



KITTELSON & ASSOCIATES, INC.

TRANSPORTATION ENGINEERING / PLANNING

610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

MEMORANDUM

Date: April 22nd, 2015

Project #: 13865.0

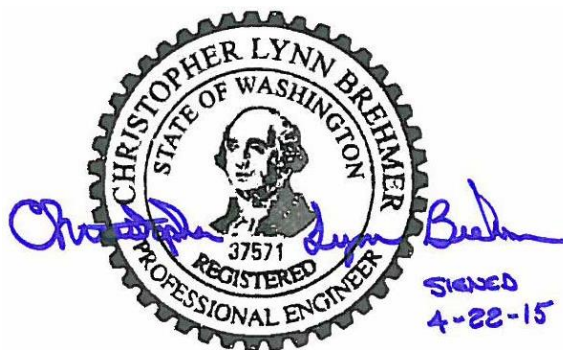
To: Wes Heigh, City of Camas

cc: Randy Printz, Landerholm Law Firm
John O'Neil, Green Mountain Land, LLC

From: Chris Brehmer, P.E. and Kelly Laustsen

Project: Green Mountain Master Plan Development

Subject: Phase 1 Access Assessment



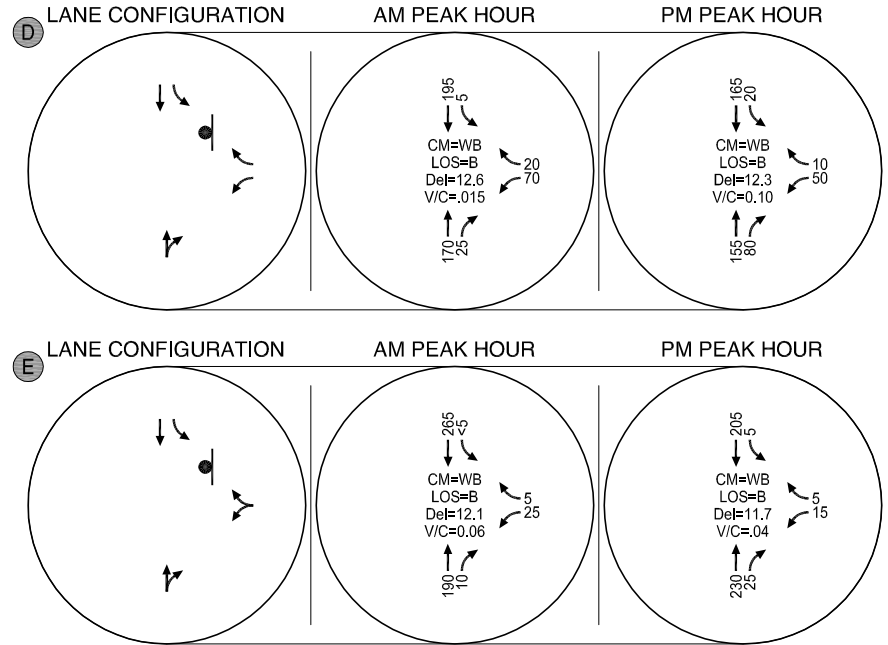
This memorandum presents a supplement to the June 2014 transportation impact analysis (TIA) for the Green Mountain Master Plan development to be located at the northeast corner of NE Ingle Road and NE Goodwin Road in Camas, Washington. Specifically, it assesses the implication of providing one access for the Phase 1 development, as opposed to the two access locations assumed in the TIA. Figure 1 provides a preliminary site plan for the Phase 1 development, showing the single access on NE Ingle Road.

The TIA assumed two access points for the Phase 1 development with exclusive southbound left-turn lanes at each access, as shown in Figure 2. Operations were re-assessed under 2018 total traffic conditions assuming a single site access, with an exclusive southbound left-turn lane. The access is subject to the City of Camas operating standards, which require LOS "D" or better and a volume-to-capacity (v/c) ratio of 0.90 or better for all intersections. As shown in Figure 2, the proposed access operates acceptably during the weekday AM and PM peak hours, with the stop-controlled westbound approach operating at LOS "B". Operational worksheets are provided in *Attachment A*. Therefore, based on this assessment, a single access to the Phase 1 development area with a southbound left-turn lane on Ingle Road satisfies City operating standards and no additional improvements are needed.

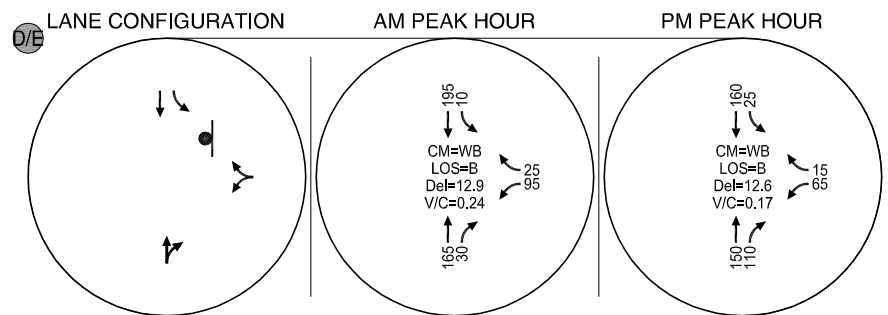
We trust this memorandum adequately addresses the traffic impacts associated with providing a single access at the Phase 1 development of the Green Mountain Master Plan development. Please contact us if you have any questions or comments regarding the contents of this memorandum or the analysis performed.

Figure
1

Previously Assumed (2 accesses)



Currently Planned (1 access)



- STOP SIGN

CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (SIG) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIG / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWSC = TWO-WAY STOP CONTROL

2018 Site Access Lane Configurations and Operations (Phase 1)
 Camas, Washington

Figure 2

Attachment A: Synchro Output Sheets

HCM Unsignalized Intersection Capacity Analysis

300: Access & NE Ingle Rd

4/22/2015

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	96	24	165	32	8	194
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	113	28	194	38	9	228
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	460	213			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	460	213			232	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	97			99	
cM capacity (veh/h)	559	832			1348	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	141	232	9	228		
Volume Left	113	0	9	0		
Volume Right	28	38	0	0		
cSH	598	1700	1348	1700		
Volume to Capacity	0.24	0.14	0.01	0.13		
Queue Length 95th (ft)	23	0	1	0		
Control Delay (s)	12.9	0.0	7.7	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.9	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			24.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

300: Access & NE Ingle Rd

4/22/2015

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	64	16	149	108	27	158
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	75	19	175	127	32	186
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	488	239			302	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488	239			302	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	98			97	
cM capacity (veh/h)	529	805			1270	
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	94	302	32	186		
Volume Left	75	0	32	0		
Volume Right	19	127	0	0		
cSH	568	1700	1270	1700		
Volume to Capacity	0.17	0.18	0.03	0.11		
Queue Length 95th (ft)	15	0	2	0		
Control Delay (s)	12.6	0.0	7.9	0.0		
Lane LOS	B		A			
Approach Delay (s)	12.6	0.0	1.2			
Approach LOS	B					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		32.3%		ICU Level of Service	A	
Analysis Period (min)		15				