TOWNSHIP OF/CANTON DE
Tiny

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April 17, 2015

Brent Armstrong, Aggregate Resources Officer
Ministry of Natural Resources and Forestry
Midhurst District Office
2284 Nursery Road
Midhurst, ON L0L 1X0

Dear Sir:

RE: Application for Site Plan Amendment
Aggregate License #3670 (Teedon Pit)
Part of Lots 79 and 80, Concession 1 Old Survey
Cedarhurst Quarries and Crushing Limited (Beamish)
File: '15/D05 (#4132) – Roll #1-028-00 (40 Darby Road)

We are in receipt of a letter from Dennis C. Simmons, Development and Land Management Consulting Services, dated March 16, 2015 with attachments requesting comments from the Township of Tiny relative to an Application to the Ministry of Natural Resources and Forestry for a Site Plan Amendment. A letter prepared by Alpha Environmental Services Inc. dated November 30, 2010 was attached to Mr. Simmons' letter, and both letters were included on the April 13th Committee of the Whole (Council) Agenda for information and public review.

Staff have completed a general review (i.e. not technical) of the proposed site plan amendments from a Township of Tiny perspective and have identified that the most significant proposed amendment is the introduction of a wash plant area. Based on this item, we offer the following comments:

- The Township of Tiny Official Plan includes principles that are based on an 'Environment First' philosophy and include:
  - The protection of significant environmental features and their associated ecological functions, which may extend over a wide area, shall take precedence over the development of such lands.
  - Changes to water quality and hydrological and hydrogeological characteristics of watercourses, lakes, aquifers and wetlands are to be minimized and no development is permitted that will result in a negative impact to the functions and processes of these features.

- Part C Environment and Groundwater Management Policies of the Township of Tiny Official Plan includes objectives that strive to:
  - Protect the quality of water available for drinking water purposes.
  - Ensure that the integrity of the municipality's watersheds are maintained or enhanced.
  - Identify what information is required to support an application that may have an impact on the hydrogeological resources of the Township.

- Part C Environment and Groundwater Management Policies, Subsection C4 Water Resource Management of the Township of Tiny Official Plan states:

  At the present time, the majority of the Township's residents obtain drinking water from private wells. Others obtain water from municipally owned communal water systems. It is a policy of this Plan to protect existing sources of drinking water for future use.

  On this basis, all major applications for development shall be supported by a Water Resource Management (WRM) Report. Major applications include any development requiring an Amendment to this Plan, all Plan of Subdivision/Condominium applications and major recreational uses, such as a golf course.

  The WRM Report shall be prepared by the appropriate professionals to the satisfaction of the Township and the appropriate agencies. The purpose of the WRM Report is to investigate the impacts of the proposed development on water quality and quantity and provide recommendations on:

  a) How to maintain or enhance the natural hydrological characteristics of the water resource;
  b) How to minimize or eliminate the effect of the proposed use on the groundwater recharge function;
  c) How to minimize or eliminate the effect of the proposed use on the quality and quantity of drinking water in adjacent private and municipal wells;
  d) How to maintain or enhance sensitive groundwater recharge/discharge areas, aquifers and headwater areas;
  e) Whether it is required to monitor water budgets for groundwater aquifers and surface water features;
  f) How to ensure that the quality of the watercourses affected by the development are maintained; and,
  g) How to ensure that there will be no negative impacts on the water quality of Georgian Bay/Severn Sound.

- The owner of the subject property also owns adjacent land to the north being North Part of Lot 80, Concession 1 Old Survey (2 Darby Road). As you know, planning applications (Official Plan and Zoning By-law Amendments) have been made on these lands, which are currently being processed by the Township to facilitate a gravel pit expansion. A public meeting on these applications was held at the Township Office on January 26th, 2015. At this public meeting, there were a number of concerns raised by local residents relative to the potential negative impact of the wash plant on water quality and water quantity and specifically area resident wells. We have attached a copy of the approved minutes from the public meeting for your records.

- The Township of Tiny gravel pit file includes a letter, dated July 30, 2007, from an area resident providing their concerns to the Ministry of the Environment relative to the Permit

to Take Water for the aggregate washing operation. We have attached a copy of the letter for your records.

- The Township of Tiny gravel pit file also includes an email, dated August 3, 200 , from Mr. Keith Sherman, Executive Director, Severn Sound Environmental Association to the Ministry of the Environment providing comments on his concerns with the water taking and washing pond. We have attached a copy of the email and its attachments for your records.

We respectfully request that the Ministry of Natural Resources and Forestry consider all the information noted in this letter and the attachments thereto when completing the technical review of the Site Plan Amendment application and when considering if the proposed Site Plan Amendments are appropriate and comply with all applicable requirements.

If you have any questions relative to our comments please contact the undersigned.

Sincerely,

THE CORPORATION OF THE TOWNSHIP OF TINY

Henk Blom, CET
Manager of Public Works

Shawn Persaud, BA, MCIP, RPP
Manager of Planning & Development

Enclosures

CC: Dennis C. Simmons, Development and Land Management Consulting Services
Cedarhurst Quarries & Crushing Limited
District Manager, Ministry of Natural Resources and Forestry
District Manager, Ministry of the Environment and Climate Change
Cecil Gratrix, R.J. Burnside & Associates
Keith Sherman, Severn Sound Environmental Association
Doug Luker, CAO/Clerk
Members of Council

THE CORPORATION OF THE TOWNSHIP OF TINY
PUBLIC MEETING HELD ON
MONDAY, JANUARY 26TH, 2015

Proposed Official Plan & Zoning By-law Amendment
North Part Lot 80, Concession 1 Old Survey
K. J. Beamish Construction Company Limited

MEMBERS PRESENT:	**George Cornell, Mayor** **Steffen Walma, Deputy Mayor** **Cindy Hastings, Councillor** **Richard Hinton, Councillor** **Gibb Wishart, Councillor**
STAFF PRESENT:	**Doug Luker, CAO/Clerk** **Sue Walton, Deputy Clerk** **Shawn Persaud, Manager of Planning & Development** **Doug Taylor, Manager, Administrative Services/Treasurer** **Henk Blom, Manager of Public Works** **Tony Mintoff, Fire Chief**
OTHERS:	**There are 31 members of the public in attendance.**

Mayor Cornell opens the meeting at 6:13 p.m. and announces that this is a public meeting under Sections 22 & 34 of the Planning Act.

Shawn Persaud, Manager of Planning & Development, outlines that Notice of this meeting was given on December 23rd, 2014 by prepaid first class mail, to the applicants, all owners of land within 750 metres of the area to which the proposed by-law would apply, and to all persons and public bodies as prescribed under Ontario Regulation 545/06 as amended and the Township of Tiny Official Plan. Notice was also posted at the assessed property to which the proposed by-law applies, as per the regulations. The Notice was also posted on the Township of Tiny Website.

The application was accompanied by the following studies/reports which have been assessed by the Municipality:

- Stage 1 and 2 Archaeological Assessment Report, dated May 2011, prepared by The Central Archaeology Group Inc. and letter dated June 24, 2011 from the Ministry of Tourism and Culture stating that the Ministry concurs with the recommendations of the report that there are no further archaeological concerns for the subject property;
- Environmental Impact Statement and Natural Environment Level 1 and 2 Technical Report, dated September 20, 2011, prepared by The Lindsay Environmental Group;
- Hydrogeological Assessment, dated April 12, 2011, prepared by Alpha Environmental Services Inc.;
- Acoustic Assessment Report, dated July 2011, prepared by F. H. Theakston Environmental Control Inc.;

- Planning Report, dated February 2012, prepared by Les C. Selby Consulting Services;
- License Site Plans, dated January 31, 2012 and revised on November 2014, prepared by C. T. Strongman Surveying Ltd., including Existing Features Plan, Operational Plan, Rehabilitation Plan, and Cross Section Plan.

The applications were received and deemed complete by Council on March 26, 2012, further to which Notice of Complete Application was circulated on April 4, 2012 in accordance with the requirements under the Planning Act.

K.J. Beamish Construction Company Limited currently operates a gravel pit on Part Lot 79 and 80, Concession 1 Old Survey (40 Darby Road); the purpose of the applications are to expand the existing gravel pit northward onto the subject property.

The intent of the official plan amendment application is to re-designate the subject property from the 'Rural', 'Environmental Protection II', and 'Mineral Aggregate Resource II' designations to the 'Mineral Aggregate Resources I' designation.

The intent of the zoning by-law amendment application is to re-zone the subject property from the Rural (RU) Zone to the Mineral Aggregate (MAR) Zone under Zoning By-law 06-001 as amended and from the Rural (A) Zone and Holding Low Hazard (OS4) Zone to the Extractive Industrial (M5) Zone under Zoning By-law 30-77 as amended.

It is reported that six written submissions were received:

1. Planning & Development Report PD-020-12 dated March 16th, 2012 – recommending the application be deemed to be complete and that Council direct staff to circulate the Notice of Application.
2. Letter dated April 26, 2012 from Ross and Linda Marchand requesting notification of proposed land use changes in the area.
3. Letter dated November 19, 2014 from R.J. Burnside & Associates, Township Engineering Consultant, stating that the amended site plan drawings have satisfactorily addressed their previous comments.
4. Letter dated November 19, 2014 from the Severn Sound Environmental Association, Township Environmental Consultant, stating that the outstanding issues have been addressed by the amended site plan drawings.
5. Email dated December 29th, 2014 from Mr. Jeff Sherk, supporting the application.
6. Email dated January 26, 2015 from Vivien Chan, Planner with the Simcoe County District School Board – no comment on the application.

The Mayor inquires if anyone present wishes to speak to the proposed amendments.

Les Selby, agent, presented a powerpoint presentation on the background and intent of the application.

Bonnie Pigeon, 1189 Marshall Road, states that she is concerned that removal of more aggregate is going to further impact the area ground water and is concerned that her well has already been impacted.

Ross Campbell, hydrogeologist for Beamish, did not believe in his professional opinion, that the current operations of the existing gravel pit, specifically the permit to take water and the washing of aggregate, could impact the ground water in the Marshall Road area. He mentioned that the MOE should have been contacted if Ms. Pigeon had an issue with her well.

Christopher Williams, 1119 Marshall Road, states that he believes that it is critical to establish a baseline on water levels to understand how Beamish taking water affects area wells. As well, he is concerned that the existing operation has negatively affected the ground water levels.

Don Morgan, 904 Ottawa Street, Midland states that this is an ethical issue and asks if there is going to be a negative impact on the people in general and in the future.

David Barkey, 30 Darby Road, states that Beamish Construction have been good neighbours however, due diligence must be done to ensure there will be no impact on the water table to protect local wells.

Peter Henderson, 6970 Highway 93, advises that he is concerned with sediment issues with wells, noise level issues since there are no berms to the north and hours of operation at the facility.

Mark Oldfield, 1149 Marshal Road, states that he has been a resident since 2004 and has no issue with water quality and quantity but wants to ensure that remains the same in the future.

Jim Simpson, 60 Gardiners Corner Road, has concerns regarding the proposed total tonnes excavated and potential ground water issues.

Steven Ogden, Seguin Township, states that he used to live adjacent to the Beamish pit and had water issues. He requests that a cumulative water impact study be prepared to protect the water in the area.

Steve Irvine, 7062 Highway 93, has concerns with water issues, water shed and the amount of gravel that is proposed to be extracted.

Anne-Ritchie Nahuis, 300 Tiny/Flos Townline, states she is concerned how Bonnie & Jake Pigeon were treated in the process. She questions why so much aggregate is required at one time and suggests that rehabilitation is crucial.

Jake Pigeon, 1189 Marshall Road, states that there should be protection for ground water in the area.

Mayor Cornell noted that this was a good first public meeting to understand the public concerns related to this proposal and that a second public meeting would be an appropriate next step after Beamish has an opportunity to address some of the issues.

There being no further comments, the meeting adjourns at 8:16 p.m.

Douglas Luker, CAO/Clerk

July 30, 2007

Ministry of the Environment
733 Exeter Road,
London, ON,
N5E 1L3

COPY

Dear Ms. Pechinger

I am writing regarding an application by Cedarhurst Quarries and Crushing Limited, King City, Ontario, for a "New Permit To Take Water" for their aggregate washing operation.

The Cedarhurst property is located at Lots 79 & 80, Concession 1, WPR, Township of Tiny, County of Simcoe.

The Reference Number is 5233-6VALAK. and Instrument Type: Permit to take water OWRA S. 34.

My husband and I have a 50 acre, estate property approximately 3-4 kilometres from this gravel extraction area. We are opposed to this Application for a Permit To Take Water. We are concerned about the water levels in the area of the application. A private well and septic system serves our property. MacDonald Creek runs through our property.

Issues that we have identified are as follows:

(a) low levels of water in all of Simcoe County watershed areas - 2007 (Environment Canada),

(b) acquifers) - lower levels than usual spatial relationships) between acquifers) providing water supplies) to nearby private and municipal wells, surface water features, the acquifer) beneath Site 41 and the acquifer) which will provide water to the propsed taking.

(c) concern for fish habitat, feeding grounds - MacDonald Creek, Wye River,
- 16,000 fingerling trout put into MacDonald Creek, Wye River - April 2007 by MNR
- 6,000 per year, put in 2000-2006 MNR (36,000)

We look fowward to open communicatio information, your comments, and transparen in this matter.

Sincerely
Barbara R.C. Hunt
(per) Harry R. Hunt

cc Township of Tiny

From: Keith Sherman [mailto:ksherman@town.midland.on.ca]
Sent: Friday, August 03, 2007 9:37 AM
To: Janis.Pechinger@ene.gov.on.ca
Cc: scott.abernethy@ontario.ca; Roger Robitaille; hproudley@tay.township.on.ca; Ruth Coursey

Hi Janis,

Please see comments below. I don't know whether the application has changed from the time you sent it out to the municipalities (late 2006?), but my comments are below. The site where they are proposing to excavate the pond for water taking will probably result in a local lowering of the water table when they start taking water. The stream channel leaving the property and traveling on the adjacent property is intermittent during low flow conditions – certainly no where near to 7,274 L/min (121 2 L/s) will be leaving the site now during low flow periods.

Keith Sherman, Coordinator
Severn Sound Environmental Association
67 Fourth Street
Midland, ON
L4R 3S9
705-527-5166
fax 527-5167
www severnsound ca
ksherman@town midland on ca

-----Original Message-----
From: Keith Sherman
Sent: Wednesday, January 31, 2007 5:20 PM
To: Scott Abernethy (scott.abernethy@ontario.ca)
Cc: Henk Blom (hblom@tiny.ca); hproudley@tay.township.on.ca
Subject: PTTW Application by Cedarhurst Quarries & Crushing Ltd, Township of Tiny

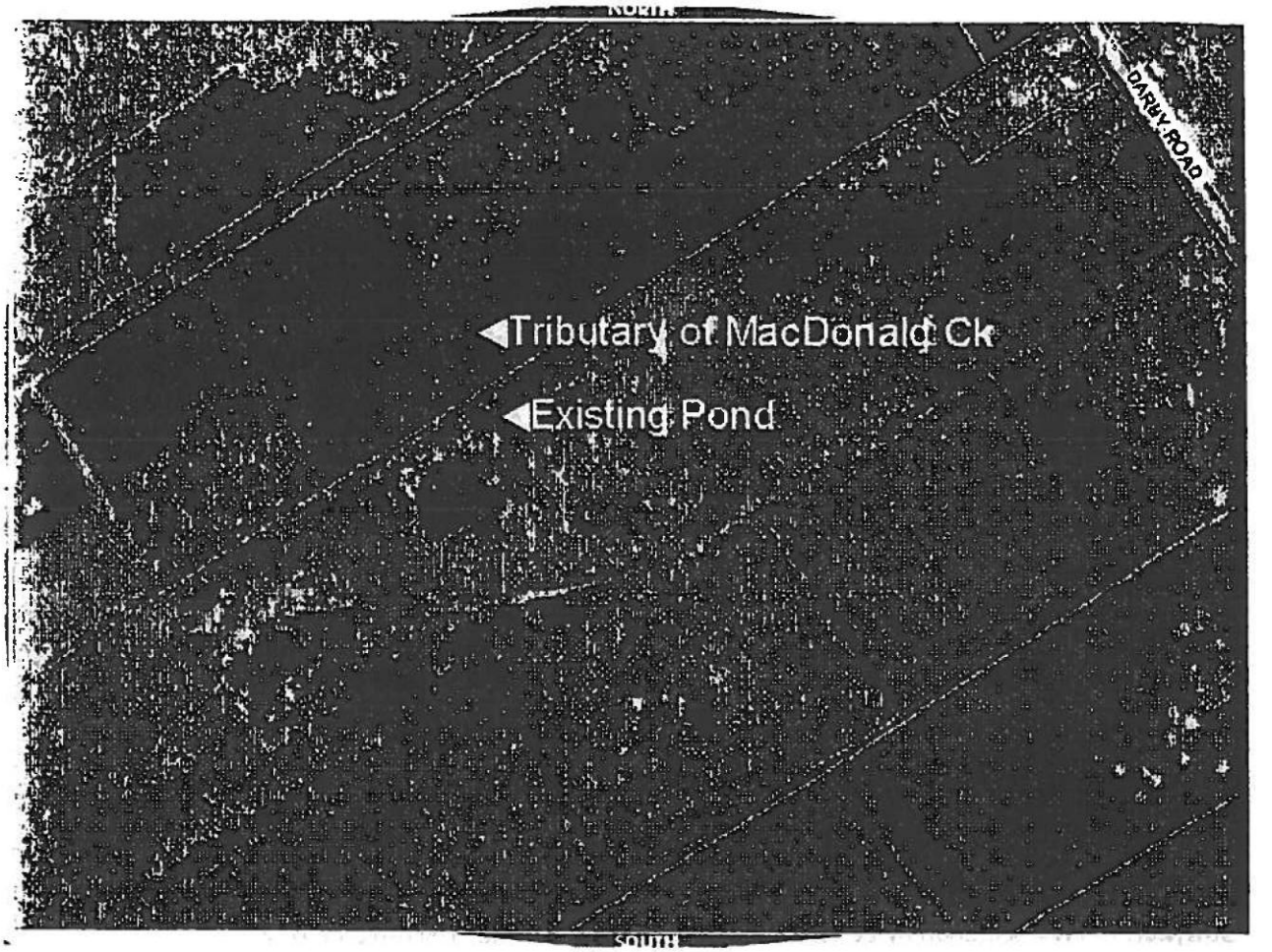
Hi Scott,

I attended a site meeting with Bill Fitzgerald and a hydrogeologist on December 4th. The site drains through a small pond located on the northern edge of the property (on the fence line) to a tributary of MacDonald Creek – see below and attached SSEA Report on MacDonald Creek. The branch that the trib enters is considered coldwater with known coldwater species inhabiting further down stream. We have no water quality information on the trib flowing through the adjacent property.

My only comment on the water taking is that the proposed washing supply pond should be excavated upstream of the existing pond, leaving the existing pond intact to act as a polishing pond/buffer.

Best regards,

Keith Sherman, Coordinator
Severn Sound Environmental Association
67 Fourth Street
Midland, ON
L4R 3S9
705-527-5166
fax 527-5167
www.severnsound ca


NORTH
DARBY ROAD
Tributary of MacDonald Ck
Existing Pond
SOUTH

A Brief Description of the Environmental Quality of MacDonald Creek, Township of Tiny

Prepared by Keith Sherman
June 9, 2003

The following information was collected by Severn Sound RAP and Severn Sound Environmental Association staff and contractors to support agricultural and fish community assessment projects carried out at various locations in the Severn Sound watershed. The chemical analyses were carried out by the Ministry of the Environment Laboratory Services Branch using standard methods. The benthic invertebrates were collected using qualitative methods that indicated presence and diversity of organisms. A single pass electro-shocking method was used with identifications made by a qualified fisheries biologist.

Flow of MacDonald Creek

The drainage basin for the Creek to the point where it enters the Wye River is 26.2 Km^2. The stream consists of two main branches, an eastern and western branch. The western branch receives drainage from site 41 (6.9 Km^2 to Baseline Rd). The eastern branch has a drainage of 12.1 Km^2 to Marshall Side Road. The Severn Sound RAP monitoring program included water quality sampling at a site (SSEA Station 42) below the confluence of the two branches at the crossing of Mertz Side Road (drainage area to road crossing 22.2. Km^2).

Spot flow guaging measurements were carried out at Station 42 by Severn Sound RAP staff during 1993 using a calibrated Marsh-McBirney flow meter. These flows were guaged against a relative measurement of water level (measuring point from the top of the concrete box culvert at the upstream end of the crossing). Comparison of the spot flows against the mean daily flow for the Wye River near Wyevale (see Table 1, 02ED013 drainage area to station 112 Km^2) provides a ratio of 0.48 which is more than twice as much as the ratio of drainage areas between the two sites. Since these measurements were taken for the most part during base flow periods, it would appear that MacDonald Creek has a higher unit base flow than the Wye River.

Measurements of flow at SSRAP Station 42 and the two branches of MacDonald Creek upstream of the confluence were made during the low flow period of 2002 as part of the North Simcoe Municipal Groundwater Study (Dixon-Golder draft). The measurements taken on August 28-29, 2002 resulted in a flow of 5 L/s at the western branch at Baseline Road (km^2); 14 L/s at the eastern branch (km^2); and 112 L/s at the confluence at Mertz

Side Road (SSRAP Station 42 - km^2). Little can be concluded from a single measurement but it was clear that the base flow of the eastern branch was stonger than that of the western branch. It is stongly suggested that a continuous, year round flow station with standards equivalent to Water Survey of Canada be established at the crossing of Mertz Road and that additional spot flows measurements or ice-free continuous stations be established on the upstream branches to provide a better basis for establishing low flow conditions.

Temperature

Spot temperatures were collected using a thermometer during 1993, 1994 and 1995 and during benthos and fish monitoring in 2000. Temperature was monitored using a temperature logger from July 1 to September 10, 2002. The stream was characterized as a coolwater stream using the DFO protocol (Figure 2). Spot temperatures taken on August 28 and 29, 2002 (North Simcoe Municipal Groundwater Study draft data) indicated that the western branch was much warmer than the eastern branch and that the confluence was influenced by the eastern branch as was expected for the greater flow contribution at that time (western br. 17.3°C, eastern br. 15.3°C and confluence 15.1°C). Based on the lower downstream temperature, additional groundwater discharge to the Creek was occurring downstream of the east and possibly the west measuring points.

Basic Chemistry

Water chemistry samples were taken during 1993, 1994 and 1995 by Severn Sound RAP staff (Table 2) in order to assess agricultural projects in the watershed. Chlorides and conductivity remained relatively constant with means of 13.0 mg/L and between 335 and 414 uS/cm respectively. Base flow values of suspended solids and turbidity were typically 7 mg/L and 4 FTU respectively. Values were influenced by spring melt periods and rain events. Mean pH was alkaline at 8.2 units.

Nutrients

Ammonia nitrogen was low with mean values ranging between 0.009 and 0.075 mg/L. Nitrate was moderate and typical for an agricultural watershed with mean values ranging between 0.8 and 1.0 mg/L. Total phosphorus concentrations fluctuated with spring runoff and rain events with mean values ranging between 0.032 and 0.060 mg/L. The MOE Provincial Water Quality Guideline for total phosphorus in streams is 0.030 mg/L, suggesting that the Creek often did not meet provincial guidelines. Dissolved organic carbon concentration was relatively stable with mean values ranging between 2.9 and 3.7 mg/L.

Benthos

The stream benthos at Station 42 were sampled using a qualitative method (i.e. collection of as many different kinds of organisms without measuring their density). The stream substrate was a mixture of riffles and emergent vegetation near the banks with

overhanging shrubs and grasses. Twenty three different kinds of organisms were noted with good representation of relatively sensitive organisms such as mayfly nymphs and caddisfly larvae.

Fish Community

The fish community in a 50-m reach downstream of Station 42 was sampled in late summer of 2000 as part of a characterization of fish community at a number of locations throughout the Severn Sound watershed. Rainbow trout, black-nosed dace, creek chub, mottled sculpin and other minnows were found with a total fish biomass of 17 kg/ha confirming that the stream has a coolwater fish community. The finding of coolwater species is consistent with fish collections made by MNR in 1990 and 2002.

[Tables 1 and 2a,b,c are on an excel spreadsheet attached]

[Figure 1 is on a .pdf file attached]

[Figure 2 is on an attached jpg file attached]

Table 1
Spot flow measurements for MacDonald Creek at Mertz Road (Station 42) and the Wye River near Wyevale (02ED013)

	MacDonald Creek (1)	Wye River(2)
22-Jul-93	135.3	373
28-Jul-93	99.2	351
05-Aug-93	128.8	303
18-Aug-93	158.8	331
27-Aug-93	105.8	255
02-Sep-93	146.5	322
10-Sep-93	264.3	420
15-Sep-93	518.5	805
20-Sep-93	257.5	377
29-Aug-02	122.0	267

(1) 1993 - SSEA unpublished data
2002 - Dixon-Golder unpublished data
(2) Water Survey of Canada provisional data

Table 2a Water quality of MacDonald Creek at Station 42 during 1993 (results in mg/L unless otherwise noted)

Date	Temp. (oC)	E.coli (org/100ml)	Fecal Strep. (org/100ml)	P. arugenosa (org/100ml)	Chlonde	Sodium	Potassium	Cond.	pH	Susp. Solids	Turbidity (FTU)	TKN	Ammonia	Nitrite	Nitrate	TP	Phosphate	DOC
27-May-93	13.0	44	36	2	14.9	1.64	404	8.30	7.6	4.70	S46	0.34	0.020	0.013	0.030	0.018	0.0025	<T 3.0
01-Jun-93	11.0	296	520	2	14.5	1.69	383	8.13	35.9	13.20	S46	0.60	0.034	0.016	0.725	0.066	0.0060	3.9
10-Jun-93	16.0	1120	340	8	18.3	1.64	403	8.39	15.5	8.13	S46	0.50	0.022	0.030	0.985	0.030	0.0065	4.4
15-Jun-93	18.0	170	130	4 <	11.2	1.67	388	8.12	14.9	6.51	S6+	0.36	0.034	0.022	0.795	0.032	0.0000	<T 2.9
22-Jun-93	17.0	8500	6400	24 A3C	15.9	2.15	426	8.15	12.8	9.99	S46	0.68	0.016	0.006	0.040	0.052	0.0135	9.1
28-Jun-93	18.0	220	120 <=>	4 <	12.4	1.68	395	8.26	14.3	6.68	S24	0.40	0.016	0.027	0.975	0.028	0.0058	3.2
03-Jul-93	19.0																	
15-Jul-93	17.0	100	100	2 <	12.3	1.71	383	8.15	9.1	4.79	S24	0.34	0.024	0.016	0.755	0.024	0.0035	<T 2.6
19-Jul-93	18.0	240	670		11.0	1.71	346	8.16	11.5	5.99	S24	0.28	0.024	0.013	0.690	0.022	0.0035	2.3
29-Jul-93	20.0	220	380	4 <	10.7	1.87	365	8.18	8.6	5.52	S6+	0.30	0.020	0.014	0.685	0.018	0.0045	<T 2.5
03-Aug-93	19.0	50 <=>	110	2 <	11.0	1.86	372	8.20	11.8	5.91	S46	0.32	0.020	0.014	0.715	0.020	0.0075	2.2
09-Aug-93	17.0	100	120	2 <	10.8	1.91	373	8.19	12.5	6.80	S24	0.30	0.018	0.012	0.740	0.026	0.0030	2.3
16-Aug-93	20.0	320	320	4	10.0	1.92	369	8.19	10.4	5.09	S46	0.30	0.022	0.014	0.760	0.200	0.0150	<T 2.4
23-Aug-93	16.5																	
30-Aug-93	17.0	130	210	68	10.7	2.02	381	8.34	7.4	4.00	S6+	0.26	0.024	0.014	0.830	0.018	0.0025	<T 2.0
07-Sep-93	13.5	160	160	2	9.5	1.86	395	8.13	13.5	6.77	S24	0.26	0.028	0.013	0.865	0.022	0.0060	2.4
13-Sep-93	15.0	1600	1250	22 A3C	11.5	2.24	403	8.20	5.1	3.31	S46	0.38	0.050	0.024	1.010	0.030	0.0075	2.6
20-Sep-93	10.0	50	50	80	14.8	1.91	417	8.32	5.1	7.11	S24	0.28	0.024	0.020	1.000	0.024	0.0035	<T 2.4
27-Sep-93	12.0	1660	1220	4	15.9	2.51	417	8.25	4.9	6.89	S24	0.38	0.006	0.020	0.920	0.034	0.0050	3.0
06-Oct-93	8.0	100	220	2	18.2	2.44	446	8.27	4.9	16.91		0.36	0.030	0.021	1.620	0.026	0.0095	2.6
13-Oct-93	7.0	40	20	2 <	16.0	2.05	437	8.23	5.1	5.13		0.30	0.014	0.015	1.310	0.016	0.0045	<T 2.1
Mean	15.3	224	230	5	13.1	1.92	395	8.22	11.1	7.02		0.37	0.023	0.017	0.813	0.037	0.0058	3.0
Max	20.0	8500	6400	80	18.3	2.51	446	8.39	35.9	16.91		0.68	0.050	0.030	1.620	0.200	0.0150	9.1
Min	7.0	40	20	2	9.5	1.64	346	8.12	4.9	3.31		0.26	0.006	0.006	0.030	0.016	0.0000	2.0
Median	17.0				12.3	1.87	395	8.20	10.4	6.51		0.34	0.022	0.015	0.795	0.026	0.0050	2.6
N	21	19	19	18	19.0	19.00	19	19	19	19		19	19	19	19	19	19	19

Table 2b Water quality of MacDonald Creek at Station 42 during 1994 (results in mg/L unless otherwise noted)

Date	Temp. (oC)	E.coli (org/100ml)	Fecal Strep. (org/100ml)	P. aeruginosa (org/100ml)	Chloride	Sodium	Potassium	Cond.	pH	Susp. Solids	Turb.	TKN	Ammonia	Nitrite	Nitrate	TP	Phosphate	DOC
07-Mar-94	8.0				14.5	1.90	437	8.20	36.7	15.20	S46	0.26	0.050	0.022	1.350	0.030	0.0035 <T	1.4
21-Mar-94	7.0				13.6	1.94	436	8.24	34.9	15.90	S6+	0.30	0.580	0.018	1.290	0.032	0.0035 <T	1.6
23-Mar-94	7.0				9.9	4.21	286	7.71	195.0	27.00	S6+	2.20	0.364	0.033	1.660	0.385	0.0960	6.8
24-Mar-94	7.0				7.7	3.88	224	7.77	145.0	54.20	S6+	1.95	0.394	0.033	1.290	0.370	0.0820	6.2
04-Apr-94	7.0																	
05-Apr-94	8.5																	
13-Apr-94	9.5				14.2	2.28	367	8.04	37.1	20.50	S46	0.62	0.034	0.015	1.460	0.020	0.0160	4.9
14-Apr-94	9.0				13.1	2.18	393	8.13	17.5	11.00	S6+	0.52	0.026	0.026	1.590	0.044	0.0120	4.2
21-Apr-94	10.5				11.6	1.82	403	8.36	8.5	4.94	S24	0.92	0.044	0.023	1.470	0.020	0.0035 <T	2.4
27-Apr-94	15.0				13.3	3.15	385	8.35	48.3	35.10	S46	0.26	0.010	0.010	0.980	0.118	0.0330	6.2
03-May-94	11.0				15.0	1.88	426	8.33	8.9	5.82	S24	0.32	0.002 <W	0.007	1.240	0.024	0.0060	3
12-May-94	11.0				13.3	2.06	366	8.15	24.0	15.80	S24	0.58	0.028	0.014	0.855	0.050	0.0095 <T	5.5
18-May-94	15.0	50	70	2 <	13.6	1.74	404	8.63	4.8	2.97	S24	0.32	0.002 <W	0.010	1.170	0.012	0.0020 <T	3.5
25-May-94	16.0	72	48	0	12.2	1.78	402	8.28	7.0	3.50	S46	0.46	0.016	0.013	0.050	0.016	0.0035	2.8
01-Jun-94	14.0	1290	1410	20	13.8	2.21	406	8.28	17.8	13.60	S46	0.68	0.028	0.023	2.720	0.052	0.0225	5.4
06-Jun-94	17.0	130	27 <=>	4 <	17.3	1.75	424	8.33	6.3	3.94	S46	0.32	0.034	0.019	0.780	0.020	0.0035 <T	3.8
15-Jun-94	20.0	76	148	2 <	18.7	1.70	418	8.34	10.3	6.31	S24	0.40	0.030	0.023	0.700	0.022	0.0070	3.2
21-Jun-94	19.5	140	128	2 <	10.3	1.82	391	8.28	13.2	8.09	S46	0.34	0.036	0.030	0.795	0.030	0.0035 <T	2.5
28-Jun-94	17.0	56	108	2 <	11.1	1.80	394	8.27	15.2	6.98	S6+	0.34	0.012	0.029	0.780	0.032	0.0065	2.8
05-Jul-94																		
18-Jul-94		84	168	2 <	11.6	0.31	383	8.42	7.8	4.83	S6+	0.30	0.020	0.018	0.750	0.022	0.0070	2.6
02-Aug-94		284	424	2	11.4	1.89	386	8.29	8.0	4.45	S46	0.30	0.002 <W	0.014	0.600	0.026	0.0035 <T	2.6
16-Aug-94		20	104	2 <	12.0		401	8.32	6.8	3.69	S24	0.22	0.008 <T	0.013	0.870	0.014	0.0030 <T	1.7
31-Aug-94		250	1050	2	10.9	2.18	391	8.13	6.2	5.95	S24	0.30	0.002 <W	0.015	0.810	0.022	0.0020 <T	2.7
12-Sep-94		60 <=>	140 <=>	2 <	10.3	1.90	397	8.29	5.7	4.10	S24	0.20	0.002 <W	0.015	1.020	0.012	0.0015 <T	7.4
19-Sep-94		50 <=>	130	2 <	12.5	1.98	413	8.36	5.2	2.80	S24	0.22	0.006 <T	0.014	0.870	0.016	0.0015 <T	2.2
Mean	12.1	102	158		12.7	2.11	388	8.24	29.1	12.03		0.54	0.075	0.019	1.091	0.060	0.0144	3.7
Max	20.0	1290	1410	20	18.7	4.21	437	8.63	195.0	54.20		2.20	0.580	0.033	2.720	0.385	0.0960	7.4
Min	7.0	20	27	0	7.7	0.31	224	7.71	4.8	2.80		0.20	0.002	0.007	0.050	0.012	0.0015	1.4
Median	11.0				12.5	1.90	397	8.28	10.3	6.31		0.32	0.026	0.018	0.980	0.024	0.0035	3.0
N	19	13	13	13	23	22	23	23	23	23		23	23	23	23	23	23	23

Table 2c Water quality of MacDonald Creek at Station 42 during 1995 (results in mg/L unless otherwise noted)

Date	Temp. (oC)	E.coli (org/100ml)	Fecal Strep. (org/100ml)	P. arugenosa (org/100ml)	Chloride	Sodium	Potassium	Cond.	pH	Susp Solids	Turb.	TKN	Ammonia	Nitrite	Nitrate	TP	Phosphate	DOC
12-Apr-95					38.8	17.3	7.10	640	8.04	192.0	23.40 S46	0.72	0.006	0.005	1.840	0.206	0.0620	3.8
12-Apr-95	8.0				14.5	9.49	1.77	428	8.24	8.1	3.30 S46	0.28	0.012	0.012	1.040	0.008	0.0025	2.2
27-Apr-95	6.0				14.4	9.56	1.74	430	8.29	10.7	7.91 S46	0.30	0.004	0.010	1.100	0.024	0.2650	2.3
10-May-95	10.0				17.7	11.7	1.75	423	8.27	11.6	3.46 S24	0.36	0.010	0.015	0.795	0.020	0.0015	3
25-May-95	11.5				13.9	9.51	1.61	417	8.32	4.8	2.82 S46	0.28	0.020	0.009	0.710	0.012	0.0005	3.3
29-May-95	13.0				15.7	10.4	1.76	429	8.22		3.54 S24	0.30	0.020	0.014	0.770	0.024	0.0020	2.9
5-Jun-95	16.0				14.9	9.93	1.71	445	8.33	6.5	4.23 S24	0.32	0.012	0.017	2.210	0.022	0.0060	3.3
12-Jun-95	16.5	68	56	0	12.6	8.5	1.66	408	8.28	9.2	6.59 S24	0.76	0.036	0.019	0.810	0.100	0.0030	2.3
21-Jun-95	21.5	44	92	0	11.2	7.91	1.77	380	8.31	9.0	4.07 S24	0.34	0.002	0.020	0.650	0.024	0.0035	2.4
28-Jun-95	21.5	190	540	2	14.1	9.2	1.83	393	8.36	6.0	4.02 S24	0.34	0.012	0.015	0.685	0.028	0.0025	2.8
6-Jul-95	22.0	50	200	2	10.0	6.79	1.76	380	8.47	5.0	2.95 S46	0.26	0.014	0.024	0.805	0.012	0.0030	2.1
11-Jul-95	19.0	80	156	2 <	10.4	7.28	1.90	390	8.33	6.5	4.13 S6+	0.26	0.002	0.022	0.805	0.012	0.0035	2.3
19-Jul-95	19.5	72	196	2 <	11.0	7.76	1.94	386	8.28	4.0	4.13 S24	0.26	0.002	0.020	0.830	0.028	0.0035	2.8
25-Jul-95	21.0	84	172	2	12.2	8.22	2.00	395	8.32	6.0	3.08 S24	0.28	0.010	0.015	0.765	0.014	0.0110	2.5
1-Aug-95	22.0	56	232	2	11.0	7.48	1.94	382	8.40	5.0	3.16 S24	0.28	0.002	0.019	0.780	0.018	0.0040	3
3-Aug-95	20.0	980	1500	8	11.0	7.34	1.97	374	8.16	7.0	3.90 S46	0.26	0.002	0.040	0.825	0.026	0.0070	2.4
8-Aug-95	19.0	20 <=>	250	2 <	12.2	8.16	2.04	396	8.35	5.0	3.42 S24	0.26	0.010	0.023	0.790	0.018	0.0080	2.8
16-Aug-95	20.5	40 <=>	520	2 <	13.6	8.56	2.33	405	8.28	6.0	4.29	0.24	0.002	0.050	0.790	0.022	0.0060	2.7
22-Aug-95	19.5	140 <=>	220	2	10.8	7.32	2.01	396	8.28	8.0	6.18 S24	0.22	0.002	0.041	0.925	0.018	0.0040	8.3
28-Aug-95	16.0	64	252	2 <	10.0	7.08	2.03	387	8.26	8.0	5.28 S46	0.24	0.002	0.039	0.925	0.016	0.0040	2
5-Oct-95	13.0				11.4	7.86	2.07	414	8.25	8.0	3.70 S24	0.24	0.006	0.018	1.010	0.012	0.0015	1.9
Mean	16.8	80	237		13.9	8.92	2.13	414	8.29	16.8	5.12	0.32	0.009	0.021	0.946	0.032	0.0192	2.9
Max	22.0	980	1500	8	38.8	17.30	7.10	640	8.47	192.0	23.40	0.76	0.036	0.050	2.210	0.206	0.2650	8.3
Min	6.0	20	56	0	10.0	6.79	1.61	374	8.04	4.0	2.82	0.22	0.002	0.005	0.650	0.008	0.0005	1.9
Median	19.0				12.2	8.22	1.90	396	8.28	6.5	4.02	0.28	0.006	0.019	0.805	0.020	0.0035	2.7
N	20	13	13	13	21	21	21	21	21	19	21	21	21	21	21	21	21	21

Note: Mean for E.coli and FS are geometric means
All analyses by MOE Lab Services Branch

MacDonald Creek

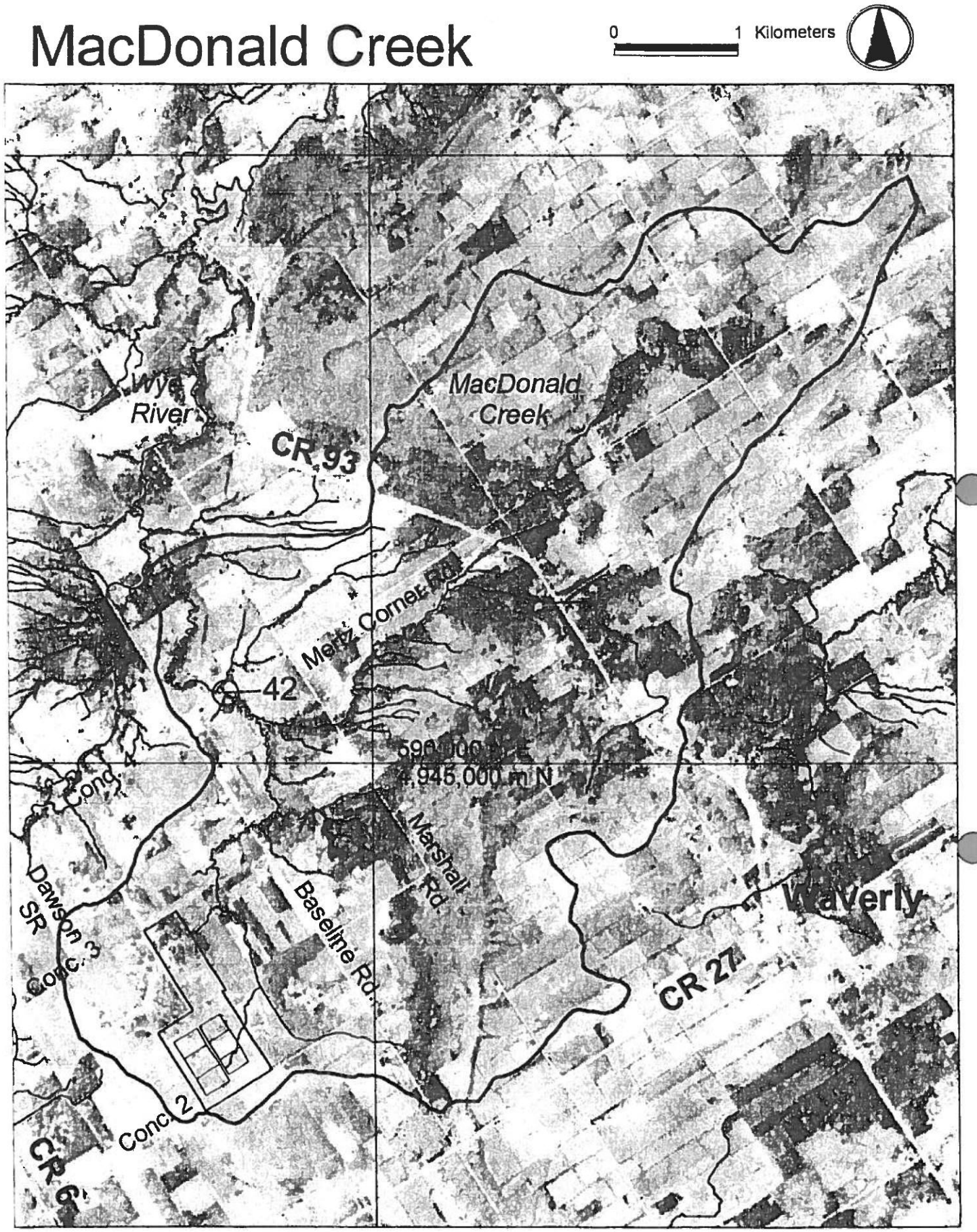


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Figure 1. MacDonald Cr. Watershed

Figure 2 # MacDonald Creek MC-1T

07/01/02 - 09/10/02