ROAD NEEDS STUDY

TOWNSHIP OF BLIND RIVER

July, 2014

Project No. 14-149

Contents

1 ROAD STUDY BACKGROUND AND PURPOSE

The Township of Blind River recently commissioned Infrastructure Solutions Inc. to assess the existing condition of the road system and determine the road condition ratings for the various road sections. This report provides a summary of the road assessment performed by Infrastructure Solutions Inc. during the summer of 2014. The scope of the study is limited to provide only condition ratings of the road surfaces. This report excludes the condition assessment of other transportation related facilities such as sidewalks, curbs, streetlights, signals and road needs studies for drainage, traffic studies, geometrics, travel platform and shoulder studies and traffic capacity.

The primary purpose of this Road Needs Study is to assist the Township in making informed decisions concerning the immediate and future needs of the Township's roads. The information on the road conditions within the Township has been used to develop a 10-Year Capital Plan (2013 to 2022) to forecast the future needs of the Township in accordance with a cost effective use of the available funds.

2 STUDY METHODOLOGY

The study methodology followed throughout this study is the one recommended by the Ministry of Transportation, Ontario. Ontario roads are classified as rural, semi-urban and urban roads. The surface types are generally Gravel, Earth, Low Class Bituminous (LCB), and High Class Bituminous (HCB). The road sections for the Township are comprised of Gravel, LCB and HCB roads.

All the road sections were traversed several times to measure the distresses based on the following condition rating systems:

- Road Condition Rating (RCR)
- Pavement Condition Index/Rating (PCI)

The first trip on each road section was to calculate the Road Condition Rating (RCR) based on the ride quality and comfort of the roads, by driving along at the posted speed. RCR is the degree of the riding comfort that the pavement provides to the travelling public. The evaluator drives along the pavement sections and rates whether the road is very smooth or a comfortable ride. With RCR, the evaluator is more concerned with the ride comfort than the appearance of the pavement. The RCR is rated from a scale 0 to 10 (Very Poor to Excellent), where a higher number means a better road, and a lower the number means a worse road. The various portions of the section are picked for further investigation to calculate the Pavement Condition Index (PCI).

Once the evaluator has determined the riding condition, subsequent trips are made to identify the various pavement distresses based on visual inspection and the PCI. Here, the evaluator determines the severity and extent of each distress and assigns them separate weights and scores. The PCI is a subjectively derived rating of serviceability, based on an evaluation of pavement riding comfort and of pavement surface distresses, such as distortion, cracking, alligator cracking and so on. The PCI is assessed based on the condition of pavement with respect to the severity and extent of various distresses, and the functional and structural

performance of the pavement. The PCI is a rating from 0 to 100 (Very Poor to Excellent), where a higher number means a better road, and a lower number means a worse road. Each pavement is analyzed in a detailed manner for surface defects, surface deformation and cracking. Respective points are assigned for severity and extent of distress, after which the PCI is calculated for the pavement. The severity of a distress was classified as slight, moderate and severe, and the density was classified as Intermittent, Frequent and Extensive.

Both the PCI and the RCR are visual and use only non-destructive techniques for analysis. The following manuals by the Ministry of Transportation, Ontario were referred to, for the analysis of the distresses on Gravel, LCB (Low Class Bituminous/Surface Treated Pavements)) and HCB (High Class Bituminous/Flexible Pavements) roads:

- Manual for Condition Rating of Gravel Surface Roads (SP-025)
- Manual for Condition Rating of Surface-Treated Pavements (SP-021)
- Manual for Condition Rating of Flexible Pavements (SP-024)

The RCR and PCI calculated in this study, provide the present conditions of each pavement section in the Township, and further assist in the prediction of immediate or future road resurfacing and reconstruction needs.

3 PAVEMENT DISTRESSES

The main surface distresses observed, vary according to the surface types (Gravel, Surface Treated (LCB) and Paved (HCB)). For LCB and HCB pavements, the major distresses taken for analysis are based on SP-021 and SP-024:

- **Loss of Coarse Aggregates** – Visible small pock marks appear on the pavement surface due to loss of coarse aggregates and propagate downwards for further loss of fine and coarse aggregate. The pavement surface will have the appearance of an open matrix with all coarse aggregates in spots.

- **Flushing** – The presence of free asphalt binder on the pavement surface due to separation of binder and aggregates in hot climates. This would be due to high asphalt content compared to air voids and high traffic volume which would worsen the condition.

- **Streaking** – The occurrence of alternate lean and thick lines parallel to the centerline of the road. Some even occur in the transverse direction; streaking usually results from a faulty spray bar height, angle and cold pavements.

- **Potholes** – Potholes are round or irregular shaped holes in pavement due to poor construction technique, poor quality material, and poor aggregates.

- **Pavement Edge Breaks** – The edge breaks occur with or without cracks due to frost action, excessive traffic loading at pavement edge, poor drainage at edge and shoulders, and insufficient bearing support.

- **Rippling** – Regular transverse undulations in the pavement surface consisting of closely spaced alternate valleys and crests; unevenness of pavement surface caused by traffic action moving surface mat forward, backward or sideways, eventually causing flushing. The major causes include unstable granular base, excessive asphalt, traffic action and poor workmanship.

- **Wheel Track Rutting** – Repeated load application due to compaction and permanent deformation under load and pavement material shoving sideways causing longitudinal depression on wheel tracks. Deep ruts are often accompanied by longitudinal cracking in wheel tracks. The main causes are poorly compacted structural layer, unstable granular base, or sub-base, overstressed subgrade and positive pore water pressure.

- **Distortion** – Any deviation of pavement surface from its original shape is known as distortion. These distortions are the result of slope failure, settlement, and frost heaving and take the form of dishing, bumps, dips, tenting, or stepping; the moving vehicles have pitching, rolling and jarring effects.

- **Longitudinal Cracking** – These cracks are observed in the direction of travel and are usually situated at the center of wheel tracks, centerline, and mid-lane. Major causes are traffic loading combined with weak pavements, environmental and climatic conditions, and poor construction techniques.

- **Transverse Cracking** – Cracks occur perpendicular to the travel direction, and are usually regularly spaced if full width, and for half width, cracks occur at shorter intervals. The major cause is low temperature and frost action which causes the pavement surface to shrink.

- **Map Cracking** – These are cracks which are polygonal in shape that resemble a map. The cracks are a combination of transverse and longitudinal cracks.

- **Pavement Edge Cracking** – These cracks are usually parallel to the pavement edge and occur within 300 mm of pavement edge, which are either a continuous crack or crescent shaped cracks in a wave formation. These, if left untreated, may progress to the outer lanes of the pavement and farther. Major causes include frost action, poor drainage facility, inadequate pavement width and insufficient bearing support.

- **Alligator Cracking** – The name comes from the resemblance of the formation of a network of cracks with that of an alligator skin. These cracks are polygonal blocks, ranging from a few millimeters to 300 mm. This cracking is caused by softening of a part of structure due to repeated loading, thereby making it unable to hold the loads. Mostly, when longitudinal and transverse cracks are left unsealed, water percolates into the bottom layers of the pavement, causing softening and further alligatoring. These cracks are progressive under traffic and rain.

The following photographs show examples of some of these distresses for several road sections in the Township:

Pine Drive: Distortion, Ravelling and Cover Aggregate Loss

Boom Camp Road: Rutting, Washboard and Loose Gravel

Marina Road: Distortion, Pavement Edge Cracking and Cover Aggregate Loss

Magog Lake Road: Distortion, Ravelling and Center Line Cracking

Robb Road: Rutting, Map Cracking and Longitudinal Cracking

Robb Road: Severe Center Line Cracking

Schurm Avenue: Pavement Edge Alligator Cracking

Birch Street: Ravelling, Longitudinal and Transverse Cracking

Old Steel Road: Ravelling and Cover Aggregate Loss

For Gravel roads, the major distresses analyzed based on SP-025 are:

- **Loose Gravel** – Gravel surface loosely compacted results in gravel alongside wheel tracks, and wind-rows, along the shoulder, parallel to direction of traffic. The cause is due to insufficient or no compaction, and continuous traffic action.

- **Dust** – Creation of dust clouds due to traffic action which affects visibility and judgment of on-coming vehicles.

- **Potholes** – In gravel roads bowl-shaped depressions on road surface, due to frost action, excess moisture and inadequate structural strength, due to insufficient structural thickness. They are often round, oval or irregular in shape.

- **Breakup** – Subgrade soils punched up through the gravel surface, usually with the broken surface area surrounded by depression or dishing type of distortion, with distortion most likely at wheel tracks. These are caused due to frost action, inadequate structural strength and traffic action combined with excessive moisture.

- **Washboard** – A series of closely-spaced crests and valleys which resembles an old fashioned washboard surface. Washboarding occurs with ripples perpendicular to the direction of travel, and more at the wheel tracks though it covers the whole of the pavement surface area. These are caused due to traffic action combined with loose gravel, insufficient structural strength and acceleration and deceleration at curves.

- **Rutting** – Generally occurs in the direction of traffic with surface depressions in the wheel path, and usually resembles a longitudinal trough, caused by traffic loadings, inadequate structural strength and excessive moisture combined with traffic.

- **Flat or Reverse Crown** – Slope of the road is flat or non-existent, or reverse, with road edges higher than the center portion of road surface, caused by poor maintenance and poor construction practices.

- **Distortion** – Distortion is a deviation of the road surface from its original shape, and usually takes the shape of dishing, bumps, or dips which are noticeable, all of which give rise to pitch, roll, or jarring drop in a moving vehicle. These are caused by differential frost heave, a poorly drained road surface, reverse differential frost heave, lack of subgrade support, embankment slope failure and differential settlement of subgrade or base materials.

4 EXISTING ROAD SYSTEM

The total length of the road system inspected is 111.70 km. The Gravel, Surface Treated and Paved roads that comprise this system have the following lengths:

Road Surface Type	Length (km)	%
Gravel	22.7	20.3
Surface Treated (LCB)	31.0	27.8
Paved (HCB)	58.0	51.9

4.1 ROAD AVERAGE CONDITION

Based on the road inspection performed by ISI, condition ratings for specific roads have been calculated. The PCIs for all roads are given in Appendix A. These values are determined using a formula that combines the pavement distress information, obtained from the visual inspection, with the RCR for each road, based on MTO guidelines.

The following table provides the weighted average PCI (factoring in road length), based on road type:

Road Surface Type	Average Condition Rating
Gravel	40.3
Surface Treated (LCB)	45.3
Paved (HCB)	46.8

5 ISI STRATEGY

Specified road sections (Paved (HCB), Surface Treated (LCB) and Gravel roads) were visually inspected and driven over by the road inspector to determine the condition of the road system.

- Gravel Roads – Unchanging rate with regular maintenance.
- Surface Treated Roads (LCB) – 5 points/year.
- Paved Roads (HCB) – 3 points/year.

As an example of applying the deterioration rate, an LCB road with an index of 80 would require reconstruction in the eighth year if no rehabilitation were conducted on it. If gravel roads are maintained regularly, no major change is expected within 10 years.

6 ROAD TREATMENT STRATEGIES

The options for road preservation treatment involves a wide range of applications, grouped into four major categories:

1. **Preventative Maintenance Treatment** – This is a low cost maintenance treatment applied to preserve, retard future deterioration, and maintain or improve the functional condition of road surfaces without significantly increasing structural strength. It could be applied to a road surface over its entire service life. This type of treatment is usually applied when PCI is over 70.

2. **Surface Treatment** – This includes surface seals and treatment applied to address surface deficiencies, such as: general raveling, segregation, or fatigue cracking distresses. These treatments could be applied to mid-life pavements to retard future surface or structural deterioration.

3. **Rehabilitation Treatment** – This includes treatment such as structural overlays, or mill and inlay, applied to increase structural capacity and restore serviceability. These treatments could be applied to mid-life and late-life pavements, and could be major or minor depending on the percentage of base repair required.

4. **Reconstruction Treatment** – This high cost treatment would be used as a rehabilitation strategy under the circumstances where the existing pavement has completely failed. In this case, the original roadbed may be the cause of reduced serviceability. Excessive maintenance cost and other rehabilitation treatment may provide only very short term solution, and a reconstruction of the entire road would be more feasible. This type of treatment is normally applicable with a PCI of 40 and below..

7 RECOMMENDATIONS

For the Capital Plan, a proactive approach was used, assuming no budgetary constraints, so that any roads that had a PCI of 70 and less would be repaired in the first year of the Capital Plan. However, if budgetary constraints do exist, the rehabilitation of LCB/HCB roads may be spread out, in most cases, as follows.

PCI Rating	Improvement Period
81 – 100	Satisfactory
70 – 80	6 to 10 years
46 – 69	1 to 5 years
41 – 45	Rehabilitation required within 1 year
40 and below	Reconstruction required within 1 year

The Surface Treated and Paved roads, based on weighted average, are on the borderline between poor and fair condition, with PCIs of 45.3 and 46.8, respectively. However, 12.1 km of

these roads, that is 27% have PCIs of 40 or less. All roads that have a PCI of less than 40 need to be reconstructed 'NOW' or within a year's time, based on the standard improvement period and repair strategy. Those roads with higher traffic (AADT), and which may pose a greater safety hazard, due to the severity of the road surface conditions, would have a higher prioritization for reconstruction.

Gravel roads are in poor condition, with a weighted average PCI of 40.3. 9.9 km, or 44% of the gravel roads have PCIs of less than 40. All the gravel roads need to be re-gravelled periodically, with base repairs made where required, except Development Drive, which has a PCI of 91.5.

In the Capital Plan, only LCB and HCB condition ratings from this report have been used; gravel roads have been excluded from the Capital Plan as they are treated as operational expense.

APPENDIX A – ROAD CONDITION RATINGS

ID	Asset Name	From Street	To Street	Material	PCI	Comments	Length (m)	Width (m)
1	Confederation Street	Wellington Avenue	Laborne Avenue	HCB	28.57		101.9	7
2	Lawton Avenue	Murray Street	Woodward Avenue	HCB	57.03		144.9	9
5	Illinois Avenue	Patton Street	Centre Street	HCB	25.16		124	7
6	Hanes Avenue	Jetty Street	Michigan Avenue	HCB	59.61		185.3	10
8	Jetty Street	Jetty Street	Hanes Avenue	HCB	49.53		163.5	4
10	Arsenault Road	End of Road	Old HWY 17 Road	Gravel	42.87		396.9	6.1
11	Trunk Road	Leacock Street E	End of Road	HCB	37.75		48.8	5
13	Hawkins Street	Causley Street	Fullerton Street	HCB	45.94		79.6	10.5
14	Longview Avenue	Causley Street	Buchan Avenue	HCB	54.25		120.5	6
15	Huron Beach Road	HWY 17	End or Road	Gravel	27		398.2	6
16	Industrial Park Road	Side B Road	Industrial Park Road	HCB	50.81		39.7	8.5
17	Industrial Park Road	Industrial Park Road	Side A Road	Gravel	29.9		186.5	8.5
19	Nadon Street	McArthur Avenue	West Street	HCB	44.93		80.4	6
20	Colonization Road	Pearson Avenue	Patton Street	HCB	67.58		115.7	7
21	Colonization Road	Birch Street	Togo Street	HCB	66.16		495.8	7
22	West Street	Archambault Street	West Street	HCB	33.16		194.2	5
23	Labbe Avenue	Confederation Street	Hiawatha Street	HCB	59.26		83.8	6.5
24	Confederation Street	Queen Avenue	Victoria Avenue	HCB	56.13		100.4	7
25	West Street	Fremont Street	Archambault Street	HCB	44.44		106.9	5

26	Woodward Avenue	Riverside Avenue	Park Street	HCB	59.09		234.2	11
27	White Road	Industrial Park Road	Side B Road	HCB	37.6		244.2	6
28	Francis Street	Colonization Road	West Street	HCB	62.88		197.1	7
29	Solomon Street	Leacock Street E	Baybridge Avenue	HCB	49.83		124.3	6
33	Hudson Street	Lachore Street	Hawkins Street	HCB	71.48		99.4	12
34	North Street	Causley Street	Hudson Street	HCB	34.48		77	4.5
37	Glen Avenue	End of Avenue	Leacock Street E	HCB	38.23		202.5	5.25
39	Woodward Avenue	Murray Street	Hudson Street	HCB	71		53.9	12
40	Woodward Avenue	Lawton Avenue	Scott Avenue	HCB	54.25		143.9	10
44	Colonization Road	Francis Street	Centre Street	HCB	73.9		31.1	7
45	Lachore Street	Fullerton Street	Hudson Street	HCB	31.98		118.8	6
46	Hawkins Street	Fullerton Street	Hudson Street	HCB	49.53		118.9	10.5
47	Pearson Avenue	Colonization Road	Togo Street	HCB	35.27		114.1	5.5
48	High Road	Woodward Avenue	Robb Road N	LCB	49.21		3296.3	6
49	Birch Street	Schurm Avenue	Forest Avenue	HCB	52.67		650.3	6.2
51	Birch Street	Birch Street	Pigeon Road	HCB	52.73		381.6	6.2
52	Martin Street	Martin Street	End of Street	Gravel	28.45		130.7	4.5
53	Martin Street	Causley Street	Martin Street	HCB	25.41		466.6	4.5
55	Royer Road	End or Road	HWY 557	LCB	27.48		626.7	4.5
57	Laborne Avenue	Confederation Street	Labbe Avenue	HCB	61.47	Drain needs serious repair work/roads run on a hill/when it rains it is an issue residents say.	144.7	6

58	McArthur Avenue	Pearson Avenue	Nadon Street	HCB	38.7		142.2	6.5
59	Beech Drive	Oak Road	Marine Drive	HCB	45.92		569.2	4.9
61	Sunset Point Road	End of Road	Woodward Avenue	HCB	48.64		118.2	6
62	Hudson Street	Chiblow Street	Woodward Lane	HCB	70.37		208.7	12
64	Bass Lake Road	High Road	Bass Lake Road	LCB	49.49		522.5	6.2
66	Hiawatha Street	Algoma Avenue	King Edward Street	HCB	40.74		85	5
67	Old Hwy 17 Road	Old HWY 17 Road	Shingwauk Street	LCB	27.04		83.2	4.5
69	Old Hwy 17 Road	End of Road	Old HWY 17 Road	LCB	29.63		100.5	4.5
71	McFadden Avenue	End of Avenue	Lakeside Avenue	HCB	40.02		272.7	4.5
72	King Edward Street	Hiawatha Street	Leacock Street E	HCB	44.32		128	6
73	Laborne Avenue	Causley Street	Confederation Street	HCB	53.62		115.2	6
74	Michigan Avenue	Robb Street S	Centre Street	HCB	39.55		140.1	7.5
77	Eastman Road	End of Road	Eastman Road	Gravel	27.07		54.6	6
78	Colonization Road	Jacques Street	Craig Street	HCB	76.54		51.3	6.2
79	Leacock Street East	Mountain Glen Road	Glen Avenue	HCB	53.24		37.6	8.5
80	Leacock Street East	Leacock Street E	Industrial Park Road	HCB	46.39		287.1	7
83	Algoma Avenue	Hiawatha Street	Leacock Street E	HCB	50.01		113.7	6
84	Leacock Street East	Algoma Avenue	King Edward Street	HCB	60.07		86	6.5
87	Marina Drive	Marina Drive	Marina Drive	Gravel	36.4		231.1	5.5
88	Birchwood Circle	Hemlock Drive	Maple Ridge Road	LCB	62.4		168.3	6
91	Huron Avenue	Murray Street	Leacock Street W	HCB	33.89		150	15
92	Woodward Avenue	Robb Road N	HWY 557	HCB	39		1188.3	12
94	Murray Street	Scott Avenue	Huron Avenue	HCB	47.4		99.8	8.5
98	Victoria Avenue	Leacock Street E	End of Avenue	HCB	43.42		197	5
100	Wellington Avenue	Confederation	Leacock Street E	HCB	40.19		159.7	5

		Street						
101	Leacock Street West	Cobden Avenue N	End of Street	HCB	39.55		63	6
102	River Road	HWY 557	Pine Drive	LCB	29.98		1967.6	6
103	Lakeside Avenue	Unknown	Robb Street S	HCB	81.37		334.3	12.5
104	Confederation Street	Victoria Avenue	Wellington Avenue	HCB	45.06		102.1	7
109	Oak Road	Maple Court	HWY 17	HCB	35.27		475.7	5
110	Oak Road	Woodlawn Drive	Beech Drive	HCB	40.9		150.2	5
111	Woodward Lane	Causley Street	Hudson Street	HCB	34.42		100	8
112	Juniper Court	End of Court	Birchwood Circle	LCB	43.29		99.2	6.5
114	Rousseau Crescent	King Edward Street	Leacock Street E	HCB	36.34		331.6	6.5
117	Dawsey Street	Woodward Avenue	Cobden Avenue N	HCB	54.81		99.5	5
119	High Road	Rocky Road	Bass Lake Road	LCB	50.48		600.3	6
120	Birchwood Circle	Juniper Court	Hemlock Drive	LCB	54.98		136.4	6
121	Michigan Avenue	Centre Street	Patricia Street	HCB	39.55		133.6	6
123	Solomon Street	Baybridge Avenue	Mary Place	HCB	42.85		90.5	6
124	Indiana Avenue	Robb Street S	Centre Street	HCB	36.87		137.9	5
125	Marina Drive	Lakeside Avenue	Marina Road	HCB	78.36		63.3	5.5
126	Illinois Avenue	Centre Street	Colonization Road	HCB	23.63		117.5	7
127	Eldorado Road	Eldorado Road	HWY 17	HCB	27.03		1224	7
128	Patricia Street	Michigan Avenue	Indiana Avenue	HCB	34.93		96.3	4.5
129	Labbe Avenue	Causley Street	Confederation Street	HCB	57.07		75.3	6
130	Indiana Avenue	Centre Street	Patricia Street	HCB	36.87		137.3	5
131	Confederation Street	Cobden Avenue S	Queen Avenue	HCB	34.19		109.8	6
132	Hudson Street	North Street	Lachore Street	HCB	75.57		93.5	12
133	White Road	Side B Road	Side A Road	HCB	46.61		238.7	5
134	Schurm Avenue	Birch Street	End of Avenue	HCB	43.13		199.8	5.5

136	Kennedy Road	End of Road	Frammpet Drive	LCB	64.52		153.3	6
137	Wellington Avenue	Causley Street	Confederation Street	HCB	28.57		152.7	5
138	Woodward Avenue	Dawsey Street	Sunset Point Road	HCB	62.4		379	8
139	Colonization Road	Togo Street	Colonization Road	HCB	53.27		200.6	7
140	Birch Street	Colonization Road	Schurm Avenue	HCB	58.64		81.2	6.2
142	Duborne Lake Road	Battle Point Road	Medicine Bay Road	LCB	56.31		2268.7	5
144	Buchan Avenue	Longview Avenue	Shirvon Drive	HCB	47.57		213.4	6.2
145	Eastman Road	Eastman Road	HWY 17	Gravel	27.07		311.4	6
147	Robb Road	Woodward Avenue	High Road	LCB	35.89		4500	6
149	River Road	Pine Drive	HWY 557	LCB	15.6		531.8	6
150	Industrial Park Road	Side A Road	HWY 17	Gravel	28.45		308.4	8.5
151	Colonization Road	End of Road	Jacques Street	HCB	58.68		440.3	6.2
152	Colonization Road	Patton Street	Francis Street	HCB	81.37		30.8	7
154	Togo Street	Togo Street	Pearson Avenue	HCB	36.91		175.6	5.5
155	Victoria Avenue	Causley Street	Confederation Street	HCB	37.96		165.5	5
156	Shirvon Drive	Buchan Avenue	Longview Avenue	HCB	40.48		105.3	5.5
157	Longview Avenue	Buchan Avenue	Shirvon Drive	HCB	59.61		159	6
158	Woodward Avenue	Park Street	Park Street	HCB	79.47		19.1	11.5
160	Kennedy Road	Frammpet Drive	End of Road	LCB	67.7		716.3	6
162	Industrial Park Road	Causley Street	Whte Road	HCB	33.34		45	8.5
165	West Street	Nadon Street	Causley Street	HCB	82.82		74.5	5
168	Centre Street	Indiana Avenue	Michigan Avenue	HCB	33.89		99.7	6.5
172	Fullerton Street	Lachore Avenue	Hawkins Street	HCB	26.98		99	6
174	Old Landfill Site Road	End of Road	Village Road	Gravel	42.68	Grass encrouching to road.	3909.4	6.1

177	Woodward Avenue	Scott Avenue	Huron Avenue	HCB	77.24		100	10.5
178	King Edward Street	Rousseau Crescent	Hiawatha Street	HCB	45.45		80.3	6
179	Labbe Avenue	Laborne Avenue	Leacock Street E	HCB	42		37.5	6.5
180	Division Street	Cobden Avenue N	Division Street	Gravel	29.8		30	4.5
180	Division Street	Cobden Avenue N	Division Street	LCB	41.45		146	4.5
181	Confederation Street	Laborne Avenue	Labbe Avenue	HCB	27.48		81.4	7
182	Woodward Avenue	Huron Avenue	Riverside Avenue	HCB	75.83		8	11
183	Michigan Avenue	End of Avenue	Indiana Avenue	HCB	36.87		33.3	7.5
184	Togo Street	Pearson Avenue	West Street	HCB	42.94		211.3	5.5
185	West Street	Togo Street	Nadon Street	HCB	61.33		57.2	5
187	Murray Street	Lawton Avenue	Scott Avenue	HCB	62.39		97.8	10.5
188	Lawton Avenue	Causley Street	Murray Street	HCB	32.25		100	9
193	Pine Drive	River Road	End of Drive	LCB	21.84		160	6
194	St. Andrews Street	Colonization Road	End of Street	HCB	52.83		61	3.7
196	Victoria Avenue	Confederation Street	Leacock Street E	HCB	28.52		166.3	5
197	Cobden Avenue South	Murray Street	Confederation Street	HCB	31.72		43	7.3
198	Cobden Avenue North	Division Street	Dawsey Street	HCB	24.91		202.9	7
201	Hiawatha Street	Labbe Avenue	Algoma Avenue	HCB	39.7		137.1	5
202	Mary Place	End of Place	Solomon Street	HCB	31.33		88.7	5.5
203	Riverside Avenue	Woodward Avenue	Park Street	HCB	62.94		250	11.5
204	Park Street	Riverside Avenue	Woodward Avenue	HCB	40.27		155.8	5.5
205	Hanes Avenue	Michigan Avenue	Colonization Road	HCB	69.2		15.2	10
206	Cobden Avenue South	Causley Street	Murray Street	HCB	24.18		136.7	7.3
207	Queen Avenue	Confederation Street	Leacock Street E	HCB	55.66		140.1	7.5

208	Leacock Street East	Queen Avenue	Victoria Avenue	HCB	44.13		99	7.5
209	Woodward Avenue	Causley Street	Murray Street	HCB	63.4		140.7	12
210	Arena Access	Lakeside Avenue	End of Road	HCB	43.41		164	6.2
212	Hudson Street	Woodward Lane	Woodward Avenue	HCB	74.08		33.5	12
214	Centre Street	Michigan Avenue	Hanes Avenue	HCB	43.41		100.4	6.5
215	Industrial Park Road	White Road	Side B Road	HCB	27.86		275.3	8.5
218	Nadon Street	Forest Avenue	Ash Street	HCB	54.56		375.4	6.5
219	Forest Avenue	Birch Street	Nadon Street	HCB	50.13		157.4	5
220	Murray Street	Huron Avenue	Cobden Avenue S	HCB	34.63		219.7	7
222	Hemlock Drive	Birchwood Circle	End of Drive	LCB	45.91		93.8	6
223	Lakeside Avenue	Birch Street	Unknown	Gravel	45.89		260.8	6.5
224	Patton Street	Illinois Avenue	Colonization Road	HCB	45.8		202.8	5
226	Mountain Glen Road	Leacock Street E	Solomon Street	HCB	43.84		251.7	4.5
227	Leacock Street East	Glen Avenue	BRDHC	HCB	39.17		437.7	9
228	Woodward Avenue	Hudson Street	Lawton Avenue	HCB	71.53		123.3	12
233	Centre Street	Illinois Avenue	Indiana Avenue	HCB	46.24		96.6	6.5
234	Cobden Avenue North	Park Street	Division Street	HCB	50.37		55.3	7
235	Indiana Avenue	Patricia Street	Colonization Road	HCB	35.97		66.1	5
236	Alma Street	Colonization Road	End of Street	HCB	73.55		75.7	6.2
239	Huron Avenue	Causley Street	Murray Street	HCB	47.73		100	12
240	Fremont Street	West Street	North Street	HCB	28.24		152.8	6
243	Eastman Road	HWY 17	Eastman Road	Gravel	23.84		152.2	6
244	Colonization Road	St. Andrews Street	Hanes Avenue	HCB	64.94		141.5	7
245	Oak Road	End of Road	Woodlawn Drive	HCB	51.58		336.9	5
246	Scott Avenue	Causley Street	Murray Street	HCB	53.76		138.4	6.5
247	Hudson Street	Hawkins Street	Chiblow Street	HCB	75.57		99.6	12
248	Colonization Road	Craig Street	Canada Avenue	HCB	57.37		260.3	7
250	Colonization Road	Canada Avenue	Birch Street	HCB	71.85		102.3	7

251	Leacock Street East	King Edward Street	Rousseau Crescent	HCB	44.11		129.6	7
252	Craig Street	Colonization Road	End of Street	HCB	54.44		99.4	5
253	Eldorado Road	End of Road	Eldorado Road	HCB	32.73		546.4	7
255	MacIver Drive	MacIver Drive	HWY 17	LCB	35.58		111.3	5.5
257	Leacock Street West	Huron Avenue	Cobden Avenue N	HCB	44.19		117.1	6.5
261	Trunk Road	Trunk Road	End of Road	Gravel	38.34		63.3	3
262	Maple Court	Oak Road	End of Road	HCB	76.87		76	5.5
263	Scott Avenue	Murray Street	Woodward Avenue	HCB	77.24		242.4	6.5
264	Hanes Avenue	Centre Street	Jetty Street	HCB	66.34		110.9	10
265	Woodlawn Drive	Oak Road	HWY 17	HCB	48.77		233.4	12
268	Robb Street	Illinois Avenue	Indiana Avenue	HCB	16.85		101.6	5.5
269	McArthur Avenue	End of Avenue	Pearson Avenue	HCB	38.95		76	6.5
270	Bayridge Avenue	End of Avenue	Solomon Street	HCB	42.01		136.2	6.2
272	Division Street	Division Street	End of Street	HCB	28.45		36.4	4.5
273	Birchwood Circle	Maple Ridge Drive	End of Circle	LCB	62.36	Drainage asphalt required to control run off water.	139.6	6
277	Huron Avenue	Leacock Street W	Woodward Avenue	HCB	46.53		107.2	16
281	Maple Ridge Road	Birchwood Circle	End of Road	LCB	49.03		123.6	6
282	Woodward Avenue	Sunset Point Road	Robb Road N	HCB	47		351.5	6
283	Solomon Street	Mary Place	Mountain Glen Road	HCB	42.29		147	6
284	Cobden Avenue North	Leacock Street W	Park Street	HCB	38.38		369	7
286	Indiana Avenue	Unknown	Robb Street S	HCB	36.87		262.1	5

287	Lakeside Avenue	Unknown	Marina Road	HCB	48.61		86.4	6.5
288	Murray Street	Woodward Avenue	Lawton Avenue	HCB	48.94		95.2	10
289	Colonization Road	Colonization Road	Pearson Avenue	HCB	73.49		48.8	7
290	Queen Avenue	Causley Street	Confederation Street	HCB	46.11		174.5	8.5
291	Leacock Street East	Victoria Avenue	Trunk Road	HCB	43.09		102.6	7
292	Pearson Avenue	Togo Street	McArthur Avenue	HCB	41.68		110.5	4.5
293	Archambault Street	End of Street	West Street	HCB	27.22		66.3	6
294	Jacques Street	Colonization Road	Jacques Street	HCB	52.68		233.2	4.5
295	Francis Street	Nadon Street	End of Street	HCB	62.02		32.3	7
296	Shirvon Drive	Causley Street	Buchan Avenue	HCB	40.15		86.2	5.5
297	Shingwauk Street	End of Street	Old HWY 17 Road	LCB	27.47		178.1	4.5
300	Percell Street	Colonization Road	End of Street	HCB	47.3		80.9	4
301	Hanes Avenue	Colonization Road	Causley Street	HCB	72.97		82.9	10
302	Centre Street	Colonization Road	Illinois Avenue	HCB	43.57		118.2	6.5
303	High Road	Robb Road N	Rocky Road	LCB	47.82		597.9	5
305	North Street	Hudson Street	Fremont Street	HCB	22.26		75.7	6
306	Birchwood Circle	HWY 17	Juniper Court	LCB	57.1		221.4	6
307	Granary Lake Road	High Road	Dunborne Lake Road	LCB	60.39		1995.2	7
308	Fremont Street	North Street	Lachore Street	HCB	32.32		91.9	6
309	Labbe Avenue	Hiawatha Street	Laborne Avenue	HCB	40.15		80.1	6.5
313	Colonization Road	Centre Street	Percell Street	HCB	78.17		143.1	7
315	Boom Camp Road	Boom Camp Road	Boom Camp Road	Gravel	50.24		2853.7	4
318	Boom Camp Road	Boom Camp Road	Pigeon Road	LCB	67.27		381.1	6
319	Leacock Street East	Rousseau Crescent	Mountain Glen Road	HCB	54.45		115.1	8
322	Michigan Avenue	Indiana Avenue	Robb Street S	HCB	32.32		205.2	7.5
323	Pigeon Road	End of Road	Boom Camp Road	Gravel	31.35		722.2	6.5
324	Lake Hope Road	HWY 557	End of Road	LCB	50.82		3200	6

327	Jacques Street	Jacques Street	Jacques Street	HCB	53.15		11	4.5
328	Lachore Street	Causley Street	Fullerton Street	HCB	40.66		19.6	6
329	Leacock Street East	BRDHC	HWY 17	HCB	47.05		23	8
331	West Street	Causley Street	Fremont Street	HCB	35.56		34.4	5
332	Colonization Road	Alma Street	St. Andrews Street	HCB	71.14		75.5	7
333	Park Street	Woodward Avenue	Cobden Avenue N	HCB	57.56		99.7	9
335	Old Hwy 17 Road	Shingwauk Street	Arsenault Road	LCB	29.63		457.8	4.5
336	Frammpet Drive	Kennedy Road	HWY 17	LCB	62.75		455.8	6
337	Nadon Street	Ash Street	McArthur Avenue	HCB	54.72		145.4	6.5
338	Ash Street	End of Street	Nadon Street	HCB	51.52		119.5	6.2
339	Birch Street	Forest Avenue	Causley Street	HCB	56.67		275.8	6.2
340	Dyke Street	Hudson Street	End of Street	HCB	39.1		127.7	5
341	Michigan Avenue	Patricia Street	Hanes Avenue	HCB	31.47		137.2	6
342	Colonization Road	Percell Street	Alma Street	HCB	65.46		58.5	7
343	Canada Avenue	Colonization Road	End of Avenue	HCB	54.79		87.1	4
344	Lakeside Avenue	McFadden Avenue	Centre Street	HCB	72.23		112.6	12.5
345	West Street	End of Street	West Street	HCB	45.66		37.4	5
346	High Road	Bass Lake Road	Sweeney Road	LCB	42.73		2640.4	4.5
349	Lachore Street	Hudson Street	Fremont Street	HCB	43.81		76.6	6
351	Woodward Avenue	Park Street	Dawsey Street	HCB	57.36		261.5	12
353	Granary Lake Road	Country Road	McElhaney Road	LCB	56.29	Cold patch cover to potholes intermittent.	1282	7

355	Boat Launch Road	Granary Lake Road	Magog Lake Road	LCB	46.92	Cold patch repair extensively.	1218.9	6
356	Astles Road	Canoe Lake Road	HWY 557	LCB	28.46		1380	6
357	Canoe Lake Road	Astles Road	End of Road	Gravel	29.18		6494.8	3.8
360	Old Steel Road	HWY 557	Carlas Lane	LCB	22.28	10m of the road is gravel; to make it accessible, they dug up the road from frost heaves.	2514	6
361	Carla's Lane	Old Steel Road	End of Lane	LCB	32.5		1211.2	6
366	Country Road	Granary Lake Road	End of Road	Gravel	56.16		1152.1	8.5
368	Magog Lake Road	Boat Launch Road	End of Road	LCB	43.94		891.8	6
377	Jensen Road	Granary Lake Road	Granary Lake Road	LCB	43.27		253.5	5
384	Bearhead Lake Road	HWY 557	Bearhead Lake Road	LCB	32.73		1014.5	6
389	Rocky Road	High Road	Rocky Road	Gravel	39.11		571.6	6
391	Leacock Street East	Trunk Road	Algoma Avenue	HCB	60.13		138.2	7
392	Lake Drive	Marine Drive	Beech Drive	LCB	61.61		620.5	7.5
394	Marina Road	End of Road	Lakeside Avenue	HCB	56.6		345.1	5.5
398	Duborne Drive	Duborne Drive	End of Drive	Gravel	35.91		220.9	6
399	Rocky Road	Rocky Road	End of Road	Gravel	43.42		195.7	6.1
400	Bass Lake Road	Bass Lake Road	End of Road	Gravel	42.87		1330.1	4
401	Buchan Avenue	Buchan Avenue	Shirvon Drive	HCB	48.6		40.6	6.2
410	Chiblow Street	Fullerton Street	Hudson Street	HCB	49.38		120.1	8.8

413	Granary Lake Road	Dunborne Lake Road	Jensen Road	LCB	33.19	Rutting is 38mm, and culvert repair with cold patch treatment.	3233.4	7
414	Granary Lake Road	Jensen Road	Duborne Drive	LCB	61.28	Cold patch work done intermittently due to severe longitudinal crack	860	7
415	Granary Lake Road	Jensen Road	Jenson Road	LCB	54.1		209.6	7
416	Lakeside Avenue	Marina Road	Unknown	HCB	73.5		86.4	6.5
417	Indiana Avenue	Michigan Avenue	Unknown	HCB	36.87		262.1	5
418	Francis Street	West Street	Nadon Street	HCB	61.5		197.1	7
419	Granary Lake Road	Duborne Drive	Country Road	LCB	58.68		1282	7
420	Granary Lake Road	McElhaney Road	Ben and Jean Road	LCB	55.53		50	7
421	Granary Lake Road	Ben and Jean Road	Granary Lake Road	LCB	27.41	Loose cover for culverts that cross the road (total of 20 metres).	3500	7
424	High Road	Sweeney Road	Wilson Road	LCB	47.33		700	6
425	High Road	Wilson Road	Allen Lake Road	LCB	49.51		300	6
426	High Road	Allen Lake Road	End or Road	LCB	47.89		2640.4	4.5
427	Duborne Lake Road	Granary Lake Road	Smith Road	LCB	66.21		2268.7	5
428	Duborne Lake Road	Smith Road	Battle Point Road	LCB	60.63		2268.7	5
429	Duborne Lake Road	Medicine Bay Road	Medicine Bay Road	LCB	61.87		2268.7	5

435	Boat Launch Road	Boat Launch Road	End of Road	Gravel	41.75		1218.9	6
439	Development Drive	HWY 17	End of Road	Gravel	91.5		537.3	6.5
324-1	Lake Hope Road	HWY 557	End of Road	Gravel	50.82		1000	6
420-1	Granary Lake Road	County	McElhaney Road	LCB	54.35		1282	7
59-1	Beech Drive	100 m	Lake Road	LCB	54.45		100	6