EXHIBIT 65

Traffic Operations, Public Works

REVIEW COMMENTS RESOLUTION FORM

Study Name: Green Mountain Master Plan (County)	Project No.:	Date 10/23/14
Study Reviewer: Bill Gilchrist, P.E.	Phone No.: (360) 487-7717	Reviewing Section: Traffic
Consultant/Engineer: Kittelson & Associates, Inc., Chris Brehmer, P.E.	Phone No.: (360) 567-3002	Project Phase:

Comm No.	Page No.	Comment	Consultant's Response/Resolution	Consultant's Initials
1	General	This study uses the HCM 2000 methodology for analyzing intersection operations. Please see the excerpt below from the HCM 2000 below where I have highlighted the limitations of this analysis method. If there is a queue as I describe in the next comment, the delay for the non-conflicting through movement is not analyzed properly.		
2	General	Additionally, you are not showing a queuing analysis. This is another concern with the HCM 2000 methodology as it does not provide this in a chapter 18 analysis such as what you have provided. I performed a queuing analysis and I am concerned about the southbound left turn lane on NE 192nd Ave at SE 13th Street. The queue far exceeds the pocket length in the existing condition (see my analysis below). This left turning movement would need to have a dual left turn to mitigate the queue.		
3	5	You mention that you are using the peak 15-minute flow rate in your analysis. However, you are not using the peak 15-minute flow rate. You are using the peak hour volume with a PHF. The analysis that I have attached uses the peak 15-minute flow rate with no PHF. This more accurately depicts the turning movement volumes in the worst 15 minute period for each movement. Whereas the average peak hour turning movement volumes with a PHF evenly distributes the effect of the peak 15 minutes to each tuning movement at the intersection and can grossly underestimate the volumes (such as what happened to the southbound left-turning movement in comment number 2).		
4	General	In addition to the southbound dual left-turn lane pocket suggested above, I agree with all suggested mitigations proposed for the NE 192nd Ave at NE 13th St intersection.		

I. INTRODUCTION

SCOPE OF THE METHODOLOGY

This chapter contains a methodology for analyzing the capacity and level of service (LOS) of signalized intersections. The analysis must consider a wide variety of prevailing conditions, including the amount and distribution of traffic movements, traffic composition, geometric characteristics, and details of intersection signalization. The methodology focuses on the determination of LOS for known or projected conditions.

Background and underlying concepts for this chapter are in Chapter 10

The methodology addresses the capacity, LOS, and other performance measures for lane groups and intersection approaches and the LOS for the intersection as a whole. Capacity is evaluated in terms of the ratio of demand flow rate to capacity (v/c ratio), whereas LOS is evaluated on the basis of control delay per vehicle (in seconds per vehicle). Control delay is the portion of the total delay attributed to traffic signal operation for signalized intersections. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Appendix A presents a method for observing intersection control delay in the field. Exhibit 10-9 provides definitions of the basic terms used in this chapter.

Each lane group is analyzed separately. Equations in this chapter use the subscript i to indicate each lane group. The capacity of the intersection as a whole is not addressed because both the design and the signalization of intersections focus on the accommodation of traffic movement on approaches to the intersection.

A lane group is indicated in formulas by the subscript i

The capacity analysis methodology for signalized intersections is based on known or projected signalization plans. Two procedures are available to assist the analyst in establishing signalization plans. The first is the quick estimation method, which produces estimates of the cycle length and green times that can be considered to constitute a reasonable and effective signal timing plan. The quick estimation method requires minimal field data and relies instead on default values for the required traffic and control parameters. It is described and documented in Chapter 10.

See Chapter 10 for description of quick estimation method

A more detailed procedure is provided in Appendix B of this chapter for estimating the timing plan at both pretimed and traffic-actuated signals. The procedure for pretimed signals provides the basis for the design of signal timing plans that equalize the degree of saturation on the critical approaches for each phase of the signal sequence. This procedure does not, however, provide for optimal operation.

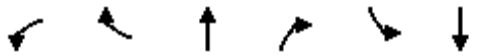
The methodology in this chapter is based in part on the results of a National Cooperative Highway Research Program (NCHRP) study (*1, 2*). Critical movement capacity analysis techniques have been developed in the United States (*3–5*), Australia (*6*), Great Britain (*7*), and Sweden (*8*). Background for delay estimation procedures was developed in Great Britain (*7*), Australia (*9, 10*), and the United States (*11*). Updates to the original methodology were developed subsequently (*12–24*).

LIMITATIONS TO THE METHODOLOGY

The methodology does not take into account the potential impact of downstream congestion on intersection operation. Nor does the methodology detect and adjust for the impacts of turn-pocket overflows on through traffic and intersection operation.

II. METHODOLOGY

Exhibit 16-1 shows the input and the basic computation order for the method. The primary output of the method is level of service (LOS). This methodology covers a wide range of operational configurations, including combinations of phase plans, lane



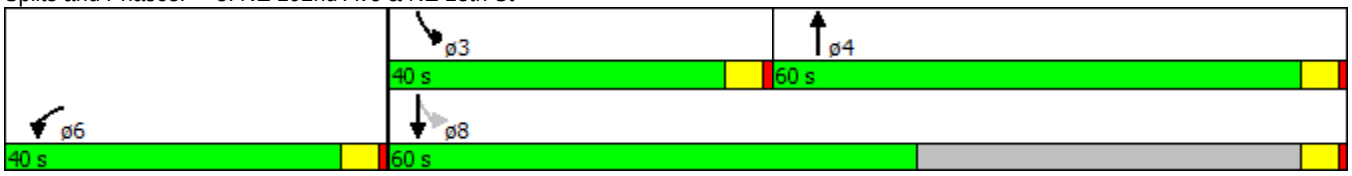
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	168	212	260	68	544	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.925		0.972			
Flt Protected	0.978				0.950	
Satd. Flow (prot)	1704	0	1811	0	1787	1863
Flt Permitted	0.978				0.285	
Satd. Flow (perm)	1704	0	1811	0	536	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	43		11			
Link Speed (mph)	40		40			40
Link Distance (ft)	1014		670			618
Travel Time (s)	17.3		11.4			10.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	0%	2%	2%	1%	2%
Adj. Flow (vph)	168	212	260	68	544	288
Shared Lane Traffic (%)						
Lane Group Flow (vph)	380	0	328	0	544	288
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	NA		NA		pm+pt	NA
Protected Phases	6		4		3	8
Permitted Phases					8	

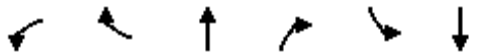
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	6		4		3	8
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		22.0		10.0	10.0
Total Split (s)	40.0		60.0		40.0	60.0
Total Split (%)	28.6%		42.9%		28.6%	42.9%
Maximum Green (s)	35.0		55.0		35.0	55.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	1.0		1.0		1.0	1.0
Recall Mode	None		Min		None	Min
Walk Time (s)	5.0		5.0			
Flash Dont Walk (s)	13.0		12.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	21.1		18.9		42.4	42.4
Actuated g/C Ratio	0.28		0.25		0.57	0.57
v/c Ratio	0.74		0.70		0.90	0.27
Control Delay	33.2		36.0		32.0	9.5
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	33.2		36.0		32.0	9.5
LOS	C		D		C	A
Approach Delay	33.2		36.0			24.2
Approach LOS	C		D			C
90th %ile Green (s)	34.8		30.4		32.0	67.4
90th %ile Term Code	Gap		Gap		Gap	Hold
70th %ile Green (s)	26.1		23.5		22.0	50.5
70th %ile Term Code	Gap		Gap		Gap	Hold
50th %ile Green (s)	20.4		18.7		16.8	40.5
50th %ile Term Code	Gap		Gap		Gap	Hold
30th %ile Green (s)	15.8		14.3		13.0	32.3
30th %ile Term Code	Gap		Gap		Gap	Hold
10th %ile Green (s)	11.0		9.6		9.4	24.0
10th %ile Term Code	Gap		Gap		Gap	Hold
Queue Length 50th (ft)	132		124		134	58
Queue Length 95th (ft)	324		304		#367	138
Internal Link Dist (ft)	934		590			538
Turn Bay Length (ft)					200	
Base Capacity (vph)	903		1396		984	1806
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.42		0.23		0.55	0.16

Intersection Summary	
Area Type:	Other

Cycle Length: 140	
Actuated Cycle Length: 74.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	
90th %ile Actuated Cycle: 112.2	
70th %ile Actuated Cycle: 86.6	
50th %ile Actuated Cycle: 70.9	
30th %ile Actuated Cycle: 58.1	
10th %ile Actuated Cycle: 45	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: NE 192nd Ave & NE 13th St





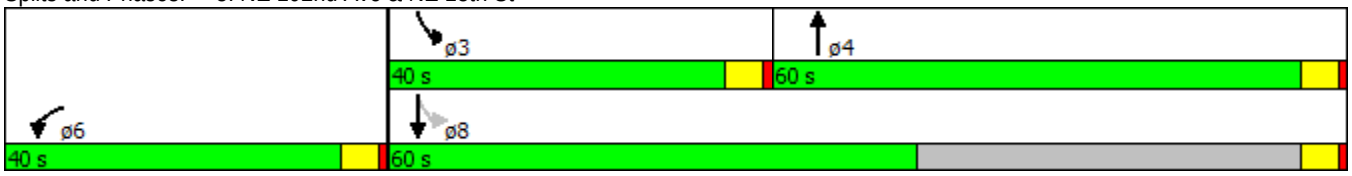
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	192	108	584	220	140	344
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951		0.963			
Flt Protected	0.969				0.950	
Satd. Flow (prot)	1729	0	1794	0	1787	1863
Flt Permitted	0.969				0.159	
Satd. Flow (perm)	1729	0	1794	0	299	1863
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	19		16			
Link Speed (mph)	40		40			40
Link Distance (ft)	1014		670			618
Travel Time (s)	17.3		11.4			10.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	0%	2%	2%	1%	2%
Adj. Flow (vph)	192	108	584	220	140	344
Shared Lane Traffic (%)						
Lane Group Flow (vph)	300	0	804	0	140	344
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (ft)	20		100		20	100
Trailing Detector (ft)	0		0		0	0
Detector 1 Position(ft)	0		0		0	0
Detector 1 Size(ft)	20		6		20	6
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	NA		NA		pm+pt	NA
Protected Phases	6		4		3	8
Permitted Phases					8	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	6		4		3	8
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	23.0		22.0		10.0	10.0
Total Split (s)	40.0		60.0		40.0	60.0
Total Split (%)	28.6%		42.9%		28.6%	42.9%
Maximum Green (s)	35.0		55.0		35.0	55.0
Yellow Time (s)	4.0		4.0		4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.0		5.0		5.0	5.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	1.0		1.0		1.0	1.0
Recall Mode	None		Min		None	Min
Walk Time (s)	5.0		5.0			
Flash Dont Walk (s)	13.0		12.0			
Pedestrian Calls (#/hr)	0		0			
Act Effct Green (s)	19.4		55.4		67.9	67.9
Actuated g/C Ratio	0.20		0.57		0.70	0.70
v/c Ratio	0.84		0.78		0.43	0.26
Control Delay	55.3		24.9		10.0	6.8
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	55.3		24.9		10.0	6.8
LOS	E		C		B	A
Approach Delay	55.3		24.9			7.8
Approach LOS	E		C			A
90th %ile Green (s)	29.1		55.0		12.8	72.8
90th %ile Term Code	Gap		Max		Gap	Hold
70th %ile Green (s)	22.8		55.0		8.8	68.8
70th %ile Term Code	Gap		Max		Gap	Hold
50th %ile Green (s)	19.1		55.0		6.6	66.6
50th %ile Term Code	Gap		Max		Gap	Hold
30th %ile Green (s)	15.9		55.0		5.1	65.1
30th %ile Term Code	Gap		Max		Gap	Hold
10th %ile Green (s)	11.9		55.0		5.0	65.0
10th %ile Term Code	Gap		Max		Min	Hold
Queue Length 50th (ft)	166		343		24	68
Queue Length 95th (ft)	278		#771		59	143
Internal Link Dist (ft)	934		590			538
Turn Bay Length (ft)					200	
Base Capacity (vph)	638		1027		747	1779
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.47		0.78		0.19	0.19

Intersection Summary	
Area Type:	Other

Cycle Length: 140	
Actuated Cycle Length: 97.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	
90th %ile Actuated Cycle: 111.9	
70th %ile Actuated Cycle: 101.6	
50th %ile Actuated Cycle: 95.7	
30th %ile Actuated Cycle: 91	
10th %ile Actuated Cycle: 86.9	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: NE 192nd Ave & NE 13th St



Intersection 192nd Av & NE 13th St
ICU 197
Date Doc't 10.08.12
Controller

Free Timing Parameters

Phase Mov't	Φ1	Φ2	Φ3 SBLT	Φ4 NB	Φ5	Φ6 WB	Φ7	Φ8 SB
Min Green			5	5		5		5
Gap Extension			1.0	1.0		1.0		1.0
Max Green 1			35	55		35		55
Max Green 2			55	55		55		55
Walk				5		5		
Ped Clearance				12		13		
Yellow			3.5	4.0		4.0		4.0
All Red			2.2	1.4		1.8		1.4
Leading Phase			Yes	No		Yes		Yes
Sim Gap								
Dual Entry				X				X
Min Recall				X				X

Notes: The SBLT is Protected-Permissive; The protected SBLT (Φ3 Green Arrow) will only activate if there is occupancy on the stop bar detector and at the same time occupancy on the advance detector located 55 feet behind the stop bar.