HEINRICH & KLEIN ASSOCIATES, INC.

TRAFFIC ENGINEERING & PLANNING
480 Herald Drive • Ambler, Pennsylvania 19002
215-793-4177 • FAX 215-793-4179

March 24, 2011

Anne W. Klepfer, Manager
East Rockhill Township
1622 Ridge Road
Perkasie, PA 18944

Re: McClennen Property Residential Development
East Rockhill Township, Bucks County, PA

Dear Ms. Klepfer:

Reference is made to correspondence addressed to you from David H. Horner, P.E., P.T.O.E. of Horner & Canter Associates, dated February 15, 2011, relative to the project listed above. In response, I offer the following:

1. Due to changes in the composition of the proposed development, as well as to respond to certain comments, a revised/expanded Traffic Impact Study (TIS) has been prepared and is enclosed for review.

   a. Satisfied.

   b. Satisfied.

   c. Satisfied.

   d. Satisfied.

   e. Satisfied.

   f. The crash data provided is for the approximate seven year time period from January 1, 2004 to December 31, 2010. There were a total of 32 crashes during the seven year time period – 31 crashes at/near the intersection of Park Avenue and Three Mile Run Road, and one crash at the intersection of Park Avenue and Old Bethlehem Pike. Of the 32 crashes, 18 were reportable (i.e., fatality, injury and/or significant property damage requiring one or more vehicles being towed from the scene) including 14 injury crashes, and 14 were non-reportable. Of the 32 crashes, 26 involved a failure to yield to the Stop-sign; and, in many cases, a citation was issued. The remaining crashes included three rear-ends, one hit pedestrian, one loss of control, and one loss of load. In most cases, the crash occurred during clear

weather under no adverse condition with good sight distances; and, in many cases it was noted that speeding was not a contributing factor. Since the requirement for consideration of a safety improvement is an average of five or more crashes per year correctable by a potential improvement, it can be concluded that the recent crash history does not support implementation of any improvement to correct an unsafe or hazardous condition.

g. Satisfied.

h. In reviewing the results of the queue analysis for the 2017 After Development scenario (included in the volume/capacity analysis worksheets in the report appendix), I note the following: with but six locations/approaches, the 95th% vehicle queue lengths are less than one vehicle length. There is only one location at any of the unsignalized intersections with a projected 95th% queue length in excess of 100 feet. This is at the eastbound Stop-sign controlled approach of Rich Hill Road at Old Bethlehem Pike during the afternoon peak hour which has a calculated 95th% queue of 646 feet. There are no road sections in the study area less than 200 feet in length. Queuing, therefore, is not an issue at any location except the eastbound Stop-sign controlled approach of Rich Hill Road at Old Bethlehem Pike during the afternoon peak hour. The distance along Rich Hill Road between Old Bethlehem Pike and PA Route 309 is about 525 feet. Installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road, as recommended to mitigate existing sight distance limitations, will alleviate queuing along the eastbound Stop-sign controlled approach of Rich Hill Road at Old Bethlehem Pike.

i. It is noted that testimony has indicated that the curvilinear layout of the internal road network with on-street parking and street widths proposed to be less than 30 feet curb-to-curb, together with internal intersections that require all vehicles to stop at least once traveling through the development represent a significant traffic calming approach to the layout of the proposed development. In addition, speed tables are considered at two locations in conjunction with pedestrian facilities. The Applicant has also indicated a willingness to consider other reasonable traffic calming strategies during the Land Development process.

2. As was indicated previously, *"The two unsignalized intersections along Old Bethlehem Pike at Forrest Road and at Green Top Road are not included since the minor street approaches are low volume side streets with adequate sight distances along all intersection approaches similar to the intersection of Old Bethlehem Pike and Rockhill Road/Weikel Road. The impact of new traffic generated by the proposed development will not be significant at either of these two unsignalized intersections; and, no mitigation measures can be proposed at this time for the two intersections."* Nevertheless, traffic counts and analyses were completed at the two intersections which support the previous response. The traffic counts were completed on Tuesday March 1, 2011 (traffic count summaries attached). The results of the volume/analysis (copy attached) reveal that all critical movements will operate at an acceptable LOS C or better for the 2017 After Development scenario. Intersection diagrams were included in

the Appendix of the Traffic Impact Study. The results of the counts and analyses support the previous opinion that *"The impact of new traffic generated by the proposed development will not be significant at either of these two unsignalized intersections; and, no mitigation measures can be proposed at this time for the two intersections."*

3. Satisfied.

4. Satisfied.

5. The findings of the Crash Analysis were previously discussed in response to comment #1f. "As described in the TIS, most unsignalized side street intersection approaches along Old Bethlehem Pike currently operate, and are expected to continue to operate, at an acceptable LOS D or better during the typical weekday commuter rush hours. Observation reveals that there is adequate available sight distances for motorists to safely turn to/from most of the sides streets that intersect Old Bethlehem Pike. With the possible exception of the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road, as described in the TIS, conditions generally do not justify improvements such as installation of multi-way Stop-signs at any of the unsignalized intersections in the study area. Of course, the municipality and the adjacent property owners are responsible for ongoing maintenance of vegetation, signage, etc. within safe sight distance triangles at public road intersections. The criteria for consideration of multi-way Stop-signs includes:

   - An interim measure where installation of a traffic control signal is warranted.
   - Five or more reported crashes in a 12-month period susceptible to correction by installation of multi-way Stop-signs.
   - Vehicular volume entering the intersection from the major street approaches averages at least 300 vehicles per hour for any 8-hours of an average day; and, the combined vehicular, pedestrian and bicycle volume entering the intersection from the minor street approaches averages at least 200 units per hour for the same 8 hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the highest hour.

   Obviously, installation of a new traffic control signal is not justified at any of the unsignalized intersections in the study area. As reported previously, the results of the Crash Analysis does not support installation of multi-way Stop-signs. While most unsignalized intersections along Old Bethlehem Pike/Park Avenue experience major-street traffic volumes that average in excess of 300 vehicles per hour, no side streets average a combined vehicular, pedestrian and bicycle volume in excess of 200 units per hour for the same hours; and, vehicular delay on side street approaches is typically less than 30 seconds per vehicle.

   Other criteria that may be considered includes: Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless the conflicting cross traffic is also required to stop. Under these criteria, as described in the Traffic Impact Study, the three municipalities of East and West Rockhill Townships and Richland Township should investigate installation of multi-

way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road where existing occupied structures in close proximity to the edge of road severely constrain sight distances.

6. Volume/capacity analysis worksheets are provided in the Appendix of the Traffic Impact Study which indicate that extension of the signal green time by six seconds per cycle for the Park Avenue approaches to Ridge Road is sufficient to provide operation at LOS C or better during both the morning and afternoon peak hours for projected (2017) peak hour conditions after development of the McClennen Property. While the Applicant is agreeable to the pursuit of this potential improvement; it is once again noted that this improvement may be required regardless of development of the McClennen Property as proposed; and, since the intersection is maintained by the Borough of Perkasie, the Borough will be responsible for requesting any signal timing changes at this intersection as part of the approval process with PennDOT.

7. As was noted previously, *"Observations reveal that back-ups along Ridge Road from the signalized intersection with Bethlehem Pike through the unsignalized intersection with Old Bethlehem Pike occur from time-to-time, but generally clear out with every signal cycle change. Most traffic exiting from the Stop-sign controlled approach of Old Bethlehem Pike is right turning traffic. At times when traffic is backed-up through Old Bethlehem Pike, traffic can still proceed into the intersection with a courtesy gap. As indicated in the TIS, all critical movements at this unsignalized intersection currently operate, and are projected to continue to operate, at an acceptable LOS C during both the morning and afternoon peak hours."* Based on these observations, it is doubtful that PennDOT would entertain signal timing changes to the detriment of traffic flow along Bethlehem Pike, for queue reduction along Ridge Road to aid what is a predominantly right turn out/left turn in traffic pattern at an adjacent unsignalized intersection.

8. Satisfied.

9. Satisfied. Reference is also made to comment #1.f.

10. Satisfied.

11. Satisfied.

12. Satisfied.

13. As an example, for the intersection of Park Avenue and Three Mile Run Road, the average volume for the four hours of available count data (it is presumed that midday traffic volume is reduced from the four hours of peak period traffic counts, therefore, the hourly average volume is likely to be reduced over an eight hour period), projected to the design year 2017, total 1844 vehicles for the major street approaches and 709 vehicles for the minor street approaches. The average hourly volume for the major street approaches is 461 vehicles, while the average hourly volume for the minor street approaches is 177 vehicles. Average delay per vehicle is projected to be 33.6 seconds

per vehicle for the eastbound approach of Three Mile Run Road during the afternoon peak hour, but less than 30 seconds per vehicle for either minor street approach during the morning or afternoon peak hour. Accordingly, the major street volume requirement is satisfied, the minor street volume requirement is not satisfied, and the delay requirement may not be satisfied until the year 2017 assuming build-out of the site plus background traffic growth. Accordingly installation of multi-way Stop-signs is not warranted at the unsignalized intersection of Park Avenue and Three Mile Run Road. This exercise can be repeated with similar, but reduced, results at every other unsignalized intersection in the study area.

As described in response to comment #5, installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road may be justified in accordance with the criteria for a location where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless the conflicting cross traffic is also required to stop. Under these criteria, as described in the Traffic Impact Study, the three municipalities of East and West Rockhill Townships and Richland Township should investigate installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road where existing occupied structures in close proximity to the edge of road severely constrain sight distances.

14. Satisfied.

15. Satisfied.

16. Satisfied under the condition that a conceptual layout plan, or fully designed roadway improvement plan as the case may be, for the recommended left turn lane along southbound Old Bethlehem Pike at the proposed access location will be provided at the appropriate time in the preparation of land development plans for the proposed development. Further, it is understood that the Applicant will be responsible for the implementation of this site access improvement.

17. As discussed in response to comment #1.i., it is noted that testimony has indicated that the curvilinear layout of the internal road network with on-street parking and street widths proposed to be less than 30 feet curb-to-curb, together with internal intersections that require all vehicles to stop at least once traveling through the development represent a significant traffic calming approach to the layout of the proposed development. In addition, speed tables are considered at two locations in conjunction with pedestrian facilities. The Applicant has also indicated a willingness to consider other reasonable traffic calming strategies during the Land Development process.

18. As noted previously, *"The available site road frontage along Hill Road is rather limited and situated predominantly north of the access location opposite Stone Edge Road and immediately south of the horizontal curve in Hill Road. While some road widening may be considered to provide minimum lane width and/or lateral clearance, road widening in this section may have the undesirable affect of increasing travel speeds. Frontage improvements, if necessary, will be considered in greater detail at the*

appropriate time in the preparation of land development plans for the proposed development. It should also be noted that frontage improvements along Hill Road may be somewhat contrary to the notion of traffic calming.

19. As noted previously, *"Access design will consider the turning radii of the appropriate design vehicle. It should be noted, however, that residential developments do not generate significant truck traffic; and, while emergency vehicle access is important to consider, their turning paths are typically not constrained by lane delineation lines."* Access design will consider the turning path(s) for a WB-50 moving van design vehicle.

20. Satisfied subject to further review and consideration of access and circulation for the required design vehicle within the townhouse section of the development at the appropriate time in the preparation of land development plans for the proposed development.

If you should have any questions, or wish to discuss these issues in greater detail, please call me at your convenience.

Sincerely,

Andreas Heinrich, P.E., P.T.O.E.
Principal

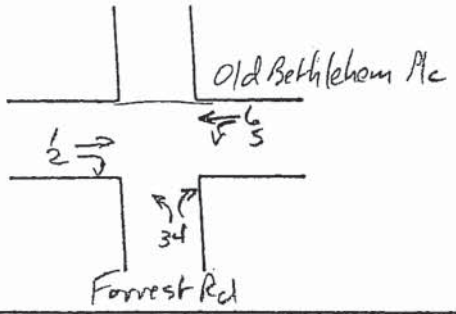
AH:rh

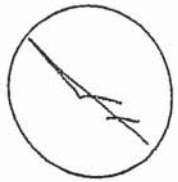
cc: David H. Horner, P.E., P.T.O.E.
Steven Baluh, P.E.
Clay Heckler
Michael D. Kracht, Esq.

HEINRICH & KLEIN ASSOCIATES, INC.
TRAFFIC ENGINEERING & PLANNING

TRAFFIC VOLUME SUMMARY

MUNICIPALITY E. Rockhill Twp PA
LOCATION Old Bethlehem Pk & Forrest Rd DATE 3/1/11
HOURS 7:00-9:00 AM & 4:00-6:00 PM WEATHER Clear
COUNT MADE BY: AHT
REMARKS





	From North on Old Bethlehem Pk			From West on Forrest Rd			From South on Old Bethlehem Pk							
TIME	L	S_1	R_2	Total	L_3	S	R_4	Total	L_5	S_6	R	Total	L	S	R	Total	Total
7:00-7:15		37	1	1 38	2		7	1 9	2	26		3 28					75
7:15-7:30		43	3	0 46	7		3	2 10	8	27		2 35					91
7:30-7:45		39	5	1 44	7		6	4 13	1	33		0 34					91
7:45-8:00		57	5	4 62	7		8	1 15	6	43		2 49					126
8:00-8:15		33	3	1 36	5		6	3 11	5	31		2 36					83
8:15-8:30		32	3	1 35	7		4	1 11	5	23		1 28					74
8:30-8:45		28	4	0 32	3		2	0 5	3	38		0 41					78
8:45-9:00		36	8	2 44	3		2	0 5	5	37		2 42					91
AM Peak Hour 7:15-8:15		172	16	6 188	26		23	10 49	20	134		6 154					391
4:00-4:15		47	1	4 48	8		4	1 12	17	81		2 98					158
4:15-4:30		51	6	1 57	8		6	0 14	1	65		1 66					137
4:30-4:45		54	2	0 56	15		9	1 24	5	80		2 85					165
4:45-5:00		62	3	0 65	13		6	1 19	3	86		0 89					173
5:00-5:15		60	7	0 67	10		4	0 14	3	93		1 96					177
5:15-5:30		56	1	0 57	19		8	0 27	3	92		1 95					179
5:30-5:45		66	2	0 68	4		7	0 11	1	79		0 80					159
5:45-6:00		31	2	0 33	10		3	0 13	0	71		0 71					117
PM Peak Hour 4:30-5:30		232	13	0 245	57		27	2 84	14	351		4 365					694
TOTAL																	

HEINRICH & KLEIN ASSOCIATES, INC.

TRAFFIC VOLUME SUMMARY

TRAFFIC ENGINEERING & PLANNING

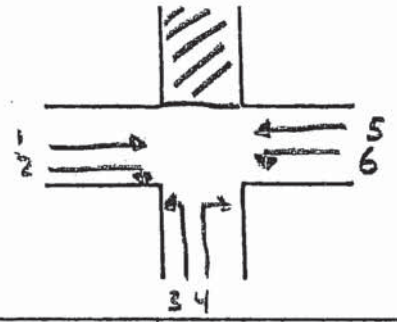
MUNICIPALITY East Rockhill Twp PA

LOCATION Old Bethlehem Pk. @ Green Top Rd. DATE 03/01/11

HOURS 7-9 A 4-6 Pm WEATHER 30°F Clear

COUNT MADE BY: Andreas A. Heinrich

REMARKS



INDICATE NORTH BY ARROW

	Old Bethlehem Pk (S)				Green Top Rd (E)				Old Bethlehem Pk (N)								
	Trucks 1	2			3	Trucks 4			Trucks 5	6							
TIME	L	S	R	Total	L	S	R	Total	L	S	#L	Total	L	S	R	Total	Total
7 - 7:15	1	33	8	41	3	1	2	5	4	25	0	25					71
- 7:30	0	40	7	47	1	1	7	9	2	30	0	30					85
- 7:45	1	48	9	57	1	0	3	4	1	45	0	45					106
- 8:00	4	59	10	69	0	1	10	10	2	32	1	33					112
- 8:15	2	34	10	44	3	1	2	5	4	37	2	39					88
- 8:30	3	34	12	46	7	0	3	10	2	28	1	29					85
- 8:45	0	26	8	34	2	1	1	3	0	32	0	32					69
- 9:00	2	42	7	49	6	0	2	8	2	43	0	43					100
PEAK																	
7:15-8:15	7	181	36	217	5	3	22	27	9	144	3	147					391
4 - 4:15	5	48	4	52	9	2	6	15	2	65	1	66					133
- 4:30	2	50	5	63	12	0	1	13	2	77	4	81					157
- 4:45	0	52	4	56	12	1	6	18	1	86	3	89					163
- 5:00	0	67	1	68	10	1	5	15	0	86	3	89					172
- 5:15	0	64	3	67	8	0	3	11	0	94	1	95					173
- 5:30	0	57	9	66	11	0	2	13	2	103	2	105					184
- 5:45	0	52	1	53	13	0	4	17	0	89	4	93					163
- 6:00	0	32	2	34	6	0	2	8	0	86	1	87					129
PEAK																	
4:30-5:30	0	240	17	257	41	2	16	57	3	369	9	378					692
TOTAL																	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	EXISTING CONDITIONS

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	20	134			172	16
Peak-Hour Factor, PHF	0.79	0.79	1.00	1.00	0.76	0.76
Hourly Flow Rate, HFR (veh/h)	25	169	0	0	226	21
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	26		23			
Peak-Hour Factor, PHF	0.82	1.00	0.82	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	31	0	28	0	0	0
Percent Heavy Vehicles	20	0	20	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	25						59	
C (m) (veh/h)	1302						624	
v/c	0.02						0.09	
95% queue length	0.06						0.31	
Control Delay (s/veh)	7.8						11.4	
LOS	A						B	
Approach Delay (s/veh)	--	--					11.4	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	EXISTING CONDITIONS

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	14	351			232	13
Peak-Hour Factor, PHF	0.95	0.95	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR (veh/h)	14	369	0	0	254	14
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	57		27			
Peak-Hour Factor, PHF	0.78	1.00	0.78	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	73	0	34	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	-1			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	14						107	
C (m) (veh/h)	1307						511	
v/c	0.01						0.21	
95% queue length	0.03						0.78	
Control Delay (s/veh)	7.8						13.9	
LOS	A						B	
Approach Delay (s/veh)	--	--					13.9	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	EXISTING CONDITIONS

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	144			181	36
Peak-Hour Factor, PHF	0.82	0.82	1.00	1.00	0.79	0.79
Hourly Flow Rate, HFR (veh/h)	3	175	0	0	229	45
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	5		22			
Peak-Hour Factor, PHF	0.68	1.00	0.68	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	32	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)	-1			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	3						39	
C (m) (veh/h)	1301						727	
v/c	0.00						0.05	
95% queue length	0.01						0.17	
Control Delay (s/veh)	7.8						10.2	
LOS	A						B	
Approach Delay (s/veh)	--	--					10.2	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	EXISTING CONDITIONS

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD

Intersection Orientation: North-South

North/South Street: OLD BETHLEHEM PIKE

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	9	369			240	17
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.94	0.94
Hourly Flow Rate, HFR (veh/h)	10	410	0	0	255	18
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	41		16			
Peak-Hour Factor, PHF	0.79	1.00	0.79	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	51	0	20	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)	-1			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	10						71	
C (m) (veh/h)	1302						481	
v/c	0.01						0.15	
95% queue length	0.02						0.51	
Control Delay (s/veh)	7.8						13.8	
LOS	A						B	
Approach Delay (s/veh)	--	--					13.8	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 W/O DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD

North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	142			183	17
Peak-Hour Factor, PHF	0.79	0.79	1.00	1.00	0.76	0.76
Hourly Flow Rate, HFR (veh/h)	26	179	0	0	240	22
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	28		24			
Peak-Hour Factor, PHF	0.82	1.00	0.82	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	34	0	29	0	0	0
Percent Heavy Vehicles	20	0	20	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	26						63	
C (m) (veh/h)	1285						602	
v/c	0.02						0.10	
95% queue length	0.06						0.35	
Control Delay (s/veh)	7.9						11.7	
LOS	A						B	
Approach Delay (s/veh)	--	--					11.7	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 W/O DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	15	373			247	14
Peak-Hour Factor, PHF	0.95	0.95	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR (veh/h)	15	392	0	0	271	15
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	61		29			
Peak-Hour Factor, PHF	0.78	1.00	0.78	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	78	0	37	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	15						115	
C (m) (veh/h)	1288						489	
v/c	0.01						0.24	
95% queue length	0.04						0.90	
Control Delay (s/veh)	7.8						14.6	
LOS	A						B	
Approach Delay (s/veh)	--	--				14.6		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 W/O DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	155			193	38
Peak-Hour Factor, PHF	0.82	0.82	1.00	1.00	0.79	0.79
Hourly Flow Rate, HFR (veh/h)	3	189	0	0	244	48
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	5		23			
Peak-Hour Factor, PHF	0.68	1.00	0.68	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	33	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	3						40	
C (m) (veh/h)	1281						710	
v/c	0.00						0.06	
95% queue length	0.01						0.18	
Control Delay (s/veh)	7.8						10.4	
LOS	A						B	
Approach Delay (s/veh)	--	--				10.4		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 W/O DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	10	394			258	18
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.94	0.94
Hourly Flow Rate, HFR (veh/h)	11	437	0	0	274	19
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	44		17			
Peak-Hour Factor, PHF	0.79	1.00	0.79	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	55	0	21	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	11						76	
C (m) (veh/h)	1280						453	
v/c	0.01						0.17	
95% queue length	0.03						0.60	
Control Delay (s/veh)	7.8						14.5	
LOS	A						B	
Approach Delay (s/veh)	--	--				14.5		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 AFTER DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	169			190	17
Peak-Hour Factor, PHF	0.79	0.79	1.00	1.00	0.76	0.76
Hourly Flow Rate, HFR (veh/h)	26	213	0	0	250	22
Percent Heavy Vehicles	5	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	28		24			
Peak-Hour Factor, PHF	0.82	1.00	0.82	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	34	0	29	0	0	0
Percent Heavy Vehicles	20	0	20	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	26						63	
C (m) (veh/h)	1274						577	
v/c	0.02						0.11	
95% queue length	0.06						0.37	
Control Delay (s/veh)	7.9						12.0	
LOS	A						B	
Approach Delay (s/veh)	--	--				12.0		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK AND FORREST RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 AFTER DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: FORREST ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	15	389			274	14
Peak-Hour Factor, PHF	0.95	0.95	1.00	1.00	0.91	0.91
Hourly Flow Rate, HFR (veh/h)	15	409	0	0	301	15
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	61		29			
Peak-Hour Factor, PHF	0.78	1.00	0.78	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	78	0	37	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	15						115	
C (m) (veh/h)	1256						462	
v/c	0.01						0.25	
95% queue length	0.04						0.97	
Control Delay (s/veh)	7.9						15.4	
LOS	A						C	
Approach Delay (s/veh)	--	--					15.4	
Approach LOS	--	--					C	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	AM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 AFTER DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	184			200	38
Peak-Hour Factor, PHF	0.82	0.82	1.00	1.00	0.79	0.79
Hourly Flow Rate, HFR (veh/h)	3	224	0	0	253	48
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	5		23			
Peak-Hour Factor, PHF	0.68	1.00	0.68	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	33	0	0	0
Percent Heavy Vehicles	11	0	11	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	3						40	
C (m) (veh/h)	1272						694	
v/c	0.00						0.06	
95% queue length	0.01						0.18	
Control Delay (s/veh)	7.8						10.5	
LOS	A						B	
Approach Delay (s/veh)	--	--					10.5	
Approach LOS	--	--					B	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	AUH
Agency/Co.	H&K
Date Performed	3/15/2011
Analysis Time Period	PM PEAK

Site Information

Intersection	O. BETHLEHEM PK & GREEN TOP RD
Jurisdiction	EAST ROCKHILL TOWNSHIP, PA
Analysis Year	2017 AFTER DEVEL.

Project Description: McCLENNEN PROPERTY

East/West Street: GREEN TOP ROAD | North/South Street: OLD BETHLEHEM PIKE

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	10	409			284	18
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.94	0.94
Hourly Flow Rate, HFR (veh/h)	11	454	0	0	302	19
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	44		17			
Peak-Hour Factor, PHF	0.79	1.00	0.79	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	55	0	21	0	0	0
Percent Heavy Vehicles	4	0	4	0	0	0
Percent Grade (%)		-1			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	11						76	
C (m) (veh/h)	1250						428	
v/c	0.01						0.18	
95% queue length	0.03						0.64	
Control Delay (s/veh)	7.9						15.2	
LOS	A						C	
Approach Delay (s/veh)	--	--					15.2	
Approach LOS	--	--					C	

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