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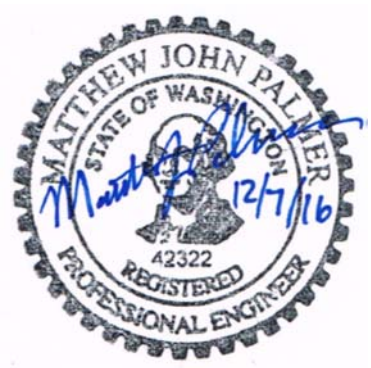
Arena Sports Development
Traffic Impact Analysis

Jurisdiction: City of Mill Creek

December 2016



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1. DEVELOPMENT IDENTIFICATION

Gibson Traffic Consultants, Inc. (GTC) has been retained to analyze the traffic impacts of the Arena Sports Development. The Arena Sports Development is proposed to consist of a 15,000 square foot (SF) portion of the building that will consist of a bowling alley, laser tag, and an arcade. Additionally, this project will create two indoor soccer fields and take credit for one single family dwelling. The site is located west of SR-527, south of SR-96, and north of 136th Street SE. The site is proposed to have two accesses, one to Dumas Road and one to SR-527. A site vicinity map is included in Figure 1.

Matthew Palmer, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of ITE.

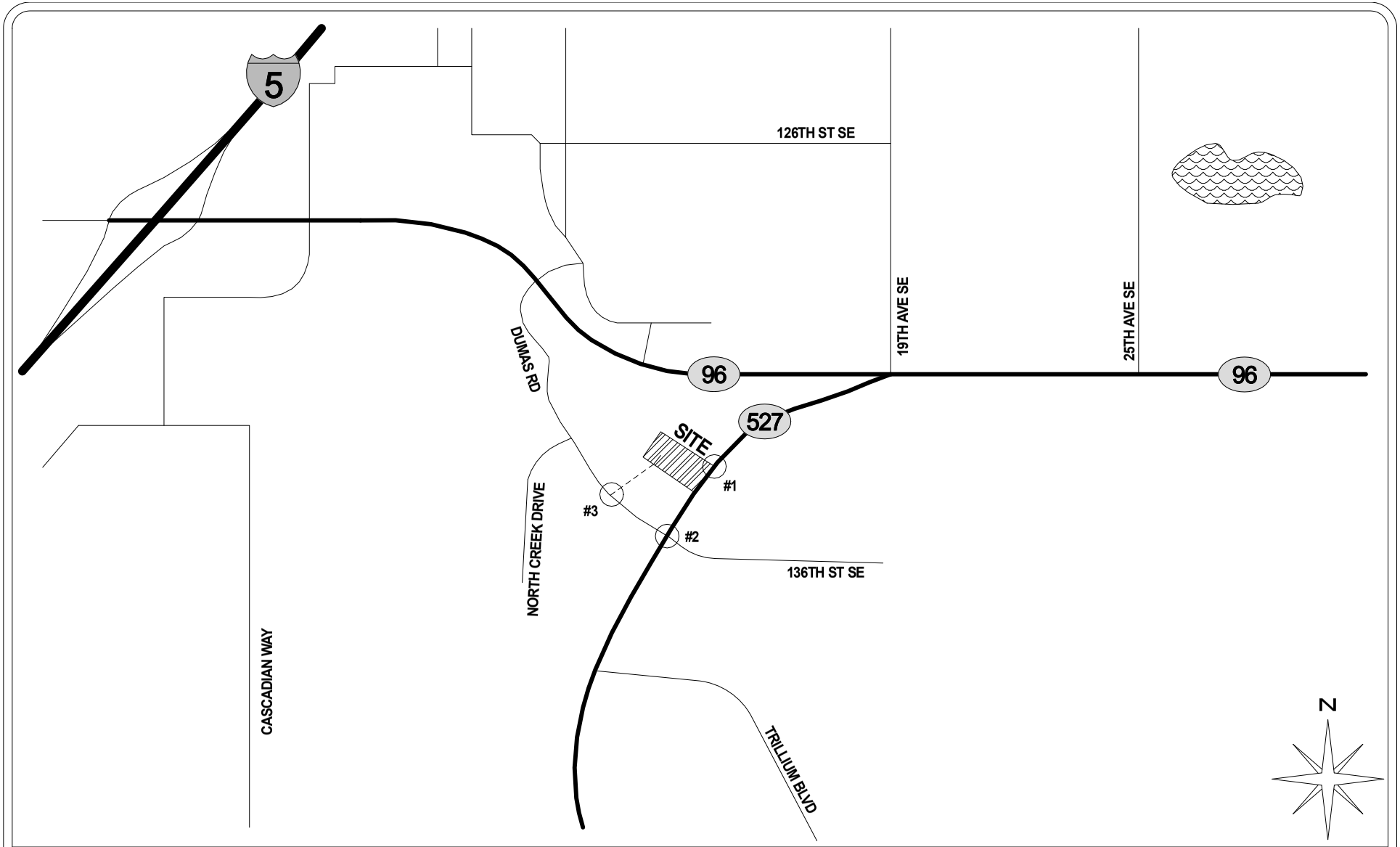
2. METHODOLOGY

2.1 General

Trip generation for the Arena Sports Development is based on data contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition*. The average trip generation rates have been used for the trip generation calculations for the following ITE Land Use Codes (LUC):

- LUC 435, Specialized Use
- LUC 435, Multipurpose
- LUC 437, Bowling Alley
- LUC 488, Soccer Fields
- LUC 210, Single-Family Detached Housing

The distribution of trips generated by the site is based on counts in the vicinity and the location of residential neighborhoods.



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DEVELOPMENT SITE

STUDY INTERSECTION

FIGURE 1

SITE VICINITY MAP

3. TRIP GENERATION

The trip generation calculations for the Arena Sports Development are based on the average trip generation rates for ITE Land Use Code 435, Specialized Use, LUC 435, Multipurpose, LUC 437, Bowling Alley, LUC 488, Soccer Fields, and LUC 210, Single-Family Detached Housing, from *Trip Generation Manual, 9th Edition*. The 15,000 SF building will be a family entertainment center and will consist of a bowling alley, laser tag, and arcade. ITE does not have a specific land use code for a single building containing these uses; therefore, an average of Specialized Use, Multipurpose, and Bowling Alley were used to create a trip generation for the family entertainment center. A breakdown of the trip generation for the Family Entertainment Center is summarized in Table 1. The total trip generation of the Arena Sports Development is summarized in Table 2.

Table 1: Family Entertainment Center Weekday Trip Generation

Land Use	Size	Average Daily Trips	PM Peak-Hour Trips		
			In	Out	Total
Specialized Use LUC 435	15,000 SF	25	1	1	2
Multipurpose LUC 435	15,000 SF	451	25	20	45
Bowling Alley LUC 437	15,000 SF	420	13	9	22
AVERAGE		**299**	**13**	**10**	**23**

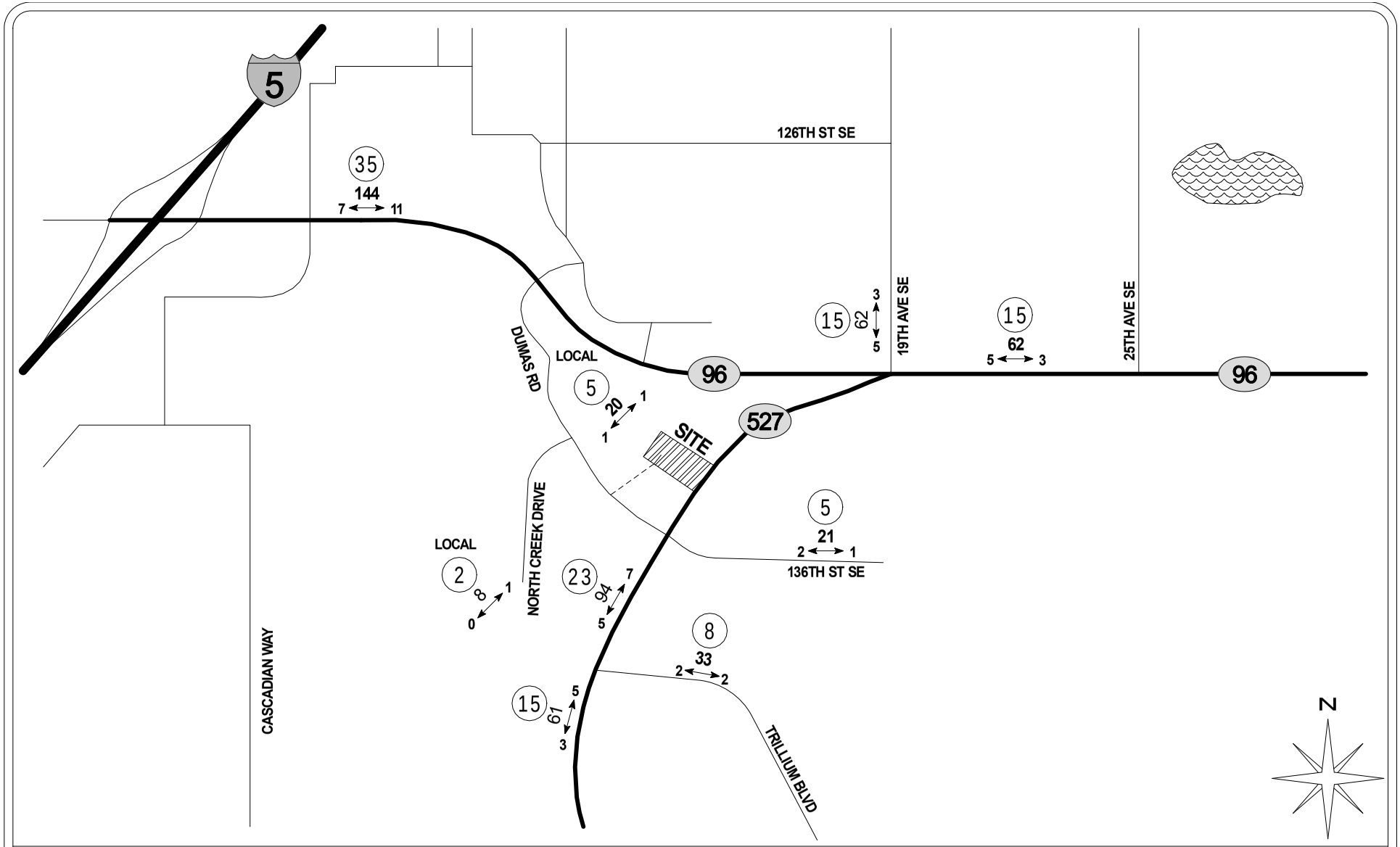
Table 2: Weekday Trip Generation Summary

Land Use	Size	Average Daily Trips	PM Peak-Hour Trips		
			In	Out	Total
Family Entertainment Center	15,000 SF	299	13	10	23
Soccer Fields	2 Fields	120	19	10	29
Single Family (Removed)	-1 Unit	-8	-1	0	-1
TOTAL		**411**	**31**	**20**	**51**

The development is anticipated to generate 411 new weekday average daily trips with 51 new PM weekday peak-hour trips after internal crossover trips between the soccer fields and family entertainment center. The trip generation calculations are included in the attachments.

4. TRIP DISTRIBUTION

The distribution of trips generated by the Arena Sports Development is based on the location of residential developments in the site vicinity. It is estimated that 35% of the development's trips will travel to and from the west along SR-96. Additionally, 23% of the development's trips will travel to and from the south, fifteen percent along SR-527 and eight percent along Trillium Boulevard. An estimated 15% of the development's trips will travel to and from the north along 19th Avenue SE. Approximately 20% of the development's trips will travel to and from the east, fifteen percent along SR-96 and five percent along 136th Street SE. The final 7% will travel to and from local destinations. Detailed distributions for the PM peak-hour trips generated by the development are shown in Figure 2.



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AWDT
PM ← → PEAK — NEW SITE TRAFFIC (DAILY/PEAK-HOUR)

(XX) — TRIP DISTRIBUTION %

FIGURE 2

DEVELOPMENT
TRIP DISTRIBUTION
PM PEAK-HOUR

5. INTERSECTION ANALYSIS

Intersection level of service analysis has been performed for the intersection of Dumas Road at SR-527. Additionally, there will be a level of service performed at SR-527 and the north driveway of the parking lot. The development will construct an extension connecting the complex to Dumas Road which was also analyzed in the Future with Development conditions. These study intersections are impacted by the highest number of development trips.

Congestion at intersections is generally measured in terms of level of service (LOS). In accordance with the 2010 Highway Capacity Manual (HCM), road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The level of service at signalized, roundabout and all-way stop-controlled intersections is based on the average delay of all approaches. The level of service for two-way stop-controlled intersections is based on average delays for the critical stopped approach. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. A summary of the intersection level of service criteria is included in Table 3.

Table 3: Level of Service Criteria for Intersections

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	**Signalized** Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The level of service threshold for residential/arterial intersections is LOS F, based on the Transportation Element section of the *City of Mill Creek 2012 Comprehensive Plan*.

[1] **Source:** *Highway Capacity Manual* 2010.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

5.1 2016 Existing Conditions

The existing intersection level of service analysis is based on the existing channelization and PM peak-hour turning movement volumes. Turning movement counts were conducted at the intersection of Dumas Road at SR-527 on December 2014 by Quality Counts Transportation Data Collection Services and the intersection of SR-527 at the north driveway on June 2016 by GTC staff. The existing turning movement volumes are shown in Figure 3.

The existing level of service analysis shows that the intersection of Dumas Road at SR-527 operates at LOS B with an average delay of 14.9 seconds. The level of service calculations are included in the attachments. For the intersection of SR-527 at the north driveway operates at LOS B with an average delay of 12.7 seconds for the eastbound approach. The level of service is summarized in Table 4.

5.2 2021 Baseline Conditions

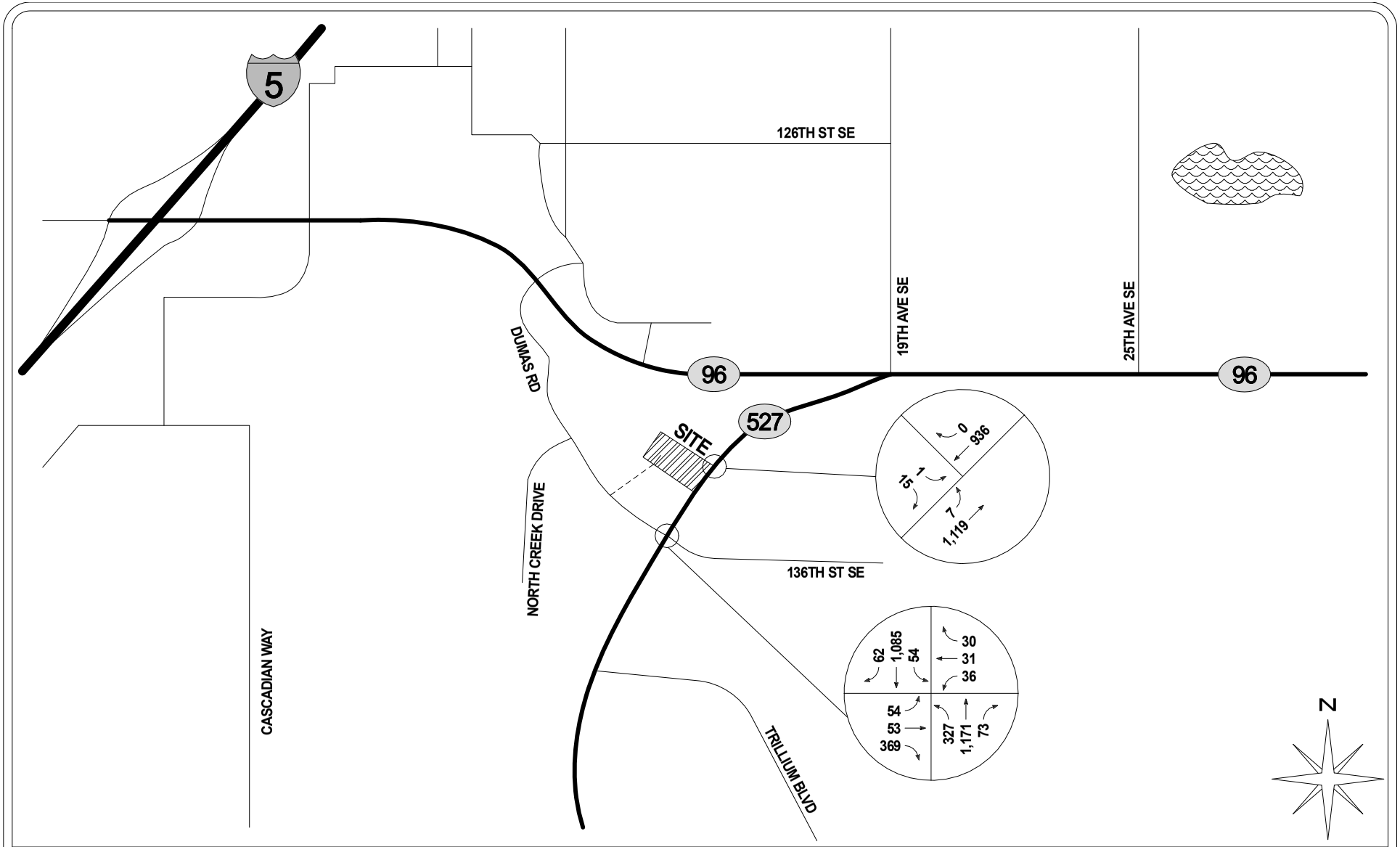
The 2021 baseline intersection level of service analysis has been performed to satisfy a 5-year concurrency period. The 2021 baseline turning movements have been calculated by adding a 1.0% annually compounding growth rate to the existing turning movement counts. The 2021 baseline turning movements are shown in Figure 4.

The analysis shows that the intersection of Dumas Road at SR-527 is expected to operate at LOS B with an average of 17.9 seconds of delay. The level of service calculations are included in the attachments. For the Intersection of SR-527 at the north driveway is expected to operate at LOS B with an average delay of 13.0 seconds for the eastbound approach. The level of service is summarized in Table 4.

5.3 2021 Future with Development Conditions

The 2021 future with development turning movements have been calculated by adding the trips from the Arena Sports Development to the 2021 baseline turning movements. The 2021 future with development turning movements at the study intersections are shown in Figure 5.

The intersection of Dumas Road at SR-527 is expected to operate at LOS B with an average delay of 18.0 seconds. For the intersection of SR-527 at the north driveway is expected to operate at LOS C with an average delay of 16.8 seconds for the eastbound approach. For the intersection at Dumas Road and the south driveway is expected to operate at LOS B with an average delay of 12.4 seconds for the southbound approach. The level of service is summarized in Table 4. The level of service calculations are included in the attachments.



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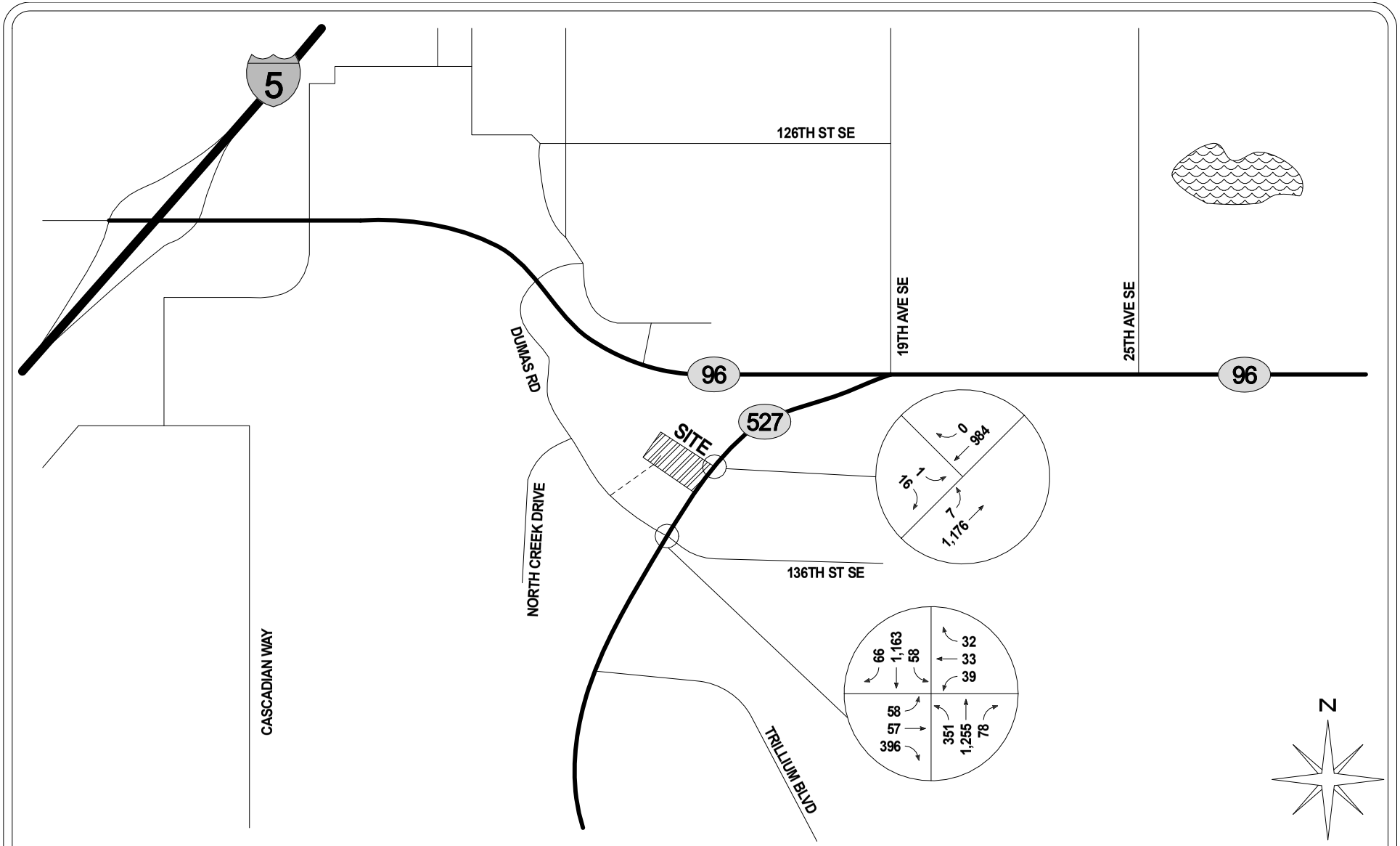
XXX → EXISTING TURNING MOVEMENT VOLUMES

FIGURE 3

EXISTING TURNING MOVEMENT VOLUMES



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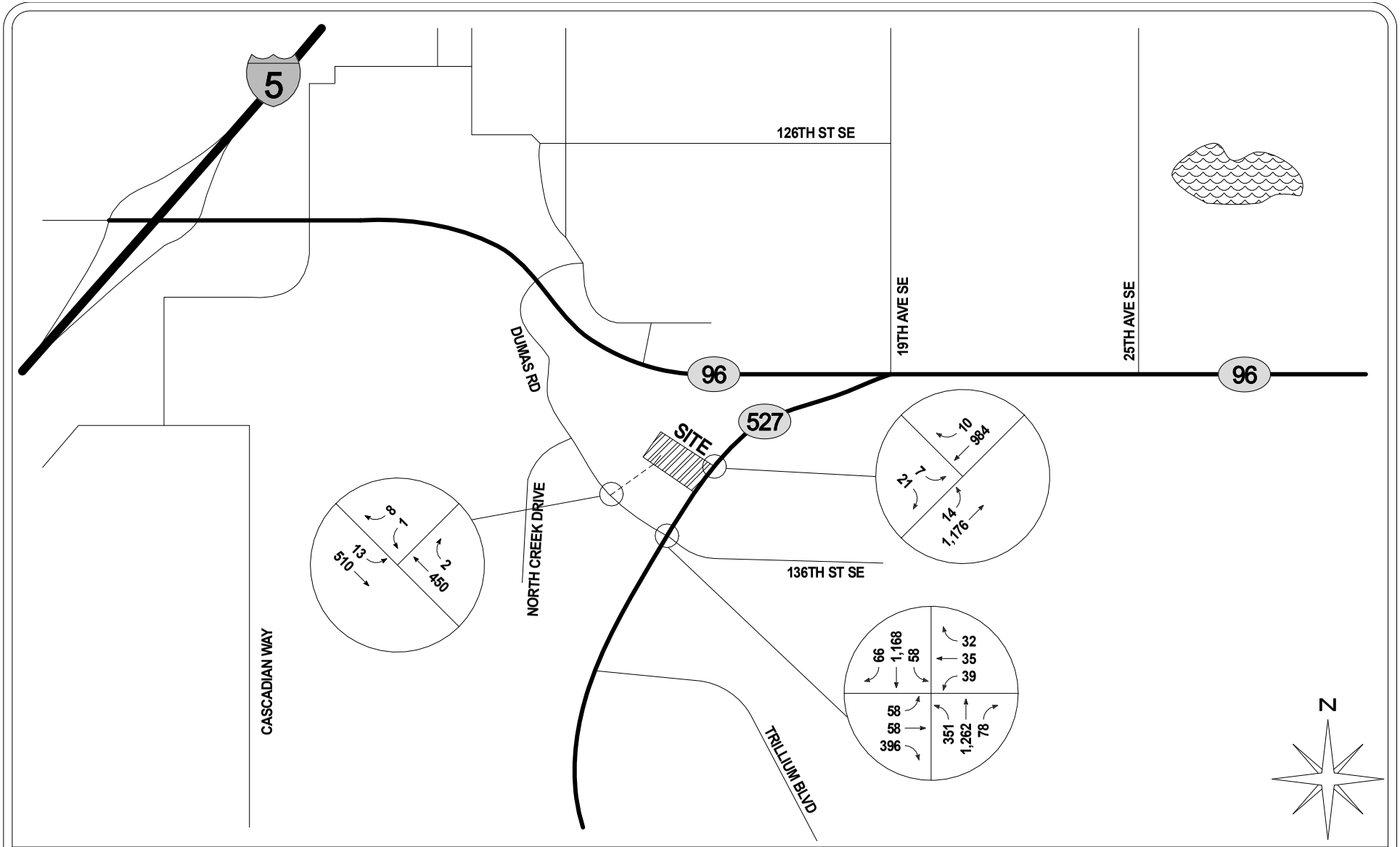
XXX → 2021 BASELINE TURNING MOVEMENT VOLUMES

FIGURE 4

2021 BASELINE TURNING MOVEMENT VOLUMES



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XXX → 2021 FUTURE TURNING MOVEMENT VOLUMES

FIGURE 5

2021 FUTURE TURNING MOVEMENT VOLUMES

Table 4: Intersection Level of Service Summary

Intersection	2016 Existing Conditions		2021 Baseline Conditions		2021 Future with Development Conditions	
	LOS	Delay	LOS	Delay	LOS	Delay
1. SR-527 at North Driveway	B	12.7 sec	B	13.0 sec	C	16.8 sec
2. Dumas Road at SR-527	B	14.9 sec	B	17.9 sec	B	18.0 sec
3. Dumas Road at South Driveway	---	---	---	---	B	12.4 sec

The study intersection will operate at an acceptable level of service under the 2021 future with development conditions. The level of service calculations at the study intersections for the PM peak-hour are included in the attachments.

The intersection of Dumas Road/136th Street SE at SR-527 will operate at LOS B in the future with development conditions with the worst leg operating at LOS D. The intersection is allowed to operate at LOS E within the city's level of service threshold.

6. ACCESS ANALYSIS

One concern with the location of the two accesses was queuing at the intersection of SR-527 at Dumas Road/ 136th Street SE. Queueing analysis was therefore performed at the intersection using Synchro 9 analysis. The 95th percentile queuing was 542 ft along SR-527 and 128 ft along Dumas Road. There is 543 feet of queueing space along SR-527 and 332 feet of queuing along Dumas Road before it would interact with the access points. Therefore, neither of the accesses should have queuing backup issues as the 95th percentile represents a condition anticipated to be exceeded only 5% of the analysis time (3 minutes) and not what the average driver would experience during a typical day.

7. TRAFFIC MITIGATION FEES

Developments in the City of Mill Creek are required to pay traffic mitigation fees to the City of Mill Creek. The City of Mill Creek does not have an interlocal agreement with other surrounding jurisdictions, including WSDOT, for the payment of traffic mitigation fees.

7.1 City of Mill Creek

The City of Mill Creek collects traffic mitigation fees based on PM peak-hour development trips generated. The traffic mitigation fee is $3,000.00 per PM peak-hour trip generated. The Arena Sports Development will generate 51 new PM peak-hour trips and will have an associated traffic mitigation fee of $153,000.

7.2 Snohomish County

The City of Mill Creek no longer has an interlocal agreement with Snohomish county, therefore there are no interlocal fees.

7.3 Traffic Impact Fee Summary

The Arena Sports Development will generate 411 new weekday average daily trips with 51 PM weekday peak-hour trips. The Arena Sports development will have a total traffic mitigation fee of $153,000.00.

8. CONCLUSIONS

The Arena Sports development is proposed to consist of a 15,000 SF building that will consist of a bowling alley, laser tag, and an arcade. Additionally this project will create two soccer fields and take credit for one single family dwelling. The site is located west of SR-527, south of SR-96, and north of 136th St SE. The site is proposed to have two accesses, one to Dumas Road and one to SR-527. The development is anticipated to generate 411 new average daily trips with 51 new PM peak-hour. The total traffic mitigation fees for the development will be $153,000.00.

Trip Generation Calculations

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Trip Generation for: Development Peak Weekday
(a.k.a.): Average Weekday Daily Trips (AWDT)

									NET EXTERNAL TRIPS BY TYPE							
									IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS			
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		NEW	PASS-BY		NEW	
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out
Speicalized Use	15.000 KSF	435	1.99	50%	50%	30	16%	5	25	0%	0	25	0	0	13	12
Multipurpose	15.000 KSF	435	35.80	50%	50%	537	16%	86	451	0%	0	451	0	0	226	225
Bowling Alley	15.000 KSF	437	33.33	50%	50%	500	16%	80	420	0%	0	420	0	0	210	210
Average of Above Uses	15.000 KSF	---	23.71	50%	50%	356	16%	57	299	0%	0	299	0	0	150	149
Soccer Fields	2 Fields	488	71.33	50%	50%	143	16%	23	120	0%	0	120	0	0	60	60
Single-Family (Removed)	-1 Unit	210	9.52	50%	50%	-10	16%	-2	-8	0%	0	-8	0	0	-4	-4
Total (Average + Soccer - SFD)						489		78	411		0	411	0	0	206	205

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Trip Generation for: **Development Peak Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM**
(a.k.a.): **Weekday PM Peak Hour**

									NET EXTERNAL TRIPS BY TYPE							
									IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS			
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		NEW	PASS-BY		NEW	
LAND USES	**VARIABLE**	**ITE LU code**	**Trip Rate**	**% IN**	**% OUT**	**In+Out (Total)**	**% of Gross Trips**	**Trips In+Out (Total)**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**In+Out (Total)**	**In**	**Out**	**In**	**Out**
Speicalized Use	15.000 KSF	435	0.17	35%	65%	3	16%	0	3	0%	0	3	0	0	1	2
Multipurpose	15.000 KSF	435	3.58	55%	45%	54	16%	9	45	0%	0	45	0	0	25	20
Bowling Alley	15.000 KSF	437	1.71	61%	39%	26	16%	4	22	0%	0	22	0	0	13	9
Average of Above Uses	15.000 KSF	---	1.82	50%	50%	28	16%	4	23	0%	0	23	0	0	13	10
Soccer Fields	2 Fields	488	17.70	67%	33%	35	16%	6	29	0%	0	29	0	0	19	10
Single-Family (Removed)	-1 Unit	210	1.00	63%	37%	-1	16%	0	-1	0%	0	-1	0	0	-1	0
Total (Average + Soccer - SFD)						62		10	51		0	51	0	0	31	20

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PM Peak-Hour

%	New ADT	New PM Peak Hour Trips			%	New ADT	New PM Peak Hour Trips		
		In	Out	Total			In	Out	Total
100%	411	31	20	51	100%	411	31	20	51
1%	4.11	0.31	0.20	0.51	51%	209.44	15.81	10.37	26.18
2%	8.21	0.62	0.41	1.03	52%	213.55	16.12	10.57	26.69
3%	12.32	0.93	0.61	1.54	53%	217.65	16.43	10.78	27.21
4%	16.43	1.24	0.81	2.05	54%	221.76	16.74	10.98	27.72
5%	**20.53**	**1.55**	**1.02**	**2.57**	**55%**	**225.87**	**17.05**	**11.18**	**28.23**
6%	24.64	1.86	1.22	3.08	56%	229.97	17.36	11.39	28.75
7%	28.75	2.17	1.42	3.59	57%	234.08	17.67	11.59	29.26
8%	32.85	2.48	1.63	4.11	58%	238.19	17.98	11.79	29.77
9%	36.96	2.79	1.83	4.62	59%	242.29	18.29	12.00	30.29
10%	**41.07**	**3.10**	**2.03**	**5.13**	**60%**	**246.40**	**18.60**	**12.20**	**30.80**
11%	45.17	3.41	2.24	5.65	61%	250.51	18.91	12.40	31.31
12%	49.28	3.72	2.44	6.16	62%	254.61	19.22	12.61	31.83
13%	53.39	4.03	2.64	6.67	63%	258.72	19.53	12.81	32.34
14%	57.49	4.34	2.85	7.19	64%	262.83	19.84	13.01	32.85
15%	**61.60**	**4.65**	**3.05**	**7.70**	**65%**	**266.93**	**20.15**	**13.22**	**33.37**
16%	65.71	4.96	3.25	8.21	66%	271.04	20.46	13.42	33.88
17%	69.81	5.27	3.46	8.73	67%	275.15	20.77	13.62	34.39
18%	73.92	5.58	3.66	9.24	68%	279.25	21.08	13.83	34.91
19%	78.03	5.89	3.86	9.75	69%	283.36	21.39	14.03	35.42
20%	**82.13**	**6.20**	**4.07**	**10.27**	**70%**	**287.47**	**21.70**	**14.23**	**35.93**
21%	86.24	6.51	4.27	10.78	71%	291.57	22.01	14.44	36.45
22%	90.35	6.82	4.47	11.29	72%	295.68	22.32	14.64	36.96
23%	94.45	7.13	4.68	11.81	73%	299.79	22.63	14.84	37.47
24%	98.56	7.44	4.88	12.32	74%	303.89	22.94	15.05	37.99
25%	**102.67**	**7.75**	**5.08**	**12.83**	**75%**	**308.00**	**23.25**	**15.25**	**38.50**
26%	106.77	8.06	5.29	13.35	76%	312.11	23.56	15.45	39.01
27%	110.88	8.37	5.49	13.86	77%	316.21	23.87	15.66	39.53
28%	114.99	8.68	5.69	14.37	78%	320.32	24.18	15.86	40.04
29%	119.09	8.99	5.90	14.89	79%	324.43	24.49	16.06	40.55
30%	**123.20**	**9.30**	**6.10**	**15.40**	**80%**	**328.53**	**24.80**	**16.27**	**41.07**
31%	127.31	9.61	6.30	15.91	81%	332.64	25.11	16.47	41.58
32%	131.41	9.92	6.51	16.43	82%	336.75	25.42	16.67	42.09
33%	135.52	10.23	6.71	16.94	83%	340.85	25.73	16.88	42.61
34%	139.63	10.54	6.91	17.45	84%	344.96	26.04	17.08	43.12
35%	**143.73**	**10.85**	**7.12**	**17.97**	**85%**	**349.07**	**26.35**	**17.28**	**43.63**
36%	147.84	11.16	7.32	18.48	86%	353.17	26.66	17.49	44.15
37%	151.95	11.47	7.52	18.99	87%	357.28	26.97	17.69	44.66
38%	156.05	11.78	7.73	19.51	88%	361.39	27.28	17.89	45.17
39%	160.16	12.09	7.93	20.02	89%	365.49	27.59	18.10	45.69
40%	**164.27**	**12.40**	**8.13**	**20.53**	**90%**	**369.60**	**27.90**	**18.30**	**46.20**
41%	168.37	12.71	8.34	21.05	91%	373.71	28.21	18.50	46.71
42%	172.48	13.02	8.54	21.56	92%	377.81	28.52	18.71	47.23
43%	176.59	13.33	8.74	22.07	93%	381.92	28.83	18.91	47.74
44%	180.69	13.64	8.95	22.59	94%	386.03	29.14	19.11	48.25
45%	**184.80**	**13.95**	**9.15**	**23.10**	**95%**	**390.13**	**29.45**	**19.32**	**48.77**
46%	188.91	14.26	9.35	23.61	96%	394.24	29.76	19.52	49.28
47%	193.01	14.57	9.56	24.13	97%	398.35	30.07	19.72	49.79
48%	197.12	14.88	9.76	24.64	98%	402.45	30.38	19.93	50.31
49%	201.23	15.19	9.96	25.15	99%	406.56	30.69	20.13	50.82
50%	**205.33**	**15.50**	**10.17**	**25.67**	**100%**	**410.67**	**31.00**	**20.33**	**51.33**

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: MJP
Date: 5/6/2016
Project: Arena Sports Mill Creek

Time Period: Daily

		Land Use A	Retail	
		ITE LU Code	435	
		Size	15,000	
Exit to Ext		Total	Internal	External
158	Enter	178	21	157
Ent from Ext	Exit	178	20	158
157	Total	356	41	315
	%	100%	12%	88%

		30%	53	28%	50	53	30%	50	28%
			Demand		Demand	Demand		Demand	
		20		21			0		0
		Balanced		Balanced			Balanced		Balanced
28%	20	30%	21					0	28%	0	30%
	Demand		Demand					Demand		Demand	

		Land Use B	Retail								Land Use C	Retail		
		ITE LU Code	488								ITE LU Code	0		
		Size	2 Fields								Size	0		
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
50	Enter	72	20	52	28%	20	0	0	30%	Enter	0	0	0	0
Ent from Ext	Exit	71	21	50	30%	21	0	0	28%	Exit	0	0	0	Exit to Ext
52	Total	143	41	102		Demand	Balanced	Demand		Total	0	0	0	0
	%	100%	29%	71%						%	100%	#DIV/0!	#DIV/0!	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	157	52	0	209	
Exit	158	50	0	208	
Total	315	102	0	417	Internal Capture
Single-Use Trip Gen. Est.	356	143	0	499	16%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: MJP
Date: 5/6/2016
Project: Arena Sports Mill Creek

Time Period: PM Peak Hour of Adj St

		Land Use A	Retail	
		ITE LU Code	435	
		Size	15,000	
Exit to Ext		Total	Internal	External
10.66666667	Enter	14	2	12
Ent from Ext	Exit	14	3	10.6667
12	Total	27.6666667	5	22.6667
	%	100%	18%	82%

		20%	3	20%	3	3	20%	3	20%
			Demand		Demand	Demand		Demand	
		3		2			0		0
		Balanced		Balanced			Balanced		Balanced
20%	5	20%	2					0	20%	0	20%
	Demand		Demand					Demand		Demand	

		Land Use B	Retail								Land Use C	Retail		
		ITE LU Code	488								ITE LU Code			
		Size	2 Fields								Size			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
10	Enter	23	3	20	20%	5	0	0	20%	Enter	0	0	0	0
Ent from Ext	Exit	12	2	10	20%	2	0	0	20%	Exit	0	0	0	Exit to Ext
20	Total	35	5	30		Demand	Balanced	Demand		Total	0	0	0	0
	%	100%	14%	86%						%	100%	#DIV/0!	#DIV/0!	

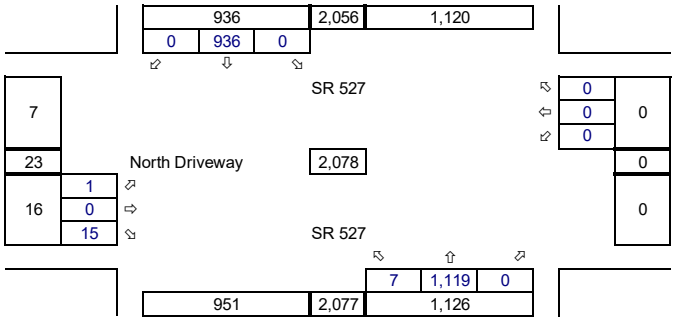
Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	12	20	0	32	
Exit	11	10	0	21	
Total	23	30	0	53	Internal Capture
Single-Use Trip Gen. Est.	28	35	0	63	16%

Existing PM Peak-Hour Count and Turning Movement Calculations

Synchro ID: 1
Existing
Average Weekday
PM Peak Hour

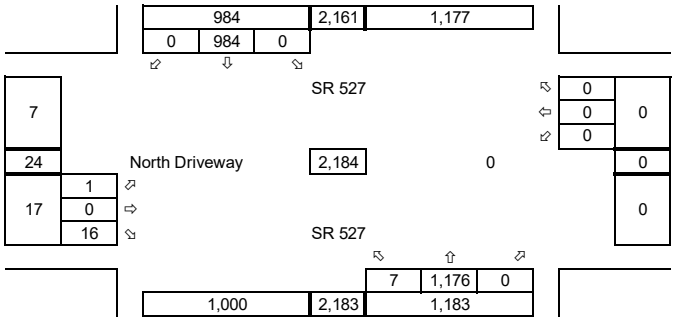
Year: **6/14/16**

Data Source: GTC

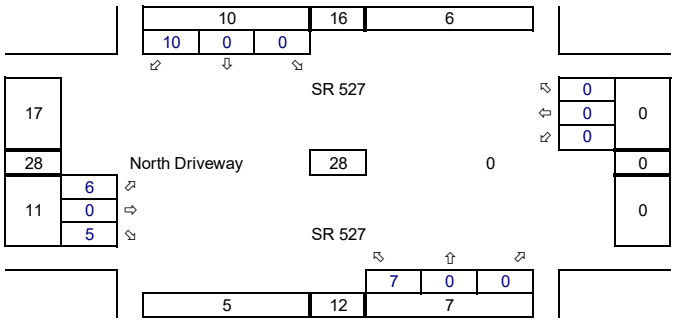


Future without Project
Average Weekday
PM Peak Hour

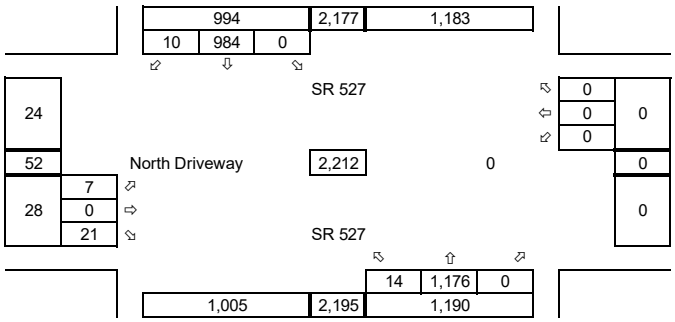
Year: 2021
Growth Rate = 1.0%
Years of Growth = 5
Total Growth = 1.0510



Total Project Trips
Average Weekday
PM Peak Hour



Future with Project
Average Weekday
PM Peak Hour



Synchro ID: 2

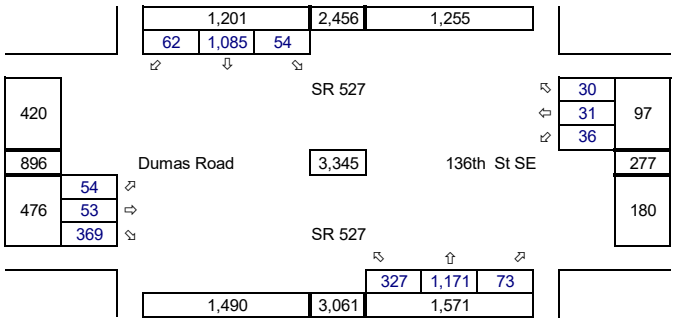
Existing

Average Weekday

PM Peak Hour

Year: **12/9/14**

Data Source: Quality Counts



Future without Project

Average Weekday

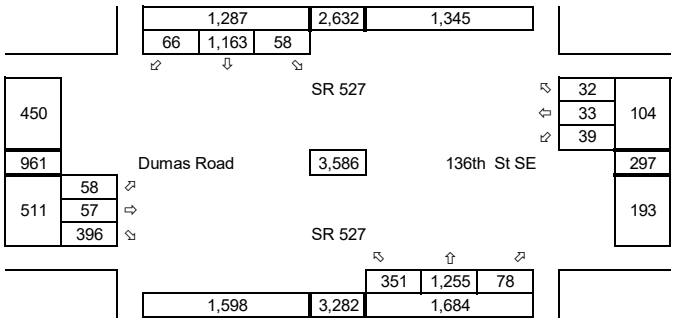
PM Peak Hour

Year: 2021

Growth Rate = 1.0%

Years of Growth = 7

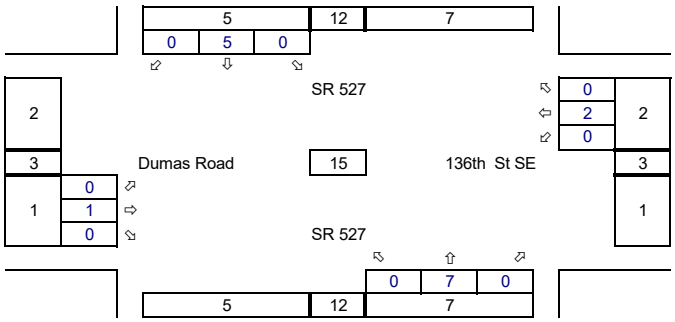
Total Growth = 1.0721



Total Project Trips

Average Weekday

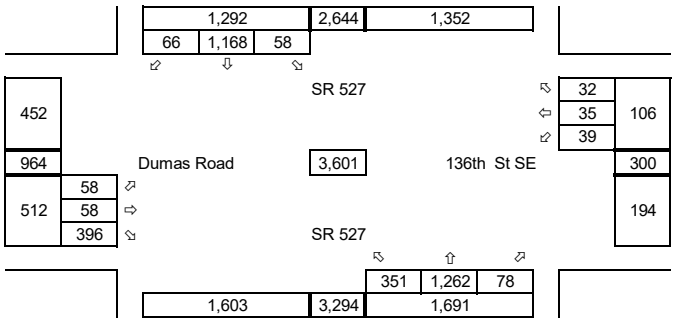
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



Synchro ID: 3

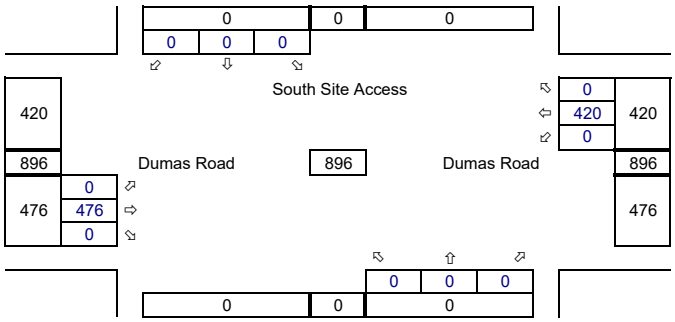
Existing

Average Weekday

PM Peak Hour

Year: **12/9/14**

Data Source: Quality Counts



Future without Project

Average Weekday

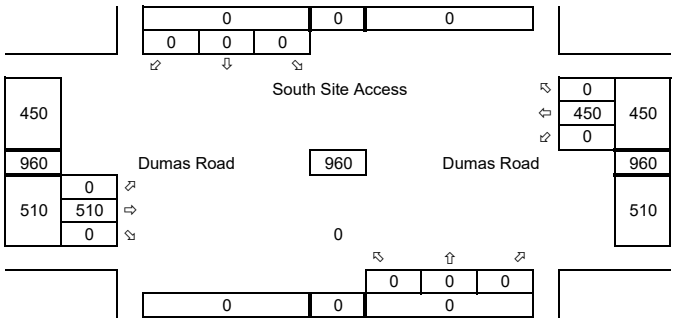
PM Peak Hour

Year: 2021

Growth Rate = 1.0%

Years of Growth = 7

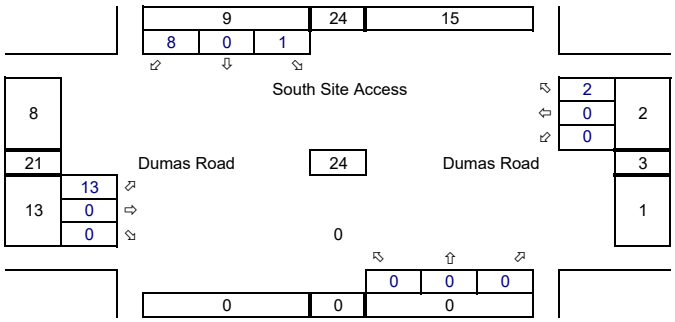
Total Growth = 1.0721



Total Project Trips

Average Weekday

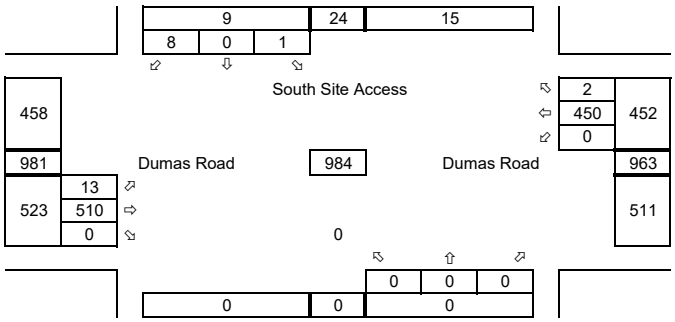
PM Peak Hour



Future with Project

Average Weekday

PM Peak Hour



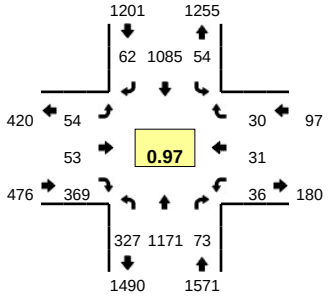
Type of peak hour being reported: Intersection Peak

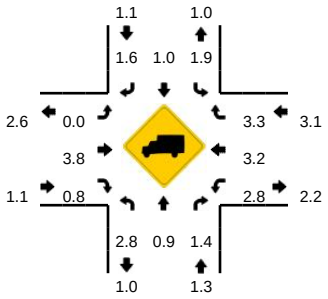
Method for determining peak hour: Total Entering Volume

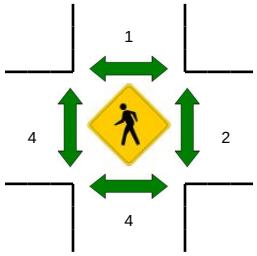
LOCATION: Bothell Everett Hwy -- 136th St SE
CITY/STATE: Mill Creek, WA

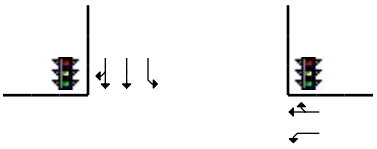
QC JOB #: 13143835
DATE: Tue, Dec 09 2014

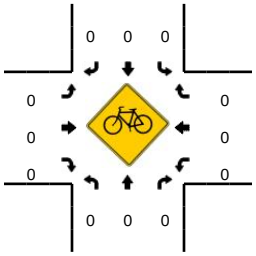
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

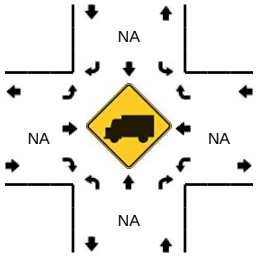


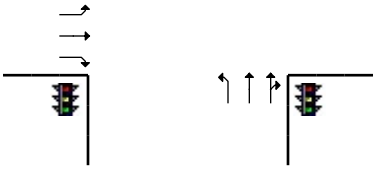


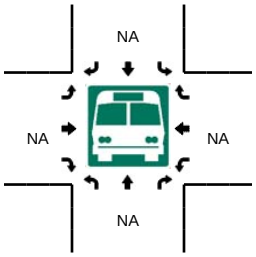












15-Min Count Period Beginning At	Bothell Everett Hwy (Northbound)				Bothell Everett Hwy (Southbound)				136th St SE (Eastbound)				136th St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	65	279	13	0	16	266	14	0	10	11	91	0	14	5	6	0	790	
4:15 PM	79	309	14	0	6	297	16	0	8	8	86	0	6	8	11	0	848	
4:30 PM	85	262	17	0	9	257	13	0	14	18	92	0	8	10	6	0	791	
4:45 PM	76	304	17	0	17	260	18	0	14	11	96	0	13	8	7	0	841	3270
5:00 PM	87	296	25	0	22	271	15	0	18	16	95	0	9	5	6	0	865	3345
5:15 PM	72	263	17	0	25	251	16	0	21	14	105	0	8	12	4	0	808	3305
5:30 PM	72	240	17	0	18	214	11	0	18	24	98	0	8	8	3	0	731	3245
5:45 PM	78	215	12	0	13	255	19	0	15	10	103	0	19	3	9	0	751	3155

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	348	1184	100	0	88	1084	60	0	72	64	380	0	36	20	24	0	3460
Heavy Trucks	16	8	4		0	16	4		0	0	0		0	4	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/31/2014 5:06 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Project No.:	16-067	Day & Date:	Tuesday June 14th
Project Name:	Arena Sports	Time Start:	4:00 PM
Prepared by:		Time End:	6:00 PM
Checked by:		Weather:	Mostly Cloudy
Location:	Shopping Center Access at SR-527		

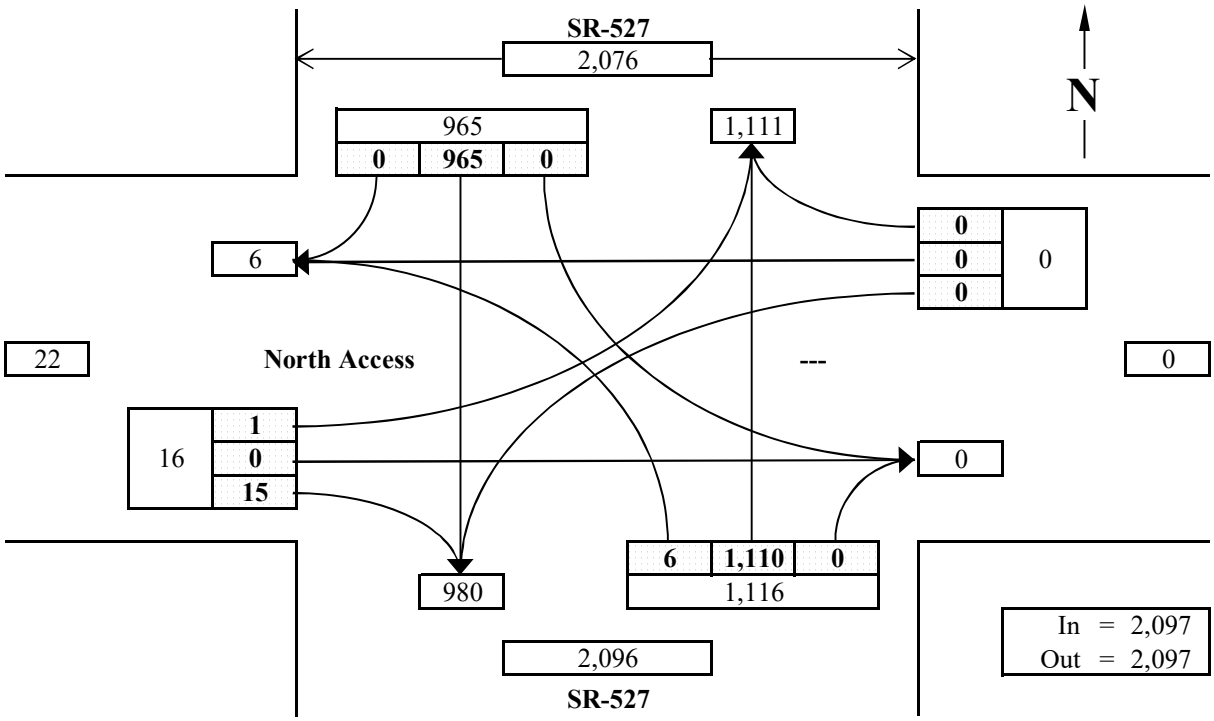
Time Interval Ending At	North Access Eastbound				--- Westbound				SR-527 Northbound				SR-527 Southbound				Total ALL APP
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
15 Minute Cumulative Volumes																	
4:15 PM	0	0	0	1	0	0	0	0	0	2	291	0	0	0	231	0	525
4:30 PM	0	1	0	5	0	0	0	0	0	3	581	0	0	0	473	0	1,063
4:45 PM	0	1	0	13	0	0	0	0	0	4	838	0	0	0	678	0	1,534
5:00 PM	0	1	0	15	0	0	0	0	0	7	1,119	0	0	0	936	0	2,078
5:15 PM	0	1	0	16	0	0	0	0	0	8	1,401	0	0	0	1,196	0	2,622
5:30 PM	0	1	0	17	0	0	0	0	0	8	1,674	0	0	0	1,416	0	3,116
5:45 PM	0	1	0	19	0	0	0	0	0	11	1,948	0	0	0	1,649	0	3,628
6:00 PM	0	1	0	22	0	0	0	0	0	15	2,215	0	0	0	1,850	0	4,103
15 Minute Interval Volumes																	
4:15 PM	0	0	0	1	0	0	0	0	0	2	291	0	0	0	231	0	525
4:30 PM	0	1	0	4	0	0	0	0	0	1	290	0	0	0	242	0	538
4:45 PM	0	0	0	8	0	0	0	0	0	1	257	0	0	0	205	0	471
5:00 PM	0	0	0	2	0	0	0	0	0	3	281	0	0	0	258	0	544
5:15 PM	0	0	0	1	0	0	0	0	0	1	282	0	0	0	260	0	544
5:30 PM	0	0	0	1	0	0	0	0	0	0	273	0	0	0	220	0	494
5:45 PM	0	0	0	2	0	0	0	0	0	3	274	0	0	0	233	0	512
6:00 PM	0	0	0	3	0	0	0	0	0	4	267	0	0	0	201	0	475
Hourly Volumes																	
5:00 PM	0	1	0	15	0	0	0	0	0	7	1,119	0	0	0	936	0	2,078
5:15 PM	0	1	0	15	0	0	0	0	0	6	1,110	0	0	0	965	0	2,097
5:30 PM	0	0	0	12	0	0	0	0	0	5	1,093	0	0	0	943	0	2,053
5:45 PM	0	0	0	6	0	0	0	0	0	7	1,110	0	0	0	971	0	2,094
6:00 PM	0	0	0	7	0	0	0	0	0	8	1,096	0	0	0	914	0	2,025

EXISTING PEAK HOUR: 4:15 PM — 5:15 PM, Tuesday June 14th

Peak Hour	Eastbound				Westbound				Northbound				Southbound				Total
4:15 PM	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
- 5:15 PM	0	1	0	15	0	0	0	0	0	6	1,110	0	0	0	965	0	2,097
Approach	0	16			0	0			0	1,116			0	965			2,097
PHF	0.50				#DIV/0!				0.96				0.93				0.96
% HV	0.0%				#DIV/0!				0.0%				0.0%				

GIBSON TRAFFIC CONSULTANTS

EXISTING PEAK HOUR: 4:15 PM to 5:15 PM, Tuesday June 14th					
Intersection	**Eastbound**	**Westbound**	**Northbound**	**Southbound**	**Total**
Approach Name	North Access	---	SR-527	SR-527	
Peak Hour Factor (PHF)	0.50	#DIV/0!	0.96	0.93	**0.96**
% of Heavy Vehicles	0.0%	#DIV/0!	0.0%	0.0%	



Level of Service Analysis

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	15	7	1119	936	0
Future Vol, veh/h	1	15	7	1119	936	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	25	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	16	7	1166	975	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1572	488	975	0	-	0
Stage 1	975	-	-	-	-	-
Stage 2	597	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	101	526	703	-	-	-
Stage 1	326	-	-	-	-	-
Stage 2	513	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	100	526	703	-	-	-
Mov Cap-2 Maneuver	224	-	-	-	-	-
Stage 1	326	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	703	-	485	-	-
HCM Lane V/C Ratio	0.01	-	0.034	-	-
HCM Control Delay (s)	10.2	-	12.7	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	53	369	36	31	30	327	1171	73	54	1085	62
Future Volume (vph)	54	53	369	36	31	30	327	1171	73	54	1085	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		100	85		0	200		0	110		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.926			0.991			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1725	0	1770	3507	0	1770	3511	0
Flt Permitted	0.716			0.721			0.158			0.216		
Satd. Flow (perm)	1334	1863	1583	1343	1725	0	294	3507	0	402	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375		31			10			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		302			639			342			515	
Travel Time (s)		6.9			14.5			7.8			11.7	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	55	380	37	63	0	337	1282	0	56	1183	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	29.0	29.0	29.0	29.0	29.0		34.0	80.6		10.4	57.0	
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%		28.3%	67.2%		8.7%	47.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	11.2	11.2	11.2	11.2	11.2		84.7	76.6		67.7	61.8	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11		0.81	0.73		0.65	0.59	
v/c Ratio	0.39	0.28	0.76	0.26	0.30		0.68	0.50		0.17	0.57	
Control Delay	52.1	46.7	15.2	47.5	29.0		17.3	7.9		6.8	17.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	52.1	46.7	15.2	47.5	29.0		17.3	7.9		6.8	17.0	
LOS	D	D	B	D	C		B	A		A	B	
Approach Delay		22.9			35.9			9.8			16.5	
Approach LOS		C			D			A			B	
Queue Length 50th (ft)	36	35	3	24	20		65	176		6	236	
Queue Length 95th (ft)	77	73	94	56	60		186	303		20	457	
Internal Link Dist (ft)		222			559			262			435	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	130		100	85			200			110		
Base Capacity (vph)	313	438	659	315	429		655	2564		337	2072	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.13	0.58	0.12	0.15		0.51	0.50		0.17	0.57	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 104.9
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 14.9 — Intersection LOS: B
Intersection Capacity Utilization 71.0% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: SR 527 & 136th St SE

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	476	420	0	0	0
Future Vol, veh/h	0	476	420	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	517	457	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	457	0	-	0	974	457
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	517	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1104	-	-	-	279	604
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	598	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1104	-	-	-	279	604
Mov Cap-2 Maneuver	-	-	-	-	279	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	598	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1104	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	16	7	1176	984	0
Future Vol, veh/h	1	16	7	1176	984	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	25	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	17	7	1225	1025	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1652	513	1025	0	-	0
Stage 1	1025	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	89	506	673	-	-	-
Stage 1	307	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	88	506	673	-	-	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	307	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	673	-	467	-	-
HCM Lane V/C Ratio	0.011	-	0.038	-	-
HCM Control Delay (s)	10.4	-	13	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	57	396	39	33	32	351	1255	78	58	1163	66
Future Volume (vph)	58	57	396	39	33	32	351	1255	78	58	1163	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		100	85		0	200		0	110		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.926			0.991			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1725	0	1770	3507	0	1770	3511	0
Flt Permitted	0.713			0.719			0.126			0.197		
Satd. Flow (perm)	1328	1863	1583	1339	1725	0	235	3507	0	367	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			370		33			10			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		302			639			342			515	
Travel Time (s)		6.9			14.5			7.8			11.7	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	59	408	40	67	0	362	1374	0	60	1267	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	29.0	29.0	29.0	29.0	29.0		34.0	80.6		10.4	57.0	
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%		28.3%	67.2%		8.7%	47.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5		84.7	76.7		65.3	59.5	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.80	0.72		0.61	0.56	
v/c Ratio	0.38	0.27	0.80	0.25	0.29		0.74	0.54		0.20	0.64	
Control Delay	50.4	45.5	19.2	46.3	27.9		26.9	9.1		8.2	20.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.4	45.5	19.2	46.3	27.9		26.9	9.1		8.2	20.6	
LOS	D	D	B	D	C		C	A		A	C	
Approach Delay		25.7			34.7			12.8			20.1	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	39	38	24	26	22		117	201		6	287	
Queue Length 95th (ft)	80	76	128	58	62		259	376		24	539	
Internal Link Dist (ft)		222			559			262			435	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	130		100	85			200			110		
Base Capacity (vph)	308	433	651	311	426		616	2533		304	1966	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.14	0.63	0.13	0.16		0.59	0.54		0.20	0.64	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 106.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 17.9 — Intersection LOS: B
Intersection Capacity Utilization 74.8% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: SR 527 & 136th St SE

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	510	450	0	0	0
Future Vol, veh/h	0	510	450	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	554	489	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	489	0	-	0	1043	489
Stage 1	-	-	-	-	489	-
Stage 2	-	-	-	-	554	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1074	-	-	-	254	579
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	575	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1074	-	-	-	254	579
Mov Cap-2 Maneuver	-	-	-	-	254	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	575	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1074	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	21	14	1176	984	10
Future Vol, veh/h	7	21	14	1176	984	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	25	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	22	15	1225	1025	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1672	518	1035	0	-	0
Stage 1	1030	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Critical Hdwy	7.54	6.94	4.14	-	-	-
Critical Hdwy Stg 1	6.54	-	-	-	-	-
Critical Hdwy Stg 2	6.54	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	63	502	667	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	502	667	-	-	-
Mov Cap-2 Maneuver	167	-	-	-	-	-
Stage 1	244	-	-	-	-	-
Stage 2	419	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.8	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	667	-	334	-	-
HCM Lane V/C Ratio	0.022	-	0.087	-	-
HCM Control Delay (s)	10.5	-	16.8	-	-
HCM Lane LOS	B	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	58	396	39	35	32	351	1262	78	58	1168	66
Future Volume (vph)	58	58	396	39	35	32	351	1262	78	58	1168	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		100	85		0	200		0	110		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.928			0.991			0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1729	0	1770	3507	0	1770	3511	0
Flt Permitted	0.712			0.718			0.125			0.196		
Satd. Flow (perm)	1326	1863	1583	1337	1729	0	233	3507	0	365	3511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			370		33			10			6	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		302			639			342			515	
Travel Time (s)		6.9			14.5			7.8			11.7	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	60	408	40	69	0	362	1381	0	60	1272	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	29.0	29.0	29.0	29.0	29.0		34.0	80.6		10.4	57.0	
Total Split (%)	24.2%	24.2%	24.2%	24.2%	24.2%		28.3%	67.2%		8.7%	47.5%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Max		None	Max	
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5		84.7	76.7		65.3	59.5	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.80	0.72		0.61	0.56	
v/c Ratio	0.39	0.28	0.80	0.25	0.30		0.75	0.55		0.20	0.65	
Control Delay	50.5	45.6	19.2	46.3	28.4		27.1	9.2		8.2	20.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.5	45.6	19.2	46.3	28.4		27.1	9.2		8.2	20.7	
LOS	D	D	B	D	C		C	A		A	C	
Approach Delay		25.7			34.9			12.9			20.1	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	39	39	24	26	23		118	202		6	289	
Queue Length 95th (ft)	80	78	128	58	64		260	379		24	542	
Internal Link Dist (ft)		222			559			262			435	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	130		100	85			200			110		
Base Capacity (vph)	308	433	651	310	427		615	2533		303	1966	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.14	0.63	0.13	0.16		0.59	0.55		0.20	0.65	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 106.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 18.0 — Intersection LOS: B
Intersection Capacity Utilization 75.0% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: SR 527 & 136th St SE

Intersection						
Int Delay, s/veh	0.2					

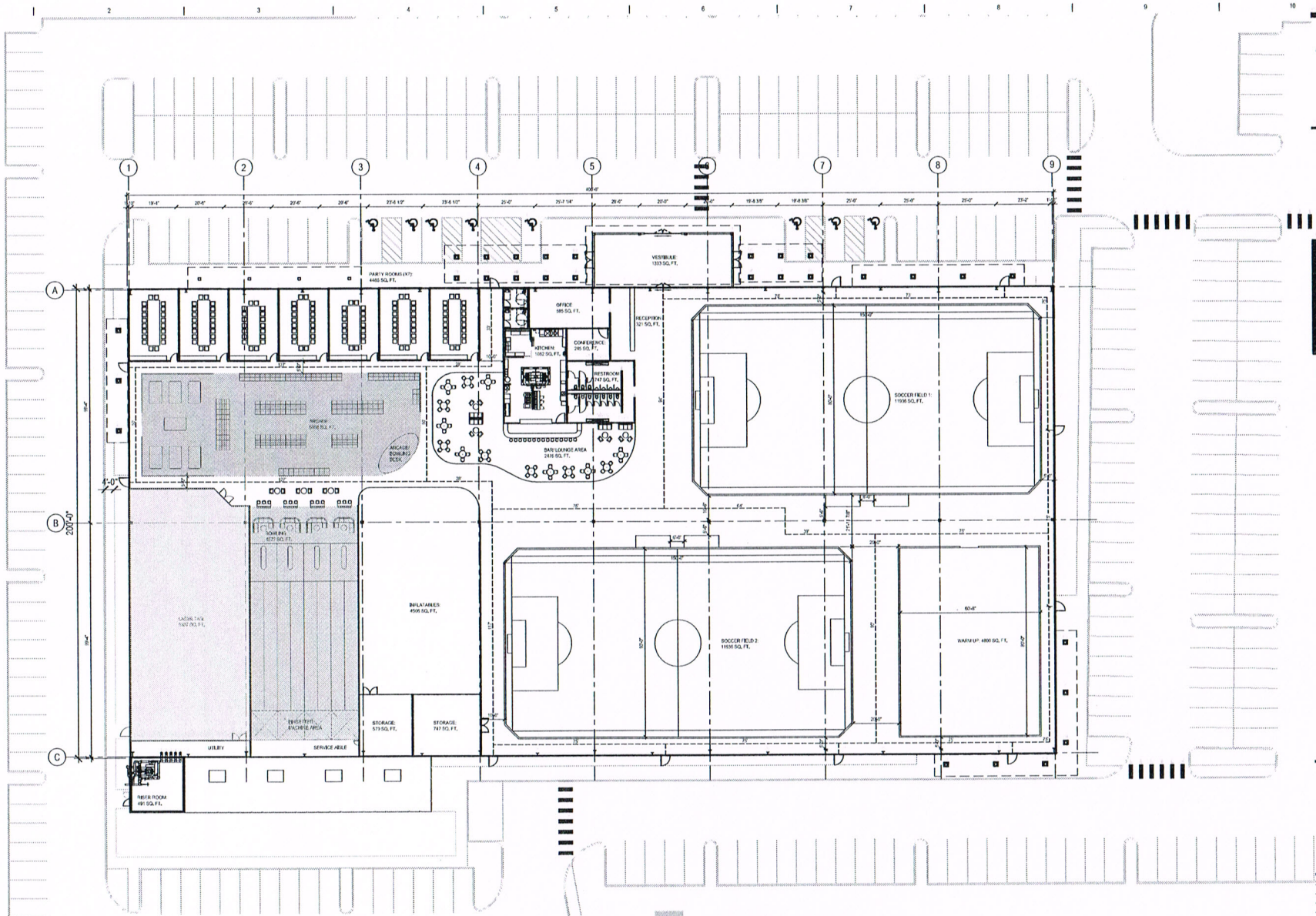
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	510	450	2	1	8
Future Vol, veh/h	13	510	450	2	1	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	554	489	2	1	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	491	0	-	0	1073	490
Stage 1	-	-	-	-	490	-
Stage 2	-	-	-	-	583	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1072	-	-	-	244	578
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	558	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1072	-	-	-	239	578
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	547	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1072	-	-	-	499
HCM Lane V/C Ratio	0.013	-	-	-	0.02
HCM Control Delay (s)	8.4	0	-	-	12.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Floor Plan



ARENA SPORTS
MILL CREEK

MILL CREEK, WA 98012

MG2

PRE-SUBMITTAL
MEETING

MITCHELL C SMITH ARCHITECT

ARCADE - 5,166 SQ. FT.

LASER TAG - 5,337 SQ. FT.

BOWLING - 4,572 SQ. FT.

TOTAL FEC - 15,075 SQ. FT.

Δ	DATE	DESCRIPTION
	05.26.16	PRE-SUBMITTAL MEETING

16-5083-01
PM: GEOFFREY GRICE
DRAWN: VS
05.26.2016

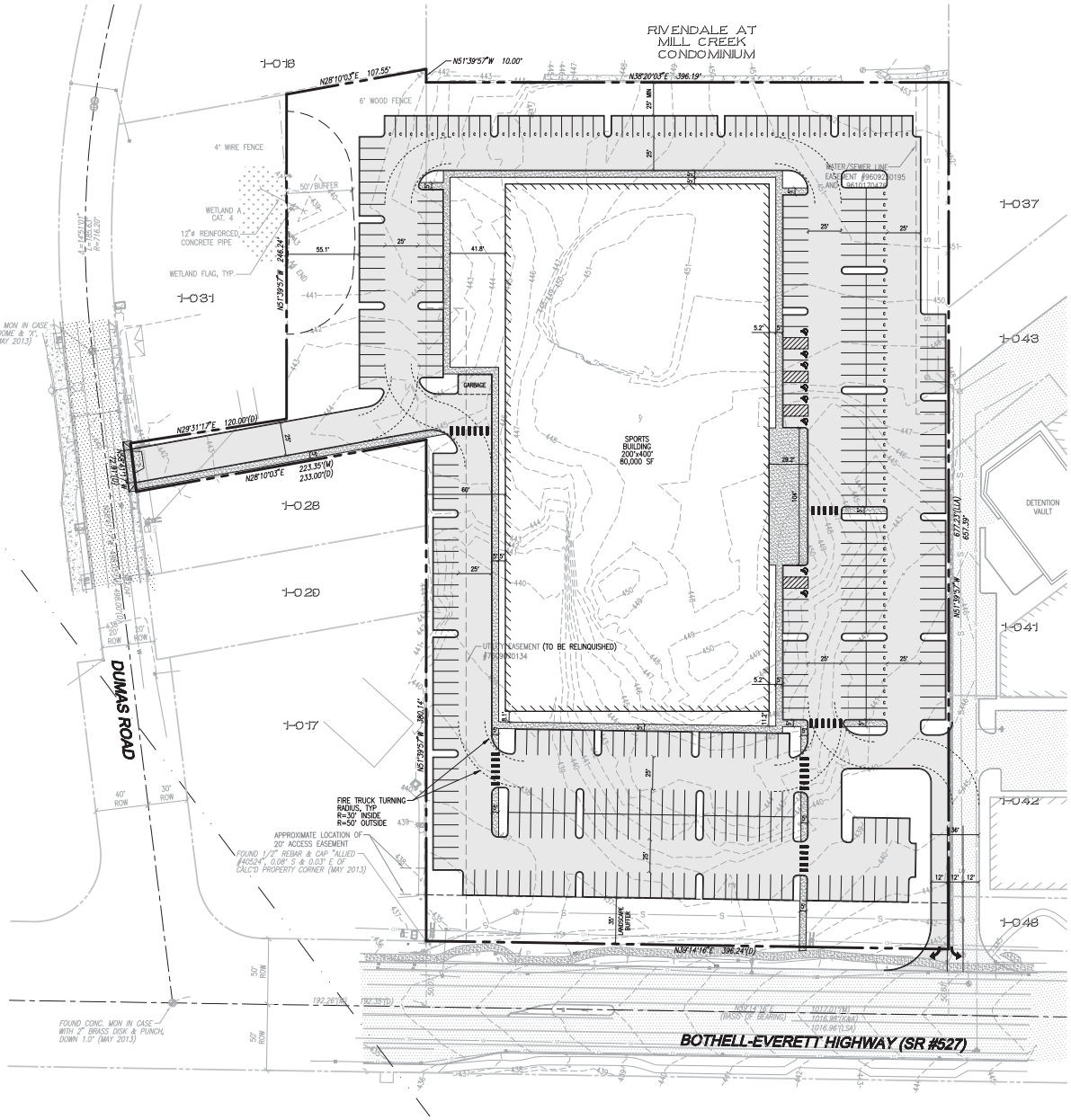
PRELIMINARY
FLOOR LAYOUT

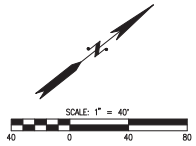
A201

D-1

Site Plan

A PORTION OF THE NE 1/4 OF SECTION 31, TWP. 28 N., RGE. 5 E., W.M., CITY OF MILL CREEK, SNOHOMISH COUNTY, WASHINGTON

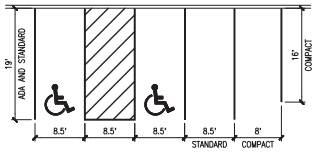




PROJECT INFORMATION

PROJECT TYPE:	PRINCIPAL USE: COMMERCIAL RECREATION FACILITIES	TAX PARCEL #'S:	28053100104000
SITE AREA:	6.73 ACRES (293,167 SF)		28053100103400
ZONING:	COMMUNITY BUSINESS		28053100103200
	PERMITTED	PROPOSED	CODE REFERENCE
MAX BUILDING COVERAGE:	NONE	80,000 SF	MCMC 17.16.060
HEIGHT LIMIT:	40 FEET	40 FEET	MCMC 17.16.070
MIN LOT SIZE:	7,200 SQUARE FEET	293,167 SF	MCMC 17.16.040
PARKING:	PROPOSED–SPORTS BLDG REQUIRED: 1/500 SF=160 STALLS		
STANDARD:	284		
COMPACT:	91		
ADA:	8		
TOTAL:	383		
REGULAR 90° STALL:	8.5 FT x 19 FT	COMPLIES	MCMC 17.22.080A
COMPACT 90° STALL:	8 FT x 16 FT	COMPLIES	WAC 51–10
DRIVE AISLE @90° PARKING:	25 FT	COMPLIES	
SETBACKS:			
FRONT – BOTHELL– EVERETT HWY.:	35 FT ROADWAY BUFFER		MCMC 17.16.080A
SIDEYARD/REARYARD TO RESIDENTIAL:	25 FT		
PARKING FRONT:	35 FT		
LANDSCAPE REQUIREMENTS:			
TREES:	1 TREE PER 4 PARKING SPACES		MCMC 17.34.04003(d)
PARKING:	383/4 = 96 TREES NO MORE THAN 10 SPACES BETWEEN LANDSCAPE ISLANDS OR MEDIANS	COMPLIES	MCMC 17.34.04003
LANDSCAPE ISLANDS:	MUST BE 5 FEET WIDE	COMPLIES	MCMC 17.34.04004

* THIS SITE HAS A COMBINATION OF USES PER MCMC17.22.150H. THE MOST STRINGENT REQUIREMENTS GOVERN.



PARKING SPACE DETAIL

NOT TO SCALE

DISCLAIMER

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Call 2 Business Days Before You Dig
811 or 1-800-424-5555
Utilities Underground Location Center

REVISIONS

NO.	DATE	DESCRIPTION	BY

LDC
THE CIVIL ENGINEERING GROUP
Engineering
Structural
Planning
Survey
14201 NE 20th Ave., #100
Vancouver, WA 98685
Ph. 360.695.1385
Fx. 360.695.8290
www.LDCinc.com

CEDAR PARK

MILL CREEK COMMERCIAL BUILDING

PRELIMINARY SITE PLAN

JOB NUMBER:	16–115
DRAWING NAME:	12168P–SP01
DESIGNER:	MEV
DRAFTING BY:	BPC
DATE:	4–18–16
SCALE:	1"=40'
JURISDICTION:	MILL CREEK

SP-01

SHEET 1 OF 1

Drawing: P:\2016\16-115 Mill Creek Commercial\Drawings\Preliminary\16115P-SP01.dwg Plotted: Apr 18, 2016 - 5:27pm