



Date: July 8, 2021

To: Jim Brennan
J.A. Brennan Associates PLLC

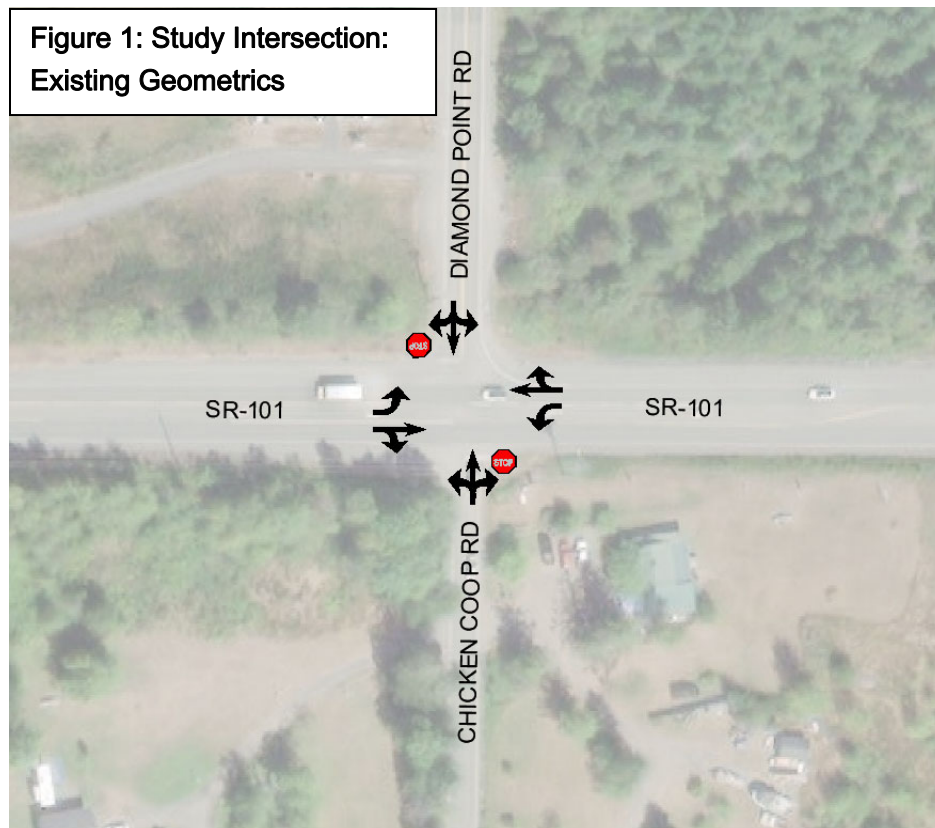
From: Aaron Van Aken, PE, PTOE

Subject: Miller State Park Traffic Memo

The intent of this memo serves to provide a performance analysis of baseline conditions as it pertains to the intersection of SR-101 and Diamond Point Road/Chicken Coop Road.

INTERSECTION DESCRIPTION

The study intersection, contained within unincorporated Clallam County, is a four-leg intersection controlled via STOP for the minor (north/south) approaches. Routine intersection turning movement counts were performed at the study intersection of SR-101 & Diamond Point Road/Chicken Coop Road on Memorial Day Weekend of 2021. Figure 1 shows the roadway geometrics of the intersection of SR-101 & Diamond Point Road/Chicken Coop Road.





EXISTING INTERSECTION VOLUMES

Field data was obtained and collected for Memorial Day Weekend in May of 2021 in order to establish baseline vehicular conditions when the park and adjacent roadways could be considered more active than an off-peak scenario. Traffic counts were administered at the study intersection of SR 101 & Diamon Point Road/Chicken Coop Road. Data for the intersection of study was collected between the hours of 12:00-6:00PM on Friday and 12:00-4:00PM on Saturday to capture peak conditions. Refer to Table 1 for peak hour findings.

Table 1: Existing 2021 SR-101 & Diamond Point Rd/Chicken Coop Rd Peak Hour Volumes

Date	Count Period	Peak Hour	Volumes (vehicles)
Friday 5-28-2021	12:00–6:00PM	3:30-4:30 PM	1586
Saturday 5-29-2021	12:00-4:00PM	3:00-4:00PM	1666

Saturday was observed to have higher peak hour volumes with 1,666 total vehicles entering the study intersection. Full count sheets are included in the appendix for reference.

EXISTING INTERSECTION LEVEL OF SERVICE

Existing level of service (LOS) was evaluated using *Synchro 10* by applying the current intersection volumes obtained in the field counts. Table 2 below summarizes LOS for each day.

Table 2: Existing Peak Hour Level of Service

Delays Given in Seconds per Vehicle

Intersection	Control	Time	Approach	LOS	Delay
SR 101 & Diamond Point Rd/Chicken Coop Rd	Stop	Friday	NB	E	37.7
			SB	D	31.1
		Saturday	NB	F	53.3
			SB	F	50

The study intersection is shown to operate with LOS E conditions for the Friday peak hour. The Saturday peak hour, with higher overall volumes, is shown to operate with failing LOS F conditions for both the northbound and southbound approaches. Potential mitigation strategies include, but



not limited to: constructing separate left & right-turn lanes on the minor approach; construct traffic signal; or construct a roundabout.

Further evaluation would be conducted once further site plans are developed for the proposed Miller State Park and forecasts of future traffic volumes are assessed.

Please let me know if you have any questions at this time.

Thank you,

Aaron Van Aken, P.E., PTOE

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4650b
Site Code : 00004650
Start Date : 5/28/2021
Page No : 1

Groups Printed- Passenger + - Heavy

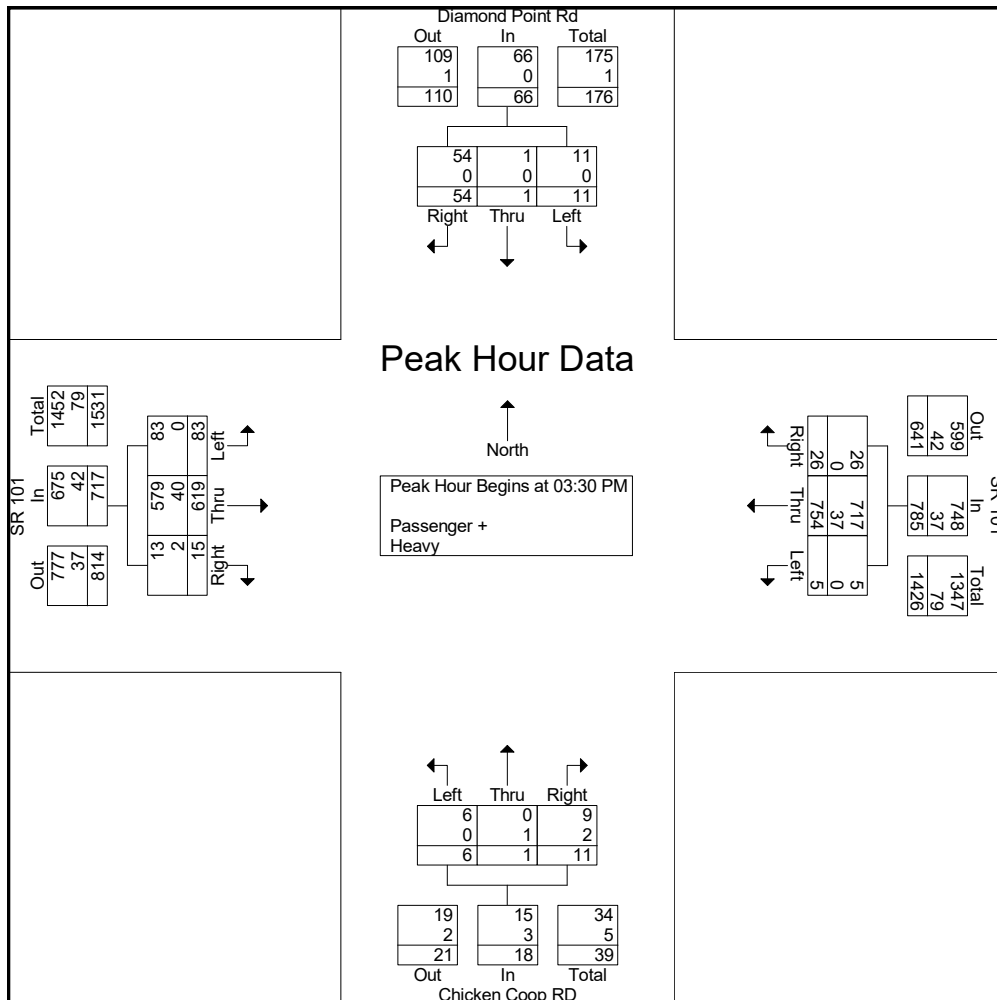
Start Time	Diamond Point Rd Southbound				SR 101 Westbound				Chicken Coop RD Northbound				SR 101 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
12:00 PM	14	0	5	19	2	135	1	138	1	1	3	5	1	128	20	149	311
12:15 PM	23	1	5	29	7	160	1	168	1	0	2	3	2	129	14	145	345
12:30 PM	27	0	5	32	7	188	1	196	2	1	0	3	6	132	16	154	385
12:45 PM	12	0	3	15	3	169	0	172	1	1	6	8	2	131	20	153	348
Total	76	1	18	95	19	652	3	674	5	3	11	19	11	520	70	601	1389
01:00 PM	24	1	4	29	0	155	3	158	1	0	1	2	7	128	16	151	340
01:15 PM	18	1	0	19	5	173	3	181	1	0	0	1	3	144	23	170	371
01:30 PM	14	0	2	16	5	174	1	180	1	0	1	2	0	148	15	163	361
01:45 PM	19	1	2	22	7	159	5	171	4	0	1	5	1	176	13	190	388
Total	75	3	8	86	17	661	12	690	7	0	3	10	11	596	67	674	1460
02:00 PM	11	0	6	17	5	158	1	164	1	0	2	3	3	146	21	170	354
02:15 PM	12	0	4	16	5	132	3	140	2	0	2	4	0	144	21	165	325
02:30 PM	14	0	2	16	2	197	2	201	1	0	1	2	5	146	21	172	391
02:45 PM	20	0	2	22	4	183	3	190	1	0	1	2	3	136	25	164	378
Total	57	0	14	71	16	670	9	695	5	0	6	11	11	572	88	671	1448
03:00 PM	20	0	4	24	3	176	2	181	5	0	2	7	2	158	21	181	393
03:15 PM	17	1	5	23	5	149	5	159	4	0	0	4	6	142	24	172	358
03:30 PM	16	1	4	21	8	204	3	215	5	1	1	7	3	150	21	174	417
03:45 PM	10	0	2	12	8	153	1	162	2	0	3	5	3	160	21	184	363
Total	63	2	15	80	24	682	11	717	16	1	6	23	14	610	87	711	1531
04:00 PM	14	0	4	18	8	192	1	201	2	0	1	3	6	171	21	198	420
04:15 PM	14	0	1	15	2	205	0	207	2	0	1	3	3	138	20	161	386
04:30 PM	14	0	5	19	9	168	1	178	0	0	0	0	1	124	14	139	336
04:45 PM	8	0	4	12	6	172	2	180	0	0	2	2	2	132	19	153	347
Total	50	0	14	64	25	737	4	766	4	0	4	8	12	565	74	651	1489
05:00 PM	16	0	4	20	5	136	1	142	1	2	1	4	4	160	18	182	348
05:15 PM	7	0	3	10	7	166	3	176	1	1	0	2	0	109	20	129	317
05:30 PM	20	0	2	22	3	187	2	192	2	0	2	4	2	131	19	152	370
05:45 PM	10	0	1	11	9	136	2	147	1	0	1	2	1	109	18	128	288
Total	53	0	10	63	24	625	8	657	5	3	4	12	7	509	75	591	1323
Grand Total	374	6	79	459	125	4027	47	4199	42	7	34	83	66	3372	461	3899	8640
Apprch %	81.5	1.3	17.2		3	95.9	1.1		50.6	8.4	41		1.7	86.5	11.8		
Total %	4.3	0.1	0.9	5.3	1.4	46.6	0.5	48.6	0.5	0.1	0.4	1	0.8	39	5.3	45.1	
Passenger +	373	5	77	455	123	3813	39	3975	33	6	30	69	47	3079	459	3585	8084
% Passenger +	99.7	83.3	97.5	99.1	98.4	94.7	83	94.7	78.6	85.7	88.2	83.1	71.2	91.3	99.6	91.9	93.6
Heavy	1	1	2	4	2	214	8	224	9	1	4	14	19	293	2	314	556
% Heavy	0.3	16.7	2.5	0.9	1.6	5.3	17	5.3	21.4	14.3	11.8	16.9	28.8	8.7	0.4	8.1	6.4

Heath & Associates

PO Box 397
Puyallup, WA 98371

File Name : 4650b
Site Code : 00004650
Start Date : 5/28/2021
Page No : 2

Start Time	Diamond Point Rd Southbound				SR 101 Westbound				Chicken Coop RD Northbound				SR 101 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:30 PM																	
03:30 PM	16	1	4	21	8	204	3	215	5	1	1	7	3	150	21	174	417
03:45 PM	10	0	2	12	8	153	1	162	2	0	3	5	3	160	21	184	363
04:00 PM	14	0	4	18	8	192	1	201	2	0	1	3	6	171	21	198	420
04:15 PM	14	0	1	15	2	205	0	207	2	0	1	3	3	138	20	161	386
Total Volume	54	1	11	66	26	754	5	785	11	1	6	18	15	619	83	717	1586
% App. Total	81.8	1.5	16.7		3.3	96.1	0.6		61.1	5.6	33.3		2.1	86.3	11.6		
PHF	.844	.250	.688	.786	.813	.920	.417	.913	.550	.250	.500	.643	.625	.905	.988	.905	.944
Passenger +	54	1	11	66	26	717	5	748	9	0	6	15	13	579	83	675	1504
% Passenger +	100	100	100	100	100	95.1	100	95.3	81.8	0	100	83.3	86.7	93.5	100	94.1	94.8
Heavy	0	0	0	0	0	37	0	37	2	1	0	3	2	40	0	42	82
% Heavy	0	0	0	0	0	4.9	0	4.7	18.2	100	0	16.7	13.3	6.5	0	5.9	5.2



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File Name : 4650e
Site Code : 00004650
Start Date : 5/29/2021
Page No : 1

Groups Printed- Passenger + - Heavy

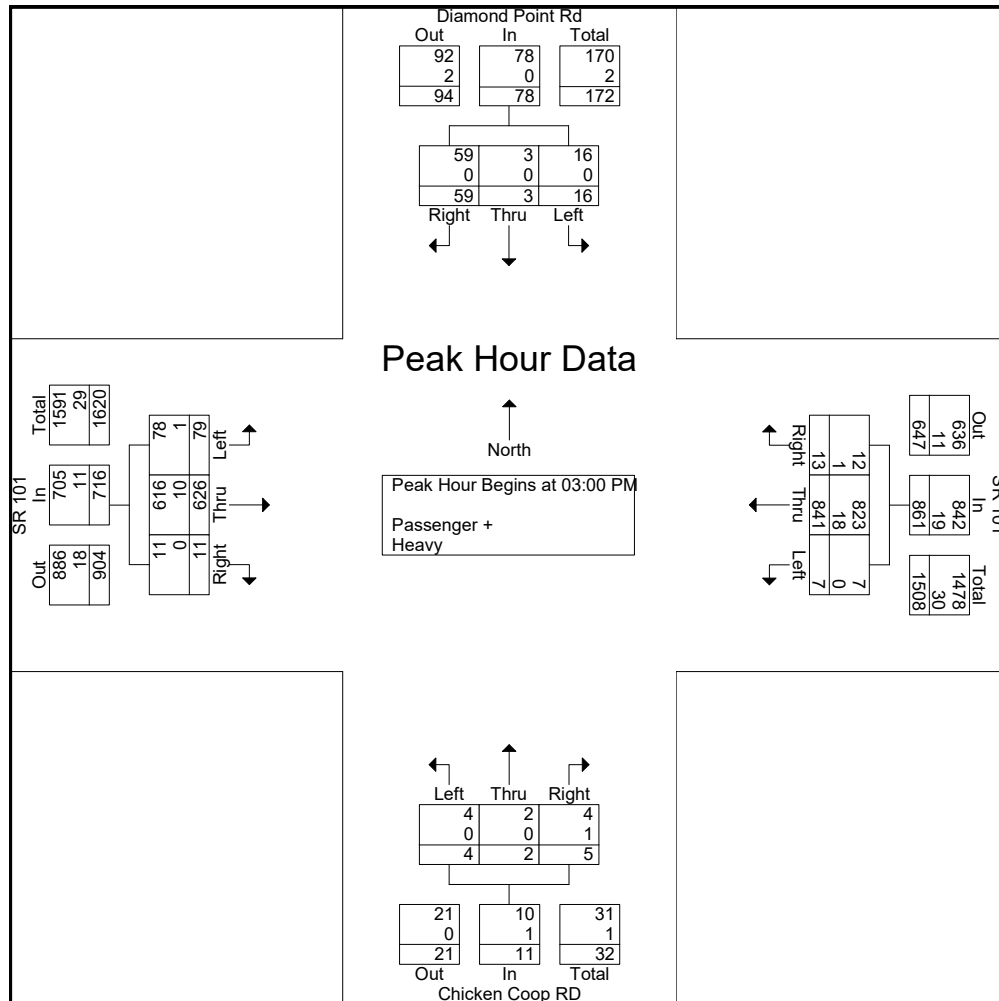
Start Time	Diamond Point Rd Southbound				SR 101 Westbound				Chicken Coop RD Northbound				SR 101 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
12:00 PM	19	1	3	23	3	183	2	188	0	1	0	1	2	136	22	160	372
12:15 PM	26	1	12	39	6	191	0	197	2	1	2	5	4	150	17	171	412
12:30 PM	20	2	3	25	7	197	0	204	1	3	2	6	3	159	20	182	417
12:45 PM	24	0	5	29	3	166	3	172	4	3	2	9	5	119	16	140	350
Total	89	4	23	116	19	737	5	761	7	8	6	21	14	564	75	653	1551
01:00 PM	8	0	4	12	6	177	0	183	1	1	2	4	0	150	15	165	364
01:15 PM	17	1	7	25	9	212	1	222	1	0	1	2	1	128	22	151	400
01:30 PM	20	1	2	23	10	185	0	195	2	0	1	3	1	154	18	173	394
01:45 PM	12	1	5	18	6	184	2	192	1	0	1	2	1	119	15	135	347
Total	57	3	18	78	31	758	3	792	5	1	5	11	3	551	70	624	1505
02:00 PM	18	0	3	21	5	203	3	211	1	0	1	2	0	139	25	164	398
02:15 PM	25	0	6	31	6	184	0	190	0	2	0	2	4	144	21	169	392
02:30 PM	18	0	6	24	8	189	1	198	1	2	3	6	7	161	13	181	409
02:45 PM	16	1	6	23	3	191	0	194	4	0	0	4	0	149	21	170	391
Total	77	1	21	99	22	767	4	793	6	4	4	14	11	593	80	684	1590
03:00 PM	19	0	2	21	4	208	0	212	0	0	1	1	2	121	22	145	379
03:15 PM	16	2	4	22	3	201	4	208	2	0	0	2	3	166	20	189	421
03:30 PM	11	0	2	13	2	215	2	219	2	0	2	4	3	182	23	208	444
03:45 PM	13	1	8	22	4	217	1	222	1	2	1	4	3	157	14	174	422
Total	59	3	16	78	13	841	7	861	5	2	4	11	11	626	79	716	1666
04:00 PM	12	0	2	14	8	180	1	189	1	0	1	2	4	170	19	193	398
Grand Total	294	11	80	385	93	3283	20	3396	24	15	20	59	43	2504	323	2870	6710
Apprch %	76.4	2.9	20.8		2.7	96.7	0.6		40.7	25.4	33.9		1.5	87.2	11.3		
Total %	4.4	0.2	1.2	5.7	1.4	48.9	0.3	50.6	0.4	0.2	0.3	0.9	0.6	37.3	4.8	42.8	
Passenger +	293	11	80	384	86	3209	20	3315	23	14	20	57	42	2445	320	2807	6563
% Passenger +	99.7	100	100	99.7	92.5	97.7	100	97.6	95.8	93.3	100	96.6	97.7	97.6	99.1	97.8	97.8
Heavy	1	0	0	1	7	74	0	81	1	1	0	2	1	59	3	63	147
% Heavy	0.3	0	0	0.3	7.5	2.3	0	2.4	4.2	6.7	0	3.4	2.3	2.4	0.9	2.2	2.2

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PO Box 397
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File Name : 4650e
Site Code : 00004650
Start Date : 5/29/2021
Page No : 2

Start Time	Diamond Point Rd Southbound				SR 101 Westbound				Chicken Coop RD Northbound				SR 101 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 12:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	19	0	2	21	4	208	0	212	0	0	1	1	2	121	22	145	379
03:15 PM	16	2	4	22	3	201	4	208	2	0	0	2	3	166	20	189	421
03:30 PM	11	0	2	13	2	215	2	219	2	0	2	4	3	182	23	208	444
03:45 PM	13	1	8	22	4	217	1	222	1	2	1	4	3	157	14	174	422
Total Volume	59	3	16	78	13	841	7	861	5	2	4	11	11	626	79	716	1666
% App. Total	75.6	3.8	20.5		1.5	97.7	0.8		45.5	18.2	36.4		1.5	87.4	11		
PHF	.776	.375	.500	.886	.813	.969	.438	.970	.625	.250	.500	.688	.917	.860	.859	.861	.938
Passenger +	59	3	16	78	12	823	7	842	4	2	4	10	11	616	78	705	1635
% Passenger +	100	100	100	100	92.3	97.9	100	97.8	80.0	100	100	90.9	100	98.4	98.7	98.5	98.1
Heavy	0	0	0	0	1	18	0	19	1	0	0	1	0	10	1	11	31
% Heavy	0	0	0	0	7.7	2.1	0	2.2	20.0	0	0	9.1	0	1.6	1.3	1.5	1.9



Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕			↕	
Traffic Vol, veh/h	83	619	15	5	754	26	6	0	11	11	1	54
Future Vol, veh/h	83	619	15	5	754	26	6	0	11	11	1	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	7	13	1	5	1	1	1	18	1	1	1
Mvmt Flow	88	659	16	5	802	28	6	0	12	12	1	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	830	0	0	675	0	0	1698	1683	667	1675	1677	816
Stage 1	-	-	-	-	-	-	843	843	-	826	826	-
Stage 2	-	-	-	-	-	-	855	840	-	849	851	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.38	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.462	3.509	4.009	3.309
Pot Cap-1 Maneuver	806	-	-	921	-	-	73	95	432	76	96	378
Stage 1	-	-	-	-	-	-	360	381	-	368	388	-
Stage 2	-	-	-	-	-	-	354	382	-	357	378	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	806	-	-	921	-	-	56	84	432	67	85	378
Mov Cap-2 Maneuver	-	-	-	-	-	-	56	84	-	67	85	-
Stage 1	-	-	-	-	-	-	321	339	-	328	386	-
Stage 2	-	-	-	-	-	-	298	380	-	309	337	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0.1			37.7			31.1		
HCM LOS							E			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	128	806	-	-	921	-	-	207
HCM Lane V/C Ratio	0.141	0.11	-	-	0.006	-	-	0.339
HCM Control Delay (s)	37.7	10	-	-	8.9	-	-	31.1
HCM Lane LOS	E	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0	-	-	1.4

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	79	626	11	7	841	13	4	2	5	16	3	59
Future Vol, veh/h	79	626	11	7	841	13	4	2	5	16	3	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	1	2	1	1	2	8	1	1	20	1	1	1
Mvmt Flow	84	666	12	7	895	14	4	2	5	17	3	63

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	909	0	0	678	0	0	1789	1763	672	1760	1762	902
Stage 1	-	-	-	-	-	-	840	840	-	916	916	-
Stage 2	-	-	-	-	-	-	949	923	-	844	846	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.4	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.11	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.48	3.509	4.009	3.309
Pot Cap-1 Maneuver	753	-	-	919	-	-	63	85	426	66	85	338
Stage 1	-	-	-	-	-	-	361	382	-	328	353	-
Stage 2	-	-	-	-	-	-	314	350	-	359	380	-
Platoon blocked, %		-	-	-	-	-						
Mov Cap-1 Maneuver	753	-	-	919	-	-	45	75	426	58	75	338
Mov Cap-2 Maneuver	-	-	-	-	-	-	45	75	-	58	75	-
Stage 1	-	-	-	-	-	-	321	339	-	291	350	-
Stage 2	-	-	-	-	-	-	251	347	-	313	337	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.1			53.3			50		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	86	753	-	-	919	-	-	159
HCM Lane V/C Ratio	0.136	0.112	-	-	0.008	-	-	0.522
HCM Control Delay (s)	53.3	10.4	-	-	8.9	-	-	50
HCM Lane LOS	F	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.5	0.4	-	-	0	-	-	2.6