August 14, 2017

Mr. M. Sooriyakumaran, P. Eng.
CKM Engineering Inc.
By Email: soori.ckm@gmail.com

RE: Addendum to the Traffic Impact Statement - Proposed Raines Mill Residential Development, St. Margarets Bay Road, Lakeside, NS

Dear Soori:

We are responding to comments dated December 7, 2016 that were provided by HRM Traffic Management on the Traffic Impact Statement for Proposed Raines Mill Residential Development (HRM Case File #20795). The following includes our response to each comment.

Comment 1: Traffic count data used was collected in 2010. Updated volumes should be collected to assess existing conditions on St. Margaret's Bay Road. The updated data should include turning movements at the intersection with Oliver Street.

Response: Intersection turning movement counts at the St. Margarets Bay Road at Oliver Street intersection were collected by WSP on Thursday June 22, 2017 for the AM and PM peak periods. The turning movement count is attached in the Appendix with peak hours indicated by shaded areas.

Observed June 2017 two-way traffic volumes at the site include approximately 850 vehicles during the AM peak hour and 1200 vehicles during the PM peak hour. These observed volumes are lower but comparable than the 2016 two-way volumes projected in *Traffic Impact Statement* (WSP, 2016) of 1000 AM peak hour vehicles and 1300 PM peak hour vehicles.

Comment 2: The proposed development will connect with St. Margaret's Bay Road opposite Oliver Street. Please provide more detail on the proposed intersection, including comments on existing site observations.

Response: The proposed intersection of St. Margarets Bay Road at Oliver Street will be a four legged, two-way STOP controlled intersection with the new site access forming the north leg of the intersection. The proposed access will include curb at the intersection that transitions to curb on St. Margarets Bay Road. There is existing sidewalk on the north side (site side) of St. Margarets Bay Road.

Comment 3: Stopping site distances have been calculated based on a 50km/h approach speed. What are the prevailing site conditions for this section of St. Margarets Bay Rd? Is 50 km/h representative of the site conditions?

Response: Traffic speed and volume data were collected on St. Margarets Bay Road at Oliver Street by WSP between 8:00 AM Friday, June 23, 2017 and 1:00 PM, Wednesday, June 28, 2017 using radar. The average travel speed on St. Margarets Bay Road during this period was 52.7 km/h. The data is attached in the Appendix.

Comment 4: The average trip generation rates appear to have been used rather than the equations, which could result in a higher number of trips generated. The equations are recommended for use.

Response: When using the published trip generation rates in *Trip Generation, 9th Edition* (Institute of Transportation Engineers, Washington, 2012) the transportation engineer's objective should be to provide a realistic estimate of the number of trips that will be generated. For smaller developments that have unit counts well below the averages seen in the ITE studies, the use of the fitted curve equations may provide estimates that are unreasonably high for the size of the development (while underestimating trip generation for very large developments). The number of proposed single family residential units (41) is well below the average rates for the AM (292)

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and PM (321) and the number of proposed apartment units (40) is well below the average rates for the AM (235) and PM (233). Since the use of the average rate for Single Family Detached Housing (Land Use 210, Pages 297 and 298) and those for Apartment (Land Use 220, Page 334 and 335) were expected to provide more realistic trip generation estimates for this development, the average rates were used in *Traffic Impact Statement* (WSP, May 2016).

Although the use of average rates is expected to produce a more accurate estimate of the trips generated by this development, WSP has reviewed the trip generation estimates (top section, Table 1) and compared them to those obtained using the fitted curve equations for the AM and PM peak hours to estimate the trips generated by the development (bottom section, Table 1).

Table 1 – Trip Generation Estimates for the Proposed Development

Land Use	Units[3]	Trip Generation Rates				Trips Generated[4]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		In	Out	In	Out	In	Out	In	Out
Trip Generation Estimate for Residential Development (Average Rates)[1]									
Single Family Residential (Land Use 210)	41	0.19	0.56	0.63	0.37	8	23	26	15
Apartment (Land Use 220)	40	0.10	0.41	0.40	0.22	4	16	16	9
Trip Generation Estimates using the average rates						12	39	42	24
Trip Generation Estimate for Residential Development (Fitted curve equations)[2]									
Single Family Residential (Land Use 210)	41	Fitted Curve Equations have been Used				10	29	30	17
Apartment (Land Use 220)	40					5	19	26	14
Trip Generation Estimates using the fitted curve equations						15	48	56	31
% Increase in estimated trips by using the fitted curve equations						27%	22%	34%	29%

Notes:
1. Trip generation rates are 'vehicles per hour per unit' for the indicated land use which have been prepared using published rates from *Trip Generation, 9th Edition* (Institute of Transportation Engineers, Washington, 2012).
2. Trip generation rates use the fitted curve equation for indicated Land Uses and Land Use Codes from *Trip Generation, 9th Edition* (Institute of Transportation Engineers, Washington, 2012).
3. Units are number of residential units.
4. Vehicles per hour for peak hours

Trip generation estimates for the development include 51 two-way vehicle trips (12 entering and 39 exiting) during the AM peak hour and 66 two-way vehicle trips (42 entering and 24 exiting) during the PM peak hour.

The fitted curve equations indicate a trip generation for the development of 63 two-way vehicle trips (15 entering and 48 exiting) during the AM peak hour and 87 two-way vehicle trips (56 entering and 31 exiting) during the PM peak hour.

The fitted curve equations provide trip generation estimates that are 22% to 34% higher than the trip generation estimates using the average rates for this development. Although trips estimated using the fitted curve equations provide generation that are higher than we expect for this project, even with the higher number of trips, the site is not expected to have any significant impact on the level of performance of St. Margarets Bay Road at this location.

If you have any questions or comments, please contact me by email at patrick.hatton@wsp.com or by telephone at 902-835-9955 extension 347.

Sincerely,

Patrick Hatton

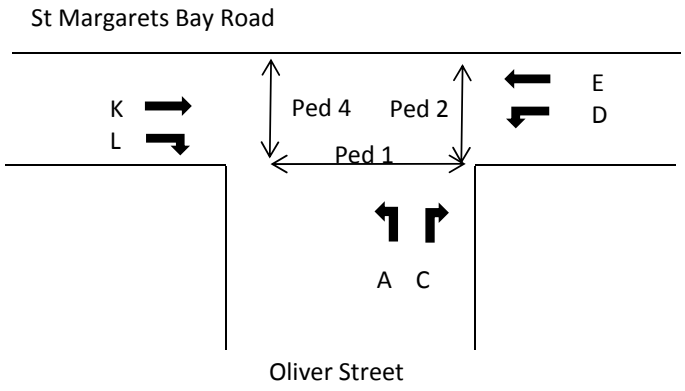
Patrick Hatton
Transportation Engineer

Table A-1

St Margarets Bay Road @ Oliver Street

Lakeside, NS

Thursday, June 22, 2017



AM Peak Period Volume Data

Time		Oliver Street Northbound Approach		St Margarets Bay Road Westbound Approach		St Margarets Bay Road Eastbound Approach		Total Vehicles
		A	C	D	E	K	L	
07:00	07:15	1	6	6	26	149	5	193
07:15	07:30	2	14	7	35	131	10	199
07:30	07:45	2	8	2	42	166	9	229
07:45	08:00	3	8	8	35	151	5	210
08:00	08:15	5	11	4	58	162	7	247
08:15	08:30	4	8	4	33	133	5	187
08:30	08:45	2	6	1	43	130	6	188
08:45	09:00	1	7	6	53	84	5	156
AM Peak Hour		**12**	**41**	**21**	**170**	**610**	**31**	**885**
07:00	**08:00**	**8**	**36**	**23**	**138**	**597**	**29**	**831**
08:00	**09:00**	**12**	**32**	**15**	**187**	**509**	**23**	**778**
		Ped 1		**Ped 2**		**Ped 4**		**Total Peds**
07:00	**08:00**	**0**		**0**		**0**		**0**
08:00	**09:00**	**2**		**0**		**1**		**3**

PM Peak Period Volume Data

Time		Oliver Street Northbound Approach		St Margarets Bay Road Westbound Approach		St Margarets Bay Road Eastbound Approach		Total Vehicles
		A	C	D	E	K	L	
16:00	16:15	5	2	9	143	85	5	249
16:15	16:30	8	12	13	175	61	6	275
16:30	16:45	7	9	14	196	67	4	297
16:45	17:00	8	14	12	193	92	4	323
17:00	17:15	5	8	12	202	73	1	301
17:15	17:30	3	8	11	197	98	4	321
17:30	17:45	4	10	8	170	103	0	295
17:45	18:00	3	2	3	144	89	0	241
PM Peak Hour		**23**	**39**	**49**	**788**	**330**	**13**	**1242**
16:00	**17:00**	**28**	**37**	**48**	**707**	**305**	**19**	**1144**
17:00	**18:00**	**15**	**28**	**34**	**713**	**363**	**5**	**1158**
		Ped 1		**Ped 2**		**Ped 4**		**Total Peds**
16:00	**17:00**	**0**		**0**		**3**		**3**
17:00	**18:00**	**0**		**0**		**0**		**0**

Location: St. Margaret's Bay Road @ Oliver Street
Dates: 8:00 AM, Friday, June 23, 2017
to 1:00 PM, Wednesday, June 28, 2017

Two-way Average Hourly Traffic Volume

Min Speed	1	21	25	29	33	37	41	45	49	53	57	61	65	69	73	77	81	85	>	
Max Speed	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	89	Total
Start Time																				
12:00 AM	0	0	0	1	0	2	2	11	11	23	11	8	4	1	1	0	0	0	0	75
01:00	0	0	0	0	0	0	1	3	5	11	6	5	2	1	0	0	0	0	0	34
02:00	1	0	0	1	0	1	1	4	3	6	4	3	2	0	0	0	0	0	0	26
03:00	0	0	0	0	0	0	1	4	4	7	4	2	1	0	0	0	0	0	0	23
04:00	0	0	0	0	0	0	0	3	5	11	6	5	1	1	0	0	0	0	0	32
05:00	0	0	1	1	0	1	1	8	15	27	21	13	5	3	1	0	0	0	0	97
06:00	2	2	0	1	5	11	7	47	49	99	48	34	10	3	1	0	0	0	0	319
07:00	9	8	10	14	26	55	38	116	81	108	44	29	6	4	2	0	0	0	0	550
08:00	5	3	5	14	18	30	31	101	85	142	57	39	10	3	1	0	0	0	0	544
09:00	3	2	3	7	6	17	17	77	82	143	65	36	10	4	1	1	0	0	0	474
10:00	3	2	3	4	4	12	23	81	84	156	82	52	13	4	0	0	0	0	0	523
11:00	4	1	2	4	5	11	15	101	101	165	78	49	11	4	0	0	0	0	0	551
12:00 PM	3	3	2	4	6	21	28	108	111	195	95	56	13	3	0	1	0	0	0	649
01:00	4	2	5	2	5	14	18	101	103	198	109	67	13	9	1	1	0	0	0	652
02:00	6	1	5	5	9	25	25	98	110	196	81	58	14	3	0	0	0	0	0	636
03:00	4	3	2	6	7	23	20	113	105	204	107	72	16	8	1	0	0	0	0	691
04:00	5	5	5	13	16	24	32	147	154	245	113	67	12	8	1	1	0	0	0	848
05:00	5	3	5	15	15	41	32	122	119	235	105	71	13	4	2	2	0	0	0	789
06:00	2	2	3	2	5	11	15	92	106	204	107	75	20	7	2	1	0	0	0	654
07:00	2	1	2	4	3	8	12	69	87	182	98	60	15	3	1	1	1	0	0	549
08:00	2	1	2	1	2	9	7	56	76	153	68	51	16	5	2	0	0	0	0	451
09:00	1	0	2	2	1	10	9	55	54	104	53	36	7	6	1	1	0	0	0	342
10:00	0	0	0	2	1	7	5	32	35	65	26	22	5	4	0	0	0	0	0	204
11:00	0	0	0	0	1	2	2	17	19	35	17	10	4	3	1	0	0	0	0	111
Total	**61**	**39**	**57**	**103**	**135**	**335**	**342**	**1566**	**1604**	**2914**	**1405**	**920**	**223**	**91**	**19**	**9**	**1**	**0**	**0**	**9824**

ADT **9824**
Average Speed **52.7 km/h**
85th Percentile Speed **60.0 km/h**