

April 19, 2018

Project No. 18-003-47E

VIA EMAIL: (CHRIS.BOWLES@OLIVERPAIPOONGE.ON.CA)

Mr. Chris Bowles
Director of Operations
Municipality of Oliver Paipoonge
3250 Hwy 130
Rosslyn, ON, P7K 0B1

Dear Mr. Bowles:

**Re: Municipality of Oliver Paipoonge
Limited Traffic Count Report**

Introduction

True Grit Engineering (TGE) was retained by the Corporation of the Municipality of Oliver Paipoonge (OP), to conduct a limited traffic count exercise, at the intersection of Highway 11/17 and Highway 102. The intent of the exercise was to attain traffic volumes on all three legs of the intersection, for the purpose of publishing the results of the limited study with focus on the total traffic numbers recorded and subsequently, the established percentage of truck volumes included in the total volumes recorded.

The study was completed over the course of two (2) consecutive days, both of which were held in order to achieve 8-hour counts on both dates. Traffic volumes were recorded between the hours of 8:00 and 12:00 and then 13:00 to 17:00 on each of the 2 days. The study was completed on Monday, April 3 and Tuesday, April 4, 2018. The following is a compilation of the data that was collected during the study, as well as a brief analysis of the results.

Limited Traffic Count Process

The traffic count was completed from the safety of an abandoned gas station property, located in the west quadrant of the intersection of Highway 11/17 and Highway 102. From that location, traffic volumes were recorded and separated into three distinct categories for the purpose of the analysis. All traffic entering into the intersection to and from the EB and WB directions on Highway 102 were recorded. Vehicles were classified as either a passenger vehicle (denoted in study as car) and trucks. Car classification was considered as any passenger vehicles and included all cars, small passenger trucks and vans. Trucks were considered to be any vehicle equivalent in size to a single-unit truck (SU) and larger. Single-Unit trucks have an overall length of 9.1 m, according to the MTO Geometric Design Manual for Provincial Highways. It was noted during the study that there were limited numbers of smaller sized trucks; the vast majority of vehicles that were recorded as trucks were composed of WB 15 and WB 17.5 type vehicles.

Highway 102 occurs on the east quadrant of the target intersection. Highway 102 was divided into Highway 102 eastbound (EB) and Highway 102 westbound (WB), respectively. Highway 11/17 occurs in both the north and south quadrants of the intersection. As such, Highway 11/17 was broken into a Highway 11/17 North and Highway 11/17 south, respectively. Similar to Highway 102, each of the two quadrants of Highway 11/17 were broken into a northbound (NB)

and southbound (SB) column, for the purpose of the study. Separate tables were completed for each of the 2 days of the study. Please refer to Appendix A of this report for the results of the limited traffic count exercise.

Method of Analysis

In order to analyze the results of the limited study, TGE utilized a combination of two different techniques. The reason for using two different techniques was due to a lack of standard tools and calculations to perform the analysis and therefore, each served as a check on the results of the other method.

The first method used in the analysis was chosen based on the length of the study and limitations surrounding the sample size collected. As such, TGE has utilized adjustment factors to the results to account for hourly variations in regular traffic flow, in order to achieve an equivalent 24-hour volume. The Hourly Expansion Factors (HEF) used were taken from values published by The Federal Highway Administration (FHWA) for Rural Primary Roadways. Hourly Expansion Factors are used to expand volumes attained during counts of less than a 24-hour continuous period, to 24-hour volumes by multiplying the individual hourly volumes for each hour during the count period by the HEF for that hour and finding the mean of the products.

The values of HEF used are presented in Table 1.1 as follows:

Individual Hour of Count	HEF
8:00 – 9:00	22.05
9:00 – 10:00	18.80
10:00 – 11:00	17.10
11:00 – 12:00	18.52
13:00 – 14:00	16.71
14:00 – 15:00	14.84
15:00 – 16:00	14.77
16:00 – 17:00	12.85

Further, the study has used Daily Expansion Factors (DEF), in order to determine weekly volumes from the 24-hour calculations, by multiplying the 24-hour volumes by the DEF. Similar to the HEF, the Daily Expansion Factors used for the purpose of this study were taken from those published by the FHWA for a Rural Primary Roadway.

The values of DEF are presented in Table 1.2 as follows:

Day of the Week	DEF
Sunday	9.515
Monday	7.012
Tuesday	7.727
Wednesday	6.582
Thursday	7.012
Friday	5.724
Saturday	6.510

Lastly, Monthly Expansion Factors (MEF) were used in order to calculate an AADT for the section of roadway. The AADT is obtained by multiplying the volume of traffic by the MEF. It should be noted that this method of calculating the traffic volumes has only been applied to the volumes obtained on Highway 102. As Highway 11/17 is not considered as a Highway as opposed to a Primary Rural Roadway, the use of these expansion factors were found to skew the results and therefore have been dismissed as being unreliable.

The second method used was to calculate a simple ratio of the number of trucks versus total volumes for each of the target sections of roadway. Even though the duration of the study was short-term, performing a ratio calculation is a viable means to determine the approximate truck volumes, as the study was conducting on multiple days and over the course of an 8-hour period.

MTO Published AADT

The MTO has published values for AADT for all provincial highways throughout the province. The following information has been obtained from the Ministry of Transportation website www.raqsa.mto.gov.on.ca. The values published by MTO for the subject sections of highway are presented in Table 1.3 as follows:

Subject section of Highway	Location Description from (from MTO counter description)	Location description to (from MTO counter description)	AADT
Highway 102	Thunder Bay (W LTS) – Oliver Paipoonge (E LTS)	W jct Hwys 11/17 – Hwy end	2,550
Highway 11/17	SEC Hwy 590 (S)	Hwy 102(N) – Sistonen’s Corner	2,500
Highway 11/17	Hwy 102 (N) – Sistonen’s Corner	Finmark Road (N)	3,900

The above published values are from the 2016 MTO Traffic Volume Publication.

Summary of Results

Upon review of the analysis completed, it is apparent that the Expansion Factor method used is an acceptable approach with respect to the results for Highway 102, however, the results were skewed for the calculations completed for the Highway 11/17 sections. As such, they have not been considered accurate for the purpose of this study. In order to explain the skewing of the Highway 11/17 results, the FHWA publications suggest that this method should not be used on interstate (provincial) highways generally, because of the higher traffic volumes and vehicular/driver tendencies and behavior from the hourly, daily and monthly variations.

Table 1.4 summarizes the results:

HIGHWAY 102				
Direction (EB/WB)	Time Period	Number of Trucks	Total Traffic	% Trucks
EB	Monday	109	375	29.1 %
WB	Monday	178	473	37.6 %
EB	Tuesday	122	377	32.4 %
WB	Tuesday	132	385	34.3 %
Average for section				33.3 %
HIGHWAY 11/17 North				
Direction (EB/WB)	Time Period	Number of Trucks	Total Traffic	% Trucks
NB	Monday	285	926	30.8 %
SB	Monday	217	743	29.2 %
NB	Tuesday	262	839	31.2 %
SB	Tuesday	249	767	32.5 %
Average for section				30.9 %
HIGHWAY 11/17 South				
Direction (EB/WB)	Time Period	Number of Trucks	Total Traffic	% Trucks
NB	Monday	137	527	26.0 %
SB	Monday	138	442	31.2 %
NB	Tuesday	140	528	26.5 %
SB	Tuesday	137	464	29.6 %
Average for section				28.3 %

Highway 102

For the Highway 102 traffic volumes, based on the Expansion Factor method, it was calculated that the AADT of Highway 102 based on Monday's count was 2,600 vehicles and 2,581 vehicles for Tuesday's count. Both results fall very close to the MTO's published AADT of 2,550, and therefore are considered a viable approach to the calculations. Based on the data presented in Table 1.4, the overall average of truck volumes, it has been identified that all ratios were calculated with similar results. The overall average of all subject quadrants results in an average of 30.8 % trucks. When comparing the AADT of trucks based on the Expansion Factor method and using the calculated truck volume ratios, the results are presented in Table 1.5 as follows:

Subject section of Highway	AADT Based on EF and averaged over 2-days	Truck AADT Based on EF (33.5%)	AADT (From published MTO values)	Truck AADT (30.8%)
Highway 102	2,590	869	2,550	785

Conclusion

Although the study conducted was limited in terms of time and data collected, a comparison of the results and upon comparison of those results with published values obtained elsewhere, there is evidence to suggest that the correct volume of trucks utilizing the Highway 102 corridor equates to approximately 30% of all vehicles using the roadway. Using the MTO's published values for AADT for the subject section of Highway, the data analyzed results in a total truck volume AADT of 765 vehicles per day (using the more conservative of the values presented).

The information and data contained in this report, including without limitation, the results of any sampling and analyses conducted by TGE pursuant to its Agreement with the client, have been developed or obtained through the exercise of TGE's professional judgment and are set forth to the best of TGE's knowledge, information and belief. Although every effort has been made to confirm that this information is factual, complete and accurate, TGE makes no guarantees or warranties whatsoever, whether expressed or implied, with respect to such information or data. The information and data presented in this report are based on the purpose and scope of the project and form the basis for any conclusions and recommendations presented herein. Any conclusions and recommendations presented herein do not preclude the existence of environmental concerns other than those that may have been identified. Work performed by TGE personnel employed sound engineering assessment principles. TGE cannot guarantee the accuracy and reliability of information provided by others or third parties. Therefore, TGE does not claim responsibility for undisclosed environmental concerns or conditions that may result in costs for environmental clean-up and/or remediation. This report is intended for information purposes only.

Respectfully submitted by:

TRUE GRIT ENGINEERING



Kevin Briggs, P.Eng.

Project Engineer

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Appendices: Appendix A – Raw Data from Traffic Counts
 Appendix B – Traffic Count Tables
 Appendix C – Map of the Subject Intersection

Appendix A: Raw Data From Traffic Counts

Sistonens Corners

Date: 3/4/10

Time: 8:00 - 9:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
19	18	7	1	8	3
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
49	33	16	5	12	6

FROM PARK

N

CAME FROM SOUTH.
(INCLUDED IN OVERALL COUNT)

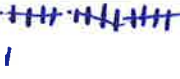
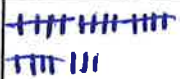
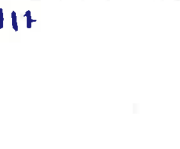
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Sistonens Corners

Date: 3/4/18

Time: 9:00 - 10:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
 19	 16	 23	 2	 12	 1
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 65	 32	 32	 3	 25	 1

Sistonens Corners

Date: 3/4/18

Time: 10:00 - 11:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
 23	 11	 16	 2	 5	 3
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 22	 22	 27 32	 4	 20	 1

Sistonens Corners

Date: 3/4/18

Time: 11:00-12:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
15	13	13	1 1	14	1 1
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
53	29	40	2	28	3

Sistonens Corners

Date: 3/4/18

Time: 1:00-2:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
15	23	16	4	11	1
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
38	46	46	3	35	5

Sistonens Corners

Date: 3/4/18

Time: 2:00:300

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
13	30	19	2	15	4
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
39	31	38	1	40	2

Sistonens Corners

Date: 3/4/18

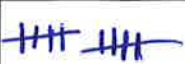
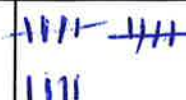
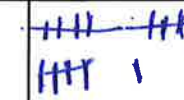
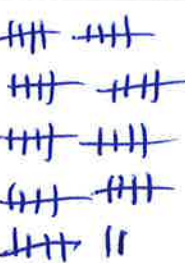
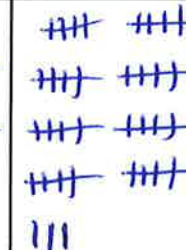
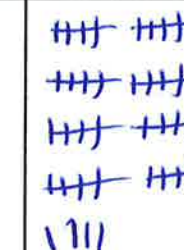
Time: 3:06 - 4:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
	 11				
10	17	13	4	15	Ø
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 	 	 		 	11
54	47	41	Ø	39	2

Sistonens Corners

Date: 3/4/18

Time: 4:00 - 5:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
 	 	 	 	 	
10	33	14	1	16	0
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 	 	 	 	 	
47	34	43	3	44	3

Sistonens Corners

Date: 4/4/18

Time: 8:00 - 9:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
1	1	111			
16	16	13	0	5	0
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
1		111			
46	24	23	4	17	2

Sistonens Corners

Date: 4/4/12

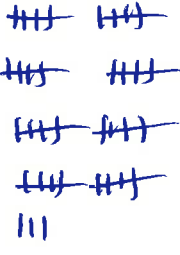
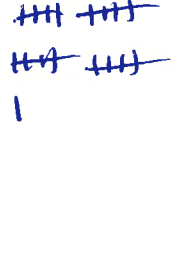
Time: 9:00-10:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
28	13	15	Ø	13	2
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
43	29	28	5	21	2

Sistonens Corners

Date: 4/4/18

Time: 10:00 - 11:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
 17	 14	 11	 1	 19	 0
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 43	 21	 33	 8	 18	 1

Sistonens Corners

Date: 4/4/18

Time: 11:00-12:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
			1		
20	16	19	1	16	0
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
			2		
37	30	44	2	23	5

Sistonens Corners

Date: 4/4/18

Time: 1:00 - 2:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
1		1		1	
11	20	16	Ø	11	Ø
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
46	28	40	3	40	6

Sistonens Corners

Date: 4/4/18

Time: 2:00 - 3:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
	1				1
17	16	13	2	25	1
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
	1	1	1	1	
47	26	36	6	36	4

Sistonens Corners

Date: 4/4/18

Time: 3:00 - 4:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
 	 	 		 	
18	16	23	1	13	0
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
 	 	 		 	
51	23	35	4	36	3

Sistonens Corners

Date: 4/4/82

Time: 4:00 - 5:00

North		South		East	
From South	From East	From North	From East	From North	From South
Trucks		Trucks		Trucks	
9	15	21	1	16	2
North		South		East	
From South	From East	From North	From East	From North	From South
Cars		Cars		Cars	
48	35	51	5	37	4

Appendix B: Traffic Count Tables

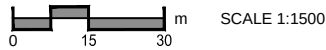
3-Apr-18												
Heading North On HWY 17					Heading South On HWY 17				Heading East On HWY 102			
From	South HWY 17		East HWY 102		North HWY 17		East HWY 102		North HWY 17		South HWY 17	
Time	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars
8:00-9:00	19	49	18	33	7	16	1	5	8	12	3	6
9:00-10:00	19	65	16	32	23	32	2	3	12	25	1	1
10:00-11:00	23	22	11	22	16	27	2	4	5	20	3	1
11:00-12:00	15	53	13	29	13	40	1	2	14	28	1	3
13:00-14:00	15	38	23	46	16	46	4	3	11	35	1	5
14:00-15:00	13	39	30	31	19	38	2	1	15	40	4	2
15:00-16:00	10	54	17	47	13	41	4	0	15	39	0	2
16:00-17:00	10	47	33	34	14	43	1	3	16	44	0	3
A.M. Total	76	189	58	116	59	115	6	14	39	85	8	11
P.M. Total	48	178	103	158	62	168	11	7	57	158	5	12
Day Total	124	367	161	274	121	283	17	21	96	243	13	23
Combined	491		435		404		38		339		36	

4-Apr-18												
Heading North On HWY 17					Heading South On HWY 17				Heading East On HWY 102			
From	South HWY 17		East HWY 102		North HWY 17		East HWY 102		North HWY 17		South HWY 17	
Time	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars
8:00-9:00	16	46	16	24	13	23	0	4	5	17	0	2
9:00-10:00	28	43	13	29	15	28	0	5	13	21	2	2
10:00-11:00	17	43	14	21	11	33	1	8	19	18	0	1
11:00-12:00	20	37	16	30	19	44	1	2	16	23	0	5
13:00-14:00	11	46	20	28	16	40	0	3	11	40	0	6
14:00-15:00	17	47	16	26	13	36	2	6	25	36	1	4
15:00-16:00	18	51	16	23	23	35	1	4	13	36	0	3
16:00-17:00	9	48	15	35	21	51	1	5	16	37	1	4
A.M. Total	81	169	59	104	58	128	2	19	53	79	2	10
P.M. Total	55	192	67	112	73	162	4	18	65	149	2	17
Day Total	136	361	126	216	131	290	6	37	118	228	4	27
Combined	497		342		421		43		346		31	

Appendix C: Map of the Subject Intersection



Scale



Municipality of Oliver Paipoonge
Limited Traffic Study
Sistonens Corner



Designed By:
Approved By:
Date: September 13, 2017

Location Plan

FIGURE 1