
TECHNICAL MEMORANDUM

TO: Howie Hehrer/JTB Homes

FROM: Aimée Giacherio, PE/Wade Trim
Matt Clark/Wade Trim

ALG

DATE: February 18, 2022

RE: Gracewil Residential TIS Update – Roundabout Analysis at Walker Avenue and 4 Mile Road

JTB200101N

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JTB Homes is proposing to construct a new single- and multi-family residential development located at the existing Gracewil Country Club in Alpine Township. The proposed development is expected to consist of 590 units of single- and multi-family development and be fully constructed and occupied by the year 2042. A traffic impact study dated January 28, 2022 was conducted by Wade Trim for the proposed development. The traffic impact that the proposed development will have on the nearby transportation network was examined for Phase 1 of development in 2023, the approximate mid-point of development in 2032, and full build out of the development in 2042. Existing, future no-build, and projected build traffic conditions were examined for each year under analysis.

The traffic impact study found that the intersection of Walker Avenue and 4 Mile Road would need improvements to mitigate the future 2023, 2032, and 2042 no build conditions as well as the future 2023, 2032, and 2042 build conditions. The traffic study mitigated this intersection with traffic signal control (split-phase operation) and a future eastbound right-turn lane. The Kent County Road Commission (KCRC) has requested additional study with construction of a roundabout in lieu of the proposed traffic signal control. The following sections provide the results of the roundabout analysis at the Walker Avenue and 4 Mile Road intersection for the future year conditions.

1.0 ROUNDABOUT ANALYSIS

The future year conditions examined include 2023 when Phase 1 of the proposed development would be expected to be constructed and occupied, 2032 when approximately half of the property would be expected to be developed and occupied, and 2042, which when the entire development would be expected to be completed.

1.1 Future No Build Conditions

The study area intersection of Walker Avenue and 4 Mile Road was evaluated with the future no build traffic volumes in 2023, 2032, and 2042 to determine the future intersection operations without the project traffic and with a single-lane roundabout. Synchro 11 was utilized to conduct the highway capacity analyses.

As shown in Table 1-1, the capacity analyses for future no build conditions revealed that converting the intersection to a single lane roundabout will improve approach delay for each approach during each peak hour. The levels of service are expected to be at a B or better under the future no build 2023 conditions and at a LOS C or better under the future no build 2032 and 2042 conditions. The capacity worksheets for future no build conditions are attached in Attachment A.

Intersection	Lane Movement / Approach	AM Peak Hour			PM Peak Hour		
		LOS	Delay (sec)	V/C Ratio	LOS	Delay (sec)	V/C Ratio
Walker Avenue NW & 4 Mile Road NW (Year 2023 - Roundabout)	EB Approach	B	12.4	0.613	A	8.5	0.446
	NB Approach	B	11.9	0.578	B	11.6	0.567
	WB Approach	B	10.3	0.483	B	10.1	0.494
	SB Approach	A	9.6	0.309	A	7.0	0.164
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Year 2032 - Roundabout)	EB Approach	C	15.2	0.689	A	9.7	0.503
	NB Approach	B	14.5	0.657	B	14.0	0.642
	WB Approach	B	12.1	0.548	B	11.9	0.561
	SB Approach	B	11.1	0.360	A	7.8	0.193
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Year 2042 - Roundabout)	EB Approach	C	18.7	0.757	B	10.9	0.552
	NB Approach	C	17.7	0.725	C	17.0	0.711
	WB Approach	B	14.0	0.607	B	13.9	0.622
	SB Approach	B	12.8	0.412	A	8.5	0.216
	Overall	N/A	N/A	N/A	N/A	N/A	N/A

1.2 Projected Build Conditions

The study area intersection of Walker Avenue and 4 Mile Road was evaluated again with the future build traffic volumes in 2023, 2032, and 2042 to determine the future intersection operations with a single-lane roundabout and project traffic. Synchro 11 was again utilized to conduct the highway capacity analyses.


As shown in Table 1-2, the capacity analyses for projected build conditions revealed that constructing a single lane roundabout at the intersection will continue to allow acceptable levels of service for each approach at the intersection, except for the eastbound approach under future build

2042 volumes which is expected to operate at a LOS E during the morning peak hour, with 48.8 seconds of average delay per vehicle. The addition of an eastbound right turn bypass lane was found to provide enough capacity to improve this individual movement and overall approach delay on the eastbound 4 Mile Road approach to a level of service B or better during each peak hour. For the other intersection approaches, the levels of service are expected to be at a B or better under the future build 2023 conditions, at a LOS C or better under the future build 2032 conditions, and at a LOS D or better under the future build 2042 conditions. The capacity worksheets for projected build conditions are attached in Attachment B.

Table 1-2 Projected Build Synchro Analyses Results

Intersection	Lane Movement / Approach	AM Peak Hour			PM Peak Hour		
		LOS	Delay (sec)	V/C Ratio	LOS	Delay (sec)	V/C Ratio
Walker Avenue NW & 4 Mile Road NW (Year 2023 - Roundabout)	EB Approach	B	13.5	0.650	A	8.9	0.465
	NB Approach	B	12.5	0.596	B	12.2	0.588
	WB Approach	B	10.6	0.493	B	10.7	0.515
	SB Approach	A	9.8	0.314	A	7.2	0.173
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Year 2032 - Roundabout)	EB Approach	C	22.2	0.812	B	11.2	0.572
	NB Approach	C	18.1	0.725	C	18.3	0.734
	WB Approach	B	13.3	0.586	C	15.3	0.652
	SB Approach	B	12.6	0.414	A	9.0	0.231
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Year 2042 - Roundabout)	EB Approach	E	48.8	0.986	B	14.7	0.676
	NB Approach	D	29.9	0.861	D	32.2	0.887
	WB Approach	C	17.3	0.682	D	25.6	0.811
	SB Approach	C	17.5	0.551	B	11.5	0.324
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Walker Avenue NW & 4 Mile Road NW (Year 2042 - Roundabout - With EB Right turn Lane)	EB Left/Thru	B	10.6	0.495	A	9.4	0.466
	EB Right	A	9.6	0.466	A	5.6	0.203
	EB Approach	B	10.1	N/A	A	8.2	N/A
	NB Approach	D	29.9	0.861	D	32.2	0.887
	WB Approach	C	17.3	0.682	D	25.6	0.811
	SB Approach	C	17.5	0.551	B	11.5	0.324
	Overall	N/A	N/A	N/A	N/A	N/A	N/A

If you have any questions regarding the information presented in this memorandum, please feel free to contact us at any time.



**Attachment A.
Future No Build Synchro Results**

Intersection				
Intersection Delay, s/veh	11.4			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	597	424	542	199
Demand Flow Rate, veh/h	627	450	563	203
Vehicles Circulating, veh/h	293	385	342	727
Vehicles Exiting, veh/h	637	520	578	108
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.4	10.3	11.9	9.6
Approach LOS	B	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	627	450	563	203
Cap Entry Lane, veh/h	1023	932	974	657
Entry HV Adj Factor	0.953	0.943	0.962	0.981
Flow Entry, veh/h	597	424	542	199
Cap Entry, veh/h	975	879	937	645
V/C Ratio	0.613	0.483	0.578	0.309
Control Delay, s/veh	12.4	10.3	11.9	9.6
LOS	B	B	B	A
95th %tile Queue, veh	4	3	4	1


Intersection				
Intersection Delay, s/veh	9.9			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	458	456	533	115
Demand Flow Rate, veh/h	467	461	544	118
Vehicles Circulating, veh/h	271	383	356	637
Vehicles Exiting, veh/h	484	517	382	207
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.5	10.1	11.6	7.0
Approach LOS	A	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	467	461	544	118
Cap Entry Lane, veh/h	1047	934	960	721
Entry HV Adj Factor	0.980	0.990	0.979	0.971
Flow Entry, veh/h	458	456	533	115
Cap Entry, veh/h	1026	924	940	700
V/C Ratio	0.446	0.494	0.567	0.164
Control Delay, s/veh	8.5	10.1	11.6	7.0
LOS	A	B	B	A
95th %tile Queue, veh	2	3	4	1

Intersection				
Intersection Delay, s/veh	13.8			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	652	463	595	217
Demand Flow Rate, veh/h	685	491	619	221
Vehicles Circulating, veh/h	321	424	374	795
Vehicles Exiting, veh/h	695	569	632	120
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	15.2	12.1	14.5	11.1
Approach LOS	C	B	B	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	685	491	619	221
Cap Entry Lane, veh/h	995	895	942	613
Entry HV Adj Factor	0.952	0.942	0.962	0.981
Flow Entry, veh/h	652	463	595	217
Cap Entry, veh/h	947	844	906	602
V/C Ratio	0.689	0.548	0.657	0.360
Control Delay, s/veh	15.2	12.1	14.5	11.1
LOS	C	B	B	B
95th %tile Queue, veh	6	3	5	2

Intersection				
Intersection Delay, s/veh	11.7			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	501	500	583	126
Demand Flow Rate, veh/h	512	505	595	131
Vehicles Circulating, veh/h	298	419	391	697
Vehicles Exiting, veh/h	530	567	419	227
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.7	11.9	14.0	7.8
Approach LOS	A	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	512	505	595	131
Cap Entry Lane, veh/h	1018	900	926	678
Entry HV Adj Factor	0.979	0.990	0.981	0.964
Flow Entry, veh/h	501	500	583	126
Cap Entry, veh/h	997	891	908	654
V/C Ratio	0.503	0.561	0.642	0.193
Control Delay, s/veh	9.7	11.9	14.0	7.8
LOS	A	B	B	A
95th %tile Queue, veh	3	4	5	1

Intersection				
Intersection Delay, s/veh	16.6			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	700	497	638	233
Demand Flow Rate, veh/h	735	527	663	238
Vehicles Circulating, veh/h	344	455	403	854
Vehicles Exiting, veh/h	748	611	676	128
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	18.7	14.0	17.7	12.8
Approach LOS	C	B	C	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	735	527	663	238
Cap Entry Lane, veh/h	972	868	915	578
Entry HV Adj Factor	0.952	0.944	0.962	0.978
Flow Entry, veh/h	700	497	638	233
Cap Entry, veh/h	925	819	880	565
V/C Ratio	0.757	0.607	0.725	0.412
Control Delay, s/veh	18.7	14.0	17.7	12.8
LOS	C	B	C	B
95th %tile Queue, veh	7	4	7	2

Intersection				
Intersection Delay, s/veh	13.7			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	539	537	627	134
Demand Flow Rate, veh/h	550	542	639	139
Vehicles Circulating, veh/h	319	451	420	749
Vehicles Exiting, veh/h	569	608	449	244
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.9	13.9	17.0	8.5
Approach LOS	B	B	C	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	550	542	639	139
Cap Entry Lane, veh/h	997	871	899	643
Entry HV Adj Factor	0.980	0.990	0.982	0.965
Flow Entry, veh/h	539	537	627	134
Cap Entry, veh/h	976	863	883	620
V/C Ratio	0.552	0.622	0.711	0.216
Control Delay, s/veh	10.9	13.9	17.0	8.5
LOS	B	B	C	A
95th %tile Queue, veh	3	4	6	1



Attachment B.
Projected Build Synchro Results

Intersection				
Intersection Delay, s/veh	12.1			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	632	429	549	200
Demand Flow Rate, veh/h	665	455	570	204
Vehicles Circulating, veh/h	293	395	360	739
Vehicles Exiting, veh/h	650	535	596	111
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.5	10.6	12.5	9.8
Approach LOS	B	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	665	455	570	204
Cap Entry Lane, veh/h	1023	922	956	649
Entry HV Adj Factor	0.951	0.943	0.963	0.981
Flow Entry, veh/h	632	429	549	200
Cap Entry, veh/h	973	870	920	637
V/C Ratio	0.650	0.493	0.596	0.314
Control Delay, s/veh	13.5	10.6	12.5	9.8
LOS	B	B	B	A
95th %tile Queue, veh	5	3	4	1

Intersection				
Intersection Delay, s/veh	10.4			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	477	468	548	118
Demand Flow Rate, veh/h	487	473	559	121
Vehicles Circulating, veh/h	271	400	365	664
Vehicles Exiting, veh/h	514	524	393	209
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.9	10.7	12.2	7.2
Approach LOS	A	B	B	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	487	473	559	121
Cap Entry Lane, veh/h	1047	918	951	701
Entry HV Adj Factor	0.979	0.990	0.980	0.972
Flow Entry, veh/h	477	468	548	118
Cap Entry, veh/h	1024	908	932	681
V/C Ratio	0.465	0.515	0.588	0.173
Control Delay, s/veh	8.9	10.7	12.2	7.2
LOS	A	B	B	A
95th %tile Queue, veh	3	3	4	1

Intersection				
Intersection Delay, s/veh	17.9			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	757	481	618	239
Demand Flow Rate, veh/h	795	510	643	244
Vehicles Circulating, veh/h	337	452	433	833
Vehicles Exiting, veh/h	740	624	699	129
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	22.2	13.3	18.1	12.6
Approach LOS	C	B	C	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	795	510	643	244
Cap Entry Lane, veh/h	979	870	887	590
Entry HV Adj Factor	0.952	0.943	0.962	0.978
Flow Entry, veh/h	757	481	618	239
Cap Entry, veh/h	931	820	853	577
V/C Ratio	0.812	0.586	0.725	0.414
Control Delay, s/veh	22.2	13.3	18.1	12.6
LOS	C	B	C	B
95th %tile Queue, veh	9	4	6	2

Intersection				
Intersection Delay, s/veh	14.6			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	567	544	642	138
Demand Flow Rate, veh/h	578	549	655	143
Vehicles Circulating, veh/h	306	485	428	788
Vehicles Exiting, veh/h	625	598	456	246
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.2	15.3	18.3	9.0
Approach LOS	B	C	C	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	578	549	655	143
Cap Entry Lane, veh/h	1010	841	892	618
Entry HV Adj Factor	0.981	0.990	0.981	0.966
Flow Entry, veh/h	567	544	642	138
Cap Entry, veh/h	990	833	875	597
V/C Ratio	0.572	0.652	0.734	0.231
Control Delay, s/veh	11.2	15.3	18.3	9.0
LOS	B	C	C	A
95th %tile Queue, veh	4	5	7	1

Intersection				
Intersection Delay, s/veh	32.4			
Intersection LOS	D			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	864	531	682	293
Demand Flow Rate, veh/h	908	562	708	299
Vehicles Circulating, veh/h	397	505	507	915
Vehicles Exiting, veh/h	817	710	797	152
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	48.8	17.3	29.9	17.5
Approach LOS	E	C	D	C
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	908	562	708	299
Cap Entry Lane, veh/h	920	824	823	543
Entry HV Adj Factor	0.952	0.944	0.963	0.980
Flow Entry, veh/h	864	531	682	293
Cap Entry, veh/h	876	779	792	532
V/C Ratio	0.986	0.682	0.861	0.551
Control Delay, s/veh	48.8	17.3	29.9	17.5
LOS	E	C	D	C
95th %tile Queue, veh	17	5	11	3

Intersection				
Intersection Delay, s/veh	23.5			
Intersection LOS	C			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	638	622	735	174
Demand Flow Rate, veh/h	651	628	749	179
Vehicles Circulating, veh/h	352	567	482	896
Vehicles Exiting, veh/h	723	664	521	299
Ped Vol Crossing Leg, #/h	1	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.7	25.6	32.2	11.5
Approach LOS	B	D	D	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	651	628	749	179
Cap Entry Lane, veh/h	964	774	844	553
Entry HV Adj Factor	0.980	0.991	0.981	0.970
Flow Entry, veh/h	638	622	735	174
Cap Entry, veh/h	944	767	828	537
V/C Ratio	0.676	0.811	0.887	0.324
Control Delay, s/veh	14.7	25.6	32.2	11.5
LOS	B	D	D	B
95th %tile Queue, veh	5	9	12	1

Intersection					
Intersection Delay, s/veh	18.3				
Intersection LOS	C				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	864	531	682	293	
Demand Flow Rate, veh/h	908	562	708	299	
Vehicles Circulating, veh/h	397	505	507	915	
Vehicles Exiting, veh/h	817	710	346	152	
Ped Vol Crossing Leg, #/h	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	10.1	17.3	29.9	17.5	
Approach LOS	B	C	D	C	
Lane	Left	Bypass	Left	Left	Left
Designated Moves	LT	R	LTR	LTR	LTR
Assumed Moves	LT	R	LTR	LTR	LTR
RT Channelized	Yield				
Lane Util	1.000		1.000	1.000	1.000
Follow-Up Headway, s	2.609		2.609	2.609	2.609
Critical Headway, s	4.976	451	4.976	4.976	4.976
Entry Flow, veh/h	456	970	562	708	299
Cap Entry Lane, veh/h	920	0.952	824	823	543
Entry HV Adj Factor	0.952	430	0.944	0.963	0.980
Flow Entry, veh/h	434	923	531	682	293
Cap Entry, veh/h	876	0.466	779	792	532
V/C Ratio	0.495	9.6	0.682	0.861	0.551
Control Delay, s/veh	10.6	A	17.3	29.9	17.5
LOS	B	3	C	D	C
95th %tile Queue, veh	3		5	11	3

Intersection					
Intersection Delay, s/veh	21.6				
Intersection LOS	C				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	638	622	735	174	
Demand Flow Rate, veh/h	651	628	749	179	
Vehicles Circulating, veh/h	352	567	482	896	
Vehicles Exiting, veh/h	723	664	319	299	
Ped Vol Crossing Leg, #/h	1	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	8.2	25.6	32.2	11.5	
Approach LOS	A	D	D	B	
Lane	Left	Bypass	Left	Left	Left
Designated Moves	LT	R	LTR	LTR	LTR
Assumed Moves	LT	R	LTR	LTR	LTR
RT Channelized	Yield				
Lane Util	1.000		1.000	1.000	1.000
Follow-Up Headway, s	2.609		2.609	2.609	2.609
Critical Headway, s	4.976	202	4.976	4.976	4.976
Entry Flow, veh/h	449	997	628	749	179
Cap Entry Lane, veh/h	964	0.980	774	844	553
Entry HV Adj Factor	0.980	198	0.991	0.981	0.970
Flow Entry, veh/h	440	977	622	735	174
Cap Entry, veh/h	944	0.203	767	828	537
V/C Ratio	0.466	5.6	0.811	0.887	0.324
Control Delay, s/veh	9.4	A	25.6	32.2	11.5
LOS	A	1	D	D	B
95th %tile Queue, veh	3		9	12	1