TOWNSHIP OF TRENT LAKES

ROAD NEEDS STUDY

FALL 2012

Prepared For:

Township of Trent Lakes
701 County Road 36
P.O. Box 820
Bobcaygeon, ON K0M 1A0

Prepared By:

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Project No. 12-1-5506
February 2013

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1.0 INTRODUCTION

1.1 Background

The Township of Trent Lakes retained The Greer Galloway Group Inc. in September 2012 to undertake a Road Needs Study for all maintained roads under municipal jurisdiction. The study is a key element of a comprehensive asset management program which, when combined with similar assessments of bridges, water systems, sewage systems and municipal buildings, provides direction for the effective utilization of resources.

The general purpose of the Road Needs Study was to assess the current state of public roadways within the township through a visual inspection of all sections of road to identify physical deficiencies, estimate capital costs for improvements and prioritize the work. The key objective is to provide the township with the information required to effectively plan and manage capital expenditures related to public roads. In general, the capital work programs include significant rehabilitation or reconstruction of roadway sections such as horizontal or vertical grade adjustments, significant drainage improvements, replacement of surface treatment, upgrading from gravel to surface treatment and similar improvements that are generally longer term construction projects that can significantly impact the travelling public and require significant funding.

In addition to capital requirements, the Township performs routine maintenance of road sections to extend the life of the roadway asset. In general, the maintenance program consists of grading and minor localized repair and resurfacing of road sections to address generally minor deficiencies.

The information developed in the current study will be used by Township staff to develop an efficient road maintenance and capital improvement program to improve operational characteristics and safety of the public. The study does not generally identify routine maintenance or similar improvements associated with normal operations.

There are numerous fire routes and other generally unmaintained or unassumed roads in the township. These road sections are generally in poor to very poor condition, and many are impassable to two-wheel drive vehicles. These roads have not been included in the study.

1.2 Methodology

The Road Needs Study included the following key items:

- Visual assessment of every passable public road section
- Identification of roadway width, surface material and drainage
- Assignment of a surface condition ranking
- Estimation of capital construction needs

- Priority rating for improvements
- Preparation of a roadway improvement objectives for 2013 through 2019

2.0 ROADWAY ASSESSMENT

2.1 Procedure

A windshield survey of all passable public roads within the Township was completed with additional physical measurements and detailed inspections as required. In order to maximize consistency, the visual assessment was completed using a standard rating table and checklist over a roughly six week period during generally good weather. Inspections were not done during periods of poor weather, particularly when light snow covered the roads late in the fall.

Each road section was reviewed as an individual unit divided generally according to traffic volume, adjacent land use, physical characteristics and terrain. The roads were further classified according to the type of construction:

- Urban – generally hot mixed asphalt, curb and gutter with storm sewers
- Semi-Urban – generally surface treatment without curb and gutter
- Rural – surface treatment or gravel with open ditches and culverts

A description of each road section was recorded during the field inspection, generally on a spreadsheet or map, as appropriate. The data were transcribed into a spreadsheet to record the key parameters of each section such as road surface, condition, major deficiencies, roadway width, adjacent property use, drainage and any other elements deemed necessary to provide a full description of the road section for the purpose of this report. The spreadsheet was utilized to develop an overall section rating based on surface type, condition and traffic volume. The data were used to develop projected capital costs for minor or major rehabilitation, reconstruction and specific maintenance requirements.

2.2 Roadway Surface Type and Condition

Approximately 60% of the lineal kilometres of roads within the Township are surface treated. Surface treatment generally has a life cycle of 6-8 years, depending on traffic volume, level of maintenance and physical characteristics of the road. It was evident during the inspections that many of the roads are relatively low volume and the surface treatment has had a longer life span and is generally performing to an acceptable standard even after 10 years or more. The life span can be extended with the application of a second surface treatment layer after a few years of service, typically within 3 years of first application, and before significant defects can develop. Prior to application of the second layer of surface treatment, localized repair of cracks, heaves, depressions or other defects is recommended. Generally speaking, surface treatment will have a shorter life cycle on roadways which have poor drainage and/or inadequate granular base. These deficiencies, especially when combined with high traffic volumes or turning movements,

will tend to degrade the surface treatment and result in the development of alligator and longitudinal or transverse cracking, wheel track rutting, pot holes and raveling. Development of these defects can have a significant impact on the safety of the travelling public by reducing overall traction, particularly on the approach to intersections or on curves. Most semi-urban and urban roads tend to be surface treated (or have hot mix asphalt) to mitigate nuisance dust and minimize ongoing maintenance activity in populated areas.

Approximately 40% of roads lineal kilometres in the Township are gravel. These roads tend to be in more rural areas of the Township. Unless there is an underlying problem with drainage or subbase material, the gravel roads tend to be consistent year to year. Generally speaking, regular maintenance consisting of grading and localized application of granular material, as required, deals with routine wear and tear. Deficiencies similar to those discussed above (wheel track rutting, potholes, development of corduroy and other irregularities) can develop into safety concerns, particularly at intersections. Application of surface treatment on the approaches to intersections can alleviate these potential problems.

Hot mix asphalt is generally on roads in urban areas. A single lift of asphalt typically has a life cycle of 10-15 years and a double lift of 15-20 years. The life cycle depends largely on the volume of traffic as well as the type of traffic and conditions of base granular material. The Township does not currently maintain any hot mix asphalt surfaces.

It was noted that many dead-end roads terminated in non-standard turning circles and that several had no turning circle at all and were without appropriate signage and barricades. In these cases, vehicles have to turn-around in private driveways or within the roadway.

The assessment indicates that about 71% of the road sections are good to very good condition Overall condition of the road network is good to very good

2.3 Benchmark Costs

The Township deals with roadway improvements through a means of well established resurfacing and reconstruction practices. Benchmark costs were developed using standard costing for recent road projects. The cost per kilometre can be adjusted to suit actual recent costs specifically related to the Township. For gravel and hard surfaced roads, the Township will typically do one of four types of improvement:

Base & Surface (Design Standard) – Upgrading of the roadway including minor widening if required, excavation of steep hills to flatten grades, ditching, placement of Granular A and B, double surface treatment and seeding and mulching. The estimated benchmark cost for this type of work was set at $180,000 per kilometer.

Base & Surface (Tolerable Standard) – Upgrading of the roadway similar to above but excluding any significant excavation or widening. This standard includes ditching,

placement of Granular A and B, double surface treatment and seeding and mulching. The estimated benchmark cost for this type of work was set at $115,000 per kilometer.

Resurface & Widen (Tolerable Standard) – General improvements to the roadway including ditching, placement of Granulars A, single surface treatment or re-graveling, seeding and mulching. Excavation is typically not required. The focus of this work is more on the surface conditions and less on the structural elements of the roadway. The estimated benchmark cost for this type of work was set at $75,000 per kilometer.

Resurface (Minor) – This type of improvement includes full or partial removal of existing surface treatment, placement of Granular A to correct minor grading or crossfall issues at select locations and application of surface treatment. This includes ditching, seeding and mulching, etc. The estimated benchmark cost for this type of work was set at $30,000 per kilometer.

Routine Maintenance
In addition to construction activities noted above, routine maintenance will extend the life span of roadways which have minor deficiencies but generally good drainage and subsurface materials. The maintenance work will generally consist of minor grading, ditch cleanouts and culvert replacements, as required. The estimated costs of such work will be on the order of $15,000 per kilometer.

The table below is a summary of a proposed budget for capital and maintenance road construction, excluding pre-engineering and geotechnical investigations through 2018 with provisional work identified for 2019. The 2019 road sections could be brought forward as budgets allow for increased work.

Year	Road Sections	Construction		Maintenance		TOTAL BUDGET ($000)	TOTAL LENGTH (km)
		Length (km)	Budget ($000)	Length (km)	Budget ($000)		
2013	13	5.8	664	21.8	327	991	27.6
2014	17	7.0	647	18.7	289	936	25.7
2015	20	4.7	634	16.9	254	888	21.6
2016	14	8.9	734	18.0	270	1,004	26.9
2017	14	7.5	672	18.4	276	948	25.9
2018	18	5.4	667	20	300	967	25.4
2019	20	12.2	664	20	300	964	32.2
Total	**116**	**51.5**	**4,682**	**133.8**	**2,016**	**6,698**	**185.3**

4.0 CAPITAL IMPROVEMENT PROGRAM

One of the key objectives of the assignment is to provide a capital improvement plan and maintenance plan for the public roads within township. As part of the assessment, a timeframe has been established based on priorities from the visual inspections.

4.1 Road Network

Capital improvements and maintenance work to the road network have been identified on the attached spreadsheets. We have prioritized the work according to the following general outline of Now, 2-6 years and > 6 years where Now implies the work should occur in 2013, 2-6 years implies work is needed in 2014, 2015, 2016, 2017 and 2018 and > 6 years implies work that should be scheduled anytime beyond 2018. The scheduling of the work also considers the Condition Rating of the specific road section based on the review completed in December 2012.

As noted previously, the life span of surface treatment on a roadway with good drainage and subgrade material is typically about 10 years. The observed condition of the network and limited number of heavy trucks suggests the life span is closer to 12-15 years for many roadways. Given the overall road network length of about 320 km, the capital improvement and maintenance program should target about 27 km per year in order to achieve significant improvements to the overall condition of the road network. The current plan averages about 28 km per year. It should be noted however, that increased truck traffic, which will develop as proposed quarries are approved, will have a significant impact on the adjacent roadways.

We understand there are other non-tangible factors for the township to consider in order to schedule and complete capital work. The annual program identified herein is based solely on observations made during the visual assessment and does not include intangibles such as political will or other external conditions which may direct one specific expenditure over another. The annual expenditures have been established to be relatively consistent year to year while making headway to improve the overall condition of the road network.

NOW (1 YEAR)
Identifies required work to be completed within the next calendar year. Generally, road sections are in very poor, poor or fair condition and require immediate action to correct significant deficiencies. Typical deficiencies include significant deterioration of the surface to include severe cracking, rutting, pot holes, drainage or other elements which have compromised road structure and/or safety of the travelling public.

2-6 YEARS
Identifies required work to be completed within 6 years but not urgent enough to require immediate attention. Road sections within this category are generally in poor to fair condition. Within this category, road sections are prioritized according to the potential for an identified problem to get worse, thereby increasing the cost to correct, current or projected traffic volumes or other reasons.

> 6 YEARS
Identifies required work that should be completed within a 15 year timeframe. Typically, road sections in this category are in good to very good condition with no significant

deficiencies. This does not imply that deficiencies will not develop and a road currently scheduled for > 6 years could require capital improvements prior to the scheduled year.

Generally speaking, the road network is in good to very good condition with approximately 71% of the road segments having a rating of 7 or above out of 10. A few notable exceptions are discussed below.

Beaver Lake Road is a generally narrow road, except for the first 2 km, and has restricted sightlines due to steep hills and sharp curves throughout most of its length, particularly the last 7 km. Work has been done over the past several years to improve the roadway, particularly at the west end, but significant additional work is required. The traffic on Beaver Lake Road has increased as the lakes are developed with more seasonal and year-round residents. As well, the road provides a primary access to the Kawartha Highlands Provincial Park.

Allens Alley is in very poor condition with severe deterioration of the surface treatment throughout the entire length. It was evident during our inspection that preliminary clearing and grubbing had been done along the roadsides in preparation of reconstruction activities in 2013.

Hill Drive off County Road #36 provides access to Hill Estates and is in generally poor condition with numerous pot holes, severely deteriorated surface treatment, heaves at culverts and overall rough ride. Similar conditions exist for all roads in Hill Estates.

Sumcot Drive, Cedar Circle and Phillips Court off of County Road #37 are all in poor condition with moderate to severe deterioration of the surface treatment, numerous pot holes and heaves at culverts. The work should be completed on all three of these roads during the same work period.

Sections of Reid Street have been reconstructed with a significant grade raise in a few localized areas. The grade raise was done largely without a road widening and the result is that the shoulders are very steep. Due to the steep shoulders and the potential for a vehicle to overturn on the embankment, slope flattening or the installation of guide posts are recommended.

Kawartha Hideaway Loop is in fair condition with moderate travelling surface defects however, there is a public safety hazard at the extension of this road. The boat launch into is directly over a sharp crest and not visible from a vehicle travelling north bound on the road. There is a high probability that a vehicle travelling at any significant speed would crest the hill and be unable to stop prior to entering the water, particularly at night or when the road is slippery. Signage is recommended to advise of the boat launch.

In general, the cost of the road capital improvement and maintenance program (excluding pre-engineering and geotechnical work) has been established at approximately $960,000 per year. This level of expenditure will enable the Township to improve the overall condition of the road network.

In addition to this construction and maintenance budget, it is recommended that an additional $50,000 be allocated annually to fund pre-engineering studies (surveying, geotechnical investigations, etc.) and traffic counts in order to optimize the rehabilitation/reconstruction strategy to be selected for each road section under consideration for future improvements. Ideally, the pre-engineering work would be completed in the year preceding the construction. Additional funds ($20,000 per year) should be added to the overall road budget to correct safety-related deficiencies such as inadequate guide rail and signage

5.0 CONCLUSIONS

The Township road network is in generally very good condition with some notable exceptions as identified elsewhere in this report. It is evident that the current capital roads program has maintained the overall condition of the road network but, in our opinion, has been below the amount required to make significant progress in improving the overall condition of the road network. Based on our visual assessment and rough calculations, an expenditure of about $960,000 per year is required to make progress and improve the overall condition of the road network. This figure does not include $50,000 for pre-engineering studies and $20,000 for guide rail and signage. Once the overall condition of the road network is improved, the annual maintenance costs will decrease.

All of which is respectfully submitted,

The Greer Galloway Group Inc.
Engineers and Planners

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APPENDIX I

Annual Program – 2013 through 2019

TOWNSHIP OF TRENT LAKES
ROAD NEEDS ASSESSMENT - CONSTRUCTION
ANNUAL PROGRAM - 2013 THROUGH 2019

Location	From	To	Year	Length (m)	Surface Width (m)	Surface Type	Surface Condition Rating	Roadbase Condition Rating	Traffic Rating 5 3 1	Roadside Drainage	Overall Rank (max=10)	Work Req'd	Period Total
ADAM & EVE RD	Cty Rd #37	Melody Bay Rd	2013	1,725	4.5	ST	8	8	5	8	6	M	
ALLENS ALLEY	Crystal Lake Rd	Galway Rd	2013	2,113	6.1	ST	2	4	3	4	2	MRC	
SUMCOT DR	Allens Rd	End	2013	1,696	6.7	ST	3	5	1	5	4	MRC	
CEDAR CIR	Sumcot Dr	End	2013	140	5.8	ST	3	5	3	5	3	MRC	
PHILLIPS CRT	Sumcot Dr	End	2013	140	6.3	ST	3	5	3	5	3	MRC	$674,620
TED'S LANE	Barcroft Rd	FR #67	2014	840	5.5	ST	8	8	1	6	6	M, D	
HILL DR	Cty Rd #36	End	2014	1,286	6.2	ST	4	8	5	7	7	MRH	
BEAVER LAKE RD	FR 256	End at FR 267	2014	2,000	4.5	ST	5	4	5	3	2	MRC	
CRYSTAL LAKE RD	Anne Dr	End @ fr #381	2014	1,625	4.2	GR	6	8	1	6	6	MRH	
PINE POINT TRAIL	West Clear Bay Poin	End	2014	355	3.9	GR	6	7	1	8	6	M	
DUTCH LINE RD	Curve E of Queens L	Queens Line	2014	840	5.8	GR	7	7	3	5	7	MRH	$647,320
ALPINE CRES	Alpine Lake Rd	End	2015	84	6.0	ST	8	8	1	8	8	MRH	
ALPINE LAKE RD	Alpine Cres	Cedar Cres	2015	200	6.0	ST	8	8	1	8	8	M	
ALPINE LAKE RD	Bay Island Dr	Alpine Lake Rd	2015	200	6.0	ST	8	8	1	8	8	M	
ALPINE LAKE RD	Cedar Cres	Bay Island Dr	2015	900	6.0	ST	8	8	1	8	8	M	

M - Routine maintenance; D - Ditching; MRH - Minor Rehabilitation; MRC - Minorr Reconstruction; RC - Reconstruction

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Location	From	To	Year	Length (m)	Surface Width (m)	Surface Type	Surface Condition Rating	Roadbase Condition Rating	Traffic Rating 5 3 1	Roadside Drainage	Overall Rank (max=10)	Work Req'd	Period Total
ALPINE LAKE RD	Tates Bay Rd	Alpine Cres	2015	700	6.0	ST	8	8	1	8	8	M	
BAY ISLAND DR	Alpine Lake Rd	End	2015	95	5.5	ST	5	6	1	5	5	MRH	
BEAVER LAKE RD	FR 240	FR 256	2015	2,400	4.5	ST	5	4	5	3	2	MRC	
CEDAR CRES	Alpine Lake Rd	End	2015	66	6.0	ST	7	7	1	7	7	MRH	$633,600
DUTCH LINE RD	Queens Line	1.8km W of Queens	2016	1,790	5.1	ST	5	8	5	7	5	MRH	
DUTCH LINE RD	Reid St	S to Curve to West	2016	2,065	5.8	GR	9	7	3	4	7	MRH	
DUTCH LINE RD	1.8km W of Queens	CtyRd #121	2016	1,270	5.1	ST	5	8	5	7	5	MRH	
ADAM CUMMINGS RD	400m	FR #51	2016	1,936	6.7	ST	5	5	3	5	4	MRH	
ADAM CUMMINGS RD	FR #51	End	2016	1,400	5.5	ST	5	5	3	5	4	MRH	
ADAM CUMMINGS RD	Lakehurst Circle Rd	400m	2016	400	5.5	ST	5	5	3	3	3	MRH	$734,170
BEAVER LAKE RD	McGinnis Lake Rd	FR 240	2017	1,700	4.5	ST	5	4	5	3	2	MRC	
BEAVER LAKE RD	FR 209	McGinnis Lake Rd	2017	1,000	6.5	ST	5	4	5	3	2	MRC	
CRYSTAL LAKE RD	Allens Alley	FR #597	2017	2,160	6.3	ST	8	8	5	8	6	M	
CRYSTAL LAKE RD	Caines Lane	Bridge	2017	1,830	6.3	ST	6	7	5	7	5	MRH	
ANNE DR	Crystal Lake Rd	End	2017	763	4.0	GR	5	5	1	7	5	M	$671,480

M - Routine maintenance; D - Ditching; MRH - Minor Rehabilitation; MRC - Minorr Reconstruction; RC - Reconstruction

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ANNUAL PROGRAM - 2013 THROUGH 2019

Location	From	To	Year	Length (m)	Surface Width (m)	Surface Type	Surface Condition Rating	Roadbase Condition Rating	Traffic Rating 5 3 1	Roadside Drainage	Overall Rank (max=10)	Work Req'd	Period Total
BEAVER LAKE RD	Mississauga Lake Rc	FR 209	2018	2,000	6.5	ST	6	4	5	3	3	MRC	
CLEARVIEW DR	East End	West End	2018	663	3.7	GR	5	7	1	7	6	M	
DARVELL LANE	Woodland Trail	End	2018	283	4.0	ST	5	5	1	8	5	MRH	
DARVELL RD	Kawarha Hideaway F	Kawartha Hideaway F	2018	223	4.0	ST	5	5	1	8	5	MRH	
CRYSTAL LAKE RD	Peter Island Rd	Anne Dr	2018	2,195	6.1	ST	9	8	3	7	6	M	$667,200
CRYSTAL LAKE RD	Bridge	Peters Island Rd	2019	1,790	6.3	ST	6	7	5	7	5	MRH	
ALEXANDER CRT	Baker Dr	End	2019	736	6.4	ST	8	8	1	8	8	M	
ALLEN'S RD	Cty Rd #37	Sumcot Rd	2019	1,917	6.7	ST	7	7	5	8	8	MRH	
ANCHOR BAY RD	Cty Rd #37	Cty Rd #37	2019	1,862	6.2	ST	8	8	3	8	8	M	
BALDWIN BAY RD	Cty Rd #507	End	2019	998	5.5	ST	8	8	3	8	8	M	
BASS LAKE RD	HWY 36	Tully's Rd	2019	1,300	6.5	ST	8	6	1	5	6	M	
BEAR CREEK RD	Elim Lodge Rd	FR #72	2019	1,944	5.1	GR	8	5	3	5	6	M	
BEAR CREEK RD	FR #72	End @ FR #69	2019	540	4.9	GR	6	5	3	5	6	M	
CEDAR CRT	Cedar Dr	End	2019	531	5.5	ST	4	3	1	4	4	MRC	
DEER BAY REACH NORTH	Cty Rd #36	End	2019	591	4.0	GR	4	4	1	4	4	M	$664,420

M - Routine maintenance; D - Ditching; MRH - Minor Rehabilitation; MRC - Minorr Reconstruction; RC - Reconstruction