

**Township of Cramahe  
Road Management Plan**

**January 2008**

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## **1 BACKGROUND AND PURPOSE**

In October of 2007 the Council of the Township of Cramahe commissioned The Greer Galloway Group Inc. to prepare a Road Management Plan for the municipality. The update included the completion of road section appraisal sheets and field reviews of a number of the road sections with the Director of Public Works to confirm deficiencies and cost improvements for those sections.

The purpose of this Road Management Plan is to keep the deficiencies, needs and costs related to the Township road and bridge system current and to assist Council and Staff in preparing an action plan that will implement maintenance, rehabilitation and reconstruction to keep the infrastructure from degrading.

## **2 STUDY METHODS AND PROCEDURES**

The Methods and Inventory Manual, Road Management Plan for Small Lower Tier Municipalities, May 1987, (page 7) lists the major components of a road management study. This study generally followed the recommended procedures in the manual.

The procedure for completing a road management study is to inventory in sections the physical characteristics of the road system, identify its construction, and maintenance needs based on previous records and bench mark costs<sup>1</sup> and draft a five year improvement program and expenditure forecast. The Study was conducted with input from the Township Director of Public Works.

<sup>1</sup> *Bench Mark Cost - current unit costs that relate to types of improvements that are typically implemented by the municipality. ie, gravel, resurfacing, ditching road base and surface construction by township forces, etc.*

## **3 EXISTING ROAD SYSTEM**

The existing road system has a total length of 213.7 km, 100.5 km in gravel, 93.2 km in surface treatment, and 20.0 km in asphalt.

The average condition rating of all roads in the Township is 6.7. The average condition rating of hot mix paved roads is 6.7, the average condition rating of surface treated roads is 8.1 and the average condition rating of gravel surfaced roads is 5.4.

### **Gravel Roads**

Gravel roads appear to be generally in satisfactory structural condition. This is attributed to the natural terrain of eskers and gravel deposits in the region. Some of the gravel roads are in need of improved drainage, base and alignment improvement. Most gravel roads have low traffic volumes and low traffic growth estimates and as such may be tolerated in their present condition. Some roads however, could benefit by being built up, above the surrounding grade, which will

result in an improvement to the road base, drainage and blowing snow in winter conditions.

The question of surface treating all gravel roads has been considered. The general rule of Municipal Road Engineers is that for rural roads with less than 200 vehicles per day, gravel is the preferred surface. Surface treatment is used on roads with daily traffic volumes of more than 200 but less than 1000. Asphalt is recommended for roads with traffic volumes in excess of 1000 vehicles per day. Other issues may play a role in the consideration of upgrading an existing gravel road to surface treatment such as the surrounding land use and maintenance costs. A prime consideration before surface treating a road is to ensure that the road base is adequate, otherwise the surface treatment life expectancy will be significantly reduced.

### **Surface Treated Roads**

The surface treated sections of the road system are in good condition with an average condition rating of 8.3. Most of the surface treated road sections need improved drainage similar to the gravel road sections. The surface treated road sections are generally in need of granular base improvement, which will add to the service-life of the surface treatment.

### **Hot Mix Asphalt Streets**

The Hot mix asphalt pavement sections of the road system are almost exclusively in the Village of Colborne and the hamlet of Castleton. They are in fair condition with an overall condition rating of 6.7. A main deficiency in urban area hot mix pavement sections is drainage and road base. Existing storm sewers appear to be adequate, however, areas with ditching often appears inadequate and is a significant factor causing premature deterioration of the road base and surface.

The horizontal and vertical alignment of the Colborne streets is good and there is generally adequate right of way and surface width.

## **4 CONDITION RATING**

The method used to assign the road system condition rating to individual road sections is based on the system described in the Methods and Inventory Manual, Road Management Plan for Small Lower Tier Municipalities, May 1987. At Greer Galloway we put an emphasis on safety, right of way width, roadside environment, alignment and a heavy weighting on the structural integrity of the roadway.

The intent of the Condition Rating Procedure for studies such as this one is purposely kept simple to permit the rapid accumulation of base data necessary for the identification of road needs and the development of a five year improvement program. The procedure is based on visual assessment of the structural integrity of each road section.

Condition Rating numbers are assigned on a scale of 1 to 10 with the lower numbers assigned to

those roads showing the most distress and the higher numbers to those roads with little or no distress. The Condition Rating numbers provide a relative measure of the condition of all road sections and of the appropriate treatment needed to either maintain or improve the level of service.

To obtain the most accurate measure of distress, the Condition Rating survey should be carried out during the “spring break-up period” with the Director of Public Works in attendance.

The condition rating of road sections will decrease with time. Following is a description of the rationale for forecasting condition ratings.

### **Surface Treated Roads**

Well constructed surface treated roads should last up to 10 years. Depending on the use of and maintenance, the condition rating eventually drops to 5. For example, a surface treated road with a life cycle of 10 years will have the condition rating lowered for each year in the 5 year forecast by:

$$\frac{5 \text{ Point Condition Rating}}{10 \text{ Year Life Cycle}} = 0.5 \text{ per year}$$

If the road section had a condition rating of 7 in the study year, and reduced by 0.5 for each subsequent year, the road would likely require improvement in the 4th or 5<sup>th</sup> year when the condition rating fell to 5.

### **Gravel Roads**

Generally, the future condition rating of gravel roads will not change due to ongoing routine loose top maintenance. Therefore, the condition rating for the five year forecast will likely be the same as the Study year. However, in case of severe spring breakup, the condition rating may be affected.

### **Hot Mix Paved Roads**

Roads with single lift hot mix pavement will have a life cycle of between 10 years and 15 years depending on their use and maintenance. A hot mix paved road with 2 or more lifts may have a life cycle of 15 years to 20 years. Rural roads and local urban streets with low traffic will likely last 15 years or more. Rural and urban roads with traffic volumes exceeding 7000 v.p.d. or with considerable truck traffic will have a life cycle of between 10 years and 15 years. For example, a rural road with a single lift of hot mix pavement with a life cycle of 10 years will have the condition rating lowered for each year of the 5 year forecast by:

$$\frac{5 \text{ Point Condition Rating}}{10 \text{ Year Life Cycle}} = 0.5 \text{ per year}$$

If the road section condition rating was 7 in the study year and reduced by 0.5 for each subsequent year the road would require improvement in the 4<sup>th</sup> or 5<sup>th</sup> year when the rating reached 5.

## **5 ROAD SYSTEM INVENTORY**

A detailed review of all roads within the municipal road system was carried out to identify the physical characteristics of the system, drainage conditions, property requirements, approximate traffic type, and volumes. The Condition Rating of all road sections was also established during the road review and collection of inventory data. Maps showing the individual road section limits and information related to the section number (traffic class and condition rating) are included in Appendix “E” of this report. The inventory of road sections is included in Appendix “C” of this report. Inventory Road Appraisal Sheets itemize existing conditions, condition ratings, improvements needs, and estimated improvement costs.

## **6 STRUCTURAL CONDITION OF THE EXISTING ROAD SYSTEM (2007)**

The following average condition ratings of the road are given separately for surface treated and gravel road sections. The average condition rating for the Total Road System is also given.

Surface Treated Roads	- Average Condition Rating- 8.1
Gravel Roads	- Average Condition Rating- 5.4
<u>Hot Mix Paved Roads</u>	<u>- Average Condition Rating- 6.7</u>
Total Road System	- Average Condition Rating- 6.7

The average condition ratings are determined by multiplying each section length by its rating number (from the road appraisal sheet) and dividing the sum of these by the total length of the road sections.

Generally a condition rating of 7 to 10 indicates good structural condition. A rating of 5 to 7 indicates that structural improvements may be required. A rating of less than 5 indicates an immediate need for improvement.

## **7 TRAFFIC COUNTS**

At the direction of the Director of Public Works, traffic hoses were installed on four local roads for one week. The roads were Durham Street, Purdy Road, Telephone Road and Morganston Road. The hoses were installed on Tuesday November 6, 2007 and removed on Wednesday November 14, 2007. Traffic data collected includes the number of vehicles traveling on each road, direction of travel, speed and percentage of large vehicles such as trucks. The data from these counts is provided in Appendix D. Table 7.1 summarizes the basic traffic data.

<b>Location</b>	<b>Average Daily Volume</b>	<b>% Trucks</b>
Durham	564	6.4
Morganston	123	10-46
Purdy	1691	12.4
Telephone	429	10.2

**Table 7.1 Traffic Counts**

## **8 BRIDGES AND CULVERTS**

Twenty bridge and culvert installations have been inspected by others over the past two years. These structures were visually inspected and the inspection reports are provided in separate reports. Table 8.1 lists the location, type of installation and brief description of its physical characteristics.

<b>Structure Location / Name</b>	<b>Structure Type</b>	<b>Physical Characteristics</b>
Dingman Road 1	Solid Slab	4.5 m span
Dingman Road 2	Rigid Frame	9.2 m span
Haynes Road 1	Concrete Box	6.1 m span
Haynes Road 2	Concrete Box	6.2 m span
Red Cloud School Road	Solid Slab	6.1 m span
Campbell Road	Rigid Frame	6.4 m span
Dawson Road	Corrugated Steel Arch	6.3 m span
Little Lake Road	Concrete Box	3.6 m span
Baily Road	Concrete Box	3.7 m span
Shiloh Road Culvert	CSP	4.4 m span
Shiloh Road Bridge	Concrete Culvert	6.2 m span
Cowie Road	Concrete – two span	4.0 m x two spans
Ontario Street	Box culvert	4.3 m span
Victoria Street Bridge	Rigid Frame	4.0 m span
Elgin Street Bridge	Rigid Frame	4.6 m span
Kensington Street Bridge	Box Culvert	4.3 m span
King Street Bridge	Rigid Frame	4.7 m span
Durham Street Bridge	Box Culvert	3.7 m span
Scott Street Bridge	Rigid Frame	4.3 m span
King Street Bridge (Legion)	CSP	2.3 m diameter

**Table 8.1 Bridge and Culvert Inventory**

## **9 BENCHMARK COSTING**

Benchmark costs were developed for use in estimating section improvement costs. The benchmark items are those, which are typically used in the Township. The cost associated with each

of the recommended improvements is based on 2007 estimates. The benchmark item and unit cost used in this Study are as follows:

Granular 'A' Type 2 - supplied and placed	-	\$ 15.00 per tonne
Granular 'B' Type 1 - supplied and placed	-	\$ 10.00 per tonne
Earth Excavation - Ditching using Township or rental equipment	-	\$ 7.00 per lineal metre
Surface Treatment - Single Application	-	\$12,000 per km.
Double Application	-	\$24,000 per km.

## **10 FIXED COSTS**

The Townships' first consideration for road funds is to address its normal maintenance or fixed cost needs. Fixed costs include normal day to day activities to keep the road system operational. The activities include Bridge and Culvert Maintenance, Roadside Maintenance, Hard Top maintenance, Loose Top Maintenance, Winter Control, Safety Devices, Miscellaneous, and Overhead.

Fixed costs were discussed with the Public Works Director but were not incorporated into this report.

## **11 RECOMMENDATIONS**

The following recommendations are provided as an experienced independent opinion of actions to promote the cost effective management of the road system. It is noted that the road system is being well managed and maintained. The following recommendations should be considered and used to enhance the current management plan.

For the benefit of reducing and managing municipal liability, traffic signage for road alignments, safe operating speed and intersections should be reviewed on an individual road section basis. Road signage should be installed in accordance with the Ontario Traffic Manual. Recommendations for road signage and traffic protection are indicated on the individual road appraisal forms.

Whenever road section improvement are planned and implemented they should be in accordance with appropriate municipal, provincial and / or Canadian standards.

Fixed maintenance and overhead costs have not been projected through this update period however it is strongly recommended that these expenditure levels be maintained and/or increased to meet required service levels and address on going maintenance needs.

The recommended capital improvement plan includes upgrading and installation of new storm sewers in Colborne. It is recommended that the storm sewers be constructed in order to protect and maximize the service life of the related road base and surface.

A 10 year surface treatment program should be incorporated into the Capital Improvement Plan and be followed over the next five years to preserve the structural condition of these sections. Sections requiring attention earlier than scheduled should be reassessed for drainage and / or base deficiencies.

A consistent program of loose top maintenance should be carried out over the next 5 years to maintain the structural condition of the gravel road sections. The practice of tendering for the supply and placing gravel on loose top roads throughout the system should be continued.

Poor drainage conditions exist throughout the entire road system. It is recommended that along with the improvements recommended in the Capital Improvement Plan, regular ditching be budgeted for and completed under roadside maintenance to improve these poor drainage conditions and help maintain the structural condition of the road system.

An ongoing roadside brushing program should be continued to clear the rights-of-way on various sections of roads. This operation will increase visibility, facilitate drainage improvements, and improve winter road conditions.

The Township equipment and public works buildings meet current needs. The practice of establishing and maintaining an equipment reserve is recommended. The reserve allows replacement of the various pieces of equipment on a scheduled basis, therefore minimizing downtime and unanticipated repair expense and minimize the annual capital investment needed to maintain the equipment fleet.

Equipment housing, while adequate at the present time should be reviewed periodically so that future repairs, rehabilitations and expansions could be identified and budgeted for, well ahead of the actual need for the repairs, rehabilitations, and/or expansions.

## **APPENDICES**

## **APPENDIX 'A'**

### **RECOMMENDED 5 YEAR IMPROVEMENT PROGRAM**

Road sections scheduled for improvement, the section number and description, type of improvement, timing, and cost are listed in Appendix 'A'. Estimated costs shown are derived using the benchmark costs developed as part of this study. Equipment scheduled for replacement is also shown in the appropriate year of the program. Improvement costs are taken from the Road Appraisal Sheets. Bridge and Culvert Improvements have been costed on the basis of individual estimates.

## **APPENDIX 'B'**

### **FORECAST CONDITION RATING**

Forecast condition ratings have been assigned to each road section in accordance with the method described in this of the report.

#### **Surface Treated Roads**

The forecast condition ratings of surface treated roads are shown in Appendix 'B-1'.

#### **Gravel Roads**

The forecast condition ratings of gravel roads are shown in Appendix 'B-2'.

#### **Hot Mix Paved Roads**

The forecast condition ratings of hot mix paved roads are shown in Appendix 'B-3'.

**APPENDIX 'C'**

**ROAD APPRAISAL SHEETS**

**APPENDIX 'D'**

**TRAFFIC COUNT DATA**

**APPENDIX 'E'**  
**TOWNSHIP MAPS**

**RECOMMENDED 5 YEAR IMPROVEMENT PLAN  
FOR THE TOWNSHIP OF CRAMAHE**

<b>Year</b>	<b>Section Number</b>	<b>Road / Street Section Limits</b>	<b>Section Length</b>	<b>Improvement Description</b>	<b>Total Cost \$</b>	<b>Year 2008 Cost \$</b>	<b>Comments / Notes</b>
2008		Various Roads	n/a	Gravel resurfacing	22,500	22,500	
	16/12	<u>Michell / Campbell</u>	1,100m	Overlay one lift of surface treatment	13,000	13,000	
	123	Old Rail Road	400 m	Overlay one lift of surface treatment	5,000	5,000	
	67	Old Shelter Valley	1,600 m	Overlay one lift of surface treatment	18,500	18,500	
	104	Honey Road West	2,600 m	Overlay one lift of surface treatment	22,000	22,000	
	1w	Pinegrove Road W.	800 m	Overlay one lift of surface treatment	9,500	9,500	
	135	Jackson Road	1,900 m	Overlay one lift of surface treatment	22,000	22,000	
	208	Elgin Street North	1,100 m	Overlay one lift of surface treatment	13,000	13,000	
	153	Blyth Park Road	1,700 m	Overlay one lift of surface treatment	20,000	20,000	
	150	Peters Road North	1,000	Overlay one lift of surface treatment	39,000	39,000	
	151	Peters Road South	850 m	Pulverize & double surface treatment	40,000	40,000	
	126	Ventress Road South	1,150 m	Pulverize & double surface treatment	60,000	60,000	
	138	Kelwood Lane	250 m	Pulverize & double surface treatment	14,000	14,000	
	183	North Street	200 m	Curb & gutter, 50 mm hot mix	61,000	61,000	
	1 e	Pinegrove Road East	1,400 m	Ditching, granular 'A', double surface treatment	103,000	103,000	
3	Darling Road	650 m	Ditching, granular 'A', double surface treatment	45,000*	45,000*	Boundary Road – proceed if Brighton agrees to share 50%	
	Victoria St. bridge		Rehab concrete deck, crack repairs, new barrier system	124,200	124,200	MIII application for assistance	
<b>Total</b>					<b>631,700</b>	<b>631,700</b>	

\* 50% of total cost estimate

**RECOMMENDED 5 YEAR IMPROVEMENT PLAN  
FOR THE TOWNSHIP OF CRAMAHE**

<b>Year</b>	<b>Section Number</b>	<b>Road / Street Section Limits</b>	<b>Section Length</b>	<b>Improvement Description</b>	<b>Total Cost \$</b>	<b>Year 2009 Cost \$</b>	<b>Comments / Notes</b>
2009		Various Roads	n/a	Gravel resurfacing	22,500	22,500	
		Elgin Street Bridge		Replacement	365,000	365,000	Subject to Provincial funding
	162	Hoskins Road	400 m	Grade raise, improve base & overlay one lift of surface treatment	20,000	20,000	
	169	Spencer Street	300 m	Base improvements & overlay one lift of surface treatment	15,000	15,000	
	181	Victoria Street	300 m	Base improvements & overlay one lift of surface treatment	22,500	22,500	
	190	William Street	600 m	Base improvements & overlay one lift of surface treatment	45,000	45,000	
	118	Purdy Road	5,200 m	Pulverize, granular 'A', ditching & widening with hot mix	1,820,000	275,000	Reconstruct from Cty Rd 25 to Elgin Street
<b>Totals</b>					<b>2,310,000</b>	<b>765,000</b>	

**RECOMMENDED 5 YEAR IMPROVEMENT PLAN  
FOR THE TOWNSHIP OF CRAMAHE**

<b>Year</b>	<b>Section Number</b>	<b>Road / Street Section Limits</b>	<b>Section Length</b>	<b>Improvement Description</b>	<b>Total Cost \$</b>	<b>Year 2010 Cost \$</b>	<b>Comments / Notes</b>
2010		Various Roads	n/a	Gravel resurfacing	22,500	22,500	
		Baily Road Bridge		Replacement	368,000	368,000	Subject to provincial funding
		Trehear Road	2,700 m	Ditching, granular 'A', double surface treatment	437,500	222,500	50% of road
	28	Morganston	4,500 m	Overlay one lift of surface treatment	129,000	129,000	
	64	Clarkson Road	1,300 m	Overlay one lift of surface treatment	15,600	15,600	
	122	Fiddick Road	3,000 m	Overlay one lift of surface treatment	75,000	75,000	
	118	Purdy Road	5,200 m	Pulverize, granular 'A', ditching & widening with hot mix	1,820,000	225,000	Reconstruct from Elgin Street to Durham Street
<b>Totals</b>					<b>2,867,600</b>	<b>1,057,600</b>	

**RECOMMENDED 5 YEAR IMPROVEMENT PLAN  
FOR THE TOWNSHIP OF CRAMAHE**

<b>Year</b>	<b>Section Number</b>	<b>Road / Street Section Limits</b>	<b>Section Length</b>	<b>Improvement Description</b>	<b>Total Cost \$</b>	<b>Year 2011 Cost \$</b>	<b>Comments / Notes</b>
2011		Various Roads	n/a	Gravel resurfacing	22,500	22,500	
		Bridge safety repairs		Repair erosion, guide rails and barriers, concrete repairs	100,000	100,000	
	125	Trehear Road	2,700 m	Ditching, granular 'A', double surface treatment	437,500	215,000	Complete road work
	156	Simpson Road	1,700 m	Base improvements & overlay one lift of surface treatment	105,400	105,400	
		165	Durham Street	600 m	Pulverize, granular 'A', & ditching	300,000	200,000
<b>Totals</b>					<b>965,400</b>	<b>542,900</b>	

**RECOMMENDED 5 YEAR IMPROVEMENT PLAN  
FOR THE TOWNSHIP OF CRAMAHE**

<b>Year</b>	<b>Section Number</b>	<b>Road / Street Section Limits</b>	<b>Section Length</b>	<b>Improvement Description</b>	<b>Total Cost \$</b>	<b>Year 2012 Cost \$</b>	<b>Comments / Notes</b>
2012		Various Roads	n/a	Gravel resurfacing	22,500	22,500	
		Bridge safety repairs		Repair erosion, guide rails and barriers, concrete repairs	100,000	100,000	
	130	Little Lake Road	2,200 m	Granular 'A' and surface treatment	191,400	100,000	
	72	Pipeline Road	1,400 m	Pulverize, granular 'A' & double surface treatment	105,000	105,000	
	165	Durham Street	600 m	Resurface, curb & gutter and hot mix paving	300,000	100,000	Complete surface in 2012
<b>Totals</b>					<b>718,900</b>	<b>527,500</b>	

**APPENDIX "C-2"**  
**FORECAST CONDITION RATING PER YEAR**  
**GRAVEL ROADS**

Section	Location	Length (km)	Condition Rating					
			2007	2008	2009	2010	2011	2012
3	Darling Road	3.5	7.0	7.0	7.0	7.0	7.0	7.0
6	O'Grady Road	0.9	5.0	5.0	5.0	5.0	5.0	5.0
7	Phillips Road	0.5	4.0	4.0	4.0	4.0	4.0	4.0
8	Hardy Lane	0.1	4.0	4.0	4.0	4.0	4.0	4.0
9	Carr Road	1.6	4.0	4.0	4.0	4.0	4.0	4.0
10	Massey Road	0.5	4.0	4.0	4.0	4.0	4.0	4.0
11	Clarke Road	1.0	4.0	4.0	4.0	4.0	4.0	4.0
12	Campbell Road	3.8	3.0	3.0	3.0	3.0	3.0	3.0
18	Stonehaven Road	1.2	5.0	5.0	5.0	5.0	5.0	5.0
19	1st Concession Road	1.7	6.0	6.0	6.0	6.0	6.0	6.0
20	Mitchell Road	1.5	4.0	4.0	4.0	4.0	4.0	4.0
21	Begg Road	1.1	4.0	4.0	4.0	4.0	4.0	4.0
22	Red Cloud School Road	3.6	4.0	4.0	4.0	4.0	4.0	4.0
23	Smith Road	0.7	4.0	4.0	4.0	4.0	4.0	4.0
24	Dawson Road	3.3	5.0	5.0	5.0	5.0	5.0	5.0
26	Tait Road	0.2	4.0	4.0	4.0	4.0	4.0	4.0
27	Tait Road	1.5	5.0	5.0	5.0	5.0	5.0	5.0
34	Sunnyhill Road	0.4	4.0	4.0	4.0	4.0	4.0	4.0
35	Dingwall Road	0.8	5.0	5.0	5.0	5.0	5.0	5.0
36	Stoney Lonesome Road	1.9	3.0	3.0	3.0	3.0	3.0	3.0
37	Combview Road	0.6	5.0	5.0	5.0	5.0	5.0	5.0
40	Bonnett Road	1.0	6.0	6.0	6.0	6.0	6.0	6.0
41	Huycke Road	2.9	6.0	6.0	6.0	6.0	6.0	6.0
42	Pine Wood School Road	4.9	5.0	5.0	5.0	5.0	5.0	5.0
45	Parsons Road	1.7	5.0	5.0	5.0	5.0	5.0	5.0
46	Jones Road	1.7	6.0	6.0	6.0	6.0	6.0	6.0
47	Phasey Lane	0.3	7.0	7.0	7.0	7.0	7.0	7.0
50	Valley Road	0.7	4.0	4.0	4.0	4.0	4.0	4.0
51	Haynes Road	2.8	7.0	7.0	7.0	7.0	7.0	7.0
63	Dunbar Road	0.1	8.0	8.0	8.0	8.0	8.0	8.0
65	Hagarty Road	0.2	6.0	6.0	6.0	6.0	6.0	6.0
66	Moore's Road	0.4	6.0	6.0	6.0	6.0	6.0	6.0
68	Old Percy Road	0.6	5.0	5.0	5.0	5.0	5.0	5.0
69	Inglis Road	0.6	6.0	6.0	6.0	6.0	6.0	6.0
73	Neil McGregor Road	0.9	7.0	7.0	7.0	7.0	7.0	7.0
77	Wilce Road	0.5	6.0	6.0	6.0	6.0	6.0	6.0
78	Cowie Road	4.2	6.0	6.0	6.0	6.0	6.0	6.0
79	Maple Grove Road	1.3	7.0	7.0	7.0	7.0	7.0	7.0
80	Pogue Road	1.7	4.0	4.0	4.0	4.0	4.0	4.0
82	Gillespie Road	1.0	7.0	7.0	7.0	7.0	7.0	7.0
83	Penryn Road	2.8	7.0	7.0	7.0	7.0	7.0	7.0
84	Feeney Road	0.1	7.0	7.0	7.0	7.0	7.0	7.0
86	Dale Road	2.2	7.0	7.0	7.0	7.0	7.0	7.0

87	Waite's Road	2.0	8.0	8.0	8.0	8.0	8.0	8.0
88	Deele Road	0.8	6.0	6.0	6.0	6.0	6.0	6.0
89	Mutton Road	2.0	7.0	7.0	7.0	7.0	7.0	7.0
90	Ibbotson Road	0.3	4.0	4.0	4.0	4.0	4.0	4.0
93	Chapman Road	2.3	5.0	5.0	5.0	5.0	5.0	5.0
94	Walker Road	2.0	4.0	4.0	4.0	4.0	4.0	4.0
95	Burbridge Road	1.3	7.0	7.0	7.0	7.0	7.0	7.0
105	Samis Road	1.2	3.0	3.0	3.0	3.0	3.0	3.0
108	McDonald Road	1.2	5.0	5.0	5.0	5.0	5.0	5.0
109	Pine Tree Lane	0.4	6.0	6.0	6.0	6.0	6.0	6.0
110	Reddick Road	0.9	1.0	1.0	1.0	1.0	1.0	1.0
111	Trehear Road North	0.8	6.0	6.0	6.0	6.0	6.0	6.0
112	Cochrane Road	1.5	6.0	6.0	6.0	6.0	6.0	6.0
124	Branscombe Road	0.9	7.0	7.0	7.0	7.0	7.0	7.0
126	Ventress Road	2.6	5.0	5.0	5.0	5.0	5.0	5.0
128	Trent Valley Drive	2.7	6.0	6.0	6.0	6.0	6.0	6.0
131	Cedar Lane	0.2	6.0	6.0	6.0	6.0	6.0	6.0
132	Van Wicklin Lane	0.2	5.0	5.0	5.0	5.0	5.0	5.0
133	Bailey Road	0.6	6.0	6.0	6.0	6.0	6.0	6.0
136	Arthurs Lane	0.7	7.0	7.0	7.0	7.0	7.0	7.0
140	Old Wharf Road	0.5	6.0	6.0	6.0	6.0	6.0	6.0
145	Beach Drive	2.2	4.0	4.0	4.0	4.0	4.0	4.0
147	Hunt Road	1.7	3.0	3.0	3.0	3.0	3.0	3.0
148	Barnes Road	1.7	5.0	5.0	5.0	5.0	5.0	5.0
149	Bellamy Road	1.3	7.0	7.0	7.0	7.0	7.0	7.0
151	Peters Road	0.8	5.0	5.0	5.0	5.0	5.0	5.0
152	C.N. Cross Road	0.4	7.0	7.0	7.0	7.0	7.0	7.0
155	Blythe Park Road	1.0	8.0	8.0	8.0	8.0	8.0	8.0
163	Durham Street	2.1	9.0	9.0	9.0	9.0	9.0	9.0
168	Spencer Street	0.4	4.0	4.0	4.0	4.0	4.0	4.0
182	Victoria Street	0.3	7.0	7.0	7.0	7.0	7.0	7.0
213	Ontario Street	0.5	5.0	5.0	5.0	5.0	5.0	5.0
<b>Total Length of Gravel Road Section</b>		100.5						
<b>Average Condition Rating of All Gravel Road Sections</b>		na	5.4	5.4	5.4	5.4	5.4	5.4

**APPENDIX "C-1"**  
**FORECAST CONDITION RATING PER YEAR**  
**SURFACE TREATED ROADS**

Section	Location	Length (km)	Condition Rating					
			2007	2008	2009	2010	2011	2012
1	Pine Grove Road	2.4	7.0	6.5	6.0	5.5	5.0	4.5
16	Mitchell Road	1.6	7.0	6.5	6.0	5.5	5.0	4.5
28	Morganston Road	4.5	8.0	7.5	7.0	6.5	6.0	5.5
33	Mount Pleasant Road	5.5	10.0	9.5	9.0	8.5	8.0	7.5
39	Tobacco Road	3.9	9.0	8.5	8.0	7.5	7.0	6.5
62	Jakobi Road	3.8	9.0	8.5	8.0	7.5	7.0	6.5
64	Clarkson Road	1.3	8.0	7.5	7.0	6.5	6.0	5.5
67	Old Shelter Valley Road	2.0	6.0	5.5	5.0	4.5	4.0	3.5
72	Pipeline Road	1.4	5.0	4.5	4.0	3.5	3.0	2.5
74	Dingman Road	5.3	7.0	6.5	6.0	5.5	5.0	4.5
81	Shiloh Road	1.9	9.0	8.5	8.0	7.5	7.0	6.5
91	Broomfield Road	0.2	9.0	8.5	8.0	7.5	7.0	6.5
92	Trottman Road	2.0	9.0	8.5	8.0	7.5	7.0	6.5
97	Telephone Road	10.5	9.0	8.5	8.0	7.5	7.0	6.5
102	Crandall Road	3.2	9.0	8.5	8.0	7.5	7.0	6.5
103	Lake Road	2.0	9.0	8.5	8.0	7.5	7.0	6.5
104	Honey Road	2.6	9.0	8.5	8.0	7.5	7.0	6.5
106	Herley Road	1.9	8.0	7.5	7.0	6.5	6.0	5.5
113	Brighton-Cramahe Boundary Road	2.5	9.0	8.5	8.0	7.5	7.0	6.5
114	Little Lake Road	1.8	10.0	9.5	9.0	8.5	8.0	7.5
115	Little Lake Road	1.3	6.0	5.5	5.0	4.5	4.0	3.5
121	Orchard Road	1.2	9.0	8.5	8.0	7.5	7.0	6.5
122	Fiddick Road	3.0	8.0	7.5	7.0	6.5	6.0	5.5
123	Old Rail Road	0.4	6.0	5.5	5.0	4.5	4.0	3.5
125	Trehear Road	2.7	4.0	3.5	3.0	2.5	2.0	1.5
130	Little Lake Road	2.2	6.0	5.5	5.0	4.5	4.0	3.5
134	Peacock Lane	0.3	8.0	7.5	7.0	6.5	6.0	5.5
135	Jackson Drive	2.0	8.0	7.5	7.0	6.5	6.0	5.5
137	Keeler Road	0.2	7.0	6.5	6.0	5.5	5.0	4.5
138	Kelwood Lane	0.2	4.0	3.5	3.0	2.5	2.0	1.5
141	Townline Road	2.4	9.0	8.5	8.0	7.5	7.0	6.5
142	Union Road	1.5	7.0	6.5	6.0	5.5	5.0	4.5
143	Union Road	0.2	9.0	8.5	8.0	7.5	7.0	6.5
144	Lakeshore Road	0.4	8.0	7.5	7.0	6.5	6.0	5.5
150	Peters Road	1.0	6.0	5.5	5.0	4.5	4.0	3.5
153	Blythe Park Road	1.0	7.0	6.5	6.0	5.5	5.0	4.5
154	Blythe Park Road	0.9	8.0	7.5	7.0	6.5	6.0	5.5
156	Simpson Road	1.7	7.0	6.5	6.0	5.5	5.0	4.5
157	Colton Street	0.1	8.0	7.5	7.0	6.5	6.0	5.5
158	Colton Street	1.9	8.0	7.5	7.0	6.5	6.0	5.5
159	Victoria Beach Road	0.9	8.0	7.5	7.0	6.5	6.0	5.5
160	Durham Street	0.2	9.0	8.5	8.0	7.5	7.0	6.5
161	Victoria Beach Road	0.6	9.0	8.5	8.0	7.5	7.0	6.5

162	Hoskins Road	0.4	8.0	7.5	7.0	6.5	6.0	5.5
166	Durham Road	1.4	9.0	8.5	8.0	7.5	7.0	6.5
167	Scott Street	0.3	8.0	7.5	7.0	6.5	6.0	5.5
169	Spencer Street	0.3	7.0	6.5	6.0	5.5	5.0	4.5
172	Parliament Street	1.0	9.0	8.5	8.0	7.5	7.0	6.5
181	Victoria Street	0.3	6.0	5.5	5.0	4.5	4.0	3.5
189	Earl Street	0.2	7.0	6.5	6.0	5.5	5.0	4.5
190	William Street	0.6	7.0	6.5	6.0	5.5	5.0	4.5
197	Old Percy Road	0.2	6.0	5.5	5.0	4.5	4.0	3.5
208	Elgins Street	0.4	8.0	7.5	7.0	6.5	6.0	5.5
210	Ontario Street	0.5	7.0	6.5	6.0	5.5	5.0	4.5
	Total Length of All Surface Treated Road Sections	92.2						
	Average Condition Rating for all Surface Treated Road Section		8.1	7.6	7.1	6.6	6.1	5.6

**APPENDIX "C-3"**  
**FORECAST CONDITION RATING PER YEAR**  
**HOT MIXED PAVED ROADS**

Section	Location	Length (km)	Condition Rating					
			2007	2008	2009	2010	2011	2012
52	Cedar Street	0.2	6.0	5.5	5.0	4.5	4.0	3.5
53	Mill Street	0.2	6.0	5.5	5.0	4.5	4.0	3.5
54	Norway Street	0.3	7.0	6.5	6.0	5.5	5.0	4.5
56	Oak Street	0.3	7.0	6.5	6.0	5.5	5.0	4.5
57	Pine Street	0.5	6.0	5.5	5.0	4.5	4.0	3.5
58	Gould Road	0.5	6.0	5.5	5.0	4.5	4.0	3.5
59	Spring Street	0.1	6.0	5.5	5.0	4.5	4.0	3.5
60	Old Percy Road	0.4	6.0	5.5	5.0	4.5	4.0	3.5
61	Old Percy Road	0.4	5.0	4.5	4.0	3.5	3.0	2.5
117	Little Lake Road	1.0	8.0	7.5	7.0	6.5	6.0	5.5
118	Purdy Road	5.2	5.0	4.5	4.0	3.5	3.0	2.5
139	Kelwood Lane	0.4	10.0	9.5	9.0	8.5	8.0	7.5
164	Steamside Drive	0.4	7.0	6.5	6.0	5.5	5.0	4.5
165	Durham Street	0.6	7.0	6.5	6.0	5.5	5.0	4.5
170	Parliament Street	0.5	4.0	3.5	3.0	2.5	2.0	1.5
171	Parliament Street	0.5	8.0	7.5	7.0	6.5	6.0	5.5
173	Janes Court	0.2	10.0	9.5	9.0	8.5	8.0	7.5
174	Kensington Street	0.3	9.0	8.5	8.0	7.5	7.0	6.5
175	Elgin Street	0.3	9.0	8.5	8.0	7.5	7.0	6.5
176	Alfred Street	0.2	7.0	6.5	6.0	5.5	5.0	4.5
177	Elgin Street	0.4	5.0	4.5	4.0	3.5	3.0	2.5
178	Simmons Street	0.2	9.0	8.5	8.0	7.5	7.0	6.5
179	Victoria Street	0.4	9.0	8.5	8.0	7.5	7.0	6.5
180	Victoria Street	0.4	9.0	8.5	8.0	7.5	7.0	6.5
183	North Street	0.2	5.0	4.5	4.0	3.5	3.0	2.5
184	Creek Street	0.2	10.0	9.5	9.0	8.5	8.0	7.5
185	Arthur Street	0.2	8.0	7.5	7.0	6.5	6.0	5.5
186	Thomlea Street	0.2	7.0	6.5	6.0	5.5	5.0	4.5
187	Arena Road	0.1	8.0	7.5	7.0	6.5	6.0	5.5
188	Division Street	0.1	7.0	6.5	6.0	5.5	5.0	4.5
191	Arthur Street	0.3	10.0	9.5	9.0	8.5	8.0	7.5
192	Cortland Crescent	0.3	10.0	9.5	9.0	8.5	8.0	7.5
193	King Street West	0.4	8.0	7.5	7.0	6.5	6.0	5.5
194	Church Street	0.4	8.0	7.5	7.0	6.5	6.0	5.5
195	Robertson Street	0.3	10.0	9.5	9.0	8.5	8.0	7.5
196	Church Street	0.1	9.0	8.5	8.0	7.5	7.0	6.5
198	Park Street	0.2	8.0	7.5	7.0	6.5	6.0	5.5
199	Norton Lane	0.1	8.0	7.5	7.0	6.5	6.0	5.5
200	Park Street	0.4	4.0	3.5	3.0	2.5	2.0	1.5
201	Cedar Street	0.2	4.0	3.5	3.0	2.5	2.0	1.5
202	Church Street	0.3	9.0	8.5	8.0	7.5	7.0	6.5
203	Maybee Lane	0.1	7.0	6.5	6.0	5.5	5.0	4.5

204	Victoria Street North		8.0	7.5	7.0	6.5	6.0	5.5
205	Burnham Street	0.4	4.0	3.5	3.0	2.5	2.0	1.5
206	Church Street	0.2	8.0	7.5	7.0	6.5	6.0	5.5
207	Elgin Street	0.1	9.0	8.5	8.0	7.5	7.0	6.5
209	Industrial Park Road	0.8	9.0	8.5	8.0	7.5	7.0	6.5
211	Ontario Street	0.2	5.0	4.5	4.0	3.5	3.0	2.5
212	Ontario Street	0.3	7.0	6.5	6.0	5.5	5.0	4.5
	Total Length of All Hot Mixed Paved Road Sections	20.00						
	Average Condition Rating for all Hot Mixed Paved Road Sections		6.7	6.2	5.7	5.2	4.7	4.2

**PSAB COSTING  
GRAVEL ROADS**

Section	Location	Length (km)	Cost Estimate to Build in 2007				
			2007				
3	Darling Road	3.5	\$595,000				
6	O'Grady Road	0.9	\$153,000				
7	Phillips Road	0.5	\$85,000				
8	Hardy Lane	0.1	\$17,000				
9	Carr Road	1.6	\$272,000				
10	Massey Road	0.5	\$85,000				
11	Clarke Road	1.0	\$170,000				
12	Campbell Road	3.8	\$646,000				
18	Stonehaven Road	1.2	\$204,000				
19	1st Concession Road	1.7	\$289,000				
20	Mitchell Road	1.5	\$255,000				
21	Begg Road	1.1	\$187,000				
22	Red Cloud School Road	3.6	\$612,000				
23	Smith Road	0.7	\$119,000				
24	Dawson Road	3.3	\$561,000				
26	Tait Road	0.2	\$34,000				
27	Tait Road	1.5	\$255,000				
34	Sunnyhill Road	0.4	\$68,000				
35	Dingwall Road	0.8	\$136,000				
36	Stoney Lonesome Road	1.9	\$323,000				
37	Combview Road	0.6	\$102,000				
40	Bonnett Road	1.0	\$170,000				
41	Huycke Road	2.9	\$493,000				
42	Pine Wood School Road	4.9	\$833,000				
45	Parsons Road	1.7	\$289,000				
46	Jones Road	1.7	\$289,000				
47	Phasey Lane	0.3	\$51,000				
50	Valley Road	0.7	\$119,000				
51	Haynes Road	2.8	\$476,000				
63	Dunbar Road	0.1	\$17,000				
65	Hagarty Road	0.2	\$34,000				
66	Moore's Road	0.4	\$68,000				
68	Old Percy Road	0.6	\$102,000				
69	Inglis Road	0.6	\$102,000				
73	Neil McGregor Road	0.9	\$153,000				
77	Wilce Road	0.5	\$85,000				
78	Cowie Road	4.2	\$714,000				
79	Maple Grove Road	1.3	\$221,000				
80	Pogue Road	1.7	\$289,000				
82	Gillespie Road	1.0	\$170,000				
83	Penryn Road	2.8	\$476,000				
84	Feeney Road	0.1	\$17,000				
86	Dale Road	2.2	\$374,000				

87	Waite's Road	2.0	\$340,000				
88	Deele Road	0.8	\$136,000				
89	Mutton Road	2.0	\$340,000				
90	Ibbotson Road	0.3	\$51,000				
93	Chapman Road	2.3	\$391,000				
94	Walker Road	2.0	\$340,000				
95	Burbridge Road	1.3	\$221,000				
105	Samis Road	1.2	\$204,000				
108	McDonald Road	1.2	\$204,000				
109	Pine Tree Lane	0.4	\$68,000				
110	Reddick Road	0.9	\$153,000				
111	Trehear Road North	0.8	\$136,000				
112	Cochrane Road	1.5	\$255,000				
124	Branscombe Road	0.9	\$153,000				
126	Ventress Road	2.6	\$442,000				
128	Trent Valley Drive	2.7	\$459,000				
131	Cedar Lane	0.2	\$34,000				
132	Van Wicklin Lane	0.2	\$34,000				
133	Bailey Road	0.6	\$102,000				
136	Arthurs Lane	0.7	\$119,000				
140	Old Wharf Road	0.5	\$85,000				
145	Beach Drive	2.2	\$374,000				
147	Hunt Road	1.7	\$289,000				
148	Barnes Road	1.7	\$289,000				
149	Bellamy Road	1.3	\$221,000				
151	Peters Road	0.8	\$136,000				
152	C.N. Cross Road	0.4	\$68,000				
155	Blythe Park Road	1.0	\$170,000				
163	Durham Street	2.1	\$357,000				
168	Spencer Street	0.4	\$68,000				
182	Victoria Street	0.3	\$51,000				
213	Ontario Street	0.5	\$85,000				
<b>Total Length of Gravel Road Section</b>		100.5	\$17,085,000				

Cost estimate based on \$170,000/km

**PSAB COSTING  
SURFACE TREATED ROADS**

Section	Location	Length (km)	Cost Estimate to Build 2007				
			2007				
1	Pine Grove Road	2.4	\$432,000				
16	Mitchell Road	1.6	\$288,000				
28	Morganston Road	4.5	\$810,000				
33	Mount Pleasant Road	5.5	\$990,000				
39	Tobacco Road	3.9	\$702,000				
62	Jakobi Road	3.8	\$684,000				
64	Clarkson Road	1.3	\$234,000				
67	Old Shelter Valley Road	2.0	\$360,000				
72	Pipeline Road	1.4	\$252,000				
74	Dingman Road	5.3	\$954,000				
81	Shiloh Road	1.9	\$342,000				
91	Broomfield Road	0.2	\$36,000				
92	Trottman Road	2.0	\$360,000				
97	Telephone Road	10.5	\$1,890,000				
102	Crandall Road	3.2	\$576,000				
103	Lake Road	2.0	\$360,000				
104	Honey Road	2.6	\$468,000				
106	Herley Road	1.9	\$342,000				
113	Brighton-Cramahe Boundary Road	2.5	\$450,000				
114	Little Lake Road	1.8	\$324,000				
115	Little Lake Road	1.3	\$234,000				
121	Orchard Road	1.2	\$216,000				
122	Fiddick Road	3.0	\$540,000				
123	Old Rail Road	0.4	\$72,000				
125	Trehear Road	2.7	\$486,000				
130	Little Lake Road	2.2	\$396,000				
134	Peacock Lane	0.3	\$54,000				
135	Jackson Drive	2.0	\$360,000				
137	Keeler Road	0.2	\$36,000				
138	Kelwood Lane	0.2	\$36,000				
141	Townline Road	2.4	\$432,000				
142	Union Road	1.5	\$270,000				
143	Union Road	0.2	\$36,000				
144	Lakeshore Road	0.4	\$72,000				
150	Peters Road	1.0	\$180,000				
153	Blythe Park Road	1.0	\$180,000				
154	Blythe Park Road	0.9	\$162,000				
156	Simpson Road	1.7	\$306,000				
157	Colton Street	0.1	\$18,000				
158	Colton Street	1.9	\$342,000				
159	Victoria Beach Road	0.9	\$162,000				
160	Durham Street	0.2	\$36,000				
161	Victoria Beach Road	0.6	\$108,000				

162	Hoskins Road	0.4	\$72,000					
166	Durham Road	1.4	\$252,000					
167	Scott Street	0.3	\$54,000					
169	Spencer Street	0.3	\$54,000					
172	Parliament Street	1.0	\$180,000					
181	Victoria Street	0.3	\$54,000					
189	Earl Street	0.2	\$36,000					
190	William Street	0.6	\$108,000					
197	Old Percy Road	0.2	\$36,000					
208	Elgins Street	0.4	\$68,400					
210	Ontario Street	0.5	\$90,000					
	Total Length of All Surface Treated Road Sections	92.2	\$16,592,400					

**PSAB COSTING  
HOT MIXED PAVED ROADS**

Section	Location	Length (km)	Cost Estimate to Build in 2007				
			2007				
52	Cedar Street	0.2	\$52,000				
53	Mill Street	0.2	\$52,000				
54	Norway Street	0.3	\$78,000				
56	Oak Street	0.3	\$78,000				
57	Pine Street	0.5	\$130,000				
58	Gould Road	0.5	\$130,000				
59	Spring Street	0.1	\$26,000				
60	Old Percy Road	0.4	\$104,000				
61	Old Percy Road	0.4	\$104,000				
117	Little Lake Road	1.0	\$260,000				
118	Purdy Road	5.2	\$1,352,000				
139	Kelwood Lane	0.4	\$104,000				
164	Steamside Drive	0.4	\$104,000				
165	Durham Street	0.6	\$156,000				
170	Parliament Street	0.5	\$130,000				
171	Parliament Street	0.5	\$130,000				
173	Janes Court	0.2	\$52,000				
174	Kensington Street	0.3	\$78,000				
175	Elgin Street	0.3	\$78,000				
176	Alfred Street	0.2	\$52,000				
177	Elgin Street	0.4	\$104,000				
178	Simmons Street	0.2	\$52,000				
179	Victoria Street	0.4	\$104,000				
180	Victoria Street	0.4	\$104,000				
183	North Street	0.2	\$52,000				
184	Creek Street	0.2	\$52,000				
185	Arthur Street	0.2	\$52,000				
186	Thomlea Street	0.2	\$52,000				
187	Arena Road	0.1	\$26,000				
188	Division Street	0.1	\$26,000				
191	Arthur Street	0.3	\$78,000				
192	Cortland Crescent	0.3	\$78,000				
193	King Street West	0.4	\$104,000				
194	Church Street	0.4	\$104,000				
195	Robertson Street	0.3	\$78,000				
196	Church Street	0.1	\$26,000				
198	Park Street	0.2	\$52,000				
199	Norton Lane	0.1	\$26,000				
200	Park Street	0.4	\$104,000				
201	Cedar Street	0.2	\$52,000				
202	Church Street	0.3	\$78,000				
203	Maybee Lane	0.1	\$26,000				

204	Victoria Street North	0.1	\$26,000					
205	Burnham Street	0.4	\$104,000					
206	Church Street	0.2	\$52,000					
207	Elgin Street	0.1	\$26,000					
209	Industrial Park Road	0.8	\$208,000					
211	Ontario Street	0.2	\$52,000					
212	Ontario Street	0.3	\$78,000					
Total Length of All Hot Mixed Paved Road Sections		20.10	\$5,226,000					

Cost estimated based on \$260,000 / km