	0.00
4. 78th Avenue SE/ SE 32nd Street	1	2	1	4	1.3	0.43

Source: WSDOT and Transpo Group, 2016
1. Million Entering Vehicles

Within the analysis time period, the highest number of collisions occurred at the 77th Avenue SE/ SE 27th Street intersection with an average of 2.3 collisions per year. The other study intersections experienced on average between 0 and 2 collisions per year. No fatalities or bicyclist collisions were reported at a study intersection; however, one pedestrian collision occurred at the 77th Avenue SE/SE 27th Street intersection. The collision was the result of driver inattention, as a pedestrian was hit when a vehicle turned right from westbound SE 27th Street onto southbound 77th Avenue SE. The most common collision type during the three-year period was an angle collision.

By incorporating the traffic volume at the intersection, the rate of collisions per million entering vehicles (MEV) allows a uniform standard for evaluating accident history. Generally, a collision rate at intersections greater than 1.0 collision per MEV is considered higher than normal. Based on this threshold, there were no safety issues identified at the study intersections.

Project Impacts

This section of the analysis documents project-generated impacts on the surrounding roadway network and at the study intersections. First, peak hour traffic volumes are estimated, distributed, and assigned to adjacent roadways and intersection within the study area. Next, 2019 volumes are projected and potential impact to traffic volumes, traffic operations and non-motorized facilities are identified.

Project Trip Generation

Project trip generation estimates were developed for the project based on assumptions consistent with MICA's intended use as a performing arts center. Trips were calculated using methodology found in *Federal Way Performing Arts & Conference Center – Traffic & Parking Study*[1]. The 41,000 square foot Federal Way (WA) Performing Arts & Conference Center includes a 700-seat auditorium and 8,000 square feet of additional conference space, as well as an outdoor plaza area. The event space is designed to accommodate music and dance performances, seminars, and local or regional meetings. Based on similarities in size and uses between the two venues, the trip generation methodology was also applied to MICA. The Federal Way Performing Arts & Conference Center study relies on average vehicle occupancy (AVO) rates from surveys conducted at Seattle's McCaw Hall[2]. The following paragraphs summarize the preliminary trip generation methodology and estimate for the proposed use.

Two scenarios were evaluated to estimate trip generation and parking demand based on utilization and room capacities of the performing arts center. Activity schedules and class sizes for both scenarios were developed through coordination with MICA's largest tenants, Youth Theatre Northwest (YTN) and Island Youth Ballet (IYB). The scenarios are listed below:

1. **Design Capacity:** This scenario includes an evening mainstage performance, as well as evening classroom or recital studio events, with each venue at 75 percent capacity. Mid-day classroom events at 100 percent capacity are also included in this scenario. Classes occur throughout the day, with six approximately 60-minute dance studio classes between 1:00 p.m. and 9:00 p.m. Classroom events, typically with Youth Theatre Northwest, occur during the afternoon, between approximately 2:30 p.m. and 4:30 p.m., but can also occur during morning hours or throughout the day. Rehearsals in the theatre lab, recital studio, and classroom venues occur between approximately 6:00 p.m. and 9:00 p.m. The Design scenario represents the majority of the facility's use.

2. **High Activity Capacity**: The High Activity scenario includes performance and classroom events listed above in the Design Capacity scenario, as well as an additional mid-day rehearsal. The evening performance in this scenario would be sold out or at 100 percent capacity. This scenario is used for the overlap of multiple classes, rehearsals, and shows. It is expected that this High Activity scenario would occur only a few nights per year.

A Design capacity and High Activity capacity were estimated to account for differences between Design and High Activity capacity audiences in the center's venues and activity

[1] Memorandum – *Federal Way Performing Arts & Conference Center – Traffic & Parking Study*, K. Jones to P. Doherty (September 23, 2014).

[2] Memorandum – *Kirkland Resource Library and Performing Arts Center Draft Environmental Impact Statement – Transportation and Parking Analysis,* The Transpo Group to Huckell/Weinman Associates Inc. and The City of Kirkland (February 4, 1991).

spaces. The two scenarios account for multiple activities taking place at the performing arts center during the same time period. These assumptions were l conservative, considering an average performance is not anticipated to reach 75 percent audience capacity. AVO values of 2.2 persons per vehicle are consistent with the *Federal Way Performing Arts & Conference Center – Traffic & Parking Study* and were assumed for staff, performers, and audience of evening performances at each venue. For daytime classes and rehearsals, AVO value of 1.0 persons per vehicle was assumed for staff of the classrooms and studios. The performers and students in the recital studio, dance studio, and classrooms were assumed to be younger than driving age and transported to/from MICA by a parent or chaperone. For trip generation purposes, classroom and studio performers were assumed to have an AVO of 1.0 or 2.0, depending on the class or rehearsal type, through coordination with Youth Theatre Northwest (YTN) and Island Youth Ballet (IYB).

No pass-by or internal trips were assumed to be included due to the nature of the venue and its events. Small percentages of transit and walk trips were included to account for the use of nearby transit and pedestrian facilities, although the majority of generated trips are assumed to be by vehicle. The project site is connected to the Mercerdale and First Hill neighborhoods by pedestrian pathways to the south and west. King County Metro provides daytime transit service one block away on 78th Ave SE. Based on extrapolations from American Community Survey data, 5 percent transit (daytime only, not for performances) and 5 percent pedestrian/bicycle trips were included. Transit trips were not included for performance peak hours because study area transit routes are not in service directly before or after performance times.

Trip generation was calculated for classes occurring during the PM peak hour (the peak of the surrounding roadways and the peak of the facility) as well as for the evening performances (both the Design and High Activity scenarios). The weekday PM peak hour trip generation assumed 100 percent capacity for events at that time (classes and rehearsals only). Pick-up and drop-off trips occurring around class and rehearsal times were included in trip generation calculations. For evening performances, trip generation was carried out for both 75 percent Design capacity and 100 percent High Activity capacity, using a peak hour of 6-7pm, These performance peak hours assumed a 7pm performance start time as this is a typical start time for performances. The traffic impact assessment evaluated the peak hour during 4-6pm. The performance peak hour (6-7pm) trip generation was used for parking accommodation. Additional traffic was expected for on-street parking circulation near the project site.

Table 4 summarizes the project's estimated trip generation for the weekday PM peak hour time period and evening performance scenarios. Detailed assumptions regarding activity schedules and trips generated are included in Appendix D.

Table 4. Weekday PM Peak Hour Trip Generation

	Network PM Peak Hour (Highest 60 minutes, 4-6pm)			Performance Design (75% Capacity) Scenario (6-7pm)			Performance High Activity (100% Capacity) Scenario (6-7pm)		
Venue	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**
Proposed Uses									
Mainstage	22	20	2	123	113	10	163	149	14
Theatre Lab	18	11	7	0	0	0	0	0	0
Recital Studio	38	11	27	0	0	0	0	0	0
Dance Studio	44	22	22	0	0	0	0	0	0
Classroom	18	11	7	0	0	0	0	0	0
Classroom	18	11	7	0	0	0	0	0	0
Daytime Staff	10	0	10	0	0	0	0	0	0
Subtotal	168	86	82	123	113	10	163	149	14
Mode Split Reduced Trips									
Transit Trips (5%)	-8	-4	-4	-0	-0	-0	-0	-0	-0
Pedestrian & Bicycle Trips (5%)	-8	-4	-4	-7	-6	-1	-8	-7	-1
Total Proposed Trips	**152**	**78**	**74**	**116**	**107**	**9**	**155**	**142**	**13**

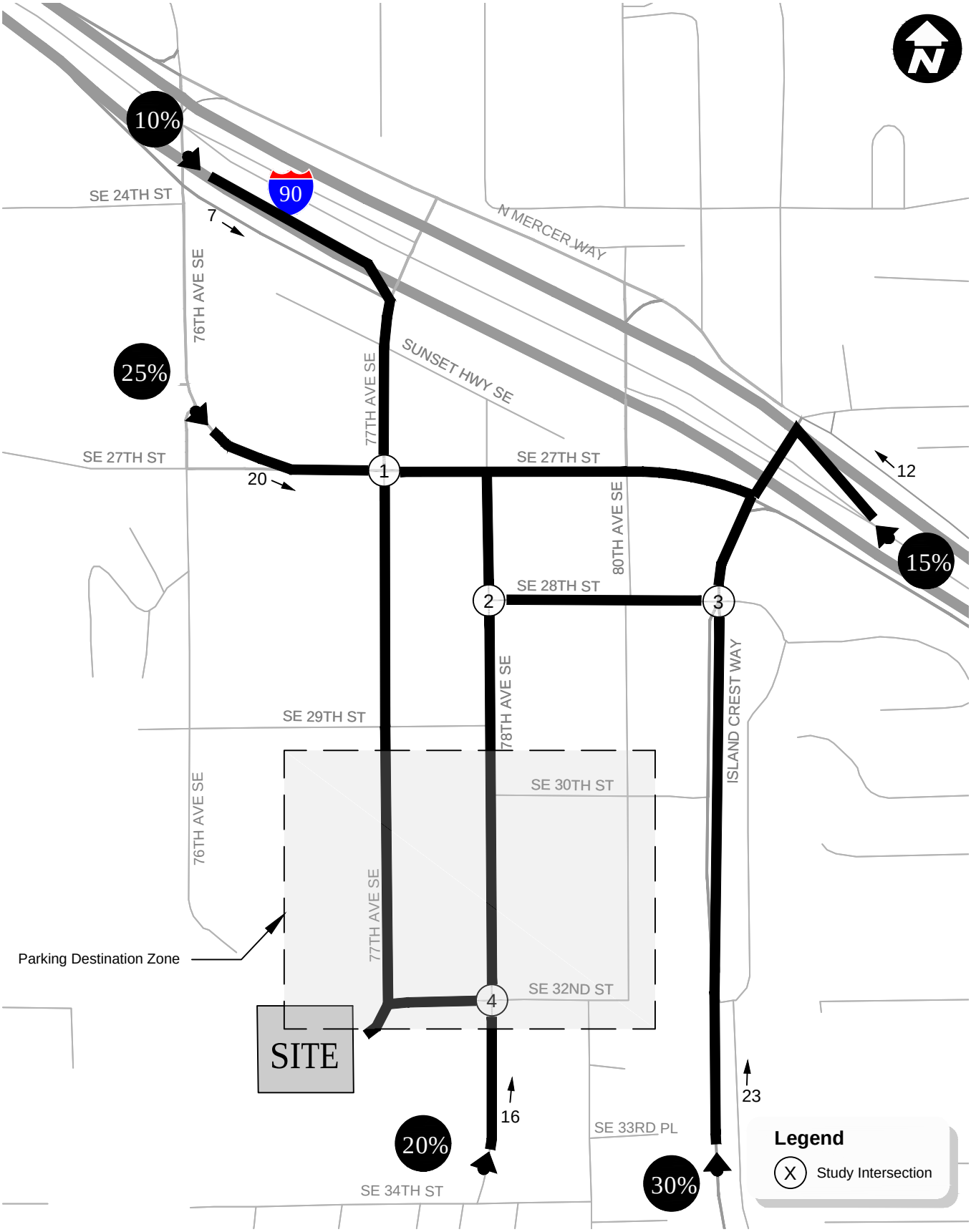
In summary, the project would generate approximately 152 trips during the weekday PM peak hour with 78 inbound and 74 outbound. During the Design Scenario, the project would generate approximately 116 trips, 107 inbound and 9 outbound, during the 6-7pm hour before an evening performance. During the High Activity Scenario, the project would generate approximately 155 trips, 142 inbound and 13 outbound, during the 6-7pm hour before an evening performance.

Project Trip Distribution and Assignment

The development of the inbound and outbound trip distributions is consistent with previous studies submitted in the vicinity of the project. Distributions were developed based on travel patterns in the study area and through the scoping process with the City of Mercer Island.

It is anticipated that 75 percent of project trips would distribute throughout Mercer Island, while the remaining 25 percent of project trips would originate off-island, utilizing eastbound and westbound I-90. Based on this distribution, project trips were then proportionally assigned to the network. Trip distribution and assignment of the inbound and outbound project trips are shown in Figures 5 and 6, respectively.

Trips were assigned to parking lots closest to the project site within the study area. Lots were chosen based on proximity to the project site and average evening availability, using information from MICA's Mercer Island Parking Analysis to Assess Availability (2015).



Project Inbound Trip Distribution

FIGURE 5

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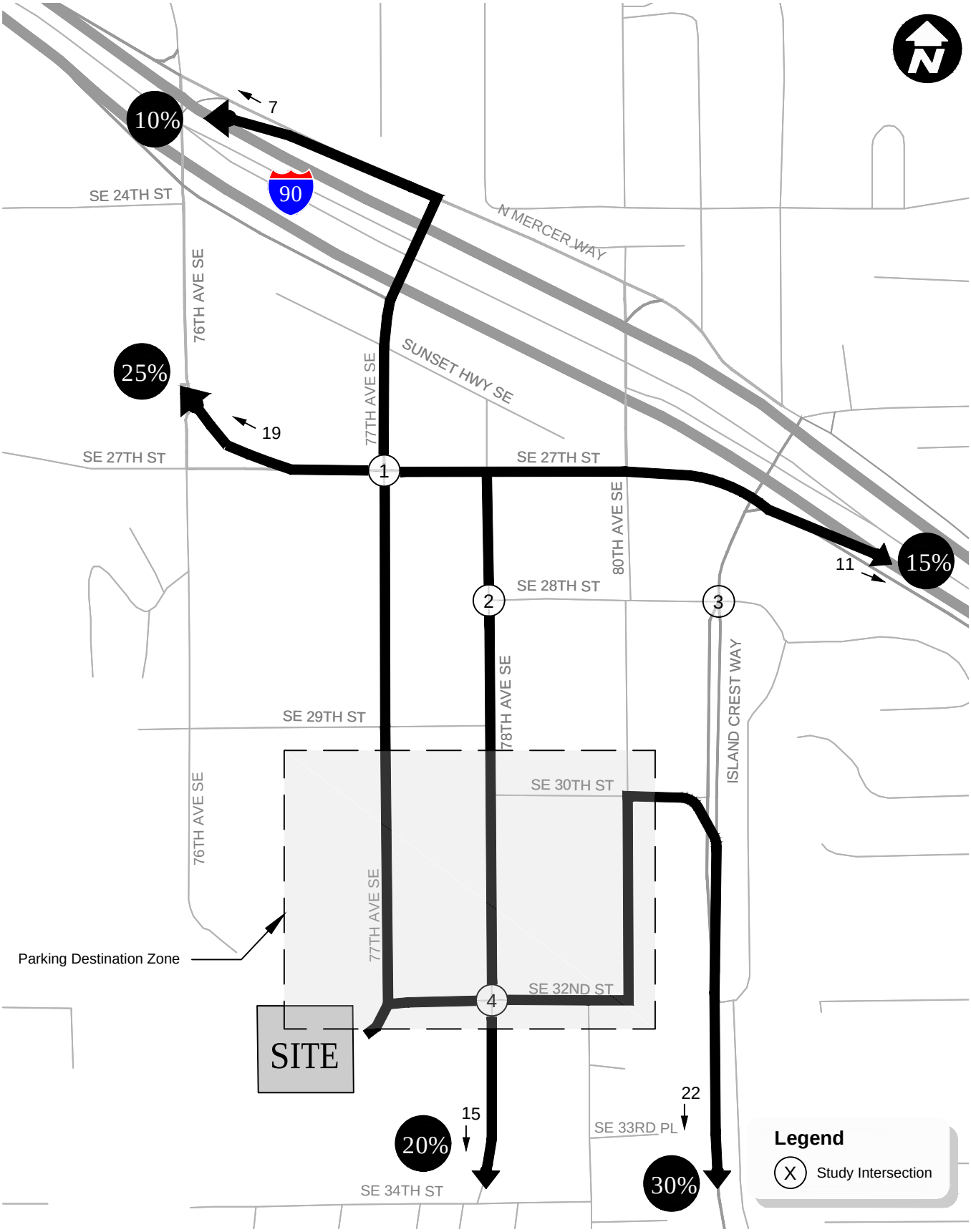

Project Outbound Trip Distribution

Mercer Island Center for the Arts (MICA)

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Traffic Volumes

The project traffic volumes were added to the future without-project 2019 traffic volumes to form the basis of the with-project analysis. Figure 7 shows the weekday PM peak hour with-project traffic volumes at the study intersections.

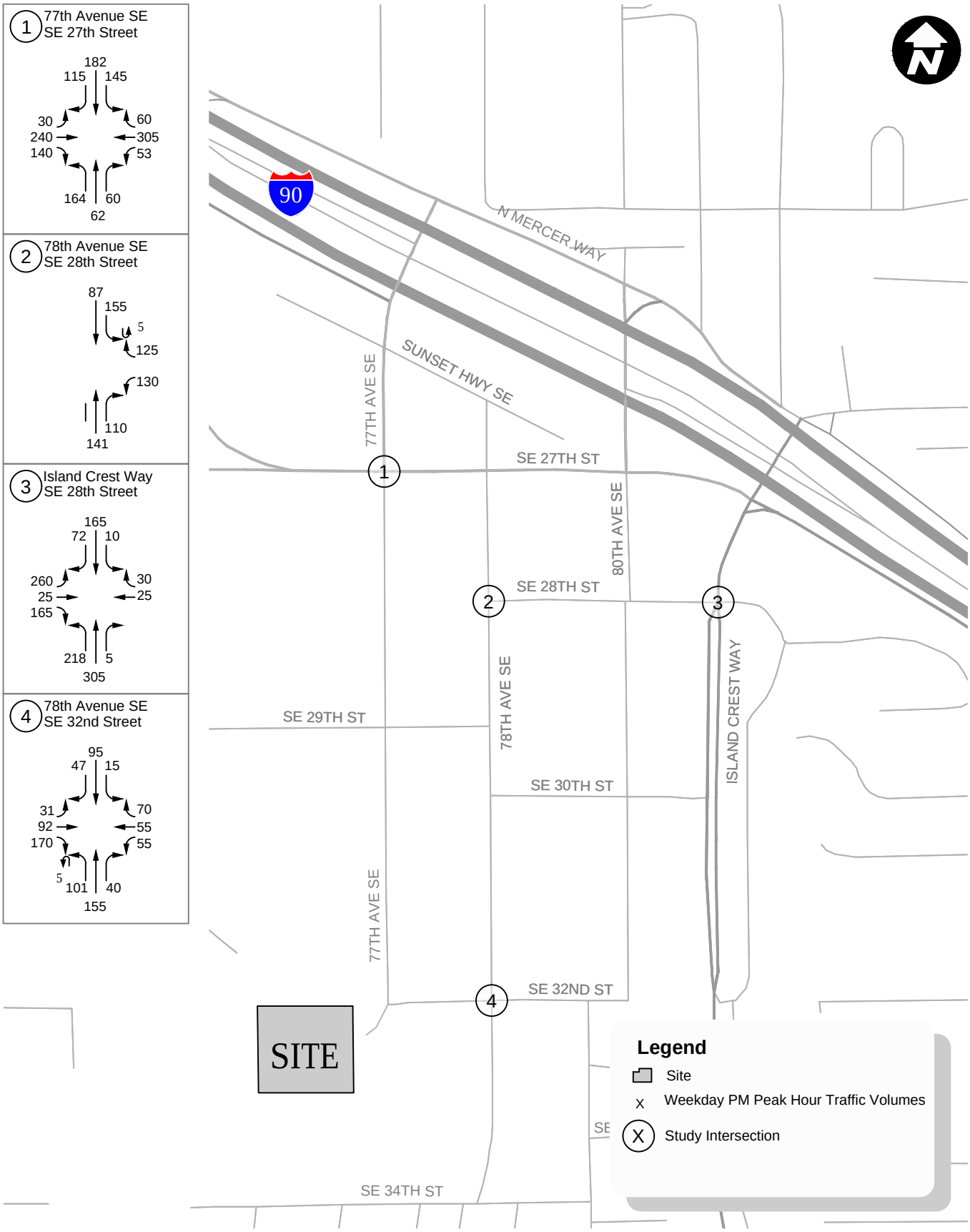
Table 5 summarizes the anticipated increase in total entering traffic as well as the percent of future with-project volume attributable to the proposed project.

Table 5. 2019 Weekday PM Peak Hour Traffic Volume Impact at Study Intersections

	2019 PM Peak Traffic			
Study Intersections	**Without-Project**	**With- Project**	**Project Traffic**	**Project Impact**
1. 77th Avenue SE/ SE 27th Street	1,490	1,556	66	4.2%
2. 78th Avenue SE/ SE 28th Street	720	753	33	4.4%
3. Island Crest Way/ SE 28th Street	1,255	1,280	25	2.0%
4. 78th Avenue SE/ SE 32nd Street	845	931	86	9.2%

Source: Transpo Group, June 2016

As shown in the table, project traffic would account for about 2 to 9 percent of the total PM peak hour traffic volume at the study intersections in 2019. At intersections closer to the project site, including the 78th Avenue SE/SE 28th Street study intersection, project traffic would have the greatest volume impact.



Future (2019) With-Project Weekday PM Peak Hour Volumes

FIGURE 7

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Traffic Operations

Intersection operations analysis was conducted in the study area to evaluate the future 2019 conditions with the development of the project. Intersection LOS were calculated at the study intersections using the LOS methodology described previously.

Table 6 provides a comparison between the 2019 with- and without-project conditions. The detailed LOS worksheets are included in Appendix C.

Table 6. Future (2019) With and Without-Project Weekday PM Peak Hour Level of Service

	2019 Without-Project			2019 With-Project		
Intersections	**LOS[1]**	**Delay[2]**	**WM[3]**	**LOS**	**Delay**	**WM**
1. 77th Avenue SE / SE 27th Street	B	17.2		B	18.1	
2. 78th Avenue SE / SE 28th Street	B	11.3	SB	B	11.6	SB
3. Island Crest Way / SE 28th Street	C	21.0		C	22.2	
4. 78th Avenue SE / SE 32nd Street	B	12.1	EB	B	14.3	EB

1. Level of service (LOS), based on 2010 *Highway Capacity Manual* methodology.
2. Average delay in seconds per vehicle.
3. Worst movement reported for unsignalized intersections where EB = eastbound and SB = southbound.

As shown in Table 6, all study intersections would operate at LOS C or better, meeting LOS standards. All study intersections would operate at the same LOS under with-project conditions relative to without-project conditions, adding approximately two seconds or less of delay.

Pick-Up and Drop-Off Trips

Youth classes and rehearsals at the MICA facility cause drop-off and pick-up trips to the site, especially during class start and dismissal times. Based on projected Youth Theatre Northwest (YTN) and Island Youth Ballet (IYB) activity schedules, back-to-back classes during daytime and afternoon hours will cause simultaneous pick-up and drop-off trips during the same time frame. It is estimated that a maximum of 35 drop-off trips and 15 pick-up trips could occur during the weekday PM peak hour for the roadway network. The loading area at the site access will be designed to accommodate queuing during dismissal times with high pick-up and drop-off volumes. Additionally, a management plan will be developed to mitigate negative pick-up and drop-off impacts to traffic in the area. The plan will incorporate curbside management with through-only time limits and supervision by MICA staff members during class dismissal times. The maximum number of pick-up trips occurred at 9pm with 48 trips from pick-ups after simultaneous class/rehearsal dismissals. These trips will be accommodated with curb space management adjacent to the site.

Parking

Supply

Parking is proposed off-site along MICA frontages at SE 32nd Street and 77th Avenue SE. Two studies, the *Mercer Island Parking Analysis to Assess Availability* (2015, MICA) and the *Town Center Parking Study* (April 2016, BERK/City of Mercer Island), assessed the availability of off-site surrounding parking lots. More than 1,600 off-street parking stalls are located within a quarter mile of the MICA site, and their occupancy ranged from 20% to 40% in the highest studied occupancy period, 12pm to 3pm. Based on these studies and commitments from surrounding lots, it is anticipated that on-street parking and parking available at local businesses will be shared to satisfy the project parking demand.

Proposed changes by the City to the town center area include on-street parking on both east and west sides of 77th Avenue SE, as well as along other roadways surrounding the site. Existing on-street parking supply is currently under-utilized, as discussed below. No on-site parking is proposed for this project.

On-Street Parking Supply

An on-street parking utilization study was conducted to determine the available on-street parking supply and occupancy within a 1200-foot walking distance of the project site. Information at 800-foot, 1000-foot, and 1200-foot walking distances from the site are summarized in Table 7. Parking supply and demand counts were conducted from 2 to 3 p.m. and 6 to 7 p.m. in April 2016. The roadways included in the study area were SE 29th Street, 80th Avenue SE, and SE 32nd Street. A detailed summary of the parking utilization study is provided in Appendix F.

Table 7. Parking Utilization Study Summary

	Walking Distance from Site		
	800-feet	**1,000-feet**	**1,200-feet**
On-Street Supply[1]	19	106	116
Afternoon			
Average On-Street Occupancy[2]	11 (58%)	70 (66%)	71 (61%)
Available Parking Supply	**8**	**36**	**45**
Evening			
Average On-Street Occupancy[2]	3 (13%)	37 (34%)	38 (33%)
Available Parking Supply	**16**	**69**	**78**

1. Estimated on-street parking spaces based on standard SDOT procedures for measurements July 2015.
2. Based on an average of two days of data collection on April 26 and 27, 2016.

As shown in the table, the average on-street occupancy ranges from approximately 3 to 35 percent of the available on-street supply in the afternoon and evening. During the afternoon, a total of 45 spaces are available within 1,200 feet the site, with 36 available within 1,000 feet of the site, and 8 available within 800 feet of the site. During the evening, a total of 78 spaces are available within the site vicinity, with 69 available within 1,000 feet of the site, and 16 available within 800 feet of the site. Note these figures do not include the approximately 88 new on-street parking spaces that are expected to be added on 77th Avenue SE; see Appendix G:.

Demand

Parking demand was evaluated through multiple factors. The Institute of Transportation Engineers (ITE) *Parking Generation*, 4th Edition, and City of Mercer Island code requirements were consulted while developing parking demand. The ITE Land Use 441 (Live Theater) recommends an average of 0.33 spaces per seat, or 1 parking space per 3 theater seats. ITE provides guidelines for parking demand; however, due to the unique characteristics of the project site, activity schedules for both Design and High Activity scenarios were analyzed.

Within the Mercer Island commercial zoned areas, City code requires 1 parking space for every 4 seats.[3] The City of Mercer Island zoning does not specifically require a minimum amount of parking for performing arts uses in the P land use zoning, but MICA will propose

[3] Mercer Island City Code, Chapter 19.04, Section 19.04.040

zoning changes to require an amount of spaces. ADA parking requirements will be accommodated with on-street designated handicap parking at the nearest areas to the site.

Parking accumulation was estimated based on venue capacity for each activity space. Two scenarios were developed to match the trip generation scenarios, a Design (75 percent capacity) Scenario, and a High Activity Scenario. As described above, the Design Scenario includes an evening mainstage performance, as well as evening classroom or recital studio events, with each venue at 75 percent capacity. Mid-day classroom events at 100 percent capacity are also included in this scenario. In addition to these activities, the High Activity Scenario includes an additional mid-day rehearsal and a sold out or 100 percent capacity performance. Average vehicle occupancies (AVO) of 2.2 persons per vehicle for staff members, performers, and audience were assumed to be consistent with trip generation methodology, as well as the *Federal Way Performing Arts & Conference Center – Traffic & Parking Study*. Figure 8 summarizes the estimated parking demand.

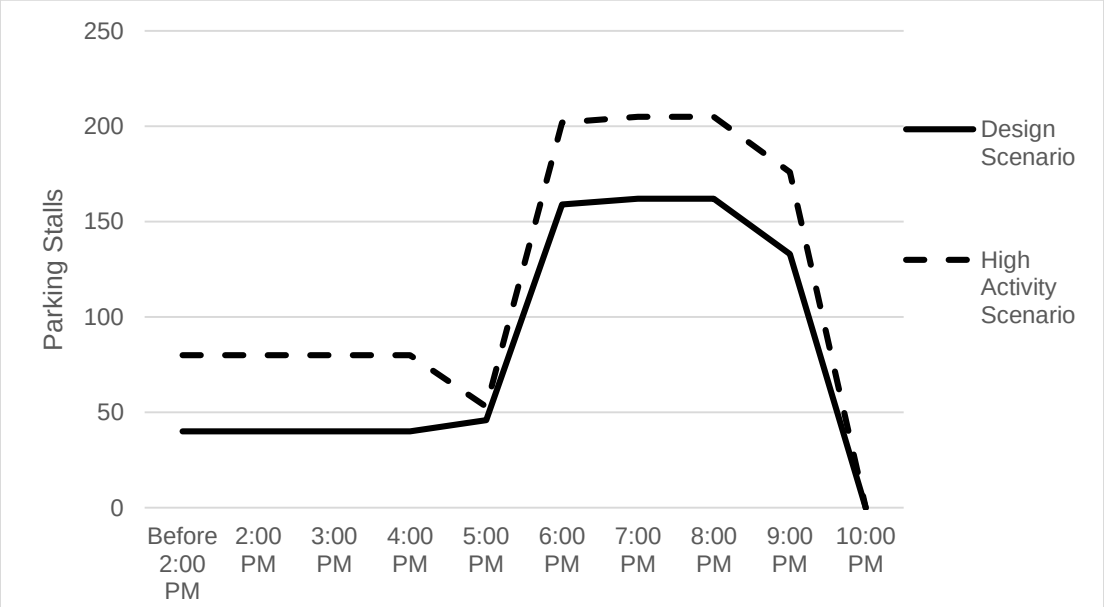
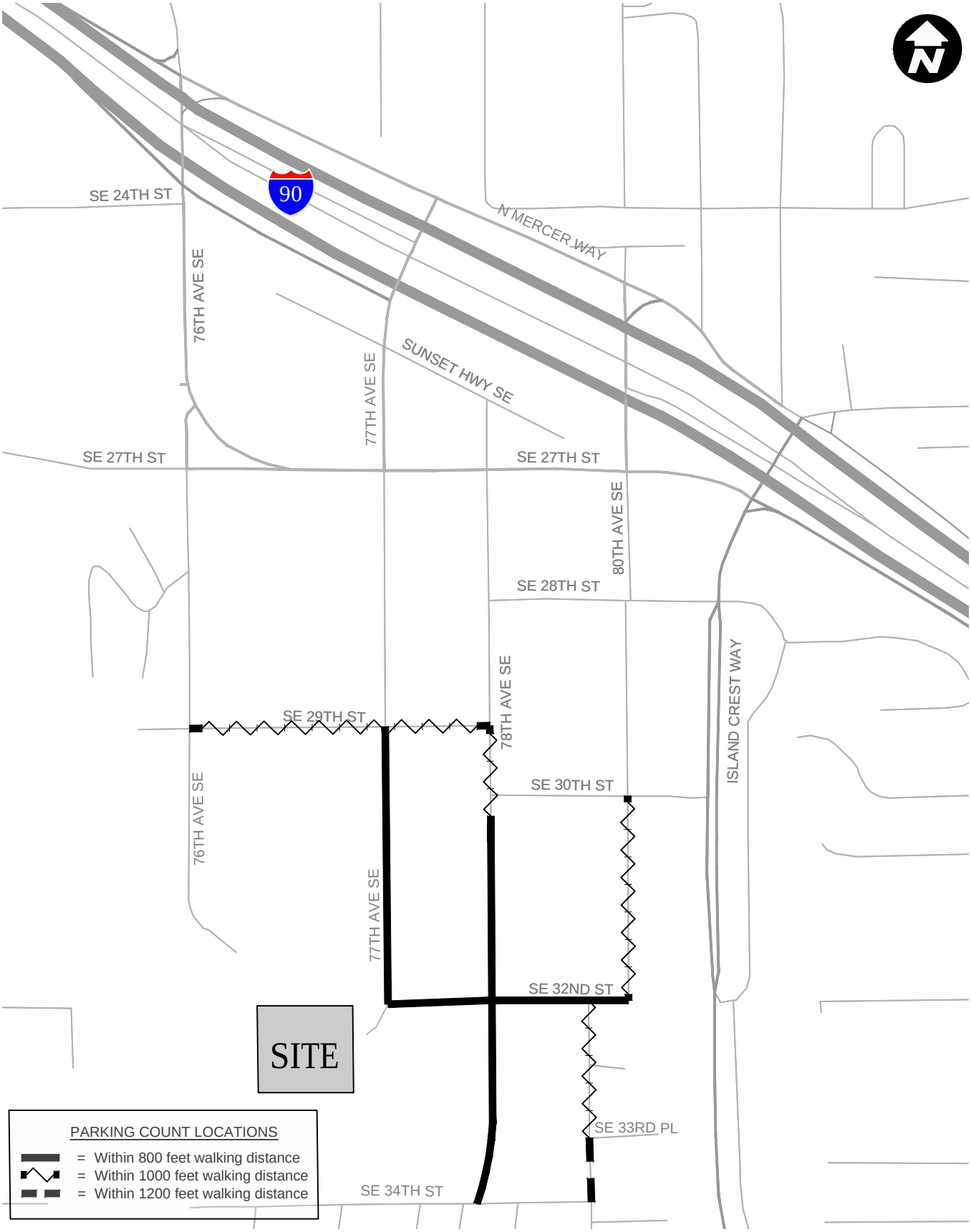


Figure 8: Parking Accumulation Curve

As shown in Figure 8, the peak parking demand ranges from a total of 162 to 205 parking stalls for the Design and High Activity scenarios, respectively. These assumptions are conservative because attendance levels are anticipated to be lower. In addition, the parking demand estimates for the performances do not include ride sharing trips, walking trips, or drop-off trips. While it is expected that multiple activities could occur throughout the performing arts center simultaneously, it is unlikely that every venue would be filled at the same time period.

The accompanying parking management plan details strategies that will accommodate parking demand. This will include discussion regarding added trips generation as vehicles circulate the study area to find on-street parking. During larger events when parking management is necessary, parking ambassadors will be utilized to direct vehicles to available lots. In addition, an on-street parking utilization study was conducted to accompany shared-parking agreements with local businesses. Detailed assumptions regarding activity schedules and parking accumulation are included in Appendix E.



Parking Utilization Study Area

Mercer Island Center for the Arts (MICA)

FIGURE
9

transpogroup
WHAT TRANSPORTATION CAN BE.

Jun 07, 2016 - 4:29pm francescal \\srv-dfs-wa\MM_Projects\Projects\15\15249.00 - Mercer Island Center for the Arts\Graphics\15249_Graphics.dwg Layout: Fig9

Findings and Recommendations

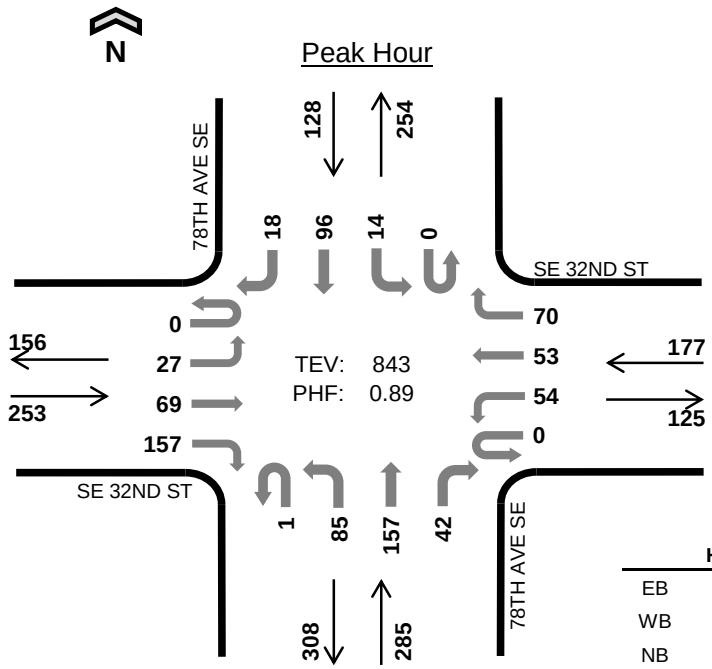
This transportation impact study summarizes the project traffic impacts of the proposed Mercer Island Center for the Arts (MICA). General findings and recommendations include:

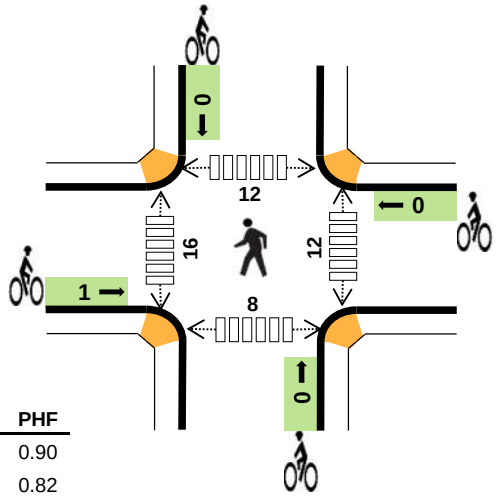
- MICA would develop a performing arts center, containing a mainstage auditorium, theatre lab, recital studio, dance studio, and several classrooms and practice rooms
- Based on a conservative estimate of project trip generation, the project would generate approximately 152 net new PM peak hour trips with 78 inbound and 74 outbound.
- Project traffic would represent 2 to 9 percent of the 2019 PM peak hour traffic volumes at off-site study.
- All study intersections are anticipated to meet the respective City and WSDOT standards, operating at LOS C or better under both future 2019 with- and without-project conditions.
- The peak parking demand ranges from a total of 162 to 205 parking stalls for the Design and High Activity scenarios, respectively.
- The project could generate a maximum of 35 drop-off trips and 15 pick-up trips during the weekday PM peak hour for the roadway network. These trips will be accommodated with site design, with a curbside loading area able to accommodate drop-off and pick-up queuing. A management plan will be developed to mitigate negative pick-up and drop-off impacts to traffic in the area.

Appendix A: Traffic Counts

78TH AVE SE
SE 32ND ST

Date: Wed, Apr 27, 2016
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM





	HV %:	PHF
EB	0.8%	0.90
WB	1.7%	0.82
NB	0.7%	0.90
SB	2.3%	0.80
TOTAL	1.2%	0.89

Three-Hour Count Summaries

Interval Start	SE 32ND ST Eastbound				SE 32ND ST Westbound				78TH AVE SE Northbound				78TH AVE SE 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	21	36	0	20	17	17	0	19	45	14	0	5	28	7	237	0
4:15 PM	0	7	21	35	0	14	16	13	1	22	38	9	0	4	26	6	212	0
4:30 PM	0	4	18	48	0	8	6	25	0	16	38	4	0	1	16	5	189	0
4:45 PM	0	8	9	38	0	12	14	15	0	28	36	15	0	4	26	0	205	843
Peak Hour	0	27	69	157	0	54	53	70	1	85	157	42	0	14	96	18	843	0

Note: For all three-hour count summary, see next page.

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	1	1	*4*	0	0	0	0	*0*	2	3	2	2	*9*
4:15 PM	0	0	0	2	*2*	1	0	0	0	*1*	3	4	2	3	*12*
4:30 PM	2	0	1	0	*3*	0	0	0	0	*0*	4	5	1	3	*13*
4:45 PM	0	1	0	0	*1*	0	0	0	0	*0*	3	4	7	0	*14*
Peak Hour	2	3	2	3	*10*	1	0	0	0	*1*	12	16	12	8	*48*

Three-Hour Count Summaries

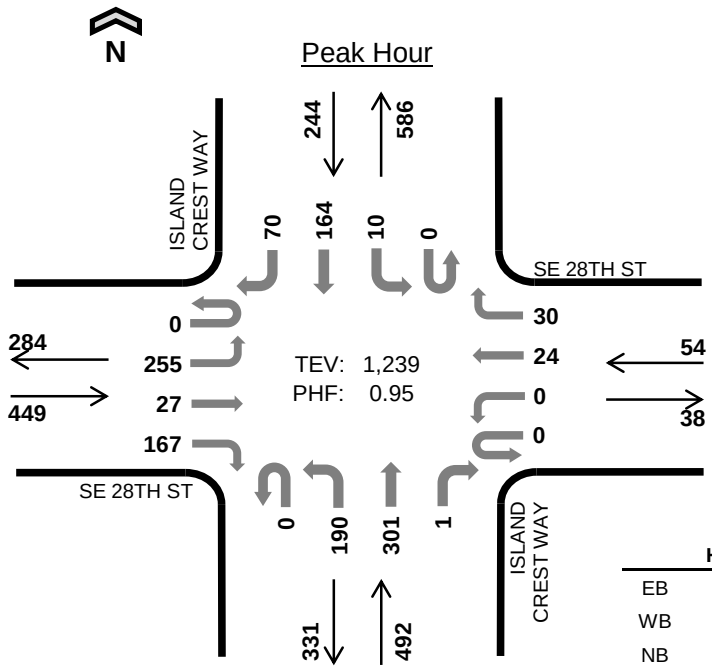
Interval Start	SE 32ND ST Eastbound				SE 32ND ST Westbound				78TH AVE SE Northbound				78TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**8**	**21**	**36**	**0**	**20**	**17**	**17**	**0**	**19**	**45**	**14**	**0**	**5**	**28**	**7**	**237**	0
4:15 PM	**0**	**7**	**21**	**35**	**0**	**14**	**16**	**13**	**1**	**22**	**38**	**9**	**0**	**4**	**26**	**6**	**212**	0
4:30 PM	**0**	**4**	**18**	**48**	**0**	**8**	**6**	**25**	**0**	**16**	**38**	**4**	**0**	**1**	**16**	**5**	**189**	0
4:45 PM	**0**	**8**	**9**	**38**	**0**	**12**	**14**	**15**	**0**	**28**	**36**	**15**	**0**	**4**	**26**	**0**	**205**	**843**
5:00 PM	0	7	15	46	0	7	10	18	0	20	29	6	0	6	24	3	191	797
5:15 PM	0	6	9	39	0	10	12	12	0	24	42	5	0	3	36	3	201	786
5:30 PM	0	3	7	39	0	4	10	3	0	26	34	11	0	1	22	3	163	760
5:45 PM	0	6	7	36	0	12	11	4	0	24	34	6	0	4	27	6	177	732
6:00 PM	0	5	8	50	0	14	7	11	0	22	34	3	0	6	34	1	195	736
6:15 PM	0	5	15	47	0	7	9	4	0	13	30	4	0	7	21	3	165	700
6:30 PM	0	8	6	30	0	5	8	3	0	26	28	5	0	7	22	4	152	689
6:45 PM	0	3	2	28	0	5	5	7	0	21	37	0	0	2	16	1	127	639
Count Total	0	70	138	472	0	118	125	132	1	261	425	82	0	50	298	42	2,214	0
Peak Hour	**0**	**27**	**69**	**157**	**0**	**54**	**53**	**70**	**1**	**85**	**157**	**42**	**0**	**14**	**96**	**18**	**843**	**0**

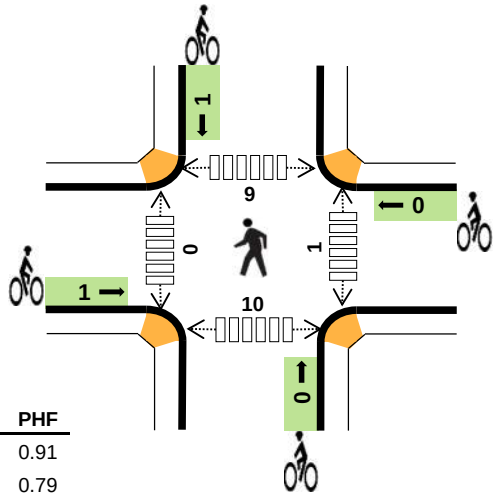
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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**	**1**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**2**	**3**	**2**	**2**	*9*
4:15 PM	**0**	**0**	**0**	**2**	***2***	**1**	**0**	**0**	**0**	***1***	**3**	**4**	**2**	**3**	*12*
4:30 PM	**2**	**0**	**1**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**4**	**5**	**1**	**3**	*13*
4:45 PM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**3**	**4**	**7**	**0**	***14***
5:00 PM	0	0	3	1	*4*	0	0	0	0	*0*	3	2	3	0	*8*
5:15 PM	0	0	0	0	*0*	0	0	0	0	*0*	1	5	4	3	*13*
5:30 PM	0	0	2	2	*4*	0	0	0	0	*0*	2	4	2	4	*12*
5:45 PM	1	0	1	0	*2*	1	0	0	0	*1*	4	2	1	0	*7*
6:00 PM	0	1	3	1	*5*	1	0	0	0	*1*	1	3	1	2	*7*
6:15 PM	0	0	0	1	*1*	0	0	0	1	*1*	5	1	1	4	*11*
6:30 PM	0	0	3	0	*3*	3	0	1	1	*5*	2	3	0	3	*8*
6:45 PM	0	0	0	0	*0*	0	0	0	1	*1*	2	5	1	3	*11*
Count Total	3	4	14	8	*29*	6	0	1	3	*10*	32	41	25	27	*125*
Peak Hour	**2**	**3**	**2**	**3**	***10***	**1**	**0**	**0**	**0**	***1***	**12**	**16**	**12**	**8**	***48***

ISLAND CREST WAY
SE 28TH ST

Date: Wed, Apr 27, 2016
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:00 PM to 5:00 PM





	HV %:	PHF
EB	0.7%	0.91
WB	1.9%	0.79
NB	2.6%	0.91
SB	1.6%	0.78
TOTAL	1.7%	0.95

Three-Hour Count Summaries

Interval Start	SE 28TH ST Eastbound				SE 28TH ST Westbound				ISLAND CREST WAY Northbound				ISLAND CREST WAY 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	75	6	38	0	0	5	6	0	49	66	0	0	4	43	26	318	0
4:15 PM	0	63	3	34	0	0	8	5	0	47	88	0	0	3	57	18	326	0
4:30 PM	0	60	7	40	0	0	7	10	0	44	64	0	0	2	32	14	280	0
4:45 PM	0	57	11	55	0	0	4	9	0	50	83	1	0	1	32	12	315	1,239
Peak Hour	0	255	27	167	0	0	24	30	0	190	301	1	0	10	164	70	1,239	0

Note: For all three-hour count summary, see next page.

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	1	3	1	*7*	0	0	0	0	*0*	0	0	3	0	*3*
4:15 PM	0	0	2	1	*3*	0	0	0	0	*0*	0	0	4	0	*4*
4:30 PM	1	0	4	2	*7*	1	0	0	0	*1*	1	0	1	6	*8*
4:45 PM	0	0	4	0	*4*	0	0	0	1	*1*	0	0	1	4	*5*
Peak Hour	3	1	13	4	*21*	1	0	0	1	*2*	1	0	9	10	*20*

Three-Hour Count Summaries

Interval Start	SE 28TH ST Eastbound				SE 28TH ST Westbound				ISLAND CREST WAY Northbound				ISLAND CREST WAY 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**	**75**	**6**	**38**	**0**	**0**	**5**	**6**	**0**	**49**	**66**	**0**	**0**	**4**	**43**	**26**	**318**	0
4:15 PM	**0**	**63**	**3**	**34**	**0**	**0**	**8**	**5**	**0**	**47**	**88**	**0**	**0**	**3**	**57**	**18**	**326**	0
4:30 PM	**0**	**60**	**7**	**40**	**0**	**0**	**7**	**10**	**0**	**44**	**64**	**0**	**0**	**2**	**32**	**14**	**280**	0
4:45 PM	**0**	**57**	**11**	**55**	**0**	**0**	**4**	**9**	**0**	**50**	**83**	**1**	**0**	**1**	**32**	**12**	**315**	**1,239**
5:00 PM	0	83	8	44	0	0	10	6	0	52	64	0	1	2	23	20	313	1,234
5:15 PM	0	55	7	42	0	1	3	4	0	45	64	0	0	2	33	16	272	1,180
5:30 PM	0	54	7	49	0	0	5	6	0	52	79	2	0	1	25	4	284	1,184
5:45 PM	0	35	10	50	0	0	13	12	0	36	66	0	0	4	32	12	270	1,139
6:00 PM	0	38	10	50	0	1	6	8	0	44	45	0	0	2	46	7	257	1,083
6:15 PM	0	35	5	43	0	0	2	5	0	39	66	0	0	5	48	14	262	1,073
6:30 PM	0	31	8	32	0	0	7	9	0	29	82	0	0	1	32	15	246	1,035
6:45 PM	0	24	6	28	0	0	5	3	0	37	75	1	0	2	30	20	231	996
Count Total	0	610	88	505	0	2	75	83	0	524	842	4	1	29	433	178	3,374	0
Peak Hour	**0**	**255**	**27**	**167**	**0**	**0**	**24**	**30**	**0**	**190**	**301**	**1**	**0**	**10**	**164**	**70**	**1,239**	**0**

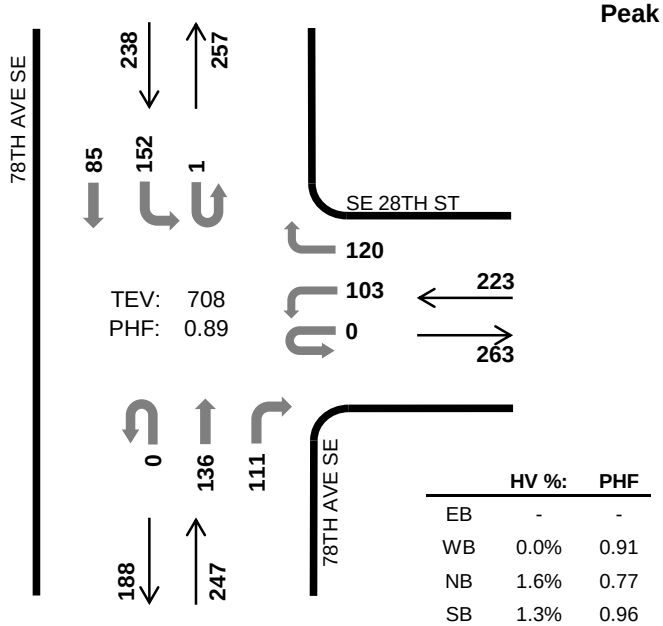
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

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**	**1**	**3**	**1**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**3**	**0**	*3*
4:15 PM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**4**	**0**	*4*
4:30 PM	**1**	**0**	**4**	**2**	***7***	**1**	**0**	**0**	**0**	***1***	**1**	**0**	**1**	**6**	*8*
4:45 PM	**0**	**0**	**4**	**0**	***4***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**1**	**4**	***5***
5:00 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	0	2	*2*
5:15 PM	1	0	2	2	*5*	0	0	0	0	*0*	0	0	3	0	*3*
5:30 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	3	0	*3*
5:45 PM	0	0	1	1	*2*	0	0	0	0	*0*	0	0	2	0	*2*
6:00 PM	1	0	2	0	*3*	0	0	0	0	*0*	0	0	1	0	*1*
6:15 PM	2	0	2	1	*5*	0	1	0	0	*1*	0	0	0	0	*0*
6:30 PM	0	0	3	0	*3*	0	0	0	0	*0*	0	0	0	1	*1*
6:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	1	0	*1*
Count Total	8	1	25	8	*42*	1	1	0	1	*3*	1	0	19	13	*33*
Peak Hour	**3**	**1**	**13**	**4**	***21***	**1**	**0**	**0**	**1**	***2***	**1**	**0**	**9**	**10**	***20***

78TH AVE SE
SE 28TH ST

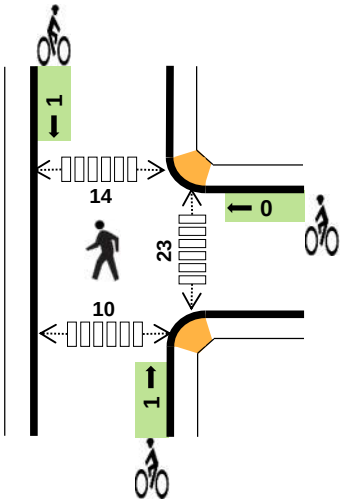
N

Peak Hour



	HV %:	PHF
EB	-	-
WB	0.0%	0.91
NB	1.6%	0.77
SB	1.3%	0.96
TOTAL	1.0%	0.89

Date: Wed, Apr 27, 2016
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 5:00 PM to 6:00 PM



Three-Hour Count Summaries

Interval Start	0				SE 28TH ST				78TH AVE SE				78TH AVE SE				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		
5:00 PM	0	0	0	0	0	26	0	35	0	0	40	40	0	33	26	0	200	0
5:15 PM	0	0	0	0	0	22	0	29	0	0	42	24	0	37	24	0	178	0
5:30 PM	0	0	0	0	0	30	0	26	0	0	27	17	1	41	14	0	156	0
5:45 PM	0	0	0	0	0	25	0	30	0	0	27	30	0	41	21	0	174	708
Peak Hour	0	0	0	0	0	103	0	120	0	0	136	111	1	152	85	0	708	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
5:00 PM	0	0	3	1	*4*	0	0	1	0	*1*	4	0	4	0	*8*
5:15 PM	0	0	0	2	*2*	0	0	0	0	*0*	12	0	3	6	*21*
5:30 PM	0	0	1	0	*1*	0	0	0	1	*1*	5	0	5	3	*13*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	2	0	2	1	*5*
Peak Hour	0	0	4	3	*7*	0	0	1	1	*2*	23	0	14	10	*47*

Three-Hour Count Summaries

Interval Start	0				SE 28TH ST				78TH AVE SE				78TH AVE SE				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	0	0	33	0	33	0	0	38	37	0	30	28	0	199	0
4:15 PM	0	0	0	0	0	30	0	37	0	0	39	30	0	21	14	0	171	0
4:30 PM	0	0	0	0	0	19	0	26	0	0	28	33	0	36	22	0	164	0
4:45 PM	0	0	0	0	0	23	0	28	0	0	21	26	0	38	24	0	160	694
5:00 PM	**0**	**0**	**0**	**0**	**0**	**26**	**0**	**35**	**0**	**0**	**40**	**40**	**0**	**33**	**26**	**0**	**200**	695
5:15 PM	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**29**	**0**	**0**	**42**	**24**	**0**	**37**	**24**	**0**	**178**	702
5:30 PM	**0**	**0**	**0**	**0**	**0**	**30**	**0**	**26**	**0**	**0**	**27**	**17**	**1**	**41**	**14**	**0**	**156**	694
5:45 PM	**0**	**0**	**0**	**0**	**0**	**25**	**0**	**30**	**0**	**0**	**27**	**30**	**0**	**41**	**21**	**0**	**174**	**708**
6:00 PM	0	0	0	0	0	21	0	23	0	0	29	23	0	27	23	0	146	654
6:15 PM	0	0	0	0	0	29	0	25	0	0	35	18	0	22	11	0	140	616
6:30 PM	0	0	0	0	0	24	0	34	0	0	34	17	0	24	13	0	146	606
6:45 PM	0	0	0	0	0	24	0	30	0	0	31	13	0	20	10	0	128	560
Count Total	0	0	0	0	0	306	0	356	0	0	391	308	1	370	230	0	1,962	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**103**	**0**	**120**	**0**	**0**	**136**	**111**	**1**	**152**	**85**	**0**	**708**	**0**

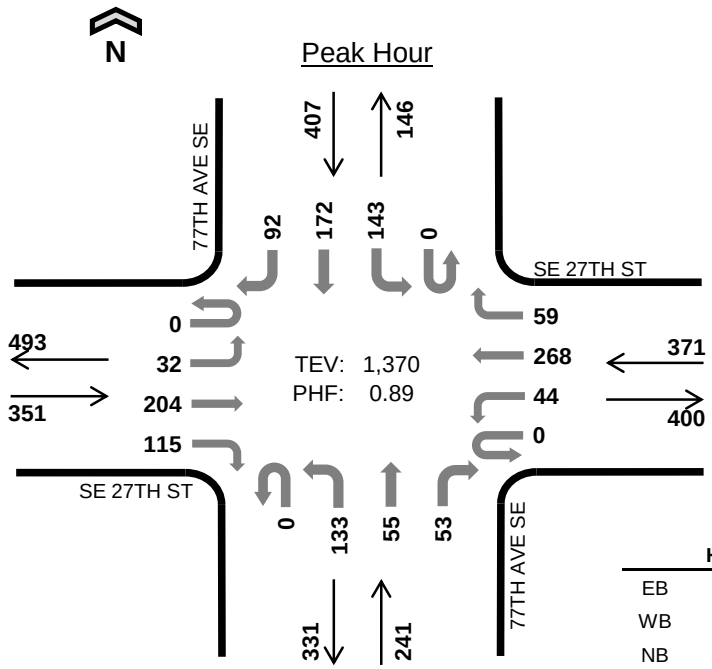
Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

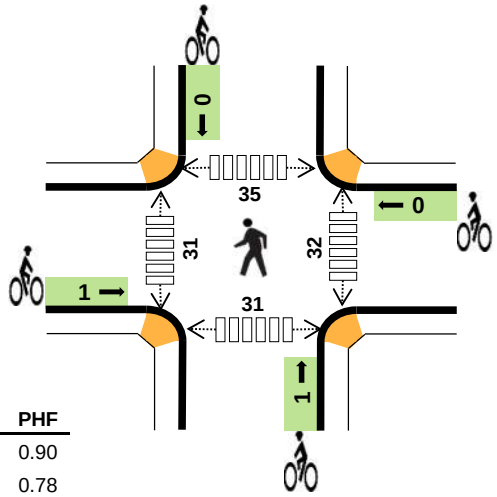
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	1	2	*3*	0	0	0	0	*0*	16	0	4	14	*34*
4:15 PM	0	0	1	1	*2*	0	0	0	1	*1*	11	0	6	3	*20*
4:30 PM	0	0	1	2	*3*	0	0	0	0	*0*	10	0	1	2	*13*
4:45 PM	0	1	0	2	*3*	0	0	0	0	*0*	6	0	0	6	*12*
5:00 PM	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**1**	**0**	***1***	**4**	**0**	**4**	**0**	*8*
5:15 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**0**	***0***	**12**	**0**	**3**	**6**	*21*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**1**	***1***	**5**	**0**	**5**	**3**	*13*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**2**	**1**	***5***
6:00 PM	0	0	3	1	*4*	0	0	0	0	*0*	9	0	2	8	*19*
6:15 PM	0	0	1	1	*2*	0	0	0	1	*1*	4	0	6	2	*12*
6:30 PM	0	0	2	0	*2*	0	0	1	1	*2*	11	0	0	5	*16*
6:45 PM	0	0	0	0	*0*	0	0	0	2	*2*	7	0	5	5	*17*
Count Total	0	1	13	12	*26*	0	0	2	6	*8*	97	0	38	55	*190*
Peak Hr	**0**	**0**	**4**	**3**	***7***	**0**	**0**	**1**	**1**	***2***	**23**	**0**	**14**	**10**	***47***

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

77TH AVE SE
SE 27TH ST

Date: Wed, Apr 27, 2016
Count Period: 4:00 PM to 7:00 PM
Peak Hour: 4:45 PM to 5:45 PM





	HV %:	PHF
EB	0.6%	0.90
WB	0.8%	0.78
NB	1.2%	0.90
SB	1.5%	0.94
TOTAL	1.0%	0.89

Three-Hour Count Summaries

Interval Start	SE 27TH ST Eastbound				SE 27TH ST Westbound				77TH AVE SE Northbound				77TH AVE SE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:45 PM	0	6	60	31	0	11	60	12	0	31	11	16	0	32	40	20	330	0
5:00 PM	0	6	39	40	0	11	64	12	0	27	16	11	0	29	49	23	327	0
5:15 PM	0	10	57	25	0	15	81	23	0	36	19	12	0	34	48	24	384	0
5:30 PM	0	10	48	19	0	7	63	12	0	39	9	14	0	48	35	25	329	1,370
Peak Hour	0	32	204	115	0	44	268	59	0	133	55	53	0	143	172	92	1,370	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:45 PM	1	2	1	1	***5***	0	0	0	0	***0***	6	8	6	9	***29***
5:00 PM	0	0	2	1	***3***	0	0	0	0	***0***	9	8	12	9	***38***
5:15 PM	1	1	0	1	***3***	1	0	0	0	***1***	5	6	8	4	***23***
5:30 PM	0	0	0	3	***3***	0	0	1	0	***1***	12	9	9	9	***39***
Peak Hour	2	3	3	6	***14***	1	0	1	0	***2***	32	31	35	31	***129***

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

Three-Hour Count Summaries

Interval Start	SE 27TH ST Eastbound				SE 27TH ST Westbound				77TH AVE SE Northbound				77TH AVE SE 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	69	39	0	10	57	11	0	33	13	25	0	33	40	20	352	0
4:15 PM	0	5	49	27	0	12	55	12	0	29	16	13	0	21	35	17	291	0
4:30 PM	0	3	59	36	0	12	38	10	0	32	10	16	0	39	37	22	314	0
4:45 PM	**0**	**6**	**60**	**31**	**0**	**11**	**60**	**12**	**0**	**31**	**11**	**16**	**0**	**32**	**40**	**20**	**330**	1,287
5:00 PM	**0**	**6**	**39**	**40**	**0**	**11**	**64**	**12**	**0**	**27**	**16**	**11**	**0**	**29**	**49**	**23**	**327**	1,262
5:15 PM	**0**	**10**	**57**	**25**	**0**	**15**	**81**	**23**	**0**	**36**	**19**	**12**	**0**	**34**	**48**	**24**	**384**	1,355
5:30 PM	**0**	**10**	**48**	**19**	**0**	**7**	**63**	**12**	**0**	**39**	**9**	**14**	**0**	**48**	**35**	**25**	**329**	**1,370**
5:45 PM	0	3	49	30	0	9	56	10	0	26	10	17	0	41	50	22	323	1,363
6:00 PM	0	4	77	28	0	8	52	13	0	35	10	9	0	28	35	25	324	1,360
6:15 PM	0	6	52	23	0	10	50	11	0	22	9	13	0	23	39	15	273	1,249
6:30 PM	0	5	54	31	0	9	60	21	0	25	8	10	0	22	40	18	303	1,223
6:45 PM	0	6	60	27	0	10	59	14	0	27	7	9	0	26	17	23	285	1,185
Count Total	0	66	673	356	0	124	695	161	0	362	138	165	0	376	465	254	3,835	0
Peak Hour	**0**	**32**	**204**	**115**	**0**	**44**	**268**	**59**	**0**	**133**	**55**	**53**	**0**	**143**	**172**	**92**	**1,370**	**0**

Note: Three-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	2	2	*6*	0	0	0	0	*0*	12	7	5	8	*32*
4:15 PM	0	1	0	1	*2*	1	0	1	0	*2*	2	2	4	20	*28*
4:30 PM	2	1	0	1	*4*	0	0	1	1	*2*	9	6	10	1	*26*
4:45 PM	**1**	**2**	**1**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**6**	**8**	**6**	**9**	*29*
5:00 PM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**9**	**8**	**12**	**9**	*38*
5:15 PM	**1**	**1**	**0**	**1**	***3***	**1**	**0**	**0**	**0**	***1***	**5**	**6**	**8**	**4**	*23*
5:30 PM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**1**	**0**	***1***	**12**	**9**	**9**	**9**	***39***
5:45 PM	0	0	0	0	*0*	0	0	2	2	*4*	3	7	7	11	*28*
6:00 PM	0	0	1	1	*2*	1	0	1	0	*2*	18	3	10	7	*38*
6:15 PM	0	0	0	1	*1*	0	1	0	0	*1*	5	7	1	12	*25*
6:30 PM	2	1	0	3	*6*	0	1	0	3	*4*	4	3	9	6	*22*
6:45 PM	0	0	1	0	*1*	0	0	0	0	*0*	4	6	7	16	*33*
Count Total	8	6	7	15	*36*	3	2	6	6	*17*	89	72	88	112	*361*
Peak Hour	**2**	**3**	**3**	**6**	***14***	**1**	**0**	**1**	**0**	***2***	**32**	**31**	**35**	**31**	***129***

Appendix B: LOS Definitions

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 8. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Appendix C: LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	205	115	45	270	60	135	55	55	145	170	90
Future Volume (veh/h)	30	205	115	45	270	60	135	55	55	145	170	90
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)	0.98		0.93	0.98		0.95	0.97		0.92	0.96		0.94
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	1881	1881	1900	1881	1881	1900	1881	1881	1900	1863	1863	1900
Adj Flow Rate, veh/h	34	230	129	51	303	67	152	62	62	163	191	101
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	2	2	2
Cap, veh/h	336	411	231	335	552	122	421	222	222	549	309	163
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.09	0.27	0.27	0.10	0.28	0.28
Sat Flow, veh/h	996	1102	618	1006	1478	327	1792	826	826	1774	1122	593
Grp Volume(v), veh/h	34	0	359	51	0	370	152	0	124	163	0	292
Grp Sat Flow(s),veh/h/ln	996	0	1720	1006	0	1805	1792	0	1651	1774	0	1715
Q Serve(g_s), s	1.6	0.0	9.5	2.4	0.0	9.3	3.4	0.0	3.4	3.7	0.0	8.5
Cycle Q Clear(g_c), s	10.9	0.0	9.5	11.9	0.0	9.3	3.4	0.0	3.4	3.7	0.0	8.5
Prop In Lane	1.00		0.36	1.00		0.18	1.00		0.50	1.00		0.35
Lane Grp Cap(c), veh/h	336	0	642	335	0	673	421	0	444	549	0	472
V/C Ratio(X)	0.10	0.00	0.56	0.15	0.00	0.55	0.36	0.00	0.28	0.30	0.00	0.62
Avail Cap(c_a), veh/h	572	0	1049	573	0	1101	728	0	864	842	0	897
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	18.5	0.0	14.2	19.0	0.0	14.2	13.6	0.0	16.6	12.8	0.0	18.2
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.2	0.0	0.7	0.5	0.0	0.3	0.3	0.0	1.3
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	0.4	0.0	4.6	0.7	0.0	4.8	1.7	0.0	1.6	1.8	0.0	4.1
LnGrp Delay(d),s/veh	18.6	0.0	15.0	19.2	0.0	14.9	14.1	0.0	16.9	13.1	0.0	19.5
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		393			421			276			455	
Approach Delay, s/veh		15.3			15.4			15.3			17.2	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.5	20.4		26.4	10.2	20.8		26.4
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	15.0	30.0		35.0	15.0	30.0		35.0
Max Q Clear Time (g_c+I1), s	5.7	5.4		12.9	5.4	10.5		13.9
Green Ext Time (p_c), s	0.3	2.8		5.6	0.3	2.7		5.5

Intersection Summary		
HCM 2010 Ctrl Delay	15.9	
HCM 2010 LOS	B	

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Traffic Vol, veh/h	0	105	120	0	135	110	5	150	85
Future Vol, veh/h	0	105	120	0	135	110	5	150	85
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	2	2	2	1	1	1
Mvmt Flow	0	118	135	0	152	124	6	169	96
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	9.8	10.3	11.1
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	64%
Vol Thru, %	55%	0%	0%	36%
Vol Right, %	45%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	105	120	240
LT Vol	0	105	0	153
Through Vol	135	0	0	87
RT Vol	110	0	120	0
Lane Flow Rate	275	118	135	270
Geometry Grp	2	7	7	2
Degree of Util (X)	0.356	0.205	0.189	0.376
Departure Headway (Hd)	4.662	6.261	5.048	5.024
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	765	569	702	712
Service Time	2.728	4.051	2.837	3.092
HCM Lane V/C Ratio	0.359	0.207	0.192	0.379
HCM Control Delay	10.3	10.7	9	11.1
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.6	0.8	0.7	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	255	25	165	0	25	30	190	300	5	10	165	70
Future Volume (veh/h)	255	25	165	0	25	30	190	300	5	10	165	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
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		1.00	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	1881	1900	1863	1900	1845	1845	1900	1863	1863	1900
Adj Flow Rate, veh/h	268	26	174	0	26	32	200	316	5	11	174	74
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	3	3	3	2	2	2
Cap, veh/h	393	38	367	0	63	78	248	1220	19	15	262	112
Arrive On Green	0.24	0.24	0.24	0.00	0.09	0.09	0.14	0.35	0.35	0.01	0.21	0.21
Sat Flow, veh/h	1640	159	1532	0	745	917	1757	3531	56	1774	1236	525
Grp Volume(v), veh/h	294	0	174	0	0	58	200	157	164	11	0	248
Grp Sat Flow(s),veh/h/ln	1799	0	1532	0	0	1662	1757	1752	1835	1774	0	1761
Q Serve(g_s), s	8.5	0.0	5.6	0.0	0.0	1.9	6.3	3.7	3.7	0.4	0.0	7.4
Cycle Q Clear(g_c), s	8.5	0.0	5.6	0.0	0.0	1.9	6.3	3.7	3.7	0.4	0.0	7.4
Prop In Lane	0.91		1.00	0.00		0.55	1.00		0.03	1.00		0.30
Lane Grp Cap(c), veh/h	431	0	367	0	0	142	248	605	634	15	0	374
V/C Ratio(X)	0.68	0.00	0.47	0.00	0.00	0.41	0.81	0.26	0.26	0.74	0.00	0.66
Avail Cap(c_a), veh/h	939	0	799	0	0	781	412	951	995	102	0	643
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	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	18.8	0.0	0.0	24.9	23.9	13.5	13.5	28.4	0.0	20.8
Incr Delay (d2), s/veh	1.4	0.0	0.7	0.0	0.0	1.4	2.3	0.2	0.2	22.8	0.0	2.0
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	4.4	0.0	2.4	0.0	0.0	0.9	3.2	1.8	1.9	0.3	0.0	3.8
LnGrp Delay(d),s/veh	21.3	0.0	19.5	0.0	0.0	26.3	26.3	13.8	13.8	51.3	0.0	22.8
LnGrp LOS	C		B			C	C	B	B	D		C
Approach Vol, veh/h		468			58			521			259	
Approach Delay, s/veh		20.6			26.3			18.6			24.0	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		18.3	12.6	17.2		9.4	5.0	24.9
Change Period (Y+Rc), s		4.5	4.5	5.0		4.5	4.5	5.0
Max Green Setting (Gmax), s		30.0	13.5	21.0		27.0	3.3	31.2
Max Q Clear Time (g_c+I1), s		10.5	8.3	9.4		3.9	2.4	5.7
Green Ext Time (p_c), s		1.9	0.1	2.6		0.2	0.0	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.7
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	25	70	155	0	55	55	70	5	85	155	40
Future Vol, veh/h	0	25	70	155	0	55	55	70	5	85	155	40
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	1	1	1	1	2	2	2	2	1	1	1	1
Mvmt Flow	0	28	79	174	0	62	62	79	6	96	174	45
Number of Lanes	0	1	1	0	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	12.1	10.5	11.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	79%	0%	31%	0%	44%	0%	83%
Vol Right, %	0%	21%	0%	69%	0%	56%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	195	25	225	55	125	15	115
LT Vol	90	0	25	0	55	0	15	0
Through Vol	0	155	0	70	0	55	0	95
RT Vol	0	40	0	155	0	70	0	20
Lane Flow Rate	101	219	28	253	62	140	17	129
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.187	0.365	0.052	0.402	0.118	0.232	0.033	0.227
Departure Headway (Hd)	6.656	6.004	6.726	5.73	6.856	5.95	6.957	6.324
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	539	598	531	627	522	601	513	566
Service Time	4.404	3.752	4.478	3.482	4.611	3.704	4.715	4.083
HCM Lane V/C Ratio	0.187	0.366	0.053	0.404	0.119	0.233	0.033	0.228
HCM Control Delay	10.9	12.2	9.8	12.3	10.5	10.5	10	10.9
HCM Lane LOS	B	B	A	B	B	B	A	B
HCM 95th-tile Q	0.7	1.7	0.2	1.9	0.4	0.9	0.1	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	15	95	20
Future Vol, veh/h	0	15	95	20
Peak Hour Factor	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	17	107	22
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.8
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	240	120	45	305	60	145	55	55	145	175	115
Future Volume (veh/h)	30	240	120	45	305	60	145	55	55	145	175	115
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)	0.98		0.93	0.98		0.95	0.97		0.92	0.96		0.94
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	1881	1881	1900	1881	1881	1900	1881	1881	1900	1863	1863	1900
Adj Flow Rate, veh/h	34	270	135	51	343	67	163	62	62	163	197	129
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	2	2	2
Cap, veh/h	304	435	217	297	571	112	404	236	236	558	293	192
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.09	0.29	0.29	0.09	0.29	0.29
Sat Flow, veh/h	962	1154	577	966	1516	296	1792	827	827	1774	1026	672
Grp Volume(v), veh/h	34	0	405	51	0	410	163	0	124	163	0	326
Grp Sat Flow(s),veh/h/ln	962	0	1731	966	0	1812	1792	0	1655	1774	0	1697
Q Serve(g_s), s	1.8	0.0	11.7	2.8	0.0	11.2	3.8	0.0	3.6	3.9	0.0	10.4
Cycle Q Clear(g_c), s	13.0	0.0	11.7	14.5	0.0	11.2	3.8	0.0	3.6	3.9	0.0	10.4
Prop In Lane	1.00		0.33	1.00		0.16	1.00		0.50	1.00		0.40
Lane Grp Cap(c), veh/h	304	0	652	297	0	682	404	0	472	558	0	485
V/C Ratio(X)	0.11	0.00	0.62	0.17	0.00	0.60	0.40	0.00	0.26	0.29	0.00	0.67
Avail Cap(c_a), veh/h	490	0	986	484	0	1032	675	0	808	825	0	829
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	20.7	0.0	15.6	21.5	0.0	15.4	14.1	0.0	17.0	13.2	0.0	19.4
Incr Delay (d2), s/veh	0.2	0.0	1.0	0.3	0.0	0.9	0.6	0.0	0.3	0.3	0.0	1.6
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	0.5	0.0	5.7	0.8	0.0	5.7	1.9	0.0	1.7	1.9	0.0	5.1
LnGrp Delay(d),s/veh	20.8	0.0	16.6	21.7	0.0	16.3	14.7	0.0	17.2	13.4	0.0	21.0
LnGrp LOS	C		B	C		B	B		B	B		C
Approach Vol, veh/h		439			461			287			489	
Approach Delay, s/veh		16.9			16.9			15.8			18.5	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.8	22.5		28.1	10.7	22.6		28.1
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	15.0	30.0		35.0	15.0	30.0		35.0
Max Q Clear Time (g_c+I1), s	5.9	5.6		15.0	5.8	12.4		16.5
Green Ext Time (p_c), s	0.3	3.1		6.1	0.3	2.8		5.9

Intersection Summary	
HCM 2010 Ctrl Delay	17.2
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Traffic Vol, veh/h	0	105	125	0	135	110	5	155	85
Future Vol, veh/h	0	105	125	0	135	110	5	155	85
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	2	2	2	1	1	1
Mvmt Flow	0	118	140	0	152	124	6	174	96
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	9.8	10.4	11.3
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	65%
Vol Thru, %	55%	0%	0%	35%
Vol Right, %	45%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	105	125	245
LT Vol	0	105	0	158
Through Vol	135	0	0	87
RT Vol	110	0	125	0
Lane Flow Rate	275	118	140	275
Geometry Grp	2	7	7	2
Degree of Util (X)	0.358	0.206	0.198	0.385
Departure Headway (Hd)	4.684	6.277	5.064	5.04
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	763	567	701	707
Service Time	2.754	4.07	2.856	3.112
HCM Lane V/C Ratio	0.36	0.208	0.2	0.389
HCM Control Delay	10.4	10.7	9.1	11.3
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.6	0.8	0.7	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	25	165	0	25	30	195	305	5	10	165	70
Future Volume (veh/h)	260	25	165	0	25	30	195	305	5	10	165	70
Number	5	2	12	1	6	16	3	8	18	7	4	14
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		1.00	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	1881	1900	1863	1900	1845	1845	1900	1863	1863	1900
Adj Flow Rate, veh/h	274	26	174	0	26	32	205	321	5	11	174	74
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	3	3	3	2	2	2
Cap, veh/h	397	38	370	0	63	78	253	1227	19	15	262	111
Arrive On Green	0.24	0.24	0.24	0.00	0.08	0.08	0.14	0.35	0.35	0.01	0.21	0.21
Sat Flow, veh/h	1643	156	1532	0	745	917	1757	3532	55	1774	1236	525
Grp Volume(v), veh/h	300	0	174	0	0	58	205	159	167	11	0	248
Grp Sat Flow(s),veh/h/ln	1799	0	1532	0	0	1662	1757	1752	1835	1774	0	1761
Q Serve(g_s), s	8.8	0.0	5.7	0.0	0.0	1.9	6.6	3.8	3.8	0.4	0.0	7.5
Cycle Q Clear(g_c), s	8.8	0.0	5.7	0.0	0.0	1.9	6.6	3.8	3.8	0.4	0.0	7.5
Prop In Lane	0.91		1.00	0.00		0.55	1.00		0.03	1.00		0.30
Lane Grp Cap(c), veh/h	435	0	370	0	0	141	253	609	638	15	0	373
V/C Ratio(X)	0.69	0.00	0.47	0.00	0.00	0.41	0.81	0.26	0.26	0.74	0.00	0.67
Avail Cap(c_a), veh/h	926	0	789	0	0	770	407	939	983	100	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)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	0.0	18.9	0.0	0.0	25.3	24.2	13.6	13.6	28.8	0.0	21.1
Incr Delay (d2), s/veh	1.5	0.0	0.7	0.0	0.0	1.4	2.5	0.2	0.2	22.9	0.0	2.0
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	4.5	0.0	2.4	0.0	0.0	0.9	3.4	1.8	1.9	0.3	0.0	3.9
LnGrp Delay(d),s/veh	21.6	0.0	19.6	0.0	0.0	26.7	26.7	13.9	13.9	51.7	0.0	23.1
LnGrp LOS	C		B			C	C	B	B	D		C
Approach Vol, veh/h		474			58			531			259	
Approach Delay, s/veh		20.8			26.7			18.8			24.3	
Approach LOS		C			C			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		18.6	12.9	17.3		9.4	5.0	25.2
Change Period (Y+Rc), s		4.5	4.5	5.0		4.5	4.5	5.0
Max Green Setting (Gmax), s		30.0	13.5	21.0		27.0	3.3	31.2
Max Q Clear Time (g_c+I1), s		10.8	8.6	9.5		3.9	2.4	5.8
Green Ext Time (p_c), s		1.9	0.1	2.7		0.2	0.0	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	11.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	25	70	155	0	55	55	70	5	85	155	40
Future Vol, veh/h	0	25	70	155	0	55	55	70	5	85	155	40
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	1	1	1	1	2	2	2	2	1	1	1	1
Mvmt Flow	0	28	79	174	0	62	62	79	6	96	174	45
Number of Lanes	0	1	1	0	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	12.1	10.5	11.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	79%	0%	31%	0%	44%	0%	83%
Vol Right, %	0%	21%	0%	69%	0%	56%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	195	25	225	55	125	15	115
LT Vol	90	0	25	0	55	0	15	0
Through Vol	0	155	0	70	0	55	0	95
RT Vol	0	40	0	155	0	70	0	20
Lane Flow Rate	101	219	28	253	62	140	17	129
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.187	0.365	0.052	0.402	0.118	0.232	0.033	0.227
Departure Headway (Hd)	6.656	6.004	6.726	5.73	6.856	5.95	6.957	6.324
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	539	598	531	627	522	601	513	566
Service Time	4.404	3.752	4.478	3.482	4.611	3.704	4.715	4.083
HCM Lane V/C Ratio	0.187	0.366	0.053	0.404	0.119	0.233	0.033	0.228
HCM Control Delay	10.9	12.2	9.8	12.3	10.5	10.5	10	10.9
HCM Lane LOS	B	B	A	B	B	B	A	B
HCM 95th-tile Q	0.7	1.7	0.2	1.9	0.4	0.9	0.1	0.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	15	95	20
Future Vol, veh/h	0	15	95	20
Peak Hour Factor	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	17	107	22
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.8
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	240	140	53	305	60	164	62	60	145	182	115
Future Volume (veh/h)	30	240	140	53	305	60	164	62	60	145	182	115
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)	0.98		0.93	0.98		0.95	0.98		0.93	0.96		0.94
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	1881	1881	1900	1881	1881	1900	1881	1881	1900	1863	1863	1900
Adj Flow Rate, veh/h	34	270	157	60	343	67	184	70	67	163	204	129
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	2	2	2
Cap, veh/h	304	414	241	279	578	113	408	249	238	551	296	187
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.10	0.29	0.29	0.09	0.28	0.28
Sat Flow, veh/h	963	1086	631	948	1516	296	1792	849	812	1774	1042	659
Grp Volume(v), veh/h	34	0	427	60	0	410	184	0	137	163	0	333
Grp Sat Flow(s),veh/h/ln	963	0	1717	948	0	1812	1792	0	1661	1774	0	1700
Q Serve(g_s), s	1.9	0.0	13.2	3.6	0.0	11.7	4.5	0.0	4.1	4.1	0.0	11.3
Cycle Q Clear(g_c), s	13.6	0.0	13.2	16.8	0.0	11.7	4.5	0.0	4.1	4.1	0.0	11.3
Prop In Lane	1.00		0.37	1.00		0.16	1.00		0.49	1.00		0.39
Lane Grp Cap(c), veh/h	304	0	655	279	0	691	408	0	488	551	0	484
V/C Ratio(X)	0.11	0.00	0.65	0.22	0.00	0.59	0.45	0.00	0.28	0.30	0.00	0.69
Avail Cap(c_a), veh/h	459	0	931	431	0	982	641	0	772	798	0	790
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	21.4	0.0	16.5	23.4	0.0	16.0	14.7	0.0	17.6	13.9	0.0	20.6
Incr Delay (d2), s/veh	0.2	0.0	1.1	0.4	0.0	0.8	0.8	0.0	0.3	0.3	0.0	1.8
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	0.5	0.0	6.4	1.0	0.0	6.0	2.3	0.0	1.9	2.0	0.0	5.5
LnGrp Delay(d),s/veh	21.6	0.0	17.6	23.8	0.0	16.8	15.5	0.0	17.9	14.2	0.0	22.3
LnGrp LOS	C		B	C		B	B		B	B		C
Approach Vol, veh/h		461			470			321			496	
Approach Delay, s/veh		17.9			17.7			16.5			19.6	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.0	24.0		29.6	11.6	23.4		29.6
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	15.0	30.0		35.0	15.0	30.0		35.0
Max Q Clear Time (g_c+I1), s	6.1	6.1		15.6	6.5	13.3		18.8
Green Ext Time (p_c), s	0.3	3.3		6.3	0.3	2.9		5.8

Intersection Summary	
HCM 2010 Ctrl Delay	18.1
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Traffic Vol, veh/h	0	130	125	0	141	110	5	155	87
Future Vol, veh/h	0	130	125	0	141	110	5	155	87
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	0	0	2	2	2	1	1	1
Mvmt Flow	0	146	140	0	158	124	6	174	98
Number of Lanes	0	1	1	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	2	0
HCM Control Delay	10.3	10.8	11.6
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	100%	0%	64%
Vol Thru, %	56%	0%	0%	36%
Vol Right, %	44%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	130	125	247
LT Vol	0	130	0	158
Through Vol	141	0	0	89
RT Vol	110	0	125	0
Lane Flow Rate	282	146	140	278
Geometry Grp	2	7	7	2
Degree of Util (X)	0.374	0.26	0.203	0.396
Departure Headway (Hd)	4.778	6.416	5.201	5.132
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	564	694	694
Service Time	2.871	4.116	2.901	3.227
HCM Lane V/C Ratio	0.379	0.259	0.202	0.401
HCM Control Delay	10.8	11.4	9.2	11.6
HCM Lane LOS	B	B	A	B
HCM 95th-tile Q	1.7	1	0.8	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	25	165	0	25	30	218	305	5	10	165	72
Future Volume (veh/h)	260	25	165	0	25	30	218	305	5	10	165	72
Number	5	2	12	1	6	16	3	8	18	7	4	14
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		0.96	1.00		1.00	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	1881	1900	1863	1900	1845	1845	1900	1863	1863	1900
Adj Flow Rate, veh/h	274	26	174	0	26	32	229	321	5	11	174	76
Adj No. of Lanes	0	1	1	0	1	0	1	2	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	2	2	2	3	3	3	2	2	2
Cap, veh/h	394	37	367	0	63	77	278	1272	20	15	257	112
Arrive On Green	0.24	0.24	0.24	0.00	0.08	0.08	0.16	0.36	0.36	0.01	0.21	0.21
Sat Flow, veh/h	1643	156	1532	0	745	916	1757	3532	55	1774	1224	535
Grp Volume(v), veh/h	300	0	174	0	0	58	229	159	167	11	0	250
Grp Sat Flow(s),veh/h/ln	1799	0	1532	0	0	1661	1757	1752	1835	1774	0	1759
Q Serve(g_s), s	9.1	0.0	5.9	0.0	0.0	2.0	7.6	3.8	3.8	0.4	0.0	7.9
Cycle Q Clear(g_c), s	9.1	0.0	5.9	0.0	0.0	2.0	7.6	3.8	3.8	0.4	0.0	7.9
Prop In Lane	0.91		1.00	0.00		0.55	1.00		0.03	1.00		0.30
Lane Grp Cap(c), veh/h	431	0	367	0	0	140	278	631	661	15	0	370
V/C Ratio(X)	0.70	0.00	0.47	0.00	0.00	0.42	0.82	0.25	0.25	0.74	0.00	0.68
Avail Cap(c_a), veh/h	898	0	765	0	0	747	395	910	953	97	0	615
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	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	19.6	0.0	0.0	26.1	24.5	13.5	13.5	29.7	0.0	21.8
Incr Delay (d2), s/veh	1.5	0.0	0.7	0.0	0.0	1.5	6.4	0.2	0.2	23.1	0.0	2.2
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(50%),veh/ln	4.7	0.0	2.5	0.0	0.0	1.0	4.2	1.9	2.0	0.3	0.0	4.0
LnGrp Delay(d),s/veh	22.4	0.0	20.3	0.0	0.0	27.6	30.9	13.7	13.7	52.9	0.0	24.0
LnGrp LOS	C		C			C	C	B	B	D		C
Approach Vol, veh/h		474			58			555			261	
Approach Delay, s/veh		21.6			27.6			20.8			25.2	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		18.9	14.0	17.6		9.6	5.0	26.6
Change Period (Y+Rc), s		4.5	4.5	5.0		4.5	4.5	5.0
Max Green Setting (Gmax), s		30.0	13.5	21.0		27.0	3.3	31.2
Max Q Clear Time (g_c+I1), s		11.1	9.6	9.9		4.0	2.4	5.8
Green Ext Time (p_c), s		1.9	0.1	2.6		0.2	0.0	3.6

Intersection Summary	
HCM 2010 Ctrl Delay	22.2
HCM 2010 LOS	C

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	31	92	170	0	55	55	70	5	101	155	40
Future Vol, veh/h	0	31	92	170	0	55	55	70	5	101	155	40
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	1	1	1	1	2	2	2	2	1	1	1	1
Mvmt Flow	0	35	103	191	0	62	62	79	6	113	174	45
Number of Lanes	0	1	1	0	0	1	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	13.9	11	12.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	79%	0%	35%	0%	44%	0%	67%
Vol Right, %	0%	21%	0%	65%	0%	56%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	195	31	262	55	125	15	142
LT Vol	106	0	31	0	55	0	15	0
Through Vol	0	155	0	92	0	55	0	95
RT Vol	0	40	0	170	0	70	0	47
Lane Flow Rate	119	219	35	294	62	140	17	160
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.228	0.38	0.067	0.486	0.123	0.243	0.034	0.286
Departure Headway (Hd)	6.903	6.249	6.918	5.949	7.14	6.231	7.202	6.456
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	518	574	516	603	500	573	494	554
Service Time	4.673	4.019	4.687	3.717	4.918	4.009	4.983	4.237
HCM Lane V/C Ratio	0.23	0.382	0.068	0.488	0.124	0.244	0.034	0.289
HCM Control Delay	11.7	12.8	10.2	14.3	10.9	11	10.2	11.8
HCM Lane LOS	B	B	B	B	B	B	B	B
HCM 95th-tile Q	0.9	1.8	0.2	2.7	0.4	0.9	0.1	1.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	15	95	47
Future Vol, veh/h	0	15	95	47
Peak Hour Factor	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	17	107	53
Number of Lanes	0	1	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	11.6
HCM LOS	B

Lane

Appendix D: Trip Generation Assumptions

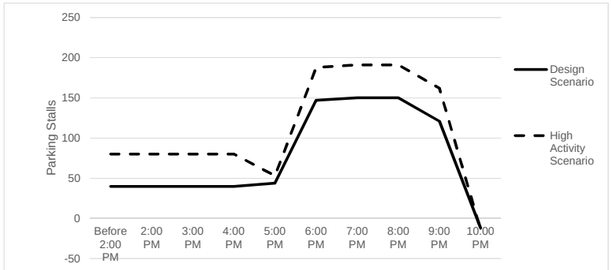
Design (75% Capacity) Scenario

Time		12-1 PM		1-2 PM		2-3 PM		3-4 PM		4-5 PM		5-6 PM		6-7 PM		7-8 PM		8-9 PM		9-10 PM		10-11 PM	
Trips Inbound/Outbound		Inbound	Outbound		Inbound	Outbound		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound		Inbound	Outbound	Inbound	Outbound
Mainstage	Audience											20	2	82	8	Performance 7-10pm, 75% capacity					10	102
	Staff													8								8
	Performers												0	23	2						2	23
Theater Lab	Audience																					
	Staff											2		Rehearsal 6-9pm, 75% capacity						2		
	Performers (includes drop-offs and pick-ups)											9	7						11	13		
Recital Studio	Audience																					
	Staff	Class 9am-5pm, 100% capacity										2	5	Rehearsal 6-9pm, 75% capacity						2		
													15									
	Performers (includes drop-offs and pick-ups)											9	7						11	13		
Dance Studio	Audience																					
	Staff	2		Class 1:15-2:15, 100% Capacity		Class 2:30-3:30, 100% Capacity				Class 3:45-4:45, 100% Capacity		Class 5-6, 100% Capacity		Class 6:15-7:15, 100% Capacity				Class 7:15-9, 100% Capacity		2		
	Performers (includes drop-offs and pick-ups)	15	7		15	7		15	7	15	7	15	7			15	4		4	15		
					7	15		7	15	7	15	7	15			7	15					
Classroom	Audience																					
	Staff							Class 2:45-4:15pm, 100% capacity				2		Rehearsal 6-9pm, 75% capacity						2		
	Performers (includes drop-offs, pick-ups, and school bus)				5	5				4	4	9	7						11	13		
Classroom	Audience																					
	Staff							Class 2:45-4:15pm, 100% capacity				2		Rehearsal 6-9pm, 75% capacity						2		
	Performers (includes drop-offs, pick-ups, and school bus)				5	5				4	4	9	7						11	13		
Dance Studio Daytime Staff x2													2									
MICA staff													3									
YTN Daytime Staff x5													5									
Total Trips		**17**	**7**	**0**	**32**	**32**	**0**	**22**	**22**	**0**	**30**	**30**	**0**	**86**	**82**	**113**	**10**	**22**	**19**	**0**	**48**	**77**	**12**	**133**
Drop-offs		**7**			**17**			**7**			**7**			**37**			**10**	**4**						
Pick-ups					**7**			**7**			**15**			**7**				**7**			**48**		**12**	

Venue	Attendance Type	Capacity	AVO Trips	AVO Parking
Mainstage	Audience	300	2.2	2.2
	Staff	10	1	1
	Performers	30	1	1

75% Capacity Parking Accumulation

Time	In	Out	Parking Stalls Required
Before 2:00 PM	47	7	40
2:00 PM	32	32	40
3:00 PM	22	22	40
4:00 PM	30	30	40
5:00 PM	86	82	44
6:00 PM	113	10	147
7:00 PM	22	19	150
8:00 PM	0	0	150
9:00 PM	48	77	121
10:00 PM	0	133	-12



Design (100% Capacity) Scenario

Time		12-1 PM		1-2 PM		2-3 PM		3-4 PM		4-5 PM		5-6 PM		6-7 PM		7-8 PM		8-9 PM	9-10 PM		10-11 PM	
Trips Inbound/Outbound		Inbound	Outbound		Inbound	Outbound		Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound		Inbound	Outbound	Inbound	Outbound
Mainstage	Audience											27		109	11						14	136
	Staff	10		Rehearsal 1-5pm, 100%									10	10		Performance 7-10pm, 75% capacity						10
	Performers	30											30	30	3						3	30
Theater Lab	Audience																					
	Staff											2		Rehearsal 6-9pm, 75% capacity						2		
	Performers (includes drop-offs and pick-ups)											9	7						11	13		
Recital Studio	Audience																					
	Staff	Class 9am-5pm, 100% capacity										2	5	Rehearsal 6-9pm, 75% capacity						2		
													15									
	Performers (includes drop-offs and pick-ups)											9	7						11	13		
Dance Studio	Audience																					
	Staff	2		Class 1:15-2:15, 100% Capacity		Class 2:30-3:30, 100% Capacity		Class 3:45-4:45, 100% Capacity				Class 5-6, 100% Capacity		Class 6:15-7:15, 100% Capacity				Class 7:15-9, 100% Capacity		2		
	Performers (includes drop-offs and pick-ups)				15		15		15	15			15		15		4		4	15		
		15	7		7	15	7	15	7	7	15		7	15	7	7	15					
Classroom	Audience																					
	Staff						Class 2:45-4:15pm, 100% capacity						2		Rehearsal 6-9pm, 75% capacity					2		
	Performers (includes drop-offs, pick-ups, and school bus)				5	5				4	4		9	7					11	13		
Classroom	Audience																					
	Staff						Class 2:45-4:15pm, 100% capacity						2		Rehearsal 6-9pm, 75% capacity					2		
	Performers (includes drop-offs, pick-ups, and school bus)				5	5				4	4		9	7					11	13		
Dance Studio Daytime Staff x2														2								
YTN Daytime Staff x5														3								
														5								
Total Trips		**57**	**7**	**0**	**32**	**32**	**0**	**22**	**22**	**0**	**30**	**30**	**0**	**93**	**120**	**149**	**14**	**22**	**19**	**0**	**48**	**77**	**17**	**176**
		7			**17**			**7**			**7**			**35**			**14**	**4**					
					7			**7**			**15**			**7**				**7**			**48**		**17**	

Venue	Attendance Type	Capacity	AVO Trips	AVO Parking
Mainstage	Audience	300	2.2	2.2
	Staff	10	1	1
	Performers	30	1	1

100% Capacity Parking Accumulation

Time	In	Out	Parking Stalls Required
Before 2:00 F	87	7	80
2:00 PM	32	32	80
3:00 PM	22	22	80
4:00 PM	30	30	80
5:00 PM	93	120	53
6:00 PM	149	14	188
7:00 PM	22	19	191
8:00 PM	0	0	191
9:00 PM	48	77	162
10:00 PM	0	176	-14

Appendix E: Activity Schedule Assumptions

Assumptions

1. Capacities: based on Activity Profile and Utilization Calenda
Mainstage - 300
Theater Lab (Blackbox) - 100
Recital Studio - 100
Dance Studio - depends on class size, typically 15
Classroom - depends on class size, typically 15
Practice Room - 1
Eliminating practice rooms from trip gen because of small capacity, adding multiple classroom events for more conservative estimate

2. Activity Times: based on Activity Profile and Utilization Calenda

Venue	Activity	Time
Mainstage	Performance	7-10pm
Mainstage	Rehearsal	4-9pm, Fridays 1-5pm
Theatre Lab	Rehearsal	6-9pm
Recital Studio	Rehearsal	6-9pm
Recital Studio	Classes	9am-5pm
Classrooms	Classes	2:45-4:15pm
Dance Studio	Classes	6 back-to-back, 1:15-2:15, 2:30-3:30, 3:45-4:45, 5-6, 6:15-7:15, 7:15-9

3. Design vs High Activity Scenarios
Added 1-5pm mainstage rehearsal at 100% capactiy to High Activity scenario (occurs on some Fridays). 50% of staff assumed to remain at venue between this rehearsal and evening performance
Performance at 75% capacity for Design scenario, performance at 100% for High Activity scenario, all classes at 100% for both scenarios

4. Attendance Types
Audience applied to performances only (no audience for rehearsals or classes)
10 staff members total assumed for mainstage performances, 5 for theater lab and recital studio, 2 for classrooms
30 performers assumed for mainstage performances and rehearsals, 15 for all other venues

5. Mode Splits
Percentage transit: 5% during the network PM peak hou
Percentage walk: 5% during network and performance peak hours
Percentage drop-off: 10% vehicle trips added for drop-offs before and after performances; 50-100% of parents drop-off/pick-up for classes and rehearsal
After school classes (approximately 2-4:30pm): 75% students arrive by school bus; up to 2 school buses arrive at the same time

6. Trip Generation
Assume 20% of audience arrives for 7pm performance during PM peak, 80% arrives after PM peak
Assume 50% of staff arrives just prior to performance or rehearsal, 50% arrives during AM
AVO: Audience 2.2, Staff 1.0, Performers 1.0
AVO of 10 is assumed for performers in Recital Studio, Dance Studio, and Classroom venues for all Design and High Activity Scenarios for parking accumulation

Youth Theatre Northwest

1. Daytime staff – 5x
    a. Working normal business hours
    b. 1:1 driving ratio
2. Preschool class
    a. 1x daily (either 9:30a-12p or 1p-4p)
    b. 10 students, 1 staff
    c. No parents stay, all drop-offs
    d. 1:1 driving ratio
3. After school class
    a. 2x daily (both 2:45-4:15p)
    b. 12 students, 1 staff (each class)
    c. 75% arrive by school bus, 25% arrive by car
    d. No parents stay, all drop-offs
    e. Up to 2 school buses at one time
    f. 1:1 driving ratio for parent drop-offs
4. Rehearsals
    a. 4x daily (all running 6p-9p)
    b. 20 students, 2 staff (each rehearsal)
    c. 20% stay from classes, 10% self-drive (i.e., require parking), 5% walk/bike, 65% arrive by ca
    d. No parents stay, all drop-offs
    e. 1:2 driving ratio for parent drop-offs

Island Youth Ballet

1. Daytime staff – 2x
    a. Working normal business hours
    b. 1:1 driving ratio
2. Morning class
    a. 2x daily (9a-12p back-to-back)
    b. 15 students, 2 staff (each)
    c. 50% of parents stay, 50% drop-offs
    d. 1:1 driving ratio
3. Afternoon/evening class
    a. 6x daily (1:15p-9p back-to-back)
    b. 15 students, 2 staff (each)
    c. 50% of parents stay, 50% drop-offs
    d. 1:1 driving ratio
    e. The last class (7:15-9pm) is for high schoolers, 75% of which would park and stay

Appendix F: On-Street Parking Utilization Study

On-Street Parking Utilization Study

Block	Description	Distance from Site (ft)	Side	Supply	Average Demand Afternoon	Average Demand Evening	Demand 1 (2-3pm)	Demand 1 (6-7pm)	Demand 2 (2-3pm)	Demand 2 (6-7pm)
1	SE 29th St b/w 76th Ave SE & 77th Ave SE	1000	N	11	6.5	5	7	5	6	5
			S	8	5	3	7	3	3	3
2	SE 29th St b/w 77th Ave SE & 78th Ave SE	1000	N	4	3	3	2	5	4	1
			S	9	3	1.5	3	2	3	1
3	77th Ave SE b/w SE 29th St & SE 32nd St	800	E	0	0	0	0	0	0	0
			W	0	0	0	0	0	0	0
4	78th Ave SE b/w SE 29th St & SE 30th St	1000	E	0	0	0	0	0	0	0
			W	0	0	0	0	0	0	0
5	78th Ave SE b/w SE 30th St & SE 32nd St	800	E	0	0	0	0	0	0	0
			W	0	0	0	0	0	0	0
6	SE 32nd St b/w 77th Ave SE & 78th Ave SE	800	N	0	0	0	0	0	0	0
			S	4	1	1	2	2	0	0
7	SE 32nd St b/w 78th Ave SE & 80th Ave SE	800	N	7	4	1	4	1	4	1
			S	8	6	0.5	6	0	6	1
8	80th Ave SE b/w SE 30th St & SE 32nd St	1000	E	30	21.5	11	20	11	23	11
			W	12	10.5	7	12	6	9	8
9	78th Ave SE b/w SE 32nd St & SE 34th St	800	E	0	0	0	0	0	0	0
			W	0	0	0	0	0	0	0
10	80th Ave SE b/w SE 32nd St & SE 33rd Pl	1000	E	13	9	3.5	9	2	9	5
			W	0	0	0	0	0	0	0
11	80th Ave SE b/w SE 33rd Pl and SE 34th St	1200	E	10	1	1.5	1	2	1	1
			W	0	0	0	0	0	0	0

Based on two days of counts (afternoon and evening) conducted in April 2016.

On-Street Parking Supply	Spaces	Demand Afternoon	Demand Evening	Afternoon Utilization	Evening Utilization
Within 1200 feet of the site	116	71	38	61%	33%
Within 1000 feet of the site	106	70	37	66%	34%
Within 800 feet of the site	19	11	3	58%	13%

Appendix G: 77th Avenue SE Potential Parking Supply


72’ / 20’ = 3.6 Stalls
72’ / 20’ = 3.6 Stalls
NOT USED
174’ / 20’ = 8.7 Stalls
70' / 20' = 3 Stalls
120' / 20' = 6 Stalls
153’ / 20’ = 7.6 Stalls
100' / 20' = 5 Stalls
80' / 20' = 4 Stalls
100' / 20' = 5 Stalls
20' = 1 Stall
490’ / 20’ = 24.5 Stalls
140' / 20' = 7 Stalls
42’ / 20 = 2.1 Stalls
190' / 20' = 9 Stalls
155 / 20 = 7.75 Stalls
TOTAL = +/- 88 20’ Stalls