

THE TOWNSHIP OF NORTH HURON
COUNCIL AGENDA



Date: Tuesday, May 22, 2018
Time: 7:00 p.m.
Location: HELD IN THE TOWNSHIP COUNCIL CHAMBERS

Pages

1.	CALL TO ORDER	
2.	CONFIRMATION OF THE AGENDA	
	<i>THAT the Council of the Township of North Huron; accept the Agenda for the May 22, 2018 Council Meeting; as presented.</i>	
3.	DISCLOSURE OF PECUNIARY INTEREST	
4.	CONSENT AGENDA	
	<i>THAT the Council of the Township of North Huron hereby adopts Consent Item 4.1.1;</i>	
	<i>AND FURTHER THAT all other Consent Items be received for information.</i>	
4.1	Minutes	
4.1.1	Minutes of the Regular Council Meeting held May 7, 2018	10
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6.1	Clerks Department	
6.1.1	Consent Application Report - File # C029-18	109
	Owner: Les Caldwell Applicant: Stephen Caldwell Property Description: Part Lot 41 (East Half), Concession 2, East Wawanosh, Township of North Huron (39835 Moncrieff Road)	

THAT the Council of the Township of North Huron hereby recommends approval of the Consent Application File #C029-18, Owner: Les Caldwell; Applicant: Stephen Caldwell; Property Description: Part Lot 41 (East Half), Concession 2, East Wawanosh, Township of North Huron (39835 Moncrieff Road) with the following conditions:

Expiry Period

✓ Conditions imposed must be met within one year of the date of notice of decision, as required by Section 53(41) of the Planning Act, RSO 1990, as amended. If conditions are not fulfilled as prescribed within one year, the application shall be deemed to be refused. Provided the conditions are fulfilled within one year, the application is valid for two years from the date of notice of decision.

Municipal Requirements

✓ All municipal requirements be met to the satisfaction of the Township including servicing connections if required, cash-in-lieu of park dedication, property maintenance, compliance with zoning by-law provisions for structures, and any related requirements, financial or otherwise.

Survey

✓ Provide to the satisfaction of the County and the Township:

- 1. a survey showing the lot lines of the severed parcel and the location of any buildings thereon, and*
- 2. a reference plan based on the approved survey*

Merging

✓ The severed land merge on title with the abutting property to the north upon issuance of the certificate under Section 53(42) of the Planning Act, RSO 1990, as amended.

✓ A firm undertaking be provided to the satisfaction of the County from the solicitor acting for the parties, indicating that:

- 1. the severed land and the abutting property to the north will be consolidated into one P.I.N. under the Land Titles system; or*
- 2. where consolidation is not possible as the parcels to be merged are registered in two different systems (e.g. the Registry or Land Titles system), a notice will be registered in both systems indicating that the parcels have merged with one another and are considered to be one parcel with respect to Section 50 (3) or (5) of the Planning Act, R.S.O. 1990, C P.13 as amended.*

✓ Section 50(3) or (5) of the Planning Act, RSO 1990, as amended, applies to any subsequent conveyance or transaction of the severed land.

✓ A one square foot portion of the abutting property to which the severed land is to be merged be conveyed to the Municipality. A survey is to be provided showing the one square foot parcel as a separate part on the reference plan.

6.1.2	Offer to Purchase - May 22, 2018	121
	<i>THAT the Council of the Township of North Huron hereby receives the May 22, 2018 report of the Clerk/Manager of IT entitled Offer to Purchase – May 22, 2018, for information;</i>	
	<i>AND FURTHER, that Council approves an exception to Section 19.1 of the Procedural By-law to allow By-law 51-2018 to be passed at the May 22, 2018 Council Meeting.</i>	
6.1.3	Traffic Enforcement - Highway 4 and County Road 25	129
	<i>THAT the Council of the Township of North Huron hereby receive the report of the Clerk / Manager of IT, dated May 22, 2018 regarding Traffic Enforcement – Highway 4 and County Road 25 for information;</i>	
	<i>AND FURTHER, that Council directs the Clerk to prepare an amendment to the Traffic By-law, incorporating no parking zones along a portion of Queen Street and County Road 25 in Blyth.</i>	
6.2	Finance Department	
6.2.1	Trevor Seip, Chair, North Huron Police Services Board - Police Service Budget Review	132
6.2.2	2018 Budget and Tax Rates	135
	<i>THAT the Council of the Township of North Huron hereby receives the updated 2018 Budget Report from the Director of Finance;</i>	
	<i>AND FURTHER THAT Council considers passing amended By-Law #47-2018 being a by-law to adopt the 2018 budget and tax rates;</i>	
	<i>AND FURTHER THAT the Council of the Township of North Huron approves an exception to Section 19.1 of the Procedural By-Law to allow the By-law to be passed at the May 22, 2018 Council Meeting.</i>	
6.3	Recreation and Facilities Department	
6.3.1	Alice Munro Festival Memorandum of Understanding	201
	<i>THAT the Council of the Township of North Huron hereby accept the May 22, 2018 report of the Director of Recreation and Facilities regarding the Alice Munro Festival of the Short Story Memorandum of Understanding for information purposes;</i>	
	<i>AND FURTHER THAT Council approves an exception to Section 19.1 of the Procedural By-Law to allow the Reeve and Clerk sign By-law No 54-2018 to adopt the Memorandum of Understanding at the May 22, 2018 Council meeting.</i>	

6.3.2	Blyth Artisan Market	206
	<p><i>THAT the Council of the Township of North Huron hereby accept the report prepared by the Acting Director of Recreation and Facilities and the Director of Public Works, dated May 22, 2018, regarding the Blyth Artisan Market for information purposes;</i></p> <p><i>AND FURTHER THAT Council approves the Blyth BIA’s initiative to operate a Blyth Artisan Market in Blyth as presented at the Council meeting on May 7th;</i></p> <p><i>AND FURTHER THAT Council approves the proposed interim location of the Blyth Artisan Market to be the alley west of Blyth Memorial Community Hall, located at the south end of the alley at Dinsley Street until the permanent proposed location at 437 Queen Street, Blyth, is available.</i></p>	
6.4	Public Works / Utilities Department	
6.4.1	Blyth Wastewater Treatment Plant 2017 Capital Works Funding	210
	<p><i>THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22nd, 2018 regarding 2017 Capital Project Funding for information;</i></p> <p><i>AND FURTHER THAT the budget be amended to reflect a transfer from Wastewater Reserves to 2018 Wastewater Operating in the amount of \$33,999.23 for costs associated with 2017 Capital Repairs to the Blyth Wastewater Treatment Plant be authorized.</i></p>	
6.4.2	Catch Basin Cleaning Service Procurement	212
	<p><i>THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22nd, 2018 regarding the procurement of catchbasin cleaning services for 2018 for information;</i></p> <p><i>AND FURTHER THAT the contract for catchbasin cleaning services for 2018 in the amount of \$12,738.75 plus applicable taxes be awarded to B. Edwards Transfer Ltd.</i></p>	
6.4.3	Howson Dam Report (May 22, 2018)	214
	<p><i>THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22, 2018 regarding the Howson Dam for information purposes;</i></p> <p><i>AND FURTHER THAT staff be directed to forward a copy of this report and the corresponding attachments to the Maitland Valley Conservation Authority, the Howson Dam Committee, the Ontario Rivers Alliance, and other stakeholders upon request.</i></p> <p><i>AND FURTHER THAT a report be presented to Council summarizing the comments of any delegations received and providing further details on financing and amortization details associated with the options presented in this report.</i></p>	
6.5	Fire Department of North Huron	

6.6	Building Department	
6.6.1	Drainage SuperIntendent Report - Scott Municipal Drain <i>THAT the Council of the Township of North Huron hereby appoint R.J. Burnside & Associates Ltd. to prepare a report to fulfil the requirements under Section 78 of the Drainage Act as requested by two separate Notice of Requests for Drain Improvement.</i>	484
6.7	CAO	
7.	CORRESPONDENCE	
7.1	Notice of a Proposed Road Closure (Morris-Turnberry) <i>THAT the Council of the Township of North Huron have reviewed and have no concerns regarding the proposed closure of road allowance known as Princess Street, Plan 410, Wingham, as submitted by the Municipality of Morris-Turnberry, and dated May 4, 2018.</i>	514
7.2	Request to formally proclaim June 2, 2018 as National Health & Fitness Day in the Township of North Huron <i>THAT the Council of the Township of North Huron hereby supports the Reeve in proclaiming June 2, 2018 as National Health & Fitness Day.</i>	518
7.3	Elementary School Fair - Request for letter of support <i>THAT the Council of the Township of North Huron hereby directs staff to prepare letters supporting the Elementary School Fair in their applications to the TSC Stores Community Agricultural Grant as well as the Premier's Award for Agri-Food Innovation Excellence.</i>	520
7.4	OGRA - Invitation to join the Preferred Autonomous Vehicles Test Corridor <i>THAT the Council of the Township of North Huron hereby participate in OGRA's Autonomous Vehicle Initiative and that this matter be referred to the Director of Public Works to develop a list of preferred routes within the municipality.</i>	521
7.5	Sacred Heart Catholic School, Wingham - Request for support of bursary for 2018 Grade 8 Graduation	522
7.6	FE Madill Secondary School, Wingham - Request for support for 2018 Grade 8 Graduation	523
7.7	Wingham Farmers Market - Request to waive licence fee	524
8.	COUNCIL REPORTS	
8.1	REEVE ACTIVITY REPORT	
8.2	COUNCIL MEMBER REPORTS (Verbal or written updates from members who sit on boards/committees)	

8.3 REQUESTS BY MEMBERS

8.3.1 Councillor Seip - Request for report regarding Snow Removal Policy

Whereas the former Village of Blyth had a snow removal policy of ensuring full access to downtown places of business for every business day; and

Whereas this policy was maintained for the Blyth Ward for several years after amalgamation of North Huron; and

Whereas the present snow removal policy of scheduled snow removal results in as many as three days a week in which passengers, people with mobility issues, and others are unable to gain reasonable access to the stores and offices which they need to visit.

Now therefore be it resolved that staff are requested to prepare a report and present available options regarding the North Huron snow removal policy as it specifically relates to the downtown core of both the Wingham and Blyth wards, addressing accessibility to stores and offices for all business days, by eliminating the snow banks along the curbs and sidewalks, and at the intersections prior to the beginning of each business day.

8.3.2 Councillor Seip - Request for report regarding North Huron policing

THAT the Council of the Township of North Huron hereby directs staff to prepare a report detailing the necessary steps and associated costs to expand the service area of Wingham Police Service to include the Blyth and East Wawanosh Wards and as part of the report, take into consideration the current OPP service level and budget allocations for the Blyth and East Wawanosh wards.

9. NOTICE OF MOTION

10. BY-LAWS

10.1 By-law No. 51-2018 525

By-law No. 51-2018; Being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, an Agreement of Purchase and Sale between the Corporation of the Township of North Huron and 909395 Ontario Inc. for a portion of land legally described as PT 1 LT 6 RP 22R-6630, Wingham Ward, Township of North Huron.

THAT By-law No. 51-2018; being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, an Agreement of Purchase and Sale between the Corporation of the Township of North Huron and 909395 Ontario Inc. for a portion of land legally described as PT 1 LT 6 RP 22R-6630, Wingham Ward, Township of North Huron; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk, and engrossed in the By-law book.

10.2 By-law No. 52-2018 533

Being a By-law to adopt a Constitution and Procedure By-law for the Blyth Business Improvement Area (BIA).

THAT By-law No. 52-2018; Being a By-law to adopt a Constitution and Procedure By-law for the Blyth Business Improvement Area (BIA); be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.

10.3	By-law No. 53-2018	548
	<p>A By-law to implement a minimum and maximum charge for the Blyth Business Improvement Area.</p> <p><i>THAT By-law No. 53-2018; Being a By-law to implement a minimum and maximum charge for the Blyth Business Improvement Area; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.</i></p>	
10.4	By-law No. 54-2018	550
	<p>A by-law to authorize the Reeve and Clerk to sign, on behalf of Council, a Memorandum of Understanding between the Corporation of the Township of North Huron and the Alice Munro Festival of the Short Story Committee</p> <p><i>THAT By-law No. 54-2018; Being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, a Memorandum of Understanding between the Corporation of the Township of North Huron and the Alice Munro Festival of the Short Story Committee; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.</i></p>	
10.5	By-law No. 47-2018	554
	<p>Being a by-law for the purposes of levying and collecting rates for various purposes and provide for the payment of taxes and to provide for penalty and interest.</p> <p><i>THAT By-law No. 47-2018; being a by-law for the purposes of levying and collecting rates for various purposes and provide for the payment of taxes and to provide for penalty and interest; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.</i></p>	
10.6	By-law No. 48-2018	622
	<p>Being a by-law to establish salary ranges for municipal employees of the Corporation of the Township of North Huron.</p> <p><i>THAT By-law No. 48-2018; being a by-law to establish salary ranges for municipal employees of the Corporation of the Township of North Huron; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.</i></p>	
11.	ANNOUNCEMENTS	
12.	OTHER BUSINESS	

13. CLOSED SESSION AND REPORTING OUT

THAT the Council of the Township of North Huron hereby proceeds at ... pm. to an In-Camera Session (Closed to the Public) to discuss the following:

- Section 239 (2) (b) Personal matters about an identifiable individual, including municipal or local board employees (Recreation Department Personnel);*
- Section 239 (2) (b) Personal matters about an identifiable individual, including municipal or local board employees and Section 239 (2) (d) Labour relations or employee negotiations (Fire Department Personnel);*
- Section 239 (2) (c) A proposed or pending acquisition or disposition of land by the municipality or local board (Blyth Property)*

THAT the Council of the Township of North Huron hereby proceed to the Regular Council meeting at ... pm.

THAT the Council of the Township of North Huron hereby confirm the direction given to staff, in Closed Session.

14. CONFIRMATORY BY-LAW

- 14.1

By-law No. 55-2018, being a By-law of the Township of North Huron to confirm generally previous actions of the Council of the Township of North Huron.
- 625

THAT By-law 55-2018; being a by-law to confirm generally previous actions of the Council of the Township of North Huron; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law book.

15. ADJOURNMENT

THAT the Council of the Township of North Huron agree that there being no further business before Council; the meeting be hereby adjourned at pm.

MINUTES OF THE TOWNSHIP OF NORTH HURON
REGULAR COUNCIL MEETING



Date: Monday, May 7, 2018
Time: 7:00 p.m.
Location: HELD IN THE TOWNSHIP COUNCIL CHAMBERS

MEMBERS PRESENT: Reeve Neil Vincent
Deputy Reeve James Campbell
Councillor Ray Hallahan
Councillor Yolanda Ritsema-Teeninga
Councillor Trevor Seip
Councillor Brock Vodden
Councillor Bill Knott

STAFF PRESENT: Dwayne Evans, CAO
Richard Al, Clerk/Manager of Information Technology
Donna White, Director of Finance
Pat Newson, Director of Recreation and Facilities
Sean McGhee, Director of Public Works
Marty Bedard, Fire Chief
Chad Kregar, Deputy Fire Chief

OTHERS PRESENT: Adam Bell, CKNX
Vicki Henderson, Jackie Lantinga, Judy Sloan, Jim Sloan,
Archie MacGowan, John Brown, Bill Taylor, Doreen Taylor,
Bart Cameron, John Schenk, Tessa Leboeuf, Chris Leboeuf,
Vanessa Reinhardt, Mark McDougall, Dianna Robinson,
Jullian Underwood, Barbara Underwood, Barry Underwood,
Herman Mooy, Barry Young, Doug Howatt

1. CALL TO ORDER

Reeve Vincent called the meeting to order at 7:00 pm.

1.1 Introduction of Fire Chief, Marty Bedard

Deputy Chief Chad Kregar introduced Fire Chief Marty Bedard.

Reeve Vincent welcomed Chief Bedard to North Huron.

1.2 Resignation of Director of Recreation and Facilities, Pat Newson

Reeve Vincent and Council expressed their gratitude to Pat Newson for her years of service with North Huron.

M223/18

MOVED BY: T. Seip

SECONDED BY: R. Hallahan

THAT the Council of the Township of North Huron hereby accept with regret, the resignation of Pat Newson, Director of Recreation and Facilities, effective May 25, 2018.

CARRIED

2. CONFIRMATION OF THE AGENDA

M224/18

MOVED BY: B. Vodden

SECONDED BY: Y. Ritsema-Teeninga

THAT the Council of the Township of North Huron; accept the Agenda for the May 7, 2018 Council Meeting; as amended to include Item 12.1 - North Huron Westcast Community Complex HVAC and an additional item under 13. Closed Session regarding Blyth-Hullett Landfill.

CARRIED

3. DISCLOSURE OF PECUNIARY INTEREST

3.1 Councillor Seip – Item 6.7.1 - Pay Equity, Market Review Report

Councillor Seip declared a conflict on Item 6.7.1 due to his wife being an employee of the North Huron Childcare department.

4. CONSENT AGENDA

4.1 Minutes

4.1.1 Minutes of the Regular Council Meeting held April 16, 2018

4.1.2 Minutes of the Budget Meeting held April 23, 2018

4.1.3 Minutes of the Special Council Meeting held April 30, 2018

4.1.4 Minutes of the Blyth BIA Annual General Meeting held February 22, 2018

4.1.5 Minutes of the Blyth BIA Meeting held March 8, 2018

4.1.6 Minutes of the Blyth BIA Meeting held April 4, 2018

4.1.7 Minutes of the Wingham BIA Meeting held April 5, 2018

4.1.8 Minutes of the Council of the County of Huron - Fifth Session held April 4, 2018

4.2 Reports

4.2.1 Bills and Accounts

4.2.2 Public Works Department 05-07-18 (Amendment to Blyth Annual Water Report)

4.2.3 CAO Report 05-07-18 (Department Update)

4.3 Correspondence

4.3.1 Municipal Election Candidate Information Session - June 27, 2018

4.3.2 Huron County Planning and Development Department - Bill 139 Update

4.3.3 Ministry of Citizenship and Immigration - Nominations for the Champion of Diversity Award.

4.3.4 Ministry of Education - Revised Pupil Accommodation Review Guideline

4.3.5 Ministry of Energy - Green Button Update

4.3.6 Ministry of Agriculture, Food and Rural Affairs - 2018 Premier's Award for Agri-Food Innovation Excellence

4.3.7 Ontario Provincial Police - Q1 Calls for Service Billing Summary Report

4.3.8 AMO Policy Update - Canada-Ontario Bilateral Agreement Signed for the National Housing Strategy

4.3.9 AMO Policy Update - Guide to Cannabis Legalization for Municipalities Released

4.3.10 AMO Policy Update - Three Presumptive Cancers for Firefighters Announced

4.3.11 AMO Board of Directors Call for Nominations

M225/18

MOVED BY: T. Seip

SECONDED BY: J. Campbell

THAT the Council of the Township of North Huron hereby adopts Consent Items 4.1.1 to 4.1.3;

AND FURTHER THAT all other Consent Items be received for information.

CARRIED

5. PUBLIC MEETINGS/HEARINGS AND DELEGATIONS

5.1 Karen Stewart, Chair, Deb Sholdice, Treasurer, Amy Zoethout, Co-ordinator
- Blyth BIA Update on RTO4 Destination Animation fund initiatives

Karen Stewart, Chair, Deb Sholdice, Treasurer, Amy Zoethout, Co-ordinator, delivered a presentation on behalf of the Blyth BIA.

K. Stewart introduced the Blyth BIA members in attendance.

D. Sholdice provided an overview of the Blyth Artisan Market noting that the final location for the market will be behind 437 Queen Street however the space is not available at this time and as such a temporary alternate location is required.

D. Sholdice requested authorization and support from North Huron to close Dinsley Street from Queen Street, west to the alley, on Thursdays from May 31 to September 13, 2018 between the hours of 3:30pm to 8:00pm as well as on July 8, July 15, August 12 and August 19, 2018 to allow the Artisan Market to use the space.

K. Stewart provided details of the RTO4 Destination Animation Fund projects currently being planned.

K. Stewart, D. Sholdice and A. Zoethout were thanked and resumed seats in the public gallery at 7:22pm.

M226/18

MOVED BY: B. Vodden

SECONDED BY: R. Hallahan

THAT the Council of the Township of North Huron hereby direct staff to prepare a report regarding the Blyth BIA's request for support of an Artisan Market in Blyth, addressing the request to close a portion of Dinsley Street in Blyth as well as the request to extend the municipality's insurance coverage to the market.

CARRIED

5.2 Denise Lockie, North Huron Marketing Assistant - Presentation of Taking Pride in North Huron Video

Denise Lockie, Marketing Assistant, Township of North Huron, provided a background on the Taking Pride in North Huron video project that was completed in conjunction with University of Western Ontario students.

D. Lockie played the video for Council and those present.

Council applauded the video and thanked the University of Western

Ontario students and Denise Lockie for their work on preparing the video showcasing North Huron.

D. Lockie departed the meeting at 7:30 pm.

6. REPORTS

6.1 Clerks Department

6.1.1 Blyth BIA Updated Constitution and Levy

M227/18

MOVED BY: B. Vodden

SECONDED BY: B. Knott

*THAT the Council of the Township of North Huron hereby receive the May 7, 2018 report of the Clerk / Manager of IT entitled Blyth BIA Updated Constitution and Levy, for information;
AND FURTHER, that the Clerk is directed to prepare the necessary by-laws to adopt the Blyth BIA updated constitution and minimum / maximum levy changes.*

CARRIED

6.2 Finance Department

6.2.1 Friends of the Museum Fundraising Account

M228/18

MOVED BY: T. Seip

SECONDED BY: Y. Ritsema-Teeninga

THAT the Council of the Township of North Huron hereby authorizes the transfer of the bank balance from the Friends of the Museum Fundraising Account to the Wingham and District Horticultural Society for the maintenance of the Alice Munro Literary Garden.

CARRIED

6.2.2 2018 BIA Budgets

M229/18

MOVED BY: B. Knott

SECONDED BY: B. Vodden

*THAT the Council of the Township of North Huron hereby adopts the 2018 Wingham and Blyth BIA Budgets;
AND FURTHER that the levy amounts be included in the 2018 Township of North Huron final budget and tax levy.*

CARRIED

6.2.3 2018 Budget Report

Director of Finance, Donna White delivered a 2018 Budget overview presentation.

Discussion took place regarding the Wingham Police Service 2018 Budget.

Deputy Reeve Campbell moved a motion requesting the North Huron Police Service Board review the Wingham Police Service budget to find efficiencies and cost savings.

Councillor Seip requested a recorded vote.

Recorded Vote

Deputy-Reeve Campbell	Yea
Councillor Hallahan	Yea
Councillor Knott	Yea
Councillor Vodden	Yea
Councillor Seip	Nay
Councillor Ritsema-Teeninga	Yea
Reeve Vincent	Yea

M230/18

MOVED BY: J. Campbell

SECONDED BY: B. Vodden

THAT the Council of the Township of North Huron hereby requests that the North Huron Police Services Board review the proposed 2018 Budget for the Wingham Police Service and attempt to find efficiencies and cost savings.

CARRIED

Discussion took place regarding a budget amount that the Police Services Board should aim for which would be acceptable to Council.

Discussion took place regarding the Wingham Police Service 2018 Budget.

Discussion took place regarding timeline for presentation of the budget after it has been reviewed by the Police Services Board.

6.3 Recreation and Facilities Department

6.3.1 Temporary Easement Agreement for Blyth Memorial Community Hall

M231/18

MOVED BY: Y. Ritsema-Teeninga

SECONDED BY: B. Vodden

THAT the Council of the Township of North Huron hereby receives the report May 7, 2018 from the Director of Recreation and Facilities for the Temporary Easement Agreement for Blyth Memorial Community Hall; AND FURTHER THAT Council accepts the terms of the Temporary Easement Agreement for 431 Queen Street, Blyth; AND FURTHER THAT Council approves an exception to Section 19.1 of the Procedural By-Law to allow By Law 49-2018 to be passed at the May 7, 2018 Council meeting.

CARRIED

6.4 Public Works / Utilities Department

6.4.1 Maintenance Gravel Tender (2018)

M232/18

MOVED BY: T. Seip

SECONDED BY: J. Campbell

THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 7th, 2018 regarding the procurement of maintenance gravel for 2018 for information; AND FURTHER, that the contract for the crushing, hauling, and spreading of maintenance gravel in the Township of North Huron for 2018, in the amount of \$111,375.00 plus applicable taxes be awarded to Joe Kerr Limited.

CARRIED

6.5 Fire Department of North Huron

6.6 Building Department

6.7 CAO

6.7.1 Pay Equity, Market Review Report

M233/18

MOVED BY: Y. Ritsema-Teeninga

SECONDED BY: J. Campbell

THAT the Council of the Township of North Huron hereby receives the report of the CAO, dated May 7, 2018 regarding implementation of a pay equity/market review study;

AND FURTHER, that Council approves an exception to Section 19.1 of the Procedural By-law to allow By-law 47-2018 being a by-law to establish salary ranges for municipal employees of the Corporation of the Township of North Huron to be passed at the May 7, 2018 Council Meeting;
AND FURTHER, that Council directs the Treasurer to amend the 2018 draft budget by increasing the budget by \$70,000 to implement the pay equity/market review study;
AND FURTHER, that Council approves implementation of the new pay grid effective May 14, 2018.

CARRIED

7. CORRESPONDENCE

- 7.1 North Huron Economic Development Committee Recommendation - Alice Munro Festival Funding Requests

M234/18

MOVED BY: B. Knott

SECONDED BY: Y. Ritsema-Teeninga

THAT the Council of the Township of North Huron hereby allocate \$3,500 towards the Alice Munro Festival as recommended by the North Huron Economic Development Committee.

CARRIED

- 7.2 Request to formally proclaim May 7 - 13, 2018 as Nursing Week in the Township of North Huron.

M235/18

MOVED BY: T. Seip

SECONDED BY: Y. Ritsema-Teeninga

THAT the Council of the Township of North Huron hereby supports the Reeve in proclaiming May 7 - 13, 2018 as Nursing Week.

CARRIED

- 7.3 Barn Dance Historical Society request for exemption from the security provisions for the 21th Annual Barn Dance Campout Jamboree being held May 24-27, 2018 at the Blyth Campground.

M236/18

MOVED BY: T. Seip

SECONDED BY: B. Vodden

THAT the Council of the Township of North Huron hereby waives the requirement for off-duty police officers or private security company

personnel during alcohol service, required in the Municipal Alcohol Policy, for the upcoming Barn Dance Campout Jamboree to be held at the Blyth Community Centre on May 24, 25, 26 and 27, 2018.

CARRIED

- 7.4 Huron County Farm & Home Safety Association request for financial support in promoting safety on agricultural operations throughout Huron County.

8. COUNCIL REPORTS

8.1 REEVE ACTIVITY REPORT

Reeve Vincent reported attending the 2018 Ontario Small Urban Municipalities (OSUM) conference on May 2 to 4, 2018 in Niagara Falls.

Reeve Vincent noted that the OSUM presentations will be made available to Council.

Reeve Vincent thanked Public Works staff for their work cleaning up the debris after the wind storm on May 4, 2018.

8.2 COUNCIL MEMBER REPORTS (Verbal or written updates from members who sit on boards/committees)

Councillor Vodden reported attending the 2018 OSUM conference on May 2 to 4, 2018 and noted attending a session on the role of municipalities in terms of healthcare as well as a session regarding education specifically the pupil accommodation review process.

Councillor Vodden commented on community newspapers being purchased by larger publishers.

8.3 REQUESTS BY MEMBERS

9. NOTICE OF MOTION

9.1 Councillor Seip - Request for report regarding Snow Removal Policy

*Whereas the former Village of Blyth had a snow removal policy of ensuring full access to downtown places of business for every business day; and
Whereas this policy was maintained for the Blyth Ward for several years after amalgamation of North Huron; and*

Whereas the present snow removal policy of scheduled snow removal results in as many as three days a week in which passengers, people with mobility issues, and others are unable to gain reasonable access to the stores and offices which they need to visit.

Now therefore be it resolved that staff are requested to prepare a report and present available options regarding the North Huron snow removal policy as it specifically relates to the downtown core of both the Wingham and Blyth wards, addressing accessibility to stores and offices for all business days, by eliminating the snow banks along the curbs and sidewalks, and at the intersections prior to the beginning of each business day.

9.2 Councillor Seip - Request for report regarding North Huron policing

THAT the Council of the Township of North Huron hereby directs staff to prepare a report detailing the necessary steps and associated costs to expand the service area of Wingham Police Service to include the Blyth and East Wawanosh Wards and as part of the report, take into consideration the current OPP service level and budget allocations for the Blyth and East Wawanosh wards.

10. BY-LAWS

10.1 By-law No. 45-2018

Being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, an agreement between the Township of North Huron and Lavis Contracting Co. Limited for the Arthur Street Servicing Project.

M237/18

MOVED BY: J. Campbell

SECONDED BY: T. Seip

THAT By-law No. 45-2018; Being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, an agreement between the Township of North Huron and Lavis Contracting Co. Limited for the Arthur Street Servicing Project; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law book.

CARRIED

10.2 By-law No. 46-2018

Being a by-law to adopt a Signage Policy for the Richard W. LeVan Airport.

M238/18

MOVED BY: Y. Ritsema-Teeninga

SECONDED BY: R. Hallahan

By-law No. 46-2018; being a by-law to adopt a Signage Policy for the Richard W. LeVan Airport; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.

CARRIED

10.3 By-law No. 47-2018

Being a by-law to establish salary ranges for municipal employees of the Corporation of the Township of North Huron.

This By-law was deferred.

10.4 By-law No. 48-2018

Being a by-law for the purposes of levying and collecting rates for various purposes and provide for the payment of taxes and to provide for penalty and interest.

This By-law was deferred.

10.5 By-law No. 49-2018

Being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, a Temporary Easement Agreement between the Corporation of the Township of North Huron and Deams Holdings Inc., to allow a temporary easement upon, over, in, under and across the lands of 431 Queen Street Blyth, to conduct renovations to the building located at 437-441 Queen Street, Blyth.

M239/18

MOVED BY: B. Knott

SECONDED BY: Y. Ritsema-Teeninga

By-law No. 49-2018; being a by-law to authorize the Reeve and Clerk to sign, on behalf of Council, a Temporary Easement Agreement between the Corporation of the Township of North Huron and Deams Holdings Inc., to allow a temporary easement upon, over, in, under and across the lands of 431 Queen Street Blyth, to conduct renovations to the building located at 437-441 Queen Street, Blyth; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law Book.

CARRIED**11. ANNOUNCEMENTS****12. OTHER BUSINESS****12.1 North Huron Wescast Community Complex HVAC**

Director of Recreation and Facilities, Pat Newson, provided an overview of repairs needed to the North Huron Wescast Community Complex HVAC condenser unit.

M240/18**MOVED BY:** J. Campbell**SECONDED BY:** T. Seip

THAT the Council of the Township of North Huron hereby authorizes the Director of Recreation and Facilities to proceed with repairs to the North Huron Wescast Community Complex HVAC condenser unit in the amount of \$7,700 to be taken from the general facility repairs budget.

CARRIED

Reeve Vincent noted that a card would be circulated for Council to sign sending condolences to Gary Rutledge on the passing of his father.

13. CLOSED SESSION AND REPORTING OUT

Councillor Ritsema-Teeninga departed the meeting at 9:30pm.

M241/18**MOVED BY:** J. Campbell**SECONDED BY:** B. Vodden

THAT the Council of the Township of North Huron hereby proceeds at 9:35 pm. to an In-Camera Session (Closed to the Public) to discuss the following:

- Section 239 (2) (k) A position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the municipality or local board (Huron Pioneer Thresher's Agreement);*
- Section 239 (2) (b) Personal matters about an identifiable individual, including municipal or local board employees and Section 239 (2) (c) A proposed or pending acquisition or disposition of land by the municipality or local board (Blyth-Hullett Landfill);*
- Section 239 (2) (b) Personal matters about an identifiable individual, including municipal or local board employees and Section 239 (2) (d)*

Labour relations or employee negotiations (Recreation Department Personnel)

CARRIED

M242/18

MOVED BY: J. Campbell

SECONDED BY: T. Seip

THAT the Council of the Township of North Huron hereby proceed to the Regular Council meeting at 10:48 pm.

CARRIED

Clerk Richard Al reported that the during the Closed Session three items were discussed:

- Council received an update regarding the Huron Pioneer Threshers Agreement.
- Council received an update regarding the Blyth-Hullet Landfill.
- Council received an update regarding Recreation Department personnel.

M243/18

MOVED BY: J. Campbell

SECONDED BY: B. Vodden

THAT the Council of the Township of North Huron hereby confirm the direction given to staff, in Closed Session.

CARRIED

14. CONFIRMATORY BY-LAW

- 14.1 By-law No. 50-2018, being a By-law of the Township of North Huron to confirm generally previous actions of the Council of the Township of North Huron.

M244/18

MOVED BY: R. Hallahan

SECONDED BY: J. Campbell

THAT By-law 50-2018; being a by-law to confirm generally previous actions of the Council of the Township of North Huron; be introduced, read a first, second, third and final time, signed by the Reeve and Clerk and be engrossed in the By-law book.

CARRIED

15. ADJOURNMENT

M245/18

MOVED BY: B. Vodden

SECONDED BY: R. Hallahan

THAT the Council of the Township of North Huron agree that there being no further business before Council; the meeting be hereby adjourned at 10:49 pm.

CARRIED

Neil Vincent, Reeve

Richard Al, Clerk

MINUTES OF THE NORTH HURON

POLICE SERVICES BOARD MEETING

Date: Tuesday, April 10, 2018
Time: 7:30 pm
Location: HELD IN THE TOWNSHIP COUNCIL CHAMBERS

MEMBERS PRESENT: Trevor Seip
Yolanda Ritsema-Teeninga
Joan van der Meer
Bill Gregoriadis
Kathy Adams

STAFF PRESENT: Tim Poole, Chief, Wingham Police Service
Richard Al, Secretary

1. CALL TO ORDER

Chair Seip called the meeting to order at 7:30 pm.

2. ACCEPT OR AMEND AGENDA

PSB40/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Bill Gregoriadis

THAT the North Huron Police Services Board hereby accept the Agenda for the April 10, 2018 Police Services Board Meeting, as presented.

3. DECLARATION OF PECUNIARY INTEREST

None disclosed.

4. MINUTES OF THE PREVIOUS MEETING

PSB41/18

MOVED BY: Kathy Adams

SECONDED BY: Joan van der Meer

THAT the North Huron Police Services Board hereby adopts the Minutes of the Police Services Board Meeting held March 20, 2018, as presented.

PSB42/18

MOVED BY: Bill Gregoriadis

SECONDED BY: Kathy Adams

THAT the North Huron Police Services Board hereby adopts the Minutes of the Police Services Board Meeting held March 27, 2018, as presented.

CARRIED

5. DELEGATIONS / PETITIONS / INVITED GUESTS

None in attendance.

6. BUSINESS ARISING FROM THE MINUTES

Chair Seip noted that Chief Poole will provide information regarding the updated Wingham Police Service Budget under new business.

7. POLICE CHIEF'S REPORT

7.1 DEPARTMENT UPDATE - APRIL 2018

Chief Tim Poole presented details of the Police Chief's Report for April 2018.

Chief Poole noted that during March 2018 there were 122 calls for service, 2 of which were responding to calls for the OPP. Chief Poole noted that there were 93 calls for service during the same period in 2017.

Chief Poole noted that the statistics for March as well as the First Quarter are attached.

Chief Poole indicated that he plans to attend the Small to Mid-Sized Police Chiefs Meeting will be held April 17, 18, 19 in Peterborough.

Chief Poole reported that Use of Force training with Saugeen Shores is ongoing, Standard Field Sobriety Test training will be conducted and noted that one officer has been trained as a firearms certifier.

Chief Poole noted receiving an email regarding the RIDE Grant and recommended that direction from the Board be provided to proceed with submitting an application for the RIDE grant.

PSB43/18

MOVED BY: Kathy Adams

SECONDED BY: Yolanda Ritsema-Teeninga

THAT the North Huron Police Services Board hereby approves the Police Chief's Report for April 2018, as presented;

AND FURTHER, that the North Huron Police Services Board hereby authorizes the Chief to proceed with application for the RIDE program grant.

CARRIED

8. TREASURY REPORT

8.1 BILLS & ACCOUNTS

Police (2200) \$981.73

Police Station (2210) \$514.44

Total \$1,496.17

PSB44/18

MOVED BY: Bill Gregoriadis

SECONDED BY: Yolanda Ritsema-Teeninga

THAT the North Huron Police Services Board hereby authorizes and approves payment of the Bills and Accounts in the total amount of \$1,496.17 for the period ending April 5, 2018.

CARRIED

9. BY-LAWS AND POLICIES FOR CONSIDERATION

None for consideration.

10. CORRESPONDENCE

10.1 OAPSB

10.1.1 Notice of the 2018 Annual General Meeting

10.1.2 Ontario Transforming Police Response and Training

10.2 Ministry of Community Safety and Correctional Services

PSB45/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Kathy Adams

THAT the North Huron Police Services Board hereby directs that the correspondence for the April 10, 2018 be ordered, read and filed.

CARRIED

11. NEW BUSINESS

11.1 Wingham Police Association Agreement

Chair Seip provided an update on the 2018-2019 Wingham Police Association Working Agreement.

Chair Seip reported having in his possession of a copy of the agreement signed by the Association President and noted that the agreement could be ratified tonight should the Board choose to do so.

PSB46/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Bill Gregoriadis

THAT the North Huron Police Services Board hereby authorizes the Chair to sign, on behalf of the Board, a 2018-2019 Working Agreement between the North Huron Police Services Board and the Wingham Police Association.

CARRIED

11.2 Wingham Police Association - Civilian Agreement

Chair Seip provided an update on the 2018-2019 Wingham Police Association Civilian Agreement.

Chair Seip reported having in his possession of a copy of the agreement signed by the Association President and that the agreement could be ratified tonight should the Board choose to do so.

PSB47/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Kathy Adams

THAT the North Huron Police Services Board hereby authorizes the Chair to sign, on behalf of the Board, a 2018-2019 Wingham Police Association Civilian Agreement.

CARRIED

11.3 Memorandum of Understanding

Chair Seip provided background on the Memorandum of Understanding noting that the document outlines the terms and process to bring the Wingham Police Service to a full complement of officers by April 30, 2019.

Chair Seip provided an explanation of the meaning of full complement and noted that the April 30, 2019 deadline will depend on applicants and may need to be flexible if items arise that are out of the Board's control.

Chair Seip noted that communication with the Police Association will take place throughout the process.

PSB48/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Joan van der Meer

THAT the North Huron Police Services Board hereby authorizes the Chair to sign, on behalf of the Board, a Memorandum of Understanding between the North Huron Police Services Board and the Wingham Police Association regarding increasing the Wingham Police Service to a full complement of officers by April 2019.

CARRIED

11.4 Budget Discussion

Chief Poole presented an updated budget for the Wingham Police Service noting various changes to the revised budget.

Chief Poole noted that the total proposed budget for 2018 is \$1,636,000.

Discussion took place regarding the overtime figures included in the proposed budget and the calculations for the remainder of 2018.

Discussion took place regarding how positions will be advertised and the replacement of firearms for officers.

Discussion took place regarding vest plates for officers.

PSB49/18

MOVED BY: Yolanda Ritsema-Teeninga

SECONDED BY: Bill Gregoriadis

*THAT the North Huron Police Services Board hereby approves the revised Wingham Police Service 2018 Budget as presented;
AND FURTHER, that the Chief is directed to provide the revised 2018 Budget to the Treasurer of the Township of North Huron for inclusion in the Township of North Huron 2018 Budget.*

CARRIED

12. BOARD MEMBERS' INQUIRIES & REPORTS

Chair Seip thanked the Board for their patience during the process of working through the agreement.

Member Gregoriadis thanked the Chair and the Vice-Chair for their work on the agreement.

Chair Seip thanked Vice-Chair van der Meer on her assistance through the agreement process.

13. PUBLIC GALLERY QUESTIONS AND / OR COMMENTS

None noted.

14. IN CAMERA SESSION

There was no in camera session during this meeting.

15. NEXT MEETING

May 15, 2018 at 7:00 pm in the Township Council Chambers.

16. ADJOURNMENT

PSB50/18

MOVED BY: Joan van der Meer

SECONDED BY: Yolanda Ritsema-Teeninga

THAT there being no further business before the North Huron Police Services Board, the meeting be hereby adjourned at 8:29 p.m.

CARRIED

Trevor Seip, Chair

Richard Al, Secretary

**MINUTES OF THE NORTH HURON POLICE SERVICES BOARD
SPECIAL MEETING**

Date: Thursday, May 10, 2018
Time: 6:30 p.m.
Location: HELD IN THE TOWNSHIP COUNCIL CHAMBERS

MEMBERS PRESENT: Trevor Seip
Joan van der Meer
Bill Gregoriadis
Kathy Adams
STAFF PRESENT: Tim Poole, Police Chief
Richard Al, Secretary
OTHERS PRESENT: Murray Foxton, John Brown

1. CALL TO ORDER

Chair Seip called the meeting to order at 6:30 pm.

2. ACCEPT OR AMEND AGENDA

PSB51/18

MOVED BY: Joan van der Meer

SECONDED BY: Kathy Adams

THAT the North Huron Police Services Board hereby accept the Agenda for the May 10, 2018 Special Meeting of the North Huron Police Services Board, as presented.

CARRIED

3. DISCLOSURE OF PECUNIARY INTEREST

None disclosed.

4. DISCUSSION

4.1 Wingham Police Service 2018 Budget

Chair Seip provided the Board with background regarding discussion that took place during the May 7, 2018 Council Meeting noting that he has been directed by Council to bring the Wingham Police Service 2018 Budget back to the Board to attempt to reduce the budget amount.

Chief Tim Poole distributed a modified budget and provided an overview of the changes noting that additional officers will not be able to start until September 1, 2018 and so by adjusting the start dates from July to September savings are realized.

Chief Poole noted that he has revised the budget to reflect the cost associated with hiring 3 of the 5 additional officers in 2018 and the remainder of the officers in 2019.

Chief Poole noted that the budget has been amended to reflect the hiring of all recruits which would be paid on a lower pay grid than experienced officers and hence reduces the budget.

Chief Poole provided details regarding the scheduling of officers to ensure 24/7 coverage.

Discussion took place regarding the hiring of recruits and when the new hires would begin employment with the Wingham Police Service.

Discussion took place regarding the modified 2018 Budget as well as providing estimates for the 2019 and 2020 Budgets for Council's information.

Discussion took place regarding revenue opportunities including grants.

Discussion took place regarding overtime and the funds budgeted for this purpose.

Chair Seip noted that he and Chief Poole will work on budget estimates for 2019.

Discussion took place regarding the modified budget and future budget estimates.

Discussion took place regarding having two officers on duty and the requirements for officer back up.

Discussion took place regarding the internal promotion of officers.

Vice Chair van der Meer moved a motion directing the Police Chief to prepare the 2018 modified budget for consideration at the May 15, 2018 meeting as well as prepare estimates for the 2019 and 2020 budgets.

Chair Seip noted that the modified budget will be included on the May 15, 2018 Police Services Board agenda for consideration by the Board.

A member of the public gallery commented that the Township of North Huron cannot afford to maintain the Wingham Police Service and commented on the area rating figures.

A member of the public gallery commented that the decision to maintain the Wingham Police Service was not a Police Board decision but rather a Council decision.

PSB52/18

MOVED BY: Joan van der Meer

SECONDED BY: Bill Gregoriadis

THAT the North Huron Police Services Board hereby directs the Police Chief to prepare the 2018 modified budget for consideration by the Board at the May 15, 2018 Board Meeting;

AND FURTHER that, the Board directs the Police Chief to prepare estimated budgets for 2019 and 2020 to be provided to Council for information.

CARRIED

5. ADJOURNMENT

PSB53/18

MOVED BY: Kathy Adams

SECONDED BY: Bill Gregoriadis

THAT there being no further business before the North Huron Police Services Board, the meeting be hereby adjourned at 7:36 pm.

CARRIED

Trevor Seip, Chair

Richard Al, Secretary

Nov. 22, 2017 Minutes East Wawanosh

Present: Reunion Chair Jamie McCallum, Secretary Joan Vincent, Jonathan VanCamp, Linda Logan, Neil Vincent, Lila Rintoul, Steve Nixon, Kim Walker, Elaine Snell, Connie Goodall, Alice McDowell, Melanie Pletch, Marvin Cook

Welcome: Chair Jamie McCallum welcomed everyone to the meeting.

Motion to approve the July 12, 2017 meeting minutes was made by Linda Logan and seconded by Kim Walker. CARRIED.

Financial report given by Joan Vincent and listed separately below.

Motion to approve the financial report made by Kim Walker and seconded by Elaine Snell. CARRIED.

Motion to write a check to North Huron to pay back the \$5000. seed money was made by Alice McDowell and seconded by Lila Rintoul. CARRIED.

Motion to donate \$500. to the Wingham Firefighters' Association and \$1000. to the Belgrave Kinsmen was made by Alice McDowell and seconded by Marvin Cook. CARRIED.

When the cheques are being presented, it is to be said that it is not the final disbursement.

History Book – Set up a photo presentation with Linda Logan and Sylvia Nonkes-Verburg at a session of County Council for the Huron Heritage Grant.

Motion to donate history books to the local schools made by Lila Rintoul and seconded by Kim Walker. CARRIED.

Linda Logan will put a note in each of the books and deliver them to the schools.

Souvenirs – There are a lot of souvenirs left. Put a reminder on social media, list the items and share broadly with a suggested deadline of Dec. 30, 2017.

Suggestions were providing a team set for a ball team, Family Day, IODE Goderich (bundles for the homeless), Kinsmen turkey bingo as door prizes, shelter in Goderich, Salvation Army and Wingham Community Christmas Dinner.

4 hats and 4 shirts to Marvin Cook for the year end curling bonspiel.

Motion by Linda Logan and seconded by Kim Walker to charge \$10 each for hats and shirts and have Margaret put on Social Media as a Black Friday sale. Those interested are to contact Linda Logan.

Motion to donate a dozen items split between hats and shirts to the Kinsmen turkey bingo for prizes and

a dozen to the Wingham Community Dinner and some to the curling bonspiel made by Alice McDowell and seconded by Lila Rintoul. CARRIED.

Steve Nixon will contact Linda Logan about the items for the turkey bingo.

Motion by Alice McDowell and seconded by Steve Nixon to have December 31, 2018 as a cut off date for selling souvenirs and then disburse any remaining inventory. CARRIED.

There was a discussion regarding Christmas decorations, updating the flags and the possibility of the Belgrave Community Centre Board storing and future care. Also decorating the Kinsmen Park and in front of the Arena for Christmas.

Motion to give the flags and flag poles to the Belgrave Community Centre Board and replace any flags that need to be replaced made by Lila Rintoul and seconded by Linda Logan. CARRIED.

Suggested that majority of profit go to the Belgrave Community Centre Board. Other group mentioned for consideration was BB2F (Building Bridges to the Future).

Motion by Alice McDowell and seconded by Neil Vincent to approach the Belgrave Kinsmen to see if they would be willing to take on a project of Christmas lighting and decorations for the Kinsmen Park, if so the East Wawanosh 150th Anniversary will provide them with \$500. towards the project.

Next meeting will be arranged after the HST refund is received. Asked that it not be held from February 17 – 27, 2018.

Motion by Linda Logan and seconded by Elaine Snell to adjourn. CARRIED.

Financial Report

Balance in Account	\$9499.89
Heritage Grant to be received	\$4131.85
Outstanding Cheques	\$620.37
Seed Money owed to North Huron	\$5000.
HST PAID TO DATE IN 2017	\$8316.72

April 5, 2018 Minutes East Wawanosh Anniversary

Present: Reunion Chair Jamie McCallum, Secretary Joan Vincent, Jonathan VanCamp, Linda Logan, Neil Vincent, Lila Rintoul, Kim Walker, Alice McDowell, Melanie Pletch, Marvin Cook, Vicky Bremner, Sylvia Nonkes-Verburg.

Regrets: Heather Shiell, Elaine Snell, Chris Michie

Welcome: Chair Jamie McCallum welcomed everyone to the meeting.

Motion to approve the November 22, 2017 meeting minutes was made by Linda Logan and seconded by Melanie Pletch. CARRIED.

After the last meeting, Jamie McCallum and Joan Vincent attended a Kinsmen meeting to discuss Christmas decorations for the park and to present the cheque to them.

Financial report given by Joan Vincent and listed separately below.

Motion made by Lila Rintoul and seconded by Linda Logan to give the Belgrave Community Centre Board \$500. For flag replacement. CARRIED.

Lila Rintoul provided the information the flags can be sprayed with UV spray to reduce fading and help them last longer.

Motion made by Marvin Cook and seconded by Neil Vincent to provide the \$500.00 to the Belgrave Community Centre Board in a separate cheque from the general donation. CARRIED.

Motion to pay the bills made by Kim Walker and seconded by Alice McDowell. CARRIED.

Motion to approve the financial report made by Linda Logan and seconded by Ray Hallahan.

CARRIED.

History Books There are 99 books left. The Heritage Committee received 1 book, MRES, FE Madill, Sacred Heart each received 1 and were pleased.

There are about 400 Wilderness to Wawanosh books left.

There was a discussion over what to do with the books. It was suggested to donate one of each to the Huron County Museum, Huron County Genealogical Society, Huronview, Huronlea, Braemar, and each of the Lucknow Retirement homes. It was also suggested trying to sell them at the Threshers Reunion and Ray Hallahan would arrange it. Alice McDowell will check out websites available to sell them on and Linda Logan will deliver them to the homes. It was also suggested putting a few in the Blyth Festival.

Motion made by Ray Hallahan and seconded by Marvin Cook for Ray Hallahan to arrange to have them displayed for sale at the Threshers, for Alice McDowell to see about advertising and selling on line and for one of each book to be donated to the nursing homes, Genealogical Society and Huron County Museum. CARRIED.

Day Lilies – The next batch will be available in the fall.

Souvenirs – Donated to Community Christmas Dinner, Huron County Christmas Bureau, Belgrave Kinsmen Bingo, Women’s Shelter, IODE (send to Men’s Missions), and Curling Club.

There are about 50 POW WOW shirts. Moved by Neil Vincent and seconded by Lila Rintoul that Linda Logan and Heather Shiell find something to do with them and eliminate the stock (possibly them being made into mats.) CARRIED.

Discussion over having a trophy case or two at the Belgrave Community Centre with memorabilia from the East Wawanosh Reunions. Jonathan VanCamp will bring up the topic at the Belgrave Community Centre Board meeting. Lila Rintoul may have 2 of the 1967 books. Jamie McCallum and Sylvia Nonkes-Verburg volunteered to be on a committee to make decisions on what want to include in it and arrangements over trophy cases with the Belgrave Community Centre giving guidance on what size. Motion made by Alice McDowell and seconded by Marvin Cook to designate \$1057.89 for the memorial display. CARRIED.

Motion by Kim Walker and seconded by Ray Hallahan to donate \$500. Each to Brandon Cemetery, Elementary School Fair, Wingham Firefighters’ Association, Blyth Firefighters’ Association, Belgrave Kinsmen, and Blyth Lions Club and the remaining \$11,000 to the Belgrave Community Centre Board.

CARRIED.

Motion made by Alice McDowell and seconded by Melanie Pletch to donate the \$11,000 included in the previous motion and with it to provide a letter to the Belgrave Community Centre Board and put in it the ideas that the 150th East Wawanosh Anniversary Committee has suggested as possible projects (playground, minor sports, bench and rest as needs dictate)

Motion made by Sylvia Nonkes-Verburg and seconded by Melanie Pletch that any future money be directed to the Belgrave Community Centre.

Put a new entry on the website “Thank you for all your support, posting pictures of the presentations”.

Have 1 night for the presentations. Neil Vincent offered to provide refreshments for it. Invite representatives from each of the groups receiving donations and the media. It will be held on Tuesday, April 24, 2018 at 7:30 pm at the Belgrave Community Centre.

There will be a short meeting after the disbursement of funds to entertain a motion to dissolve the committee.

Alice McDowell expressed a Thank You to Joan Vincent for her contributions.

Motion by Neil Vincent and seconded by Alice McDowell to adjourn. CARRIED.

Financial Report

Balance in Account as of April 5, 2018	\$15, 485.10
Money to be deposited	\$ 735.00

Outstanding Cheques	\$130.00
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Bill to be Paid – Sylvia Nonkes-Verburg (ad in Advance Times)	\$32.21
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Notes

Lucknow Kinsmen \$500. Cheque went stale dated (told to treat as a donation)

Wild Willies Food Truck (Bruce Vincent) \$300.00 donation

HST Refund was \$7203.86

Proceeds available for disbursement \$16,057.89

Accounts Payable

Paid Invoice History By Cheque Report - CIBC GENERAL ACCOUNT 9801014

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 044812 Date 05/09/2018 Amount 351.58				
001204 ALBERT MARTENS	224 JOSEPHINE ST	05/09/2018	2017 VACANCY APPLICATION	351.58
			Invoice Count 1 Total	351.58
Cheque 044813 Date 05/09/2018 Amount 810.15				
004803 DEAMS HOLDINGS INC.	414 QUEEN ST	05/09/2018	2017 VACANCY APPLICATION	399.88
004803 DEAMS HOLDINGS INC.	437 QUEEN ST	05/09/2018	2017 VACANCY APPLICATION	410.27
			Invoice Count 2 Total	810.15
Cheque 044814 Date 05/09/2018 Amount 138.26				
004658 EDGAR DALE BRIAN	284 JOSEPHINE ST	05/09/2018	2017 VACANCY REBATE	138.26
			Invoice Count 1 Total	138.26
Cheque 044815 Date 05/17/2018 Amount 1,625.00				
004810 ADD SOME FLAIR	5-16-2018	05/16/2018	REC PROG- PAINT CLOCK PF	1,625.00
			Invoice Count 1 Total	1,625.00
Cheque 044816 Date 05/18/2018 Amount 110.00				
004811 ALEYA MURRAY	5-14-2018	05/14/2018	PW- WORK BOOT ALLOWANC	110.00
			Invoice Count 1 Total	110.00
Cheque 044817 Date 05/18/2018 Amount 3,500.00				
004005 ALICE MUNRO FESTIVAL OF THE SHOF	5-7-2018	05/07/2018	EC DEV- FUNDING REQUEST	3,500.00
			Invoice Count 1 Total	3,500.00
Cheque 044818 Date 05/18/2018 Amount 261.31				
003939 B & L FARM SERVICES LTD	699436	04/10/2018	BALL PARK- FIELD MARKER I	261.31
			Invoice Count 1 Total	261.31
Cheque 044819 Date 05/18/2018 Amount 73.00				
001590 CINTAS CANADA LTD	398103829	05/04/2018	ESTC MATS	73.00
			Invoice Count 1 Total	73.00
Cheque 044820 Date 05/18/2018 Amount 150.00				
003278 COLLEGE OF EARLY CHILDHOOD EDU	13937-2018	05/02/2018	DAY CARE- 2018 MEMBERSH	150.00
			Invoice Count 1 Total	150.00
Cheque 044821 Date 05/18/2018 Amount 968.94				
000885 DEAN'S VALU-MART	641-7702	04/30/2018	EL- FOOD SUPPLIES	104.45
000885 DEAN'S VALU-MART	641-7959	05/01/2018	BA-MR- FOOD SUPPLIES	176.72
000885 DEAN'S VALU-MART	641-5167-2018	05/03/2018	DAY CARE- FOOD SUPPLIES	395.51
000885 DEAN'S VALU-MART	641-0213	05/07/2018	EL- FOOD SUPPLIES	105.32
000885 DEAN'S VALU-MART	641-8830	05/07/2018	BA-MR- FOOD SUPPLIES	155.26
000885 DEAN'S VALU-MART	642-4355	05/09/2018	REC ADMIN- FRUIT DRINKS	5.76

Accounts Payable

Paid Invoice History By Cheque Report - CIBC GENERAL ACCOUNT 9801014

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000885 DEAN'S VALU-MART	641-5203	05/11/2018	DAY CARE- FOOD SUPPLIES	25.92
		Invoice Count	7 Total	968.94
Cheque 044822	Date 05/18/2018	Amount	47.18	
003933 DOC'S REPAIR	2	05/03/2018	PARKS W- AIR FILTERS, SPAI	47.18
		Invoice Count	1 Total	47.18
Cheque 044823	Date 05/18/2018	Amount	813.60	
004813 GROVES TREE SERVICE	1038	05/15/2018	PW- CHIPPER USE	813.60
		Invoice Count	1 Total	813.60
Cheque 044824	Date 05/18/2018	Amount	150.60	
004698 HENSALL DISTRICT CO-OP	PE419990	04/30/2018	PARKS B- FUEL	6.80
004698 HENSALL DISTRICT CO-OP	PE420001	04/30/2018	PW- FUEL FOR 07-13	143.80
		Invoice Count	2 Total	150.60
Cheque 044825	Date 05/18/2018	Amount	2,825.00	
004786 HICKS MORLEY HAMILTON STEWART	447938	05/08/2018	BILL 148 WORKSHOP- FEES	2,825.00
		Invoice Count	1 Total	2,825.00
Cheque 044826	Date 05/18/2018	Amount	110.00	
004649 JOSH BLOEMBERG	5-14-2018	05/14/2018	PW- WORK BOOT ALLOWANC	110.00
		Invoice Count	1 Total	110.00
Cheque 044827	Date 05/18/2018	Amount	75.00	
004102 KEVIN DUNN	5-14-2018	05/14/2018	PW- MEDICAL	75.00
		Invoice Count	1 Total	75.00
Cheque 044828	Date 05/18/2018	Amount	946.23	
000422 MIDWESTERN EQUIPMENT	31721	05/09/2018	PW- BRUSH SET	946.23
		Invoice Count	1 Total	946.23
Cheque 044829	Date 05/18/2018	Amount	768.40	
002685 ONTARIO POLICE TECHNOLOGY INFO	2018-40	04/01/2018	POLICE- OPTIC- ANNUAL FEE	768.40
		Invoice Count	1 Total	768.40
Cheque 044830	Date 05/18/2018	Amount	7,184.12	
003138 OWEN SOUND POLICE SERVICES	3511-18	05/04/2018	POLICE- MAY DISPATCH SER	2,252.60
003138 OWEN SOUND POLICE SERVICES	3516-48	05/04/2018	FIRE- DISPATCH SERVICE	4,897.62
003138 OWEN SOUND POLICE SERVICES	3530-18	05/11/2018	POLICE- GPS TRACKING	33.90
		Invoice Count	3 Total	7,184.12
Cheque 044831	Date 05/18/2018	Amount	335.82	
004609 RADAR AUTO PARTS- BRUSSELS	5341-223923	04/23/2018	PW- B- SHOP SUPPLIES	99.44

Accounts Payable

Paid Invoice History By Cheque Report - CIBC GENERAL ACCOUNT 9801014

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
004609 RADAR AUTO PARTS- BRUSSELS	5341-224569	04/30/2018	PW- LH FLOOR PAN FOR 1 TC	236.38
		Invoice Count	2 Total	335.82
Cheque 044832 Date 05/18/2018 Amount 14,981.43				
004814 RAMPART INTERNATIONAL CORP	R2018_4972	04/30/2018	POLICE- 12 FIREARMS/LIGHT	14,981.43
		Invoice Count	1 Total	14,981.43
Cheque 044833 Date 05/18/2018 Amount 54.23				
004345 RICHARD BADLEY	4-26-2018	04/26/2018	HALL B- BOOT ALLOWANCE	54.23
		Invoice Count	1 Total	54.23
Cheque 044834 Date 05/18/2018 Amount 855.00				
004078 ST JOHN AMBULANCE-GREY BRUCE H I-SJSGB-008139		05/07/2018	REC- BABYSITTING BASICS C	45.00
004078 ST JOHN AMBULANCE-GREY BRUCE H I-SJSGB-008140		05/07/2018	REC- BABYSITTING BASICS C	810.00
		Invoice Count	2 Total	855.00
Cheque 044835 Date 05/18/2018 Amount 299.00				
004809 ST. JOHN AMBULANCE	I-SJGUE-006716	04/16/2018	FIRE- MEDICAL FIRST RESPC	299.00
		Invoice Count	1 Total	299.00
Cheque 044836 Date 05/18/2018 Amount 7,703.82				
000721 W S I B	April 2018	04/30/2018	APRIL 2018 REMITTANCE	7,703.82
		Invoice Count	1 Total	7,703.82
Cheque 044837 Date 05/18/2018 Amount 3,607.38				
000710 WINGHAM HORTICULTURE SOCIETY	5-7-2018	05/07/2018	FOM- TRANSFER TO W HORT	3,607.38
		Invoice Count	1 Total	3,607.38
Report Total				48,745.05

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Paid Invoice History By Cheque Report - CIBC WATER ACCOUNT 6902413

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 004918 Date 05/18/2018 Amount 5.43				
000100 CANADA POST CORPORATION	9652233795	04/30/2018	WATER- E- BILLING	5.43
		Invoice Count	1 Total	5.43
Cheque 004919 Date 05/18/2018 Amount 223.08				
003997 CDW CANADA INC	MPM1700- W	05/02/2018	WATER- TABLET	223.08
		Invoice Count	1 Total	223.08
Cheque 004920 Date 05/18/2018 Amount 259.53				
000969 CREDIT RISK MANAGEMENT	40618	04/30/2018	WATER- COLLECTION FEES	259.53
		Invoice Count	1 Total	259.53
Report Total				488.04

Accounts Payable

Paid Invoice History By Cheque Report - INTERNET/PRE-AUTHORIZED PAYMENTS GENERAL

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 001134 Date 05/04/2018 Amount 43,087.79				
000535 RECEIVER GENERAL FOR CANADA	5-3-2018- Fire	05/03/2018	FIRE PAYROLL REMITTANCE	315.00
000535 RECEIVER GENERAL FOR CANADA	5-3-2018-FT	05/03/2018	FT PAYROLL REMITTANCE	34,081.07
000535 RECEIVER GENERAL FOR CANADA	5-3-2018-PT	05/03/2018	PT PAYROLL REMITTANCE	8,691.72
Invoice Count 3 Total				43,087.79
Cheque 001135 Date 05/07/2018 Amount 11,675.17				
000687 WESTARIO POWER INC.	2103861964	04/17/2018	4920 KWH- DAY CARE	592.48
000687 WESTARIO POWER INC.	2103861967	04/17/2018	3359 KWH- LIBRARY	416.96
000687 WESTARIO POWER INC.	2103861968	04/17/2018	17704 KWH- POLICE/TOWN H	2,029.80
000687 WESTARIO POWER INC.	2103861972	04/17/2018	524 KWH- JOSEPHINE ST ST	97.26
000687 WESTARIO POWER INC.	30025379	04/18/2018	35419 KWH- WINGHAM STLIG	8,538.67
Invoice Count 5 Total				11,675.17
Cheque 001136 Date 05/08/2018 Amount 5,494.69				
000665 UNION GAS LIMITED	March 2018-0458	04/18/2018	12257 M3- COMPLEX	3,746.58
000665 UNION GAS LIMITED	March 2018-4108	04/18/2018	1787 M3- TOWN HALL	548.86
000665 UNION GAS LIMITED	March 2018-5109	04/18/2018	461 M3- POLICE	160.97
000665 UNION GAS LIMITED	March 2018-5340	04/18/2018	805 M3- LIBRARY	261.54
000665 UNION GAS LIMITED	March 2018-5467	04/18/2018	954 M3- DAY CARE	281.14
000665 UNION GAS LIMITED	March 2018-7408	04/18/2018	1748 M3- 445 JOSEPHINE ST	495.60
Invoice Count 6 Total				5,494.69
Cheque 001137 Date 05/09/2018 Amount 2,093.27				
000294 HYDRO ONE NETWORKS INC	March 2018-0523	04/20/2018	10998 KWH- BLYTH STREETL	2,093.27
Invoice Count 1 Total				2,093.27
Cheque 001138 Date 05/09/2018 Amount 19,588.41				
000687 WESTARIO POWER INC.	2103862214	04/20/2018	128260 KWH- COMPLEX	19,588.41
Invoice Count 1 Total				19,588.41
Cheque 001139 Date 05/10/2018 Amount 180.36				
001365 TOWNSHIP OF NORTH HURON WATER	281072	05/10/2018	WATER PAID TO GENERAL A	180.36
Invoice Count 1 Total				180.36
Cheque 001140 Date 05/10/2018 Amount 892.96				
000665 UNION GAS LIMITED	March 2018-8454	04/20/2018	1876 M3-WINGHAM FIRE STN	521.64
000665 UNION GAS LIMITED	March 2018-9991	04/20/2018	1307 M3-MUSEUM	371.32
Invoice Count 2 Total				892.96
Cheque 001141 Date 05/11/2018 Amount 2,618.50				
000140 CIBC VISA	GoDaddy-1284091820	03/26/2018	RECOVERABLE- ALICE MUNF	45.18
000140 CIBC VISA	HiMama- 7354	03/28/2018	DAY CARE- MONTHLY SUBSC	65.54
000140 CIBC VISA	AMCTO-Manual	03/29/2018	ADMIN- ELECTIONS MANUAL	169.50
000140 CIBC VISA	Const. Cont. 1876920	03/29/2018	ESTC- EMAIL MARKETING	6.63
000140 CIBC VISA	CPC- 1067697	04/04/2018	LANDFILL - POSTAGE	399.07
000140 CIBC VISA	CPC-286830	04/04/2018	LANDFILL- POSTAGE	115.33
000140 CIBC VISA	Dancesocks-100036216	04/06/2018	FITNESS- DANCE SOCKS	78.71

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Paid Invoice History By Cheque Report - INTERNET/PRE-AUTHORIZED PAYMENTS GENERAL

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000140 CIBC VISA	GoDaddy- 1291027926	04/08/2018	FIRE- HOARDING WEBSITE	22.59
000140 CIBC VISA	ISSUU-753262	04/15/2018	REC DMIN- MONTHLY SUBSC	50.45
000140 CIBC VISA	GovDeals-625678	04/16/2018	PW- GRADER ATTACHMENT	118.65
000140 CIBC VISA	Stak Fitness- B7N4C1	04/16/2018	FITNESS EQUIPMENT	870.83
000140 CIBC VISA	Spotify- 4-17	04/17/2018	FITNESS- MONTHLY SUBSCR	14.99
000140 CIBC VISA	CI Gear- 547090705	04/18/2018	ADMIN- PHONE SYSTEM REN	389.85
000140 CIBC VISA	Canadian Tire- 4740	04/18/2018	EMRGENCY PLAN- WHEELEC	271.18
Invoice Count 14 Total				2,618.50
Cheque 001142 Date 05/14/2018 Amount 8,472.53				
000294 HYDRO ONE NETWORKS INC	March 2018-4216	04/25/2018	43440 KWH- BLYTH COMM CE	8,472.53
Invoice Count 1 Total				8,472.53
Cheque 001143 Date 05/14/2018 Amount 6,973.84				
000427 MINISTER OF FINANCE	4-30-2018	04/30/2018	APRIL 2018 PREMIUM	6,973.84
Invoice Count 1 Total				6,973.84
Cheque 001144 Date 05/15/2018 Amount 30.21				
000294 HYDRO ONE NETWORKS INC	March 2018-8337	04/26/2018	0 KWH- 377 GYPSY OTH OTH	30.21
Invoice Count 1 Total				30.21
Cheque 001145 Date 05/16/2018 Amount 2,339.31				
000657 TOWNSHIP OF NORTH HURON WATER	4-24-2018-BPW	04/24/2018	PW- BLYTH- WATER/SEWER	180.36
000657 TOWNSHIP OF NORTH HURON WATER	4-24-2018-ESTC	04/24/2018	ESTC/FIRE B- WATER/SEWEF	180.36
000657 TOWNSHIP OF NORTH HURON WATER	4-24-2018-Library	04/24/2018	LIBRARY- WATER/SEWER	180.36
000657 TOWNSHIP OF NORTH HURON WATER	182577	04/26/2018	COMPLEX- WATER/SEWER	807.82
000657 TOWNSHIP OF NORTH HURON WATER	182584	04/26/2018	DAY CARE- WATER/SEWER	118.33
000657 TOWNSHIP OF NORTH HURON WATER	182601	04/27/2018	ARENA/HALL B-WATER/SEWE	872.08
Invoice Count 6 Total				2,339.31
Cheque 001146 Date 05/18/2018 Amount 43,012.95				
000535 RECEIVER GENERAL FOR CANADA	5-17-2018-FIRE	05/17/2018	FIRE PAYROLL REMITTANCE	315.00
000535 RECEIVER GENERAL FOR CANADA	5-17-2018-FT	05/17/2018	FT PAYROLL REMITTANCE	34,220.80
000535 RECEIVER GENERAL FOR CANADA	5-17-2018-PT	05/17/2018	PT PAYROLL REMITTANCE	8,477.15
Invoice Count 3 Total				43,012.95
Report Total				146,459.99

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Paid Invoice History By Cheque Report - WATER INTERNET/PRE-AUTHORIZED PAYMENTS

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 000613 Date 05/07/2018 Amount 983.70				
000687 WESTARIO POWER INC.	2103861969	04/17/2018	8400 KWH- WELL #3	983.70
			Invoice Count 1 Total	983.70
Cheque 000614 Date 05/09/2018 Amount 1,984.11				
000687 WESTARIO POWER INC.	2103862215	04/20/2018	13680 KWH- WELL #4	1,984.11
			Invoice Count 1 Total	1,984.11
Cheque 000615 Date 05/15/2018 Amount 1,603.06				
000294 HYDRO ONE NETWORKS INC	April 2018- 7904	04/26/2018	9458 KWH- 201 VICTORIA ST '	1,603.06
			Invoice Count 1 Total	1,603.06
Cheque 000616 Date 05/17/2018 Amount 76.55				
003924 GLOBAL PAYMENTS	3639	04/30/2018	DEBIT MACHINE FEES	76.55
			Invoice Count 1 Total	76.55
Report Total				4,647.42

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 502497 Date 05/23/2018 Amount 214.73				
003445 A J STONE COMPANY LTD	139238	05/01/2018	FIRE- CLEANER	214.73
		Invoice Count	1 Total	214.73
Cheque 502498 Date 05/23/2018 Amount 113.95				
001987 ALLSTREAM BUSINESS INC.	1726285-19061881	04/28/2018	CEMETERY PHONE	53.28
001987 ALLSTREAM BUSINESS INC.	1726358-19061882	04/28/2018	PW- EW- PHONE	60.67
		Invoice Count	2 Total	113.95
Cheque 502499 Date 05/23/2018 Amount 394.56				
003499 ALTRUCK INTL TRUCK CENTRES	63280	05/03/2018	PW- SERVICE 2018 INTERNA	394.56
		Invoice Count	1 Total	394.56
Cheque 502500 Date 05/23/2018 Amount 2,059.78				
004605 AVRON	434492	05/02/2018	DAY CARE- LOCKERS/COAT (2,059.78
		Invoice Count	1 Total	2,059.78
Cheque 502501 Date 05/23/2018 Amount 459.91				
000073 B M ROSS AND ASSOCIATES LTD	14747	05/09/2018	RECOVERABLE- RUTLEDGE I	459.91
		Invoice Count	1 Total	459.91
Cheque 502502 Date 05/23/2018 Amount 63.05				
000569 BLYTH FOOD MARKET	03011656896	04/23/2018	HALL B- COKE, GINGERALE, I	50.44
000569 BLYTH FOOD MARKET	03011657523	04/26/2018	HALL B- DIET COKE	12.61
		Invoice Count	2 Total	63.05
Cheque 502503 Date 05/23/2018 Amount 214.81				
000072 BLYTH PRINTING INC.	28987	05/01/2018	FITNESS- INFORMATION CAR	139.35
000072 BLYTH PRINTING INC.	29032	05/10/2018	FIRE- BUSINESS CARDS M. B	75.46
		Invoice Count	2 Total	214.81
Cheque 502504 Date 05/23/2018 Amount 28.82				
004526 BRENDA QUIPP	5-7-2018	05/07/2018	DAY CARE- POSTAGE	28.82
		Invoice Count	1 Total	28.82
Cheque 502505 Date 05/23/2018 Amount 137.70				
002066 BROCK VODDEN	April 2018	04/30/2018	COUNCIL- APRIL 2018 MILEA	137.70
		Invoice Count	1 Total	137.70
Cheque 502506 Date 05/23/2018 Amount 207.92				
000086 BROPHY TIRE	44361	04/09/2018	POLICE- CHANGE TIRES	92.66
000086 BROPHY TIRE	44373	04/10/2018	POLICE- CHANGE TIRES	115.26
		Invoice Count	2 Total	207.92
Cheque 502507 Date 05/23/2018 Amount 50.18				

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Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
001557 CAROL MACPHERSON	5-1-2018	05/01/2018	DAY CARE- SUPPLIES	50.18
		Invoice Count	1 Total	50.18
Cheque 502508	Date 05/23/2018	Amount	723.72	
003997 CDW CANADA INC	MQX7508	05/09/2018	ADMIN- BACK UP HARD DRIV	144.23
003997 CDW CANADA INC	MQZ8395	05/09/2018	DAY CARE- TONER CARTRID	378.99
003997 CDW CANADA INC	MSF9735	05/15/2018	ADMIN- CARTRIDGE FOR PRI	200.50
		Invoice Count	3 Total	723.72
Cheque 502509	Date 05/23/2018	Amount	421.26	
003919 CINTAS CANADA LIMITED	839565851	05/03/2018	POOL/FITNESS- SANITIZE RE	421.26
		Invoice Count	1 Total	421.26
Cheque 502510	Date 05/23/2018	Amount	1,132.51	
000146 CLIFF'S PLUMBING & HEATING	31252	03/16/2018	KOC- REPAIR URINALS	1,132.51
		Invoice Count	1 Total	1,132.51
Cheque 502511	Date 05/23/2018	Amount	1,235.51	
004702 COCO PAVING INC.	16447	04/27/2018	PW-COLD PATCH ASPHALT	1,235.51
		Invoice Count	1 Total	1,235.51
Cheque 502512	Date 05/23/2018	Amount	237.30	
004697 COMCENTRIC NETWORKING INC.	6506	05/01/2018	ESTC- NETWORK	237.30
		Invoice Count	1 Total	237.30
Cheque 502513	Date 05/23/2018	Amount	745.80	
004606 CUT-RITE TREE SERVICE	434858	05/12/2018	PW- BUCKET TRUCK/CHIPPE	745.80
		Invoice Count	1 Total	745.80
Cheque 502514	Date 05/23/2018	Amount	897.79	
003299 DARCH FIRE	66477	04/24/2018	FIRE- 50' HOSE	897.79
		Invoice Count	1 Total	897.79
Cheque 502515	Date 05/23/2018	Amount	980.41	
000186 DELTA ELEVATOR COMPANY LTD	9176676	05/01/2018	TOWN HALL- ELEVATOR MAII	490.84
000186 DELTA ELEVATOR COMPANY LTD	9176677	05/01/2018	COMPLEX- ELEVATOR MAINT	489.57
		Invoice Count	2 Total	980.41
Cheque 502516	Date 05/23/2018	Amount	1,440.75	
002183 DONNELLY & MURPHY	47913	04/05/2018	POLICE- LEGAL FEES	1,101.75
002183 DONNELLY & MURPHY	48048	05/01/2018	POLICE- LEGAL FEES	254.25
002183 DONNELLY & MURPHY	48049	05/01/2018	POLICE- LEGAL FEES	84.75
		Invoice Count	3 Total	1,440.75
Cheque 502517	Date 05/23/2018	Amount	59.40	

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Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
004738 DWAYNE EVANS	4-30-2018	04/30/2018	CAO- MILEAGE	59.40
		Invoice Count	1 Total	59.40
Cheque 502518 Date 05/23/2018 Amount 11,774.40				
000074 FOXTON FUELS LIMITED	358002	04/03/2018	LANDFILL- COMPACTOR FUE	345.73
000074 FOXTON FUELS LIMITED	358430	04/03/2018	LANDFILL- 60 L HYDREX	260.35
000074 FOXTON FUELS LIMITED	358580	04/10/2018	LANDFILL- COMPACTOR FUE	384.87
000074 FOXTON FUELS LIMITED	359010	04/16/2018	PW EW- CLEAR DIESEL	1,560.96
000074 FOXTON FUELS LIMITED	359011	04/16/2018	PW EW- DYED DIESEL	3,202.53
000074 FOXTON FUELS LIMITED	35903	04/16/2018	PW- W- DYED DIESEL	905.01
000074 FOXTON FUELS LIMITED	359030	04/16/2018	PW- W- CLEAR DIESEL	1,222.97
000074 FOXTON FUELS LIMITED	359072	04/17/2018	LANDFILL- COMPACTOR FUE	253.48
000074 FOXTON FUELS LIMITED	359785	04/27/2018	LANDFILL- COMPACTOR FUE	402.70
000074 FOXTON FUELS LIMITED	360391	04/30/2018	BUILDING - FUEL	175.18
000074 FOXTON FUELS LIMITED	360456	04/30/2018	FIRE- APRIL FUEL	122.84
000074 FOXTON FUELS LIMITED	360497	04/30/2018	POLICE- APRIL FUEL	1,389.60
000074 FOXTON FUELS LIMITED	360840	04/30/2018	PW- APRIL FUEL	1,548.18
		Invoice Count	13 Total	11,774.40
Cheque 502519 Date 05/23/2018 Amount 377.00				
000233 FROSTY QUEEN	28-2018	04/27/2018	AQUATICS- ICE CREAM CAKE	377.00
		Invoice Count	1 Total	377.00
Cheque 502520 Date 05/23/2018 Amount 685.92				
000237 GEORGIAN BAY FIRE & SAFETY LTD	747430	04/25/2018	FIRE W- SCBA- TESTING	200.58
000237 GEORGIAN BAY FIRE & SAFETY LTD	748271	04/30/2018	DAY CARE- FIRE ALARM INSF	485.34
		Invoice Count	2 Total	685.92
Cheque 502521 Date 05/23/2018 Amount 456.55				
000249 GREEN'S MEAT MARKET	14637	05/10/2018	DAY CARE- MEAT PRODUCTS	456.55
		Invoice Count	1 Total	456.55
Cheque 502522 Date 05/23/2018 Amount 22.39				
000286 HURON TRACTOR LTD	B46116	03/26/2018	PW- POST LUB	4.19
000286 HURON TRACTOR LTD	B46907	04/13/2018	PW- B- PRESSURE WASHER	18.20
		Invoice Count	2 Total	22.39
Cheque 502523 Date 05/23/2018 Amount 70.00				
000290 HURONIA WELDING & INDUSTRIAL	D56884	05/01/2018	PW EW- COMPRESSED OXYC	70.00
		Invoice Count	1 Total	70.00
Cheque 502524 Date 05/23/2018 Amount 378.48				
000296 IDEAL SUPPLY INC.	4654793	04/03/2018	ROADS- 6 VOLT BATTERIES	44.21
000296 IDEAL SUPPLY INC.	4659290	04/04/2018	COMPLEX- LIGHT BULB	10.66
000296 IDEAL SUPPLY INC.	4680368	04/10/2018	FIRE- SUPER DIESEL HD AF	13.53
000296 IDEAL SUPPLY INC.	4691099	04/13/2018	COMPLEX- B-SECTION BELT	10.84
000296 IDEAL SUPPLY INC.	4694860	04/16/2018	TOWN HALL - ICE MELTER	54.19
000296 IDEAL SUPPLY INC.	4697703	04/16/2018	FIRE- WIPER BLADES	53.77

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Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000296 IDEAL SUPPLY INC.	4698838	04/17/2018	PW- SHOP TOWELS, HALOGE	72.05
000296 IDEAL SUPPLY INC.	4704880	04/18/2018	CEMETERY- BACKHOE BATTI	101.69
000296 IDEAL SUPPLY INC.	4714728	04/20/2018	PW- HARD HAT	14.16
000296 IDEAL SUPPLY INC.	4727978	04/25/2018	BALL PARK- COMPRESSION I	3.38
Invoice Count 10 Total				378.48
Cheque 502525 Date 05/23/2018 Amount 40.27				
004610 JAMIE BELL	5-4-2018	05/04/2018	BUILDING- MEALS	40.27
Invoice Count 1 Total				40.27
Cheque 502526 Date 05/23/2018 Amount 10.15				
004533 JANELLA SMITH	5-1-2018	05/01/2018	DAY CARE SUPPLIES	10.15
Invoice Count 1 Total				10.15
Cheque 502527 Date 05/23/2018 Amount 1,388.42				
000321 JOE'S AUTOMOTIVE	41699	04/18/2018	PW- REPAIR 2007 FORD 550	596.64
000321 JOE'S AUTOMOTIVE	41722	04/24/2018	PW- REPAIR 2003 CHEV 3500	322.90
000321 JOE'S AUTOMOTIVE	41751	04/26/2018	PW- REPAIR 2007 SILVERAD	468.88
Invoice Count 3 Total				1,388.42
Cheque 502528 Date 05/23/2018 Amount 135.04				
004507 KELSEY STRONG	5-10-2018	05/10/2018	DAY CARE- OUTDOOR SUPPI	16.39
004507 KELSEY STRONG	5-14-2018	05/14/2018	DAY CARE- CPR TRAINING	118.65
Invoice Count 2 Total				135.04
Cheque 502529 Date 05/23/2018 Amount 478.59				
000352 KITSUPPLY	146648	05/01/2018	DAY CARE- JANITORIAL SUPI	349.83
000352 KITSUPPLY	146764	05/08/2018	ARENA B- JANITORIAL SUPPI	128.76
Invoice Count 2 Total				478.59
Cheque 502530 Date 05/23/2018 Amount 193.89				
003506 LESLIE MOTORS LTD	927731	04/23/2018	BUILDING- SERVICE/CHANGE	193.89
Invoice Count 1 Total				193.89
Cheque 502531 Date 05/23/2018 Amount 3,114.28				
000370 LETCO LIMITED	9302	05/09/2018	PW- WEAR PLATE, ICE BLADI	3,114.28
Invoice Count 1 Total				3,114.28
Cheque 502532 Date 05/23/2018 Amount 339.50				
000372 LIFESAVING SOCIETY	160368	04/25/2018	AQUATICS- FIRST AID/CPR	339.50
Invoice Count 1 Total				339.50
Cheque 502533 Date 05/23/2018 Amount 2,717.65				
003733 LLOYD COLLINS CONSTRUCTION LTD	8249807	05/10/2018	GRAVEL PIT DOZER RENTAL	2,717.65
Invoice Count 1 Total				2,717.65

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 502534 Date 05/23/2018 Amount 161.37				
002258 MARIA WALDEN	5-7-2018	05/07/2018	EARLY ON- MILEAGE/SUPPLI	161.37
			Invoice Count 1 Total	161.37
Cheque 502535 Date 05/23/2018 Amount 85.00				
002373 MERTON MEDIA	S118006	01/31/2018	1/2 PAGE AD- CAMPGROUND	85.00
			Invoice Count 1 Total	85.00
Cheque 502536 Date 05/23/2018 Amount 149.11				
003946 MICAH LODER	5-2-2018	05/02/2018	ME- HALL GLUE FOR BENCH	70.04
003946 MICAH LODER	5-2-2018 B	05/02/2018	HALL B- SAFETY BOOT ALLO'	79.07
			Invoice Count 2 Total	149.11
Cheque 502537 Date 05/23/2018 Amount 80.28				
004748 MICHAEL ROESS	4-25-2018	04/25/2018	FPO- MILEAGE	36.45
004748 MICHAEL ROESS	5-9-2018	05/09/2018	FPO- MILEAGE	43.83
			Invoice Count 2 Total	80.28
Cheque 502538 Date 05/23/2018 Amount 1,795.51				
000421 MICROAGE BASICS	263510	04/02/2018	EARLY ON- TONER, GLUE	375.70
000421 MICROAGE BASICS	263637	04/03/2018	EARLY ON- PAPER, PAGE PR	24.78
000421 MICROAGE BASICS	263641	04/03/2018	EL- SCHOOL GLUE	80.52
000421 MICROAGE BASICS	263890	04/04/2018	EARLY ON- CASE OF PAPER	47.45
000421 MICROAGE BASICS	264365	04/07/2018	POLICE- DVD'S	28.24
000421 MICROAGE BASICS	264483	04/09/2018	AQUATICS- LAMINATE POU	20.54
000421 MICROAGE BASICS	264708	04/10/2018	REC ADMIN- USB DRIVE	38.40
000421 MICROAGE BASICS	264812	04/11/2018	PW- WHITE BOARD, MARKER	37.40
000421 MICROAGE BASICS	264813	04/11/2018	CEMETERY- OFFICE SUPPLIE	39.82
000421 MICROAGE BASICS	264815	04/11/2018	REC ADMIN- PAPER	66.51
000421 MICROAGE BASICS	265036	04/12/2018	EL- OFFICE SUPPLIES	22.44
000421 MICROAGE BASICS	265098	04/12/2018	REC ADMIN- LAMINATE POU	41.09
000421 MICROAGE BASICS	265139	04/13/2018	REC ADMIN- BRISTOL BOAR	28.24
000421 MICROAGE BASICS	265220	04/13/2018	LANDFILL- DEBIT MACHINE R	48.65
000421 MICROAGE BASICS	265261	04/13/2018	DAY CARE- OFFICE SUPPLIE	86.46
000421 MICROAGE BASICS	265409	04/16/2018	DAY CARE- BOOK TAPE, PEN	59.48
000421 MICROAGE BASICS	423702	04/16/2018	EMERGENCY PREPAREDNES	332.72
000421 MICROAGE BASICS	265707	04/17/2018	AQUATICS- OFFICE SUPPLIE	54.86
000421 MICROAGE BASICS	265746	04/18/2018	AQUATICS- OFFICE SUPPLIE	48.60
000421 MICROAGE BASICS	265777	04/18/2018	CEMETERY- BOOKENDS, OR	16.37
000421 MICROAGE BASICS	265919	04/19/2018	EARLY ON- SUPPLIES	125.77
000421 MICROAGE BASICS	266017	04/19/2018	DAY CARE- BATTERIES, DIAR	40.67
000421 MICROAGE BASICS	266210	04/20/2018	PW- SIGNS FOR BRIDGE CLC	16.18
000421 MICROAGE BASICS	424138	04/24/2018	PW- WHITEBOARD	68.33
000421 MICROAGE BASICS	267469	04/30/2018	ADMIN- ELECTION- REPORT	13.55
000421 MICROAGE BASICS	267471	04/30/2018	ADMIN- KEYBOARD	32.74
			Invoice Count 26 Total	1,795.51
Cheque 502539 Date 05/23/2018 Amount 192.10				

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
002608 MILLER THOMSON LLP	3180126	04/30/2018	ADMIN- LEGAL FEES	192.10
		Invoice Count	1 Total	192.10
Cheque 502540	Date 05/23/2018	Amount	1,176.11	
004794 MINTO AG LTD.	WM06826	04/17/2018	LANDFILL- REPAIR COMPACT	365.31
004794 MINTO AG LTD.	WM06954	04/17/2018	LANDFILL- REPAIR COMPACT	810.80
		Invoice Count	2 Total	1,176.11
Cheque 502541	Date 05/23/2018	Amount	319.84	
003216 MINTO TRUCK CENTRE LIMITED	174770	04/13/2018	PW-PARTS FOR SWEEPER	236.69
003216 MINTO TRUCK CENTRE LIMITED	174901	04/26/2018	PW- PARTS FOR 99-04	83.15
		Invoice Count	2 Total	319.84
Cheque 502542	Date 05/23/2018	Amount	11.56	
000629 MORAN MECHANICAL AND ELECTRICAL	102109	04/27/2018	PARKS W- PARTS FOR BALL	11.56
		Invoice Count	1 Total	11.56
Cheque 502543	Date 05/23/2018	Amount	1,312.29	
000123 MUNICIPALITY OF CENTRAL HURON	120549	05/01/2018	PW- AUBURN SNOWPLOWING	1,312.29
		Invoice Count	1 Total	1,312.29
Cheque 502544	Date 05/23/2018	Amount	9,156.11	
000444 MUNICIPALITY OF MORRIS TURNBERRY	6157	05/02/2018	APRIL 2018 BUILDING DEPART	9,156.11
		Invoice Count	1 Total	9,156.11
Cheque 502545	Date 05/23/2018	Amount	279.09	
004578 NOVACK'S UNIFORM SOLUTIONS	207592	05/02/2018	FIRE- UNIFORM SHIRT/STRIP	148.53
004578 NOVACK'S UNIFORM SOLUTIONS	207646	05/03/2018	FIRE- UNIFORM SHIRTS	130.56
		Invoice Count	2 Total	279.09
Cheque 502546	Date 05/23/2018	Amount	322.05	
002966 ONTARIO ASSOC. OF FIRE CHIEFS	56159	05/02/2018	ESTC- INDUSTRY MEMBERSHIP	322.05
		Invoice Count	1 Total	322.05
Cheque 502547	Date 05/23/2018	Amount	151.42	
000498 ORKIN CANADA CORPORATION	IN-8487974	05/04/2018	LANDFILL PEST CONTROL	151.42
		Invoice Count	1 Total	151.42
Cheque 502548	Date 05/23/2018	Amount	371.93	
002282 PAT NEWSON	5-4-2018	05/04/2018	REC ADMIN- MILEAGE/MEALS	371.93
		Invoice Count	1 Total	371.93
Cheque 502549	Date 05/23/2018	Amount	5,122.76	
003284 PPE SOLUTIONS INC	6544	05/01/2018	FIRE- CLEAN/REPAIR BUNKER	2,209.62

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
003284 PPE SOLUTIONS INC	6563	05/09/2018	FIRE- BUNKER SUIT	2,913.14
		Invoice Count	2 Total	5,122.76
Cheque 502550 Date 05/23/2018 Amount 29.51				
000520 PUROLATOR COURIER LTD	437909029	04/27/2018	POLICE- COURIER SERVICE	11.64
000520 PUROLATOR COURIER LTD	437973835	05/04/2018	POLICE- COURIER	17.87
		Invoice Count	2 Total	29.51
Cheque 502551 Date 05/23/2018 Amount 8,959.37				
000542 R.J. BURNSIDE & ASSOCIATES	LNE085780.2018-2	05/11/2018	LANDFILL EW- SERVICES	2,920.96
000542 R.J. BURNSIDE & ASSOCIATES	LNE085790.2018-2	05/11/2018	LANDFILL- WING- SERVICES	6,038.41
		Invoice Count	2 Total	8,959.37
Cheque 502552 Date 05/23/2018 Amount 5,009.89				
004791 REALTERM ENERGY CORP.	785171	05/08/2018	STREETLIGHTS- TOPHAT FIX	5,009.89
		Invoice Count	1 Total	5,009.89
Cheque 502553 Date 05/23/2018 Amount 93.36				
003055 RICHARD AL	5-1-2018	05/01/2018	ADMIN- PHONE/MILEAGE	93.36
		Invoice Count	1 Total	93.36
Cheque 502554 Date 05/23/2018 Amount 803.82				
004569 RICOH	SCO91955638	04/30/2018	REC/ADMIN- COPIER RENTAL	583.27
004569 RICOH	SCO91955639	04/30/2018	POLICE- COPIER RENT/COPII	54.42
004569 RICOH	SCO91955640	04/30/2018	DC-FIREW/ESTC- COPIER RE	166.13
		Invoice Count	3 Total	803.82
Cheque 502555 Date 05/23/2018 Amount 219.78				
000272 RONA HODGINS	132963/1	03/26/2018	FIRE- TRUCK WASH BRUSHE	81.36
000272 RONA HODGINS	133545/1	04/05/2018	PW- SHOP- CHANNEL, SCRE\	27.93
000272 RONA HODGINS	133698/1	04/09/2018	PW- W- PEX ADAPTOR	3.55
000272 RONA HODGINS	133702/1	04/09/2018	PW- W- PEX PIPE, COUPLING	4.41
000272 RONA HODGINS	133756/1	04/09/2018	DAY CARE- BLACK MULCH	15.98
000272 RONA HODGINS	134126/1	04/16/2018	FIRE- HOSE/SPRAY NOZZLE	86.55
		Invoice Count	6 Total	219.78
Cheque 502556 Date 05/23/2018 Amount 805.40				
004330 SEPOY WIRING	11861	04/19/2018	POOL- REPAIR PUMP	586.27
004330 SEPOY WIRING	11863	04/19/2018	COMPLEX- LIGHT BULBS	219.13
		Invoice Count	2 Total	805.40
Cheque 502557 Date 05/23/2018 Amount 133.93				
002155 SMYTH WELDING & MACHINE SHOP	38504	04/27/2018	PW- ELIMINATOR PLATE	133.93
		Invoice Count	1 Total	133.93
Cheque 502558 Date 05/23/2018 Amount 1,740.23				
000602 STANTON HARDWARE	293660	04/03/2018	PW- GARBAGE BAGS, GLOVE	85.85

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000602 STANTON HARDWARE	293664	04/03/2018	COMPLEX- SCREWS, SPONG	20.66
000602 STANTON HARDWARE	293666	04/03/2018	PARKS- FLAGS	108.46
000602 STANTON HARDWARE	293681	04/04/2018	PW- GARDEN HOSE, NOZZLE	106.15
000602 STANTON HARDWARE	293720	04/05/2018	COMPLEX- PAINT, PAINT TAF	80.89
000602 STANTON HARDWARE	293725	04/05/2018	PARKS W- SCREWS, UTILITY	28.68
000602 STANTON HARDWARE	293732	04/05/2018	DAY CARE- STORAGE BOXES	137.06
000602 STANTON HARDWARE	293745	04/06/2018	POOL- WATER REFILL	2.95
000602 STANTON HARDWARE	293748	04/06/2018	PARKS W- CANADA FLAGS	81.34
000602 STANTON HARDWARE	293754	04/06/2018	PW- ABS PIPE/ FITTINGS	27.30
000602 STANTON HARDWARE	293809	04/09/2018	DAY CARE- GARBAGE BAGS	44.06
000602 STANTON HARDWARE	293814	04/09/2018	COMPLEX- PAINT, BRUSHES,	105.51
000602 STANTON HARDWARE	293882	04/11/2018	PARKS W- DOOR STOP, SCR	9.91
000602 STANTON HARDWARE	293892	04/11/2018	COMPLEX- PAINT	94.90
000602 STANTON HARDWARE	293913	04/12/2018	POOL- WATER REFILLS	5.90
000602 STANTON HARDWARE	293927	04/12/2018	COMPLEX- PAINT	142.35
000602 STANTON HARDWARE	293934	04/13/2018	EARLY ON- VELCRO CIRCLE	11.28
000602 STANTON HARDWARE	293940	04/13/2018	PW- GARBAGE BAGS, GAS C	66.65
000602 STANTON HARDWARE	294003	04/17/2018	POLICE- VENT, FAN KIT	39.54
000602 STANTON HARDWARE	294006	04/17/2018	DAY CARE, PROPELAIR PUM	33.89
000602 STANTON HARDWARE	294013	04/17/2018	COMPLEX-PAINT, SCRAPERS	99.38
000602 STANTON HARDWARE	294016	04/17/2018	DAY CARE- LAUNDRY BASKE	11.96
000602 STANTON HARDWARE	294020	04/17/2018	DAY CARE- GARBAGE CAN	42.87
000602 STANTON HARDWARE	294023	04/17/2018	PARKS W- LAG SCREWS, PW	11.18
000602 STANTON HARDWARE	294045	04/18/2018	COMPLEX- DUCT TAPE	11.27
000602 STANTON HARDWARE	294058	04/19/2018	COMPLEX- PAINT	94.90
000602 STANTON HARDWARE	294083	04/20/2018	PARKS- PLUG	8.69
000602 STANTON HARDWARE	294085	04/20/2018	PARKS W- CONNECTOR, BIT	18.75
000602 STANTON HARDWARE	294095	04/20/2018	POOL- WATER REFILLS	5.90
000602 STANTON HARDWARE	294098	04/20/2018	DAY CARE- SCREWS, SHELF	46.78
000602 STANTON HARDWARE	294099	04/20/2018	ARENA W- CAGE BRACKET	11.29
000602 STANTON HARDWARE	291138	04/23/2018	POOL- WATER REFILL	5.90
000602 STANTON HARDWARE	294164	04/24/2018	AIRPORT- LIGHT BULB, PAPE	29.32
000602 STANTON HARDWARE	294171	04/24/2018	PARKS W- BRASS UNION	4.73
000602 STANTON HARDWARE	294181	04/24/2018	PARKS- CLOTHESLINE, CLIP	19.41
000602 STANTON HARDWARE	294192	04/25/2018	EARLY ON- VELCRO CIRCLE	56.39
000602 STANTON HARDWARE	294238	04/27/2018	PW- RUBBER TARP STRAPS	13.53
000602 STANTON HARDWARE	294252	04/27/2018	PARKS W- VALVE	7.90
000602 STANTON HARDWARE	294298	04/30/2018	PARKS W- CABLE TIES	6.75

Invoice Count 39 Total 1,740.23

Cheque 502559 Date 05/23/2018 Amount 260.29

000606 STEFFEN AUTO SUPPLY	240769	04/03/2018	LANDFILL- COMPACTOR PAR	109.75
000606 STEFFEN AUTO SUPPLY	240814	04/03/2018	PW- SHOP- KLEEN START	5.23
000606 STEFFEN AUTO SUPPLY	240890	04/04/2018	PW- HYDRAULIC HOSES	118.79
000606 STEFFEN AUTO SUPPLY	242636	04/27/2018	PW- HYDRAULIC HOSES	26.52

Invoice Count 4 Total 260.29

Cheque 502560 Date 05/23/2018 Amount 232.21

000620 SWAN DUST CONTROL LTD	5184066	05/08/2018	COMPLEX- MATS/MOPS	143.00
000620 SWAN DUST CONTROL LTD	5184079	05/08/2018	POLICE- MATS/MOPS	36.50
000620 SWAN DUST CONTROL LTD	5184080	05/08/2018	TOWN HALL- MATS	29.15

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000620 SWAN DUST CONTROL LTD	5184085	05/08/2018	DAY CARE- MATS	23.56
		Invoice Count	4 Total	232.21
Cheque 502561	Date 05/23/2018	Amount	37.35	
001796 TIM HORTON'S	4-9-2018	04/09/2018	PW- COFFEE, MUFFINS	37.35
		Invoice Count	1 Total	37.35
Cheque 502562	Date 05/23/2018	Amount	90.00	
000161 TREASURER, COUNTY OF HURON	5-7-2018	05/07/2018	DAY CAMP- HIGH 5 TRAINING	90.00
		Invoice Count	1 Total	90.00
Cheque 502563	Date 05/23/2018	Amount	58.64	
003270 TRISHA MCLEAN	5-14-2018	05/14/2018	DAY CARE- SUPPLIES	58.64
		Invoice Count	1 Total	58.64
Cheque 502564	Date 05/23/2018	Amount	189.84	
003532 TRULY NOLEN	36235	05/04/2018	COMPLEX- MAY PEST CONTF	79.10
003532 TRULY NOLEN	34763	05/14/2018	TOWN HALL- PEST CONTROL	110.74
		Invoice Count	2 Total	189.84
Cheque 502565	Date 05/23/2018	Amount	135.59	
001974 TSC STORES L.P.	6671	05/04/2018	PW- DEWALT BATTERIES- 2 F	135.59
		Invoice Count	1 Total	135.59
Cheque 502566	Date 05/23/2018	Amount	66.22	
004451 VANESSA MARKS	5-2-2018	05/02/2018	EL- SUPPIES	66.22
		Invoice Count	1 Total	66.22
Cheque 502567	Date 05/23/2018	Amount	20,741.29	
001735 WASTE MANAGEMENT	0541172-0256-1	05/01/2018	APRIL WASTE/RECYCLING	20,741.29
		Invoice Count	1 Total	20,741.29
Cheque 502568	Date 05/23/2018	Amount	301.07	
000685 WATSON'S HOME HARDWARE	1610	05/09/2018	FIRE B- DRILL, NUTDRIVERS,	286.96
000685 WATSON'S HOME HARDWARE	85502	05/10/2018	FIRE - GAS CAN	14.11
		Invoice Count	2 Total	301.07
Cheque 502569	Date 05/23/2018	Amount	467.00	
002186 WEED MAN	142462	05/09/2018	CENOTAPH- WEED MANAGEI	80.00
002186 WEED MAN	142449	05/10/2018	CRUICKSHANK PK- AERATIC	317.00
002186 WEED MAN	142460	05/10/2018	CENOTAPH- AERATION	70.00
		Invoice Count	3 Total	467.00
Cheque 502570	Date 05/23/2018	Amount	2,761.16	

Accounts Payable

Paid Invoice History By Cheque Report - GENERAL DIRECT DEPOSIT 9801014

Cheque Date 05/09/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
000856 WEILER'S CLEANING & RESTORATION	12309766	04/30/2018	APRIL JANITORIAL SERVICE:	2,761.16
			Invoice Count 1 Total	2,761.16
Cheque 502571	Date 05/23/2018	Amount	22.30	
002081 WINGHAM FOODLAND	725-600	05/08/2018	EARLY ON- SUPPLIES	22.30
			Invoice Count 1 Total	22.30
				<hr/>
Report Total				97,847.17

Accounts Payable

Paid Invoice History By Cheque Report - SEWER PRE-AUTHORIZED PAYMENTS

Cheque Date 05/04/2018 to 12/31/2018

Vendor 000000 to 999999

Vendor Number Name	Invoice Number	Invoice Date	Invoice Description	Invoice Amount
Cheque 900124 Date 05/07/2018 Amount 2,828.33				
000294 HYDRO ONE NETWORKS INC	March 2018-9227	04/16/2018	18600 KWH- 117 NORTH STRI	2,828.33
			Invoice Count 1 Total	2,828.33
Cheque 900125 Date 05/07/2018 Amount 929.64				
000687 WESTARIO POWER INC.	2103861966	04/17/2018	7919 KWH- 120 JOSEPHINE S	929.64
			Invoice Count 1 Total	929.64
Cheque 900126 Date 05/14/2018 Amount 3,840.46				
000294 HYDRO ONE NETWORKS INC	March 2018-1727	04/25/2018	31260 KWH- 60 LLOYD STREE	3,840.46
			Invoice Count 1 Total	3,840.46
Cheque 900127 Date 05/16/2018 Amount 180.36				
000657 TOWNSHIP OF NORTH HURON WATER	4-24-2018-BWWTP	04/24/2018	B SEWAGE TR PT- WATER/SE	180.36
			Invoice Count 1 Total	180.36
Report Total				7,778.79



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Richard Al, Clerk/Manager of IT
DATE: 22/05/2018
SUBJECT: Department Update – May 2018
ATTACHMENTS:

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receive the May 22, 2018 Department Update report of the Clerk/Manager of IT for information purposes.

EXECUTIVE SUMMARY

The Clerk provides periodic updates to Council on the activities of the Clerk's Department.

DISCUSSION

Administration

Election 2018

The Huron County Election Working Group met on May 9, 2018 during which a conference call with PIN letter provider Gilmore Doculink was held. The group discussed options for the layout of PIN letters which will be distributed to each elector later this year.

The Huron County Clerks and Treasurers' Association has scheduled a Candidate Information Session for Wednesday, June 27, 2018 at 7:00pm. The session will be held at the Libro Community Hall, 239 Bill Fleming Drive in Clinton and will cover a wide range of topics related to the municipal election.

Cemetery

Administration and Public Works staff met with local Funeral Directors to discuss cemetery operations and provide an update on cemetery related items. In addition, on May 11, 2018 Administration and Public Works staff attended a cemetery workshop presented by the Bereavement Authority of Ontario and hosted by the Town of Goderich.

Emergency Management

On May 11, 2018 the Emergency Management Program Committee consisting of the CAO, Clerk, Director of Public Works, Fire Chief, and County CEMC, met to review and update the Hazard Identification Risk Assessment (HIRA). A follow up meeting to complete the annual review has been scheduled for June.

Information Technology

Staff Setup

To support the Fire Prevention Officer's requirement to access Huron East items as well as the Fire Chief's requirement to access North Huron files and equipment, changes to systems have been made to enable the necessary access.

FINANCIAL IMPACT

No immediate financial impact.

FUTURE CONSIDERATIONS

No future considerations at this time.

RELATIONSHIP TO STRATEGIC PLAN

Goal #3 – Our community is Health and Safe

Goal #4 – Our administration is fiscally responsible and strives for operational excellence.



Richard AI, Clerk/Manager of IT



Dwayne Evans, CAO



PLANNING & DEVELOPMENT

57 Napier Street, Goderich, Ontario N7A 1W2 CANADA

Phone: 519.524.8394 Ext. 3 Fax: 519.524.5677 Toll Free: 1.888.524.8394 Ext. 3

www.huroncounty.ca

May 8, 2018

Members of Local Council,

You are invited to attend upcoming information sessions on the draft Huron Natural Heritage Plan.

Public information sessions are being held on:

Tuesday, May 29th from 3-8pm, Clinton Public Library (27 Albert Street, Clinton)

Wednesday, June 6th, 3-8pm, Alicia Munro Library (281 Edward Street, Wingham)

Thursday, June 14th, 3-8pm, Exeter Public Library (330 Main Street South, Exeter)

The Huron Natural Heritage Plan summarizes Huron's current approach to natural environment planning and contains recommendations for updates. The mapping in this Plan has been updated to reflect the 2015 aerial photography. Drop-in information sessions provide an opportunity for members of the public to view the updated mapping and provide comments on the draft plan.

The draft plan is also available online by visiting: www.huroncounty.ca/plandev/huron-natural-heritage-plan/

Comments can also be sent to:

Huron County Planning and Development Dept. or planning@huroncounty.ca
57 Napier Street, 2nd Floor
Goderich ON N7A 1W2

Thank you for participating in this public process.

Sincerely,

Denise Van Amersfoort, Senior Planner

April 30, 2018

Ian Taylor
Executive Director
Ontario Minor Hockey Association
25 Brodie Drive, Unit 3
Richmond Hill, ON L4B 3K7

sent via email

-and-

Fran Rider
President / CEO
Ontario Women's Hockey Association
225 Watline Avenue
Mississauga, Ontario L4Z 1P3

sent via email

Re: Hockey Season Re-alignment

Please be advised that at its meeting held the 26th day of April 2018, the Council of the Township of Selwyn passed the following resolution:

Whereas the Township of Selwyn operates two municipal arenas, originally built over 30 years ago, and has a healthy hockey community; and

Whereas the Township of Selwyn conducted a 5 year review of its Recreation Services Master Plan; and indoor recreation facilities (like the arena) register strong levels of importance through online survey responses and community input, generating an importance rating above 70%; and

Whereas the Township of Selwyn's Corporate Strategic Plan identifies the need to participate in provincial lobbying initiatives to enhance services and operational efficiencies including lobbying the Ontario Minor Hockey Association and the Ontario Women's Hockey Association for ice season re-alignment; and

Whereas the unpredictable weather patterns have created warmer temperatures in early fall resulting in astronomical hydro costs for creating and maintaining ice which has resulted in approximately a 20% increase in hydro expenses in the month of September versus January; and

Mailing Address
PO Box 270
Bridgenorth
Ontario K0L 1H0

Whereas municipal staffing resources are limited when making the transition to 'winter' operations while 'summer' operations are still in effect; and

Whereas the current hockey season alignment results in many teams ending their season by January; at a point when weather conditions are more conducive to maintaining ice in a more economical fashion; and

Whereas municipalities are closing arenas throughout the Province of Ontario due to increases in operating costs and the need to repair/replace aging facilities;

Now therefore be it resolved that the Township of Selwyn request that the Ontario Minor Hockey Association and the Ontario Women's Hockey Association consider commencing the competitive hockey season no earlier than October of each year in order to support local arenas in having more efficient, environmentally friendly and economical operations; resulting in the ability to reduce or maintain rental fees for hockey teams which will in turn keep registration costs reasonable and make hockey an accessible sport for Canadian children; and further that a copy of this Resolution be forwarded to MPP Jeff Leal, the Ministry of Tourism, Culture and Sport, the Association of Municipalities of Ontario, all municipalities in Ontario.

Carried.

Should you have any questions regarding the above-noted matter, please do not hesitate to contact the office directly.

Regards,

Tania Goncalves

Tania Goncalves
Deputy Clerk

cc: Ministry of Tourism, Culture and Sport
MPP Jeff Leal
Association of Municipalities of Ontario
All Municipalities in Ontario

RECEIVED

MAY 14 2018

TOWNSHIP OF NORTH HURON

J. R. Brown

Belgrave ON N0G 1E0

May 14, 2018

North Huron Council

P.O. Box 90,
Wingham, ON N0G2W0

Dear Council Members:

You are all well aware of my position with regards to the policing options. In fairness to everyone concerned with the costing, it was at times a confusing process. At no time was there a **clear comparison** of the projected costing estimates in light of any **new information** that came forward before the final vote.

The presentation to council December 04, 2017 by the CAO shows side by side comparison which was easy to understand(see attachment). However, as the process moved forward with different options and scenarios this picture became blurred.


It wasn't until the last public meeting that the revelation to maintain the current force would require additional officers, along with upgrading computer services, more vehicles etc. etc.

Couldn't council revisit the OPP option in light of the new cost estimates? Explain that there is now new information that was not clear at decision time. Even with a revised WPS budget for this year the problem is simply being forwarded to 2019 and beyond. At least with the OPP the cost would have decreased after year three but the WPS budget is now on an upward trajectory and will forever be a burden to the ratepayers.

As for any notion of expansion of WPS to East Wawanosh and Blyth there is still no appetite to give up the OPP. Redirecting the current funding to WPS will simply open the door for future councils to eventually further expand services and possibly equalization of policing costs which as you all know would result in massive tax hikes for North Huron's southern wards a burden we do not want.

I want to make it clear that I respect the work of all police services, Wingham being no exception. My opposition is driven solely by the fact that a municipality the size of Wingham or North Huron simply can no longer afford it, the tax base is just not there.

Sincerely:



John Brown



Wingham Ward Policing

Year	OPP Service	Wingham Service	Savings
2019	\$1,454,753	\$1,165,459	-289,294
One time exit costs	\$450,000		-450,000
2020	\$1,285,363	\$1,170,265	-115,097
2021	\$1,311,070	\$1,195,569	-115,500
2022	\$801,972	\$1,219,480	417,508
2023	\$818,011	\$1,243,870	425,859
2024	\$834,371	\$1,268,747	434,376
2025	\$851,059	\$1,294,122	443,063
2026	\$868,080	\$1,320,004	451,924
2027	\$885,441	\$1,346,404	460,963
2028	\$903,150	\$1,373,333	470,183
TOTAL	\$10,463,270	\$12,597,256	2,133,986
AVERAGE PER YEAR	\$1,046,327	\$1,259,725	213,398



Projected Cost Summary

Years	OPP (\$)	Wingham Ward Police Service (\$)	Wingham, Blyth, East Wawanosh (\$)
2019	1,454,753	1,165,459	1,666,222*
2020	1,285,363**	1,170,265**	1,601,181**
2021	1,311,070**	1,195,569**	1,635,105**
2022	801,972	1,219,480**	1,667,807**
2023	818,011**	1,243,870**	1,701,163**
Total	5,671,169	5,994,644	8,271,477
Average Per Year	1,134,234	1,198,928	1,654,296
One Time Exit Costs	\$450,000		

* Includes one time capital expenses (\$78,300) + building repairs, improvements (\$40,000)

** Includes 2% CPI

May 13, 2018

RECEIVED

MAY 16 2018

TOWNSHIP OF NORTH HURON

North Huron Council:

Re: Police Service in Blyth

I am pleased with the police service provided by the Ontario Provincial Police. I do not feel a review of policing in Blyth is needed. I wish to stay with the service provided by the Ontario Provincial Police to Blyth.

Joan Clark

Lavern Clark

Nancy Roe

DORFEN SIERTSENA

Susan Bromley

Cliff Snell

Shirley Fyfe

Sharon Bromley

Brenda Brooks

Mac Brooks

Gwen Papple

Joan Clark

Lavern Clark

Nancy Roe

Doreen Sierstena

Susan Bromley

Cliff Snell

Sharon Bromley

Brenda Brooks

MAC BROOKS

Gwen Papple

Barbara M Snell

Kathie Ansley

Catherine Howson

Linda Stewart

Ella Ives

Guy Ives

Joann Mac Donald

Barbara Snell

Kathie Ansley

Cath Howson

Linda Stewart

ELLA IVES

GUY IVES

Joann Mac Donald



23 April 2018

Township of North Huron
274 Josephine Street
P.O. Box 90
Wingham, ON
N0G 2W0

By Email:

To: Reeve Neil Vincent
Deputy Reeve James Campbell
Councillor Bill Knott
Councillor Brock Vodden
Councillor Ray Hallahan
Councillor Trevor Seip
Councillor Yolanda Ritsema-Teeninga

Re: Howson Dam, North Maitland River

Dear Reeve Vincent and Councillors:

Ontario Rivers Alliance (ORA) is a Not-for-Profit grassroots organization acting as a voice for several stewardships, associations, citizens and First Nation peoples who have come together to protect, conserve and restore riverine ecosystems.

ORA is writing regarding the future of Howson Dam on the North Maitland River. It has come to our attention that the Township of North Huron (Township) entered into a Class Environmental Assessment (EA) for the Howson Dam in August of 2016 and is currently awaiting the results of the Howson Dam Safety Assessment. We are also aware that the Howson Dam is in a very deteriorated and unsafe condition, so much so that the associated bridge has been closed since 1999, and the concrete is so degraded that it has been breaking away from the dam and bridge. Consequently, the Township has entered into a Class EA to explore its options.

Background:

On 23 – 24 June of 2017, the upstream Gorrie Dam failed and the Howson Dam was at capacity during an extreme rain event and flood when 175 mm of rain fell in just 7 hours, placing more than 150 property owners at risk and resulting in an estimated \$11-million in damages in the Town of Harriston. This severe rain event broke previous records by approximately 40% and was the second highest flow on the North Maitland in the 48 years of record. Fortunately, no one was killed; however, it could have been much worse, as in October of 2015, when a South Carolina flood breached 18 dams, and resulted in 16 deaths.¹

¹ 18 Dams Breached And Death Toll Rises in S.C. Flooding



The Maitland River Watershed has had more than its share of extreme weather over the last seven years, with 2 tornadoes, 3 floods (all in different seasons – February, June and December), 3 ice storms, the driest year in 30 years followed by the wettest year in 40 years. The insured cost of the clean-up from these events exceeded \$140,000,000, and not all losses were covered by insurance.

We also understand that the North Maitland River has had a long history of washing dams out during extreme weather events. Therefore, it is crucial that we acknowledge the hazards of infrastructure that has the potential to fail and put citizens at risk, degrade water quality, threaten our fisheries, or that would jeopardize the ecosystem services that healthy rivers provide.

Drought conditions can place additional stress on riverine ecosystems, while more extreme rainfall will heighten the risk of dam failure with the rapid release of high volumes of water. Increasing intensity of rain and melt events are already challenging manmade infrastructure such as the Gorrie Dam and Howson Dam like never before - and the magnitude of these impacts is only expected to increase. Dams are vulnerable to extreme weather - they deteriorate over time, require costly maintenance and repairs, significantly increase the risk to public safety and are becoming enormous liabilities.



Looking upstream at Howson Dam.

Resilience to a Changing Climate:

Our rapidly changing climate is a compelling reason to remove dams to increase the resiliency of our freshwater systems and the protection and safety of our communities. It is important to mitigate and adapt to the extremes of climate change as Paul Beckwith, who works on climatology in the Department of Geography at the University of Ottawa said, *"We're getting a lot more extreme weather events around the planet, whether that be torrential rains leading to flooding, or really hot and dry temperatures leading to drought. These extreme weather events*



*are much more severe, much more intense, they last longer, they're happening more frequently, and they're happening in areas where they didn't happen before."*²

*"Climate will interact with overexploitation, dams and diversions, habitat destruction, non-native species and pollution to destroy native freshwater fisheries."*³ *"Climate warming will adversely affect water quality and water quantity, as well as the magnitude and timing of river flows, lake levels and water renewal times."*⁴

Drought conditions will also exacerbate warming and can result in toxic blue-green algae, placing upstream and downstream communities at risk. Reservoirs interrupt sediment transport and encourage deposition behind the dam, effectively starving the downstream of its sediment supply. As water impounded by a reservoir is necessarily held longer than water flowing in a stream, modifications to water quality and flow regimes will occur. The period of storage will, to some degree, modify temperature, dissolved gases and suspended solids in the water.

Additionally, any upstream municipal wastewater treatment facilities releasing undertreated and untreated wastewater into the river can result in extreme nutrient enrichment, creating a toxic brew within a reservoir, especially during the hot low flow summer season.



Signage at Howson Dam & Bridge.

Conclusion:

Naturalizing the North Maitland River would meet several goals as set out in the Township of North Huron Strategic Plan – to be fiscally responsible, healthy and safe, and to have a natural environment that is valued and protected. Removing the dam would meet your environmental objectives, reinstate natural processes, allow transport of sediments downstream, remove a barrier to fish passage and boaters, lower water temperatures, improve water quality, improve fish habitat, restore the fishery to a more diverse and natural population, reduce flooding, increase public safety and improve the river's resiliency to climate change.

It would also be the most prudent and fiscally responsible option for the Township, for both the short and long term. The life-cycle costs associated with naturalizing the riverine ecosystem are significantly lower than to rebuild, avoids the substantial costs of the ongoing maintenance, and significantly reduces the Township's short and long-term liability.

² National Observer, 8 May 2017, [Here are the climate science benchmarks of the Quebec floods.](#)

³ Schindler, D.W., 2001. The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new Millennium. *Canadian Journal of Fisheries and Aquatic Sciences*. 58: 18-29.

⁴ Schindler, D.W., 2001. The cumulative effects of climate warming and other human stresses on Canadian freshwaters in the new millennium. *Canadian Journal of Fisheries and Aquatic Sciences*. 58: 18-29.



ORA understands the pressure municipalities are under when communities rally to maintain their beloved mill ponds. However, it is up to all authorities and municipalities to take a leadership role that places public safety and landscape scale ecological integrity above local individual or group interests.

Anything we can do now to reduce that risk and any corresponding liability will be a positive for both local communities and the natural environment. Removing the dam would not only save taxpayer dollars, but it would also improve sediment transport which is vital to a thriving riverine ecosystem.

Lake Huron relies on its tributaries as spawning and feeding grounds for the numerous fish species that move throughout its region, contributing billions of dollars through its commercial and recreational fishery; and Canada and the US have been working collaboratively to find ways to improve water quality in the Great Lakes. Howson Dam is the first dam upstream of Lake Huron; therefore, naturalizing the North Maitland River would remove a barrier to fish passage, significantly benefitting its fishery, and remove an impoundment of water that would greatly improve water quality and natural flow into Lake Huron.

ORA is asking the Township to look beyond the pure aesthetics of the dam and pond feature, to the greater long-term health, vitality and resilience of a revived and healthy fishery and natural environment, both now and far into the future.

We submit, that neither the public good, nor the environment are served in a decision to rebuild and maintain the dam. Decommissioning the Howson Dam and naturalizing the North Maitland River would be a strong action for the Township to take in ensuring the river and adjacent communities are more resilient to climate change and, most importantly, it would demonstrate that protecting the safety of its citizens is its top priority.

ORA respectfully requests that the Township of North Huron's Reeve and Council move to fully decommission the Howson Dam and naturalize the river at your earliest opportunity. This would improve the health and resiliency of the North Maitland River, at the same time reducing public safety risks and liability.

We would be pleased to meet with you to discuss this further in the hopes of finding the best alternatives for the Township, local communities, and the North Maitland River.

Respectfully,

Linda Heron
Chair, Ontario Rivers Alliance
(705) 866-1677

Cc: Jeff Molenhuis, Director of Public Works – Jmolenhuis@NorthHuron.ca
Richard Al, Clerk - RAL@NorthHuron.ca
Phil Beard, General Manager, Maitland Conservation – PBeard@MVCA.on.ca
GSS Engineering Consultants Ltd., Jeff Graham, P. Eng. – JeffGraham@GSSEngineering.ca

May 8, 2018

As Minister of Community Safety and Correctional Services, it is my responsibility to ensure that the framework for the delivery of municipal fire services meets the needs and circumstances of the communities they serve across the province.

Ontario's firefighters – both career and volunteer – are among the best in the world. Our government is committed to the safety of our firefighters and of the communities they serve. An important part of my responsibilities is to work with municipalities to identify and address emerging gaps and challenges related to the delivery of fire protection services.

The ministry established the Fire Safety Technical Table (the Table) in January 2017 to provide recommendations on the enhancement of fire safety in Ontario.

The Table meets on a monthly basis and includes municipal representation (the Association of Municipalities of Ontario and the Town of Aurora), representatives from firefighter associations and representatives from career, composite, and volunteer fire departments.

I want to thank the members of the Table for their dedication and for their work with my ministry on the development of three new fire safety regulations under the *Fire Protection and Prevention Act (FPPA)*. The regulations relate to:

- Certification of firefighters
- Risk assessments to inform the delivery of fire protection services
- Public reporting on fire department response times

These regulations respond to a number of coroner's inquest recommendations, enhance the consistency of fire safety across the province, increase transparency and accountability, and ensure that fire protection services meet the unique needs of communities.

The regulations were posted for comment on the regulatory registry in early 2018, and a great deal of valuable commentary was received. A number of changes have been made to reflect the thoughtful feedback.

I want to thank municipalities for their participation in this process and I am pleased to provide an update on the outcome of the regulatory consultation.

Mandatory Certification

The mandatory certification of firefighters, based on internationally recognized National Fire Protection Association (NFPA) standards, is a key step forward in building safer communities.

I want to emphasize that mandatory certification for four firefighter roles – including basic fire suppression – would only apply to new hires.

As such, the majority of existing suppression firefighters in Ontario – including those that work in volunteer departments – will not need to certify to maintain their jobs in their current positions. To progress to more senior positions in the fire service, certification would be required.

Some fire services in Ontario already train to NFPA standards – and over 80 have already begun certifying their firefighters. Province-wide certification would help ensure firefighters have a consistent level of knowledge and skill to safely provide fire protection services.

We recognize that some municipalities may require more time to comply with the mandatory certification of their firefighters. In response to feedback from the public posting of this regulation, we are delaying the in-force date for several roles to July 1st, 2019 and for others to January 1, 2020 and January 1, 2021.

For firefighters who have made best efforts to complete the certification in 24 months but were not able to do so, we are allowing an additional 12 months for completion, if the extension is approved by the Fire Marshal. This program would allow firefighters to work while completing their training and certification.

The internship program will also be expanded to include in-service fire instructors and fire inspectors for an initial 6-month internship. These participants will also benefit from a potential 6-month extension, if the extension is approved by the Fire Marshal. Firefighters who are certified and deemed-to-be certified (i.e., grandfathered) will have the ability to supervise firefighters in the internship program.

We believe the training and certification process for fire services across the province should be convenient and straightforward – particularly for small and rural municipalities who may face challenges in recruiting new volunteer firefighters.

We also recognize that firefighters will need a straightforward way to access testing services – and we will provide an online testing system that will be available free of charge. Where high-speed internet is not available, paper testing will continue to be available to fire services, also free of charge.

To ensure any challenges small or rural fire services may have adapting to the new requirements are mitigated, we will work with these municipalities to assess their current state of readiness and we will provide funding to cover all additional costs associated with this initiative.

In collaboration with our partners, MCSCS will be setting up an implementation table with a specific focus on small and rural communities to address their unique challenges throughout the implementation process.

Community Risk Assessments

Most communities undertake a risk assessment of some sort to help inform local decisions on the provision of fire protection services.

This regulation requires that all municipalities undertake a standardized risk assessment that will be used to inform the development of municipal fire protection services. A full risk assessment must be conducted every five years, with monitoring and reviewing conducted annually.

Undertaking a risk assessment will ensure that the delivery of fire protection services, including the development of public education and fire prevention programs, are based on consideration of key profiles of the community.

Public Reporting

Fire services across Ontario report their response times to the Office of the Fire Marshal and Emergency Management (OFMEM) using varying definitions. The result is inconsistent data that may be misinterpreted. There is no requirement to share this data with municipal governments or to make the information public. The public reporting regulation will create consistent reporting, and will increase transparency and accountability by providing the public with a clear understanding of what they can expect from the fire department in terms of response times.

This regulation is consistent with the Ontario Government's "open-by-default" approach to data sharing, and it is in line with the public's expectation that key information be available about their fire services.

Conclusion

My most important priority as Minister is the safety and security of every Ontarian. That is why we are requiring firefighters to certify, fire departments to develop risk assessments, and fire department response time data to be publicly reported – it will help to improve community safety across our province.

We will work closely with communities to ensure a smooth transition to the new regulations that will begin to come into force on July 1, 2019.

I want to thank all of our partners who worked with us on these regulations, and the municipal governments who submitted comments to the public registry.

If you have further questions about next steps, please contact mcscsinput@ontario.ca.

Warm regards,

Marie-France Lalonde
Minister

Also attached are:

1. Questions and answers document
2. Compendium with plain language explanation (clause-by-clause explanation)
3. Narrative

Confidentiality Warning: This e-mail contains information intended only for the use of the individual named above. If you have received this e-mail in error, we would appreciate it if you could advise us through the Ministry of Community Safety and Correctional Services' website at http://www.mcscs.jus.gov.on.ca/english/contact_us/contact_us.asp and destroy all copies of this message. Thank you.

If you have any accommodation needs or require communication supports or alternate formats, please let us know.



Office of the Minister

Bureau de la ministre

25 Grosvenor Street
18th Floor
Toronto ON M7A 1Y6
Tel: 416-325-0408
MCSCS.Feedback@ontario.ca

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18^e étage
Toronto ON M7A 1Y6
Tél. : 416-325-0408
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May 8, 2018

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Ontario's firefighters – both career and volunteer – are among the best in the world. Our government is committed to the safety of our firefighters and of the communities they serve. An important part of my responsibilities is to work with municipalities to identify and address emerging gaps and challenges related to the delivery of fire protection services.

The ministry established the Fire Safety Technical Table (the Table) in January 2017 to provide recommendations on the enhancement of fire safety in Ontario.

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.../2

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Some fire services in Ontario already train to NFPA standards – and over 80 have already begun certifying their firefighters. Province-wide certification would help ensure firefighters have a consistent level of knowledge and skill to safely provide fire protection services.

We recognize that some municipalities may require more time to comply with the mandatory certification of their firefighters. In response to feedback from the public posting of this regulation, we are delaying the in-force date for several roles to July 1st, 2019 and for others to January 1, 2020 and January 1, 2021.

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We believe the training and certification process for fire services across the province should be convenient and straightforward – particularly for small and rural municipalities who may face challenges in recruiting new volunteer firefighters.

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.../3

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I want to thank all of our partners who worked with us on these regulations, and the municipal governments who submitted comments to the public registry.

If you have further questions about next steps, please contact mcscsinput@ontario.ca.

Warm regards,



Marie-France Lalonde
Minister

Fire Protection and Prevention Act Regulations

Narrative

Ontario is committed to the safety of both firefighters, and the public. That is why it's critical that the framework for the delivery of fire services across the province meets the needs and circumstances of communities they serve.

Following recommendations from multiple coroner's inquests, the Ministry of Community Safety and Correctional Services (MCSCS) formed a Fire Safety Technical Table (the Table) to provide recommendations on enhancing fire service delivery in Ontario. The Table includes municipal representation from the Association of Municipalities of Ontario (AMO), the Town of Aurora, fire associations and representatives from career, composite and volunteer fire departments from both urban and rural communities.

To date, the work of the Table has been informing the development of regulations related to mandatory certification of firefighters, community risk assessments to inform the delivery of fire protection services, and public reporting of fire department response times.

In regards to mandatory certification, currently, under the Occupational Health and Safety Act, employers must provide information, instruction and supervision to a worker to protect their health or safety. Ontario voluntarily adopted National Fire Protection Association (NFPA) standards in 2013/14, although certification is not yet mandatory. NFPA uses codes and standards that are considered best practice, evidence based and are used throughout North America.

More than 80 fire departments (a mix of urban/rural, large/small, professional/composite and volunteer) are already voluntarily certifying to the NFPA standards and many are training to the NFPA standards, but not yet certifying.

Under the new regulation, certification for four firefighter roles – including basic fire suppression – would only apply to new hires. As such, the majority of existing suppression firefighters in Ontario will not need to certify to maintain their jobs in their current positions. Those seeking to advance to a higher rank (e.g., Fire Officer) would be required to certify.

Firefighters who need to be certified will be able to work under the supervision of another certified firefighter, via an internship program, while they complete their training. They will have up to two years (with the potential of a one-year extension, with the approval of the Fire Marshal) to complete their certification.

Firefighters not certified before being hired by a fire department would need to be enrolled in the two year internship program. Firefighters seeking to certify to NFPA 1001 Levels 1 and 2 (exterior and interior attack), would be required to train approximately 3 hours a week to achieve certification if the firefighter is enrolled in the two year internship program.

Those who have previously trained to the former Ontario standards may be eligible to have their previous knowledge or experience qualify them for alternative compliance to certification

(i.e., grandfathering). In these instances, fire chiefs would need to attest that training has been received by the firefighter and provide documentation, upon request.

The earliest that any part of the regulation comes into force is July 2019, with other parts coming in force in 2020 and 2021.

The government of Ontario will work closely with the Table and municipalities, especially those who represent small, northern and rural areas, to identify specific challenges and seek their input in developing an implementation model that would best address their needs in order to ensure successful implementation.

Clause-by-Clause Explanation

Mandatory Certification Regulation under the *Fire Protection and Prevention Act, 1997*

Regulation Section Affected	Provision	Description
Definitions		
1.	Definition 1. In this Regulation, “NFPA” means the National Fire Protection Association.	In the regulation, “NFPA” means the National Fire Protection Association.
Mandatory Certification		
2.(1)	Mandatory certification 2. (1) Every municipality, and every fire department in a territory without municipal organization, must ensure that its firefighters perform a fire protection service set out in Table 1 only if, (a) the firefighter performing the fire protection service is certified to the corresponding certification standard set out in that Table; or (b) this Regulation provides that the certification standard referred to in clause (a) does not apply with respect to the firefighter.	A municipality is responsible for ensuring its firefighters that perform fire protection services are certified except where a firefighter is grandfathered or is enrolled in an internship program. In an area where there is no local government, the fire department is responsible for

Regulation Section Affected	Provision	Description
		ensuring its firefighters that perform fire protection services are certified except where a firefighter is grandfathered or is enrolled in an internship program.
2.(2)	Who provides certifications (2) The certification must be provided by the Fire Marshal.	The Office of the Fire Marshal and Emergency Management (OFMEM) is responsible for knowledge and skills testing and issuing certificates to firefighters.
Intern firefighters		
3.(1)	Intern firefighters 3. (1) A certification standard does not apply with respect to a firefighter who, <ul style="list-style-type: none"> (a) is enrolled in an internship program approved by the Fire Marshal; and (b) is operating under the supervision of a firefighter certified to that standard; and (c) has, <ul style="list-style-type: none"> (i) been a firefighter for no more than 24 months, or 	If a firefighter is performing a role in the internship program under the supervision of a certified firefighter and has not been a firefighter for more than two years, the intern firefighter does not have to be certified. The intern firefighter must be supervised by another firefighter who is certified to the appropriate NFPA standard. (e.g., if an intern is training to become a Public Educator, their supervisor must be

Regulation Section Affected	Provision	Description
	(ii) been in the internship program for no more than six months, if the internship program is to train to be a fire instructor or to train to be a fire inspector.	<p>certified as a Public Educator [NFPA 1035]).</p> <p>An intern firefighter can also be an existing firefighter who is training to become a Fire Instructor or Fire Inspector. These individuals have six months to become certified.</p>
3.(2)	<p>Extension of time</p> <p>(2) If a firefighter did their best to fulfil the requirements of the internship program but did not fulfil the requirements, the Fire Marshal must grant them an extension of a further,</p> <p>(a) 12 months; or</p> <p>(b) 6 months, if the internship program is to train to be a fire instructor or to train to be a fire inspector.</p>	<p>OFMEM will grant an extension of 12 months to an intern firefighter if they have made their best efforts to achieve certification within the two year internship period but were unable to do so.</p> <p>OFMEM will grant an extension of six months to an intern firefighter who has made their best efforts to achieve certification to become a Fire Instructor or Fire Inspector within the six month internship period but were unable to do so.</p>

Regulation Section Affected	Provision	Description
Transition		
4.(1)	<p>Transition</p> <p>4. (1) A certification standard set out in item 1, 2, 3, or 4 of Table 1 does not apply with respect to a firefighter who,</p> <ul style="list-style-type: none"> (a) became a firefighter before July 1, 2019; and (b) performed the fire protection service that the standard corresponds to before July 1, 2019 	<p>This section states that mandatory certification for Public Educators, Suppression Firefighters (interior and exterior) and Pump Operators will be implemented on a go-forward basis for newly hired firefighters.</p> <p>Firefighters in the roles of Public Educator, Suppression Firefighter (both interior and exterior attack) and Pump Operators hired after July 1, 2019 will have to be certified. Existing firefighters hired before July 1, 2019 in these roles <u>do not</u> have to be certified.</p>
4.(2)	<p>Same, technical rescue</p> <p>(2) The certification standard set out in item 5.1 of Table 1 does not apply with respect to a firefighter who,</p> <ul style="list-style-type: none"> (a) became a firefighter before January 1, 2021; and 	<p>Firefighters in the role of a Technical Rescuer hired after January 1, 2021 will have to be certified.</p> <p>Existing firefighters hired before January 1, 2021 in the</p>

Regulation Section Affected	Provision	Description
	(b) performed the fire protection service that the standard corresponds to before January 1, 2021.	role of Technical Rescuer <u>do not</u> have to be certified.
4.(3)	Letter of compliance (3) A certification standard set out in item 1, 2 or 3 of Table 1 does not apply with respect to a firefighter that both of the following criteria apply to: <ol style="list-style-type: none"> 1. The firefighter became a firefighter before July 1, 2019. 2. The firefighter's fire chief was given permission by the Fire Marshal to issue the firefighter a Letter of Compliance with NFPA Standards respecting the relevant standard under Fire Marshal's Communiqué 2014-04, "Transition to NFPA Professional Qualifications Standards: Grandfathering Policy", which is dated January 2014 and available on a website of the Government of Ontario. 	This section speaks to firefighters that have been grandfathered. Firefighters in the roles of Public Educator and Suppression Firefighter (both interior and exterior attack) <u>do not</u> have to be certified if they were hired before July 1, 2019 and have been grandfathered to the appropriate NFPA standard.
4.(4)	Earlier version of standard (4) A certification standard does not apply with respect to a firefighter who, prior to July 1, 2019, was certified to an earlier version of that standard.	Firefighters who, before July 1, 2019 are certified to an earlier version of an NFPA standard <u>do not</u> need to re-certify to the newer editions of the standard.
4.(5)	Deemed certification for the purpose of supervising interns (5) If subsection (3) or (4) provides that a certification standard does not apply with respect to a firefighter, that firefighter is deemed to be certified to that standard for the purpose of clause 3 (1) (b).	A firefighter who has been grandfathered or holds certification to an earlier version of the appropriate NFPA standard may supervise intern firefighters.

Regulation Section Affected	Provision		Description																		
Amendments																					
5.(1)	Amendments (1) Subsection 4 (3) of this Regulation is amended by striking out “item 1, 2 or 3” in the portion before paragraph 1 and substituting “item 1, 1.3, 2, 3, 5 or 6”.		As of January 1, 2020, Fire Inspectors, Fire Officers and Fire Instructors will need to be certified unless they were hired before July 1, 2019 and received grandfathering to appropriate NFPA standard.																		
5.(2)	(2) Table 1 to this Regulation is amended by adding the following items: <table><tr><td>1.1</td><td>Dispatch fire department resources (personnel and equipment)</td><td>NFPA 1061, “Professional Qualifications for Public Safety Telecommunications Personnel”, 2014 Edition, Level I</td></tr><tr><td>1.2</td><td>Fire investigation activities</td><td>NFPA 1033, “Standard for Professional Qualifications for Fire Investigator”, 2014 Edition</td></tr><tr><td>1.3</td><td>Fire prevention inspections or plans examination activities</td><td>NFPA 1031, “Standard for Professional Qualifications for Fire Inspector and Plan Examiner”, 2014 Edition, Level I</td></tr><tr><td>3.1</td><td>Hazardous materials response at the Technician Level</td><td>NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition</td></tr><tr><td>5.</td><td>Supervise other firefighters</td><td>NFPA 1021, “Standard for Fire Officer Professional Qualifications”, 2014 Edition, Level I</td></tr><tr><td>6.</td><td>Training courses for fire protection services</td><td>NFPA 1041, “Standard for Fire Service Instructor Professional Qualifications”, 2012 Edition, Level I</td></tr></table>		1.1	Dispatch fire department resources (personnel and equipment)	NFPA 1061, “Professional Qualifications for Public Safety Telecommunications Personnel”, 2014 Edition, Level I	1.2	Fire investigation activities	NFPA 1033, “Standard for Professional Qualifications for Fire Investigator”, 2014 Edition	1.3	Fire prevention inspections or plans examination activities	NFPA 1031, “Standard for Professional Qualifications for Fire Inspector and Plan Examiner”, 2014 Edition, Level I	3.1	Hazardous materials response at the Technician Level	NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition	5.	Supervise other firefighters	NFPA 1021, “Standard for Fire Officer Professional Qualifications”, 2014 Edition, Level I	6.	Training courses for fire protection services	NFPA 1041, “Standard for Fire Service Instructor Professional Qualifications”, 2012 Edition, Level I	As of January 1, 2020, Table 1, which outlines the roles that require certification, will be amended to include Fire Dispatchers, Fire Investigators, Fire Inspectors, Hazardous Materials Personnel (Technician), Fire Officers, and Fire Instructors.
1.1	Dispatch fire department resources (personnel and equipment)	NFPA 1061, “Professional Qualifications for Public Safety Telecommunications Personnel”, 2014 Edition, Level I																			
1.2	Fire investigation activities	NFPA 1033, “Standard for Professional Qualifications for Fire Investigator”, 2014 Edition																			
1.3	Fire prevention inspections or plans examination activities	NFPA 1031, “Standard for Professional Qualifications for Fire Inspector and Plan Examiner”, 2014 Edition, Level I																			
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6.	Training courses for fire protection services	NFPA 1041, “Standard for Fire Service Instructor Professional Qualifications”, 2012 Edition, Level I																			
5.(3)	(3) Table 1 to this Regulation is amended by adding the following item: <table><tr><td>5.1</td><td>Technical rescue activities, but only the following technical rescue activities: 1. Confined space rescue 2. Ice rescue 3. Rope rescue 4. Surface water rescue 5. Swift water rescue</td><td>NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2017 Edition</td></tr></table>		5.1	Technical rescue activities, but only the following technical rescue activities: 1. Confined space rescue 2. Ice rescue 3. Rope rescue 4. Surface water rescue 5. Swift water rescue	NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2017 Edition	On January 1, 2021, Table 1, which outlines the roles that require certification, will be amended to include Technical Rescuers who perform these seven specific rescue activities need to be certified.															
5.1	Technical rescue activities, but only the following technical rescue activities: 1. Confined space rescue 2. Ice rescue 3. Rope rescue 4. Surface water rescue 5. Swift water rescue	NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2017 Edition																			

Regulation Section Affected	Provision		Description				
	<table><tr><td>6. Trench rescue</td><td></td></tr><tr><td>7. Vehicle rescue</td><td></td></tr></table>	6. Trench rescue		7. Vehicle rescue			
6. Trench rescue							
7. Vehicle rescue							
Commencement							
6. (1)	Commencement 6. (1) Subject to subsections (2) and (3), this Regulation comes into force on July 1, 2019.		<p>On July 1, 2019, Sections 1 to 4 and Table 1 of the regulation come into force.</p> <p>On July 1, 2019, newly hired firefighters in the roles of Public Educator, Suppression Firefighter (interior and exterior attack) and Pump Operator will need to be certified.</p>				
6. (2)	(2) Subsections 5 (1) and (2) come into force on January 1, 2020.		<p>On January 1, 2020 subsection 5(1) and Table 1 are amended with respect to adding the firefighter roles that are eligible for grandfathering and require certification: Fire Inspector, Fire Officer and Fire Instructor.</p> <p>On January 1, 2020 existing firefighters in the roles of Fire Dispatchers, Fire Investigators and Hazardous Materials Personnel (Technician) will need to be certified.</p>				

Regulation Section Affected	Provision	Description
		Grandfathered Fire Inspectors, Fire Officers and Fire Instructors will not need to be certified.
6. (3)	(3) Subsections 4 (2) and 5 (3) come into force on January 1, 2021.	On January 1, 2021, subsection 4 (2) and Table 1 are amended so that Technical Rescuers performing seven specific rescue activities will need to be certified, unless they performed these specific rescue activities before January 1, 2021.

Clause-by-Clause Explanation

Public Reports Regulation under the *Fire Protection and Prevention Act, 1997*

Regulation Section Affected	Provision	Description
Definitions		
1.	Definition 1. In this Regulation, “PSAP” is short for public safety answering point, which means a call centre responsible for answering calls to 9-1-1 for police, firefighting and ambulance services.	In the regulation, “PSAP” is short for public safety answering point, which means a call centre responsible for answering calls to 9-1-1 for police, firefighting and ambulance services.
Preparation of public reports		
2.(1)	Preparation of public reports Fire Marshal sends fire department the information 2. (1) The Fire Marshal must give every fire department the information required by Schedule 1, based on the information the Fire Marshal has received through reports under subsection 11 (2) of the Act.	Fire departments must time stamp information through the Standard Incident Reporting system to the Office of the Fire Marshal and Emergency Management (OFMEM). OFMEM will then provide calculated response times to fire departments.
2.(2)	Fire department prepares the public report (2) Every fire department must prepare a public report setting out,	Using the calculated response time data from OFMEM, fire departments will prepare a public report.

Regulation Section Affected	Provision	Description
	(a) the information required by Schedule 1; and (b) any other information the fire department chooses to include.	This report will include all response times set out in Schedule 1. Fire departments may include any other information, including explanatory language that will help the public understand the factors that may have impacted the department's response times.
2.(3)	Fire department may use Fire Marshal's data (3) The fire department may use the information required by Schedule 1 that the Fire Marshal provided to prepare their public report, or may carry out their own calculations respecting the same time period.	A fire department may choose to calculate their own response time data in their public report instead of relying on OFMEM to conduct and provide calculations.
Dissemination of public reports		
3.(1)	Dissemination of public reports From fire department to Fire Marshal 3. (1) Every fire department must give their public report to the Fire Marshal no later than 180 days after the Fire Marshal gives the fire department the information.	After the fire department receives their calculated response time data from OFMEM or does their own calculations, the fire department will have six months to provide their public report to the OFMEM.
3.(2)	From fire department to municipality (2) Every fire department that is authorized to provide fire protection services by a municipality must give their public report to the municipal council before giving its public report to the Fire Marshal.	Before a fire department submits their public report to OFMEM, they must submit the report to their municipal council.
3.(3)	From fire department to group of municipalities (3) Every fire department that is authorized to provide fire protection services by a group of municipalities must	If a fire department provides services to more than one municipality (e.g., through an automatic or mutual aid agreement),

Regulation Section Affected	Provision	Description
	give their public report to the municipal council of each municipality in the group of municipalities before giving their public report to the Fire Marshal.	the fire department must submit the public report to each municipal council for which they provide services.
3.(4)	Fire Marshal makes public (4) The Fire Marshal may make the public report available to the public.	OFMEM may make the public report available to the public (e.g., on its website)
Clarification		
4.	Clarification 4. For greater certainty, this Regulation does not imply that firefighters have authority to perform acts that the <i>Regulated Health Professions Act, 1991</i> does not permit them to perform.	The Regulated Health Professions Act (RHPA) provides authority for firefighters to perform “controlled acts” in response to medical emergencies in specific instances. The purpose of this provision is to clarify that the regulation does not authorize firefighters to provide any medical services that would not be permitted under the RHPA.
Commencement		
5.	Commencement 5. This Regulation comes into force on the later of January 1, 2020 and the day it is filed.	The regulation comes into force on January 1, 2020.

Regulation Section Affected	Provision				Description
SCHEDULE 1 REQUIRED INFORMATION CAREER FIREFIGHTERS					
1. (1)	<p>1. (1) The public report must set out the following information respecting incidents in which the first fire department unit that arrives on the scene does not include a volunteer firefighter:</p> <p>1. For each standard set out in the following Table,</p> <p style="margin-left: 40px;">i. the percentage value of how often the fire department achieves that standard for the corresponding time interval, and</p> <p style="margin-left: 40px;">ii. the corresponding benchmark percentage value for how often the fire department should achieve or exceed that standard.</p> <p>2. For each time interval set out in the following Table that does not have a corresponding standard, the time interval value that the fire department achieves or exceeds 90% of the time.</p>				<p>In instances, where the first fire truck on scene only includes career firefighters, the fire department must include response time benchmark data as outlined in Schedule 1 (e.g., turnout time of 80 seconds for fire and special operations) and the percentage of time the fire department achieved the benchmark (e.g., turnout time benchmark of 90%).</p> <p>Where a response time does not have a benchmark, the first fire truck that only includes career firefighters will report the response time that they met or exceeded 90% of the time.</p>
Table	Item	Column 1 Time interval	Column 2 Standard	Column 3 Benchmark	Definitions of each item are as follows: 1. Alarm transfer time: The time the call the PSAP is in receipt of the alarm from the time that the alarm is first
	1.	Alarm transfer time: The time interval from the receipt of the emergency alarm at the PSAP until the alarm is first received at the fire department communication centre	30 seconds	95%	

Regulation Section Affected	Provision				Description
	2.	Alarm answering time: The time interval that begins when the alarm is received at the fire department communication centre and ends when the alarm is acknowledged at the communication centre	15 seconds	95%	<p>received at the communication or dispatch centre</p> <p>2. Alarm answering time: The time the call is received at the communication or dispatch centre from the time the alarm is acknowledged by the communication or dispatch centre</p> <p>3. Alarm processing time: The time the call is initially received by the communication or dispatch centre from the first time facilities/units are notified of the emergency by the communication or dispatch centre</p> <p>4. Alarm handling time: The time the alarm is received at the PSAP from the beginning time that emergency facilities/unit(s) have information transmitted to them</p> <p>5. Turnout time: The time the call is received by the facilities/unit from the time that the unit leaves the station</p> <p>6. Travel time: The time the unit(s) leaves the station from the time that the first unit arrives on scene</p> <p>7. Initiating action/intervention time: The time between when the fire department first arrives on the scene and when they begin to respond to the emergency</p>
	3.	Alarm processing time: The time interval from when the alarm is acknowledged at the fire department communication centre until response information begins to be transmitted via voice or electronic means to fire department facilities and fire department units	<p>64 seconds for calls other than the following calls; and</p> <p>90 seconds for the following calls:</p> <ol style="list-style-type: none"> 1. Calls requiring emergency medical dispatch questioning and pre-arrival medical instructions 2. Calls requiring language translation 3. Calls requiring the use of a TTY/TDD device or audio/video relay services 4. Calls of criminal activity that require information vital to emergency responder safety prior to dispatching units 5. Hazardous material incidents 6. Technical rescue 7. Calls that require determining the 	90%	

Regulation Section Affected	Provision				Description
			location of the alarm due to insufficient information 8. Calls received by text message		8. Total response time: The time the call is initially received by the PSAP from the time the first unit arrives on scene
	4.	Alarm handling time: The time interval from the receipt of the alarm at the PSAP until the beginning of the transmittal of the response information via voice or electronic means to fire department facilities or the fire department units in the field	No standard; set out the time interval value that the fire department achieves or exceeds 90% of the time	No benchmark	
	5.	Turnout time: The time interval that begins when the fire department facilities and fire department units notification process begins by either an audible alarm or visual annunciation or both and ends at the beginning point of travel time	80 seconds for fire and special operations; 60 seconds for emergency medical services	90%	
	6.	Travel time: The time interval that begins when a fire department unit is en route to the incident and ends when the fire department unit arrives at the scene	240 seconds for fire suppression; 240 seconds for the arrival of a unit with a first responder with an automatic external defibrillator or higher level capability no standard for other services	90%	
	7.	Initiating action/intervention time: The time interval from when a fire department unit arrives on the scene to the initiation of emergency mitigation	No standard; set out the time interval value that the fire department achieves or exceeds 90% of the time	No benchmark	
	8.	Total response time: The time interval from the receipt of the alarm at the PSAP to when the first	No standard; set out the time interval value that the fire	No benchmark	

Regulation Section Affected	Provision				Description
		fire department unit is initiating action or intervening to control the incident	department achieves or exceeds 90% of the time		
1. (2)	(2) The public report does not have to set out information for items 1, 2, 3, 4 and 8 if the information is not available from the fire department's records.				If a fire department does not have information for alarm transfer time, alarm answering time, alarm processing time, alarm handling time, or total response time, then this information does not need to be included in the public report.
SCHEDULE 1 REQUIRED INFORMATION VOLUNTEER FIREFIGHTERS					
2. (1)	2. (1) The public report must set out the following information respecting incidents in which the first fire department unit that arrives on the scene includes at least one volunteer firefighter: 1. For each time interval set out in the following Table, the time interval value that the fire department achieves or exceeds 90% of the time.				In instances, where the first fire truck on scene has at least one volunteer firefighter, the fire department will include the response time that they met or exceeded 90% of the time in their public report.
Table	Item	Column 1 Time interval			Definitions of each item are as follows: 1. Alarm transfer time: The time the call the PSAP is in receipt of the alarm from the time that the alarm is first received at the communication or dispatch centre
	1.	Alarm transfer time: The time interval from the receipt of the emergency alarm at the PSAP until the alarm is first received at the fire department communication centre			
	2.	Alarm answering time: The time interval that begins when the alarm is received at the fire department communication centre and ends when the alarm is acknowledged at the communication centre			
	3.	Alarm processing time: The time interval from when the alarm is acknowledged at the fire department communication centre until response information begins to be transmitted via voice or electronic			

Regulation Section Affected	Provision		Description
		means to fire department facilities and fire department units	<p>2. Alarm answering time: The time the call is received at the communication or dispatch centre from the time the alarm is acknowledged by the communication or dispatch centre</p> <p>3. Alarm processing time: The time the call is initially received by the communication or dispatch centre from the first time facilities/units are notified of the emergency by the communication or dispatch centre</p> <p>4. Alarm handling time: The time the alarm is received at the PSAP from the beginning time that emergency facilities/unit(s) have information transmitted to them</p> <p>5. Turnout time: The time the call is received by the facilities/unit from the time that the unit leaves the station</p> <p>6. Travel time: The time the unit(s) leaves the station from the time that the first unit arrives on scene</p> <p>7. Initiating action/intervention time: The time between when the fire department first arrives on the scene and when they begin to respond to the emergency</p>
	4.	Alarm handling time: The time interval from the receipt of the alarm at the PSAP until the beginning of the transmittal of the response information via voice or electronic means to fire department facilities or the fire department units in the field	
	5.	Turnout time: The time interval that begins when the fire department facilities and fire department units notification process begins by either an audible alarm or visual annunciation or both and ends at the beginning point of travel time	
	6.	Travel time: The time interval that begins when a fire department unit is en route to the incident and ends when the fire department unit arrives at the scene	
	7.	Initiating action/intervention time: The time interval from when a fire department unit arrives on the scene to the initiation of emergency mitigation	
	8.	Total response time: The time interval from the receipt of the alarm at the PSAP to when the first fire department unit is initiating action or intervening to control the incident	

Regulation Section Affected	Provision	Description
		8. Total response time: The time the call is initially received by the PSAP from the time the first unit arrives on scene
2. (2)	(2) The public report does not have to set out information for items 1, 2, 3, 4 and 8 if the information is not available from the fire department's records.	If a fire department does not have information for alarm transfer time, alarm answering time, alarm processing time, alarm handling time, or total response time then this information does not need to be included in the public report.

Clause-by-Clause Explanation

Community Risk Assessments Regulation under the *Fire Protection and Prevention Act, 1997*

Regulation Section Affected	Provision	Description
Mandatory Use		
1.	<p>Mandatory use</p> <p>1. Every municipality, and every fire department in a territory without municipal organization, must,</p> <p style="padding-left: 40px;">(a) complete and review a community risk assessment as provided by this Regulation; and</p> <p style="padding-left: 40px;">(b) use its community risk assessment to inform decisions about the provision of fire protection services.</p>	<p>A municipality is responsible for completing a community risk assessment and using the completed assessment to make evidence-based decisions on the provision of fire protection services in their community.</p> <p>In an area where there is no local government, the fire department is responsible for completing a community risk assessment and using the completed assessment to make evidence-based decisions on the provision of fire protection services in their community.</p>

Regulation Section Affected	Provision	Description
What it is		
2. (1)	What it is 2. (1) A community risk assessment is a process of identifying, analyzing, evaluating and prioritizing risks to public safety to inform decisions about the provision of fire protection services.	An explanation of what is a community risk assessment in the regulation.
Mandatory profiles		
2. (2)	Mandatory profiles (2) A community risk assessment must include consideration of the mandatory profiles listed in Schedule 1.	Schedule 1 lists all of the factors within a community that a municipality must consider when identifying and categorizing risks.
Form		
2. (3)	Form (3) A community risk assessment must be in the form, if any, that the Fire Marshal provides or approves.	If OFMEM provides a community risk assessment template a municipality or fire department in an area where there is no local government must use the template provided. A municipality or fire department in an area where there is no local government that uses another risk assessment process can be approved by OFMEM provided the mandatory profiles outlined in Schedule 1 are included.
When to complete (at least every five years)		
3. (1)	When to complete (at least every five years) 3. (1) The municipality or fire department must complete a community risk assessment no later than five years after the day its previous community risk assessment was completed.	Municipalities or fire departments in areas with where there is no local government must complete a risk assessment every five years.

Regulation Section Affected	Provision	Description
New municipality or fire department		
3. (2)	New municipality or fire department (2) If a municipality, or a fire department in a territory without municipal organization, comes into existence, the municipality or fire department must complete a community risk assessment no later than two years after the day it comes into existence	If a new municipality or fire department in an area where there is no local government is created after the regulation comes into force, they must complete their first community risk assessment within two years.
Transition		
3. (3)	Transition (3) A municipality that exists on July 1, 2019, or a fire department in a territory without municipal organization that exists on July 1, 2019, must complete a community risk assessment no later than July 1, 2024.	A municipality or fire department in an area where there is no local government has five years to complete its community risk assessment when the regulation comes into force on July 1, 2019. As a result, the first community risk assessment will not need to be in place until July 1, 2024.
Revocation		
3. (4)	Revocation (4) Subsection (3) and this subsection are revoked on July 1, 2025	The 'transition' item in the regulation will be removed on July 1, 2025, as municipalities or fire departments in areas where there is no local government will have completed a risk assessment.
When to review (at least every year)		
4. (1)	When to review (at least every year)	Risk assessments must be reviewed annually within the five year period.

Regulation Section Affected	Provision	Description
	<p>4. (1) The municipality or fire department must complete a review of its community risk assessment no later than 12 months after,</p> <p>(a) the day its community risk assessment was completed; and</p> <p>(b) the day its previous review was completed.</p>	
Other reviews		
4. (2)	<p>Other reviews</p> <p>(2) The municipality or fire department must also review its community risk assessment whenever necessary.</p>	Risk assessments must be reviewed whenever necessary.
Revisions		
4. (3)	<p>Revisions</p> <p>(3) The municipality or fire department must revise its community risk assessment if it is necessary to reflect,</p> <p>(a) any significant changes in the mandatory profiles;</p> <p>(b) any other significant matters arising from the review.</p>	Municipalities and or fire departments in an area where there is no local government must revise its risk assessment if there are any significant changes to the mandatory profiles or another significant change in the community
New assessment instead of review		
4. (4)	<p>New assessment instead of review</p> <p>(4) The municipality or fire department does not have to review its community risk assessment if it expects to complete a new community risk assessment on or before the day it would complete the review.</p>	If a municipality or fire department plans to complete a new risk assessment before the five years is up, then an annual review is not required.
Commencement		
5.	<p>Commencement</p> <p>5. This Regulation comes into force on the later of July 1, 2019 and the day it is filed.</p>	The regulation comes into force July 1, 2019.

Regulation Section Affected	Provision	Description
SCHEDULE 1 MANDATORY PROFILES		
Schedule 1	1. Geographic profile: The physical features of the community, including the nature and placement of features such as highways, waterways, railways, canyons, bridges, landforms and wildland-urban interfaces.	Physical features of the community may present inherent risks or potentially have an impact on fire department access or response time.
Schedule 1	2. Building stock profile: The types of buildings in the community, the uses of the buildings in the community, the number of buildings of each type, the number of buildings of each use and any building-related risks known to the fire department.	Potential fire risks associated with different types or uses of buildings given their prevalence in the community and the presence or absence of fire safety systems and equipment at time of construction.
Schedule 1	3. Critical infrastructure profile: The capabilities and limitations of critical infrastructure, including electricity distribution, water distribution, telecommunications, hospitals and airports.	Presence/availability and capacity of infrastructure elements that could have a significant impact on such things as dispatch, communications, suppression operations, overall health care or transportation for the community if compromised, or that may present unique fire risks by virtue of their size or design.
Schedule 1	4. Demographic profile: The composition of the community's population, respecting matters relevant to the community, such as population size and dispersion, age, gender, cultural background, level of education, socioeconomic make-up, and transient population.	Characteristics of the population in the community in order to tailor delivery of fire protection services including public education and fire prevention programs.
Schedule 1	5. Hazard profile: The hazards in the community, including natural hazards, hazards caused by humans, and technological hazards.	Hazards, to which fire departments may be expected to respond, that may have a significant impact on the

Regulation Section Affected	Provision	Description
		community. Examples of natural hazards would include floods, forest fires or earthquakes; human caused hazards would include such things as chemical or biological attacks, or other terrorist activity; and technological hazards would include such things as industrial pollution, nuclear or hazardous materials incidents.
Schedule 1	6. Public safety response profile: The types of incidents responded to by other entities in the community, and those entities' response capabilities.	Other public safety response agencies (such as police/ambulance/rescue) that might be tasked to or able to assist in the some capacity to the response to emergencies or in mitigating the impact of emergencies to which the fire department responds.
Schedule 1	7. Community services profile: The types of services provided by other entities in the community, and those entities' service capabilities.	Presence or absence and potential abilities of other agencies, organizations, or associations to provide services that may assist in mitigating the impact of emergencies to which the fire department responds.
Schedule 1	8. Economic profile: The economic sectors affecting the community that are critical to its financial sustainability.	Economic drivers in the community that have significant influence on the ability of the community to provide or maintain service levels.

Regulation Section Affected	Provision	Description
Schedule 1	<p>9. Past loss and event history profile: The community's past emergency response experience, including the following analysis:</p> <ol style="list-style-type: none"> 1. The number and types of emergency responses, injuries, deaths and dollar losses. 2. Comparison of the community's fire loss statistics with provincial fire loss statistics. <p>Note: Each profile is to be interpreted as extending only to matters relevant to fire protection services.</p>	<p>Evaluation of previous response data to identify circumstances and behaviours that will inform decisions on fire protection services delivery including public fire safety education and inspection programs.</p>

**Minister of
Seniors Affairs**

6th Floor
400 University Avenue
Toronto ON M7A 2R9
Tel.: (416) 314-9710
Fax: (416) 325-4787

**Ministre des Affaires
des personnes âgées**

6e étage
400, avenue University
Toronto ON M7A 2R9
Tél.: (416) 314-9710
Téléc.: (416) 325-4787



May 4, 2018

Dear Friends:

June is Ontario's 34th annual Seniors' Month. This year's theme, "Now's the time to start something new," highlights how aging does not prevent any of us from leading fulfilling lives. Seniors continue to contribute to our community and we can all benefit from their wisdom, friendship, and experience.

To help spread the word, we have enclosed a copy of this year's poster in English and French. If you would like additional copies, please send an email to infoseniors@ontario.ca and indicate the quantity you require and your full mailing address. Posters are available while quantities last.

Finally, I continue to encourage everyone to celebrate Seniors' Month by hosting an event in your community. For more information about programs and services that are available to help seniors lead a healthy, active, and engaged life over 65, please visit our new website ontario.ca/AgingWell.

Thank you for your continued support and for celebrating Ontario's seniors.

Sincerely,

A handwritten signature in black ink, appearing to read "Dipika".

Dipika Damerla
Minister

Enclosure



Now's the time to start something new

June is Seniors' Month in Ontario

Find programs and services in your community

ontario.ca/AgingWell

Attorney General
McMurtry-Scott Building
720 Bay Street
11th Floor
Toronto ON M7A 2S9
Tel: 416-326-4000
Fax: 416-326-4016

Procureur général
Édifice McMurtry-Scott
720, rue Bay
11^e étage
Toronto ON M7A 2S9
Tél.: 416-326-4000
Télééc.: 416-326-4016

RECEIVED



Our Reference #: MC-2018-948

MAY 08 2018

Mr. Neil Vincent
274 Josephine Street
PO Box 90
Wingham, Ontario
N0G 2W0

Dear Mr. Vincent:

Thank you for your letter concerning Bill 175, *Safer Ontario Act, 2018*. As Attorney General, I am pleased to respond, and I apologize for the delay in responding.

As you may be aware, Justice Michael H. Tulloch was appointed to lead an independent review of Ontario's three policing oversight bodies: the Special Investigations Unit (SIU), the Office of the Independent Police Review Director (OIPRD), and the Ontario Civilian Police Commission (OCPC). After extensive consultation with more than 1,500 people from across the province, Justice Tulloch's Report of the Independent Police Oversight Review (IPOR report), including 129 recommendations, was released on April 6, 2017.

When the IPOR report was released, I committed to introducing legislation that used Justice Tulloch's recommendations as a blueprint for reforming Ontario's policing oversight system. I am pleased to inform you that, on March 8, 2018, the government passed the *Safer Ontario Act, 2018* (formerly Bill 175) which implements 118 of 119 recommendations directed towards the Ministry of the Attorney General – the most significant overhaul of policing oversight since the oversight bodies were created.

The *Safer Ontario Act, 2018* is based on four key principles outlined in the IPOR report which include:

1. Increasing openness: taking an open-by-default approach to sharing information with the public regarding investigations, thereby keeping them better informed about the investigative process;
2. Increasing accountability: requiring mandatory cooperation from police officers in oversight investigations and by accessing the tools needed for policing oversight bodies to become more effective;
3. Increasing public confidence: increasing public confidence by restricting investigations and decision making about public complaints regarding the conduct of policing officials to policing oversight bodies only; and,

.../2

4. Increasing cultural competency: improving the cultural competence of the oversight bodies through new training, more diverse staff, and better data collection.

To increase the independence, openness, and accountability of the policing oversight bodies, the new legislation will:

- strengthen the obligation of policing officials to comply with oversight investigations;
- authorize the Attorney General to regulate the proportion or number of investigators who may be former policing officials;
- require the delivery of training to employees of the police oversight bodies that promotes recognition and respect for the diverse, multiracial and multicultural character of Ontario and the rights and cultures of First Nation, Inuit and Métis Peoples;
- provide authority for the policing oversight bodies to collect and publicly report on demographic data, including race-based data; and,
- expand the Ontario Ombudsman's jurisdiction to all three oversight bodies.

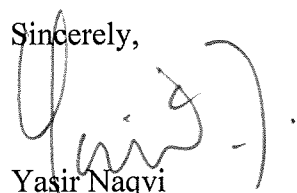
The *Safer Ontario Act, 2018* is a comprehensive public safety legislation package that modernizes our approach to community safety. It improves policing oversight, transparency and accountability, enhances civilian governance, responds to the needs and realities of Ontario's diverse communities and mandates local community safety and well-being planning.

The *Safer Ontario Act, 2018* sets out that the OIPRD will, after a phase-in period of five years, conduct 100% of public complaint investigations, instead of referring complaints back to police services. There will likely be cost savings realized by municipal policing budgets during the transition period and when the OIPRD is conducting 100% of all public complaint investigations.

The Ministry of Community Safety and Correctional Services (MCSCS) is responsible for ensuring the safety and security of communities across Ontario through effective policing, correctional services and emergency services programs. As such, the responsibility for many of the issues you addressed in your letter, such as municipalities adopting community safety and well-being plans fall under the purview of MCSCS. For your convenience, I have copied the Minister of MCSCS, the Honourable Marie-France Lalonde on this letter.

We are confident that these changes will make Ontario a leader in policing oversight with a system that is robust, open and accountable. Once again, thank you for taking the time to contact the ministry.

Sincerely,



Yasir Naqvi
Attorney General

c: The Honourable Marie-France Lalonde



DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS

10 Alpine Court, Kitchener, ON, N2E 2M7 | T: (519) 880-2708 | F: (519) 880-2709 | E: mail@dietricheng.com

RECEIVED

May 14, 2018

MAY 17 2018

TOWNSHIP OF NORTH HURON

Reeve and Council,

We are pleased to announce that Dietrich Engineering Limited is celebrating its 15th anniversary. This accomplishment would not have been possible without Clients like you.

We would also like to inform you that Dietrich Engineering Limited is moving. As of May 28th, our new address will be:

10 Alpine Court
Kitchener, Ontario
N2E 2M7

Our telephone numbers, fax numbers and email addresses remain the same.

Please circulate this information to others within your organization. We look forward to providing engineering services to you from our new location.

Yours truly,

DIETRICH ENGINEERING LIMITED

A handwritten signature in black ink, appearing to read 'William J. Dietrich'.

William J. Dietrich, P.Eng.

WJD:rd

May 17, 2018

Township of North Huron
PO Box 90, 274 Josephine St.
Wingham, ON N0G2W0

ATT: North Huron Council
: Sean Mc Ghee, Foreman, North Huron Works Department

Dear Council and Mr. McGhee,

Many citizens in our community would like to know the reason for the closure of the Howson Dam to foot traffic. Although the KGS engineering report stated that they felt that the dam should be closed, they also stated that the scope of their work does not include the analysis of the bridge structure.


Did council ask the engineering firm specifically for the reason for their recommendation that the bridge needed to be closed?

Secondly, was KGS' concern for the whole bridge or just portions of it? For example, is their concern for the older portion of the structure or the much newer section?

Our community expects the stop logs to be installed this spring as they would be loaded from the newer section of the bridge.

We look forward to your reply.

On behalf of the Howson Dam and Pond Committee,
Andy McBride, Jim Wickens, Bruce McDonald,
Bob Middleton, Tom Inglis, Rennie Alexander

Mailing address: Howson Dam and Pond Committee,
 c/o R. Alexander,
 
 Wingham, ON N0G 2W0

Consent Application Report- File # C029-18

Owner: Les Caldwell Applicant: Stephen Caldwell	Date: 15 May 2018
Property Description: Part Lot 41 (East Half), Concession 2, East Wawanosh, Township of North Huron (39835 Moncrieff Road)	

Recommendation: That provisional consent be:

- √ granted with conditions (attached)
- deferred
- denied (referred to the Committee of the Whole, for a decision)

Purpose:

- √ enlarge abutting lot
- create new lot
- surplus farm dwelling
- right-of-way / easement
- other:

Area Severed: 0.5 acres	Official Plan Designation: Agriculture	Zoning: AG1-5 General Agriculture
Area Retained: 98 acres	Official Plan Designation: Agriculture and Natural Environment- Limited Protection	Zoning: AG1-5 General Agriculture, NE2- Natural Environment Limited Protection

Review: This application:

- √ Is consistent with the Provincial Policy Statement (s. 3(5) Planning Act);
- √ Does not require a plan of subdivision for the proper and orderly development of the municipality (s. 53(1) Planning Act);
- √ Conforms with section 51(24) of the Planning Act;
- √ Conforms with the Huron County Official Plan;
- √ Conforms with the North Huron Official Plan,
- √ Complies with the municipal Zoning By-law (or will comply subject to a standard condition of rezoning or minor variance);
- Has been recommended for approval by the local municipality; and
- √ Has no unresolved objections/concerns raised (to date) from agencies or the public.

(Applications that do not meet all of the foregoing criteria will be referred to the Committee of the Whole for a decision)

Agency/Public Comments:

	Not Received or N/A	No Concerns	Comments/Conditions
Maitland Valley Conservation Authority	√		
Neighbours/Public	√		
Huron County Public Works	√		

Figure 1. Aerial photo of proposed severed (outlined in red) and retained lands (outlined in green)



Figure 2. Aerial photo of proposed severed land



Figure 3. Photo showing proposed severed land



Figure 4. Photo of the proposed severed land and former location of the residence



Additional Comments:

The purpose of this application is to sever land and enlarge an abutting property to the north through merging the severed lands. The land to be severed is approximately 0.5 acres and has a detached garage and no agriculture use. The land to be retained is approximately 98 acres and contains a barn and accessory structures, with the remainder of the farm being used for crop growing and agricultural use.

Comments Received

Consent Application Report- File # C029-18

There have been no comments received from the public or any concerns or comments received from North Huron staff during the circulation of this application. This report was prepared ahead of the meeting for its consideration and further comments may arise then.

Provincial Policy Statement

Section 2.3.4.1 of the Provincial Policy Statement 2014 (PPS) contains policies for lot creation in agricultural areas. In the proposed severance, there is not a creation of a new lot and no proposal for a new residential building. The severance is adjusting the lot dimensions by adding the proposed severed portion with the abutting land and two properties will remain after its completion. There is no loss in currently utilized agricultural land; the land to be severed previously had a residence located on it and has not been used for agriculture.

Huron County Official Plan Policies

The severance complies with the agricultural standards of the *Huron County Official Plan*. The plan states that severances shall protect the farmer's ability to farm; in this case, the land proposed to be severed had no previous impacts on the agriculture practices on the AG1-5 lot. The proposed severance does not conflict with any statements and goals proposed in the Huron County Official Plan, considering the previous use of the land.

North Huron Official Plan Policies

The proposed severed land is designated Agriculture the *North Huron Official Plan*. The consent policies in Section 11.3.1 of the Township of North Huron Official Plan contain criteria to permit a severance in an Agriculture designated area, including for land being conveyed to an abutting non-farm use, provided that a minimal amount of productive agriculture land is involved and it is for convenience or servicing purposes.

The land proposed to be severed previously had a residential building that has been demolished; the current land only contains a small accessory structure and has no agricultural uses. When merged with the neighboring property, the severed land will be used for additional parking and lawn, with the ability for an accessory building to be constructed. The farmlands have a separate entrance for farming equipment and access.

If the proposed severed lands are merged with the abutting property, the retained farmlands would still meet the minimum size of 38 hectares, as identified in the *North Huron Official Plan* and maintain their agricultural use.

The designated Natural Environment land found on the property is a small section on the south end of the lot. There is no expected impact or change of use for the Natural Environment designated land by this severance.

This application conforms to *the North Huron Official Plan* and its consent policies for a severance in an Agriculture area.

Zoning By-Law Provisions

The subject property is currently zoned General Agriculture (AG1-5) and Natural Environment Limited Protection (NE2). The abutting property the severed land is to merge with is zoned Agricultural Small Holdings (AG4). When the proposed severed land is merged with the abutting property it is enlarging, it will automatically be rezoned in accordance with the provisions of Section 3.15 of the North Huron Zoning By-Law and be zoned AG4.

For future consideration, it is important to note that the retained land would be viable for the construction of a residential building due to the AG1-5 zoning permitting one single detached dwelling on the property. To date, there is no intent of building a residential building on this parcel of land.

This application is consistent with the North Huron Zoning By-law.

Consent Application Report- File # C029-18

Recommended Conditions

Expiry Period

- √ Conditions imposed must be met within one year of the date of notice of decision, as required by Section 53(41) of the Planning Act, RSO 1990, as amended. If conditions are not fulfilled as prescribed within one year, the application shall be deemed to be refused. Provided the conditions are fulfilled within one year, the application is valid for two years from the date of notice of decision.

Municipal Requirements

- √ All municipal requirements be met to the satisfaction of the Township including servicing connections if required, cash-in-lieu of park dedication, property maintenance, compliance with zoning by-law provisions for structures, and any related requirements, financial or otherwise.

Survey

- √ Provide to the satisfaction of the County and the Township:
 - a) a survey showing the lot lines of the severed parcel and the location of any buildings thereon, and
 - b) a reference plan based on the approved survey

Merging

- √ The severed land merge on title with the abutting property to the north upon issuance of the certificate under Section 53(42) of the Planning Act, RSO 1990, as amended.
- √ A firm undertaking be provided to the satisfaction of the County from the solicitor acting for the parties, indicating that:
 - a) the severed land and the abutting property to the north will be consolidated into one P.I.N. under the Land Titles system; or
 - b) where consolidation is not possible as the parcels to be merged are registered in two different systems (e.g. the Registry or Land Titles system), a notice will be registered in both systems indicating that the parcels have merged with one another and are considered to be one parcel with respect to Section 50 (3) or (5) of the Planning Act, R.S.O. 1990, C P.13 as amended.
- √ Section 50(3) or (5) of the Planning Act, RSO 1990, as amended, applies to any subsequent conveyance or transaction of the severed land.
- √ A one square foot portion of the abutting property to which the severed land is to be merged be conveyed to the Municipality. A survey is to be provided showing the one square foot parcel as a separate part on the reference plan.

As this application to sever and enlarge an abutting property is consistent with the Provincial Policy Statement, conforms to the North Huron Official Plan, and is consistent with the North Huron Zoning By-law, it is recommended for approval with the above stated conditions.

'Original Signed By'

Laura Simpson, Planner

15 May 2018

Date

'Original Signed By'

Elizabeth Nakashima

15 May 2018

Date

CONSENT APPLICATION

North Huron Council
22 May 2018



Consent C29-2018

Owner: Les Caldwell

Applicant: Stephen Caldwell

39835 Moncrieff Road

*Part Lot 41, Concession 2, East Wawanosh, North
Huron Township*



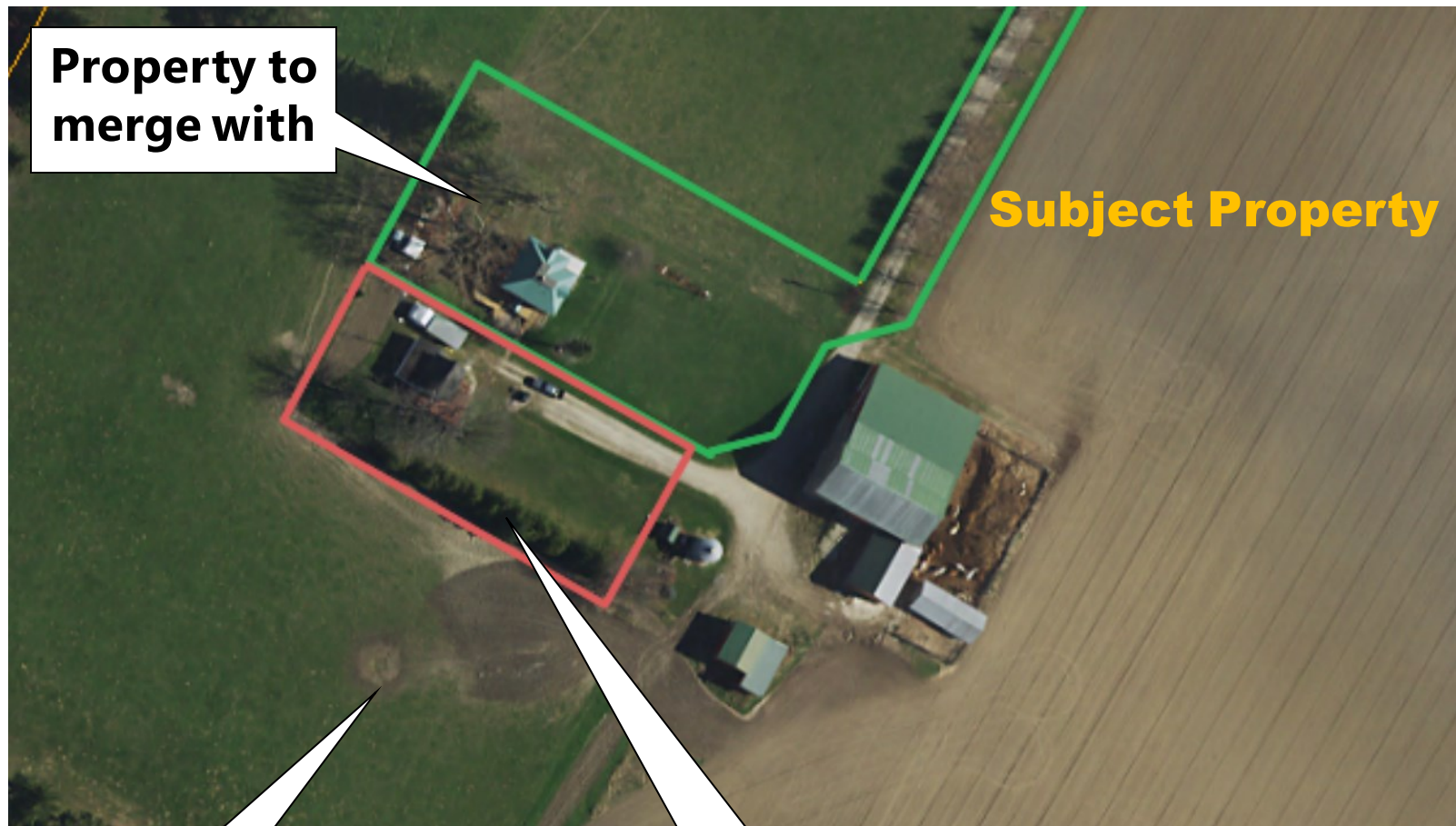
Lot Enlargement

Area Severed: 0.2 ha (0.5 acres)

Area Retained: 39.7 ha (98 acres)

Zoning: AG1- General Agriculture and NE2- Natural Environment
Limited Protection

Designated: Agriculture and Natural Environment- Limited Protection



Retained

Severed



Photo of the proposed severed parcel



Severed area



Retained farmlands



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Richard Al, Clerk/Manager of IT
DATE: 22/05/2018
SUBJECT: Offer to Purchase – May 22, 2018
ATTACHMENTS: Agreement of Purchase and Sale

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receives the May 22, 2018 report of the Clerk/Manager of IT entitled Offer to Purchase – May 22, 2018, for information;

AND FURTHER, that Council approves an exception to Section 19.1 of the Procedural By-law to allow By-law 51-2018 to be passed at the May 22, 2018 Council Meeting.

EXECUTIVE SUMMARY

The purpose of this report is to inform Council regarding an Agreement of Purchase and Sale received for the property designated Part 1 Lot 6 RP 22R-6630 (portion of 360 Josephine Street).

DISCUSSION

During the April 16, 2018 Meeting, Council passed the following resolution declaring a portion of 360 Josephine Street to be surplus to the needs of the municipality

M192/18

MOVED BY: J. Campbell

SECONDED BY: B. Knott

THAT the Council of the Township of North Huron hereby declares Part 1 Lot 6 RP 22R-6630 to be surplus to the needs of the municipality;

AND FURTHER, that the Council of the Township of North Huron hereby authorizes the Clerk to proceed with the disposition of Part 1 Lot 6 RP 22R-6630 by advertising the disposition of said property as well as informing 909395 Ontario Inc. of Council's decision so that they may exercise their first right of refusal, if they so choose, as permitted by By-law No. 50-2008.

CARRIED

In response to the above noted resolution, a representative of 909395 Ontario Inc. has provided a proposal to purchase the subject land (see attached Agreement of Purchase and Sale). Should Council accept this offer a by-law authorizing the Reeve and Clerk to sign the agreement would be required. As such, By-law 51-2018 has been prepared and is included on the May 22, 2018 agenda for Council's consideration.

FINANCIAL IMPACT

The proposal suggests a purchase price of \$3,000 plus the cost of any and all fees associated with the sale of this land.

FUTURE CONSIDERATIONS

If Council accepts this offer, the subject land would merge with the adjacent property to the south, 360 Josephine Street.

RELATIONSHIP TO STRATEGIC PLAN

Goal #4 – Our municipality is fiscally responsible and strives for operational excellence.



Richard Al, Clerk / Manager of IT



Dwayne Evans, CAO

Agreement of Purchase and Sale Commercial

Form 500

for use in the Province of Ontario

This Agreement of Purchase and Sale dated this 9th day of May, 2018

BUYER, 909395 ONTARIO INC., agrees to purchase from
(Full legal names of all Buyers)

SELLER, TOWNSHIP OF NORTH HURON, the following
(Full legal names of all Sellers)

REAL PROPERTY:

Address PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURON

fronting on the West side of JOSEPHINE ST.

in the TOWN OF WINGHAM NORTH HURON

and having a frontage of more or less by a depth of more or less

and legally described as PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURON and

Being Irregularly Shaped (the "property")
(Legal description of land including easements not described elsewhere)

PURCHASE PRICE:

Dollars (CDN\$) 3,000.00

Three Thousand Dollars

DEPOSIT: Buyer submits Upon Acceptance
(Herewith/Upon Acceptance/as otherwise described in this Agreement)

One Hundred Dollars (CDN\$) 100.00

by negotiable cheque payable to TOWNSHIP OF NORTH HURON "Deposit Holder" to be held in trust pending completion or other termination of this Agreement and to be credited toward the Purchase Price on completion. For the purposes of this Agreement, "Upon Acceptance" shall mean that the Buyer is required to deliver the deposit to the Deposit Holder within 24 hours of the acceptance of this Agreement. The parties to this Agreement hereby acknowledge that, unless otherwise provided for in this Agreement, the Deposit Holder shall place the deposit in trust in the Deposit Holder's non-interest bearing Real Estate Trust Account and no interest shall be earned, received or paid on the deposit.

Buyer agrees to pay the balance as more particularly set out in Schedule A attached.

SCHEDULE(S) A **attached hereto form(s) part of this Agreement.**

1. **IRREVOCABILITY:** This offer shall be irrevocable by Buyer until 8:00 ~~am~~ pm on the 23rd day of May, 2018, after which time, if not accepted, this offer shall be null and void and the deposit shall be returned to the Buyer in full without interest.

2. **COMPLETION DATE:** This Agreement shall be completed by no later than 6:00 p.m. on the 29th day of June, 2018. Upon completion, vacant possession of the property shall be given to the Buyer unless otherwise provided for in this Agreement.

INITIALS OF BUYER(S):

INITIALS OF SELLER(S):



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Wilfred McIntee & Co. Limited

- 3. NOTICES:** The Seller hereby appoints the Listing Brokerage as agent for the Seller for the purpose of giving and receiving notices pursuant to this Agreement. Where a Brokerage (Buyer's Brokerage) has entered into a representation agreement with the Buyer, the Buyer hereby appoints the Buyer's Brokerage as agent for the purpose of giving and receiving notices pursuant to this Agreement. **Where a Brokerage represents both the Seller and the Buyer (multiple representation), the Brokerage shall not be appointed or authorized to be agent for either the Buyer or the Seller for the purpose of giving and receiving notices.** Any notice relating hereto or provided for herein shall be in writing. In addition to any provision contained herein and in any Schedule hereto, this offer, any counter-offer, notice of acceptance thereof or any notice to be given or received pursuant to this Agreement or any Schedule hereto (any of them, "Document") shall be deemed given and received when delivered personally or hand delivered to the Address for Service provided in the Acknowledgement below, or where a facsimile number or email address is provided herein, when transmitted electronically to that facsimile number or email address, respectively, in which case, the signature(s) of the party (parties) shall be deemed to be original.

FAX No.:
(For delivery of Documents to Seller)

FAX No.:
(For delivery of Documents to Buyer)

Email Address:
(For delivery of Documents to Seller)

Email Address:
(For delivery of Documents to Buyer)

4. CHATELS INCLUDED: N/A

Unless otherwise stated in this Agreement or any Schedule hereto, Seller agrees to convey all fixtures and chattels included in the Purchase Price free from all liens, encumbrances or claims affecting the said fixtures and chattels.

5. FIXTURES EXCLUDED: N/A

- 6. RENTAL ITEMS (Including Lease, Lease to Own):** The following equipment is rented and **not** included in the Purchase Price. The Buyer agrees to assume the rental contract(s), if assumable:

N/A

The Buyer agrees to co-operate and execute such documentation as may be required to facilitate such assumption.

- 7. HST: If the sale of the property (Real Property as described above) is subject to Harmonized Sales Tax (HST), then such tax shall be in addition to the Purchase Price.** The Seller will not collect HST if the Buyer provides to the Seller a warranty that the Buyer is registered under the Excise Tax Act ("ETA"), together with a copy of the Buyer's ETA registration, a warranty that the Buyer shall self-assess and remit the HST payable and file the prescribed form and shall indemnify the Seller in respect of any HST payable. The foregoing warranties shall not merge but shall survive the completion of the transaction. If the sale of the property is not subject to HST, Seller agrees to certify on or before closing, that the transaction is not subject to HST. Any HST on chattels, If applicable, is not included in the Purchase Price.

INITIALS OF BUYER(S):

INITIALS OF SELLER(S):



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8. TITLE SEARCH: Buyer shall be allowed until 6:00 p.m. on the 22nd day of June, 2018, (Requisition Date) to examine the title to the property at his own expense and until the earlier of: (i) thirty days from the later of the Requisition Date or the date on which the conditions in this Agreement are fulfilled or otherwise waived or; (ii) five days prior to completion, to satisfy himself that there

are no outstanding work orders or deficiency notices affecting the property, that its present use (VACANT LAND) may be lawfully continued and that the principal building may be insured against risk of fire. Seller hereby consents to the municipality or other governmental agencies releasing to Buyer details of all outstanding work orders and deficiency notices affecting the property, and Seller agrees to execute and deliver such further authorizations in this regard as Buyer may reasonably require.

9. FUTURE USE: Seller and Buyer agree that there is no representation or warranty of any kind that the future intended use of the property by Buyer is or will be lawful except as may be specifically provided for in this Agreement.

10. TITLE: Provided that the title to the property is good and free from all registered restrictions, charges, liens, and encumbrances except as otherwise specifically provided in this Agreement and save and except for (a) any registered restrictions or covenants that run with the land providing that such are complied with; (b) any registered municipal agreements and registered agreements with publicly regulated utilities providing such have been complied with, or security has been posted to ensure compliance and completion, as evidenced by a letter from the relevant municipality or regulated utility; (c) any minor easements for the supply of domestic utility or telephone services to the property or adjacent properties; and (d) any easements for drainage, storm or sanitary sewers, public utility lines, telephone lines, cable television lines or other services which do not materially affect the use of the property. If within the specified times referred to in paragraph 8 any valid objection to title or to any outstanding work order or deficiency notice, or to the fact the said present use may not lawfully be continued, or that the principal building may not be insured against risk of fire is made in writing to Seller and which Seller is unable or unwilling to remove, remedy or satisfy or obtain insurance save and except against risk of fire (Title Insurance) in favour of the Buyer and any mortgagee, (with all related costs at the expense of the Seller), and which Buyer will not waive, this Agreement notwithstanding any intermediate acts or negotiations in respect of such objections, shall be at an end and all monies paid shall be returned without interest or deduction and Seller, Listing Brokerage and Co-operating Brokerage shall not be liable for any costs or damages. Save as to any valid objection so made by such day and except for any objection going to the root of the title, Buyer shall be conclusively deemed to have accepted Seller's title to the property.

11. CLOSING ARRANGEMENTS: Where each of the Seller and Buyer retain a lawyer to complete the Agreement of Purchase and Sale of the property, and where the transaction will be completed by electronic registration pursuant to Part III of the Land Registration Reform Act, R.S.O. 1990, Chapter L4 and the Electronic Registration Act, S.O. 1991, Chapter 44, and any amendments thereto, the Seller and Buyer acknowledge and agree that the exchange of closing funds, non-registrable documents and other items (the "Requisite Deliveries") and the release thereof to the Seller and Buyer will (a) not occur at the same time as the registration of the transfer/deed (and any other documents intended to be registered in connection with the completion of this transaction) and (b) be subject to conditions whereby the lawyer(s) receiving any of the Requisite Deliveries will be required to hold same in trust and not release same except in accordance with the terms of a document registration agreement between the said lawyers. The Seller and Buyer irrevocably instruct the said lawyers to be bound by the document registration agreement which is recommended from time to time by the Law Society of Upper Canada. Unless otherwise agreed to by the lawyers, such exchange of the Requisite Deliveries will occur in the applicable Land Titles Office or such other location agreeable to both lawyers.

12. DOCUMENTS AND DISCHARGE: Buyer shall not call for the production of any title deed, abstract, survey or other evidence of title to the property except such as are in the possession or control of Seller. If requested by Buyer, Seller will deliver any sketch or survey of the property within Seller's control to Buyer as soon as possible and prior to the Requisition Date. If a discharge of any Charge/Mortgage held by a corporation incorporated pursuant to the Trust And Loan Companies Act (Canada), Chartered Bank, Trust Company, Credit Union, Caisse Populaire or Insurance Company and which is not to be assumed by Buyer on completion, is not available in registrable form on completion, Buyer agrees to accept Seller's lawyer's personal undertaking to obtain, out of the closing funds, a discharge in registrable form and to register same, or cause same to be registered, on title within a reasonable period of time after completion, provided that on or before completion Seller shall provide to Buyer a mortgage statement prepared by the mortgagee setting out the balance required to obtain the discharge, and, where a real-time electronic cleared funds transfer system is not being used, a direction executed by Seller directing payment to the mortgagee of the amount required to obtain the discharge out of the balance due on completion.

13. INSPECTION: Buyer acknowledges having had the opportunity to inspect the property and understands that upon acceptance of this offer there shall be a binding agreement of purchase and sale between Buyer and Seller.

14. INSURANCE: All buildings on the property and all other things being purchased shall be and remain until completion at the risk of Seller. Pending completion, Seller shall hold all insurance policies, if any, and the proceeds thereof in trust for the parties as their interests may appear and in the event of substantial damage, Buyer may either terminate this Agreement and have all monies paid returned without interest or deduction or else take the proceeds of any insurance and complete the purchase. No insurance shall be transferred on completion. If Seller is taking back a Charge/Mortgage, or Buyer is assuming a Charge/Mortgage, Buyer shall supply Seller with reasonable evidence of adequate insurance to protect Seller's or other mortgagee's interest on completion.

INITIALS OF BUYER(S):

INITIALS OF SELLER(S):



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- 15. PLANNING ACT:** This Agreement shall be effective to create an interest in the property only if Seller complies with the subdivision control provisions of the Planning Act by completion and Seller covenants to proceed diligently at his expense to obtain any necessary consent by completion.
- 16. DOCUMENT PREPARATION:** The Transfer/Deed shall, save for the Land Transfer Tax Affidavit, be prepared in registrable form at the expense of Seller, and any Charge/Mortgage to be given back by the Buyer to Seller at the expense of the Buyer. If requested by Buyer, Seller covenants that the Transfer/Deed to be delivered on completion shall contain the statements contemplated by Section 50(22) of the Planning Act, R.S.O.1990.
- 17. RESIDENCY:** (a) Subject to (b) below, the Seller represents and warrants that the Seller is not and on completion will not be a non-resident under the non-residency provisions of the Income Tax Act which representation and warranty shall survive and not merge upon the completion of this transaction and the Seller shall deliver to the Buyer a statutory declaration that Seller is not then a non-resident of Canada;
(b) provided that if the Seller is a non-resident under the non-residency provisions of the Income Tax Act, the Buyer shall be credited towards the Purchase Price with the amount, if any, necessary for Buyer to pay to the Minister of National Revenue to satisfy Buyer's liability in respect of tax payable by Seller under the non-residency provisions of the Income Tax Act by reason of this sale. Buyer shall not claim such credit if Seller delivers on completion the prescribed certificate.
- 18. ADJUSTMENTS:** Any rents, mortgage interest, realty taxes including local improvement rates and unmetered public or private utility charges and unmetered cost of fuel, as applicable, shall be apportioned and allowed to the day of completion, the day of completion itself to be apportioned to Buyer.
- 19. TIME LIMITS:** Time shall in all respects be of the essence hereof provided that the time for doing or completing of any matter provided for herein may be extended or abridged by an agreement in writing signed by Seller and Buyer or by their respective lawyers who may be specifically authorized in that regard.
- 20. PROPERTY ASSESSMENT:** The Buyer and Seller hereby acknowledge that the Province of Ontario has implemented current value assessment and properties may be re-assessed on an annual basis. The Buyer and Seller agree that no claim will be made against the Buyer or Seller, or any Brokerage, Broker or Salesperson, for any changes in property tax as a result of a re-assessment of the property, save and except any property taxes that accrued prior to the completion of this transaction.
- 21. TENDER:** Any tender of documents or money hereunder may be made upon Seller or Buyer or their respective lawyers on the day set for completion. Money shall be tendered with funds drawn on a lawyer's trust account in the form of a bank draft, certified cheque or wire transfer using the Large Value Transfer System.
- 22. FAMILY LAW ACT:** Seller warrants that spousal consent is not necessary to this transaction under the provisions of the Family Law Act, R.S.O.1990 unless the spouse of the Seller has executed the consent hereinafter provided.
- 23. UFFI:** Seller represents and warrants to Buyer that during the time Seller has owned the property, Seller has not caused any building on the property to be insulated with insulation containing ureaformaldehyde, and that to the best of Seller's knowledge no building on the property contains or has ever contained insulation that contains ureaformaldehyde. This warranty shall survive and not merge on the completion of this transaction, and if the building is part of a multiple unit building, this warranty shall only apply to that part of the building which is the subject of this transaction.
- 24. LEGAL, ACCOUNTING AND ENVIRONMENTAL ADVICE:** The parties acknowledge that any information provided by the brokerage is not legal, tax or environmental advice, and that it has been recommended that the parties obtain independent professional advice prior to signing this document.
- 25. CONSUMER REPORTS:** The Buyer is hereby notified that a consumer report containing credit and/or personal information may be referred to in connection with this transaction.
- 26. AGREEMENT IN WRITING:** If there is conflict or discrepancy between any provision added to this Agreement (including any Schedule attached hereto) and any provision in the standard pre-set portion hereof, the added provision shall supersede the standard pre-set provision to the extent of such conflict or discrepancy. This Agreement including any Schedule attached hereto, shall constitute the entire Agreement between Buyer and Seller. There is no representation, warranty, collateral agreement or condition, which affects this Agreement other than as expressed herein. For the purposes of this Agreement, Seller means vendor and Buyer means purchaser. This Agreement shall be read with all changes of gender or number required by the context.
- 27. TIME AND DATE:** Any reference to a time and date in this Agreement shall mean the time and date where the property is located.

INITIALS OF BUYER(S):



INITIALS OF SELLER(S):





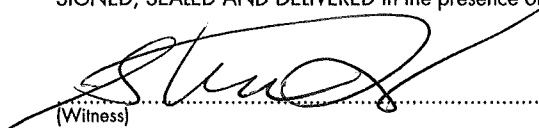
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28. SUCCESSORS AND ASSIGNS: The heirs, executors, administrators, successors and assigns of the undersigned are bound by the terms herein.

SIGNED, SEALED AND DELIVERED in the presence of:

IN WITNESS whereof I have hereunto set my hand and seal:


(Witness)

(Witness)

909395 ONTARIO INC.

(Buyer/Authorized Signing Officer)

(Buyer/Authorized Signing Officer)

(Seal)
(Seal)
(Seal)

DATE 9 May 2018.

DATE _____

I, the Undersigned Seller, agree to the above offer. I hereby irrevocably instruct my lawyer to pay directly to the brokerage(s) with whom I have agreed to pay commission, the unpaid balance of the commission together with applicable Harmonized Sales Tax (and any other taxes as may hereafter be applicable), from the proceeds of the sale prior to any payment to the undersigned on completion, as advised by the brokerage(s) to my lawyer.

SIGNED, SEALED AND DELIVERED in the presence of:

IN WITNESS whereof I have hereunto set my hand and seal:

(Witness)

(Witness)

TOWNSHIP OF NORTH HURON

(Seller/Authorized Signing Officer)

(Seller/Authorized Signing Officer)

(Seal)
(Seal)
(Seal)

DATE _____
DATE _____

SPOUSAL CONSENT: The undersigned spouse of the Seller hereby consents to the disposition evidenced herein pursuant to the provisions of the Family Law Act, R.S.O.1990, and hereby agrees to execute all necessary or incidental documents to give full force and effect to the sale evidenced herein.

(Witness)

(Spouse)

(Seal)

DATE _____

CONFIRMATION OF ACCEPTANCE: Notwithstanding anything contained herein to the contrary, I confirm this Agreement with all changes both typed and written was finally accepted by all parties at _____ a.m./p.m. this _____ day of _____, 20_____.

(Signature of Seller or Buyer)

INFORMATION ON BROKERAGE(S)

Listing Brokerage Wilfred McIntee & Co. Limited Tel.No. (519) 357-2222

STEVE NIXON
(Salesperson / Broker Name)
Co-op/Buyer Brokerage _____ Tel.No. (_____) _____

(Salesperson / Broker Name)

ACKNOWLEDGEMENT

I acknowledge receipt of my signed copy of this accepted Agreement of Purchase and Sale and I authorize the Brokerage to forward a copy to my lawyer.

I acknowledge receipt of my signed copy of this accepted Agreement of Purchase and Sale and I authorize the Brokerage to forward a copy to my lawyer.

(Seller) DATE _____

(Seller) DATE _____
Address for Service _____

Tel.No. (_____) _____
Seller's Lawyer _____
Address _____
Email _____
(_____) _____
Tel.No. (_____) FAX No. _____

(Buyer) DATE _____

(Buyer) DATE _____
Address for Service _____

Tel.No. (_____) _____
Buyer's Lawyer _____
Address _____
Email _____
(_____) _____
Tel.No. (_____) FAX No. _____

FOR OFFICE USE ONLY

COMMISSION TRUST AGREEMENT

To: Co-operating Brokerage shown on the foregoing Agreement of Purchase and Sale:

In consideration for the Co-operating Brokerage procuring the foregoing Agreement of Purchase and Sale, I hereby declare that all moneys received or receivable by me in connection with the Transaction as contemplated in the MLS® Rules and Regulations of my Real Estate Board shall be receivable and held in trust. This agreement shall constitute a Commission Trust Agreement as defined in the MLS® Rules and shall be subject to and governed by the MLS® Rules pertaining to Commission Trust.

DATED as of the date and time of the acceptance of the foregoing Agreement of Purchase and Sale.

Acknowledged by:

(Authorized to bind the Listing Brokerage)

(Authorized to bind the Co-operating Brokerage)



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This Schedule is attached to and forms part of the Agreement of Purchase and Sale between:

BUYER, 909395 ONTARIO INC., and

SELLER, TOWNSHIP OF NORTH HURON

for the purchase and sale of PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURON in
the TOWN OF WINGHAM dated the 9th day of May 20 18

Buyer agrees to pay the balance as follows:

The Buyer agrees to pay the balance of the purchase price, subject to adjustments, to the Seller on completion of this transaction, with funds drawn on a lawyer's trust account in the form of a bank draft, certified cheque or wire transfer using the Large Value Transfer System.

THIS PARCEL OF LAND WILL MERGE WITH 350 JOSEPHINE ST. WINGHAM ON CLOSING.

BUYER IS PAYING \$3000.00 FOR THIS LAND PLUS ALL COSTS RELATED TO THE
DISBURSEMENT OF THIS PARCEL OF LAND.

This form must be initialed by all parties to the Agreement of Purchase and Sale.

INITIALS OF BUYER(S):

YB

INITIALS OF SELLER(S):



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Wilfred McIntee & Co. Limited





TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Richard Al, Clerk / Manager of IT
DATE: 22/05/2018
SUBJECT: Traffic Enforcement – Highway 4 and County Road 25
ATTACHMENTS:

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receive the report of the Clerk / Manager of IT, dated May 22, 2018 regarding Traffic Enforcement – Highway 4 and County Road 25 for information;

AND FURTHER, that Council directs the Clerk to prepare an amendment to the Traffic By-law, incorporating no parking zones along a portion of Queen Street and County Road 25 in Blyth.

EXECUTIVE SUMMARY

The purpose of this report is to receive direction from Council regarding the establishment of additional no parking zones in Blyth. The proposed no parking zones would be located along the north side of County Road 25 as well as the east and west sides of Queen Street near the County Road 25 intersection. The intention is to address safety concerns that exist at the intersection of Highway 4 and County 25 south of Blyth.

DISCUSSION

On December 4, 2017 Council received a delegation from Huron County Engineer Steve Lund and CAO Meighan Wark, regarding traffic concerns at the intersection of Highway 4 and County Road 25 south of Blyth.

One particular concern expressed during the meeting as well as on occasions since that time, relates to vehicles parking along the sides of the road in close proximity to the intersection, resulting in safety concerns due to blocked sight lines. Huron County staff have investigated various options to mitigate concerns at the intersection, including ways to address vehicles parking along the road side.

North Huron and Huron County staff have been in frequent contact regarding this intersection, communicating ideas to address the concerns. Based on that communication, is it staff's recommendation that the North Huron Traffic By-law be amended to incorporate the following no parking zones along Highway 4 and County Road 25.

- County Road 25 – 70m westerly from Highway 4, north side
- County Road 25 – 90m easterly from Highway 4, north side
- Highway 4 – 150m northerly from County Road 25, east and west side

Due to the fact that this intersection is located on a municipal border, the no parking zones required to the south of County Road 25 must be established by the Municipality of Central Huron. Likewise,

enforcement of the no parking zones south of County Road 25 would be the responsibility of Central Huron.

The following is a map displaying the proposed no parking zones in both North Huron, as well as those being considered in Central Huron. As shown in the photo, the yellow areas are proposed as no parking zones. It should be noted that the mark in red (located in front of Tim Horton's) was approved as a parking spot for transports through Site Plan approval when that property was developed and as such would remain as a designated parking spot.



Huron County staff have contacted business owners in the vicinity of this intersection to communicate the proposed change in an effort to ensure that they are aware as well as gain their support. Thus far the owners of Tim Horton's, Cowbell, and Huron Tractor have all expressed support for the establishment of no parking zones as proposed. Huron County staff has also reached out to the Municipality of Central Huron seeking support for the proposed no parking zones on the south side of County Road 25 and along the east and west sides of Highway 4, south of County road 25. At the time of writing this report, Central Huron's response was unknown.

FINANCIAL IMPACT

There would be a cost in terms of staff time to enforce the no parking zone. As by-law enforcement is typically based on a complaint driven process it would be difficult to estimate how many complaints may be received for enforcement and similarly difficult then to estimate an associated cost.

FUTURE CONSIDERATIONS

Huron County staff continue to monitor the intersection and investigate options such as 'enhanced stop signs' and 'enhanced stop-ahead signs' which feature LED flashing lights around the perimeter of the sign to enhance visibility over the flashing beacons that are currently installed. County staff have indicated that these signs will be installed at the intersection in the near future.

Should Council support the establishment of no parking zones as proposed, a revised Traffic By-law to incorporate these changes could be prepared for the June 4, 2018 Council Meeting.

RELATIONSHIP TO STRATEGIC PLAN

Goal #3 – Our community is healthy and safe.



Richard Al, Clerk / Manager of IT



Dwayne Evans, CAO

2018-2020 Operational Police Budget

- 2018-2020 Operational Budget submission
- Commentary as the details of the budget
- Questions

2018 -2020 Police Operational Budget Review

2018 Police Budget			2018		2019		2020
			Budget		Budget		Budget
Revenue							
2200	5105	Parking Revenues	2,200.00		2,200.00		2,200.00
2200	5125	Transfer from Reserves			25,000.00		
2200	5280	Court Security/Prisoner Transport	2,888.00		2,888.00		2,888.00
2200	5286	Conditional Grants - Ontario	110,000.00		110,000.00		110,000.00
Total Revenue			115,088.00		140,088.00		115,088.00
Expenditures							
2200	6100	Salaries - Full Time	(a) 882,541.00	(b)	1,091,221.40	(c)	1,226,315.55
2200	6120	Benefits - Full Time	264,762.00		327,366.00		367,903.66
2200	6130	Overtime	70,000.00		70,000.00		70,000.00
2200	6150	Honorarium	5,000.00		5,000.00		5,000.00
2200	6200	Clothing/Uniforms	5,000.00		5,000.00		5,000.00
2200	6205	Meeting Allowance	600.00		600.00		600.00
2200	6210	Subscriptions/Memberships	2,000.00		2,000.00		2,000.00
2200	6220	Training/Travel/Workshops	9,000.00		9,000.00		9,000.00
2200	6225	Police Board Expenses	2,500.00		2,500.00		2,500.00
2200	6250	Office Supplies	10,000.00		10,000.00		10,000.00
2200	6260	Phone/Fax/Internet	3,700.00		3,700.00		3,700.00
2200	6270	Insurance	14,000.00		14,500.00		15,000.00
2200	6280	Legal/Accounting	10,000.00		10,000.00		10,000.00
2200	6295	Transfer to Reserve	15,000.00		15,000.00		15,000.00
2200	6400	Equip Repair/Maintenance	12,000.00		12,000.00		12,000.00
2200	6410	Fuel	20,000.00		20,000.00		20,000.00
2200	6650	Communication System	47,000.00		47,940.00		48,898.00
2200	6685	OPTIC	15,000.00		15,300.00		15,900.00
2200	6686	CISO	3,500.00		3,500.00		3,500.00
Total Expenditures			1,391,603.00		1,664,627.40		1,842,317.21
Police Stn							
2210	6100	Salaries - Full Time					
2210	6110	Salaries - Part Time					
2210	6120	Benefits - Full Time					
2210	6270	Insurance					
2210	6300	Bldg Repair/Maintenance					
2210	6320	Janitorial Supplies					
2210	6330	Inspections/Contracts					
2210	6350	Electricity					
2210	6360	Water/Sewer					
2210	6370	Natural Gas/Heat					
2210	6380	Waste Disposal					
2210	6390	SnowPlowing					
2210	6708	Administration Overhead					
Total Building Expenditures							
Total Operating Expenditures							
Capital							
New firearms for all officers			\$14,400.00				
Outfit additional officers (uniforms etc)			\$18,000.00				
New Cruiser					\$41,000.00	(b)	
Total Capital							
			\$32,400.00		\$41,000.00		
Total Expense - Operating + Capital							
NOTE: Police station maintenance/cleaning is controlled by Facilities							
Areas highlighted in yellow are not controlled by the police service							
These estimates are assuming we would be able to get suitable applicants for the positions.							

(a)– represents 24hrs a day 7 day a week coverage existing of 2-12 hr. shifts as consistent with previous years; 4.5% pay increase for existing officers; hiring 3 new recruit officers starting in September and sent to Police College with return municipality for January. Hiring is a result of a health and safety concern for the officers to have 2 fully trained officers on shift.

(b)Represents an additional 4.0% plus Cost of Living pay increase from 2018 based on negotiated contract. Hiring 2 more recruit officers in January 2019 and sending to police college for return in April 2019. Costs associated to hiring of new chief - additional wages during transition (Jan – Apr 2019) – At January 2019 we would have 2 Chief, 1 Deputy Chief/Inspector, 1 Sgt., 9 Cst. and 1 Special Constable. In April we would drop to one Chief on retirement of the current Chief.

2020 salaries represent movement of the officers through the grid of the negotiated contract (Recruit starting Salary \$58k vs First Class Constable \$98k) as well as estimate based on new negotiated contract

(c) Replacement of Dodge Charger (maintain 3 vehicle fleet)

No other technology needed for additional officers as office equipment are a shared resource

Costs associated to the Police Station are budgeted and controlled by facilities and not by the Police Service Board

Communication System Contract with the Owen Sound Police Services Board has been expired since December 31, 2017 – but terms have been extended until later this year. Estimated increase of 2% year.

The reduction in the 2018 budget is a direct result of delayed hiring from the budget that was presented to council prior to May 7th as well as reviewed at the May 7th Council Meeting. This delay will result in those monies now being pushed into 2019. Overall there has been no real reduction of costs associated to operating the service only increasing resources which in the mind of the Police Service Board are necessary to operate the service in a safe and effective way for our officers while maintaining the same service level that the Wingham Ward has had in the past.



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Donna White
DATE: 22/05/2018
SUBJECT: 2018 Budget
ATTACHMENTS: 2018 Budget

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receives the updated 2018 Budget Report from the Director of Finance;

AND FURTHER THAT Council considers passing amended By-Law #47-2018 being a by-law to adopt the 2018 budget and tax rates;

AND FURTHER THAT the Council of the Township of North Huron approves an exception to Section 19.1 of the Procedural By-Law to allow the By-law to be passed at the May 22, 2018 Council Meeting.

EXECUTIVE SUMMARY

Section 290 of the Municipal Act, S.O. 2001, c 25 as amended, requires municipalities to annually prepare and adopt a budget including estimates of all sums required during the year for the purposes of raising the general local municipal levy. Section 312 (2) requires each municipality to pass a by-law levying a separate tax rate on the assessment in each property class rateable for local municipal purposes.

The Director of Finance prepared a budget presentation for Council at the May 7, 2018 Meeting. At that meeting a motion was passed requesting the North Huron Police Services Board to review their proposed 2018 Budget and attempt to find efficiencies and cost savings. The Police Services Board passed a Revised Budget at their May 15, 2018 meeting and the figures from this budget have been incorporated into the latest version of the 2018 Draft Township budget. A notice was placed in the local papers advertising the budget consideration at the May 22, 2018 meeting.

DISCUSSION

The following is a summary of the 2018 Budget:

- Overall spending increase – 13.03% = \$637,159.93
- Total expenses – \$15,324,611.93
- Total revenues – \$9,457,746.00
- Transfer from Tax Stabilization Reserve - \$338,066.00
- Raised from taxation - \$5,528,799.93
- \$6,555.00 raised from flat rate streetlights
- Wingham BIA Levy - \$27,500.00
- Blyth BIA Levy - \$7,500.00

- Water and sewer services has no effect on tax rate – fully funded by user fees – includes a 3.5% rate increase for Year 4 of the current five year rate plan – no change to reserve amount
- Amortization is not included in the budget (Ont Reg 284/09)
- Gas Tax Annual Average investment amount is \$1,281,000.00

2018 Capital

The following is a list of capital projects included in the 2018 budget:	
Westmoreland Street (Final Cover)	30,273.00
Arthur Street – Phase 2	52,745.00
Rural Tar & Chip Program	101,760.00
PW Equipment – Mower	25,440.00
PW – Trackless Sidewalk Machine (used)	101,760.00
Howson Dam	69,610.00
Cemetery Software	50,091.00
Wingham Cemetery – Niche Wall	40,000.00
Streetlight LED Conversion Project	421,508.00
Summit Drive Streetlight Project	40,000.00
Sewer – Equipment Upgrades	34,000.00
Sewer – Arthur Street – Phase 2	64,841.00
Water – Equipment Upgrades	30,000.00
Water – Arthur Street – Phase 2	186,973.00
Police – Firearms	14,400.00
Police – Uniforms/Equipment additional officers	18,000.00
Wingham Theatre Renovations	38,000.00
Wayward Signs	10,000.00
Wingham Fire Hall – Grates	8,000.00
Police Building – Roof repairs	26,000.00
Day Care Building – Roof repairs	25,000.00
Day Care Building – Washroom Renovation	35,000.00
Fitness Centre – Treadmill	10,000.00
HVAC System – Fitness/Squash	35,000.00
Multi-purpose Cleaning Machine	6,500.00
Floor Scrubber	7,500.00
Legends Software (Recreation)	5,000.00
Wingham Arena – CO Monitors	10,000.00
Wingham Complex Fitness Area – Roof leaks	113,000.00
Memorial Hall – Renovation project	154,590.00
Total	\$1,764,991.00

Total Tax Bill

A property assessed at \$200,000 in 2018 (\$197,500 in 2017) will reflect the overall increases:

- Wingham - \$277.01 = 7.18%
- Blyth - \$86.10 = 2.58%
- East Wawanosh = 2.06%
- The Township of North Huron will keep 62.03% of the tax bill for its own purposes, the County of Huron will receive 24.56% and the School Boards will receive 13.41% for education purposes.

Total Dollars Raised By Ward

	Municipal Rate	County Rate	Education Rate	Total
Wingham	3,373,945.87	1,138,288.71	693,899.45	\$5,206,134.03
Blyth	905,247.78	406,227.62	220,127.63	\$1,531,603.03
*East Wawanosh	1,243,051.28	642,056.81	280,194.26	\$2,165,302.35
Total	5,522,244.93	2,186,573.14	1,194,221.35	\$8,903,039.42

- Plus flat rate Streetlight Charge - \$6,555.00

FINANCIAL IMPACT

Approval of the 2018 Budget will enable operational and capital plans to move forward.

FUTURE CONSIDERATIONS

Once the budget is passed, year to date reports will be compiled for review by the Department Heads and Council and monitored throughout the year.

RELATIONSHIP TO STRATEGIC PLAN

Goal #4 – Our administration is fiscally responsible and strives for operational excellence.



Donna White, Director of Finance



Dwayne Evans, CAO

TOWNSHIP OF NORTH HURON



**2018 Draft Budget
May 22, 2018**

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Township of North Huron					
SCHEDULE "A"	2017	2017	2018	Budget \$	Budget - Actual
	Budget	Actuals	Budget	Variance	% Change
Revenue					
General Government					
General Government	1,567,802.00	1,780,692.73	1,603,450.00	35,648.00	-9.95%
Members of Council		1,576.27		-	-100.00%
Administration	135,461.00	110,762.44	46,000.00	(89,461.00)	-58.47%
Rental Property Red Cross				-	
Protection to Persons				-	
Fire	325,078.00	337,120.73	331,367.00	6,289.00	-1.71%
FPO & NH ONLY	5,000.00	630.00	600.00	(4,400.00)	-4.76%
ESTC	208,079.00	134,013.24	25,550.00	(182,529.00)	-80.93%
Police	93,787.00	120,764.20	115,088.00	21,301.00	-4.70%
Conservation Authority				-	
Building Department	156,607.00	159,032.53	149,885.00	(6,722.00)	-5.75%
Property Standards		80.00	100.00	100.00	25.00%
Animal Control	11,800.00	9,320.00	10,600.00	(1,200.00)	13.73%
Emergency Planning				-	
Transportation Services				-	
Public Works (New)	1,394,300.00	1,856,962.50	527,710.00	(866,590.00)	-71.58%
Streetlighting	546,515.00	7,572.75	6,555.00	(539,960.00)	-13.44%
Air Transportation	99,748.00	101,887.94	94,524.00	(5,224.00)	-7.23%
Environmental Services				-	
Sanitary Sewer	1,431,768.00	1,080,594.29	1,126,149.00	(305,619.00)	4.22%
Waterworks	1,721,664.00	1,343,216.16	1,478,352.00	(243,312.00)	10.06%
Storm Sewer					
Waste Diversion/Disposal	282,000.00	392,082.24	332,750.00	50,750.00	-15.13%
Health Services				-	
Cemeteries	114,550.00	98,522.38	113,375.00	(1,175.00)	15.08%
Social & Family Services				-	
Child Care	744,840.00	805,659.09	811,914.00	67,074.00	0.78%
Early Learning	87,276.00	164,355.04	156,378.00	69,102.00	-4.85%
Before & After - Maitland	155,996.00	163,820.40	175,082.00	19,086.00	6.87%
Before & After - Sacred Heart	31,234.00	30,620.47	42,433.00	11,199.00	38.58%
Early Years	86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Recreation & Cultural				-	
Parks - W	15,600.00	18,541.65	5,711.00	(9,889.00)	-69.20%
Parks - B	1,050.00	1,168.31	1,050.00	-	-10.13%
Trailer Park - W	9,778.00	9,943.08	9,778.00	-	-1.66%
Campground - B	22,390.00	36,928.83	27,350.00	4,960.00	-25.94%
Rec Programs	81,477.00	74,787.04	70,480.00	(10,997.00)	-5.76%
Aquatic Programs/Pool	490,919.00	149,668.07	158,332.00	(332,587.00)	5.79%
Fitness Programs/Facility	175,706.00	172,635.21	158,884.00	(16,822.00)	-7.97%
Rec Admin	46,500.00	54,869.26	56,100.00	9,600.00	2.24%
Complex Admin		250.00		-	-100.00%
Arena - W	319,255.00	334,353.46	226,625.00	(92,630.00)	-32.22%
Concession - W	32,800.00	27,513.46	16,000.00	(16,800.00)	-41.85%
Pool - W		332,233.66		-	-100.00%
Fitness - W				-	
KOC Hall	39,500.00	39,800.00	39,500.00	-	-0.75%
Arena - B	142,268.00	144,511.55	128,400.00	(13,868.00)	-11.15%
Concession - B	31,800.00	24,757.42	15,200.00	(16,600.00)	-38.60%
Hall - B	15,284.00	12,490.21	15,284.00	-	22.37%
Arena - E/W	13,305.00	13,794.48	14,029.00	724.00	1.70%
Library - W	15,000.00	15,000.00	15,000.00	-	0.00%
Library - B	9,996.00	9,999.96	9,996.00	-	-0.04%
Museum	20,450.00	21,387.52	8,015.00	(12,435.00)	-62.52%
Memorial Hall	2,493,697.00	2,549,133.21		(2,493,697.00)	-100.00%
Blyth Meeting Room				-	
Community Development			68,008.00	68,008.00	
Planning & Zoning	23,200.00	33,766.98	9,500.00	(13,700.00)	-71.87%
Drainage	15,900.00	18,497.28	17,650.00	1,750.00	-4.58%
Capital Revenue			1,103,992.00	1,103,992.00	
TOTAL REVENUE	13,215,863.00	12,899,762.83	9,457,746.00	(3,758,117.00)	-26.68%
Expenditures					
General Government				-	
General Government	124,804.00	253,727.94	252,785.00	127,981.00	-0.37%
Members of Council	96,000.00	97,668.60	98,000.00	2,000.00	0.34%
Administration	1,062,913.00	1,026,087.07	989,342.00	(73,571.00)	-3.58%
Rental Property Expense				-	
Protection to				-	
Persons & Property				-	
Fire	625,077.00	651,877.61	629,467.00	4,390.00	-3.44%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

	2017	2017	2018	Budget	Budget - Actual
	Budget	Actuals	Budget	Variance	% Change
FPO & NH ONLY	151,494.00	132,611.48	126,596.82	(24,897.18)	-4.54%
ESTC	259,926.00	185,860.24	150,919.00	(109,007.00)	-18.80%
Police	1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
Conservation Authority	84,840.00	84,840.00	86,161.00	1,321.00	1.56%
Building Department	217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%
Property Standards	15,796.00	9,283.87	15,796.00	-	70.14%
Animal Control	6,000.00	1,712.61	4,000.00	(2,000.00)	133.56%
Emergency Planning	5,075.00	8,925.86	4,000.00	(1,075.00)	-55.19%
Transportation Services				-	
Public Works (New)	2,898,211.00	3,323,901.90	2,092,573.11	(805,637.89)	-37.04%
Streetlighting	695,710.00	168,931.63	158,856.00	(536,854.00)	-5.96%
Air Transportation	99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%
Environmental Services				-	
Sanitary Sewer	1,431,768.00	1,080,595.29	1,027,308.00	(404,460.00)	-4.93%
Waterworks	1,721,664.00	1,349,124.98	1,261,379.00	(460,285.00)	-6.50%
Storm Sewer	38,470.00	23,824.17	55,998.00	17,528.00	135.05%
Waste Disposal/Diversion	557,975.00	624,827.61	510,268.00	(47,707.00)	-18.33%
Health Services				-	
Cemeteries	153,477.00	141,303.66	146,133.00	(7,344.00)	3.42%
Social & Family Services				-	
ChildCare	809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
Best Start				-	
Early Learning	91,403.00	148,208.01	141,316.00	49,913.00	-4.65%
Before & After - Maitland	106,177.00	80,243.69	110,411.00	4,234.00	37.59%
Before & After - Sacred Heart	29,446.00	22,633.06	30,672.00	1,226.00	35.52%
Early Years	86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Recreation & Cultural				-	
Parks - W	163,665.00	133,877.44	145,862.00	(17,803.00)	8.95%
Parks - B	48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%
Parks - EW	4,052.00	967.92	3,302.00	(750.00)	241.14%
Trailer Park - W	14,207.00	8,067.90	11,708.00	(2,499.00)	45.12%
Campground - B	68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%
Rec Programs	79,865.00	72,367.59	71,073.00	(8,792.00)	-1.79%
Aquatic Programs/Pool	820,110.00	797,159.52	463,947.00	(356,163.00)	-41.80%
Fitness Programs/Facility	194,333.00	183,295.09	175,712.00	(18,621.00)	-4.14%
Rec Admin	422,577.00	454,144.97	445,434.00	22,857.00	-1.92%
Complex Admin				-	
Arena - W	386,965.00	376,708.51	326,877.00	(60,088.00)	-13.23%
Concession - W	32,140.00	28,122.70	16,852.00	(15,288.00)	-40.08%
Pool - W				-	
Fitness - W				-	
KOC Hall	48,025.00	45,503.31	48,494.00	469.00	6.57%
Arena - B	244,944.00	249,083.12	244,970.00	26.00	-1.65%
Concession - B	31,299.00	24,306.80	15,602.00	(15,697.00)	-35.81%
Hall - B	75,863.00	53,487.31	81,593.00	5,730.00	52.55%
Arena - E/W	51,503.00	52,229.93	53,129.00	1,626.00	1.72%
Library - W	32,561.00	22,838.96	31,838.00	(723.00)	39.40%
Library - B	14,732.00	13,699.09	14,812.00	80.00	8.12%
Museum	48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%
Memorial Hall	2,557,356.00	2,610,992.34	63,571.00	(2,493,785.00)	-97.57%
Blyth Meeting Room				-	
Community Development	184,792.00	172,361.16	253,688.00	68,896.00	47.18%
Planning & Development	20,000.00	23,177.85	25,000.00	5,000.00	7.86%
Drainage	25,200.00	27,261.52	28,400.00	3,200.00	4.18%
Capital Expenditures			1,764,991.00	1,764,991.00	</

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

TOWNSHIP OF NORTH HURON - 2018 AREA RATING SCHEDULE - B							
	WINGHAM	BLYTH	EAST WAWANOSH	TOTAL	TAXATION AMOUNT	FLAT RATE	TOTAL RAISED
EXPENSES							
1. POLICING	1,449,840.00	167,937.00	155,018.00	1,772,795.00			
2. STREETLIGHTING	109,713.00	42,588.00		152,301.00		6,555.00	158,856.00
3. SANITATION				-			
4. RECYCLING							
SUBTOTAL	1,559,553.00	210,525.00	155,018.00	1,925,096.00			
5. COMPLEX				-			
6. LONG TERM				-			
TOTAL	1,559,553.00	210,525.00	155,018.00	1,925,096.00			
REVENUE OFFSETS							
LESS: S/L RESERVES				-			
LESS: OMPF FUNDING			10,000.00	10,000.00			
LESS: OPP REBATE				-			
LESS: POLICE REVENUE	115,088.00			115,088.00			
LESS: WESTARIO	17,200.00			17,200.00			
LESS: RESERVES				-			
LESS: RECYCLING REV				-			
LESS: POLICE RESERVES				-			
LESS: GAS TAX				-			
TOTAL	132,288.00	-	10,000.00	142,288.00			
TOTAL AREA RATED	1,427,265.00	210,525.00	145,018.00	1,782,808.00	3,739,436.93	6,555.00	5,528,799.93
	1,417,440.00					5,528,799.93	
	32,400.00						
	1,449,840.00						

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 General Government Budget							
			2017	2017	2018	Budget \$	Budget - Actual
Revenue			Budget	Actuals	Budget	Variance	% Change
1000	5100	Licences/Permits	5,000.00	5,862.30	5,500.00	500.00	
1000	5101	Marriage Licences	1,200.00	1,404.00	1,500.00	300.00	
1000	5102	Civil Marriages	3,000.00	2,250.00	3,000.00	-	
1000	5105	Fines				-	
1000	5115	Interest Income	37,000.00	53,199.08	37,000.00	-	
1000	5117	Penalty & Interest on Taxes	70,000.00	84,998.83	70,000.00	-	
1000	5118	Interest A/R Program	500.00	115.64	250.00	(250.00)	
1000	5120	Misc Revenue	8,000.00	27,047.17	8,000.00	-	
1000	5125	Transfer from Reserve	16,602.00	16,602.00	17,200.00	598.00	
1000	5125	Transfer from Reserve - SS				-	
1000	5200	Admissions/Rentals	3,000.00	12,568.89	3,000.00	-	
1000	5282	Unconditional Grants - OMPF	1,361,000.00	1,361,000.00	1,395,000.00	34,000.00	
1000	5286	Conditional Grants - Ontario				-	
1000	5288	Conditional Grants - Canada				-	
1000	5700	Tax Certificates	4,500.00	6,670.00	5,000.00	500.00	
9500	4020	Supplemental Revenue	3,000.00	21,659.31	3,000.00	-	
9500	4040	Payments In Lieu	55,000.00	79,483.64	55,000.00	-	
1000	5290	Shared Services - Revenue MT		1,139.05		-	
1000	5950	Sale of Land		106,692.82		-	
			1,567,802.00	1,780,692.73	1,603,450.00	35,648.00	-9.95%
						-	
Expenditures							
						0	
1000	6900	Principal Payment	71,443.00	71,442.99	73,585.00	2,142.00	
1000	6902	Interest Payment	16,764.00	16,764.37	14,777.00	(1,987.00)	
1000	6295	Transfer to General Reserves - Assets		126330.23	127,826.00	127,826.00	
1000	6290	Physician Recruitment	33,097.00	33,097.00	33,097.00	-	
1000	6340	Energy & Environment	3,500.00	3,300.08	3,500.00	-	
1000	6292	Shared Services Expenses - Admin		2,793.27		-	
						-	
			124,804.00	253,727.94	252,785.00	127,981.00	-0.37%
		Civil Marriage/Licences					

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Members of Council Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
1100	5290	Revenue from Other Mun		1,576.27			
Total Revenue				1,576.27			
Expenditures							
1100	6125	Benefits - Part Time	2,000.00	1,803.58	2,000.00	-	
1100	6150	Honorarium	72,000.00	72,519.00	72,000.00	-	
1100	6220	Training/Travel/Workshops	14,000.00	17,500.56	20,000.00	6,000.00	
1100	6292	Misc Expense	2,000.00	2,029.46		(2,000.00)	
1100	6293	Council Contingency	6,000.00	3,816.00	4,000.00	(2,000.00)	
						-	
Total Expenditures			96,000.00	97,668.60	98,000.00	2,000.00	0.34%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Administration Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
1210	5110	Donation - Theatre	1,500.00	7,705.00		(1,500.00)	
1200	5125	Transfer from Reserves	73,849.00	97,960.64	40,000.00	(33,849.00)	
1200	5125	Transfer from Reserves (Election)	24,112.00		5,000.00	(19,112.00)	
1200	5200	Admissions/Rentals	1,000.00	362.50	1,000.00	-	
1200	5280	Grants/Levies OCIF	32,000.00	4,050.00		(32,000.00)	
1200	5280	Trillium - Theatre Balance	3,000.00			(3,000.00)	
1200	5288	Gas Tax - Asset Management				-	
1200	5290	Revenue Other Municipalities - MT		684.30		-	
Total Revenue			135,461.00	110,762.44	46,000.00	(89,461.00)	-58.47%
						-	
						-	
Expenditures							
1200	6100	Salaries - Full Time	516,419.00	474,279.64	434,190.00	(82,229.00)	
1200	6120	Benefits - Full Time	149,762.00	121,194.49	125,915.00	(23,847.00)	
1200	6200	Clothing/Uniforms	910.00	687.74	910.00	-	
1200	6205	Meeting Allowance	5,800.00	4,100.00	5,800.00	-	
1200	6210	Subscriptions/Memberships	5,731.00	5,537.93	5,731.00	-	
1200	6220	Training/Travel/Workshops	16,000.00	15,253.33	16,000.00	-	
1200	6230	Health & Safety	4,800.00	3,684.21	4,800.00	-	
1200	6240	Advertising/Promotion	5,500.00	2,848.01	5,500.00	-	
1200	6255	Postage/Courier	10,500.00	11,206.72	12,600.00	2,100.00	
1200	6260	Phone/Fax/Internet	9,500.00	8,589.40	9,500.00	-	
1200	6265	Lease/Copier Expense	5,500.00	4,330.27	5,500.00	-	
1200	6270	Insurance	10,000.00	7,918.78	7,920.00	(2,080.00)	
1200	6280	Legal/Accounting	30,000.00	44,557.67	50,000.00	20,000.00	
1200	6281	Insurance Deductible Expense	15,000.00	13,859.86	15,000.00	-	
1200	6282	Tax Write-Offs/Refunds	26,000.00	25,597.66	26,000.00	-	
1200	6283	Tax Collection	500.00	413.58	500.00	-	
1200	6284	Bank Fees/Charges	1,815.00	3,101.30	1,815.00	-	
1200	6285	Service Awards	650.00	635.89	125.00	(525.00)	
1200	6286	Election Expense	6,000.00	966.72	24,000.00	18,000.00	
1200	6287	Rental Properties Expense	500.00	456.29	500.00	-	
1200	6290	Materials/Supplies	21,000.00	22,859.47	28,350.00	7,350.00	
1200	6292	Misc Expense		-	4,000.00		
1200	6295	Transfer to Reserves		5,000.00		-	
1200	6330	Inspections/Contracts	1,500.00	22,279.32	1,500.00	-	
1200	6800	Civil Marriage Fees	1,500.00	900.00	1,500.00	-	
1200	6910	Pay Equity/Market Review Study			40,000.00	40,000.00	
		Pay Equity/Market Review Impact			70,000.00	70,000.00	
1200	6910	HR/Recruitment	13,500.00	23,440.12	10,000.00	(3,500.00)	
1200	6915	Asset Management/PSAB	10,000.00	3,012.71	10,000.00	-	
Total Expenditures			868,387.00	826,711.11	917,656.00	49,269.00	11.00%
Townhall Building Expense							
1210	6100	Salaries - Full Time	5,996.00	9,809.35	7,462.00	1,466.00	
1210	6110	Salaries - Part Time	1,353.00	578.21	1,381.00	28.00	
1210	6111	Wages - PW Support	1,083.00	434.52	1,083.00	-	
1210	6120	Benefits - Full Time	1,969.00	2,998.67	2,399.00	430.00	
1210	6127	Benefit -- PW Support	303.00	118.27	303.00	-	
1210	6200	Clothing/Uniforms		0		-	
1210	6260	Phone/Fax/Internet	336.00	309.12	336.00	-	
1210	6270	Insurance	8,775.00	11,838.96	9,221.00	446.00	
1210	6295	Transfer to Reserve		37,772.87		-	
1210	6300	Bldg Repair/Maintenance	7,850.00	5,352.12	11,350.00	3,500.00	
1210	6320	Janitorial Supplies	750.00	537.24	750.00	-	
1210	6330	Inspections/Contracts	16,958.00	17,218.89	15,658.00	(1,300.00)	
1210	6350	Electricity	17,833.00	13,898.09	14,593.00	(3,240.00)	
1210	6360	Water/Sewer	2,100.00	1,638.07	2,100.00	-	
1210	6370	Natural Gas/Heat	3,180.00	3,390.56	2,358.00	(822.00)	
1210	6380	Waste Disposal	742.00	713.57	742.00	-	
1210	6390	SnowPlowing		0		-	
1210	6401	PW Machine Rent	1,950.00	986.68	1,950.00	-	
Total Building Expense			71,178.00	107,595.19	71,686.00	508.00	-33.37%
Total Expense			939,565.00	934,306.30	989,342.00	49,777.00	5.89%
Capital Expense							
1210	0400	Commvalut Backup/Copiers				-	
1210	0300	Townhall Renovations				-	
1210	0300	General Facility Repairs				-	(Moved to Rec Ad)
1210	0300	Facility Condition Assessment				-	
1210	0300	HVAC	45,000.00	39,696.88		(45,000.00)	
1210	0300	Theatre Renovations	78,348.00	52,083.89		(78,348.00)	
Total Capital			123,348.00	91,780.77	-	(123,348.00)	
						-	
Total Operating and Capital			1,062,913.00	1,026,087.07	989,342.00	(73,571.00)	-3.58%
						-	

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Fire Budget						
		2017	2017	2018	Budget \$	Budget - Actual
Revenue		Budget	Actuals	Budget	Variance	% Change
2100	5110 Donations				-	
2100	5125 Transfer from Reserves				-	
2100	5700 Grants/Fees (MVA)				-	
2100	5290 Rev-Other Municipalities	311,078.00	311,078.16	316,367.00	5,289.00	
2100	5700 Rev - Fire Marque/Recoverable	14,000.00	26,042.57	15,000.00	1,000.00	
Total Revenue		325,078.00	337,120.73	331,367.00	6,289.00	-1.71%
Expenditures						
2100	6100 Salaries/Wages - Full Time	84,679.00	80,874.20	65,000.00	(19,679.00)	
2100	6110 Salaries/Wages - Part Time	159,316.00	160,185.46	167,038.00	7,722.00	
2100	6120 Benefits	42,283.00	44,078.63	45,696.00	3,413.00	
2100	6200 Clothing/Uniforms/Bunker Gear	12,695.00	28,543.03	12,715.00	20.00	
2100	6210 Subscriptions/Memberships	509.00	865.56	615.00	106.00	
2100	6220 Training/Travel/Workshops	24,829.00	13,588.75	38,000.00	13,171.00	
2100	6230 Health & Safety	1,018.00	1,056.07	1,070.00	52.00	
2100	6240 Advertising/Promotion	916.00	3,094.06	950.00	34.00	
2100	6250 Office Supplies	662.00	982.43	700.00	38.00	
2100	6255 Postage/Courier	204.00	276.80	300.00	96.00	
2100	6260 Phone/Fax/Internet	2,378.00	2,354.62	2,460.00	82.00	
2100	6265 Lease/Copier	764.00	407.13	720.00	(44.00)	
2100	6270 Insurance	20,697.00	17,258.82	15,590.00	(5,107.00)	
2100	6280 Legal/Accounting	814.00	305.29	800.00	(14.00)	
2100	6285 Service Awards	305.00	69.35	300.00	(5.00)	
2100	6290 Materials/Supplies	17,235.00	21,414.97	16,000.00	(1,235.00)	
2100	6292 Misc		-		-	
2100	6295 Transfer to Reserves	70,010.00	130,702.78	122,040.00	52,030.00	
2100	6330 Inspections/Contracts	2,835.00	2,098.29	2,840.00	5.00	
2100	6335 Dispatch	23,238.00	23,027.23	25,678.00	2,440.00	
2100	6400 Equipment Repair/Maint	36,237.00	21,194.29	35,000.00	(1,237.00)	
2100	6410 Fuel	8,600.00	4,915.04	8,750.00	150.00	
2100	6472 Radio Equipment	9,934.00	6,407.93	11,000.00	1,066.00	
2100	6620 Mutual Aid	480.00	461.44	480.00	-	
2100	6704 Food	1,200.00	2,260.16	2,000.00	800.00	
2100	6790 Generator Expense	1,200.00	-	1,200.00	-	
2100	6795 Public Education	500.00	450.03	500.00	-	
2100	6900 Loan - Principle SCBA	7,578.00	7,578.08	7,800.00	222.00	
2100	6955 Gain/loss on Disposal of Assets		(424.43)		-	
Total Expenditure		531,116.00	574,026.01	585,242.00	54,126.00	1.95%
Wingham Hall						
2110	6100 Salaries - Full time	4,654.00	1,462.80	3,400.00	(1,254.00)	
2110	6111 Wages - PW Support	1,825.00	-	1,825.00	-	
2110	6110 Salaries - Part time	183.00	774.99	187.00	4.00	
2110	6120 Benefits - Full time	1,381.00	440.40	1,018.00	(363.00)	
2110	6127 Benefits - PW Support	511.00	204.71	511.00	-	
2110	6270 Insurance	2,514.00	1,627.56	1,676.00	(838.00)	
2110	6300 Building Repair & Maintenance	3,500.00	-	5,200.00	1,700.00	
2110	6320 Janitorial Supplies	275.00	266.35	275.00	-	
2110	6330 Inspections/Contracts	1,820.00	487.44	1,820.00	-	
2110	6350 Electricity	3,020.00	2,904.37	3,050.00	30.00	
2110	6360 Water/Sewer	850.00	848.27	875.00	25.00	
2110	6370 Natural Gas/Heat	1,900.00	2,075.82	1,900.00	-	
2110	6380 Waste Disposal	25.00	34.98	494.00	469.00	
2110	6390 SnowPlowing/Grass Cutting		-		-	
2110	6401 PW Machinery Rent	3,285.00	1,760.00	3,285.00	-	
Total		25,743.00	12,887.69	25,516.00	(227.00)	97.99%
Blyth Hall						
2115	6100 Salaries - Full time	446.00	399.86	454.00	8.00	
2115	6111 Wages - PW Support	1,146.00	1,372.83	1,145.00	(1.00)	
2115	6110 Salaries - Part time	2,568.00	1,153.35	2,619.00	51.00	
2115	6120 Benefits - Full time	311.00	178.16	342.00	31.00	
2115	6127 Benefits - PW Support	323.00	264.38	323.00	-	
2115	6270 Insurance	1,291.00	1,366.14	1,407.00	116.00	
2115	6300 Building Repair/Maintenance	1,035.00	247.66	1,035.00	-	
2115	6320 Janitorial Supplies	248.00	260.39	248.00	-	
2115	6330 Inspections/Contracts	108.00	-	108.00	-	
2115	6350 Electricity	5,292.00	4,232.85	5,557.00	265.00	
2115	6360 Water/Sewer	476.00	475.98	487.00	11.00	
2115	6370 Natural Gas/Heat		-		-	
2115	6375 Propane	2,925.00	1,374.74	2,925.00	-	
2115	6380 Waste Disposal		-		-	
2115	6390 SnowPlowing/Grass Cutting		-		-	
2115	6401 PW Machinery Rent	2,059.00	2,349.75	2,059.00	-	
Total		18,228.00	13,676.09	18,709.00	481.00	36.80%
Total Operating		575,087.00	600,589.79	629,467.00	54,380.00	
Capital						
2100	500 Pumper/Tanker					
2100	400 Equipment Capital	49,990.00	51,287.82		(49,990.00)	
Total Capital		49,990.00	51,287.82	-	(49,990.00)	
Total Capital and Operating		625,077.00	651,877.61	629,467.00	4,390.00	-3.44%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 FPO & NHONLY BUDGET							
			2017	2017	2018	Budget \$	Budget - Actual
Revenue			Budget	Actuals	Budget	Variance	% Change
2120	5110	Donations					
2120	5125	Transfer from Reserves				-	
2120	5700	Fire Inspection Fees	5,000.00	630.00	600.00	(4,400.00)	
2120	5290	Rev-Other Municipalities				-	
						-	
Total Revenue			5,000.00	630.00	600.00	(4,400.00)	-4.76%
Expenditures							
2120	6110	Wages		2,972.18	6,000.00		
2120	6120	Benefits		316.92	1,740.00	1,740.00	
2120	6210	Subscriptions & Memberships	1,028.00		500.00	(528.00)	
2120	6220	Training/Travel/Workshops		273.41	800.00		
2120	6295	Transfer to Reserve		6,500.00		-	
2120	6330	Inspections & Contracts	25,810.00	5,352.98		(25,810.00)	
2120	6795	Public Education	3,599.00	2,639.16	3,000.00	(599.00)	
2120	6900	Loan Principal - Payouts/Bldg	73,577.00	73,576.82	76,610.80	3,033.80	
2120	6902	Loan Interest - Payouts/Bldg	40,980.00	40,980.01	37,946.02	(3,033.98)	
2120	6955	Gain/Loss on Disposal of Assets				-	
Total Expense			144,994.00	132,611.48	126,596.82	(18,397.18)	-4.54%
						-	
Capital						-	
2120	300	Diesel Exhaust				-	
2120	300	Floor Drain	6,500.00			(6,500.00)	
Total Operating and Capital						-	
			151,494.00	132,611.48	126,596.82	(24,897.18)	-4.54%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
2018 ESTC Training Centre							
Revenue							
2700	5100	Course Revenue	54,950.00	21,772.35	20,300.00	(34,650.00)	
2700	5103	Contract Instructor Courses	81,174.00			(81,174.00)	
2700	5120	Misc Revenue		110.19		-	
2700	5121	Meal Revenue	21,770.00	1,082.23	250.00	(21,520.00)	
2700	5125	Transfer from Reserve		70,411.27		-	
2700	5132	Donations				-	
2700	5200	Facility Rental	38,325.00	40,106.50	5,000.00	(33,325.00)	
2700	5205	Classroom/Long Term Rental	8,710.00	275.00		(8,710.00)	
2700	5208	PPE Rental	1,150.00			(1,150.00)	
2700	5255	Clothing/Textbook Sales	2,000.00	255.70		(2,000.00)	
2700	5280	Grants/Levies				-	
2700	5900	Loan Proceeds				-	
Total			208,079.00	134,013.24	25,550.00	(182,529.00)	-80.93%
Expenditures							
2700	6100	Salaries & Wages	33,750.00	42,613.50	39,798.00	6,048.00	
2700	6110	Wages - Part time	20,150.00	7,387.50		(20,150.00)	
2700	6120	Benefits	9,163.00	6,329.93	7,190.00	(1,973.00)	
2700	6200	Clothing/Uniforms				-	
2700	6210	Subscriptions/Memberships	460.00	134.29	135.00	(325.00)	
2700	6220	Travel/Training	500.00	876.89	880.00	380.00	
2700	6223	Mileage - Instructors	500.00	48.58	50.00	(450.00)	
2700	6224	Meal Expense - Instructors		16.68	50.00	50.00	
2700	6225	Accommodations	1,500.00		500.00	(1,000.00)	
2700	6240	Advertising/Promotion	3,000.00	5,416.29	2,000.00	(1,000.00)	
2700	6250	Office Supplies	2,500.00	1,712.30	500.00	(2,000.00)	
2700	6255	Postage/Courier	100.00	312.51	100.00	-	
2700	6260	Phone/Fax/Internet	1,000.00	1,939.28	2,000.00	1,000.00	
2700	6265	Lease/Copier	1,200.00	1,025.04	1,025.00	(175.00)	
2700	6270	Insurance	4,000.00	2,645.31	4,225.00	225.00	
2700	6284	Legends Software	4,964.00	1,287.73	1,860.00	(3,104.00)	
2700	6290	Materials/Supplies	24,610.00	23,611.88	2,500.00	(22,110.00)	
2700	6295	Transfer to Reserves				-	
2700	6330	Contract - Consulting			2,500.00	2,500.00	
2700	6335	Contracts - Instructors	41,651.00	7,114.00	6,000.00	(35,651.00)	
2700	6350	Hydro - program cost	500.00	398.87	400.00	(100.00)	
2700	6375	Propane - program cost	8,295.00	5,201.68	1,000.00	(7,295.00)	
2700	6400	Equipment Repair/Maintenance	5,000.00	13,257.41	5,000.00	-	
2700	6410	Fuel - Program Diesel	1,400.00	357.76	400.00	(1,000.00)	
2700	6704	Meals - Courses	18,069.00	2,599.14	1,200.00	(16,869.00)	
2700	6790	Clothing (resale)	3,000.00	493.50	-	(3,000.00)	
2700	6900	Loan - Payment Principal @ 55%	26,852.00	26,852.06	27,858.00	1,006.00	
2700	6902	Loan - Interest	20,183.00	20,182.91	19,177.00	(1,006.00)	
2700	6955	Gain/Loss on Disposal		(3,755.21)		-	
Total			232,347.00	168,059.83	126,348.00	(105,999.00)	-24.82%
Building Costs							
2710	6100	Salaries - Full time	545.00	272.25	741.00	196.00	
2710	6111	Wages - PW Support	1,401.00	1,409.66	1,401.00	-	
2710	6110	Salaries - Part time	3,139.00	1,872.09	3,201.00	62.00	
2710	6120	Benefits	380.00	298.97	417.00	37.00	
2710	6127	Benefits - PW Support	395.00	323.13	394.00	(1.00)	
2710	6270	Insurance	1,578.00	1,669.74	1,720.00	142.00	
2710	6300	Building Repair/Maintenance	6,065.00	370.81	2,065.00	(4,000.00)	
2710	6320	Janitorial Supplies	303.00	401.91	303.00	-	
2710	6330	Inspections/Contracts	632.00	788.84	852.00	220.00	
2710	6350	Electricity	6,468.00	5,173.46	6,791.00	323.00	
2710	6360	Water/Sewer	582.00	581.70	595.00	13.00	
2710	6375	Propane	3,575.00	1,680.23	3,575.00	-	
2710	6380	Waste Disposal		232.37		-	
2710	6390	Grass Cutting/Snowplowing				-	
2710	6401	PW Machinery Rent	2,516.00	2,725.25	2,516.00	-	
Total			27,579.00	17,800.41	24,571.00	(3,008.00)	38.04%
Capital							
2700	300	Burn Building Update				-	
2700	400	Generator				-	
Total Operating & Capital			259,926.00	185,860.24	150,919.00	(109,007.00)	-18.80%
						-	

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Police Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2200	5105	Fines/Parking Revenues	2,000.00	2,958.00	2,200.00	200.00	
2200	5120	Misc Revenue	100.00	13,668.61		(100.00)	
2200	5125	Transfer from Reserves				-	
2200	5280	Court Security/Prisoner Trans	1,187.00	2,682.82	2,888.00	1,701.00	
2200	5286	Conditional Grants - Ontario	90,500.00	101,454.77	110,000.00	19,500.00	
Total Revenue			93,787.00	120,764.20	115,088.00	21,301.00	-4.70%
Expenditures							
2200	6100	Salaries - Full Time	776,104.00	759,312.34	882,541.00	106,437.00	
2200	6120	Benefits - Full Time	194,110.00	201,101.40	264,762.00	70,652.00	
2200	6130	Overtime	45,000.00	54,298.11	70,000.00	25,000.00	
2200	6150	Honorarium	5,000.00	4,020.00	5,000.00	-	
2200	6200	Clothing/Uniforms	5,000.00	4,398.93	5,000.00	-	
2200	6205	Meeting Allowance	600.00	600.00	600.00	-	
2200	6210	Subscriptions/Memberships	1,500.00	973.44	2,000.00	500.00	
2200	6220	Training/Travel/Workshops	6,000.00	5,425.33	9,000.00	3,000.00	
2200	6225	Police Board Expenses	2,000.00	4,436.02	2,500.00	500.00	
2200	6250	Office Supplies	7,500.00	6,451.29	10,000.00	2,500.00	
2200	6260	Phone/Fax/Internet	3,500.00	2,679.76	3,700.00	200.00	
2200	6270	Insurance	13,000.00	12,003.41	14,000.00	1,000.00	
2200	6280	Legal/Accounting	5,000.00	686.88	10,000.00	5,000.00	
2200	6295	Transfer to Reserve	10,000.00	39,000.00	15,000.00	5,000.00	
2200	6400	Equip Repair/Maintenance	9,000.00	35,232.50	12,000.00	3,000.00	
2200	6410	Fuel	15,000.00	15,869.87	20,000.00	5,000.00	
2200	6650	Communication System	40,000.00	31,333.43	47,000.00	7,000.00	
2200	6685	OPTIC	11,000.00	9,235.13	15,000.00	4,000.00	
2200	6686	CISO	3,500.00	2,039.91	3,500.00	-	
2200	6690	OPP Policing	324,116.00	321,051.81	322,955.00	(1,161.00)	
Total Expenditures			1,476,930.00	1,510,149.56	1,714,558.00	237,628.00	13.54%
Police Stn							
2210	6100	Salaries - Full Time	4,231.00	1,452.20	6,474.00	2,243.00	
2210	6111	Wages PW Support	1,083.00	79.18	1,083.00	-	
2210	6110	Salaries - Part Time	200.00	282.52	200.00	-	
2210	6120	Benefits - Full Time	1,261.00	451.66	1,911.00	650.00	
2210	6127	Benefits - PW Support	303.00	81.94	303.00	-	
2210	6270	Insurance	1,892.00	2,003.40	2,063.00	171.00	
2210	6295	Transfer to Reserves		-		-	
2210	6300	Bldg Repair/Maintenance	1,200.00	255.27	750.00	(450.00)	
2210	6320	Janitorial Supplies	300.00	251.04	300.00	-	
2210	6330	Inspections/Contracts	5,135.00	4,348.05	1,416.00	(3,719.00)	
2210	6350	Electricity	8,505.00	6,611.64	6,943.00	(1,562.00)	
2210	6360	Water/Sewer	850.00	826.87	850.00	-	
2210	6370	Natural Gas/Heat	1,100.00	1,016.92	1,100.00	-	
2210	6380	Waste Disposal	494.00	464.13	494.00	-	
2210	6390	SnowPlowing		-		-	
2210	6401	PW Machinery Rent	1,950.00	1,006.69	1,950.00	-	
Total Building Expenditures			28,504.00	19,131.51	25,837.00	(2,667.00)	35.05%
Total Operating Expenditures			1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
Capital							
2210	0300	Garage Upgrades				-	
2210	0500	New Cruiser				-	
Total Capital			-			-	
Total Expense - Operating + Capital			1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
2018 Capital					32,400.00		
					1,772,795.00		
					(322,955.00)		
					1,449,840.00		

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Conservation Authority Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Expenditures							
2300	6680	Conservation Levy	84,840.00	84,840.00	86,161.00	1,321.00	
						-	
Total Expenditures			84,840.00	84,840.00	86,161.00	1,321.00	1.56%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Building Department Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2400	5100	Building Permits	70,000.00	66,627.05	70,000.00	-	
2400	5105	Misc Revenue			34,296.00	34,296.00	
2400	5125	Transfer from Reserve				-	
2400	5131	Pool Permits				-	
2400	5132	Sign Permits				-	
2400	5280	Grants (Source Water)	6,575.00	7,725.00		(6,575.00)	
2400	5290	Revenue - Howick	32,880.00	84,680.48		(32,880.00)	
2400	5290	Revenue - MT	47,152.00		41,089.00	(6,063.00)	
2400	5700	Zoning Certificates			4,500.00		
Total Revenues			156,607.00	159,032.53	149,885.00	(6,722.00)	-5.75%
						-	
						-	
Expenditures						-	
2400	6100	Salaries - Full Time	65,704.00	73,019.64	62,732.00	(2,972.00)	
2400	6120	Benefits - Full Time	19,054.00	19,581.15	19,447.00	393.00	
2400	6200	Clothing/Uniforms	300.00	117.07	675.00	375.00	
2400	6210	Subscriptions/Memberships	1,180.00	517.42	1,350.00	170.00	
2400	6220	Training/Travel/Workshops	8,600.00	3,850.12	8,000.00	(600.00)	
2400	6240	Advertising/Promotion	100.00	161.81		(100.00)	
2400	6250	Office Supplies	100.00	1,093.23	500.00	400.00	
2400	6260	Phone/Fax/Internet	720.00	759.98	1,500.00	780.00	
2400	6270	Insurance	380.00	380.00	380.00	-	
2400	6280	Legal/Accounting	7,000.00	4,211.44		(7,000.00)	
2400	6290	Materials/Supplies	1,500.00	161.07	850.00	(650.00)	
2400	6295	Transfer to Reserve		-		-	
2400	6330	Inspections/Contracts	102,500.00	125,443.87	91,939.00	(10,561.00)	
2400	6340	Engineering	5,000.00	-		(5,000.00)	
2400	6400	Equip Repair/Maintenance	2,800.00	534.05		(2,800.00)	Fuel & maintenance
2400	6410	Fuel		1,758.50	3,500.00	3,500.00	
2400	6250	Computer Software	1,000.00		1,100.00	100.00	
2400	6330	Accessibility			500.00	500.00	
2400	6706	Office Rent/Utilities	1,240.00	1,240.00	3,950.00	2,710.00	
Total Expenditures			217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%
						-	
Capital						-	
2400	500	Vehicle Replacement				-	
						-	
Total Operating and Capital			217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Property Standards Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2410	5133	Inspections		80.00		-	
2410	5105	Misc revenue			100.00	100.00	
Total Revenue				80.00	100.00	100.00	25.00%
Expenditures						-	
2410	6100	Salaries - Full Time	7,240.00	2,112.00	7,240.00	-	
2410	6120	Benefits - Full Time	2,146.00	612.48	2,146.00	-	
2410	6200	Clothing/Uniforms				-	
2410	6210	Subscriptions/Memberships	110.00		110.00	-	
2410	6220	Training/Travel/Workshops	2,600.00		2,600.00	-	
2410	6240	Advertising/Promotion				-	
2410	6250	Office Supplies	300.00	7.80	300.00	-	
2410	6260	Phone/Fax/Internet	200.00		200.00	-	
2410	6280	Legal/Accounting	2,500.00	3,242.74	2,500.00	-	
2410	6330	Inspections/Contracts		3,308.85			
2410	6400	Equip Repair/Maintenance	200.00		200.00	-	
2410	6410	Fuel	500.00		500.00	-	
Total Expenditures			15,796.00	9,283.87	15,796.00	-	70.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Animal Control Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
2500	5100	Licences/Permits	10,000.00	8,635.00	8,800.00	(1,200.00)	
2500	5105	Fines	800.00	685.00	800.00	-	
2500	5280	Livestock Claim Grants	1,000.00		1,000.00	-	
Total Revenue			11,800.00	9,320.00	10,600.00	(1,200.00)	13.73%
						-	
						-	
Expenditures						-	
2500	6280	Legal	1,000.00		500.00	(500.00)	
2500	6290	Materials/Supplies	1,600.00	778.03	800.00	(800.00)	
2500	6660	Animal Control Officer	1,500.00	934.58	1,000.00	(500.00)	
2500	6330	Inspections/Contracts	400.00		200.00	(200.00)	
2500	6670	Livestock Claims	1,500.00		1,500.00	-	
Total Expenditures			6,000.00	1,712.61	4,000.00	(2,000.00)	133.56%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Emergency Planning Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
2600	5125	Transfer from Reserves					
2600	5280	Grants/Levies					
Total Revenue							
Expenditures							
2600	6100	Wages		1,207.78			
2600	6120	Benefits		882.60			
2600	6130	Overtime		4,632.52			
2600	6205	Meeting Allowance					
2600	6220	Training/Travel/Workshops	1,075.00	143.55	500.00	(575.00)	
2600	6290	Materials/Supplies	1,500.00	916.67	1,000.00	(500.00)	
2600	6295	Transfer to Reserve				-	
2600	6401	Machine Rent		560.00		-	
2600	6790	Generator Expense				-	
2600	6795	Public Education	2,500.00		2,500.00	-	
2600	6910	Flood Management		582.74		-	
2600	0400	Generator				-	
Total Expenditures			5,075.00	8,925.86	4,000.00	(1,075.00)	-55.19%

2018 PW Budget			2017	2017	2018	Budget - Actual
			Budget	Actuals	Budget	Variance
Revenue						
3100	5120	Misc Revenue - Developers		14,341.05		
3100	5132	Entrance Permits	5,000.00	2,250.00		
3100	5125	Transfer from Reserve	315,000.00	565,000.00		
3100	5280	Gas Tax	300,000.00	350,000.00		
3100	5280	OCIF - Formula Based	120,000.00	113,276.37		
3100	5290	Shared Services		40,726.12		
3100	5120	Fees & Charges	2,000.00		12,000.00	
3100	5280	Loan Proceeds	270,000.00			
3100	5480	PW Income		32,905.41		
33XX	5480	Equipment Rentals	382,300.00	738,463.55	515,710.00	
Total Revenue			1,394,300.00	1,856,962.50	527,710.00	-71.58%
Expenditures						
Roads Paved						
3111	6100	HT-1 Wages	14,019.00	10,777.26	8,213.00	
3111	6120	HT-1 Benefits	4,206.00	2,845.78	2,381.77	
3111	6130	HT-1 Overtime	1,558.00	247.57	332.00	
3111	6401	HT-1 Machine Rentals	12,000.00	20,277.50	6,280.00	
3112	6100	HT-2 Wages	7,009.00	15,762.95	8,489.00	
3112	6120	HT-2 Benefits	2,103.00	4,549.33	2,461.81	
3112	6130	HT-2 Overtime	779.00	513.78	590.00	
3112	6401	HT-2 Machine Rentals	6,000.00	47,330.00	42,108.00	
3110	6290	Materials & Supplies	10,000.00	9,684.32	10,000.00	
3110	6330	Contracted Service	10,000.00	51,431.04	10,000.00	
Total			67,674.00	163,419.53	90,855.58	-44.40%
Roads Unpaved						
3121	6100	LT-1 Wages	49,498.00	6,594.41	6,937.00	
3121	6120	LT-1 Benefits	13,365.00	1,735.82	2,011.73	
3121	6130	LT-1 Overtime		1,293.76	1,735.00	
3121	6401	LT-1 Machine Rentals	66,668.00	19,825.00	6,280.00	
3122	6100	LT-2 Wages	24,750.00	12,731.91	8,468.00	
3122	6120	LT-2 Benefits	6,682.00	2,776.23	2,455.72	
3122	6130	LT-2 Overtime		1,164.61	1,561.00	
3122	6401	LT-2 Machine Rentals	33,333.00	59,452.50	82,740.00	
3120	6290	Materials & Supplies	200,500.00	183,930.72	200,000.00	
3120	6330	Contracted Service	300.00	293.28		
Total			395,096.00	289,798.24	312,188.45	7.73%
Roads - Bridges & Culverts						
3131	6100	BC Wages	2,596.00	2,276.36	2,803.00	
3131	6120	BC Benefits	701.00	599.79	812.87	
3131	6130	BC Overtime		5.90		
3131	6401	BC Machine Rentals	6,500.00	5,130.00	7,280.00	
3131	6290	BC Materials/Supplies		4,815.55	4,000.00	
3131	6330	BC Contracted Service	7,500.00	2,295.26	3,500.00	
Total			17,297.00	15,122.86	18,395.87	21.64%
Roads - Traffic Operations & Roadside						
3141	6100	RS-1 Wages	17,306.00	46,168.98	42,693.00	
3141	6120	RS-1 Benefits	4,672.00	11,533.56	12,380.97	
3141	6130	RS-1 Overtime		1,542.22	1,900.00	
3141	6401	RS-1 Machine Rentals	4,332.00	80,260.00	46,891.00	
3143	6100	RS-2 Wages	17,306.00	22,533.87	11,835.00	
3143	6120	RS-2 Benefits	4,672.00	5,988.26	3,432.15	
3143	6130	RS-2 Overtime		549.16	675.00	
3143	6401	RS-2 Machine Rentals	4,332.00	39,905.00	6,280.00	
3144	6100	RS-3 Wages	8,653.00	6,897.04	4,734.00	
3144	6120	RS-3 Benefits	2,336.00	1,842.46	1,372.86	
3144	6130	RS-3 Overtime		89.05	119.00	
3144	6401	RS-3 Machine Rentals	2,166.00	14,287.50	10,000.00	
3140	6290	Materials/Supplies	76,500.00	35,708.05	41,500.00	
3140	6330	Contracted Service	20,700.00	35,454.71	40,000.00	
Total			162,975.00	302,759.86	223,812.98	-26.08%
Signs & Guardrails						
3146	6100	SD Wages	8,657.00	7,026.69	2,803.00	
3146	6120	SD Benefits	2,339.00	1,817.74	812.87	
3146	6130	SD Overtime		197.74	265.00	
3146	6401	SD Machine Rentals	2,170.00	10,270.00	7,280.00	
3146	6290	SD Materials/Supplies				
3146	6330	SD Contracted Service				
Total			13,166.00	19,312.17	11,160.87	-42.21%
Winter Control - Except Sidewalks & Parking Lots						
3151	6100	WC Wages	71,278.00	50,575.28	101,800.00	
3151	6120	WC Benefits	21,384.00	12,264.48	29,522.00	
3151	6130	WC Overtime	7,920.00	8,621.39	6,848.00	
3151	6401	WC Machine Rentals	80,000.00	193,076.05	116,580.00	
3154	6100	WP Wages	35,639.00	6,791.00	37,129.00	
3154	6120	WP Benefits	10,692.00	2,049.79	10,767.41	
3154	6130	WP Overtime	3,960.00	4,080.60	2,895.00	
3154	6401	WP Machine Rentals	40,000.00	13,400.00	14,560.00	
3150	6290	Materials/Supplies	12,350.00	42,737.24	65,000.00	
3150	6330	Contracted Service	34,000.00	22,522.08	10,000.00	
Total			317,223.00	356,117.91	395,101.41	10.95%
Winter Control - Sidewalks & Parking Lots						
3161	6100	PL Wages	12,871.00	6,452.03	30,207.00	
3161	6120	PL Benefits	4,008.00	1,645.40	8,760.03	
3161	6130	PL Overtime	1,980.00	826.35	1,595.00	
3161	6401	PL Machine Rentals	15,000.00	5,800.00	6,280.00	
3163	6100	SW Wages	12,871.00	6,302.57	19,403.00	
3163	6120	SW Benefits	4,008.00	1,611.22	5,626.87	
3163	6130	SW Overtime	1,980.00	748.50		
3163	6401	SW Machine Rentals	15,000.00	40,180.00	24,340.00	
3160	6290	Materials/Supplies	650.00	8,739.94	1,500.00	
3160	6330	SW Contracted Service		1,420.39		
Total			68,368.00	73,726.40	97,711.90	32.53%
Roads Administration						
3180	6100	ADMIN F/T Salaries/Wages (PWA, ROH-1-4)	78,522.00	97,418.68	59,806.00	
3180	6101	ADMIN Sick Days	9,000.00	9,264.55	13,088.00	
3180	6102	ADMIN Stat Days	50,000.00	31,693.97	26,010.00	
3180	6103	ADMIN Vacation Days	15,000.00	32,152.13	50,129.00	
3180	6104	ADMIN Bereavement Days	2,350.00	1,248.08	3,913.00	
3180	6105	ADMIN Patrol Inspection - PAT	2,035.00	10,424.82	21,644.00	
3180	6106	ADMIN Training / Health and Safety	460.00	7,769.60	26,501.00	
3180	6107	ADMIN PW Office	15,000.00	31,864.85	50,994.00	

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Streetlighting Budget		2017	2017	2018	Budget \$	Budget - Actual
		Budget	Actuals	Budget	Variance	% Change
Streetlighting Revenue						
01-3400-5450	Humphrey Consumption	2,314.00		2,415.00	101.00	
01-3400-5450	Humphrey S/L Repairs & Maintenance	275.00		250.00	(25.00)	
01-3400-5450	Auburn Consumption	1,157.00		1,260.00	103.00	
01-3400-5450	Auburn S/L Repairs & Maintenance	275.00		170.00	(105.00)	
01-3400-5450	Hutton Heights Consumption	1,405.00		1,365.00	(40.00)	
01-3400-5450	Hutton Heights S/L Repairs & Maint	275.00		300.00	25.00	
01-3400-5450	Whitechurch Consumption	407.00		430.00	23.00	
01-3400-5450	Belgrave Consumption	407.00		365.00	(42.00)	
01-3400-6295	Transfer from reserves				-	
01-3400-5900	Loan Proceeds	540,000.00			(540,000.00)	
Total Revenue		546,515.00		6,555.00	(539,960.00)	
					-	
Wingham Streetlights						
01-3401-6100	Wages	1,500.00	2,566.07	2,250.00	750.00	
01-3401-6120	Benefits	500.00	699.59	585.00	85.00	
01-3401-6130	Overtime	150.00	134.87	-	(150.00)	
01-3401-6290	Materials/Supplies	4,000.00	5,352.48	1,500.00	(2,500.00)	
01-3401-6330	Sub-Contract Exp	4,217.00	7,731.49	1,500.00	(2,717.00)	
01-3401-6350	Hydro	105,000.00	105,087.29	74,365.00	(30,635.00)	
01-3401-6401	Machinery Rent	-	3,780.00	-	-	
01-3401-6295	Transfer to Reserve - Loan Payment			29,513.00	29,513.00	
Total Expense		115,367.00	125,351.79	109,713.00	(5,654.00)	-12.48%
Blyth Streetlights						
01-3402-6100	Wages	600.00	1,753.06	1,174.00	574.00	
01-3402-6120	Benefits	128.00	443.51	305.00	177.00	
01-3402-6130	Overtime	100.00	76.49	-	(100.00)	
01-3402-6290	Materials/Supplies	1,500.00	3,786.09	600.00	(900.00)	
01-3402-6330	Sub-Contract Exp	1,500.00	1,243.30	600.00	(900.00)	
01-3402-6350	Hydro	30,000.00	27,608.67	21,334.00	(8,666.00)	
01-3402-6401	Machinery Rent	-	400.00	-	-	
01-3402-6295	Transfer to Reserve - Loan Payment			18,575.00	18,575.00	
Total Expense		33,828.00	35,311.12	42,588.00	8,760.00	20.61%
Humphrey Streetlights						
01-3403-6100	Wages	50.00		-	(50.00)	
01-3403-6120	Benefits	15.00		-	(15.00)	
01-3403-6290	Materials/Supplies	124.00	62.48	150.00	26.00	
01-3403-6330	Sub-Contract Exp	100.00		100.00	-	
01-3403-6350	Hydro	2,300.00	2,229.74	2,415.00	115.00	
Total Expense		2,589.00	2,292.22	2,665.00	76.00	16.26%
Auburn Streetlights						
01-3404-6100	Wages	50.00	24.46		(50.00)	
01-3404-6120	Benefits	15.00	6.72	-	(15.00)	
01-3404-6290	Materials/Supplies	67.00	62.48	70.00	3.00	
01-3404-6330	Sub-Contract Exp	100.00		100.00	-	
01-3404-6350	Hydro	1,200.00	1,020.17	1,260.00	60.00	
01-3404-6401	Machine Rent		40.00			
Total Expense		1,432.00	1,153.83	1,430.00	(2.00)	23.9%
Hutton Heights Streetlights						
01-3405-6100	Wages	50.00		-	(50.00)	
01-3405-6120	Benefits	15.00		-	(15.00)	
01-3405-6290	Materials/Supplies	215.00	62.49	200.00	(15.00)	
01-3405-6330	Sub-Contract Exp	100.00		100.00	-	
01-3405-6350	Hydro	1,300.00	1,346.46	1,365.00	65.00	
Total Expense		1,680.00	1,408.95	1,665.00	(15.00)	18.17%
Whitechurch Streetlights						
01-3406-6350	Hydro	407.00	160.39	430.00	23.00	
Total Expense		407.00	160.39	430.00	23.00	168.10%
Belgrave Streetlights						
Expense					-	
01-3407-6100	Wages	50.00	36.69	-	(50.00)	
01-3407-6120	Benefits	10.00	5.85	-	(10.00)	
01-3407-6350	Hydro	347.00		365.00	18.00	
Total Expense		407.00	42.54	365.00	(42.00)	
					-	
Total Expenditures		155,710.00	165,720.84	158,856.00	3,146.00	-4.14%
					-	
Capital LED Program		540,000.00	3,210.79		(540,000.00)	
					-	
Total Operating & Capital		695,710.00	168,931.63	158,856.00	(536,854.00)	-5.96%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Air Transportation Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
3500	5125	Transfer from Reserves	6,700.00	6,700.00		(6,700.00)	
3500	5200	Rentals	7,748.00	68,264.05	7,724.00	(24.00)	
3500	5200	Land Lease Rental	59,800.00		59,800.00	-	
3500	5255	Sales	23,500.00	25,418.29	25,000.00	1,500.00	
3500	5260	Vending		5.60		-	
3500	5280	Grants/Levies	2,000.00	1,500.00	2,000.00	-	
Total Revenue			99,748.00	101,887.94	94,524.00	(5,224.00)	-7.23%
Expenditures							
3500	6100	Salaries - Full Time	3,766.00	4,311.84	3,841.00	75.00	
3500	6111	Wages - PW Support	3,455.00	16,792.13	3,455.00	-	
3500	6110	Salaries - Part Time	15,508.00	4,877.70	15,819.00	311.00	
3500	6120	Benefits - Full Time	3,729.00	2,014.14	3,803.00	74.00	
3500	6127	Benefits - PW Works Support	975.00	987.14	975.00	-	
3500	6200	Clothing/Uniforms	150.00	-	150.00	-	
3500	6205	Meeting Allowance	300.00	-	300.00	-	
3500	6210	Subscriptions/Memberships	950.00	759.00	950.00	-	
3500	6220	Training/Travel/Workshops	862.00	452.88	862.00	-	
3500	6240	Advertising/Promotion		-		-	
3500	6250	Office Supplies	50.00	31.31	50.00	-	
3500	6260	Phone/Fax/Internet	1,356.00	1,372.22	1,356.00	-	
3500	6270	Insurance	6,263.00	5,070.60	5,219.00	(1,044.00)	
3500	6290	Materials/Supplies	500.00	289.46	800.00	300.00	
3500	6295	Transfer to Reserve		6,700.00		-	
3500	6300	Bldg Repair/Maintenance	6,950.00	7,356.63	7,150.00	200.00	
3500	6310	Taxes	6,700.00	7,962.82	8,201.00	1,501.00	
3500	6320	Janitorial Supplies	200.00	136.34	200.00	-	
3500	6330	Inspections/Contracts	9,750.00	2,041.81	4,550.00	(5,200.00)	
3500	6350	Electricity	9,200.00	7,767.80	8,156.00	(1,044.00)	
3500	6390	SnowPlowing		-		-	
3500	6401	PW Machinery Rent	6,200.00	14,810.00	6,200.00	-	
3500	6410	Fuel	22,992.00	23,851.07	24,000.00	1,008.00	
Total Expenditures			99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%
						-	
3500	300	Roof Repair					
Total Capital							
Total Capital + Operating			99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Sanitary Sewer Budget - Wingham			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
4100	5115	Interest Income	10,000.00	19,932.81	10,000.00	-	
4100	5120	Misc Revenue	1,000.00	487.50	500.00	(500.00)	
4100	5125	Transfer from Reserve	462,694.00	43,349.48	107,404.00	(355,290.00)	
4100	5280	Grants/Levies (CWWF)	45,000.00	83,591.11	74,745.00	29,745.00	
4100	5600	Wingham Residential	390,370.00	401,113.71	402,000.00	11,630.00	
4100	5605	Blyth Residential	121,334.00	125,064.28	125,000.00	3,666.00	
4100	5620	Wingham Commerical	59,740.00	59,481.09	60,000.00	260.00	
4100	5625	Blyth Commercial	21,630.00	25,124.29	25,000.00	3,370.00	
4100	5630	Installations/Connections	5,000.00	3,500.00	5,000.00	-	
4100	5675	Long Term Reserve	298,500.00	302,063.13	300,000.00	1,500.00	
4100	5680	Frontage & Connection	6,500.00	6,536.89	6,500.00	-	
4100	5685	Braemar Agreement	10,000.00	10,350.00	10,000.00	-	
						-	
Total Revenue			1,431,768.00	1,080,594.29	1,126,149.00	(305,619.00)	4.22%
Expenditures - Administration							
4100	6100	Salaries - Full Time	83,738.00	55,885.22	84,374.00	636.00	
4100	6120	Benefits - Full Time	24,288.00	13,934.28	24,469.00	181.00	
4100	6130	Overtime		1,237.39		-	
4100	6220	Training/Travel/Workshops	750.00	206.23	750.00	-	
4100	6230	Health & Safety				-	
4100	6240	Advertising/Promotion				-	
4100	6250	Office Supplies				-	
4100	6260	Phone/Fax/Internet				-	
4100	6270	Insurance	11,000.00	16,562.69	16,955.00	5,955.00	
4100	6280	Legal/Accounting	500.00		500.00	-	
4100	6288	Bad Debt Expense	14,934.00	14,933.83	2,000.00	(12,934.00)	
4100	6290	Materials/Supplies	2,500.00	5,184.31	2,500.00	-	
4100	6292	Misc Expense	6,500.00		2,500.00	(4,000.00)	
4100	6295	Transfer to Reserve				-	
4100	6295	Transfer to Long Term Reserve	298,500.00	305,563.13	300,000.00	1,500.00	
4100	6300	Bldg Repair/Maintenance				-	
4100	6310	Taxes	30,000.00	33,987.56	34,000.00	4,000.00	
4100	6330	Inspections/Contracts				-	
4100	6330	Veolia Contract	250,000.00	258,425.30	255,000.00	5,000.00	
4100	6340	Engineering	4,500.00			(4,500.00)	
4100	6401	Machinery Rental	9,000.00			(9,000.00)	
4100	6513	Billing & Collecting		6,379.56	6,500.00	6,500.00	
4100	6514	Distribution/Collection Maintenance		115,507.21		-	
4100	6515	Sludge Disposal				-	
4100	6910	Wingham/Blyth Systems Master Plan	60,000.00	14,597.16	99,660.00	39,660.00	
						-	
Total Expenditures			796,210.00	842,403.87	829,208.00	32,998.00	-1.57%
Wingham Sewer							
4105	6100	Salaries & Wages	10,385.00	9,296.50	5,000.00	(5,385.00)	
4105	6120	Benefits	2,818.00	2,208.26	1,300.00	(1,518.00)	
4105	6260	Phone/Fax/Internet	1,900.00	1,773.39	2,000.00	100.00	
4105	6290	Materials/Supplies	22,646.00	18,560.45	10,000.00	(12,646.00)	
4105	6330	Inspections/Contracts	3,350.00	470.64	3,500.00	150.00	
4105	6350	Electricity	70,000.00	72,730.87	75,000.00	5,000.00	
4105	6401	Machinery Rentals			2,500.00		
4105	6514	Distribution/Collection Maintenance			30,000.00	30,000.00	
				26,395.00		-	
Total Wingham Sewer			111,099.00	131,435.11	129,300.00	18,201.00	-1.62%
Blyth Sewer							
4150	6100	Salaries & Wages	5,192.00	1,340.82	5,000.00	(192.00)	
4150	6120	Benefits	1,388.00	360.87	1,300.00	(88.00)	
4150	6260	Phone/Fax/Internet	1,075.00	1,051.40	2,500.00	1,425.00	
4150	6290	Materials/Supplies	11,154.00	8,454.88	7,500.00	(3,654.00)	
4150	6330	Inspections/Contracts	1,650.00		1,500.00	(150.00)	
4150	6350	Electricity	40,000.00	35,460.90	42,500.00	2,500.00	
4150	6260	Water/Sewer	1,500.00	1,057.68	1,500.00	-	
4150	6401	Machinery Rentals		2,960.00	2,000.00	2,000.00	
4150	6514	Distribution/Collection Maintenance			5,000.00		
Total Blyth Sewer			61,959.00	50,686.55	68,800.00	6,841.00	35.74%
		2017 Capital	462,500.00	56,069.76		(462,500.00)	
Total Sewer			1,431,768.00	1,080,595.29	1,027,308.00	(404,460.00)	(0.05)

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Waterworks Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
4300	5115	Interest Income	8,000.00	33,604.56	10,000.00	2,000.00	
4300	5120	Misc Revenue	-	8,040.46	5,000.00	5,000.00	
4300	5125	Transfer from Reserve	408,979.00	171,860.93	278,507.00	(130,472.00)	
4300	5125	Transfer from Reserve OCIF				-	
4300	5280	Grants - SWP/CWWF	199,215.00	18,069.24	67,545.00	(131,670.00)	
4300	5600	Wingham Residential	428,480.00	428,618.81	438,000.00	9,520.00	
4300	5605	Blyth Residential	194,670.00	196,063.05	202,000.00	7,330.00	
4300	5610	East Wawanosh Residential	12,500.00	12,966.66	13,700.00	1,200.00	
4300	5620	Wingham Commercial	103,000.00	100,739.22	106,000.00	3,000.00	
4300	5625	Blyth Commercial	16,480.00	22,636.63	21,000.00	4,520.00	
4300	5630	Installations/Connections/Developers	5,000.00	2,500.00	5,000.00	-	
4300	5640	Fire Protection Revenue	4,100.00	4,237.64	4,100.00	-	
4300	5645	Late Payment Revenue	5,740.00	13,943.41	9,000.00	3,260.00	
4300	5650	Billing Revenue	25,000.00	16,513.40	6,500.00	(18,500.00)	
4300	5675	Long Term Reserve	310,500.00	313,422.15	312,000.00	1,500.00	
Total Revenue			1,721,664.00	1,343,216.16	1,478,352.00	(243,312.00)	10.06%
Expenditures							
Administration							
4300	6100	Salaries - Full Time	102,480.00	102,892.44	88,400.00	(14,080.00)	
4300	6120	Benefits - Full Time	29,645.00	23,063.05	23,357.00	(6,288.00)	
4300	6130	Overtime		1,357.83		-	
4300	6220	Training/Travel/Workshops	2,750.00	206.23	2,700.00	(50.00)	
4300	6240	Advertising/Promotion		124.44		-	
4300	6250	Office Supplies		301.97	750.00	750.00	
4300	6260	Phone/Fax/Internet	4,500.00	2,883.05	4,500.00	-	
4300	6270	Insurance	16,000.00	11,842.85	15,435.00	(565.00)	
4300	6280	Legal/Accounting	500.00	268.96	500.00	-	
4300	6288	Bad Debt Expense	18,252.00	18,252.40	1,000.00	(17,252.00)	
4300	6290	Materials/Supplies				-	
4300	6292	Misc Expense	27,300.00	3,557.03	27,300.00	-	
4300	6295	Transfer to Long Term Reserve	310,500.00	315,922.15	312,000.00	1,500.00	
4300	6310	Taxes	5,500.00	3,868.76	5,500.00	-	
4300	6330	Inspections/Contracts				-	
4300	6335	Veolia Contract	375,000.00	401,257.88	382,500.00	7,500.00	
4300	6340	Engineering	2,000.00		2,000.00	-	
4300	6401	Machinery Rental	10,000.00		10,000.00	-	
4300	6513	Billing/Collecting		12,768.07	13,000.00	13,000.00	
4300	6514	Distribution/Collection Maintenance		8,470.00		-	
4300	6516	M-T - Belgrave Water	32,340.00	31,815.77	33,000.00	660.00	
4300	6517	Source Water Protection	4,215.00	11,249.19	10,015.00	5,800.00	
4300	6910	Wingham/Blyth Master Plan	60,000.00	12,516.70	90,060.00	30,060.00	
4300	6955	Gain/Loss on Disposal of Assets		5,908.82		-	
			1,000,982.00	968,527.59	1,022,017.00	21,035.00	5.52%
Wingham Water							
4305	6100	Salaries & Wages	10,437.00	2,680.24	6,339.00	(4,098.00)	
4305	6120	Benefits	2,817.00	602.01	1,648.00	(1,169.00)	
4305	6250	Office Supplies		577.80	750.00	750.00	
4305	6260	Phone/Fax/Internet		6,342.15	5,400.00	5,400.00	
4305	6290	Materials/supplies	16,616.00	11,505.70	12,000.00	(4,616.00)	
4305	6330	Inspections/Contracts	23,517.00		24,000.00	483.00	
4305	6350	Electricity	80,400.00	42,861.12	83,000.00	2,600.00	
4305	6360	Water/Sewer	1,000.00	827.91	1,000.00	-	
4305	6401	Machinery Rent		2,395.00			
4305	6514	Distribution Maintenance	20,100.00	2,889.52	19,500.00	(600.00)	
Total Wingham Water System			154,887.00	70,681.45	153,637.00	(1,250.00)	117.37%
Blyth Water							
4350	6100	Salaries & Wages	5,140.00	1,383.87	6,330.00	1,190.00	
4350	6120	Benefits	1,388.00	364.37	1,645.00	257.00	
4350	6130	Overtime		77.46			
4350	6250	Office Supplies				-	
4350	6260	Phone/Fax/Internet		5,098.28	2,750.00	2,750.00	
4350	6290	Materials/supplies	8,184.00	2,188.33	6,000.00	(2,184.00)	
4350	6330	Inspections/Contracts	11,583.00		12,000.00	417.00	
4350	6350	Electricity	39,600.00	27,122.40	44,000.00	4,400.00	
4350	6360	Water/Sewer				-	
4350	6401	Machinery Rent		1,695.00			
4350	6514	Distribution Maintenance	9,900.00		13,000.00	3,100.00	
Total Wingham Water System			75,795.00	37,929.71	85,725.00	9,930.00	126.01%
2017 Capital			490,000.00	271,986.23		(490,000.00)	
Total Operating Expense			1,231,664.00	1,349,124.98	1,261,379.00	(460,285.00)	-6.50%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Storm Sewer Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
Expenditures							
Wingham Storm							
4200	6100	Salaries - Full Time	17,307.00	2,951.51	17,500.00	193.00	
4200	6120	Benefits - Full Time	4,499.00	579.72	4,550.00	51.00	
4200	6130	Overtime		152.28			
4200	6330	Inspections/Contracts		12,453.14	14,000.00	14,000.00	
4200	6401	Machinery Rental	3,700.00	5,300.00	2,500.00	(1,200.00)	
						-	
Total			25,506.00	21,436.65	38,550.00	13,044.00	79.83%
Blyth Storm							
4210	6100	Salaries - Full Time	8,654.00	211.00	10,276.00	1,622.00	
4210	6120	Benefits - Full Time	2,510.00	56.25	2,672.00	162.00	
4210	6290	Materials/Supplies		191.64			
4210	6330	Inspections/Contracts		1,808.63	3,500.00	3,500.00	
4210	6401	Machinery Rental	1,800.00	120.00	1,000.00	(800.00)	
						-	
Total			12,964.00	2,387.52	17,448.00	4,484.00	630.80%
Total Storm System			38,470.00	23,824.17	55,998.00	17,528.00	135.05%
2017 shown for comparison - included in PW budger for 2017							

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Waste Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Landfill Administration							
4810	5125	Transfer from Reserves	30,000.00	30,000.00	30,000.00	-	
4810	5280	Grants - WDO	40,000.00	50,444.61	40,000.00	-	
4810	5400	Bag Tags	110,000.00	107,178.00	110,000.00	-	
4810	5420	Recycling Revenue - Blue Box	10,000.00	1,730.91	2,500.00	(7,500.00)	
4810	5480	Machinery Rental Income	20,000.00	14,465.00	20,000.00	-	
Wingham Landfill							
4820	5410	Tipping Fees	72,000.00	174,548.65	120,000.00	48,000.00	
4820	5412	Scrap Metal		4,259.73	2,500.00	2,500.00	
4820	5413	e-Waste		1,116.04	250.00	250.00	
4820	5414	Shingles		8,339.30	7,500.00	7,500.00	
						-	
Total Revenue			282,000.00	392,082.24	332,750.00	50,750.00	-15.13%
Expenses							
Curbside Collection							
4800	6498		125,000.00	113,117.76	101,788.00	(23,212.00)	
4800	6499		97,500.00	91,078.23	93,499.00	(4,001.00)	
Total Curbside			222,500.00	204,195.99	195,287.00	(27,213.00)	
Landfill Administration						-	
4810	6100	Salaries & Wages	14,120.00	13,651.70	11,293.00	(2,827.00)	
4810	6120	Benefits	4,095.00	3,355.59	2,214.00	(1,881.00)	
4810	6220	Training	850.00	1,054.06	1,000.00	150.00	
4810	6250	Office Supplies	1,500.00	1,442.64	1,200.00	(300.00)	
4810	6255	Postage/Courier	400.00	396.60	400.00	-	
4810	6260	Phone/Fax/Internet	200.00	465.48	800.00	600.00	
4810	6270	Insurance	10,000.00	10,562.69	10,630.00	630.00	
4810	6295	Transfer to Reserve	30,000.00	105,000.00		(30,000.00)	
4810	6300	Building Repair/Maintenance	1,000.00	1,174.26	1,200.00	200.00	
4810	6310	Taxes	5,000.00	22,615.87	14,400.00	9,400.00	
4810	6340	Engineering	7,050.00			(7,050.00)	
4810	6490	Operating Expense	2,500.00	647.86	2,500.00	-	
Total Administration			76,715.00	160,366.75	45,637.00	(31,078.00)	-71.54%
Wingham Landfill							
4820	6100	Salaries & Wages	35,276.00	53,204.46	39,081.00	3,805.00	
4820	6120	Benefits	9,515.00	9,685.33	10,161.00	646.00	
4820	6292	Concrete Disposal	30,000.00	39,177.60	30,000.00	-	
4820	6330	Inspections/Contracts	4,500.00	15,081.41	4,500.00	-	
4820	6350	Electricity	2,000.00	1,210.78	1,400.00	(600.00)	
4820	6401	Machinery Rental	20,000.00	15,192.50	20,000.00	-	
4820	6400	Equipment Repair & Maintenance	8,024.00			(8,024.00)	
4820	6410	Fuel	300.00			(300.00)	
4820	6490	Operating Cost	20,000.00	22,928.61	20,000.00	-	
4820	6492	Annual Costs	24,500.00	12,107.14	25,800.00	1,300.00	
4820	6494	Pest Control	1,000.00	1,655.56	1,500.00	500.00	
4820	6910	Studies - Off Site Investigation	45,000.00		26,457.00	(18,543.00)	
Total Wingham Landfill			200,115.00	170,243.39	178,899.00	(21,216.00)	5.08%
E/W Landfill							
4830	6100	Salaries & Wages	500.00	201.80	500.00	-	
4830	6120	Benefits	145.00	25.13	145.00	-	
4830	6330	Inspections/Contracts	3,000.00	5,108.66	3,000.00	-	
4830	6492	Annual Costs	15,000.00	2,039.80	16,800.00	1,800.00	
Total E/W Landfill			18,645.00	7,375.39	20,445.00	1,800.00	177.21%
						-	
B/H Landfill						-	
4840	6490	Operating Cost	40,000.00	40,000.00	40,000.00	-	-
4840		Machine Expense		42,646.09	30,000.00		
						-	
Total Waste Expense			557,975.00	624,827.61	510,268.00	(47,707.00)	-18.33%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Cemetery Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
54XX	5110	Donations	100.00	20.00	100.00	-	
54XX	5120	Misc Revenue	1,000.00	75.00	100.00	(900.00)	
54XX	5125	Transfer from Reserve				-	
54XX	5280	Grants/Levies	500.00			(500.00)	
54XX	5290	Revenue - Other Municipalities	25,000.00	16,666.72	25,000.00	-	
54XX	5300	Plots Sales	20,000.00	13,055.00	20,000.00	-	
54XX	5305	Grave Openings	27,000.00	37,575.00	27,000.00	-	
54XX	5310	Storage Vault Rental		1,200.00		-	
54XX	5315	Vault Installation	600.00		750.00	150.00	
54XX	5320	Ontario Licence Fee				-	
54XX	5370	Perpetual Care Interest	5,000.00	3,374.17	5,000.00	-	
54XX	5375	Monument Care Interest	350.00	126.49	425.00	75.00	
54XX	5480	Machinery Rental Revenue	35,000.00	26,430.00	35,000.00	-	
Total Revenue			114,550.00	98,522.38	113,375.00	(1,175.00)	15.08%
Expenditures							
Wingham Cemetery							
5400	6100	Salaries - Full Time	28,750.00	36,938.62	30,270.00	1,520.00	
5400	6120	Benefits - Full Time	7,937.00	9,533.01	8,778.00	841.00	
5400	6200	Clothing/Uniforms	240.00		250.00	10.00	
5400	6210	Subscriptions/Memberships	300.00	91.43	300.00	-	
5400	6220	Training/Travel/Workshops	780.00	974.40	1,000.00	220.00	
5400	6230	Health & Safety	120.00		120.00	-	
5400	6250	Office Supplies		9.97	-	-	
5400	6260	Phone/Fax/Internet	660.00	1,048.13	900.00	240.00	
5400	6270	Insurance	960.00	1,076.90	1,100.00	140.00	
5400	6280	Legal				-	
5400	6290	Materials/Supplies	9,000.00	145.86	9,200.00	200.00	
5400	6292	Misc Expense	3,000.00	1,119.50	2,500.00	(500.00)	
5400	6295	Transfer to Reserve	4,500.00	4,500.00	4,500.00	-	
5400	6300	Building Repair/Maintenance	6,000.00		6,500.00	500.00	
5400	6340	Engineering				-	
5400	6350	Electricity	1,020.00	1,151.74	1,200.00	180.00	
5400	6400	Equip Repair/Maintenance	9,000.00			(9,000.00)	
5400	6401	Machinery Rentals	20,719.00	43,960.00	20,000.00	(719.00)	
5400	6410	Fuel				-	
5400	6870	Foundations				-	
5400	6950	Depreciation				-	
5400	6955	Gain/Loss on Disposal				-	
Total Expenditures			92,986.00	100,549.56	86,618.00	(6,368.00)	-13.86%
Blyth Cemetery							
5410	6100	Salaries - Full Time	19,166.00	9,212.22	19,136.00	(30.00)	
5410	6120	Benefits - Full Time	5,292.00	2,407.17	5,549.00	257.00	
5410	6200	Clothing/Uniforms	160.00		160.00	-	
5410	6210	Subscriptions/Memberships	200.00	91.43	200.00	-	
5410	6220	Training/Travel/Workshops	520.00	488.45	520.00	-	
5410	6230	Health & Safety	80.00		80.00	-	
5410	6250	Office Supplies		9.98	-	-	
5410	6260	Phone/Fax/Internet	440.00	335.88	500.00	60.00	
5410	6270	Insurance	640.00	530.40	600.00	(40.00)	
5410	6280	Legal		145.17		-	
5410	6290	Materials/Supplies	6,000.00	818.05	6,000.00	-	
5410	6292	Misc Expense	2,000.00	223.50	2,000.00	-	
5410	6295	Transfer to Reserve	3,000.00	3,000.00	3,000.00	-	
5410	6300	Building Repair/Maintenance	4,000.00	7,326.72	4,500.00	500.00	
5410	6330	Inspections/Contracts		35.84		-	
5410	6340	Engineering				-	
5410	6350	Electricity	680.00		750.00	70.00	
5410	6400	Equip Repair/Maintenance	3,000.00			(3,000.00)	
5410	6401	Machinery Rentals	13,813.00	12,345.00	13,500.00	(313.00)	
5410	6410	Fuel				-	
5410	6870	Foundations				-	
5410	6950	Depreciation				-	
5410	6955	Gain/Loss on Disposal				-	
Total Expenditures			58,991.00	36,969.81	56,495.00	(2,496.00)	52.81%
Closed Cemeteries							
5420	6100	Salaries & Wages	800.00	334.69	2,000.00	1,200.00	
5420	6120	Benefits	232.00	96.61	520.00	288.00	
5420	6401	Machinery Rentals	468.00	435.00	500.00	32.00	
Total			1,500.00	866.30	3,020.00	1,520.00	
54XX		Machine Costs		2,917.99		-	
Total Cemeteries Expenses			153,477.00	141,303.66	146,133.00	(7,344.00)	3.42%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 ChildCare Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
6400	5120	Misc Revenue		10,000.00	10,000.00		
6400	5125	Transfer from Reserve				-	
6400	5205	Revenue from Parents	418,475.00	447,867.62	440,267.00	21,792.00	
6400	5505	Fee Subsidy (County)	139,492.00	140,039.11	146,756.00	7,264.00	
6400	5510	Program Assistant				-	
6400	5515	Direct Operating Grant	127,987.00	143,251.70	155,188.00	27,201.00	
6400	5520	Health & Safety Grant	872.00	2,616.89		(872.00)	
6400	5521	Wage Enhancement	49,194.00	52,886.77	48,203.00	(991.00)	
6400	5525	Early Years Admin Fee	8,820.00	8,997.00	11,500.00	2,680.00	
Total Revenue			744,840.00	805,659.09	811,914.00	67,074.00	0.78%
Expenditures						-	
6400	6100	Salaries - Full Time	582,478.00	646,821.30	599,140.00	16,662.00	
6400	6120	Benefits - Full Time	124,802.00	120,348.88	138,529.00	13,727.00	
6400	6200	Clothing/Uniforms	1,000.00	702.42	1,000.00	-	
6400	6220	Training/Travel/Workshops	2,000.00	2,740.58	2,500.00	500.00	
6400	6250	Office Supplies	5,000.00	4,550.00	5,000.00	-	
6400	6270	Insurance	2,205.00	2,475.93	2,534.00	329.00	
6400	6295	Transfer to Reserve		10,000.00		-	
6400	6700	Program Occupancy	3,500.00	4,342.39	6,500.00	3,000.00	
6400	6702	Program Supplies	4,000.00	3,878.14	4,000.00	-	
6400	6704	Food	25,000.00	21,804.18	28,000.00	3,000.00	
6400	6710	Health & Safety	872.00	3,611.70		(872.00)	
Total Program Expenditures			750,857.00	821,275.52	787,203.00	36,346.00	-4.15%
Expenditures - Building						-	
6410	6100	Salaries - Full Time	5,325.00	5,858.94	6,116.00	791.00	
6410	6110	Salaries - Part Time	732.00	476.85	746.00	14.00	
6410	6111	Wages - PW Support	1,750.00	522.56	1,750.00	-	
6410	6120	Benefits - Full Time	1,669.00	1,816.49	1,900.00	231.00	
6410	6127	Benefits - PW Support	490.00	150.74	490.00	-	
6410	6270	Insurance	1,272.00	1,345.68	1,387.00	115.00	
6410	6295	Transfer to Reserves		-		-	
6410	6300	Bldg Repair/Maintenance	4,200.00	4,675.30	5,700.00	1,500.00	
6410	6320	Janitorial Supplies	5,200.00	5,569.58	5,800.00	600.00	
6410	6330	Inspections/Contracts	21,164.00	19,780.21	19,699.00	(1,465.00)	
6410	6350	Electricity	9,848.00	7,229.91	7,590.00	(2,258.00)	
6410	6360	Water/Sewer	1,400.00	1,304.59	1,400.00	-	
6410	6370	Natural Gas/Heat	1,600.00	1,838.53	1,600.00	-	
6410	6380	Waste Disposal	742.00	713.57	742.00	-	
6410	6390	SnowPlowing		-		-	
6410	6401	PW Machinery Rent	3,150.00	1,720.00	3,150.00	-	
6410	6708					-	
Total Building Expenditures			58,542.00	53,002.95	58,070.00	(472.00)	9.56%
Total Operating			809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
Capital						-	
6410	0300	Flooring				-	
6410	0300	Roof Repairs				-	
Total Capital			-			-	
Total Operating + Capital			809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying							
Billable days - takes off two week shutdown, three week allowable vacation days							
Calculated estimating							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Early Learning Site								
			2017	2017	2018	Budget \$	Budget - Actual	
			Budget	Actuals	Budget	Variance	% Change	
Revenue								
6500	5205	Revenue from Parents	49,713.00	91,262.92	100,788.00	51,075.00		
6500	5505	Fee Subsidy (County)	16,571.00	52,100.04	33,596.00	17,025.00		
6500	5510	Program Assistant				-		
6500	5515	Direct Operating Grant	13,579.00	13,579.08	13,579.00	-		
6500	5520	Health & Safety Grant				-		
6500	5521	Wage Enhancement	7,413.00	7,413.00	8,415.00	1,002.00		
Total Revenue			87,276.00	164,355.04	156,378.00	69,102.00		-4.85%
						-		
Expenditures						-		
6500	6100	Salaries - Full Time	67,554.00	112,090.00	107,006.00	39,452.00		
6500	6110	Salaries - Part Time				-		
6500	6120	Benefits - Full Time	16,719.00	20,391.00	23,550.00	6,831.00		
6500	6200	Clothing/Uniforms	130.00		260.00	130.00		
6500	6220	Training/Travel/Workshops	350.00	363.43	500.00	150.00		
6500	6250	Office Supplies	400.00	1,950.50	850.00	450.00		
6500	6700	Program Occupancy	500.00	631.97	500.00	-		
6500	6702	Program Supplies	750.00	482.83	650.00	(100.00)		
6500	6704	Food	5,000.00	12,298.28	8,000.00	3,000.00		
6500	6706	Rent				-		
6500	6710	Health & Safety Project				-		
Total Expenditures			91,403.00	148,208.01	141,316.00	49,913.00		-4.65%
		Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying						
		Billable days - takes off two week shutdown, three week allowable vacation days						
		Increased this program to 16 children instead of 8 as we have kept two groups up there steady year round.						
		This is why revenue and costs are all increased.						

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Before & After Program Budget			2017	2017	2018	Budget \$	Budget - Actual
Maitland Campus			Budget	Actuals	Budget	Variance	% Change
Revenue							
6600	5205	Revenue from Parents	93,825.00	85,185.66	106,125.00	12,300.00	
6600	5505	Fee Subsidy (County)	31,275.00	46,200.63	35,375.00	4,100.00	
6600	5510	Program Assistant		855.97		-	
6600	5515	Direct Operating Grant	26,179.00	26,861.14	26,179.00	-	
6600	5521	Wage Enhancement	4,717.00	4,717.00	7,403.00	2,686.00	
Total Revenue			155,996.00	163,820.40	175,082.00	19,086.00	6.87%
						-	
						-	
Expenditures						-	
6600	6110	Salaries - Part Time	83,261.00	59,004.11	86,550.00	3,289.00	
6600	6125	Benefits - Part Time	12,916.00	8,876.75	13,861.00	945.00	
6600	6702	Program Supplies	3,000.00	4,364.08	3,000.00	-	
6600	6704	Food	7,000.00	7,998.75	7,000.00	-	
6600	6708	Administration Fee				-	
Total Expenditures			106,177.00	80,243.69	110,411.00	4,234.00	37.59%
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying							
Billable days 40 weeks and used am and pm calculations							
Revenue based on							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Before & After Program Budget								
Sacred Heart Campus			2017	2017	2018	Budget \$	Budget - Actual	
			Budget	Actuals	Budget	Variance	% Change	
Revenue								
6700	5205	Revenue from Parents	17,550.00	20,655.43	26,600.00	9,050.00		
6700	5505	Fee Subsidy (County)	5,850.00	2,080.56	6,650.00	800.00		
6700	5510	Program Assistant				-		
6700	5515	Direct Operating Grant	5,817.00	5,867.48	5,817.00	-		
6700	5521	Wage Enhancement	2,017.00	2,017.00	3,366.00	1,349.00		
Total Revenue			31,234.00	30,620.47	42,433.00	11,199.00	38.58%	
						-		
						-		
Expenditures								
6700	6110	Salaries - Part Time	23,621.00	17,974.75	24,720.00	1,099.00		
6700	6120	Benefits - Part Time	4,075.00	1,926.73	4,202.00	127.00		
6700	6702	Program Supplies	750.00	1,667.99	750.00	-		
6700	6704	Food	1,000.00	1,063.59	1,000.00	-		
6700	6708	Administration Fee				-		
Total Expenditures			29,446.00	22,633.06	30,672.00	1,226.00	35.52%	
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying								
Billable days 40 weeks and used am and pm calculations								
Revenue based on								
		\						

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 EarlyON Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
6800	5125	Transfer from Reserve			20,000.00		
6800	5290	Rev-Huron County	82,440.00	102,590.00	115,000.00	32,560.00	
6800	5521	Wage Enhancement	4,043.00	1,856.79		(4,043.00)	
Total Revenue			86,483.00	104,446.79	135,000.00	48,517.00	29.25%
						-	
						-	
Expenditures						-	
6800	6110	Salaries - Part Time	55,718.00	52,143.88	69,750.00	14,032.00	
6800	6125	Benefits - Part Time	9,530.00	9,721.52	13,996.00	4,466.00	
6800	6220	Training/Travel/Workshops	5,000.00	5,506.30	7,000.00	2,000.00	
6800	6295	Transfer to Reserve		20,000.00		-	
6800	6702	Program Supplies	6,488.00	8,078.09	12,754.00	6,266.00	
6800	6706	Rent	750.00	-		(750.00)	
6800	6708	Administration Fee	8,997.00	8,997.00	11,500.00	2,503.00	
6800		EarlyON Capacity Building			20,000.00		
Total Expenditures			86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Revenue 100% County funded.							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - W Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7100	5110	Donations					
7100	5125	Transfer from Reserve	10,000.00	10,000.00		(10,000.00)	
7100	5200	Admissions/Rentals	5,600.00	5,988.63	5,711.00	111.00	
7100	5280	Grants		2,553.02		-	
Total Revenue			15,600.00	18,541.65	5,711.00	(9,889.00)	-69.20%
						-	
						-	
Expenditures						-	
7100	6100	Salaries - Full Time	45,160.00	31,863.04	46,063.00	903.00	
7100	6110	Salaries - Part Time	7,758.00	8,811.11	8,400.00	642.00	
7100	6111	Wages - PW Support	14,000.00	12,584.12	14,000.00	-	
7100	6120	Benefits - Full Time	14,415.00	11,788.49	14,786.00	371.00	
7100	6127	Benefits - PW Support	4,000.00	2,234.94	4,000.00	-	
7100	6200	Clothing/Uniforms	75.00	114.82	100.00	25.00	
7100	6210	Subscriptions/Memberships	140.00	-	140.00	-	
7100	6220	Training/Travel/Workshops	1,430.00	165.00	1,300.00	(130.00)	
7100	6230	Health & Safety		-		-	
7100	6240	Advertising/Promotion	500.00	-	500.00	-	
7100	6260	Phone/Fax/Internet		-		-	
7100	6270	Insurance	4,230.00	4,006.21	4,138.00	(92.00)	
7100	6290	Materials/Supplies	2,800.00	4,570.71	2,000.00	(800.00)	
7100	6295	Transfer to Reserve		10,000.00		-	
7100	6300	Bldg Repair/Maintenance	10,500.00	3,755.15	6,000.00	(4,500.00)	
7100	6310	Taxes	505.00	531.87	505.00	-	
7100	6320	Janitorial Supplies	400.00	413.69	400.00	-	
7100	6330	Inspections/Contracts	2,300.00	2,102.98	2,300.00	-	
7100	6350	Electricity	4,190.00	2,747.13	2,888.00	(1,302.00)	
7100	6360	Water/Sewer	4,162.00	3,343.44	3,942.00	(220.00)	
7100	6400	Equip Repair/Maintenance	4,500.00	1,966.67	4,500.00	-	
7100	6401	PW Machinery Rent	25,000.00	28,520.00	25,000.00	-	
7100	6405	Fleet Expense	400.00	400.00	400.00	-	
7100	6410	Fuel	3,200.00	565.46	1,000.00	(2,200.00)	
7100	6745	Flowers/Planters	4,000.00	3,392.61	3,500.00	(500.00)	
7100	6950	Studies - Master Plan				-	
7100	6708			-		-	
Total Expenditures			153,665.00	133,877.44	145,862.00	(7,803.00)	8.95%
				-		-	
						-	
Capital						-	
7100	0200	Wayward Signs	10,000.00			(10,000.00)	
Total Capital			10,000.00			(10,000.00)	
						-	
						-	
Total Operating + Capital			163,665.00	133,877.44	145,862.00	(17,803.00)	8.95%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7110	5110	Donations					
7110	5125	Transfer from Reserves					
7110	5200	Admissions/Rentals	1,050.00	1,168.31	1,050.00	-	
Total Revenue			1,050.00	1,168.31	1,050.00	-	-10.13%
						-	
						-	
						-	
Expenditures						-	
7110	6100	Salaries - Full Time	2,805.00	2,514.31	4,039.00	1,234.00	
7110	6110	Salaries - Part Time	11,284.00	9,258.11	11,199.00	(85.00)	
7110	6111	Wages - PW Support	2,800.00	5,134.34	2,800.00	-	
7110	6120	Benefits - Full Time	2,732.00	1,717.44	3,075.00	343.00	
7110	6127	Benfits - PW Support	800.00	1,209.80	800.00	-	
7110	6200	Clothing/Uniforms		-		-	
7110	6210	Subscriptions/Memberships	70.00	-	70.00	-	
7110	6220	Training/Travel/Workshops	150.00	-	150.00	-	
7110	6240	Advertising & Promotion	200.00	-	200.00	-	
7110	6260	Phone/Fax/Internet		-		-	
7110	6270	Insurance	1,029.00	848.71	876.00	(153.00)	
7110	6290	Materials/Supplies	4,000.00	1,905.68	2,000.00	(2,000.00)	
7110	6295	Transfer to Reserve		-		-	
7110	6300	Bldg Repair/Maintenance	6,350.00	4,709.65	7,350.00	1,000.00	
7110	6320	Janitorial Supplies		-		-	
7110	6330	Inspections/Contracts	1,755.00	1,013.51	1,755.00	-	
7110	6350	Electricity	1,000.00	950.97	1,000.00	-	
7110	6360	Water/Sewer		-		-	
7110	6400	Equipment Repair/Maintenance	2,000.00	465.37	650.00	(1,350.00)	
7110	6401	Machinery Rent	5,000.00	6,900.00	5,000.00	-	
7110	6405	Fleet Expense	3,691.00	3,691.00	3,691.00	-	
7110	6410	Fuel	900.00	290.99	300.00	(600.00)	
7110	6745	Flowers/Planters	2,400.00	2,281.01	2,500.00	100.00	
7110	6708					-	
Total Expenditures			48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%
						-	
						-	
						-	
Total Capital						-	
						-	
Total Operating + Capital			48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Trailer Park - W Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7120	5200	Contracts/Utility Costs	6,478.00	9,943.08	6,478.00	-	
7120	5200	Admissions/Rentals	3,300.00		3,300.00	-	
Total Revenue			9,778.00	9,943.08	9,778.00	-	-1.66%
						-	
						-	
Expenditures						-	
7120	6100	Salaries - Full Time	1,342.00	844.98	1,369.00	27.00	
7120	6110	Salaries - Part Time		-		-	
7120	6111	Wages - PW Support	500.00	97.84	500.00	-	
7120	6120	Benefits - Full Time	389.00	216.88	397.00	8.00	
7120	6127	Benefits - PW Support	140.00	15.59	140.00	-	
7120	6240	Advertising/Promotion		-		-	
7120	6250	Office Supplies		-		-	
7120	6260	Phone/Fax/Internet		-		-	
7120	6270	Insurance	558.00	609.46	624.00	66.00	
7120	6300	Bldg Repair/Maintenance	2,500.00	287.72	1,500.00	(1,000.00)	
7120	6310	Taxes		-		-	
7120	6320	Janitorial Supplies		-		-	
7120	6330	Inspections/Contracts		-		-	
7120	6350	Electricity	7,000.00	5,117.75	5,376.00	(1,624.00)	
7120	6360	Water/Sewer	878.00	877.68	902.00	24.00	
7120	6380	Waste Disposal		-	900.00	900.00	
7120	6401	PW Machinery Rent	900.00	-		(900.00)	
7120	6950	Depreciation		-		-	
						-	
Total Expenditures			14,207.00	8,067.90	11,708.00	(2,499.00)	45.12%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Campground - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7130	5110	Donations		300.00		-	
7130	5200	Admissions/Rentals	22,390.00	36,628.83	27,350.00	4,960.00	
Total Revenue			22,390.00	36,928.83	27,350.00	4,960.00	-25.94%
						-	
						-	
Expenditures						-	
7130	6100	Salaries - Full Time	13,200.00	5,478.00	9,425.00	(3,775.00)	
7130	6110	Salaries - Part Time	5,208.00	4,726.61	9,646.00	4,438.00	
7130	6111	Wages - PW Support	3,080.00	2,174.59	3,080.00	-	
7130	6120	Benefits - Full Time	4,713.00	2,017.28	4,373.00	(340.00)	
7130	6127	Benefits - PW Support	880.00	557.40	880.00	-	
7130	6200	Clothing/Uniforms	100.00	-	-	(100.00)	
7130	6230	Health & Safety		-		-	
7130	6240	Advertising/Promotion	850.00	261.04	850.00	-	
7130	6270	Insurance	4,307.00	2,475.93	2,535.00	(1,772.00)	
7130	6290	Materials/Supplies	500.00	191.22	500.00	-	
7130	6295	Transfer to Reserve		33,057.83		-	
7130	6300	Bldg Repair/Maintenance	10,700.00	7,977.69	10,700.00	-	
7130	6320	Janitorial Supplies	2,300.00	2,118.14	2,300.00	-	
7130	6330	Inspections and Contracts				-	
7130	6350	Electricity	14,228.00	11,304.00	11,869.00	(2,359.00)	
7130	6360	Water/Sewer	878.00	877.68	902.00	24.00	
7130	6375	Natural Gas/Heat	200.00		200.00	-	
7130	6380	Waste Disposal	1,900.00	260.38	1,900.00	-	
7130	6400	Equip Repair/Maintenance		8.04		-	
7130	6401	PW Machinery Rentals	5,500.00	9,655.00	5,500.00	-	
7130	6410	Fuel	300.00	242.00	300.00	-	
						-	
Total Expenditures			68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%
Total Operating + Capital			68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - EW Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7140	5110	Donations					
7140	5125	Transfer from Reserves					
7140	5200	Admissions/Rentals					
Total Revenue							
Expenditures							
7140	6100	Salaries - Full Time					
7140	6110	Salaries - Part Time					
7140	6111	Wages - PW Support	650.00	133.73	650.00	-	
7140	6120	Benefits - Full Time				-	
7140	6127	Benefits - PW Support	182.00	31.40	182.00	-	
7140	6200	Clothing/Uniforms				-	
7140	6210	Subscriptions/Memberships				-	
7140	6220	Training/Travel/Workshops				-	
7140	6240	Advertising & Promotion				-	
7140	6260	Phone/Fax/Internet				-	
7140	6270	Insurance				-	
7140	6290	Materials/Supplies	500.00		500.00	-	
7140	6295	Transfer to Reserve				-	
7140	6300	Bldg Repair/Maintenance				-	
7140	6320	Janitorial Supplies	50.00		50.00	-	
7140	6330	Inspections/Contracts	1,500.00	682.79	750.00	(750.00)	
7140	6350	Administration Overhead				-	
7140	6360	Water/Sewer				-	
7140	6400	Equipment Repair/Maintenance				-	
7140	6401	Machinery Rentals	1,170.00	120.00	1,170.00	-	
7140	6410	Fuel				-	
7140	6745	Flowers/Planters				-	
7140	6708	Administration Overhead				-	
Total Expenditures			4,052.00	967.92	3,302.00	(750.00)	241.14%
						-	
						-	
Total Operating + Capital			4,052.00	967.92	3,302.00	(750.00)	241.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Rec Programs Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7210	5125	Transfer from Reserves					
7210	5205	Program Registrations	81,477.00	71,709.04	70,480.00	(10,997.00)	
7210	5280	Grants		3,078.00			
Total Revenue			81,477.00	74,787.04	70,480.00	(10,997.00)	-5.76%
						-	
						-	
Expenditures						-	
7210	6100	Salaries - Full Time	7,317.00	7,317.00	6,530.00	(787.00)	
7210	6110	Salaries - Part Time	41,139.00	44,375.86	34,332.00	(6,807.00)	
7210	6125	Benefits - Part Time	9,116.00	5,391.85	7,730.00	(1,386.00)	
7210	6200	Clothing/Uniforms	520.00	348.00	520.00	-	
7210	6210	Subscriptions/memberships	400.00		400.00	-	
7210	6220	Training/Travel/Workshops	1,448.00	110.00	1,448.00	-	
7210	6240	Advertising/Promotion	400.00		400.00	-	
7210	6250	Office Supplies	100.00		100.00	-	
7210	6260	Phone/Fax	336.00	337.44	336.00	-	
7210	6290	Materials/Supplies	17,589.00	11,971.95	15,477.00	(2,112.00)	
7210	6295	Transfer to Reserve				-	
7210	6335	Contracts - Instructors	1,500.00	2,515.49	3,800.00	2,300.00	
7210	6400	Equip Repair/Maintenance				-	
7210	6708					-	
Total Expenditures			79,865.00	72,367.59	71,073.00	(8,792.00)	-1.79%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Aquatic Budget							
			2017	2017	2018	Budget \$	Budget - Actual
Program			Budget	Actuals	Budget	Variance	% Change
Revenue							
7320	5125	Transfer from Reserve	182,000.00	182,000.00	1,000.00	(181,000.00)	
7220	5200	Admissions/Rentals	23,404.00	32,672.15	9,612.00	(13,792.00)	
7220	5205	Program Registrations	75,411.00	64,314.34	72,093.00	(3,318.00)	
7220	5210	Memberships/Pass	59,104.00	50,771.40	57,001.00	(2,103.00)	
7220	5255	Sales	1,000.00	1,660.18	1,000.00	-	
7220	5270	Rentals		250.00	17,626.00		
7320	5280	Trillum Grant	150,000.00	150,233.66		(150,000.00)	
Total Revenue			490,919.00	481,901.73	158,332.00	(332,587.00)	-67.14%
						-	
						-	
Expenditures						-	
7220	6100	Salaries - Full Time	50,268.00	54,006.07	51,273.00	1,005.00	
7220	6110	Salaries - Part Time	101,684.00	93,875.00	116,349.00	14,665.00	
7220	6120	Benefits - Full Time	31,864.00	23,607.35	34,649.00	2,785.00	
7220	6200	Clothing/Uniforms	1,234.00	812.31	1,234.00	-	
7220	6210	Subscriptions/Memberships	686.00	596.50	1,059.00	373.00	
7220	6220	Training/Travel/Workshops	1,803.00	260.90	1,803.00	-	
7220	6240	Advertising/Promotion				-	
7220	6250	Office Supplies	700.00	206.23	700.00	-	
7220	6290	Materials/Supplies	9,400.00	9,382.65	8,434.00	(966.00)	
7220	6295	Transfer to Reserve				-	
7220	6400	Equip Repair/Maintenance	1,450.00	3,084.51	2,850.00	1,400.00	
7220	6708	Administration Overhead				-	
7220	6790	Clothing Sales	1,000.00		1,000.00	-	
Total Program Expenditures			200,089.00	185,831.52	219,351.00	19,262.00	18.04%
						-	
						-	
Pool W - Building						-	
Expenditures						-	
7320	6100	Salaries - Full Time	31,181.00	23,942.73	31,804.00	623.00	
7320	6110	Salaries - Part Time	14,787.00	14,220.64	15,563.00	776.00	
7320	6111	Wages - Public Works Support	870.00	432.88	870.00	-	
7320	6120	Benefits - Full Time	11,556.00	8,704.84	11,869.00	313.00	
7320	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7320	6200	Clothing/Uniforms	230.00	214.19	230.00	-	
7320	6220	Training/Travel/Workshops	900.00	413.96	900.00	-	
7320	6230	Health & Safety		300.00	300.00	300.00	
7320	6260	Phone/Fax/Internet				-	
7320	6270	Insurance	3,150.00	3,519.22	3,789.00	639.00	
7320	6290	Materials/Supplies	9,000.00	13,057.72	18,200.00	9,200.00	
7320	6295	Transfer to Reserve		98,488.51	35,500.00	35,500.00	
7320	6300	Bldg Repair/Maintenance	5,238.00	5,162.94	6,363.00	1,125.00	
7320	6320	Janitorial Supplies	2,400.00	2,363.13	2,400.00	-	
7320	6330	Inspections/Contracts	6,177.00	7,078.64	4,645.00	(1,532.00)	
7320	6350	Electricity	76,000.00	72,365.11	77,178.00	1,178.00	
7320	6360	Water/Sewer	4,042.00	3,874.00	4,242.00	200.00	
7320	6370	Natural Gas/Heat	7,260.00	5,999.65	7,260.00	-	
7320	6380	Waste Disposal	1,625.00	1,319.95	1,625.00	-	
7320	6390	SnowPlowing				-	
7320	6400	Equip Repair/Maintenance	17,100.00	20,052.15	20,050.00	2,950.00	
7320	6401	Machinery Rental	1,563.00	1,526.25	1,563.00	-	
Total Building Expenditures			193,324.00	283,119.51	244,596.00	51,272.00	-13.61%
						-	
Total Operating (Program + Building)			393,413.00	468,951.03	463,947.00	70,534.00	-1.07%
						-	
Capital						-	
7320	0300	Capital Improvements	426,697.00	328,208.49		(426,697.00)	
7320	0300	Repair Pool Tiles				-	
7320	0300	To Reserves - move				-	
7320	300	Pool Liner				-	
Total Capital			426,697.00	328,208.49	-	(426,697.00)	-100.00%
						-	
						-	
Total Operating + Capital			820,110.00	797,159.52	463,947.00	(356,163.00)	-41.80%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Fitness Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7240	5125	Transfer from Reserve	4,000.00	4,000.00		(4,000.00)	
7240	5200	Admissions/Rentals		713.84		-	
7240	5205	Program Registrations	8,430.00	5,277.71	1,974.00	(6,456.00)	
7240	5210	Memberships/Pass	163,276.00	162,472.33	156,910.00	(6,366.00)	
7240	5255	Sales				-	
7240	5280	Grants		171.33			
Total Revenue			175,706.00	172,635.21	158,884.00	(16,822.00)	-7.97%
						-	
						-	
Program Expense						-	
7240	6100	Salaries - Full Time	47,561.00	38,679.17	48,512.00	951.00	
7240	6110	Salaries - Part Time	37,756.00	49,118.00	33,031.00	(4,725.00)	
7240	6120	Benefits - Full Time	20,211.00	18,964.37	19,684.00	(527.00)	
7240	6200	Clothing/Uniforms	200.00	169.10	130.00	(70.00)	
7240	6210	Subscriptions/Memberships	1,134.00	842.10	1,014.00	(120.00)	
7240	6220	Training/Travel/Workshops	2,035.00	1,688.06	2,035.00	-	
7240	6240	Advertising/Promotion		358.73		-	
7240	6250	Office Supplies	750.00	772.48	550.00	(200.00)	
7240	6290	Materials/Supplies	400.00	248.65	380.00	(20.00)	
7240	6295	Transfer to Reserve				-	
7240	6300	Bldg Repair/Maintenance				-	
7240	6330	Inspections/Contracts	12,165.00	6,404.68	6,550.00	(5,615.00)	
7240	6400	Equip Repair/Maintenance	2,260.00	1,992.78	2,080.00	(180.00)	
7240	6708	Administration Overhead				-	
Total Program Expense			124,472.00	119,238.12	113,966.00	(10,506.00)	-4.42%
						-	
						-	
Fitness Building - Expenses						-	
						-	
7325	6100	Salaries - Full Time	9,917.00	9,341.31	10,115.00	198.00	
7325	6110	Salaries - Part Time	870.00	10,196.34	11,541.00	10,671.00	
7325	6111	Wages - PW Support	10,844.00	432.88	870.00	(9,974.00)	
7325	6120	Benefits - Full Time	4,719.00	4,239.07	4,895.00	176.00	
7325	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7325	6200	Clothing/Uniforms				-	
7325	6260	Phone/Fax/Internet				-	
7325	6270	Insurance	3,342.00	3,519.22	3,789.00	447.00	
7325	6290	Materials/Supplies				-	
7325	6295	Transfer to Reserve				-	
7325	6300	Bldg Repair/Maintenance	3,143.00	3,111.46	3,818.00	675.00	
7325	6320	Janitorial Supplies	1,600.00	1,648.60	1,600.00	-	
7325	6330	Inspections and Contracts	6,177.00	6,933.90	4,645.00	(1,532.00)	
7325	6350	Electricity	8,000.00	7,737.01	8,124.00	124.00	
7325	6360	Water/Sewer	2,021.00	1,936.94	2,121.00	100.00	
7325	6370	Natural Gas/Heat	4,620.00	3,817.94	4,620.00	-	
7325	6380	Waste Disposal	1,625.00	1,430.05	1,625.00	-	
7325	6390	SnowPlowing				-	
7325	6400	Equip Repair/Maintenance	2,175.00	1,528.00	2,175.00	-	
7325	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
Total Building Expenses			60,861.00	57,481.97	61,746.00	885.00	7.42%
						-	
Total Operating (Program + Building)			185,333.00	176,720.09	175,712.00	(9,621.00)	
						-	
Capital						-	
						-	
7240	0400	Cross Trainer	9,000.00	6,575.00		(9,000.00)	
Total Capital			9,000.00	6,575.00		(9,000.00)	
						-	
						-	
Total Operating + Capital			194,333.00	183,295.09	175,712.00	(18,621.00)	-4.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Rec Admin Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7301	5120	Misc Revenue	300.00	648.62	300.00	-	
7301	5125	Transfer from Reserves	45,000.00	45,000.00	50,000.00	5,000.00	
7301	5215	Gift Certificates		964.43			
7301	5250	Advertising	1,200.00	8,256.21	5,800.00	4,600.00	
Total Revenue			46,500.00	54,869.26	56,100.00	9,600.00	2.24%
						-	
						-	
Expenditures						-	
7301	6100	Salaries - Full Time	186,371.00	231,783.88	221,531.00	35,160.00	
7301	6110	Salaries - Part Time	27,353.00	35,790.04	11,322.00	(16,031.00)	
7301	6120	Benefits - Full Time	66,631.00	66,825.95	62,832.00	(3,799.00)	
7301	6200	Clothing/Uniforms	856.00	443.66	756.00	(100.00)	
7301	6205	Meeting Allowance	1,600.00	1,604.65	1,600.00	-	
7301	6210	Subscriptions/Memberships	225.00	425.00	225.00	-	
7301	6220	Training/Travel/Workshops	3,500.00	4,058.55	3,500.00	-	
7301	6230	Health & Safety	1,000.00	923.29	1,400.00	400.00	
7301	6240	Advertising/Promotion	15,700.00	17,414.94	14,400.00	(1,300.00)	
7301	6250	Office Supplies	9,151.00	9,181.54	9,150.00	(1.00)	
7301	6255	Postage/Courier	1,651.00	1,097.11	1,650.00	(1.00)	
7301	6260	Phone/Fax/Internet	7,672.00	5,361.73	7,672.00	-	
7301	6270	Insurance - Facility Users		1,893.52		-	
7301	6280	Legal/Accounting	6,000.00	1,856.52	4,000.00	(2,000.00)	
7301	6295	Transfer to Reserve	20,000.00	20,000.00	20,000.00	-	
7301	6330	Inspections/Contracts	14,099.00	15,037.27	19,628.00	5,529.00	
7301	6400	Equip Repair/Maintenance	1,000.00	1,389.95	1,000.00	-	
7301	6405	Fleet Expense	14,768.00		14,768.00	-	
7301	6910	Recreation Master Plan			50,000.00	50,000.00	
Total Expenditures			377,577.00	415,087.60	445,434.00	67,857.00	7.31%
						-	
7860		Rec Special Events		1,986.79		-	
						-	
7301	0600	Business machines				-	
7301	0600	Upgrade - Legends Software	45,000.00	37,070.58		(45,000.00)	
						-	
Total Capital			45,000.00	37,070.58	-	(45,000.00)	-100.00%
						-	
						-	
Total Operating + Capital			422,577.00	454,144.97	445,434.00	22,857.00	-1.92%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena - W Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7310	5125	Transfer from Reserve	97,255.00	97,255.00		(97,255.00)	
7310	5200	Admissions		3,076.58		-	
7310	5250	Advertising	8,700.00	9,855.23	9,800.00	1,100.00	
7310	5260	Vending		23.70	25.00	25.00	
7310	5270	Room Space Rental	14,300.00	14,627.55	14,800.00	500.00	
7310	5275	Ice Rentals	129,000.00	139,141.55	132,000.00	3,000.00	
7310	5280	Grants		373.85			
7310	5290	Rev-Other Municipalities	70,000.00	70,000.00	70,000.00	-	
7310	5900	Loan Proceeds				-	
Total Revenue			319,255.00	334,353.46	226,625.00	(92,630.00)	-32.22%
						-	
Expenditures						-	
7310	6100	Salaries - Full Time	77,507.00	67,183.23	79,057.00	1,550.00	
7310	6110	Salaries - Part Time	23,659.00	24,235.48	24,132.00	473.00	
7310	6111	Wages - PW Support	870.00	432.87	870.00	-	
7310	6120	Benefits - Full Time	26,499.00	21,722.99	27,029.00	530.00	
7310	6127	Benefits - PW Support	245.00	82.98	245.00	-	
7310	6200	Clothing/Uniforms	730.00	989.96	2,380.00	1,650.00	
7310	6210	Subscriptions/Memberships	330.00		330.00	-	
7310	6220	Training/Travel/Workshops	1,700.00	2,199.13	1,700.00	-	
7310	6230	Health & Safety	500.00	528.50	600.00	100.00	
7310	6240	Advertising/Promotion	400.00		400.00	-	
7310	6250	Office Supplies	300.00	34.65	100.00	(200.00)	
7310	6260	Phone/Fax/Internet				-	
7310	6270	Insurance	3,342.00	3,519.24	3,789.00	447.00	
7310	6295	Transfer to Reserve	5,000.00	22,372.61	25,000.00	20,000.00	
7310	6300	Bldg Repair/Maintenance	10,475.00	11,008.30	12,725.00	2,250.00	
7310	6320	Janitorial Supplies	4,000.00	3,665.75	4,000.00	-	
7310	6330	Inspections/Contracts	3,427.00	6,438.41	3,725.00	298.00	
7310	6350	Electricity	98,000.00	94,779.25	99,519.00	1,519.00	
7310	6360	Water/Sewer	4,042.00	3,874.02	4,242.00	200.00	
7310	6370	Natural Gas/Heat	5,280.00	4,363.36	5,280.00	-	
7310	6375	Propane	1,776.00	1,546.26	1,776.00	-	
7310	6380	Waste Disposal	3,250.00	2,860.00	3,250.00	-	
7310	6390	SnowPlowing					
7310	6400	Equip Repair/Maintenance	16,630.00	23,277.81	24,980.00		
7310	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
7310	6410	Fuel				-	
7310	6740	Socan	185.00	185.07	185.00	-	
7310	6900	Loan Principal				-	
7310	6902	Loan Interest				-	
7310	6708	Administration Overhead				-	
Total Expenditures			289,710.00	296,826.12	326,877.00	37,167.00	10.12%
						-	
Capital						-	
						-	
7310	0300	Building Water Intrusion	97,255.00	79,882.39		(97,255.00)	
Total Capital			97,255.00	79,882.39	-	(97,255.00)	
						-	
						-	
Total Operating + Capital			386,965.00	376,708.51	326,877.00	(60,088.00)	-13.23%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Concession - W Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7315	5255	Sales	30,000.00	22,911.35	11,500.00	(18,500.00)	
7315	5260	Vending	2,800.00	4,602.11	4,500.00	1,700.00	
Total Revenue			32,800.00	27,513.46	16,000.00	(16,800.00)	-41.85%
						-	
						-	
Expenditures						-	
7315	6100	Salaries - Full Time	4,146.00	3,559.69	1,990.00	(2,156.00)	
7315	6110	Salaries - Part Time	10,593.00	9,295.27	6,720.00	(3,873.00)	
7315	6120	Benefits - Full Time	1,801.00	1,718.54	1,142.00	(659.00)	
7315	6200	Clothing/Uniforms	150.00	33.00		(150.00)	
7315	6220	Training/Travel/Workshops	50.00		-	(50.00)	
7315	6240	Advertising/Promotion	250.00		-	(250.00)	
7315	6290	Materials/Supplies	15,000.00	13,451.20	7,000.00	(8,000.00)	
7315	6400	Equip Repair/Maintenance	150.00	65.00		(150.00)	
7315	6708					-	
Total Expenditures			32,140.00	28,122.70	16,852.00	(15,288.00)	-40.08%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 KOC Hall Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7330	5205	User Fees	27,000.00	27,300.00	27,000.00	-	
7330	5205	Loan Payment	12,500.00	12,500.00	12,500.00	-	
Total Revenue			39,500.00	39,800.00	39,500.00	-	-0.75%
						-	
						-	
Expenditures						-	
7330	6100	Salaries - Full Time	1,426.00	248.88	1,455.00	29.00	
7330	6111	Wages - PW Support	870.00	432.88	870.00	-	
7330	6120	Benefits - Full Time	385.00	76.66	393.00	8.00	
7330	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7330	6270	Insurance	2,506.00	2,639.41	2,209.00	(297.00)	
7330	6295	Transfer to Reserves	12,500.00	12,500.00	12,500.00	-	
7330	6300	Bldg Repair/Maintenance	2,095.00	4,410.44	2,545.00	450.00	
7330	6330	Inspections/Contracts	200.00	144.73	200.00	-	
7330	6350	Electricity	18,000.00	18,545.75	18,279.00	279.00	
7330	6360	Water/Sewer	895.00	894.93	895.00	-	
7330	6370	Natural Gas/Heat	4,840.00	3,999.92	4,840.00	-	
7330	6390	SnowPlowing				-	
7330	6400	Equip Repair/Maintenance	2,500.00	0.46	2,500.00	-	
7330	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
Total Expenditures			48,025.00	45,503.31	48,494.00	469.00	6.57%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7340	5110	Donations		2,000.00			
7340	5125	Transfer from Reserves	14,668.00	14,668.80		(14,668.00)	
7340	5200	Admissions	400.00	524.76	500.00	100.00	
7340	5250	Advertising	5,800.00	5,140.78	5,200.00	(600.00)	
7340	5255	Sales	200.00	420.00	400.00	200.00	
7340	5270	Room Space Rental	2,600.00	3,758.13	3,700.00	1,100.00	
7340	5275	Ice Rentals	102,600.00	97,027.08	102,600.00	-	
7340	5280	Grants/Levies		4,972.00			
7340	5290	Rev-Other Municipalities	16,000.00	16,000.00	16,000.00	-	
Total Revenue			142,268.00	144,511.55	128,400.00	(13,868.00)	-11.15%
						-	
						-	
Expenditures						-	
7340	6100	Salaries - Full Time	39,666.00	38,783.81	39,113.00	(553.00)	
7340	6110	Salaries - Part Time	29,090.00	32,625.88	30,085.00	995.00	
7340	6111	Wages - PW Support	913.00	4,371.87	913.00	-	
7340	6120	Benefits - Full Time	16,449.00	13,003.77	16,457.00	8.00	
7340	6127	Benefits - PW Support	256.00	1,088.52	256.00	-	
7340	6200	Clothing/Uniforms	380.00	177.00	1,480.00	1,100.00	
7340	6210	Subscriptions/Memberships	330.00		330.00	-	
7340	6220	Training/Travel/Workshops	1,029.00		1,029.00	-	
7340	6230	Health & Safety	750.00	410.36	750.00	-	
7340	6240	Advertising/Promotion	500.00		500.00	-	
7340	6250	Office Supplies	300.00	239.40	300.00	-	
7340	6260	Phone/Fax/Internet	691.00	886.72	691.00	-	
7340	6270	Insurance	4,527.00	4,806.29	4,942.00	415.00	
7340	6295	Transfer to Reserve	5,000.00	5,000.00	20,000.00	15,000.00	
7340	6300	Bldg Repair/Maintenance	2,000.00	1,292.49	2,000.00	-	
7340	6320	Janitorial Supplies	2,000.00	1,724.29	2,000.00	-	
7340	6330	Inspections/Contracts	4,180.00	5,809.51	4,180.00	-	
7340	6350	Electricity	60,160.00	63,044.91	66,196.00	6,036.00	
7340	6360	Water/Sewer	3,050.00	2,669.67	3,050.00	-	
7340	6375	Propane	19,125.00	20,369.34	23,250.00	4,125.00	
7340	6380	Waste Disposal	1,100.00	1,211.41	1,200.00	100.00	
7340	6390	SnowPlowing		22.08		-	
7340	6400	Equip Repair/Maintenance	26,555.00	22,658.75	24,355.00	(2,200.00)	
7340	6401	Machinery Rentals	1,643.00	2,560.00	1,643.00	-	
7340	6410	Fuel	250.00	243.05	250.00	-	
7340	6708	Administration Overhead				-	
Total Expenditures			219,944.00	222,999.12	244,970.00	25,026.00	9.85%
						-	
						-	
Capital						-	
						-	
7340		Arena Lights	25,000.00	26,084.00		(25,000.00)	
						-	
Total Capital			25,000.00	26,084.00	-	(25,000.00)	-100%
						-	
						-	
Total Operating + Capital			244,944.00	249,083.12	244,970.00	26.00	-1.65%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Concession - B Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7345	5520	Vending	6,800.00	5,121.35	5,200.00	(1,600.00)	
7345	5525	Sales	25,000.00	19,636.07	10,000.00	(15,000.00)	
Total Revenue			31,800.00	24,757.42	15,200.00	(16,600.00)	-38.60%
						-	
						-	
Expenditures						-	
7345	6100	Salaries - Full Time				-	
7345	6110	Salaries - Part Time	12,862.00	9,148.55	5,856.00	(7,006.00)	
7345	6120	Benefits - Full Time	2,187.00	909.63	996.00	(1,191.00)	
7345	6200	Clothing/Uniforms	150.00			(150.00)	
7345	6220	Training/Travel/Workshops	50.00		-	(50.00)	
7345	6230	Health & Safety				-	
7345	6290	Materials/Supplies	15,500.00	14,248.62	8,750.00	(6,750.00)	
7345	6300	Bldg Repair/Maintenance	550.00			(550.00)	
7345	6708	Administration Overhead				-	
Total Expenditures			31,299.00	24,306.80	15,602.00	(15,697.00)	-35.81%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Hall - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7350	5125	Transfer from Reserves					
7350	5200	Admissions/Rentals	7,884.00	12,178.81	7,884.00	-	
7350	5255	Sales	7,400.00	311.40	7,400.00	-	
7350	5280	Grants/Levies (Trillium)				-	
Total Revenue			15,284.00	12,490.21	15,284.00	-	22.37%
Expenditures							
7350	6100	Salaries - Full Time	5,610.00	5,610.78	6,732.00	1,122.00	
7350	6110	Salaries - Part Time	15,683.00	7,137.18	16,438.00	755.00	
7350	6111	Wages - PW Support	913.00	114.32	913.00	-	
7350	6120	Benefits - Full Time	4,293.00	2,191.78	4,747.00	454.00	
7350	6127	Benefits - PW Support	256.00	13.75	256.00	-	
7350	6200	Clothing/Uniforms	350.00	115.04	350.00	-	
7350	6220	Training/Travel/Workshops	963.00		963.00	-	
7350	6230	Health & Safety	250.00	147.17	250.00	-	
7350	6250	Office Supplies	300.00	188.30	300.00	-	
7350	6260	Phone/Fax/Internet	220.00	443.04	220.00	-	
7350	6270	Insurance	4,527.00	4,806.28	4,942.00	415.00	
7350	6290	Materials/Supplies	6,000.00	362.27	6,000.00	-	
7350	6295	Transfer to Reserve				-	
7350	6300	Bldg Repair/Maintenance	2,000.00	629.75	2,000.00	-	
7350	6320	Janitorial Supplies	2,000.00	1,490.41	2,000.00	-	
7350	6330	Inspections/Contracts	2,105.00		2,105.00	-	
7350	6350	Electricity	15,040.00	15,761.17	16,549.00	1,509.00	
7350	6360	Water/Sewer	3,050.00	2,669.67	3,050.00	-	
7350	6375	Propane	5,375.00	6,373.34	6,750.00	1,375.00	
7350	6380	Waste Disposal	1,100.00	1,161.44	1,200.00	100.00	
7350	6390	SnowPlowing				-	
7350	6400	Equip Repair/Maintenance	4,000.00	1,526.55	4,000.00	-	
7350	6401	Machinery Rentals	1,643.00	2,560.00	1,643.00	-	
7350	6740	Socan	185.00	185.07	185.00	-	
7350	6708	Administration Overhead				-	
Total Expenditures			75,863.00	53,487.31	81,593.00	5,730.00	52.55%
						-	
Capital						-	
7350	300	Roof Repairs				-	
Total Capital						-	
						-	
Total Operating and Capital			75,863.00	53,487.31	81,593.00	5,730.00	52.55%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena E/W - Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7360	5125	Transfer from Reserves				-	
7360	5200	Admissions/Rentals	13,305.00	13,794.48	14,029.00	724.00	
			13,305.00	13,794.48	14,029.00	724.00	1.70%
Total Revenue							
Expenditures							
7360	6100	Salaries - Full Time					
7360	6110	Salaries - Part Time					
7360	6120	Benefits - Full Time					
7360	6125	Benefits - Part Time					
7360	6130	Overtime					
7360	6200	Clothing/Uniforms					
7360	6210	Subscriptions/Memberships					
7360	6220	Training/Travel/Workshops					
7360	6230	Health & Safety					
7360	6240	Advertising/Promotion					
7360	6250	Office Supplies					
7360	6260	Phone/Fax/Internet					
7360	6270	Insurance	1,511.00	1,650.11	1,689.00	178.00	
7360	6280	Legal/Accounting					
7360	6290	Materials/Supplies					
7360	6300	Bldg Repair/Maintenance					
7360	6310	Taxes					
7360	6320	Janitorial Supplies					
7360	6330	Inspections/Contracts	49,992.00	50,579.82	51,440.00	1,448.00	
7360	6340	Engineering					
7360	6350	Electricity					
7360	6360	Water/Sewer					
7360	6370	Natural Gas/Heat					
7360	6375	Propane					
7360	6380	Waste Disposal					
7360	6390	SnowPlowing					
7360	6400	Equip Repair/Maintenance					
7360	6410	Fuel					
Total Expenditures			51,503.00	52,229.93	53,129.00	1,626.00	1.72%
Total Operating + Capital			51,503.00	52,229.93	53,129.00	1,626.00	1.72%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Library - W Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7710	5125	Transfer from Reserves				-	
7710	5200	Admissions/Rentals				-	
7710	5290	Rev-Other Municipalities	15,000.00	15,000.00	15,000.00	-	
Total Revenue			15,000.00	15,000.00	15,000.00	-	0.00%
Expenditures							
7710	6100	Salaries - Full Time	6,667.00	1,886.42	6,801.00	134.00	
7710	6110	Salaries - Part Time		308.43		-	
7710	6111	Wages - PW Support	1,084.00	282.52	1,084.00	-	
7710	6120	Benefits - Full Time	1,933.00	620.26	1,972.00	39.00	
7710	6127	Benefits - PW Support	303.00	81.92	303.00	-	
7710	6270	Insurance	2,457.00	2,651.27	2,721.00	264.00	
7710	6295	Transfer to Reserve				-	
7710	6300	Bldg Repair/Maintenance	1,000.00	1,410.10	2,000.00	1,000.00	
7710	6320	Janitorial Supplies	450.00	305.52	450.00	-	
7710	6330	Inspections/Contracts	6,365.00	6,591.49	6,365.00	-	
7710	6350	Electricity	6,800.00	4,586.65	4,816.00	(1,984.00)	
7710	6360	Water/Sewer	1,058.00	1,086.89	1,082.00	24.00	
7710	6370	Natural Gas/Heat	2,000.00	1,716.81	1,800.00	(200.00)	
7710	6380	Waste Disposal	494.00	464.05	494.00	-	
7710	6390	SnowPlowing				-	
7710	6401	Machinery Rental	1,950.00	846.63	1,950.00	-	
7710	6708					-	
Total Expenditures			32,561.00	22,838.96	31,838.00	(723.00)	39.40%
						-	
7710	300	Windows/exterior painting				-	
7710	300	Flooring/paint				-	
Total Capital						-	
						-	
Total Operating + Capital			32,561.00	22,838.96	31,838.00	(723.00)	39.40%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Library - B Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7720	5290	Rev-Other Municipalities	9,996.00	9,999.96	9,996.00	-	
Total Revenue			9,996.00	9,999.96	9,996.00	-	-0.04%
Expenditures							
7720	6100	Salaries - Full Time				-	
7720	6110	Salaries - Part Time	1,902.00	1,561.07	1,940.00	38.00	
7720	6120	Benefits - Full Time	323.00	118.33	330.00	7.00	
7720	6260	Phone/Fax/Internet				-	
7720	6295	Transfer to Reserve				-	
7720	6300	Bldg Repair/Maintenance	300.00		300.00	-	
7720	6320	Janitorial Supplies	325.00	303.13	325.00	-	
7720	6330	Inspections/Contracts	11,882.00	11,716.56	11,917.00	35.00	
7720	6708	Administration Overhead				-	
Total Expenditures			14,732.00	13,699.09	14,812.00	80.00	8.12%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Museum Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7810	5110	Donations	50.00	25.00		(50.00)	
7810	5120	Misc Revenue/Gift Shop	200.00	227.00		(200.00)	
7810	5125	Transfer from Reserves	15,000.00	15,000.00	8,015.00	(6,985.00)	
7810	5200	Admissions/Rents	4,000.00	4,596.52		(4,000.00)	
7810	5210	Memberships/Pass				-	
7810	5255	Fundraising Revenue	500.00			(500.00)	
7810	5280	Grants/Levies	700.00	1,539.00		(700.00)	
Total Revenue			20,450.00	21,387.52	8,015.00	(12,435.00)	-62.52%
						-	
Expenditures						-	
7810	6100	Salaries - Full Time				-	
7810	6110	Salaries - Part Time	6,500.00	5,785.14		(6,500.00)	
7810	6120	Benefits - Full Time	910.00	644.04		(910.00)	
7810	6210	Subscriptions/Memberships				-	
7810	6240	Advertising/Promotion	1,200.00	182.00		(1,200.00)	
7810	6250	Office Supplies				-	
7810	6260	Phone/Fax/Internet	400.00	304.59	400.00	-	
7810	6270	Insurance	780.00	824.29	845.00	65.00	
7810	6290	Materials/Supplies	1,200.00	783.44		(1,200.00)	
7810	6760	Fundraising Expense	500.00	716.80		(500.00)	
7810	6762	Collection Restoration				-	
7810	6764	Outreach Development				-	
7810	6766	Exhibit Expense				-	
7810	6768	Gift Shop	200.00			(200.00)	
Total Expenditures			11,690.00	9,240.30	1,245.00	(10,445.00)	-86.53%
						-	
Bldg Expense						-	
7815	6100	Salaries - Full Time	5,325.00	4,043.24	2,716.00	(2,609.00)	
7815	6110	Salaries - Part Time	951.00	432.06	485.00	(466.00)	
7815	6120	Benefits - Full Time	1,706.00	1,290.49	870.00	(836.00)	
7815	6270	Insurance	1,668.00	1,690.20	1,741.00	73.00	
7815	6295	Transfer to Reserve		7,926.42		-	
7815	6300	Bldg Repair/Maintenance	3,000.00	489.75	490.00	(2,510.00)	
7815	6320	Janitorial Supplies	300.00	6.99	30.00	(270.00)	
7815	6330	Inspections/Contracts	660.00	240.00	660.00	-	
7815	6350	Electricity	4,600.00	2,894.84	1,672.00	(2,928.00)	
7815	6360	Water/Sewer	1,100.00	841.78	842.00	(258.00)	
7815	6370	Natural Gas/Heat	2,500.00	2,865.88	1,467.00	(1,033.00)	
7815	6380	Waste Disposal	494.00	456.64	-	(494.00)	
7815	6708	Administration Overhead				-	
7815	6910	Facility Condition Assessment	15,000.00	7,073.58	8,015.00	(6,985.00)	
Total Expenditures			37,304.00	30,251.87	18,988.00	(18,316.00)	-37.23%
						-	
Total Operating			48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%
						-	
						-	
Total Operating + Capital			48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Memorial Hall Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7850	5120	Misc Revenue		2,263.05			
7850	5125	Transfer from Reserve - Bank Balance	26,784.00			(26,784.00)	
7850	5125	Transfer from Reserve - Twsp Balance	481,206.00	337,322.79		(481,206.00)	
7850	5200	Admissions/Rentals				-	
7850	5110	14/19 - Prov Grant	1,543,604.00	1,841,720.59		(1,543,604.00)	
7850	5288	Federal Grants	367,827.00	367,826.78		(367,827.00)	
7850	5110	14/19 Contribution (Committed)	74,276.00			(74,276.00)	
Total Revenue			2,493,697.00	2,549,133.21		(2,493,697.00)	-100.00%
						-	
Expenditures						-	
7850	6100	Salaries - Full Time	1,320.00	1,486.12	1,346.00	26.00	
7850	6110	Salaries - Part Time		1,500.32		-	
7850	6120	Benefits - Full Time	383.00	556.82	390.00	7.00	
7850	6230	Health & Safety				-	
7850	6260	Phone/Fax/Internet				-	
7850	6270	Insurance	9,256.00	9,850.55	10,135.00	879.00	
7850	6291	Special Project - Trillium				-	
7850	6295	Transfer to Reserves	50,000.00	78,098.42	50,000.00	-	
7850	6300	Bldg Repair/Maintenance	1,700.00	41.29	1,700.00	-	
7850	6320	Janitorial Supplies				-	
7850	6330	Inspections/Contracts	1,000.00	967.58		(1,000.00)	
7850	6350	Electricity				-	
7850	6360	Water/Sewer				-	
7850	6370	Natural Gas/Heat				-	
7850	6375	Propane				-	
7850	6708			(280.50)		-	
Total Expenditures			63,659.00	92,220.60	63,571.00	(88.00)	-31.07%
						-	
Capital						-	
7850	0300	Memorial Hall - Phase 1	2,493,697.00	2,518,771.74		(2,493,697.00)	
7850	0300	Huron Geomatics				-	
Total Capital			2,493,697.00	2,518,771.74	-	(2,493,697.00)	-100.00%
						-	
Total Operating + Capital			2,557,356.00	2,610,992.34	63,571.00	(2,493,785.00)	-97.57%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Economic Development Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7900	5110	Donations				-	
7900	5125	Transfer from Reserves				-	
7900	5205	Program Registrations				-	
7900	5280	Grants - Libro "In It to Win It"			20,000.00	20,000.00	
7900	5280	Grants - BIA's			5,000.00		
7900	5280	Grants - Huron Futures Corp			1,000.00		
7900	5280	Grants - Main Street Revitalization			42,008.00		
7900	5290	Rev - Other Municipalities				-	
Total Revenue					68,008.00	68,008.00	0
						-	
						-	
Expenditures						-	
7900	6100	Salaries - Full Time	60,060.00	60,410.46	31,000.00	(29,060.00)	
7900	6110	Salaries - Part Time				-	
7900	6120	Benefits	17,417.00	16,558.57	8,980.00	(8,437.00)	
7900	6130	Overtime		49.50			
7900	6200	Clothing/Uniforms	130.00	117.07		(130.00)	
7900	6205	Meeting Allowance	450.00	111.94	250.00	(200.00)	
7900	6210	Subscriptions/Memberships	1,250.00	740.05	1,300.00	50.00	
7900	6220	Training/Travel/Workshops	4,000.00	2,731.96	1,000.00	(3,000.00)	
7900	6240	Advertising/Promotion	22,000.00	21,905.82	20,375.00	(1,625.00)	
7900	6250	Office Supplies	1,000.00	646.23	1,000.00	-	
7900	6255	Postage/Courier	400.00		130.00	(270.00)	
7900	6260	Phone/Fax/Internet	1,500.00	878.90	900.00	(600.00)	
7900	6290	Materials/Supplies	3,750.00	2,057.93	1,500.00	(2,250.00)	
7900	6291	Ec Development Committee			2,500.00	2,500.00	
7900	6292	Alice Munro	4,500.00	3,500.00	3,500.00	(1,000.00)	
7900	6293	Special Projects	6,000.00	3,674.66	1,500.00	(4,500.00)	
7900	6294	Special Projects	6,500.00	2,500.00	45,910.00	39,410.00	
7900	6296	Special Project - Main St. Revitalization			42,008.00		
7900	6297	Special Projects - Libro Prosperity Project			36,000.00		
7900	6295	Transfer to Reserve				-	
7900	6750	Community Partnership	53,335.00	53,710.00	53,335.00	-	
7900	6752	Web Site Update	2,500.00	2,768.07	2,500.00	-	
						-	
Total Expenditures			184,792.00	172,361.16	253,688.00	68,896.00	47.18%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Planning & Development Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
8100	5120	Misc Revenue - Developers	15,000.00	17,702.98		(15,000.00)	
8100	5125	Transfer from Reserve				-	
8100	5700	Tax Certificates	3,700.00	5,150.00	5,000.00	1,300.00	
8100	5710	Planning Applications	4,500.00	10,914.00	4,500.00	-	
Total Revenue			23,200.00	33,766.98	9,500.00	(13,700.00)	-71.87%
						-	
						-	
Expenditures						-	
8100	6100	Salaries - Full Time	10,000.00	10,000.00	10,000.00	-	
8100	6120	Benefits - Full Time	2,500.00	2,500.00	2,500.00	-	
8100	6210	Subscriptions/Memberships				-	
8100	6220	Training/Travel/Workshops				-	
8100	6240	Advertising/Promotion	1,000.00		1,000.00	-	
8100	6250	Office Supplies				-	
8100	6280	Legal/Accounting	1,500.00	4,101.51	1,500.00	-	
8100	6290	Materials/Supplies				-	
8100	6295	Transfer to Reserves				-	
8100	6330	Inspections/Contracts				-	
8100	6340	Engineering	5,000.00	6,576.34	10,000.00	5,000.00	
Total Expenditures			20,000.00	23,177.85	25,000.00	5,000.00	7.86%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Drainage Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
8500	5286	Conditional Grants - Drainage	7,500.00	10,127.81	9,250.00	1,750.00	
8500	5800	Tile Drain Loan Revenue	8,400.00	8,369.47	8,400.00	-	
8500	5800	Drainage - A/R				-	
Total Revenue			15,900.00	18,497.28	17,650.00	1,750.00	-4.58%
						-	
Expenditures						-	
8500	6100	Salaries - Full Time	15,000.00	355.27		(15,000.00)	
8500	6120	Benefits - Full Time		85.48		-	
8500	6210	Subscriptions/Memberships	300.00		-	(300.00)	
8500	6220	Training/Travel/Workshops	1,500.00	287.14	1,500.00	-	
8500	6250	Office Supplies			-	-	
8500	6280	Legal/Accounting			-	-	
8500	6290	Materials/Supplies			-	-	
8500	6330	Inspections/Contracts		18,164.16	18,500.00	18,500.00	
8500	6800	Tile Drain Loan Payment	8,400.00	8,369.47	8,400.00	-	
						-	
Total Expenditures			25,200.00	27,261.52	28,400.00	3,200.00	4.18%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Borrowing - Prinicipal & Interest Payments							
		Original	Dec 31/17				
	Yr Paid	Loan	Balance	Principal	Interest	Total	Term
Grader	2026	242,000	170,327	7,689.39	3,294.99	10,984.38	15
				7,852.40	3,131.98	10,984.38	
RINC	2022	264,000	154,989	13,451.15	2,355.83	15,806.98	10
				13,655.61	1,956.06	15,611.67	
2009 Roads	2021	293,000	145,402	15,547.01	2,165.07	17,712.08	10
				15,389.30	1,872.78	17,262.08	
2016 P & I		799,000	470,718	73,584.86	14,776.71	88,361.57	
						-	
Sub-total				73,584.86	14,776.71	88,361.57	
Training Centre	2032	1,200,000	1,001,209.76	25,092.28	17,666.79	42,759.07	20
				25,557.74	17,201.33	42,759.07	
Fire Payouts	2026	838,000	589,811	26,626.90	11,409.93	38,036.83	15
				27,191.39	10,845.44	38,036.83	
2017 Total		2,837,000	2,061,739	178,053.17	71,900.20	249,953.37	
ESTC/Fire Dept Split							
Training Centre		1,200,000		25,092.28	17,666.79	42,759.07	
				25,557.74	17,201.33	42,759.07	
				50,650.02	34,868.12	85,518.14	
55% ESTC		55%		27,857.51	19,177.47	47,034.98	
45% Fire Dept		45%		22,792.51	15,690.65	38,483.16	
				50,650.02	34,868.12	85,518.14	
Fire				26,626.90	11,409.93	38,036.83	
				27,191.39	10,845.44	38,036.83	
				22,792.51	15,690.65	38,483.16	
				76,610.80	37,946.02	114,556.82	

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Capital Spending										
	Budget	Grant	Long Term	Reserves	User	Gas Tax	Taxation	Donations/ Other	Total	Difference
		Funding	Borrowing		Fees					
Mill Street - Phase 3 OCIF Top Up									-	-
Westmoreland St - Final Cover	30,273.00	30,273.00							30,273.00	-
Arthur Street - Phase 2	52,745.00	52,745.00							52,745.00	-
Rural Roads - Tar & Chip Program	101,760.00	101,760.00							101,760.00	-
Equipment Purchase - Mower	25,440.00						25,440.00		25,440.00	-
Trackless Sidewalk Machine	101,760.00						101,760.00		101,760.00	-
Howson Dam EA	69,610.00			69,610.00					69,610.00	-
Cemetery Software - Stone Orchard	50,091.00			50,091.00					50,091.00	-
Wingham Cemetery - Niche Wall	40,000.00			28,410.00			11,590.00		40,000.00	-
S/L LED Conversion Project	421,508.00		421,508.00						421,508.00	
Summit Drive - LED Streetlight Project	40,000.00		40,000.00						40,000.00	
Sewer - Arthur Street - Phase 2	64,841.00				64,841.00				64,841.00	-
Sewer - Equipment Upgrades	34,000.00				34,000.00				34,000.00	-
Water - Equipment Upgrades	30,000.00				30,000.00				30,000.00	
Water - Arthur Street	186,973.00				186,973.00				186,973.00	-
Police - Firearms	14,400.00						14,400.00		14,400.00	
Police - Uniforms/Equip Additional officers	18,000.00						18,000.00			
Townhall Theatre - Renovations	38,000.00			38,000.00					38,000.00	
Wayward Signs	10,000.00			10,000.00					10,000.00	-
Fire Hall Grates	8,000.00			6,500.00			1,500.00		8,000.00	-
Police Roof	26,000.00			20,000.00			6,000.00		26,000.00	-
Day Care Roof - Engineering	25,000.00			18,750.00			6,250.00		25,000.00	-
Day Care - Washroom Renovation	35,000.00	35,000.00							35,000.00	
Fitness - Treadmill #1	10,000.00						10,000.00		10,000.00	-
Fitness/Squash - HVAC	35,000.00						35,000.00		35,000.00	-
Floor Scrubber	7,500.00						7,500.00		7,500.00	-
Multi-purpose Cleaning Machine	6,500.00			6,500.00					6,500.00	
Legends Software	5,000.00			5,000.00					5,000.00	
CO Monitors for Arena	10,000.00						10,000.00		10,000.00	-
Complex - Roof Leaks - Fitness Area	113,000.00			15,255.00			97,745.00		113,000.00	-
Memorial Hall - Renovation Project	154,590.00			133,690.00				20,900.00	154,590.00	-
Total Capital	1,764,991.00	219,778.00	461,508.00	401,806.00	315,814.00	-	345,185.00	20,900.00	1,764,991.00	-
		219,778.00								
		461,508.00								
		401,806.00								
		20,900.00								
		1,103,992.00								

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Capital Budget			
	Roads	Revenue	Expense
02-3100-0793	Westmoreland St - Final Cover		30,273.00
02-3100-5280	OCIF Formual Base	30,273.00	
02-3100-0794	Phase 2 - Arthur Street		52,745.00
02-3100-5280	OCIF Formula Base	52,745.00	
02-3100-0707	Rural Tar & Chip Program		101,760.00
02-3100-5280	OCIF Formula Base	101,760.00	
02-3100-0400	Equipment Purchase - Mower		25,440.00
02-3100-0400	Trackless Sidewalk Machine (used)		101,760.00
02-3100-1200	Howson Dam EA		69,610.00
02-3100-5125	Transfer from Reserves	69,610.00	
02-5400-0600	Cemetery - Stone Orchard Software		50,091.00
02-5400-5125	Transfer from Reserves	50,091.00	
02-5400-0200	Wingham Cemetery - Niche Wall		40,000.00
02-5400-5125	Transfer from Reserves	28,410.00	
02-3400-0450	S/L LED Conversion Project		421,508.00
02-3400-5900	Loan Proceeds	421,508.00	
02-3400-0450	Summit Drive Streetlight Project		40,000.00
02-3400-5900	Loan Proceeds	40,000.00	
	Total Roads	794,397.00	933,187.00
	Sewer		
02-4100-0400	Equipment Upgrades		34,000.00
02-4100-0794	Arthur Street		64,841.00
	Total Sewer	-	98,841.00
	Water		
02-4300-0400	Equipment Upgrades		30,000.00
02-4300-0794	Arthur Street		186,973.00
	Total Water	-	216,973.00
	Total Water/Sewer		315,814.00
02-2200-0400	Police - Firearms		14,400.00
02-2200-0400	Uniforms/Equipment Additional officers		18,000.00
	Total Police		32,400.00
	Recreation & Facilities		
02-1210-0300	Theatre Renovations		38,000.00
02-1210-5125	Transfer from Reserve	38,000.00	
02-7100-0200	Wayward Signs		10,000.00
02-7100-5125	Transfer from Reserve	10,000.00	
02-2120-0300	Fire Hall Grates		8,000.00
02-2120-5125	Transfer from Reserve	6,500.00	
02-2210-0300	Police Roof		26,000.00
02-2210-5125	Transfer from Reserve	20,000.00	
02-6410-0300	Day Care Roof - Engineering		25,000.00
02-6410-5125	Transfer from Reserve	18,750.00	
02-6410-0300	Day Care - Washroom Renovation		35,000.00
02-6410-5290	Grant - County of Huron	35,000.00	
02-7240-0400	Fitness - Treadmill #1		10,000.00
02-7325-0300	Fitness Squash HVAC		35,000.00
02-7310-0400	Multi-purpose Cleaning Machine		6,500.00
02-7310-5125	Transfer from Reserve	6,500.00	
02-7310-0400	Floor Scrubber		7,500.00
02-7301-0600	Legends Software		5,000.00
02-7301-5125	Transfer from Reserve	5,000.00	
02-7310-0400	CO Monitors for Arena		10,000.00
02-7310-0300	Roof Leaks (Fitness Area)		113,000.00
02-7310-5125	Transfer from Reserve	15,255.00	
02-7850-0306	Memorial Hall - Twsp Other		149,590.00
02-7850-0303	Memorial Hall -Twsp Consulting		5,000.00
02-7850-5125	Memorial Hal - Transfer from Reserves	133,690.00	
02-7850-	Memorial Hall - Donations	20,900.00	
	Total Recreation & Facilities	309,595.00	483,590.00
	Total Capital	1,103,992.00	1,764,991.00

2018 DRAFT BUDGET

THE CORPORATION OF THE MUNICIPALITY OF NORTH HURON - 2018														
SCHEDULE "C"														
					WINGHAM	BLYTH	E/W		TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
		BASE	COUNTY	EDUCATION	SPECIAL	SPECIAL	SPECIAL		MUNICIPAL	MUNICIPAL	MUNICIPAL	WINGHAM	BLYTH	E/W
		MUNICIPAL			AREA RATE	AREA RATE	AREA RATE		WINGHAM	BLYTH	E/W	WARD	WARD	WARD
RTC	DESCRIPTION	RATE												
RT	RESIDENTIAL/FARM	0.00818334	0.00478507	0.00170000	0.00599885	0.00247983	0.00108078	RT	0.01418319	0.01066317	0.00926412	0.02066826	0.01714824	0.01574919
MT	MULTI-RESIDENTIAL	0.00900167	0.00526358	0.00170000	0.00659984	0.00272782	0.00118886	MT	0.01560151	0.01172949	0.01019053	0.02256509	0.01869307	0.01715411
FT	FARMLANDS	0.00204584	0.00119627	0.00042500	0.00149996	0.00061996	0.00027019	FT	0.00354580	0.00266579	0.00231603	0.00516707	0.00428706	0.00393730
CT/ST/XT	COMMERCIAL	0.00900167	0.00526358	0.01055893	0.00659984	0.00272782	0.00118886	CT/ST	0.01560151	0.01172949	0.01019053	0.03142402	0.02755200	0.02601304
IT/LT	INDUSTRIAL	0.00900167	0.00526358	0.01090000	0.00659984	0.00272782	0.00118886	IT/LT	0.01560151	0.01172949	0.01019053	0.03176509	0.02789307	0.02635411
PT	PIPELINE	0.00572834	0.00334955	0.00469360	0.00419990	0.00173588	0.00075655	PT	0.00992823	0.00746422	0.00648488	0.01797138	0.01550737	0.01452803
TT	MANAGED FORESTS	0.00204584	0.00119627	0.00042500	0.00149996	0.00061996	0.00027019	TT	0.00354580	0.00266579	0.00231603	0.00516707	0.00428706	0.00393730
R1	RES/FARM CLASS 1	0.00204584	0.00119627	0.00042500	0.00149996	0.00061996	0.00027019	R1	0.00354580	0.00266579	0.00231603	0.00516707	0.00428706	0.00393730
CU	COMMERCIAL EXCESS	0.00630117	0.00368450	0.00739125	0.00461989	0.00190947	0.00083220	CU	0.01092106	0.00821064	0.00713337	0.02199681	0.01928639	0.01820912
CX	COMMERCIAL VACANT	0.00630117	0.00368450	0.00739125	0.00461989	0.00190947	0.00083220	CX	0.01092106	0.00821064	0.00713337	0.02199681	0.01928639	0.01820912
IU	IND. EXCESS	0.00630117	0.00368450	0.00763000	0.00461989	0.00190947	0.00083220	IU	0.01092106	0.00821064	0.00713337	0.02223556	0.01952514	0.01844787
IX	IND. VACANT	0.00630117	0.00368450	0.00763000	0.00461989	0.00190947	0.00083220	IX	0.01092106	0.00821064	0.00713337	0.02223556	0.01952514	0.01844787
H	LANDFILL	0.00900167	0.00526358	0.00831607	0.00775993	0.00272782	0.00118886		0.01560151	0.01172949	0.01019053	0.02918116	0.02530914	0.02377018
	2017 Average Assessment	200,000	957.01	340.00					2,836.64	2,132.63	1,852.82	4,133.65	3,429.65	3,149.84
	2016 Assessment	197,500	978.43	353.53					2,524.68	2,011.59	1,754.45	3,856.64	3,343.55	3,086.41
	Increase in \$		(21.42)	(13.53)					311.96	121.04	98.37	277.01	86.10	63.43
	Overall % Increase											7.18%	2.58%	2.06%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

Township of North Huron			13.03%						
2018 Taxes vs 2017 Tax Examples									
Wingham			Assessment	Municipal	County	Education	Total Rate	Total Tax	
2018		006-022		148,500	0.01418319	0.00478507	0.00170000	0.02066826	3,069.24
2017	RT		2.24%	145,250	0.01278324	0.00495408	0.00179000	0.01952732	2,836.34
									232.89
2018		019-036		178,000	0.01418319	0.00478507	0.00170000	0.02066826	3,678.95
2017	RT		3.19%	172,500	0.01278324	0.00495408	0.00179000	0.01952732	3,368.46
									310.49
2018		016-101		305,500	0.01418319	0.00478507	0.00170000	0.02066826	6,314.15
2017	RT		0.41%	304,250	0.01278324	0.00495408	0.00179000	0.01952732	5,941.19
									372.97
2018				825,000	0.01560151	0.00526358	0.01055893	0.03142402	25,924.82
2017	CT	001-043	1.13%	815,750	0.01406157	0.00544949	0.01071388	0.03022494	24,655.99
									1,268.82
Blyth									
2018		005-04701	4.24%	123,000	0.01066317	0.00478507	0.00170000	0.01714824	2,109.23
2017	RT			118,000	0.01018527	0.00495408	0.00179000	0.01692935	1,997.66
									111.57
2018		003-023	2.52%	274,500	0.01066317	0.00478507	0.00170000	0.01714824	4,707.19
2017	RT			267,750	0.01018527	0.00495408	0.00179000	0.01692935	4,532.83
									174.36
East Wawanosh									
2018		010-014	6.16%	69,800	0.00926412	0.00478507	0.00170000	0.01574919	1,099.29
2017	RT			65,750	0.00888333	0.00495408	0.00179000	0.01562741	1,027.50
									71.79
2018			14.99%	663,200	0.00231603	0.00119627	0.00042500	0.00393730	2,611.22
2017	FT			576,750	0.00222083	0.00123852	0.00044750	0.00390685	2,253.28
									357.94

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	3,739,437	Base Rate							
TAX RATE CALCULATIONS											
	Township of North Huron										
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)				
	Returned										
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of				
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax				
	1999 Current Value Based Assessment	Class (excludes rail/municipal Act or as per)	(col. 3 X's (1 - col. 4))	(col. 2 X's col. 5)	rate (calculated below) X's Col. 5	(col. 2 X's col. 7)					
res/farm (RT)	339,331,090	1.000000	0.00%	0.000000	339,331,090	0.00818334	\$2,776,862				
multi-res (MT)	9,850,550	1.100000	0.00%	1.100000	10,835,605	0.00900167	\$88,671				
farmlands (FT)	209,742,659	0.250000	0.00%	0.250000	52,435,665	0.00204584	\$429,099				
commercial (CT)	35,165,594	1.100000	0.00%	1.100000	38,682,153	0.00900167	\$316,549				
industrial (IT)	9,965,920	1.100000	0.00%	1.100000	10,962,512	0.00900167	\$89,710				
pipeline (PT)	4,284,196	0.700000	0.00%	0.700000	2,998,937	0.00572834	\$24,541				
managed forests (TT)	2,431,256	0.250000	0.00%	0.250000	607,814	0.00204584	\$4,974				
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0				
	610,771,265				455,853,776		\$3,730,407				
res/farm farmland class I (R1)	122,100	0.250000	0.00%	0.250000	30,525	0.00204584	250				
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00818334	0				
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00818334	0				
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00900167	0				
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00900167	0				
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00900167	0				
commercial excess/vacant unit (CU)	370,500	1.100000	30.00%	0.770000	285,285	0.00630117	2,335				
commercial vacant land (CX)	857,166	1.100000	30.00%	0.770000	660,018	0.00630117	5,401				
industrial excess/vacant unit (IU)	29,100	1.100000	30.00%	0.770000	22,407	0.00630117	183				
industrial vacant land (IX)	102,750	1.100000	30.00%	0.770000	79,118	0.00630117	647				30,973,125.00
industrial (IH)	23,750	1.100000	0.00%	1.100000	26,125	0.00900167	214 **				2,981,225.00
	1,505,366				1,103,477		9,030				33,954,350.00
Total Returned Assess.	612,276,631				456,957,254		\$3,739,437				
Levy Requirements											
net levy =	3,739,437										
			(col. 6 Total)								
TOTAL MUNICIPAL	3,739,437	divided by	456,957,254	equals	Res/Farm Tax Rate	0.00818334					
Updated April 3/2017											

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	1,427,265	Wingham Ward				
TAX RATE CALCULATIONS								
	Township of North Huron							
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)	
	Returned							
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of	
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax	
1999-Current Value Based Assessment Class (excludes rail) Municipal Act or as prescribed in col. 3 X's (1 - col. 4) (col. 2 X's col. 5) calculated below X's (col. 2 X's col. 7)								
res/farm (RT)	192,435,594	1.000000	0.00%	0.000000	192,435,594	0.00599985	\$1,154,585	
multi-res (MT)	7,972,050	1.100000	0.00%	1.100000	8,769,255	0.00659984	\$52,614	
farmlands (FT)	38,650	0.250000	0.00%	0.250000	9,663	0.00149996	\$58	
commercial (CT)	24,455,246	1.100000	0.00%	1.100000	26,900,771	0.00659984	\$161,401	
industrial (IT)	7,816,500	1.100000	0.00%	1.100000	8,598,150	0.00659984	\$51,588	
pipeline (PT)	740,933	0.700000	0.00%	0.700000	518,653	0.00419990	\$3,112	
managed forests (TT)	0	0.250000	0.00%	0.250000	0	0.00149996	\$0	
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0	
	233,458,973				237,232,085		\$1,423,357	
res/farm farmland class I (R1)	0	0.250000	0.00%	0.250000	0	0.00149996	0	
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00599985	0	
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00599985	0	
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00659984	0	
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00659984	0	
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00659984	0	
commercial excess/vacant unit (CU)	109,550	1.100000	30.00%	0.770000	84,354	0.00461989	506	
commercial vacant land (CX)	570,500	1.100000	30.00%	0.770000	439,285	0.00461989	2,636	
industrial excess/vacant unit (IU)	29,100	1.100000	30.00%	0.770000	22,407	0.00461989	134	
industrial vacant land (IX)	102,750	1.100000	30.00%	0.770000	79,118	0.00461989	475	21,802,700.00
industrial (IH)	23,750	1.100000	0.00%	1.100000	26,125	0.00659984	157	2,652,546.00
	835,650				651,288		3,908	24,455,246.00
Total Returned Assess.	234,294,623				237,883,373		\$1,427,265	
Levy Requirements								
net levy =	1,427,265							
			(col. 6 Total)					
TOTAL MUNICIPAL	1,427,265	divided by	237,883,373	equals	Res/Farm Tax Rate	0.00599985		
Agrees to Assessment Roll								

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	210,525	Blyth Ward					
TAX RATE CALCULATIONS									
	Township of North Huron								
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)		
	Returned								
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of		
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax		
<i>1999-Current Value Based Ass Class (excludes rail/municipal Act or as pres</i>				<i>(col. 3 X's (1 - col. 4))</i>	<i>(col. 2 X's col. 5)</i>	<i>(calculated below) X's C</i>	<i>(col. 2 X's col. 7)</i>		
res/farm (RT)	72,853,835	1.000000	0.00%	0.000000	72,853,835	0.00247983	\$180,665		
multi-res (MT)	1,878,500	1.100000	0.00%	1.100000	2,066,350	0.00272782	\$5,124		
farmlands (FT)	961,150	0.250000	0.00%	0.250000	240,288	0.00061996	\$596		
commercial (CT)	6,852,938	1.100000	0.00%	1.100000	7,538,232	0.00272782	\$18,694		
industrial (IT)	1,470,500	1.100000	0.00%	1.100000	1,617,550	0.00272782	\$4,011		
pipeline (PT)	518,468	0.700000	0.00%	0.700000	362,928	0.00173588	\$900		
managed forests (TT)		0.250000	0.00%	0.250000	0	0.00061996	\$0		
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0		
	84,535,391				84,679,182		\$209,990		
res/farm farmland class I (R1)	110,000	0.250000	0.00%	0.250000	27,500	0.00061996	68		
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00247983	0		
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00247983	0		
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00272782	0		
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00272782	0		6,711,538.00
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00272782	0		141,400.00
commercial excess/vacant unit (C)	34,650	1.100000	30.00%	0.770000	26,681	0.00190947	66		6,852,938.00
commercial vacant land (CX)	209,666	1.100000	30.00%	0.770000	161,443	0.00190947	400		
industrial excess/vacant unit (IU)		1.100000	30.00%	0.770000	0	0.00190947	0		
industrial vacant land (IX)	0	1.100000	30.00%	0.770000	0	0.00190947	0		
	354,316				215,623		535		
Total Returned Assess.	84,889,707				84,894,805		\$210,525		
Levy Requirements									
net levy =	210,525								
			(col. 6 Total)						
TOTAL MUNICIPAL	210,525	divided by	84,894,805	equals	Res/FarmTax Rate	0.00247983			
Agrees to Assessment Roll									

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	145,018	E/W Ward					
TAX RATE CALCULATIONS									
	Township of North Huron								
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)		
	Returned								
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of		
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax		
1999-Current Value Based Assessment Class (excludes rail) as prescribed by Municipal Act or as prescribed by the Township of North Huron				(col. 3 X's (1 - col. 4))	(col. 2 X's col. 5)	calculated below X's	(col. 2 X's col. 7)		
res/farm (RT)	74,041,661	1.000000	0.00%	0.000000	74,041,661	0.00108078	\$80,023		
multi-res (MT)		1.100000	0.00%	1.100000	0	0.00118886	\$0		
farmlands (FT)	208,742,859	0.250000	0.00%	0.250000	52,185,715	0.00027019	\$56,401		
commercial (CT)	3,857,410	1.100000	0.00%	1.100000	4,243,151	0.00118886	\$4,586		
industrial (IT)	678,920	1.100000	0.00%	1.100000	746,812	0.00118886	\$807		
pipeline (PT)	3,024,795	0.700000	0.00%	0.700000	2,117,357	0.00075655	\$2,288		
managed forests (TT)	2,431,256	0.250000	0.00%	0.250000	607,814	0.00027019	\$657		
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0		
	292,776,901				133,942,509		\$144,762		
res/farm farmland class I (R1)	12,100	0.250000	0.00%	0.250000	3,025	0.00027019	3		
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00108078	0		
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00108078	0		3,157,328.00
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00118886	0		700,082.00
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00118886	0		3,857,410.00
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00118886	0		
commercial excess/vacant unit (CU)	226,300	1.100000	30.00%	0.770000	174,251	0.00083220	188		
commercial vacant land (CX)	77,000	1.100000	30.00%	0.770000	59,290	0.00083220	64		
industrial excess/vacant unit (IU)	0	1.100000	30.00%	0.770000	0	0.00083220	0		
industrial vacant land (IX)	0	1.100000	30.00%	0.770000	0	0.00083220	0		
	315,400				236,566		256		
Total Returned Assess.	293,092,301				134,179,075		\$145,018		
Levy Requirements									
net levy =	145,018								
			(col. 6 Total)						
TOTAL MUNICIPAL	145,018	divided by	134,179,075	equals	Res/FarmTax Rate	0.00108078			
Agrees to Assessment Roll									

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

TOWNSHIP OF NORTH HURON - 2018 Assessment					
RTC		WINGHAM	BLYTH	E/W	TOTAL
RT		192,435,594.00	72,853,835.00	74,041,661.00	339,331,090.00
MT		7,972,050.00	1,878,500.00		9,850,550.00
FT		38,650.00	961,150.00	208,742,859.00	209,742,659.00
CT/ST		21,802,700.00	6,711,538.00	3,157,328.00	31,671,566.00
XT		2,652,546.00	141,400.00	700,082.00	3,494,028.00
IT/LT		7,816,500.00	1,470,500.00	678,920.00	9,965,920.00
PT		740,933.00	518,468.00	3,024,795.00	4,284,196.00
TT				2,431,256.00	2,431,256.00
R1			110,000.00	12,100.00	122,100.00
CU		109,550.00	34,650.00	226,300.00	370,500.00
CX		570,500.00	209,666.00	77,000.00	857,166.00
IU		29,100.00			29,100.00
IX		102,750.00			102,750.00
IH		23,750.00			23,750.00
TAXABLE		234,294,623.00	84,889,707.00	293,092,301.00	612,276,631.00
PIL		975,150.00	900,800.00	2,213,350.00	4,089,300.00
EXEMPT		32,306,623.00	5,895,150.00	5,978,394.00	44,180,167.00
TOTAL		267,576,396.00	91,685,657.00	301,284,045.00	660,546,098.00
Agrees to Assessment Roll					



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Pat Newson, Director of Recreation and Facilities
DATE: 22/05/2018
SUBJECT: Alice Munro Festival of the Short Story Memorandum of Understanding
ATTACHMENTS: Draft Memorandum of Understanding

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby accept the May 22, 2018 report of the Director of Recreation and Facilities regarding the Alice Munro Festival of the Short Story Memorandum of Understanding for information purposes;

AND FURTHER THAT Council approves an exception to Section 19.1 of the Procedural By-Law to allow the Reeve and Clerk sign By-law No 54-2018 to adopt the Memorandum of Understanding at the May 22, 2018 Council meeting.

EXECUTIVE SUMMARY

The Alice Munro Festival was an initiative started by the Wingham Horticultural Society, and has significant ties to the Township of North Huron. It was established as a local event, but has grown in scope to include all of Huron County, and now operates under its own committee, separate from the Wingham Horticultural Society. The Alice Munro Festival Committee has operated as a Committee of Council in North Huron, however this is no longer applicable because the event has grown to include the entire County and surrounding areas. The purpose of this Memorandum of Understanding is to provide a framework for the relationship between the Alice Munro Festival of the Short Story Committee and the Township of North Huron.

DISCUSSION

The Alice Munro Festival of the Short Story Committee has been operating as a North Huron Committee of Council. Committees of Council are subject to specific criteria that need to be met and they are required to follow the Township of North Huron Committee Appointment Policy. Staff met with Rick Sickinger, Cultural Development Officer for the County of Huron, to discuss the framework for the committee and the festival. Rick has been deeply involved in the Festival Committee. As the Festival has grown in scope and size, and expands to other Huron County Communities, it is no longer appropriate for the group to operate solely under North Huron Council, or to fall under the Township of North Huron insurance. For example the 2018 Festival is enjoying the Saturday activities in Bayfield, and the Sunday activities are hosted in Wingham. The Festival and Alice Munro have strong ties to the Town of Wingham, and it is strategically and culturally significant that some of the event is always hosted in Wingham. It is also an opportunity to expand the festival to other communities.

To that end, staff and Rick Sickinger (representing the Festival Committee), have suggested that a new Memorandum of Understanding be prepared to capture the essence of the relationship between the Festival and the Township, and also permit a framework by which the Festival can expand into other areas and have the necessary insurance required.

The Draft Alice Munro Festival of the Short Story Memorandum of Understanding is attached to this report. It is recommended that even though the committee is no longer a Committee of Council, that a North Huron Councillor be appointed to the Committee to ensure North Huron 's interests are preserved in the future delivery of this event, and to provide the ongoing connection to North Huron Council and the community.

The event will no longer be covered by the Township of North Huron insurance, and instead will operate under the Huron County liability insurance policy.

FINANCIAL IMPACT

Within the agreement, there is a provision for North Huron Council to consider a financial contribution to the Festival on an annual basis as part of their budget process.

In kind support from North Huron, for the Festival, includes space for the committee to meet to prepare for the event, and use of the Wingham Theatre for one day during the event

FUTURE CONSIDERATIONS

The Festival in 2018 is scheduled for June 2-3. Staff are requesting that this agreement be approved under exception to Section 19.1 of the Procedural By-Law so that it can be adopted at the May 22, 2018 meeting.

There is a six month termination clause in the agreement.

RELATIONSHIP TO STRATEGIC PLAN

Our administration is fiscally responsible and strives for operational excellence.

Our residents are engaged and well informed.

Our community is attractive and welcoming to new businesses and residents.



Pat Newson, Director of Recreation and
Facilities



Dwayne Evans, CAO

MEMORANDUM OF UNDERSTANDING

MEMORANDUM

Dated: , 2018

Between:

The Alice Munro Festival of the Short Story Committee (the Committee)

AND

The Corporation of the Township of North Huron (the Township)

WHERE AS:

The Alice Munro Festival was initiated as an event hosted by the Wingham and District Horticultural Society, and has significant ties to the Town of Wingham both as an established local event, and because of Wingham's ties to Alice Munro;

AND FURTHER THAT the event has expanded in scope to include a planning committee and event that encompasses other communities in Huron County;

AND FURTHER THAT the Township has traditionally supported this event due to its impact on tourism, but no longer is desirous of having the board operate as a Committee of Council;

The parties have come together to establish this Memorandum of Understanding to clarify the roles and responsibilities of each.

THIS MEMORANDUM OF UNDERSTANDING (MOU)

a) COMMENCEMENT

The MOU becomes effective when signed and dated by both parties.

b) DURATION

This MOU will continue indefinitely until terminated in accordance with Section 8 or until such time as the Alice Munro Festival of the Short Story ceases to exist, or until such time as a revision of this Memorandum of Understanding is signed by both parties, replacing this MOU agreement.

c) MODIFICATIONS

Additions or modifications to this MOU must be made in writing and signed by the authorized representatives of both parties.

1. INTENT OF THIS MOU:

- The purpose of this Memorandum is to provide a framework for the relationship between the Alice Munro Festival of the Short Story Committee and the Township of North Huron.

2. THE ROLE OF ALICE MUNRO FESTIVAL OF THE SHORT STORY COMMITTEE

- The role of the Committee is to host an annual event *The Alice Munro Festival of the Short Story*. One day of the event will be hosted in the Town of Wingham due to the historical connection between the author Alice Munro, and the Town of Wingham. Additional days or activities of the event may be hosted in North Huron or in another Huron County community.
- The Committee operates independently of the Township. It is not a Committee of Council or a committee of the Township of North Huron. The committee is responsible for their own activities and finances, and is not covered under Township of North Huron insurance.
- The Committee is responsible for all activities of their volunteers, vendors, guests, and public attending this event.

3. RESPONSIBILITIES OF THE TOWNSHIP OF NORTH HURON AND THE ALICE MUNRO FESTIVAL OF THE SHORT STORY COMMITTEE.

- The Council of the Township of North Huron will consider a financial contribution to the Festival, on an annual basis as part of their budget process. In exchange the Township of North Huron would be recognized as a sponsor of the event.
- Under the provisions of the North Huron Donation and Fee Waiving Policy the committee will be provided with meeting space for planning meetings of the committee. Although the fee for the space is waived, the committee is required to acquire a rental permit from the Township for use of the space.
- Rental fees waived for use of the Town Hall Theatre in Wingham. Although the fee for the space is waived, the committee is required to acquire a rental permit from the Township for use of the space. All conditions under the rental contract must be complied with by the committee. The committee will cooperate with the Township to reduce the "hard costs" associated with the use of

this space. Volunteers of the committee will assist with set up and take down, and return the facility in the condition it was assumed by the Committee.

- The Committee will comply with all Federal, Provincial and Municipal By-Laws and resolutions particularly those pertaining to games of chance, lotteries, gambling, special events, and alcoholic beverages.
- The Committee must apply for any required tent permits or licenses from the Township of North Huron for their event.
- The Committee will assign one position to a North Huron Council Representative on the committee. North Huron Council will appoint that Council Representative annually. Their role is to attend meetings and be a liaison between the Committee and Township Council and staff.
- The Committee is responsible for the conduct and supervision of all persons admitted to the facilities and shall see that all regulations are strictly enforced. The Committee will ensure that all persons admitted to the function being held vacated the permitted facilities and that all privately-owned property and personal affects have been removed by the time specified. Return the facilities to the Township in the condition they were prior to the event.

4. INDEMNITY

- The Alice Munro Festival of the Short Story Committee shall indemnify the Township of North Huron from fines, suits, claims, demands from any loss, damage, or injury suffered by any Committee/Volunteer member resulting from negligence, willful misconduct or default on the part of the Alice Munro Festival of the Short Story Committee.

5. INSURANCE

- The Festival and the Committee are not covered under the Township of North Huron insurance.
- The Alice Munro Festival of the Short Story Committee will obtain its' own liability insurance coverage. Annually the Committee will provide the Township of North Huron with a' proof of insurance certificate', naming the Township of North Huron as an additional insured.
- General Liability insurance is required for Alice Munro Festival of the Short Story with minimum \$5,000,000 limit per occurrence for bodily injury or property damage, showing the Corporation of the Township of North Huron as additional insured and containing cross liability/severability if interest clause.
- Insurance for all equipment rented by the Committee must be covered by the insurance policy.
- Actions of all Committee members and volunteers must be covered under the General Liability policy.
- Vendors and suppliers of the event, operating on Township property, must show proof of their own General Liability insurance with minimum \$2,000,000 limit per occurrence for bodily or property damage, showing the Corporation of the Township of North Huron as additional insured.
- Submit the proof of insurance certificate(s) for review by the Township insurance company to confirm coverage at least 30 days prior to the event.

6. NOTICES

- Notices must be in writing, signed by, or on behalf of the sender. The notices must be addressed to the recipient and delivered to the recipient's address either by pre-paid mail, facsimile or email. Any facsimile or email delivery requires confirmation of receipt by the sender.

7. DISPUTE RESOLUTION

- If a dispute arises regarding the intention and or interpretation of this MOU, the issue shall be resolved between The Alice Munro Festival of the Short Story Committee Chair and the Director of Recreation and Facilities of the Township of North Huron through a discussion. If a resolution cannot be reached, the dispute can be referred to the Council of the Township of North Huron for a decision. Both parties, (the Alice Munro Festival of the Short Story Committee Chair and the Director of Recreation and Facilities of the Township of North Huron) can request the intervention of the Council.

8. TERMINATION

- Either party may terminate this arrangement without cause, by giving at least six (6) months' notice, or any period as may be mutually agreed to, with written notice to the other party.

EXECUTED AS A MEMORANDUM OF UNDERSTANDING

SIGNED for and on behalf of

THE ALICE MUNRO FESTIVAL OF THE SHORT STORY
By

Signature Date: _____

Print Name Date: _____

Witness Date: _____

Print Name: _____

SIGNED for and on behalf of

THE TOWNSHIP OF NORTH HURON

Neil Vincent, Reeve

Date: _____

Richard AI, Clerk

Date: _____



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Kim Scholl (A) Director of Recreation and Facilities
DATE: 22/05/2018
SUBJECT: Blyth Artisan Market
ATTACHMENTS: [Click here to enter text.](#)

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby accept the report prepared by the Acting Director of Recreation and Facilities and the Director of Public Works, dated May 22, 2018, regarding the Blyth Artisan Market for information purposes;

AND FURTHER THAT Council approves the Blyth BIA's initiative to operate a Blyth Artisan Market in Blyth as presented at the Council meeting on May 7th;

AND FURTHER THAT Council approves the proposed interim location of the Blyth Artisan Market to be the alley west of Blyth Memorial Community Hall, located at the south end of the alley at Dinsley Street until the permanent proposed location at 437 Queen Street, Blyth, is available.

EXECUTIVE SUMMARY

The Blyth Artisan Market is an initiative started by the Blyth BIA and will have co-investment from the Blyth Destination Development Partnership. This initiative is designed to attract visitors to the downtown, and to encourage visitors to the Blyth Festival Theatre, Cowbell etc. This report outlines the details for Council's consideration to permit the Market on Township property, and to support this BIA initiative.

DISCUSSION

Background

At the May 7, 2018 Council meeting, representatives of the Blyth BIA presented a proposal to Council to operate an Artisan Market in Blyth. Council directed staff to bring back a report discussing location, insurance, and details for their consideration.

The Market will run on Thursdays from 3:30-8:00pm and feature a curated selection of local vendors selling produce and artisanal products and different local entertainment. The goal is to attract 10-20 vendors for the Market. There are also 4 Sundays during the summer when the Artisan Market will be open. The first date for the proposed Market is May 31, 2018.

Location

Initially the Blyth BIA had selected Dinsley Street as their preferred temporary location for the Market. After a review of this option, staff communicated with the Blyth BIA delegation that the road closure would need to be addressed in a manner consistent with the Ontario Highway Traffic Act. The cost of staff and resources from the Township made this option no longer viable for the organizers of the Market.

A second proposed location, using the alley west of the Legion and Blyth Memorial Community Hall, initiating at Dinsley Street (see diagram attached), was suggested. This new proposed location is not influenced by the Highway Traffic Act and was acceptable to staff as a safe and acceptable option. Staff will work with the BIA representatives to ensure public safety, delivery of barricades, and ensure notifications of the alley closure are made to impacted properties.

The permanent proposed location of the Blyth Artisan Market will be the parking lot behind 437 Queen Street, Blyth. This lot is currently under construction, but the plan is to move the Market to this space by end of July, assuming construction continues on schedule.

Insurance

This is a BIA initiative and therefore covered under the Township of North Huron liability insurance policy. Staff are working with the organizers of the Market to ensure the following risk management items are completed:

- Appropriate vendor insurance is in place
- Volunteer sign waiver forms
- The Market acquires a North Huron License to operate. As a BIA event, the fee is waived for this license, but all conditions of the license must comply.

Wingham Farmer's Market

Council requested staff to provide information on what in-kind support from the Township is provided to the Wingham Farmer's Market, in order to assess equity.

The Wingham Farmer's Market operates under an Agreement between the Market and the Township of North Huron, with a term from 2017-2019. They are also a member of the Ontario Farmer's Market Association. As a member of the Farmer's Market Association, they qualify to be covered under the associations insurance.

- Vendors are still required to submit proof of their own insurance.
- They are not automatically exempt from the North Huron Licensing By-Law to Operate. At the May 22, 2018 Council meeting, the Wingham Farmer's Market submitted a request to Council to amend the agreement to include waiving this fee. They would still be required to comply with the Licensing By-Law.
- The Market pays rent weekly for use of Cruikshank Park for the Market (\$31.51 plus HST weekly). This is the Community rate for parks open space rent in North Huron.

FINANCIAL IMPACT

There is no municipal financial impact. There is in-kind support from staff for the following:

- Delivery and pick up of barricades (estimated 11 times).

FUTURE CONSIDERATIONS

This is a proposed temporary location for the Blyth Artisan Market. The Market will move to its permanent location at 437 Queen Street as soon as the property is available.

RELATIONSHIP TO STRATEGIC PLAN

Our administration is fiscally responsible and strives for operational excellence.

Our residents are engaged and well informed.

Our community is attractive and welcoming to new businesses and residents.

A handwritten signature in cursive script, reading "Kim Scholl".

Kim Scholl, Acting Director of
Recreation and Facilities

A handwritten signature in cursive script, reading "Dwayne Evans".

Dwayne Evans, CAO

PROPOSED TEMPORARY LOCATION OF THE BLYTH ARTISAN MARKET





TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Sean McGhee
DATE: 22/05/2018
SUBJECT: Blyth Wastewater Facility 2017 Capital Project Funding
ATTACHMENTS:

RECOMMENDATION:

That the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22nd, 2018 regarding 2017 Capital Project Funding for information;

And Further That the budget be amended to reflect a transfer from Wastewater Reserves to 2018 Wastewater Operating in the amount of \$33,999.23 for costs associated with 2017 Capital Repairs to the Blyth Wastewater Treatment Plant be authorized.

EXECUTIVE SUMMARY

Veolia Water Canada Inc. was contracted by the Township of North Huron to operate and maintain Blyth and Wingham water and wastewater facilities. The Veolia contract anniversary date is May 1st of each year.

The difference between the Veolia contract year end and the Township year end has resulted in 2017 expenditures being invoiced in 2018. As the 2017 Capital and Operating surplus funds were returned to Reserve, there is an administrative requirement to secure authorization from Council in order to draw the 2017 expenses into the 2018 budget and fund them from Reserve.

DISCUSSION

The expenses are as follows:

1. Blyth Wastewater Treatment Plant Clarifier Repairs, \$27,096.01 including adjusted taxes – This project was an approved capital project that was completed in 2017 but not billed until May.
2. Return Activated Sludge Pump replacement, \$6,903.22 including tax – This backup unit failed and is integral to the operation of the facility. The unit was purchased using appropriate procurement processes as an operational item.

FINANCIAL IMPACT

This is an administrative function requiring Council approval and has no net impact on the 2018 budget.

FUTURE CONSIDERATIONS

Staff has commenced discussions with Veolia in an effort to align the contract year end with the Township year end.

RELATIONSHIP TO STRATEGIC PLAN

This project relates to **Goal No. 4** of the Strategic Plan in that the administration is fiscally responsible and strives for operational excellence,



Sean McGhee, Director of Public Works



Dwayne Evans, CAO



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Sean McGhee
DATE: 22/05/2018
SUBJECT: Procurement of Catch Basin Cleaning Services
ATTACHMENTS:

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22nd, 2018 regarding the procurement of catchbasin cleaning services for 2018 for information;

AND FURTHER THAT the contract for catchbasin cleaning services for 2018 in the amount of \$12,738.75 plus applicable taxes be awarded to B. Edwards Transfer Ltd.

EXECUTIVE SUMMARY

Catchbasin cleaning services are contracted out annually and are considered an integral part of routine municipal storm system maintenance. The Tender for services was released through the County of Huron as a group procurement.

Two firms responded to the Tender with B. Edwards Transfer Ltd. providing the lowest price for the service.

The submissions were reviewed by County of Huron Public Works Department staff. Township staff have confidence in the County's recommendation.

DISCUSSION

The municipality has 645 storm water catchbasins which are cleaned and inspected annually. As there is a requirement for specialized equipment to perform the cleaning and inspection, the service is contracted out.

The two respondents to the tender were as follows:

- B. Edwards Transfer Ltd. - \$19.75 / catch basin for a total of \$12,738.75
- Hurricane Hydrovac - \$34.80 / catch basin totalling \$22,446.00

B. Edwards Transfer Ltd. has provided this service for the Township of North Huron in the past. The work was completed in accordance with the contract requirements.

FINANCIAL IMPACT

This service is included in the 2018 Operating Budget for storm systems. The tender price is below budgeted amounts.

FUTURE CONSIDERATIONS

None at this time.

RELATIONSHIP TO STRATEGIC PLAN

This project relates to **Goal No. 4** of the Strategic Plan in that the administration is fiscally responsible and strives for operational excellence,

A handwritten signature in black ink, appearing to read 'Sean McGhee', with a stylized flourish at the end.

Sean McGhee, Director of Public Works

A handwritten signature in black ink, appearing to read 'Dwayne Evans', with a stylized flourish at the end.

Dwayne Evans, CAO



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Sean McGhee
DATE: 22/05/2018
SUBJECT: Howson Dam Report
ATTACHMENTS: KGS Stability Assessment 2018, Structure Assessments 1983 – 1984 BM Ross / Atkinson Davies, Various BM Ross Documents – 2014 – 2016, MNRF LRIA Requirements - MNRF

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby receive the report of the Director of Public Works, dated May 22, 2018 regarding the Howson Dam for information purposes;

AND FURTHER THAT staff be directed to forward a copy of this report and the corresponding attachments to the Maitland Valley Conservation Authority, the Howson Dam Committee, the Ontario Rivers Alliance, and other stakeholders upon request.

AND FURTHER THAT a report be presented to Council summarizing the comments of any delegations received and providing further details on financing and amortization details associated with the options presented in this report.

EXECUTIVE SUMMARY

There has been a great deal of engineering work associated with the Howson Dam which has spanned a number of decades. The information found within this report has been compiled from available historic files and has been presented in conjunction with the KGS report.

KGS Group was commissioned by Council in 2017 to complete a Safety Assessment of the Howson Dam. The intent of the study was to determine the following:

- Establish the Hazard Potential Classification (HPC) of the Dam;
- Determine the Inflow Design Flood (IDF);
- Complete a Breach Analysis;
- Perform a Slope Stability and Concrete Condition Assessment, and;
- Determine options with associated costs for the consideration of Council.

The recommendations found in the Executive Summary presented by KGS Group were developed through analysis of the data generated through a number of site visits. The findings of this evaluation were determined to be consistent with the structural evaluations performed by Atkinson Davis Inc. and BM Ross between 1983 and 1984.

Decisions surrounding the future of the Howson Dam potentially impact the environment, safety, and quality of life within our community. There are various stakeholders interested in the future of the Howson Dam, many of which may wish to address Council to present their concerns and perspectives.

The findings of the KGS and past reports, options available to Council, and associated costs are outlined in the Discussion below. The merits of each option should be weighed and considered against Council's own Strategic Plan.

DISCUSSION

Engineering History and Background:

In 1983, the services of Atkinson Davis Inc. were retained at the request of the Ministry of Natural Resources to visually examine the Howson Dam concrete and make recommendations for further investigation should they be warranted. As a result of their examination, a number of approaches, including core sampling and ultrasonic testing, were recommended in the brief report from P.H. Davies, B.Sc. P.Eng dated September 30th, 1983.

Subsequently, the firm was commissioned to acquire and analyze a number of core samples and collect ultrasonic data to determine the strength and integrity of the concrete. Following this analysis, in a document dated May 10th, 1984, Mr. Davis concluded, *"In view of the condition of the concrete, we are of the opinion that it will not act as a base for repair work and that the only course open is to remove and replace the dam and bridge structure."*

This prompted a structural review at the request of the Municipality, at which time the allowable load on the bridge structure was reduced to a 3 tonne live load.

As a follow-up to the Atkinson Davis reports, the municipality contracted the services of BM Ross to complete an evaluation of the Bridge and Dam structure as well as its load carrying capacity. The report concurred with the 1984 report of Atkinson Davis Inc. and went on to recommend that aside from the reduction in allowable loading, the structure should be inspected yearly to detect further deterioration until appropriate measures could be taken.

Load capacity reviews were carried out until approximately 1999 when it was determined that the bridge was no longer appropriate for vehicular traffic. No notable planning or design work was done until 2015 at which time BM Ross was instructed through a group comprised of municipal staff in consultation with members of the public to develop plans and a costing for concrete repair work on the Dam. Preliminary drawings were completed and submitted to the Township for review in March 2015. As a follow-up to the submission of draft drawings, a letter from BM Ross to the Director of Public Works of the day identified the requirement for the completion of a stability analysis, IDF report, and HPC classification prior to any work permit being issued by MNRF.

The mandate given to KGS Group through RFP 2017-004 went beyond the structural and material assessments that were completed in the eighties insofar as they establish the rating of the Howson Dam, consider downstream risk, suggest the options available to the municipality, and look at high level costing for various options. All assessments completed by KGS Group were conducted in accordance with legislative requirements associated with the Lakes and Rivers Improvement Act (LRIA) and its associated Administrative Guide.

Outcome of the KGS Group Assessment:

The consequences of a dam breach in terms of Incremental Loss of Life (ILOL) were reviewed by KGS utilizing hydraulic modeling and resulted in a Hazard Potential Classification of HIGH. It was determined that the design of the Howson Dam corresponds with an Inflow Design Flood (IDF) which was equivalent to a 100-year storm providing that all bays are opened and the boards were removed from the sluiceway on the North Structure.

During the course of the evaluation, which included site work and analysis of core samples, it was determined that there was sufficient evidence that the deterioration of the structure could pose a risk to the public that the bridge was closed to pedestrian traffic.

Four options were considered by KGS Group following the assessment. The options are:

Option 1 – Do Nothing and Maintain Status Quo.

This option, although included for the purpose of discussion, is not viable. The existing structure has deteriorated to the point that it does not meet the dam safety requirements under LRIA and is a risk to the community. No costing was associated with this option.

Option 2 – Decommission the Dam.

The decommissioning of the Howson Dam is a viable option although there is a great deal of work associated with the rehabilitation of the area. If pursued, there will be extensive stakeholder consultation at many levels. It is expected that there will be public opposition to this route by some groups. An estimated cost of \$436,000 for the removal of the dam was suggested with additional funds necessary for the rehabilitation of the area and the establishment of an aesthetically acceptable public use area.

Option 3 – Dam Rehabilitation.

There are two courses of action available with regard to this option. They include the installation of tension anchors to stabilize the structure as well as the addition of concrete mass. The rehabilitation option is ONLY viable if the concrete in the weirs and foundation were found to possess sufficient compressive strength. If the concrete in the spillways is found to be consistent with the concrete tested previously, the rehabilitation option cannot be considered as an option. Cost for LRIA compliant rehabilitation is estimated to be between \$2,869,000 and \$4,581,000.

Option 4 – Replacement of the Howson Dam

For the purpose of this study, two options were considered for reconstruction. The construction of a new concrete overflow weir was estimated at \$6,209,000. The second option was an earth embankment and new sluiceway structure which had an approximate cost of \$3,960,000.

The final report developed by KGS Group provides all of the technical information necessary to fully understand the condition of the Howson Dam. This information is vital in assisting with the determination of next steps and ultimately in determining the future of the Howson Dam.

In the interim, the Howson Dam has been closed to all public use based on an opinion provided in light of the data available by KGS Group that identifies concern over the use of the current structure. In response to this document, the Public Works department has closed the structure to all pedestrian and vehicle traffic.

Considerations and Implications

Equipped with the Safety and Stability reports, there are varying perspectives to consider while assessing the merits and detriments associated with the various options available to Council. Discussion leading up to the decision on the disposition of the Howson Dam should at the very least consider the following:

Environmental Impacts:

There is a great deal of information surrounding the changes to a natural watercourse that are introduced through the operation of a Dam. This includes changes in water temperature, habitat, flow patterns, and fish population. The Ontario Rivers Alliance distributed a letter to a number of municipalities which is included in the May 22nd Council agenda package maintaining that returning any watercourse to its natural state has distinct benefits.

Social Considerations:

The Howson Dam has been a landmark within the community since its initial construction prior to 1862. The existing Dam, which was constructed in approximately 1921 is seen by many as part of the community. There is a group of local residents who are actively working to save the Howson Dam and desire to see the headwaters returned to previous historic levels.

Financial Implications:

Each viable option presented carries with it a varying degree of significant financial pressure for the municipality. Both replacement and rehabilitation options have very high price tags and carry with them the cost associated with ongoing maintenance, regulatory inspection, repair, and replacement of the asset in the future.

The information found in this report, as supported by the KGS Group Reports as well as the BM Ross and Atkinson Davis studies, should provide Council with sufficient background information to identify a preferred course of action. Staff is prepared to take direction from Council to either arrange for further information to be presented either in the form of invited delegations or staff reports for information.

FINANCIAL IMPACT

As noted, the cost to address the Howson Dam will range between an estimated \$436,000, and \$6,209,000 depending upon the direction taken.

It is important to note that AACE Class 4 estimate methods were used to develop all of the estimates provided. This method provides a very high-level estimate with an accuracy of plus or minus 40% to 50% and are not for budget purposes, rather to establish comparative pricing for discussion purposes.

A detailed cost analysis will be performed on the options preferred by Council. Costs associated with the investigation of these options and next steps will be brought forward in a manner consistent with the Municipal Procurement Policy.

FUTURE CONSIDERATIONS

In light of the current condition of the Howson Dam and the risk factors associated with it in its current state, the determination of next steps should be seen as a matter of highest priority. The closing of the structure should be seen as a short-term measure.

RELATIONSHIP TO STRATEGIC PLAN

This project relates to **Goal No. 2** of the Strategic Plan in that our residents are engaged and well informed, **Goal No.3**, the Township is healthy and safe. **Goal No. 4**, the administration is fiscally responsible and strives for operational excellence, and **Goal No. 5** in that our natural environment is valued and protected.



Sean McGhee, Director of Public Works



Dwayne Evans, CAO

EVALUATION OF EXISTING
MAIN HOWSON DAM
BRIDGE STRUCTURE
OVER MAITLAND RIVER ON WATER STREET
IN THE TOWN OF WINGHAM

"Official Copy"

BR-476

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B. M. ROSS AND ASSOCIATES LIMITED

CONSULTING ENGINEERS



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B.M. ROSS, P.ENG.,
K.G. DUNN, P.ENG.,
S.D. BURNS, P.ENG.,
B.W. POTTER P.ENG.

OUR FILE NO. BR-476

December 14, 1984

Mr. Byron Adams
Clerk
Town of Wingham
Box 90
WINGHAM, Ontario
N0G 2W0

Dear Sir:

Re - Evaluation of Existing Main Howson
Dam and Bridge Structure Over
Maitland River on Water Street

In accordance with Council's authorization, we are pleased to submit the following Report on the evaluation of the Main Howson Dam and Bridge Structure.

We thank you for the opportunity to be of service on this project, and we would be pleased to discuss any aspect of the Report at your convenience.

Yours very truly,

B. M. ROSS AND ASSOCIATES LIMITED

KGD:jj

Per _____
K. G. Dunn, P. Eng.

TOWN OF WINGHAM
REPORT ON EVALUATION
OF EXISTING MAIN HOWSON DAM AND BRIDGE
OVER MAITLAND RIVER ON WATER STREET

INTRODUCTION

The purpose of the requested evaluation and of this Report is to examine the existing Main Howson Dam and Bridge Structure on Water Street in the Town of Wingham and to provide an assessment of the condition of the existing structure, and an evaluation of the bridge super-structure load carrying capacity.

GENERAL SITE CONDITIONS AND BACKGROUND INFORMATION

The Main Howson Dam and Bridge Structure is constructed on Water Street over the Maitland River immediately downstream from the Hanna Bridge on Josephine Street or the Highway No. 4 Connecting Link. The Water Street approaches run in a northerly-southerly direction with the main structure constructed near the southerly part of the Maitland River channel. We understand that the main structure was constructed in the early 1920's. Sometime in the late 1940's or early 50's, a steel sheet piling cut-off wall was driven along the downstream edge of the concrete dam spillway apron. The concrete headwall railings along the side of the roadway were constructed around 1965. There is considerable evidence where the spalled surfaces of the concrete along the faces of the piers and abutments, the spillways and the soffit of

GENERAL SITE CONDITIONS AND BACKGROUND INFORMATION (cont'd)

the deck have been patched and refaced with concrete repairs.

We understand that in 1965, a three-span emergency spillway relief structure was constructed to the north of the Main Howson Dam and along the north side of the Maitland River channel. Repairs to undermining of the floor slab of this emergency relief structure were completed in the fall of 1983. The top surface of the roadway on Water Street over the relief emergency structure were completed in the fall of 1983. The Water Street approach to the north of the relief structure rises gently. The southerly Water Street approach to the Main Howson Dam falls to a lower elevation with relief provided over the south road approach. It was reported that in periods of extreme flooding in 1948, the flood waters used this relief.

The purpose of this Report is to comment on the surface deterioration and the integrity of the concrete in the Main Howson Dam and Bridge Structure, and to assess the load carrying capacity of the roadway supporting the bridge super-structure. This Report does not deal with any aspect of the emergency spillway structure, nor does it deal with the stability of the Main Howson Dam or the hydrological capacity of the combined dam and emergency spillway.

GENERAL SITE CONDITIONS AND BACKGROUND INFORMATION (cont'd)

The main structure consists of a four-span poured in place concrete combination dam and bridge structure. We were provided with one sheet of plans dated June, 1920, and prepared by Fred B. James from Walkerton, Ontario. The plans show the length of the two end spans at the underside of the deck at a clear distance of 10.06 m (33 feet) and the centre two spans at 10.67 m (35 feet). The width of the roadway is shown as 5.49 m (18 feet) with a 1.52 m clear sidewalk along the east side and 0.40 m wide concrete headwall handrails on either side to form the full deck width. The concrete deck is supported on four reinforced concrete beams. The present clear spans as measured by our firm on October 26, 1983, consist of 9.9 m - 9.7 m - 10.0 m - 9.8 m, indicating that if the original spans were constructed as shown on the plan, refacings have been added subsequently.

The dam portion of the structure consists of a raised concrete weir at the upstream face of the bridge transforming into a sloped spillway down onto a concrete apron with cut-off wall. The original plans show 1" diameter pipe sockets along the top of the concrete weir which were to be used to hold splash boards in position to raise the level of the upstream pond above that of the surface of the concrete weir. The construction has been altered and the present usage consists of 200 mm square stop log held in place by steel "H" beam sections at the third points of each span with the top of the intermediate column support resting against the side of the bridge deck, and the bottom fitted into a recess

GENERAL SITE CONDITIONS AND BACKGROUND INFORMATION (cont'd)

in the top of the concrete weir. The abutment and pier ends of the stop log are restrained by either a vertical chase cast in the concrete or a steel channel section lagged to the concrete. We understand it is the intention in the operation of the dam that all stop log and intermediate vertical supporting beams be removed during times of any major flooding.

The configuration of the stop logs, their supports, the upstream weir and spillway is shown in Pictures (i), (ii) and (iii) of the Appendix.

DETERIORATION OF EXISTING STRUCTURE

The deterioration of both the dam and bridge structure was inspected by both our firm and Mr. P. H. Davies, P. Eng., of Atkinson Davies Inc., Consulting Soils and Materials Engineers. Mr. Davies was retained by the Ministry of Natural Resources and the Maitland Valley Conservation Authority to perform a visual inspection along with a thorough investigation by ultrasonic testing and core samples drilled from the concrete to discover the strength of the concrete and confirm if the original concrete would form a suitable base for repair work. The location and extent of the testing was also co-ordinated with the requirements of our firm to provide the needed information on concrete strengths for a proper structural evaluation.

DETERIORATION OF EXISTING STRUCTURE (cont'd)

A visual inspection of the site was completed by Mr. Davies on September 20, 1983. The results of this inspection and Mr. Davies' recommendation are contained in his letter dated September 30, 1983, to the Ministry of Natural Resources, London Regional Office. A copy of this letter report is provided in Pages 1 - 3 of the Appendix. From this initial inspection, Mr. Davies recommended that their firm complete a program of ultrasonic testing and the taking of concrete compressive core samples to be tested in the laboratory to determine the soundness and strength of the original concrete.

A further investigation by Mr. Davies was authorized by the Maitland Valley Conservation Authority on December 20, 1983. Because of the severe winter conditions, the field work was completed on May 8, 1984. The results of this further testing are contained in a letter from Mr. Davies to the Maitland Valley Conservation Authority dated May 10, 1984, and found in Appendix Pages 4 - 8 at the back of this Report. As originally planned, this investigation was to consist of drilling a number of cores from the concrete with additional information being obtained from an ultrasonic survey. All areas of the dam and bridge including the weir, spillway, piers, abutments, deck and beams were to be included. The location of the cores in the deck super-structure was outlined by our firm and was to consist of six cores taken through the deck of the structure and one core to be taken through the centre of one of the supporting beams. With

DETERIORATION OF EXISTING STRUCTURE (cont'd)

the six tests through the deck, we wished four to be used for compressive strength purposes and two to be used to determine the chloride content of the concrete.

As reported in Mr. Davies' May 10, 1984, letter, nine concrete compressive core samples were taken and it was impossible to obtain any solid original concrete core samples suitable for testing. The samples consisted of lenses of concrete separated by dirt seams, and Mr. Davies reports that the result is that the concrete has a compressive strength which is so low that it is effectively zero. This condition applied to both the weir, spillway, pier and abutment sub-structure and the deck super-structure. Because of the large number of voids and discontinuities in the concrete, ultrasonic testing was not attempted. Any readings obtained would have been invalid.

A detailed visual inspection was made of all the components of the bridge by the undersigned on May 8, May 11 and June 6, 1984. The soundness of all concrete was checked by tapping with a chipping hammer. The underside of the beams and deck were visually inspected with the use of a ladder. The upper surface of the deck is covered with 75 mm of asphalt and was not visually inspected. Based on the poor results obtained by Mr. Davies testing, we recommended to Committee of Council on Friday, May 11, 1984, that the Town immediately take steps to post a 3 tonne live load limit on the structure, and that our firm consult with the Structural

DETERIORATION OF EXISTING STRUCTURE (cont'd)

Office of the Ministry of Transportation and Communications as to further testing and calculations which could be completed to more accurately assign a load carrying capacity. Confirmation of our recommendation is contained in our letter to the Town dated May 15, 1984, and shown as Appendix 9 - 10. The results of this further investigation were that there was not any additional testing which could be used to accurately assess the concrete compressive strength. The one other method of assessing the load carrying capacity would be to have the Structural Office perform an official and relatively complicated load testing program at the site. Mr. Kleinsteinber of the Structural Office of the M.T.C. wished us to proceed with a structural evaluation to obtain the carrying capacity of the structure assuming the concrete strength was satisfactory. After this information was available, we would have more background information to assess the carrying capacity of the structure under its present condition. The results of this further investigation with the M.T.C. is contained in our June 8, 1984, letter to the Town, a copy of which is in Appendix 11 and 12.

Our visual inspection and checking of the soundness of the concrete with a chipping hammer confirmed the results obtained from Mr. Davies testing. The concrete in the weir, spillway, piers, abutments and the beams contains many areas of delaminated hollow sounding concrete. In many areas, the concrete is a combination of a collection of loose aggregate stones and small particles of concrete separated by dirt lenses. This also applies

DETERIORATION OF EXISTING STRUCTURE (cont'd)

to sections of the deck supporting beams as well as the sub-structure. Pictures (i) and (ii) in the back of the Appendix are indicative of the upstream spalled concrete surfaces of the sub-structure. Pictures (iv) and (v) show the spalling of the outside downstream beam of spans two and three from the north abutment.

There is evidence of considerable leaching of chloride through the porous concrete of the deck, beams and sub-structure. While this is shown in many of the photographs enclosed, it is particularly evident in photos (iii), (vi) and (vii).

There are severe signs of deterioration with spalling and cracking in the super-structure. There is a pattern of vertical cracking in the concrete headwall handrails. The majority of these cracks are located either at the one-third point of the spans or at the mid-span. Normally such cracking occurs over the piers and is caused by tension as a result of settlement at the centreline of the span. The location of these cracks would normally be caused by tension from uplift of ice on the underside of the deck. One other possible explanation for the location of these cracks may be due to the fact that the top of the beams supporting the stop log at the one-third point is now held by the side of the deck. If in the past the stop log and supporting beams were left in under severe flooding conditions, this could have resulted in the cracking of the handrail. An example of the typical cracking is shown in Picture (viii) and is located in the west handrail at the two-thirds point of the first span

DETERIORATION OF EXISTING STRUCTURE (cont'd)

from the north abutment.

The underside of the concrete deck is in fair condition with areas of surface spalling and delamination. There was also considerable evidence of leaching of chlorides through the deck. It was impossible to inspect the upper surface of the concrete deck with the presence of the 75 mm thickness of asphalt. From the core samples that were taken through the roadway section of the deck, the thickness is approximately 280 mm (11 inches) and not the 200 mm (8 inches) shown on the original plans. One of the poorer areas showing the spalling of the underside of the deck and the exposed reinforcing is shown in Picture (ix) and is between the first beam east of the centreline of the road and the outside east beam of the second span from the north abutment.

There is serious spalling, delamination and cracking in the beams of the superstructure. There is also considerable evidence of leaching from chlorides. There are four beams in the super-structure of each of the spans. The two outside beams are directly under the concrete headwall handrails. The spalling on the bottom of the downstream side of the westerly outside girder is quite deep as shown in Pictures (iv) and (v). Much of the remaining concrete is delaminated and can be readily chipped away. The inside face of the outside west beam of the second span from the north abutment is shown in Picture (x). The bottom 200 mm of the beam is badly cracked and

DETERIORATION OF EXISTING STRUCTURE (cont'd)

delaminated and could be removed through chipping. Picture (xi) is also of the mid-span of the same beam and shows a serious horizontal stress crack located approximately 150 mm from the underside of the concrete deck slab. There were also places in the other beams where there is spalling, delamination and cracking. Picture (xii) is of the bottom of the first beam west of centreline in the second span from the north abutment. Picture (xiii) shows a serious delamination on the bottom of the east outside girder of the first span from the north abutment while Picture (xiv) shows the bottom of the first beam east of centreline in the first span. In both of the last two mentioned locations, the remaining concrete consisted of loose aggregate which could be readily chipped away.

From our deterioration examination of both the sub-structure and the super-structure, we concur with Atkinson Davies Inc.'s assessment that the existing concrete is not sound enough to act as a base for satisfactory long term repair work, and that the only course open is to remove and replace the dam and bridge structure.

STRUCTURE EVALUATION OF DECK SUPER-STRUCTURE

As requested by Mr. K. L. Kleinsteinber of the Structural Office of the M.T.C., we have proceeded with an evaluation of the deck super-structure to obtain the carrying capacity of the

STRUCTURE EVALUATION OF DECK SUPER-STRUCTURE (cont'd)

structure assuming that the concrete strength was satisfactory. It was intended that the dimensions and reinforcing steel shown on the original drawing confirmed by dimensions taken in the field would be used for this analysis. In reviewing the existing plan, we found that there was considerable important information missing, and many unconfirmed assumptions had been made. This applies particularly to the reinforcing steel, number of bars, their length and layout. There was also a scarcity of concrete dimensions on the plan and the dimensions that are given, especially for the depth of the beams, do not match the scale on the drawing and are not confirmed by the depth of the beams in the field. The depth of the central part of the deck shown on the plans is given as 8" and scales as 11".

The plans do not provide sufficient detail on the vertical steel from the beams into the deck to determine if the structure is acting as a "T" beam. As a first trial in making various assumptions, we considered the beams not acting as a "T" section and found their capacity to be 7.1 tonnes using the assumption of 20 MPa compressive concrete. A similar analysis assuming sufficient steel and full "T" beam action and using the depth of the beams as constructed in the field with 20 MPa compressive concrete resulted in the beams being capable of carrying the full design truck loads.

STRUCTURE EVALUATION OF DECK SUPER-STRUCTURE (cont'd)

We also evaluated the load carrying capacity of the deck slab and again making assumptions on the detailing and bending of the transverse reinforcing steel and 20 MPa compressive concrete, we found the steel in the bottom of the slab to be capable of carrying full design truck loading while the top transverse steel over the beams is capable of carrying a design loading of 15.2 tonnes.

After completing the detailed site inspection and the various calculations, we recommend that under its present condition, the 3 tonne live load limit remain on the deck super-structure. We are well aware that loads well in excess of this have been using the structure in the past. Our judgment is based on the many assumptions that have to be made and the lack of material given on the plans, the inability to obtain concrete compressive core samples, and most importantly, the cracking, delamination, leaching and absence of cement bond around the aggregate of the concrete in the supporting beams.

SUMMARY

The enclosed Report comments on the deteriorated condition of the Main Howson Dam and Bridge and provides a recommended live load carrying capacity for the bridge super-structure. We wish to summarize the salient features of our Report as follows:

SUMMARY (cont'd)

- (a) Atkinson Davies Inc. conducted a visual inspection and attempted to take concrete core samples from both the dam and bridge sub-structure and the bridge super-structure. The results of their testing was that the concrete has a compressive strength which is so low that it is effectively zero, and that the concrete in their opinion will not act as a base for suitable repairs and rehabilitation.
- (b) Our firm completed a detailed visual inspection and an evaluation of the deck super-structure using information provided on the original plan. We concur with Atkinson Davies Inc. that the concrete in the dam and bridge sub-structure and the deck super-structure is not sufficiently sound to warrant making satisfactory repairs and rehabilitation of the existing structure, and it is our opinion that the only course open is to remove and replace the dam and bridge structure.
- (c) We recommend that based on the condition of the concrete, that the Town continue to post this structure with a maximum 3 tonne live load limit, and that the structure while in use be inspected on a yearly basis to detect further deterioration until it can be replaced.

All of the above is respectfully submitted for your consideration.



B. M. ROSS AND ASSOCIATES LIMITED
Consulting Engineers
62 North Street
Goderich, Ontario
N7A 2T4

December 14, 1984

Per _____
K. G. Dunn, P. Eng.

APPENDIX A-1 - 3 -- Atkinson Davies Inc., letter dated
September 30, 1983 to M.N.R.

APPENDIX A-4 - 8 -- Atkinson Davies Inc., letter dated
May 10, 1984 to M.V.C.A.

APPENDIX A-9 -10 -- Our letter dated May 15, 1984 to
the Town of Wingham

APPENDIX A-11-12 -- Our letter dated June 8, 1984 to
the Town of Wingham

APPENDIX A-13-19 -- BR-476 (i) to (xiv) - Pictures



ATKINSON, DAVIES INC. CONSULTING SOILS AND MATERIALS ENGINEERS
69 BESSEMER ROAD, UNIT 35, LONDON, ONTARIO N6E 2V6 (519) 685-6400

September 30, 1983

Ref: 3-0198

Ministry of Natural Resources,
1106 Dearness Drive,
LONDON, Ontario
N6E 1N9

Attention: Mr. Jeff Jilek

Gentlemen:

Re: Howson Dam
Wingham, Ontario

As instructed by you, the undersigned visited the Howson Dam, Wingham, on September 20, 1983.

The object of the visit was to visually examine the condition of the concrete in the structure and to make recommendations on further investigative work which is required in order to ascertain the condition of the existing structure.

We understand that the original structure was built in 1920. The concrete appears to have been made using pit-run aggregate. Considerable repairs have been made at certain times during the history of the dam. These repairs consisted of fresh concrete cast against the existing concrete in most instances, although some repairs appear to have been made using shotcrete, an instance of the latter being the stop log support on the north side of the original relief spillway. The downstream faces of the piers also appear to have been repaired in this way.

The crests of all the weirs have been raised by additional concrete. The report from Mr. Stan McClellan on his under-water inspection reveals that the slabs downstream of the weirs have also had additional concrete placed on them and that he was able to see a gap between new and old concrete at one point. This confirms quite general hollowness found by tapping the existing top surface of this slab.

An additional and fairly recent addition to the bridge part of the structure is a solid concrete parapet on each side of the structure. This appears to have been constructed so that it forms a part of each outside beam, effectively deepening these beams. The parapets were apparently not designed to do this and consequently are cracking badly. The structural aspect of this wall should be investigated by a structural engineer.

The general state of the concrete in the structure is badly deteriorated. On the upstream side the repairs have broken away from the original structure. This has occurred at all piers and both abutments. The deterioration is worse at the north abutment and at the first pier from the north end, but is well advanced at the other piers and in progress at the south abutment.

The additional concrete on the weirs appears to have separated from the base concrete. The latter is badly deteriorated.

The least deterioration appears to have occurred in the shotcreted sections, but even there considerable cracking has occurred and many hollow areas found.

The concrete in the bridge beams is not badly deteriorated except on the underside of the downstream beam where much spalling of the concrete has occurred, exposing the steel reinforcement. Also, the haunches of the beams seem to have been deepened after the original construction. This additional concrete at the haunch is spalling severely.

In the deck concrete, viewed from the underside only due to the asphalt paving, the cover to the steel appears to have been inadequate. The reinforcement is seen on the underside in several areas, particularly in the second span from the north end. Grazing of the surface has occurred generally and deposited salts can be seen on the underside of the concrete. The salts are also seen on the sides of the beams and probably originate from road salt seeping through pores and cracks in the deck concrete.

As stated earlier, we were unable to see the upper surface of the deck, but, in view of the cracking and salt deposits seen on the underside, the state of the upper surface must be suspect. If arrangements could be made at the time of our visit to remove 4 or 5 areas of asphalt, say 2 feet by 2 feet, we would be able to form some opinions as to the state of the deck.

The basic cause of the deterioration is, in our opinion, the lack of resistance to cycles of freezing and thawing by the original concrete, and also insufficient care taken in the repair work to ensure that the new concrete was fully bonded to the old in such a way that seepage of moisture between the new and old could not occur.

At the time the original concrete was placed in 1920, nothing was known about the addition of air entrainment to resist freeze-thaw forces. Thus it is essential to protect this concrete completely wherever it

is subject to cycles of freezing and thawing. None of the repair work has done this.

We propose that the next stage of the investigation should consist in determining whether or not the original concrete is adequate to form a base for repairs. Since none of the previous repairs are properly bonded, it is clear that all such concrete must be removed and replaced, with the possible exception of the downstream slabs where grouting the gap between the original slab and the later addition might be filled by grouting.

In this same area, the condition under the original slab should be investigated to ascertain whether the voids which existed prior to the driving of the steel sheet piling are filled.

Because of the apparent general lack of bond between the old and new concrete, we do not think that a thorough investigation by ultra sonic testing is justifiable. We propose that a series of 12 cores be drilled from the concrete in the weirs, piers and beams to discover the strength of the concrete in those areas. Also we propose to do a thorough but not exhaustive program of ultra-sonic testing to confirm that the original concrete is sound. The drilling machine used for coring would not be suitable for drilling down through the slabs to investigate voids under the original slab. A larger drill such as is used for soil investigation would be required for this because the work must be done in the wet.

We think that one day will be sufficient for the investigation as outlined above, barring unforeseen delays.

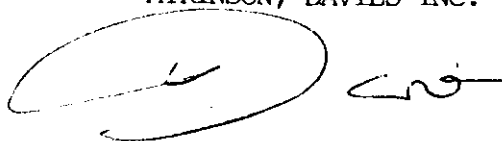
As discussed previously, we have assumed that scaffolding will be provided to enable us to gain access to the upper part of the piers and the beams, probably two sets to avoid stand-by time, and that one man will be available from the Town of Wingham to assist by holding one of the ultra-sonic transducers in place as required.

Our estimate of the upset figure for the cost of the work as outlined above, plus a report and laboratory testing to be \$3,200.00, exclusive of the cost of any labour supplied by the Town and the local rental of scaffold.

We would be very happy to discuss with you further the amount of work involved.

Yours very truly,

ATKINSON, DAVIES INC.

A handwritten signature in dark ink, appearing to be 'P.H. Davies', is written over a large, faint oval-shaped stamp or watermark.

P.H. Davies, P.Eng.

PHD/kih



ATKINSON, DAVIES INC. *CONSULTING SOILS AND MATERIALS ENGINEERS*
69 BESSEMER ROAD, UNIT 35, LONDON, ONTARIO N6E 2V6 (519) 685-6400

May 10, 1984

Ref: 3-0198

Maitland Valley Conservation Authority,
P.O. Box 5,
Wroxeter, Ontario.
N0G 2X0

Attention: Ms. Jane Taylor, Water Resources Technologist

Dear Ms. Taylor:

As instructed by your letter of 20 December, 1983, we have carried out an investigation of the condition of the concrete in the existing Howson Dam.

The field work was done 8 May, 1984, the delay being caused by the severe winter.

As originally planned, the investigation was to consist of drilling a number of cores from the concrete with additional information being obtained from an ultra-sonic survey. This program, which is a fairly standard type of investigation was planned based on the visual observation of the state of the concrete made by the undersigned on 20 September, 1983. From that, it appeared that very severe deterioration had occurred on the surface, but it was anticipated that once the surface deterioration had been penetrated by the cores, a solid concrete would be found, which might act as a base on which to perform an extensive repair program.

When the coring was done, it was found that the dirt which had been observed embedded in the cracks of the deteriorated concrete had not come from debris deposited by the river in flood but had in fact always been a part of the concrete. The cores were found to consist of comparatively small pieces of solid concrete separated by dirt seams.

The list of core locations and comments about each is attached. Only one short length of solid core was obtained, Core No. 4, from the north face of the north pier, above the shotcrete repair. This sheared from the remaining concrete during the drilling.

To investigate the condition of the concrete behind the shotcrete repair, Core No. 5 was drilled in such an area of the south face of the north abutment. This core yielded a thin solid disc of shotcrete from the surface, then part of the core from the original concrete emerged as a shattered mixture of stones and mortar, and one part, about 4 inches long, as a highly fissured series of poorly connected discs of concrete which would easily shatter if dropped.

Since virtually no solid concrete was located in the north abutment, north pier and north spillway and since the visual appearance of the remainder of the lower part of the structure was, if anything, worse than the north section, it was decided to terminate the coring of the lower structure at that point.

The next part of the investigation was to drill cores vertically down through the deck in two lines, (1) at the mid point between the two centre beams and (2) at the mid point between the west centre beam and the west outside beam, in each case drilling close to mid-span. The thickness of the asphalt, approximately 3 inches, plus the cover to the top reinforcing steel prevented us from locating any top reinforcing steel accurately. Consequently, the cores were placed where the drawing indicated that no top steel existed.

It was not possible to locate the bottom steel, but only one of the three cores drilled out this.

The purpose of the deck coring program was to obtain samples for compression testing and also for testing for the presence of chloride ions.

Once the three inches of asphalt had been drilled through, only shattered pieces of concrete and separated discs were recovered from the core barrel. At Core No. 7, one 5/8 inch square bar was cut. This bar had little or no bond to the concrete and was virtually uncorroded. The operator of the coring drill observed that while he normally expected to drill quickly through the asphalt and slow down when he came to the concrete deck, here his drilling rate was speeding up when he encountered the concrete. The thickness of the deck was found to be 11¼ inches, not 8 inches as stated on the drawing. It had also been planned to take a horizontal core through one of the centre beams, at about mid depth. Since it had been found impossible to obtain any cores from the first three deck locations drilled, it was decided, in consultation with Mr. Ken Dunn, P.Eng., B.M. Ross & Associates Ltd., to abandon the bridge deck coring program.

Because of the large number of voids and discontinuities in the concrete, ultra sonic testing was not attempted. Any readings obtained would have been invalid.

Comparing the aggregate in the concrete with the gravel in the river bed, it seems to be a reasonable supposition that the concrete was made from the gravel on site, including all dirt present. Mixing was obviously not thorough, with the result that the concrete in the dam consists of lenses of passable concrete separated by dirt seams. The result is that the concrete has a compressive strength which is so low that it is effectively zero. The severe deterioration is due to freezing and thawing of water which is able to enter the concrete through the dirt passages. It seems surprising that the deterioration is not more severe. This may be due to water being able to flow out of the concrete with the same ease with which it enters.

There is very little corrosion of reinforcing steel to be seen so that the bridge structure remains reinforced as designed.

In view of the condition of the concrete, we are of the opinion that it will not act as a base for repair work and that the only course open is to remove and replace the dam and bridge structure.

Yours very truly,

ATKINSON, DAVIES INC.



A handwritten signature in dark ink, appearing to be "P. H. Davies", written over a horizontal line.

P.H. Davies, B.Sc. M.I.C.E. P.Eng.

PHD/kih

Enclosures

Copies: Ministry of Natural Resources
Attention: Mr. Jeff Jilek

B.M. Ross & Associates Ltd.
Attention: Mr. K.G. Dunn, P.Eng.✓

CONCRETE CORES DRILLED 8 MAY, 1984.

<u>Core No.</u>	<u>Dia.</u>	<u>Location</u>	<u>Remarks</u>
1	4"	North abutment, east side	Core shattered when drilled.
2	6"	" " " "	Core shattered.
3	6"	Upstream face, north spillway.	Core shattered.
4	6"	North face, north pier, above gunite repair.	Solid section 6½" to 8" long recovered, at that point the core sheared
5	6"	South face, north abutment.	One section of 4" long core recovered, highly fissured. Remainder of core shattered.
6	4"	Apron, north spillway.	Core shattered.
7	4"	Deck, east side north span, mid way between two centre beams.	Core broke into irregular discs, also part completely shattered.
8	4"	As 7 but one span to south.	Core shattered.
9	4"	As 7 but two spans to south.	Similar to 7.

BR-476

May 15, 1984

Mr. Byron Adams
Clerk-Treasurer
Town of Wingham
Box 90
WINGHAM, Ontario
N0G 2W0

Dear Sir:

Re: Main Howson Dam Structure
Over Maitland River

We wish to confirm our recommendations to Committee of Council on Friday, May 11th, 1984. This meeting was subsequent to concrete testing of the structure initiated by the Maitland Valley Conservation Authority and performed by Davies Testing on Tuesday, May 8th, 1984.

On Tuesday, May 8th, I met at the site with Peter Davies from Davies Testing, Jane Taylor from the Maitland Valley, Ross Jackson from the Stratford District of the M.T.C. and Jeff Jilek from the Ministry of Natural Resources, to outline the portion of the concrete testing that we required to assist in our structure evaluation to determine the load carrying capacity of the roadway as authorized by your Town. At 11:00 a.m., Davies had completed two test cores in the substructure and had found that the concrete fractured sufficiently that compressive strength cores could not be obtained to test in the laboratory for the concrete strength of the material.

I outlined with Peter Davies that we wished six cores to be taken through the deck of the structure and one core to be taken through the centre of one of the supporting beams. With the six tests through the deck, we wished four to be used for a compressive strength purposes and two to be used to determine the calcium chloride or salt content of the concrete.

At 3:30 p.m. the same afternoon, we received a telephone call from Peter Davies outlining that they had taken three of the deck test cores and found the concrete fractured upon

Mr. Byron Adams
Clerk-Treasurer
Town of Wingham

Page 2
BR-476
May 15, 1984

coring resulting in not being able to obtain a suitable sample for testing from any of the cores. On the basis of this testing, we did not take the additional three deck cores or the core sample through the face of one of the beams.

Prior to our meeting on Friday, May 11th, I contacted Peter Davies for his recommendations on the strength of the concrete, Ross Jackson from the District Office of the M.T.C. and Ken Kleinstaiber from the Toronto Structural Office of the M.T.C. Based on the testing and our discussions, we propose the following recommendations:

- (1) From our initial inspection of the structure and the testing by Davies, we are of the opinion that there is not a sufficiently solid base of sound concrete to repair the existing bridge and dam.
- (2) We recommend that the Town immediately take steps to post a 3-tonne liveload limit on the structure.
- (3) Over the next two week period, we wish to consult with the research department of the Toronto Structural Office of the M.T.C. as to further testing and calculations which can be completed to more accurately assign a load carrying capacity for the existing structure.

We shall keep you informed of our progress. Should you have any questions on the enclosed, please contact us.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per _____

K. G. Dunn, P. Eng.

RGD*jb

c.c. - Ross Jackson
M.T.C., Stratford
- Bryan Howard
M.V.C.A.

BR-476

June 8, 1984

Mr. Byron Adams
Clerk-Treasurer
Town of Wingham
Box 90
WINGHAM, Ontario
N0G 2W0

Dear Sir:

Re - Main Howson Dam Structure Over
Maitland River

Subsequent to our letter of May 15, 1984, we have had conversations with Dr. David Manning of the Research Department of the M.T.C., and K. L. Kleinsteinber from the Downsview Structural Office of the M.T.C. Dr. Manning does not feel that there are any additional testing to what we have already taken, which could be used to accurately assess the concrete compressive strength in the existing bridge. The one other method of assessing the low carrying capacity would be to have the Structural Office perform an official and relatively complicated load testing program at the site.

Arrangements for load testing are made through Mr. Kleinsteinber, and are generally used on structures where the materials are sufficiently sound to warrant rehabilitation of the structure.

Prior to load testing, one of the basic steps to be taken is the structural evaluation of the existing structure which you have already authorized our firm to complete. Mr. Kleinsteinber feels that the Town should proceed with the structure evaluation to obtain the carrying capacity of the structure, assuming that the concrete strength was satisfactory. After this information is available, we would have more background information to assess the carrying capacity of the structure under its present condition.

Based on the recommendation of the M.T.C. and as previously authorized by your Council, we are proceeding with the structure evaluation. If there are any questions on the enclosed, please contact us.

..... cont'd

Mr. Byron Adams
Clerk-Treasurer
Town of Wingham
June 3, 1994
Page 2

BR-476

Yours very truly,

S. M. ROSS AND ASSOCIATES LIMITED

KCD:1)

Per

K. G. Dunn, P. Eng.

c.c. Mr. Ross Jackson
M.T.C. Stratford

Mr. Bryan Howard
M.T.C.A.

TOWN OF WINGHAM
MAIN HOWSON DAM AND BRIDGE
BR-476 - PICTURES



BR-476 - (i) - Upstream East Elevation
Third Span from North



BR-476 - (ii) - Upstream East Elevation
Second Span from North



BR-476 - (iii) - North Face of Pier No. 2 from
North Abutment



BR-476 - (iv) - West Elevation Second Span from
North Abutment



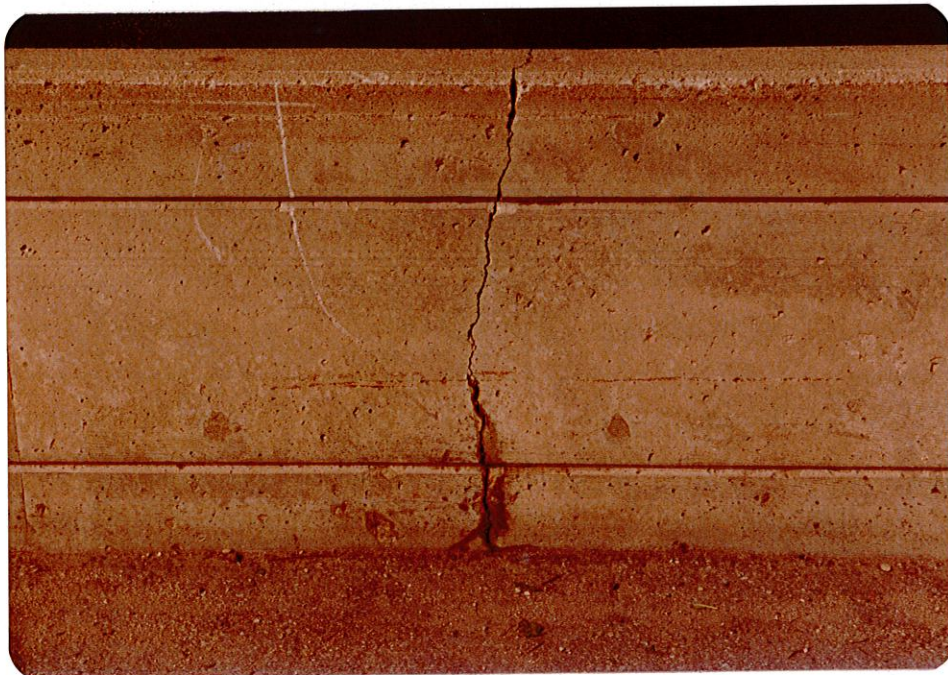
BR-476 - (v) - West Elevation Third Span from
North Abutment



BR-476 - (vi) - South Face of Pier No. 1 from
North Abutment



BR-476 - (vii) - West Face of First Beam East of
Centreline Roadway - Second Span
from North Abutment



BR-476 - (viii) - Crack through West Handrail at
Two-Thirds Point of First Span
from North Abutment



BR-476 - (ix) - Underside of Deck Between First Beam
East of Centreline and Outside East
Beam - Second Span from North Abutment



BR-476 - (x) - Inside Face of Outside West Beam - Second
Span from North Abutment



BR-476 - (xi) - Inside Face of Outside West Beam - Second Span from North Abutment



BR-476 - (xii) - Bottom of First Beam West of Centreline - Second Span from North Abutment



BR-476 - (xiii) - Bottom of Inside Face of East Outside
Girder - First Span from North Abutment



BR-476 - (xiv) - Bottom of First Beam East of Centreline
- First Span from North Abutment



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File No. BR476B

RECEIVED

JAN 26 2016

TOWNSHIP OF NORTH HURON

January 21, 2016

Sharon Chambers
Chief Administrative Officer
Township of North Huron
274 Josephine St., Box 90
Wingham, ON N0G 2W0

Dear Sharon

RE: Howson Dam – Stability Analysis

We have received a copy of the January 21, 2016 letter to you, from the Ontario Ministry of Natural Resources and Forestry. Their letter provides background information about the Lakes and Rivers Improvement Act, (LRIA) and references a technical bulletin. Their letter concludes, *"If the proposed repairs exceed the definition of minor works outlined in the procedure and approval is required under the LRIA, a stability analysis would be required..."*

The drawing of proposed repairs, prepared by our office and dated March 30, 2015, certainly does not meet the definition of *minor works* and almost no sub-portion of the works would meet that criteria. So the proposed work or any sub-part would, in the opinion of the MNRF, require a stability analysis in order to obtain their approval. Their letter also suggests that they would require reports on the Intake Design Flood and the Hazard Potential Classification for the dam before issuing such approval.

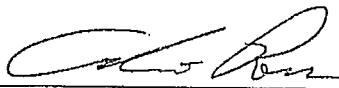
Of course, it must be assumed that the conclusions of the analyses would need to be favourable before they would approve the proposed work. The analyses could show the dam to have insufficient factors of safety, and it could be assumed that the Ministry would not approve the project unless it is shown to bring the factors of safety within Ministry criteria.

Another consideration is the bridge that spans the dam. We have seen examples, (County of Huron at Benmiller), where a bridge, integral with a dam, has been repaired and the MNRF has not been concerned. However, the removal of the bridge from the Howson Dam will remove gravity loads that will be significantly contributing to the stability of this dam. Whether or not the LRIA criteria cover this situation or not, it is our opinion that a stability analysis must prove that the factors of safety are adequate if the mass of the bridge is removed.

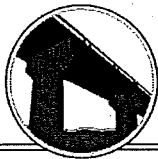
Please contact us if you have any questions.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per 
A. I. Ross, P. Eng.

AIR:dmd



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File No. BR476B

March 30, 2015

Pat Newson, Director of Recreation and Facilities
Township of North Huron
274 Josephine Street, Box 90
Wingham, ON N0G 2W0

Dear Pat

RE: Proposed Repairs to Howson Dam

Please find enclosed 5 copies of a revised plan of the proposed repairs for the Howson Dam. Please distribute the plan among members of your committee.

By way of this letter we wish to address some of the items discussed in our meeting of March 2, 2015. This report is in addition to the report dated February 2, 2015.

Flashboards and Operating Height

Our previous report and the preliminary drawings referred to an elevation of 309.28 m for the restoration of the concrete sill. This was suggested as the operating height. However, the committee provided photos from July 2006 that showed the flashboards in place. They may have even been used since that time. Members of your committee report that the flashboards have been located and measure 21 to 30 inches (530 to 762 mm) high. Water marks are reported to be visible on the piers at about 36 inches above the concrete sill which would confirm the height of 30 inch flash boards plus overflow.

Probably some flashboards were higher than others so that the overflow would be directed to particular bays, rather than have a thin overflow along the entire spillway. Observations of the committee were that many of the newer flashboards were 24 inches or 28 inches high.

As mentioned previously, no stability analysis has been completed and was not included in the scope of this report. Previously the report indicated that the operating level in recent decades was the concrete sill elevation of 309.28 m. However, your committee has provided proof that the summer operating level as recently as 2006 was as high as elevation 310.04, or about 30 inches above the concrete sill. For this reason, we have revised the design of the stop logs that are to be installed on the north side of pier #1. The lower logs are now detailed as 10"x10" timbers to resist the higher hydrostatic pressures caused by the flashboards to this level.

The details of the concrete wall that support the stop logs has been revised to show the re-facing, and not a new cutwater. A cutwater detail has been provided which could be used to help with the restoration of other piers.

No details have been provided for the flashboards and removable posts. These are assumed to be service items and not part of the main structure. The revised drawing makes reference to them and the operating water level resulting from the flashboards.

Probable Costs

The February 2 report provided some unit and lump sum costs. We understand that the committee may wish to break the project into components for the sake of budgets. At the meeting of March 2, it was discussed that the re-facing and restoration of the upstream concrete sill is probably of the highest priority. The total project cost of the sill restoration and re-facing may look like this:

1. Mobilize and site access	\$ 12,000
2. Dewatering, environmental controls	\$ 7,000
3. Excavate and backfill for re-face to frost depth 160 m ³ @ \$20	\$ 3,200
4. New concrete face and crest 36 m ³ @ \$3,500	\$126,000
5. New stop logs	\$ 2,800
6. Contingency allowance	\$ 10,000
Subtotal construction	\$161,000
Design and contract administration	\$ 24,000
Total probable cost	\$185,000 + HST

Secondary repairs would include patch-repair restoration of concrete surfaces of the piers and aprons of each of the four bays of the spillway. This would be limited to the lowest 2 m of the vertical surfaces of the piers. The restoration would not apply to any of the bridge components except the lower portions of the pier or abutments. Detailed soundings have not been measured. It has been assumed that about 40% of the apron area requires repair and about 50% of the lowest 2 m of the piers and abutments require repairs. Based on this, a typical repair of one spillway bay may look like this:

1. Concrete patch repairs 9.5 m ³ @ \$5,000	\$47,500
2. Steel dowels to concrete 56 @ \$18	\$ 1,000
3. Restoration of upstream cutwater of one pier	\$ 7,000
4. Contingency allowance	\$ 4,000
Subtotal construction	\$59,500
Design and contract administration	\$ 8,800
Total probable cost	\$68,300 + HST

Considering the needs of the four bays of the spillway and the restoration of the sill and stop logs, the probable cost of the entire project is about \$458,200 plus HST. This does not include materials or maintenance of the flashboards and removable posts, and it does not include repairs to the bridge structure above.

Service Life

The new concrete in the repairs should be expected to perform satisfactorily for 30 to 50 years. However, the old concrete beneath some patches or adjacent to patches will show some signs of deterioration within even a few years after the repair. The deteriorated areas may be left to accumulate for some years until there is enough volume to make a repair contract worthwhile. Probably a repair program should be anticipated about every 15 years. Such repair contracts are not likely to be as comprehensive as the one suggested here, but could be in the range of \$50,000 (2015 dollar value) each time. The timber stop logs may only have a service life of about 10 years, but this can be reviewed during annual operations.

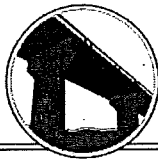
Please contact us if you have any questions.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per _____
A.I. Ross, P. Eng.

AIR:hv
Encl.



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File No. BR476B

February 2, 2015

Pat Newson, Director of Recreation and Facilities
Township of North Huron
274 Josephine Street, Box 90
Wingham, ON N0G 2W0

Dear Pat

RE: Proposed Repairs to Howson Dam

Please find enclosed 5 copies of a preliminary plan of the proposed repairs for the Howson Dam. Please have the plan reviewed by your committee and let us know if you require modifications.

By way of this letter we wish to outline some of the parameters and assumptions used in the design as well as suggest some unit costs that could be applied to the repairs.

No stability analysis of the dam was completed. The dam has performed satisfactorily for many decades. Most recently, it has functioned without the installation of flashboards to raise the water level. All features of this design of repairs assumes that the weir level of 309.28 m will be restored. Although the existing weir has degraded to values lower than this elevation in places, some areas of original concrete on the weir were found to be at that elevation. The design does not indicate any use of flashboards to raise the water level above this value and we cannot support an increase in the water level as the effects on the stability of the dam are unknown. The design is based on repairing to base conditions.

All of the repairs detailed on the drawing will either be neutral to stability or improve stability. For example, the new re-facing of the upstream side of the weir will add mass to this gravity dam, and add it to the side that would help to resist overturning.

No part of the design shown on this drawing represents a repair or restoration of the strength of the bridge overhead.

Stop Logs

The design shows replacement stop logs made from 8x8 dimension timbers. The lapped detail is optional. It is designed to slow (but not stop) leakage between logs. The lap detail also allows for sharing loads and deflections from one log to the next, assuming that the deeper log takes the greater pressure.

The 8x8 grade SPF2 has been chosen as being strong enough to resist water pressure to the weir elevation plus 0.5 m. This is to allow up to 0.5 m deep flow over the weir, and is not intended to suggest that flashboards could be used. The logs are assumed to be in good condition. Logs that show deterioration or excessive deflection should be replaced with good material.

The stop logs are shown without any lift bolts. It is assumed that the spillway at the north end of the dam is the control structure. These new stop logs beside pier #1 might be lifted out once the pond is drawn down and allow some additional seasonal flow through the opening. This may improve seasonal sediment transport from upstream of the dam.

A detail on the drawing shows a new cutwater construction for the concrete wall between piers 1 and 2. The cutwater allows for a new concrete gain to hold the stop logs in place. Currently, the north end of the stop logs just rest against the end of the wall by pressure.

Concrete Repairs

The areas of deteriorated concrete are very large on this structure. Repairs could be phased by priority if budget values do not allow for one comprehensive repair. Identification of all areas needing repair are beyond the scope of this design.

The detail of the new cutwater to contain the north ends of the stop logs could be used as a typical detail to reconstruct or repair any of the pier cutwaters. Currently, the cutwater of pier #3 is in very poor condition and the same detail could be used there.

Details are provided for concrete surface patch repairs. These could be used in any location on the structure. In general, it is not necessary to remove poor concrete deeper than 225 mm. If the concrete is still poor below this depth, it is assumed that the new reinforced concrete acts as an armoured encasement. Steel dowels will still be required to be drilled and grouted to provide a physical bond between old and new concrete. Surface preparation is also important by sand-blasting or pressure washing, and cement slurry brushing, where possible.

Note that it is not acceptable to build-out or re-face the sides of the piers or abutments as that would reduce the hydraulic area of the spillway. Concrete repairs must be flush with existing surfaces. The ends of the piers or the wings of the abutments could be overlaid with new concrete without restricting the flow.

Probable Costs

The cost of the project is related to the extent of the repairs. The following construction costs could be expected, based on recent similar works.

• Mobilization, demobilization, site access	\$12,000
• Dewatering, environmental controls	\$ 7,000
• Excavation and backfill same material	\$ 20 per m ³
• New concrete in weir wall face, cutwater of stop log gain	\$ 3,500 per m ³
• Concrete removal and replacement	\$ 5,000 per m ³
• Drill and grout dowels	\$ 18 each
• Supply, cut, place stop logs	\$ 2,000

Approvals

It is our understanding that the work is to repair existing infrastructure without changing the size, purpose or capacity, and so there should be no requirement for an environmental assessment.

Based on the nature of the work and the proximity to the river, it is expected that you will require work permits or approvals from the Maitland Valley Conservation Authority, Fisheries and Oceans Canada, and the Ontario Ministry of Natural Resources. The plans contained may be used as attachments in the applications for approval. The agencies may wish to see an engineer's seal on the drawings and this can be provided once your review is complete and any mutually-agreed edits are made.

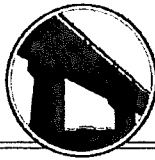
Please contact us if you have any questions.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per _____
A. I. Ross, P. Eng.

AIR:es
Encl.



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File No. BR476

VIA EMAIL ONLY

August 18, 2014

Kelly Church
Township of North Huron
274 Josephine Street, Box 90
Wingham, ON N0G 2W0

Dear Sir:

Re: Improvements to Howson Dam

The Howson Dam and the bridge that it supports is suffering from weathering effects on the concrete structures. The south spans of the bridge are no longer safe for traffic and the piers and crest of the dam are in obvious decay.

It is understood that the Township and local citizens would like to work towards maintaining the weir crests of the south segments of dam, to prevent their degradation. To allow deterioration further would result in reduction of water levels in the upstream pond.

The Township and a volunteer committee are proposing to have the weir maintained by constructing a wall on the upstream face of the dam. BMROSS is able to provide engineering services to design the new wall to integrate into the old structure and improve the durability for many more years. The work would be done by Andrew Ross, P.Eng. (Member, Canadian Dam Association). Of our 12 engineers, Andrew has the most experience with dams in southwestern Ontario.

It is proposed that the new wall would act as a re-facing of the upstream face of the concrete weir for only the south series of spans. The north span, which was built in the 1970's would not be involved in the work. Site surveys would be made to establish existing elevations of the weir and determine what the probable elevation of concrete was before deterioration.

The wall re-facing would be designed to go below frost grade (1.2 m deep). Some removal and replacement of deteriorated concrete would be required at the weir to interlock the old with the new structures.

This proposal for engineering services includes a design meeting with the Township and volunteers, site survey and modelling, design and drawings suitable for construction, specifications included as notes on the drawing. At this time, no budget is set to prepare a contract or tender package.

BMROSS prefers to work on a per diem basis as with other work for North Huron. We suggest the following budgets be used to include the work described above:

Site survey and modelling:	\$3,270 + HST
Design and drawing	\$5,140 + HST

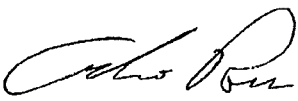
The project will require the approval of the Ontario Ministry of Natural Resources and the Maitland Valley Conservation Authority. We understand that some of the volunteers and staff will look after discussions and applications to these agencies. The MNR may request further studies such as a stability analysis or a dam-break analysis or hazard classification. These studies are not included in the budgets shown above, nor are attendance at meetings with these agencies. However, BMROSS can assist, if required, at normal rates.

BMROSS is well suited to design the wall as described. If the Township wishes to consider raising the weir elevation or restoring a stop-log system as was once used here, we would require further study, (by us or others), to prove the stability of the dam to hold water pressure which it has not seen for some decades.

Please consider this proposal and we would be pleased to discuss any aspect of it with you.

Yours very truly

B. M. ROSS AND ASSOCIATES LIMITED

Per 
A.I. Ross, P. Eng.

AIR:hv

January 21, 2016

Sharon Chambers, CAO
Township of North Huron
P.O. Box 90, 274 Josephine Street
Wingham, ON
N0G 2W0

Re: Howson Dam – LRIA requirements

Dear Sharon,

Further to our meeting on October 16, 2015 to discuss the Howson dam, I committed to confirm the approval requirements under the *Lakes and Rivers Improvement Act* (LRIA) for any repairs that may be proposed for the dam and whether a stability analysis would be a requirement of that approval process.

Regulation 454/96 under the LRIA states that approval is required to make alterations, improvements or repairs to the dam, if the alterations, improvements or repairs may affect the dam's safety or *structural integrity*, the waters or natural resources.

The Ministry has created a procedure to assist in the administration of applications and approvals under the LRIA (see attached) which identifies minor works that are not subject to LRIA approval which includes:

"Minor concrete repair/spalling-isolated repair to area(s) less than 15m², have a penetration depth not exceeding 75mm, and/or involve exposure or replacement of reinforcing steel and have a total area(s) not to be comprised of more than 15% of the total concrete surface area of the dam".

Concrete repairs exceeding these amounts require approval, since they may affect the dam's structural integrity.

Approval may be granted if an improvement to a dam meets or exceeds Ministry standards. The Ministry's current structural criteria for concrete dams are described in the "Technical Bulletin for Structural Design and Factors of Safety, MNRF, 2011. Addressing the structural requirements requires consideration of the Inflow Design Flood (IDF), which in turn requires consideration of the Hazard Potential Classification (HPC). These requirements are described in the Technical Bulletin for Classification and Inflow Design Flood Criteria, MNRF, 2011.

If the proposed repairs exceed the definition of minor works outlined in the procedure and approval is required under the LRIA, a stability analysis would be required to meet the requirements within the above listed technical bulletins.

If you have any further questions or concerns, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Rose Whalen', with a long horizontal flourish extending to the right.

Rose Whalen
Lands and Waters Technical Specialist
T: 519-826-4910 E: rose.whalen@ontario.ca

c. Stephen Jackson, Maitland Valley Conservation Authority

Encl.



**HOWSON DAM
DAM STABILITY ASSESSMENT REPORT**

DRAFT REV C

KGS Group 17-3212-001
May 2018

PREPARED BY:

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EXECUTIVE SUMMARY

The Howson Dam, on the North Branch of the Maitland River (North Maitland River), is located north of Highway 86 in Wingham, in the Township of North Huron, Ontario. The available documentation suggests that the dam was originally built to prevent flooding and to create a reservoir for recreational use. It has two distinguishable components: the South Dam built approximately in the 1920's and the North Dam, built in 1966, to provide additional spill capacity.

The South Dam consists of four overflow weirs with a sill level of El. 309.3 m. Their crest lengths are, from North to South, 10.6 m, 11.5 m, 10.8 m and 10.7 m. The North Dam consists of three sluiceway bays of lengths: 3.8 m, 4.0 m and 3.8 m. They have a sill elevation of approximately El. 306.6 m and each has seven stop-logs that are operated to maintain the reservoir levels and removed to provide spill capacity in the spring. Historically, the dam was operated to maintain a reservoir level of approximately El. 310 m; but it has been operated at lower levels in recent years. There is an earth embankment section between the North and the South dams, of approximately 20 m of length. There is a bridge located on the deck of the dam, on Water Street in Wingham.

The concrete in the South Dam at the Howson Dam and in the bridge structure shows severe signs of deterioration. The bridge has been closed to vehicular traffic; but at the time of initiation of this project it was open to public use. Evaluations of the concrete were carried out by the firms BM Ross and Associates Ltd and Atkinson-Davies Inc. in the period from 1983 to 1985. At that time, attempts to obtain concrete cores on the South Dam were terminated at shallow depths due to the poor condition of the concrete. The two consultant firms concluded that the concrete in the dam and bridge did not provide a basis for satisfactory long-term repair works and that the only course of action available was removal and replacement of these structures.

The available documentation also indicates that through the history of the dam, works have been required to prevent or mitigate undermining of the foundation. Extension of the apron and sheet-piling were carried out in the downstream end of the South Dam, as early as the 1940's or 1950's. More recently, in 1963, additional sheet-piling was required for one section of the South Dam. Repairs for foundation undermining of the North Dam were also required in the 1980's.

It was indicated by the Township of North Huron that an Environmental Assessment (EA) was initiated in 2016 to evaluate alternatives for repairing the dam. Correspondence from that period by BM Ross and Associates Ltd refer to a plan to repair the dam that included re-facing and restoration of the upstream concrete sill and patch restoration on the piers, with a cost of approximately \$485,000 plus HST. During this process the MNRF was consulted and it was concluded that it would most likely require application to obtain approval under Section 16 of the Lakes and Rivers Improvement Act (LRIA). For this application, a dam safety and structural stability assessment are required.

The Township of North Huron retained KGS Group to carry out a dam safety assessment of the dam, determine the Hazard Potential Classification (HPC) and the Inflow Design Flood (IDF), evaluate the adequacy of the discharge capacity at the site to convey the IDF, conduct site investigations and testing for the concrete and structural stability assessment on the South Dam. The assessment of the stability of the South Dam was to be performed considering the conditions with and without the bridge in place. These analyses were required to be conducted in accordance with the Bulletins and Guidelines issued by MNRF in 2011, associated to the

Lakes and Rivers Improvement Act (LRIA) and its Administrative Guide. The scope of the project did not include an assessment of the condition of the bridge or analyses of its strength.

KGS Group carried out hydrologic analysis to determine flood flow values for the site, based on data from Water Survey of Canada (WSC Station 02FE005). It was estimated that the 100-Year Flood had a peak flow value at the site of 415 m³/s. This value is in the same range of previous estimates found in the available documentation. An order of magnitude of 1,400 m³/s was obtained for the Maximum Probable Flood (PMF).

KGS Group also carried out simulations of a dam breach, using hydraulic models, to evaluate the potential consequences of a breach of the Howson Dam in two conditions: normal (sunny-day) and during a large flood. The dam break consequences were evaluated, in accordance with the 2011 LRIA associated bulletins, in terms of Incremental Loss of Lives (ILOL), and damages to third party assets, the environment and to cultural assets.

The analysis indicated ILOL values between 1 and 10 for a dam breach in normal (sunny-day) conditions, mainly associated to the recreational use of the areas downstream of the dam. It corresponded to an HPC of HIGH and a design ground motion with exceedance probability of 1 in 2,500 years. The analysis also indicated that a dam breach during a large flood would result in a small increase in water levels, attributable to the dam failure, in the downstream areas of permanent population. Recognizing the flooding in those areas, and from application of the “2x2 Rule” promoted by the 2011 LRIA associated bulletins, the dam was assigned an HPC of HIGH for a breach during a flood. Through incremental analysis the 100-Year Flood was proposed as IDF, because larger flood events would only cause a small increase in water levels (10 cm or less) in areas of hazard to population.

The analysis indicated that the dam could adequately pass the IDF (100-Year Flood with a peak flow of 415 m³/s) with all the bays open, and provide adequate freeboard. It requires, however, that provisions are taken to ensure that the sluiceway bays can be opened in advance of a flood. The analysis of energy dissipation downstream of the dam suggests that the conditions are adequate; but these need to be confirmed at the time of design of dam upgrades. This confirmation should include a more detailed determination of the tailwater rating curve than what was available during the study. It must be noted that previous studies have identified concerns with the management of ice and debris affecting spill capacity, as well as scour on the banks and downstream of the dam. These need to be also considered during the design of potential dam upgrades.

As part of the assessment, KGS Group engineers carried out a visual inspection of the structures and a reconnaissance of the site and surrounding area. A concrete coring program was carried out during the structural assessment of the dam (refer to 2018 Geotechnical Site Investigation Report by KGS Group). Three vertical core holes were completed from the top of the piers to depths between 1.6 and 1.9 m. The concrete in the cores was observed to be extensively deteriorated with fractures present throughout the core length. In those conditions, the load-carrying capacity and the water tightness of the concrete are expected to be significantly reduced.

The visual inspection revealed that the South Dam at the site is in very poor condition. Large areas of freeze/thaw spalling and delamination were visible in the concrete overflow weirs, piers and abutments. If the concrete condition within the body of the overflow weirs is similar to the concrete obtained from the core logs from the piers, it would mean that the integrity of the

concrete in the weir may no longer be reliable and that the South Dam is required to be repaired as soon as possible.

The bridge deck is a reinforced concrete beam structure but a large portion of the reinforcing steel is exposed and corroded. Due to the corroded reinforcing steel, and potential horizontal fractures and extensive deterioration within the concrete at the girders and deck, the structural capacity of the girders and deck is compromised. Moreover, it is not possible to reasonably estimate the load-carrying capacity of the girders/ deck slabs based on the deteriorated concrete condition. Although an analysis of the bridge or its members was not within the scope and has not been conducted, the observations from the site visit suggest that the further use of the bridge may pose a risk to the public and that the safety of the bridge should be addressed.

The dam appears to be founded on soil, based on the report of the B.M. Ross and Associates Ltd. There have been undermining issues that have required repairs at different times during the life of the structure. As such, the foundation condition and potential scouring and undermining need to be assessed as part of any future alternatives for the dam.

The structural stability analyses for the South Dam were carried out in accordance with the criteria indicated in the 2011 LRIA associated bulletins. KGS Group computed stability factors for the six load-combination cases specified in 2011 LRIA:

- Load Case One: with maximum normal operation water level in summer.
- Load Case Two: winter operation water level plus “usual” ice loading condition.
- Load Case Three: flood condition (IDF).
- Load Case Four: winter operation water level plus “unusual” ice loading condition.
- Load Case Five: earthquake condition, and
- Load Case Six: post-earthquake condition.

Note that for the stability assessment, the concrete of the piers and weir was assumed to be intact.

The results of the stability analyses show that the piers under current condition (with the bridge deck) meet the 2011 LRIA stability criteria for all loading conditions. For the case with the bridge deck removed, the results of the stability analyses show that the piers do not meet the 2011 LRIA stability criteria for the sliding stability under normal summer, winter, IDF and earthquake loading conditions.

The results of stability analyses show that the overflow weirs of the South Dam do not meet the 2011 LRIA stability criteria for the sliding stability under all loading conditions except the IDF.

Under the current dam operation condition, the results of stability analyses show that the entire South Dam does not meet the 2011 LRIA stability criteria for the sliding stability under all loading conditions except the IDF and post-earthquake loadings.

It was concluded that the dam does not meet the 2011 LRIA sliding stability criteria. Remedial work is required to address the dam stability deficiency, required for the application to obtain approval from MNRF under Section 16 of the LRIA.

The following alternatives for addressing the stability deficiency of the South Dam at the Howson Dam were evaluated:

- Do nothing
- Dam Decommissioning
- Dam Rehabilitation
- Dam Replacement

For these alternatives, American Association of Cost Engineering (AACE) Class 4 estimates, with an accuracy of plus or minus 40 to 50%, were obtained and are provided in subsequent paragraphs.

The do nothing alternative was considered not feasible because it would not address the risk posed by the dam, since it does not satisfy the dam safety requirements indicated in the 2011 LRIA associated criteria for stability. The do nothing alternative also does not address the risk posed by the bridge at its present state of deterioration.

The alternative of dam decommissioning was not ruled unfeasible; but it would require an extensive process of consultation at various levels. It is anticipated, based on the input obtained during the 2016 EA, that it could be opposed by the public. A cost estimate of \$ 436,000 was obtained for this option. This estimate does not include some costs that might be related to environmental controls and management of fish population or fish habitat. There are also considerations such as effect on species at risk and on the character of the area and public use of the site for which a monetary value is difficult to assign.

For the alternative of dam rehabilitation, two options were considered: installation of post-tension anchors and addition of concrete mass. Both options need to be confirmed with site investigations to assess the condition of the concrete in the weirs and of the foundation of the dam. The information available from the visual inspection and limited core sampling suggests that these options will likely be found not feasible after these site investigations are carried out. Nonetheless, a cost estimate was prepared assuming that the concrete in the weirs would be found to be sound and would only need removal of damaged concrete up to 0.5 m of depth from the surface. The cost estimate also was based on the assumption of a competent dam foundation. The rehabilitation options, if feasible, would ensure that the South Dam satisfies the stability requirements of the LRIA. The rehabilitated dam, in conjunction with the North Dam would allow safe passage of the IDF in accordance with the requirements by the LRIA. The estimated costs of the two rehabilitation options are:

- Installation of post-tensioned anchors at the overflow weirs: \$ 2,869,000
- Addition of concrete mass to the overflow weirs: \$ 4,581,000.

Additional evaluation is necessary to assess the structural stability of the North Dam. It is possible that, as the result of this assessment, the North Dam also requires rehabilitation works to satisfy the LRIA, which have not been included in the cost estimates presented above.

Two options were considered for rebuilding the dam: concrete weir and earth embankment with an additional sluiceway structure. These options would allow satisfying the requirements of the LRIA. As in the case of the rehabilitation alternative, the rebuilt dam would require the spill capacity from the North Dam to safely pass the IDF. The stability of the North Dam would need to be assessed and it could potentially need rehabilitation works to ensure that this dam also satisfies the requirement of the LRIA. The estimated costs of the two rebuilt options are:

- New concrete overflow weir \$ 6,209,000
- Earth embankment and new sluiceway structure: \$ 3,960,000.

Further consideration of these alternatives is required, including public consultation. It is recommended that these are included in the EA process initiated in 2016. A more detailed investigation program to determine the concrete condition of the overflow weir and its foundation condition are recommended prior to selecting the preferred alternative. These investigations and analyses will be required to confirm the feasibility of any of the rehabilitation options.

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1.0 INTRODUCTION

The Howson Dam, located north of Highway 86 in the Township of North Huron, was built in approximately 1920 (South Section) and 1966 (North Section). The dam is located on the North Branch of the Maitland River (North Maitland River) and was originally built to prevent flooding and to create a reservoir for recreational use. Water levels at the reservoir are managed by operating stop-log sluices in the north section of the dam.

The Township of North Huron retained KGS Group to carry out a design services for the stability assessment on the South Dam of the Howson Dam. The stability assessment is one component of a dam safety management system which is developed in order to ensure safe management of the dam throughout its life cycle. The scope of work for this project includes the assessment of the stability of the South Dam considering two conditions: with and without the bridge at the site in place. It must be noted that the scope does not include an assessment of the condition of the bridge or analyses of its strength and stability.

As part of the assessment, KGS Group engineers carried out a visual inspection of the structures, features of geological significance, flow control equipment, and the hydrology of the site and surrounding area.

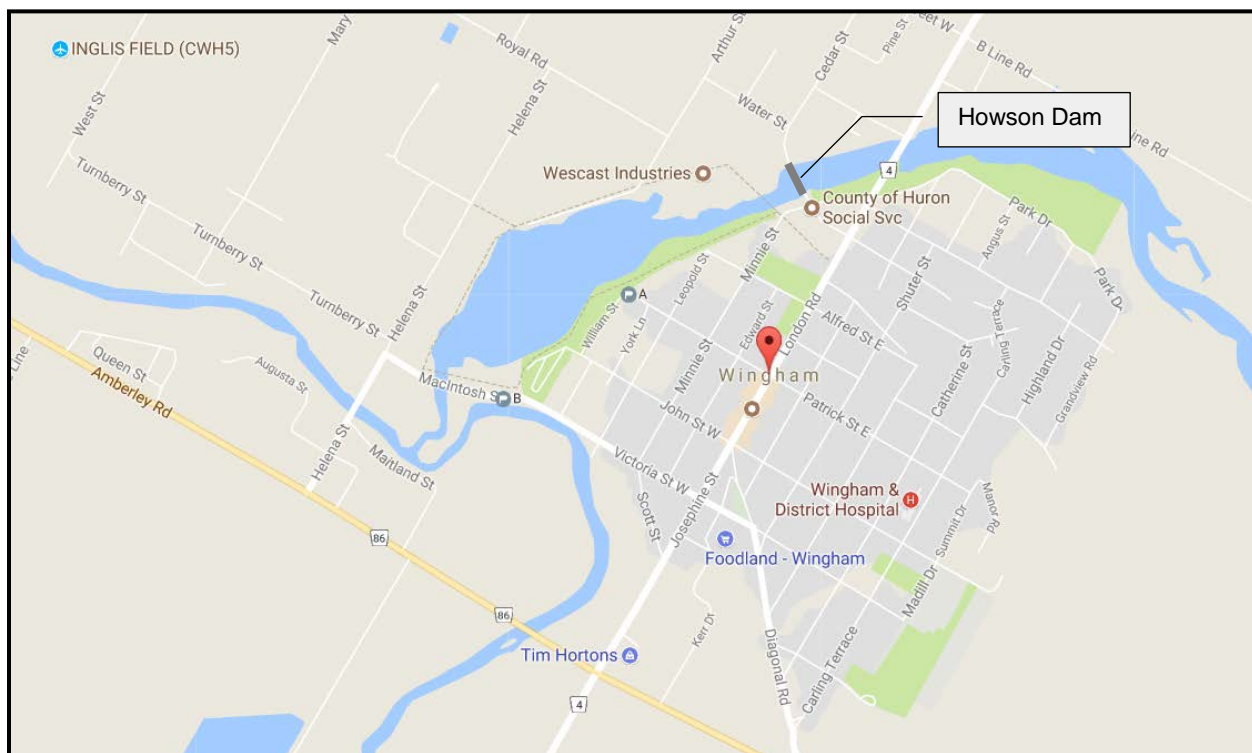
This report presents the findings and results of stability assessment on the South Dam and provides recommendations.

The dam stability assessment has been completed by KGS Group in accordance with the requirements of the MNRF 2011 Lakes and Rivers Improvement Act Dam Safety Technical Bulletins (hereafter referred to as 2011 LRIA).

The South Dam is approximately 54m long, 6.5 m high and has four sluice bays, each with a sill level at approximately El. 309.25 m. This elevation was obtained from the document “Proposed Repairs to the Howson Dam” prepared by BM Ross and Associates Limited in 2015 (BM Ross 2015). The top elevation of the deck of the structure is at El. 312.48 m (geodetic elevation provided by the Township of North Huron). A structure inspection report prepared by BM Ross and Associated Limited in 2013 – Report No. 010 (BM Ross 2013a) indicates that the four bays, from north to south, were 10.6 m, 11.5 m, 10.8 m, and 10.7 m in length.

Figure 1-1 shows the location of the Howson Dam

FIGURE 1-1
GENERAL LOCATION OF THE HOWSON DAM (GOOGLE MAPS IMAGE)



2.0 BACKGROUND INFORMATION

2.1 GENERAL

In the report submitted in May 1965 by Crysler, Davis & Jorgensen Ltd. Consulting Engineers, it was indicated that the ogee section of the sluiceway (South Dam) was spalled and spalling was observed in all piers, too, but they appeared to be structurally sound.

The deteriorated concrete condition of the south dam was further reported by B.M Ross and Associates including the inspection results and report carried out by Atkinson Davies Inc in December 1984. Nine concrete core samples were taken from superstructure and substructure of south sluiceway by Atkinson Davies. Given the conditions of the concrete, negligible or zero concrete compression strength was noted in the report of Atkinson Davies inc. Severe delaminated /spalled concrete areas were identified in the report of B.M Ross and Associates for both of the bridge and the south dam. Consequently, a 3-tonne live load limit on the bridge was proposed by B.M Ross and Associates. The reports also discussed alternatives of remedial measures to the structure, that were developed by B.M Ross and Associates in October 1985. These alternatives corresponded to options for reconstructing the dam.

A document provided by the Township of North Huron, referring to the 2013 Asset Management Plan and the status of the Howson Dam project indicates that the bridge over the dam was closed to vehicular traffic, approximately since 1999. The document refers to the poor condition of the dam and the previous recommendations for repairs. It mentions that the MNRF has suggested the potential need for application under Section 16 of the LRIA, before approval of the dam repairs. The document also discuss the head pond levels and the fact that flashboards cannot be installed in the present conditions, and mentions discussions that have taken place regarding hydro generation potential at the site.

The Township also provided correspondence from BM Ross Engineering that refer to a revised plan of the repairs to the dam. The letter refers to a cost of approximately \$485,000 plus HST for re-facing and restoration of the upstream concrete sill and patch restoration on the piers. The letter does not provide details but refer to reports issued in 2015. These were not available for review. The letter does indicate that stability analyses had not been completed for the structure. Subsequent to this letter, there were other communications with MNRF and with BM Ross. In

those it is suggested that the proposed works might exceed MNRF's definition of "minor works" and, therefore, require approval under the LRIA.

DRAFT

3.0 INSPECTION AND DEFICIENCIES

3.1 RECORD OF OBSERVATIONS

As part of this dam stability assessment, KGS Group engineers carried out a visual inspection of the south dam on November 22, 2017. The weather was sunny to partly cloudy, and the temperature was about 3° C. Photographic records of the inspection were made.

The detailed structural and geotechnical observations were recorded on Dam Safety General Inspection (DSGI) sheets provided in Appendix C.

3.2 DAM STRUCTURE CONDITION ASSESSMENT

3.2.1 General

The South Dam is made up of concrete overflow weirs and piers/abutments. A bridge deck is supported on the top of the piers/abutments. The various elements of the inspected structures are described below.

3.2.1.1 Concrete Overflow Weir

The concrete overflow weir is a concrete mass structure and is in poor to very poor condition. Large area of freeze/thaw spalling/erosion are found at upstream face, top and downstream side of the structure as shown in photos Photo 3.2.1 and Photo 3.2.2.

PHOTO 3.2.1
UPSTREAM VIEW OF OVERFLOW WEIR



PHOTO 3.2.2
TOP AND DOWNSTREAM VIEW OF OVERFLOW WEIR



3.2.1.2 Piers / Abutments

The piers/abutments are concrete mass structures and are in very poor condition. The pier noses were found to have large spalled concrete as shown in photo 3.2.3. The side face of the pier shows severe spalling / delamination (see photo 3.2.4). As shown in photo 3.2.5, the downstream sides of the piers are cracked. Large spalled concrete is also found at the abutments (see photo 3.2.6).

PHOTO 3.2.3
SPALLED PIER NOSE

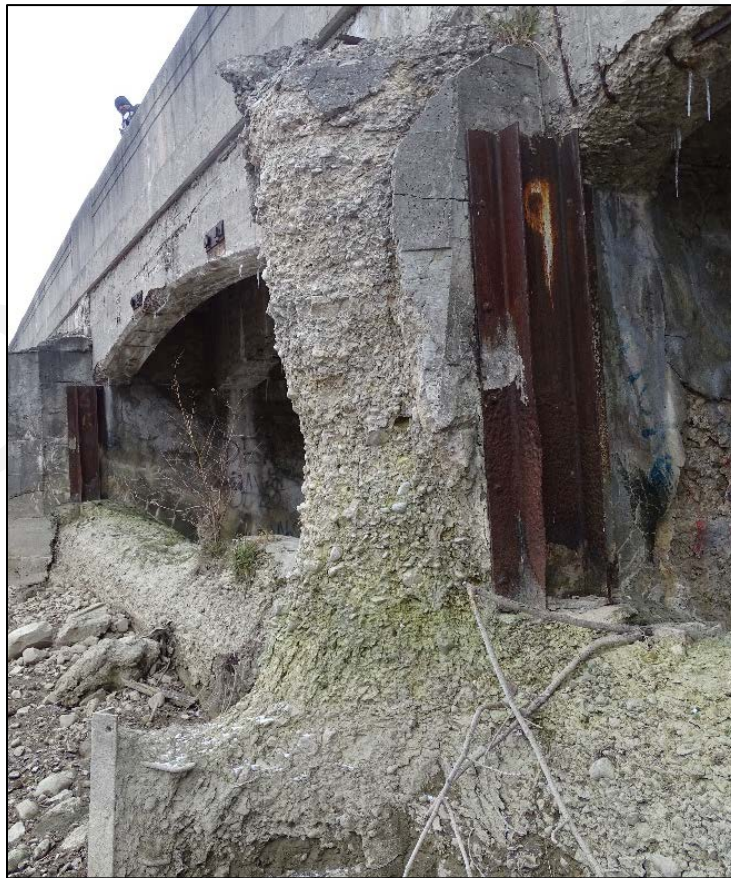


PHOTO 3.2.4
VIEW OF PIER SIDE FACE



PHOTO 3.2.5
VIEW OF PIER DOWNSTREAM SIDE



PHOTO 3.2.6
VIEW OF ABUTMENTS



3.2.1.3 Bridge Deck

The bridge deck consists of deck slab and concrete girders. They are structural beam elements and are in very poor condition. The concrete deck has leakage and exposed corroded reinforcing bars. The bottom reinforce bars of the girders are largely exposed and severely corroded. The girders also show large areas of spalling concrete. (See Photo 3.2.7 and Photo 3.2.8).

PHOTO 3.2.7
BOTTOM VIEW OF THE BRIDGE DECK AND GIRDERS



PHOTO 3.2.8
EXCESSIVE REBAR CORROSION AT GIRDERS



3.2.2 Field Inspection Conclusions

A concrete coring program was carried during the structural assessment of the dam (refer to 2018 Geotechnical Site Investigation Report by KGS Group). The core logs of the concrete at the top of piers indicate that the concrete is extensively deteriorated with horizontal fractures present throughout the core length. Therefore, the load-carrying capacity and the water tightness of the concrete are expected to be significantly reduced.

Based on the visual inspection, the south dam is in very poor condition. Large areas of freeze/thaw spalling and delamination are identified for concrete overflow weirs, piers and abutments. If the concrete condition within the body of the overflow weirs is similar to the concrete obtained from core logs, the integrity of the concrete dam may no more reliable. Therefore, the south dam is required to be repaired as soon as possible.

The bridge deck is a reinforced concrete beam structure and its strength is relied on the reinforced bars and the concrete. Since the reinforced bars for the girders are largely exposed to weather and experienced severe corrosion, the strength reduction of the reinforced bars is expected. Due to the potential horizontal fractures and extensively deterioration within the concrete at the girders and decks, the structural capacity of the girders and decks is compromised. Moreover, it is not possible reasonably to estimate the load-carrying capacity of the girders/ deck slabs based on the deteriorated concrete condition. Although an analysis of the bridge or its members has not been conducted, the observations from the site visit suggest that the further use of the bridge may pose a risk to the public. The safety of the bridge should be addressed.

The dam appears to be founded on the soil, based on the report of the B.M. Ross and Associates. Since the downstream apron and its cut-off wall was not visible during the presence of water, the condition of potential scour and undermining at the downstream of the overflow weir is unknown.

4.0 STRUCTURAL ANALYSIS

4.1 GENERAL

Assuming the concrete is intact for the south dam; calculations to check the stability of the south dam have been performed. The stability assessment of the south dam is based on the following:

- Drawings provided by the Township of North Huron. The drawings are listed in Appendix A.
- Field measurements taken as part of this dam safety assessment.
- Howson Dam - 2018 Geotechnical Site Investigation Report, KGS Group.
- Howson Dam – 2017 Dam Safety Assessment Report, KGS Group.

The structures were analyzed based on the 2011 LRIA Technical Bulletin “Structural Design and Factors of Safety”. KGS Group assessed the stability of the structures, and compared the results to the LRIA acceptance criteria. The structural sections examined were as follows:

- Overflow Weirs
- Piers with Bridge Deck
- Piers without Bridge Deck (Assuming The Bridge Deck Is Removed).

The stability of the structures was calculated using the “gravity method”. By this method, the dam is assumed to be a two dimensional rigid block. All loads are carried by gravity to the underlying soil, and the foundation pressure distribution is assumed linear. This is also known as rigid body analysis. The stability analysis was assessed at the concrete/soil interface, which is typically the weakest plane of failure.

4.2 GENERAL PARAMETERS

The load parameters and acceptance criteria for the stability assessment were based on 2011 LRIA. KGS Group used stability parameters with no cohesion based on the 2011 LRIA, our previous experience and overall industry practice. As per 2011 LRIA, “usual”, “unusual”, “earthquake” and “post-earthquake” loading combinations were analyzed.

The major parameters used for the dam stability analyses are provided in the following Table 4.2-1.

TABLE 4.2-1
GENERAL PARAMETERS USED FOR ANALYSES^{/1/}

INCREMENTAL CONSEQUENCE CATEGORY	HIGH
Water Unit Weight	9.81 kN/m ³
Friction Angle at Concrete to Soil Interface	23°
Cohesion at Concrete to Soil Interface	0.0 kPa
Concrete Unit Weight (assumed)	23.5 kN/m ³
Concrete Compressive Strength	23 MPa
Factored Foundation Bearing Capacity at Service Limit State (SLS)	300 kPa.

^{/1/} Material properties and shear strength parameters were estimated based on the original drawings and background information.

The south dam is founded on the native sandy silt to silty sand till. The recommended lower bound shear strength parameters at the interface concrete / soil is 23° internal friction angle with zero (0) cohesion.

The test results of the limited solid concrete cylinders show the compressive strength of the concrete to be 23 MPa.

4.3 LOADING

4.3.1 Earthquake

Since the Hazard Classification for the Howson Dam is HIGH, the Design Basis Earthquake (DBE) should have a probability of annual exceedance of 1 in 2,500 years for this dam as specified in Table 1 of the 2011 LRIA Technical Bulletin "Seismic Hazards". The horizontal Peak Ground Acceleration (PGA) is estimated to be 8.34% g based on the 2015 National Building Code Seismic Hazard calculations provided by the National Research Council (NRC).

Pseudo-Static Analysis (Seismic Coefficient) was performed by using a seismic coefficient equal to the PGA expressed as a fraction of gravity in accordance with 2011 LRIA. Earthquake-induced horizontal and vertical inertia forces were simultaneously taken into account for the stability analysis of the concrete structures. The vertical seismic coefficient is scaled from the

horizontal seismic coefficient using a scaling factor in the range of 1/2 to 2/3. Two thirds of the horizontal seismic coefficient was assumed for the vertical seismic coefficient in the calculations. The earthquake-induced hydrodynamic pressure of the reservoir was also considered in the analysis for the spillway and pier. For analysis of the retaining walls, the Mononobe-Okabe formula was used to determine the increase in earth pressure from the backfill.

4.3.2 Ice

The approach to determine the thermal ice load must consider site-specific characteristics and operating information.

For the usual load combination, a load of 75 kN/m was used. An unusual ice load of 83.5 kN/m was estimated for the stability analysis based on the database of the Centre for Energy Advancement through Technological Innovation. (CEATI). For the stability analyses, the ice load was considered to act at 305 mm below the maximum winter operating water level water level.

4.3.3 Water Pressure

The dam is required to resist the maximum normal operating headwater levels for summer and winter. Since there are no data recorded for the historical water levels at the headpond, the maximum summer normal operating water level is estimated to be 310.9 m based on the rating curve. This water level is corresponding to an annual exceedance probability of 10% (recommended by the 2011 LIRA). The winter water level is take at 310.26 m which equals to the top elevation of the overflow weir. The associated assumed tailwater level at the toe of the dam is dry. The estimated IDF water level is at an elevation of 311.9 m (refer to 2017 Dam Safety Assessment Report, KGS Group) for the headwater level and the associated tailwater level at the toe of dams is 310.3 m.

Full uplift, varying linearly from 100% headwater pressure at the upstream face to 100% tailwater pressure at the downstream face, was assumed. Once a cracked plane was determined based on the calculations, crack analysis was performed. The modified uplift was assumed to be full headwater pressure over the length of the crack, varying as a straight line

from full headwater pressure at the end of the crack to full tailwater pressure at the toe. The stress distribution and shear-friction safety factor was calculated along the uncracked portion.

4.3.4 Force Due to Passive Rock Wedge

The dam base appears keyed into the soil as shown on the reference drawings provided in Appendix A. However, the sliding capacity of the possible passive wedge downstream of the key was not taking into account for the dam stability calculations. This is because the calculated passive pressure of the wedge is insignificant by using its gravitational sliding friction resistance in the absence of the cohesion. Note that the cohesion value of the soil cannot be confirmed based on available data.

4.4 ACCEPTANCE CRITERIA

For dam structures with cohesion assumed to be zero, 2011 LRIA outlines the following performance factors summarized in the Table 4.3-1.

TABLE 4.3-1
STABILITY PERFORMANCE FACTORS

LOADING CASE	LOAD COMBINATION			
	USUAL (Summer / Winter)	UNUSUAL (IDF)	EARTHQUAKE	POST-EARTHQUAKE
Sliding Stability Factor (SSF)	1.5	1.3	1.1	1.1
Location of the Resultant	Within Middle-third ^{/1/}	Within Base	May be outside base	May be outside base

^{/1/} For existing dams, it may be acceptable to allow a small percentage of the base to not be in compression if all other performance factors, including the sliding factor of safety, are met and the resultant is within the base of the dam and allowable bearing stresses are not exceeded.

4.5 RESULTS OF STABILITY ANALYSIS

KGS Group has computed stability factors for the six load-combination cases specified in 2011 LRIA. Table 4.5-1 shows the six load cases that were considered for the stability analyses of the

pier and rollway sections individually and for the entire dam as sensitivity analysis. Load Case One is related to the maximum normal operation water level in summer. Load Case Two represents the winter operation water level plus the usual ice loading condition. Load Case Three is for the flood condition (IDF). Load Case Four is the winter operation water level plus the unusual ice loading condition. Load Cases Five and Six are the loading cases for earthquake and post-earthquake condition, respectively.

The stability calculations for the piers were performed with the weight of the bridge deck. However, taking consideration of the potential removal of the existing bridge deck, the pier stability was also assessed without using the weight of the bridge deck. Since the original drawings don't provide the conclusive information for the connections between the piers and overflow weirs, KGS Group performed stability analyses for the individual sections of the weirs and piers as base case. In other words, it was assumed the each weir and pier worked independently to resist the applicable loads. In addition, sensitivity analyses were performed for the entire dam assuming that the piers and weirs worked together. Tables 4.5-2 through 4.5-6 show the summary of the results of the stability analyses. Detailed calculations are provided in Appendix B.

TABLE 4.5-1
PIER AND ROLLWAY LOADING DATA

DATA TYPE	LOADING CASES					
	USUAL		UNUSUAL		EXTREME	
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Head Water Level (H.W.L) (m)	310.9	309.26	311.90	309.26	310.9	310.9
Tail Water Level (T.W.L) (m)	0	0	310.30	0	0	0
Ice Load (kN/m)	---	75.0	---	83.5	---	---
Seismic Coefficient (horizontal)	---	---	---	---	8.34% g	---
Drag Force	---	---	---	---	---	---
Uplift	Full	Full	Full	Full	Full	Full

Legend:

Case 1: Summer Normal Maximum Operating Water Level

Case 2: Winter Normal Maximum Operating Water Level plus Usual Ice

Case 3: Inflow Design Flood (IDF)

Case 4: Winter Normal Maximum Operating Water Level plus Unusual Ice

Case 5: Earthquake Loads in Conjunction with Usual Loading Case 1

Case 6: Post-Earthquake to Consider Modified Uplift Pressures Applied to the Cracked Section

4.5.1 Dam Stability Calculations including Bridge Deck

Table 4.5-2 and Table 4.5-3 show the summary of the results of the base case stability analyses for the pier and overflow weir including the bridge deck in place. Table 4.5-4 shows the results of sensitivity analysis for the entire dam by the combination of the pier and the weir.

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TABLE 4.5-2
RESULTS OF STABILITY ANALYSIS - PIER INCLUDING BRIDGE DECK

LOADING CASE		USUAL		UNUSUAL		EXTREME	
		Case 1 (Summer Normal Water Level)	Case 2 (Winter Normal Water Level + Usual Ice)	Case 3 (IDF)	Case 4 (Winter Normal Water Level + Unusual Ice)	Case 5 (Normal Water Level plus EQ)	Case 6 (Post EQ Condition)
Sliding Stability Factor (SSF)	LRIA Required	1.5	1.5	1.3	1.3	1.1	1.1
	Computed	2.52	2.38	2.53	2.23	1.41	2.52
Location of the Resultant	LRIA Required	Within Mid- Third	Within Mid- Third	Within Base	Within Base	Outside Base	Outside Base
	Computed	Within Mid- Third	Within Mid- Third	Within Base	Within Base	Within Base	Within Base
Location of the Resultant from Toe 'a' (m)		3.4	3.3	3.4	3.3	2.8	3.4
Maximum bearing stress (kPa)	Required	300	300	300	300	300	300
	Computed	235	255	191	261	282	235

Height of Section = 5.67 m
 Base Length of Section = 7.95 m
 Compressive Strength of Concrete f'_c = 20 MPa
 Tensile Strength of Concrete / Rock = 0.0 MPa
 Internal Friction Angle Concrete / Rock = 23°
 Cohesion Concrete / Rock, c = 0.0 kPa
 Uplift = Varies linearly from 100% headwater pressure to 100% tailwater pressure.

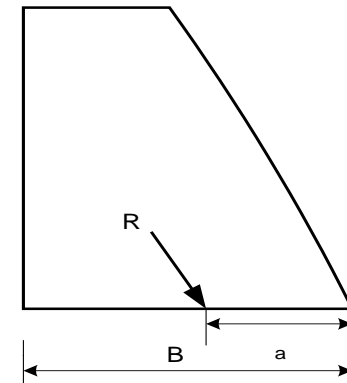


TABLE 4.5-3
RESULTS OF STABILITY ANALYSIS – OVERFLOW WEIR

LOADING CASE		USUAL		UNUSUAL		EXTREME	
		Case 1 (Summer Normal Water Level)	Case 2 (Winter Normal Water Level + Usual Ice)	Case 3 (IDF)	Case 4 (Winter Normal Water Level + Unusual Ice)	Case 5 (Normal Water Level plus EQ)	Case 6 (Post EQ Condition)
Sliding Stability Factor (SSF)	LRIA Required	1.5	1.5	1.3	1.3	1.1	1.1
	Computed	0.85	0.57	1.31	0.53	0.59	0.85
Location of the Resultant	LRIA Required	Within Mid- Third	Within Mid- Third	Within Base	Within Base	Outside Base	Outside Base
	Computed	Within Mid- Third	Within Mid- Third	Within Base	Within Base	Within Base	Within Base
Location of the Resultant from Toe 'a' (m)		3.0	2.3	3.5	2.1	2.6	3.0
Maximum bearing stress (kPa)	Required	300	300	300	300	300	300
	Computed	35	48	34	52	43	35

Height of Section = 3.20 m
 Base Length of Section = 6.20 m
 Compressive Strength of Concrete f'_c = 20 MPa
 Tensile Strength of Concrete / Rock = 0.0 MPa
 Internal Friction Angle Concrete / Rock = 23°
 Cohesion Concrete / Rock, c = 0.0 kPa
 Uplift = Varies linearly from 100% headwater pressure to 100% tailwater pressure.

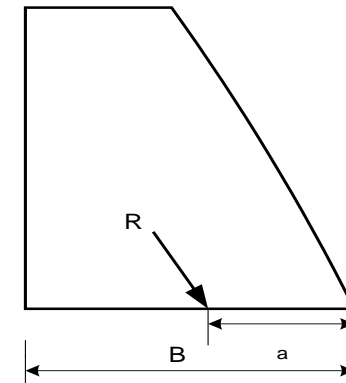
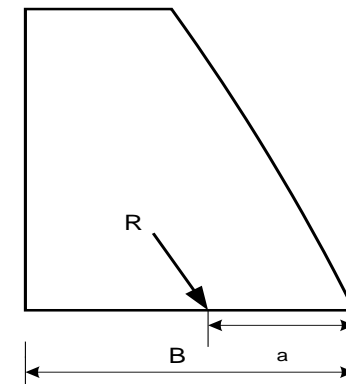


TABLE 4.5-4
RESULTS OF STABILITY ANALYSIS – ENTIRE DAM INCLUDING BRIDGE DECK

LOADING CASE		USUAL		UNUSUAL		EXTREME	
		Case 1 (Summer Normal Water Level)	Case 2 (Winter Normal Water Level + Usual Ice)	Case 3 (IDF)	Case 4 (Winter Normal Water Level + Unusual Ice)	Case 5 (Normal Water Level plus EQ)	Case 6 (Post EQ Condition)
Sliding Stability Factor (SSF)	LRIA Required	1.5	1.5	1.3	1.3	1.1	1.1
	Computed	1.29	1.02	1.76	0.95	0.85	1.29
Location of the Resultant	LRIA Required	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Outside Base	Outside Base
	Computed	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Within Base	Within Base
Location of the Resultant from Toe 'a' (m)		3.2	2.9	3.4	2.8	2.7	3.2
Maximum bearing stress (kPa)	Required	300	300	300	300	300	300
	Computed	65	74	44	78	79	65

Height of Section = 5.67 m
 Base Length of Section = 7.95 m
 Compressive Strength of Concrete f'_c = 20 MPa
 Tensile Strength of Concrete / Rock = 0.0 MPa
 Internal Friction Angle Concrete / Rock = 23°
 Cohesion Concrete / Rock, c = 0.0 kPa
 Uplift = Varies linearly from 100% headwater pressure to 100% tailwater pressure.



4.5.2 Dam Stability Calculations Assuming the Bridge Deck to be Removed

Table 4.5-2 and Table 4.5-3 show the summary of the results of the base case stability analyses for the pier and overflow weir including the bridge deck in place. Table 4.5-4 shows the results of the sensitivity analysis for the entire dam by the combination of the pier and the weir

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TABLE 4.5-5
RESULTS OF STABILITY ANALYSIS - PIER (FOR BRIDGE DECK REMOVED)

LOADING CASE		USUAL		UNUSUAL		EXTREME	
		Case 1 (Summer Normal Water Level)	Case 2 (Winter Normal Water Level + Usual Ice)	Case 3 (IDF)	Case 4 (Winter Normal Water Level + Unusual Ice)	Case 5 (Normal Water Level plus EQ)	Case 6 (Post EQ Condition)
Sliding Stability Factor (SSF)	LRIA Required	1.5	1.5	1.3	1.3	1.1	1.1
	Computed	1.40	1.37	1.16	1.28	0.90	1.36
Location of the Resultant	LRIA Required	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Outside Base	Outside Base
	Computed	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Within Base	Within Base
Location of the Resultant from Toe 'a' (m)		2.9	2.8	2.7	2.8	2.4	2.8
Maximum bearing stress (kPa)	Required	300	300	300	300	300	300
	Computed	163	188	118	188	184	163

Height of Section = 5.67 m
 Base Length of Section = 7.95 m
 Compressive Strength of Concrete f'_c = 20 MPa
 Tensile Strength of Concrete / Rock = 0.0 MPa
 Internal Friction Angle Concrete / Rock = 23°
 Cohesion Concrete / Rock, c = 0.0 kPa
 Uplift = Varies linearly from 100% headwater pressure to 100% tailwater pressure.

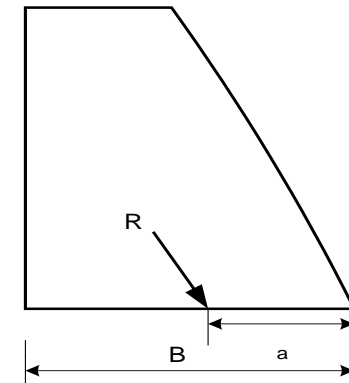
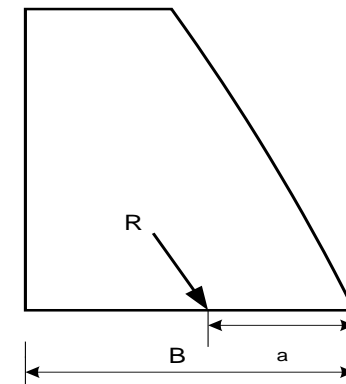


TABLE 4.5-6
RESULTS OF STABILITY ANALYSIS – ENTIRE DAM (FOR BRIDGE DECK REMOVED)

LOADING CASE		USUAL		UNUSUAL		EXTREME	
		Case 1 (Summer Normal Water Level)	Case 2 (Winter Normal Water Level + Usual Ice)	Case 3 (IDF)	Case 4 (Winter Normal Water Level + Unusual Ice)	Case 5 (Normal Water Level plus EQ)	Case 6 (Post EQ Condition)
Sliding Stability Factor (SSF)	LRIA Required	1.5	1.5	1.3	1.3	1.1	1.1
	Computed	0.99	0.77	1.25	0.72	0.68	0.98
Location of the Resultant	LRIA Required	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Outside Base	Outside Base
	Computed	Within Mid-Third	Within Mid-Third	Within Base	Within Base	Within Base	Within Base
Location of the Resultant from Toe 'a' (m)		3.0	2.5	3.2	2.4	2.5	3.0
Maximum bearing stress (kPa)	Required	300	300	300	300	300	300
	Computed	58	67	36	71	66	58

Height of Section = 5.67 m
 Base Length of Section = 7.95 m
 Compressive Strength of Concrete f'_c = 20 MPa
 Tensile Strength of Concrete / Rock = 0.0 MPa
 Internal Friction Angle Concrete / Rock = 23°
 Cohesion Concrete / Rock, c = 0.0 kPa
 Uplift = Varies linearly from 100% headwater pressure to 100% tailwater pressure.



4.6 DISCUSSION OF RESULTS

4.6.1 Piers

The results of stability analyses show that the piers under current dam operation condition meet the 2011 LRIA stability criteria for the sliding stability under all loading conditions. Note that for the assessment the concrete of the piers was assumed to be intact.

For the case with the bridge deck removed, the results of the stability analyses show that the piers do not meet the 2011 LRIA stability criteria for the sliding stability under normal summer, winter, IDF and earthquake loading conditions.

4.6.2 Overflow Weirs

The results of stability analyses show that the weirs do not meet the 2011 LRIA stability criteria for the sliding stability under all loading conditions except the IDF.

4.6.3 Entire Dam – Combination of Piers and Overflow Weirs

Under current dam operation condition, the results of stability analyses show that the entire dam does not meet the 2011 LRIA stability criteria for the sliding stability under all loading conditions except the IDF and post-earthquake loadings.

5.0 ALTERNATIVES TO THE PROJECT

KGS Group conducted a Dam Safety Assessment for the Howson Dam (KGS Group, 2017) and concluded that, in accordance with the 2011 LRIA, the Hazard Potential Classification (HPC) for the dam corresponds to the category of HIGH. This was based on the evaluation of incremental consequences of a dam breach, and applied to both normal or “sunny-day” conditions and flood conditions. The Dam Safety Assessment concluded that the Inflow Design Flood (IDF) for the dam should be the 100-Year Flood, since a breach during a greater flood would not pose significant additional threat to lives, property or environmental or cultural assets. The corresponding peak flow of the IDF is 415 m³/s, and it could be safely passed through the dam in its present condition. However, the stability analysis documented in this report indicates that the dam does not meet the 2011 LRIA sliding stability criteria, and that remedial work would be required to address the dam stability deficiency, required for the application to obtain approval from MNRF under Section 16 of the LRIA.

Two aspects have not been included in the assessment and would need to be considered, depending on the alternative selected. The first one is the stability of the sluiceway structure that constitutes the North Dam. This was not investigated as part of the scope of this study, and would need to be evaluated as this structure is part of some of the alternatives discussed in this section. The second aspect is the stability of the earth embankment between the North Dam and the South Dam. Depending on the alternative selected, if this embankment is part of the preferred solution, its stability would need to be evaluated. An allowance to cover those costs have been included in those cases.

The alternatives evaluated to address the stability deficiency of the South Dam at the Howson Dam are the following:

- Do nothing
- Dam Decommissioning
- Dam Rehabilitation
- Dam Replacement.

Considerations and cost estimates for each of these alternatives are presented in the following sections. These are based on the information available for the site and costs of similar projects. These cost estimates correspond to American Association of Cost Engineering (AACE) Class 4

estimates, with an accuracy of plus or minus 40 to 50%. The feasibility and costs of these alternatives should be confirmed with further studies.

5.1 DO NOTHING

This alternative consists of continuing with the status quo, allowing the structure to continue to deteriorate. The Do Nothing alternative is not considered feasible, as the existing dam does not meet current standards and deficiencies have been identified which need to be addressed. Furthermore, the bridge at the site, although not specifically evaluated as part of this project, shows major signs of deterioration. It is the opinion of KGS Group that the further use of the bridge may pose a risk to the public and that the safety of the bridge should be addressed.

5.2 DAM DECOMMISSIONING

This alternative involves the demolition and removal of the dam structure or part of it, including the bridge deck, and draining the reservoir. Any components of the dam left in place would need to be in a condition that do not pose further risk or require maintenance.

This alternative would require studies, consultations, approvals and permits, including an Environmental Assessment (EA) and approval under Section 16 of the LRIA. It is expected that this option would not be favored by the public, since the EA conducted in 2016 demonstrated that there is strong support from the public for the rehabilitating or repairing the dam. However, it must be noted that the options presented at the time of the 2016 EA did not consider the findings that the stability assessment subsequently revealed.

The decommission alternative would address the deficiencies identified in the structural stability analysis of the dam, and would remove the perceived risk posed by the bridge; but it would also have significant effect on the character of the area and the use of the reservoir by the community. The reservoir would be lost and the exposed area as well as the shoreline would need to be restored. Its aesthetic and recreational importance would need to be considered as part of the evaluation of this alternative.

The removal of the dam would include demolition, river flow diversion and sediment management. An estimate of these construction costs is included in Appendix D. Additional

costs, such as design, engineering and permitting, administration and contingency, which have been estimated as a percentage of the construction cost, are also included in Appendix D. The total estimated cost for this alternative is \$ 436,000. It is estimated that the demolition work would have a duration of 6 months.

The dam decommissioning would require management and monitoring of sediment, to ensure that the sediment is not mobilized and transported to downstream reaches. It would also have environmental effects that need to be evaluated and for which it can be difficult to assign a monetary value. The Township of North Huron has noted that the EA identified two species at risk in the areas upstream and downstream of the dam. This alternative would require follow up monitoring and adaptive management of the area of influence of the dam. It would also require permits and approvals from federal and provincial government agencies. There could be requirements issued by the Department of Fisheries and Oceans (DFO) as part of their review and/or authorization process, which could include water and sediment management, considerations for disposal of material, work restrictions for areas and timing of the works, fish salvage operations, management of fish habitat.

The decision to proceed with this alternative would require careful examination of the multiple aspects described above and would involve an EA process.

5.3 DAM REHABILITATION

This alternative involves applying remedial measures to the dam to establish structural integrity and provide for the safe operation and passage of flows up to and including the IDF.

Two options were considered for the dam rehabilitation alternative:

1. Installation of post-tensioned anchors at the overflow weirs
2. Addition of concrete mass to the overflow weirs.

The feasibility of any of these options requires that the concrete in the overflow weirs be in sound condition and that the foundation of the dam is compact and with no leakage. The compliance with these two requirements could not be confirmed or refuted with the information available for this study. The external signs and appearance of the concrete and the limited

concrete core samples obtained on the piers, as part of this study, suggest that it is likely that the condition of the concrete in the weirs will not be adequate for the rehabilitation options. That, however, would need confirmation with core samples taken on the weirs. Likewise, the type of foundation and the overall condition at the site suggest that the dam foundation might not be completely sound, since there are reports of previous undermining issues being addressed on both the North Dam and the South Dam; but that needs to be confirmed. If those concerns are confirmed, and the dam is in such a state that it is beyond repair, the rehabilitation alternative would not be feasible as it would essentially become a rebuild or replacement of the dam.

For the purpose of estimating a cost for the rehabilitation options, it has been assumed that the foundation is adequate and that the concrete core of the weirs is sound, and only requires removal and replacement of the concrete surface up to a 0.5 m depth. Site investigations, on the weir concrete and the dam foundation, beyond those conducted in this study, are required to confirm the viability of the two potential rehabilitation options. These site investigations have been included in the cost estimate for this alternative.

Another element included in both options for the rehabilitation alternative, and in the corresponding cost estimates, is the removal of the bridge deck and the upper portion of the piers. KGS Group is of the opinion that the bridge in its present condition would be a safety hazard for the works included in the rehabilitation alternative.

In both options for the dam rehabilitation alternative, the North Dam is maintained, to provide spill capacity. This capacity, supplemented by the discharge provided by the overtopping of the rehabilitated portion of the dam, would allow safe passage of the IDF with a minimum of 0.5 m of freeboard with respect to the top of the North Dam (El. 311.9 m). Stability requirements for the North Dam, with respect to 2011 LRIA, have not been evaluated. It is possible that this dam requires some remedial measures to satisfy these requirements; but these have not been included in this analysis.

The first option evaluated for rehabilitating the dam is the installation of post-tensioned anchors at the weirs to improve the dam stability. The dam would be a similar structure to the present one, without the bridge deck and the upper portion of the piers. The top level of the weir would be El. 310.0 m. This alternative is, in general, cost effective, easy to construct and requires

minor maintenance. As previously indicated, for it to be feasible, the concrete body of the existing weirs must be reasonably intact and the soil foundation to approximately 15 m below the ground must be able to carry the post-tensioning design force. If the concrete in the weirs is similar to that revealed by the limited concrete coring obtained at the piers, its condition is deteriorated and is not appropriate for the installation of the post-tensioned anchors.

Appendix D shows a cost estimate for this rehabilitation option with a total value of \$2,869,000. It includes construction costs for removal of damage concrete in the weirs (up to 0.5 m from the surface), installation of post-tensioned anchors, cofferdam and works to divert water from the area of work, using the North Dam, and demolition of the bridge deck and part of the piers. General costs, such as mobilization, demobilization, site investigations, environmental program, material quality control, site restoration are included, as a percentage of the work activities previously listed. The estimate also includes costs for design, engineering and permitting, overhead and administration as well as a cost contingency, which were estimated as percentages of the construction cost.

The second rehabilitation option is the addition of mass to the overflow weir. This can be achieved by removing the deteriorated concrete at the surface of the weir (up to 0.5 m from the surface) and placing new concrete around the cross-section of the existing weir. The new concrete would result in a bigger structure than the present one, with sufficient mass to satisfy the stability requirements. The top of the weir would be El. 310.0 m. For this option to be feasible, the concrete body of the existing weir must be reasonably intact. Otherwise, the removal of the deteriorated concrete could result in demolishing the entire weir. Similarly, if the foundation is not sound, the repair works could require removal of an extensive part of the structure. In both cases, this option would change to removal of the dam and/or dam replacement.

The dam rehabilitation by addition of mass, if feasible, will in general involve more construction activities than the installation of post-tension anchors. This reflects in greater construction costs, as well as increased cost of the activities estimated as a percentage of it. The estimated cost for this option is \$4,581,000 and it is provided in Appendix D.

5.4 DAM REPLACEMENT

This alternative consists of replacing the existing dam with a new dam constructed at the same location. It would involve water diversion, demolition of the existing bridge and dam, investigation of the foundation condition and properties, and building of the new structure. The new dam would satisfy the stability requirements, in accordance with the 2011 LRIA. It also will, in conjunction with the North Dam, provide adequate spill capacity to safely pass the IDF with a minimum of 0.5 m freeboard with respect to the top of the North Dam (El. 311.9 m). As indicated in Section 5.3, the stability requirements for the North Dam have not been assessed and it is possible that further work is required to ensure that this structure satisfy the requirements of 2011 LRIA.

Two options were considered for the Dam Replacement alternative:

1. Concrete weir
2. Earth embankment with an additional sluiceway structure

The first dam replacement option consists of maintaining the North Dam and replacing the South Dam with a concrete weir across the river. The weir would extend from the south bank to the abutment of the North Dam. It would be built up to El. 310.0 m, to maintain historical water levels in the reservoir. The cost estimates for this option are shown in Appendix D and amount to \$6,209,000. They include construction costs as well as design, engineering, permitting, overhead and project management by the Township and contingency costs, which were estimated as percentages of the construction cost.

The second dam replacement option consists of maintaining the North Dam and replacing the South Dam with an earth embankment and a new sluiceway structure, of a similar size to the North Dam. The new sluiceway structure would provide the required additional spill capacity to ensure safe passage of the IDF with a minimum 0.5 m of freeboard with respect to the top of the North Dam. It includes provision of a winch mechanism to allow operation of the sluiceway structure in response to floods. The crest of the proposed new dam would be at the same level as the North Dam (El. 311.9 m). Since the new dam would consist of an earth embankment, it will be vulnerable to a failure if it is overtopped. The estimated cost of this alternative is included in Appendix D and amounts to \$3,960,000.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the stability analyses, the entire dam does not meet the 2011 LRIA sliding stability criteria. Remedial work is required to address the dam stability deficiency.

The bridge at the Howson Dam is currently closed to vehicle traffic; but it is accessible to pedestrian use. Although an analysis of the bridge or its elements was not part of the scope of work, and has not been completed, the information obtained from the limited concrete cores, and the site observations, suggest the bridge being structurally deficient. It is our opinion that the further use of the bridge may pose a risk to the public and that the safety of the bridge should be addressed.

The following alternatives for addressing the stability deficiency of the South Dam at the Howson Dam were evaluated:

- Do nothing
- Dam Decommissioning
- Dam Rehabilitation
- Dam Replacement

AACE Class 4 estimates, with an accuracy of plus or minus 40 to 50%, were obtained for these alternatives and are provided in the report.

The do nothing alternative was considered not feasible because it would not address the risk posed by the dam, which does not satisfy the dam safety requirements indicated in the 2011 MNRF for stability, or that of the bridge at its present state of deterioration.

The alternative of dam decommissioning was not ruled unfeasible; but it would require an extensive process of consultation at various levels. It is anticipated, based on the input obtained during the 2016 EA, that it could be opposed by the public. A cost estimate of \$ 436,000 was obtained for this option. This cost does not include some costs that might be related to environmental controls and management of fish population or fish habitat. There are also considerations such as effect on species at risk and on the character of the area and public use of the site for which a monetary value is difficult to assign.

Two options were considered for dam rehabilitation: installation of post-tension anchors and addition of concrete mass. Both alternatives need to be confirmed with site investigations to assess the condition of the concrete in the weirs and the foundation of the dam. The information available suggests that these options will likely be found not feasible after these site investigations. Nonetheless, a cost estimate was prepared assuming that the concrete in the weirs would be found to be sound and would only need removal of damaged concrete up to 0.5 m of depth from the surface. The cost estimate also was based on the assumption of a competent dam foundation. The rehabilitation options, if feasible, would ensure that the South Dam satisfies the stability requirements of the LRIA. The rehabilitated dam, in conjunction with the North Dam would allow safe passage of the IDF in accordance with the requirements by the LRIA. The estimated costs of the two rehabilitation options are:

- Installation of post-tensioned anchors at the overflow weirs: \$ 2,869,000
- Addition of concrete mass to the overflow weirs: \$ 4,581,000

Additional evaluation is necessary to assess the structural stability of the North Dam. It is possible that, as the result of this assessment, the North Dam also requires rehabilitation works to satisfy the LRIA, which have not been included in the cost estimates presented above.

Two options were considered for rebuilding the dam: concrete weir and earth embankment with an additional sluiceway structure. These options would allow satisfying the requirements of the LRIA. As in the case of the rehabilitation options, the rebuilt dam would require the spill capacity from the North Dam to safely pass the IDF. The stability of the North Dam would need to be assessed and it could potentially need rehabilitation works to ensure that this dam also satisfies the requirement of the LRIA. The estimated costs of the two rebuilt options are:

- New concrete overflow weir \$ 6,209,000
- Earth embankment and new sluiceway structure: \$ 3,960,000

Further consideration of these alternatives is required, including public consultation. It is recommended that these are included in the EA process initiated in 2016. A more detailed investigation program to determine the concrete condition of the overflow weir and its foundation condition are recommended prior to selecting the preferred alternative. These investigations and analyses will be required to confirm the feasibility of any of the rehabilitation options.

7.0 STATEMENT OF LIMITATIONS

7.1 THIRD PARTY USE OF REPORT

This report has been prepared for the Township of North Huron to whom this report has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report. This report has been prepared for the Client to whom this report has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

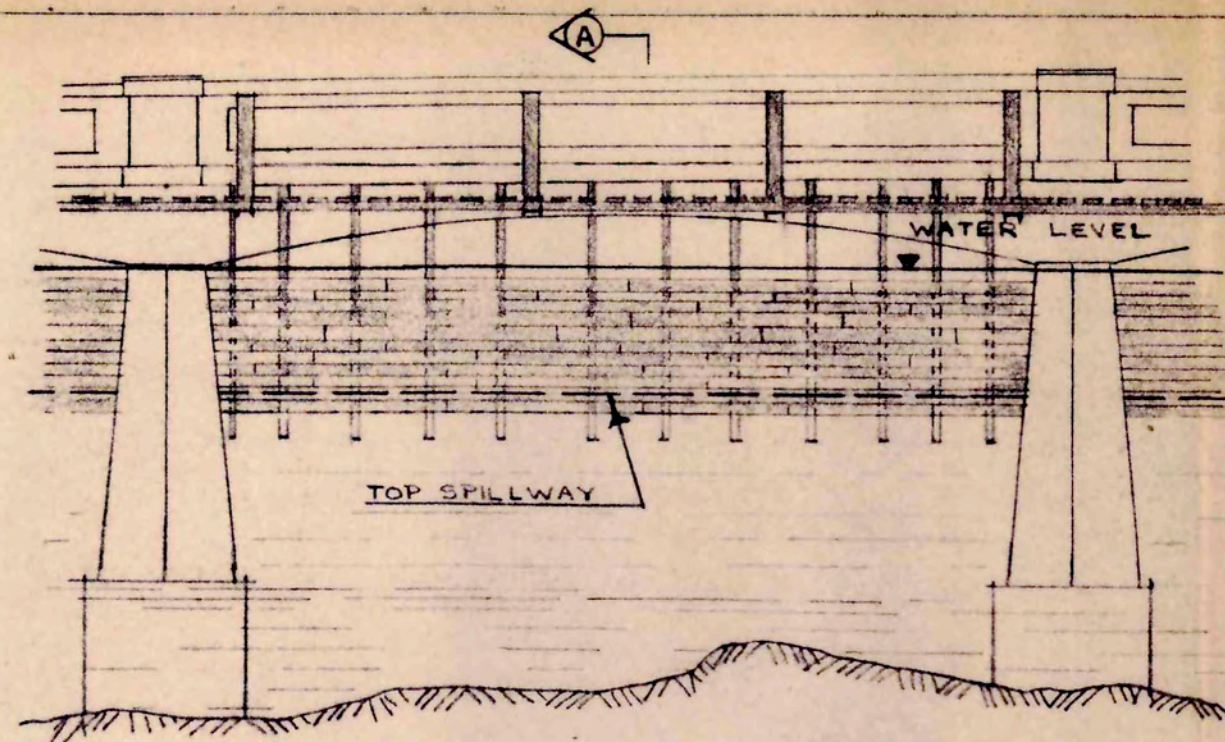
DRAFT

8.0 REFERENCE

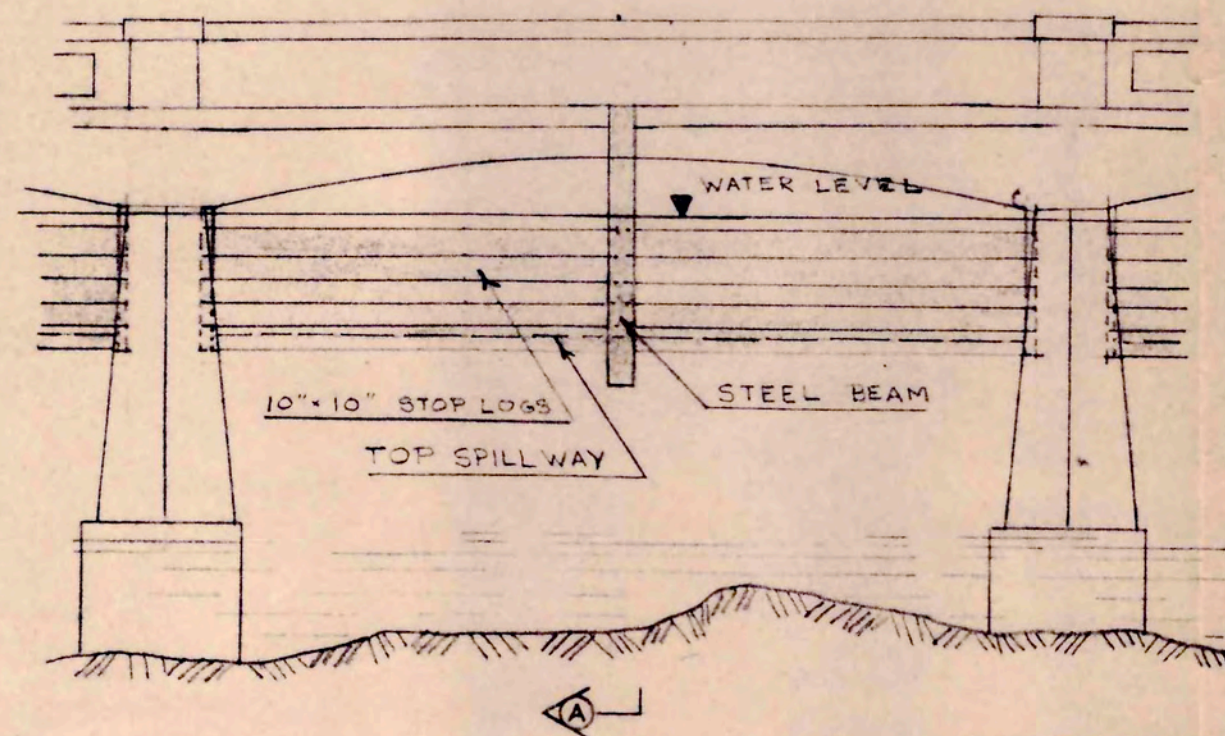
1. Ontario Ministry of Natural Resources (MNR), 2011, Lakes And Rivers Improvement Act- Administrative Guide, Technical Bulletins and Best Management Practices
2. Request for Proposals for the Provision of Consulting Services for the Howson Dam – Dam Safety Assessment, 2017, Township of North Huron
3. Howson Dam Safety Assessment Proposal for Engineering Services, April 2017, KGS Group Consulting Engineers
4. Proposed Repairs To Howson Dam, March 2015, BM Ross and Associates Limited.
5. Inspection Report No. 009, November 2013 BM (Ross 2013a), BM Ross and Associates Limited.
6. Inspection Report No. 010, November 2013 BM (Ross 2013b), BM Ross and Associates Limited.
7. Preliminary Engineering Report, October 1985, BM Ross and Associates Limited.
8. Evaluation of Existing Main Howson Dam Bridge Structure, December 1984, BM Ross and Associates Limited.
9. Report On Howson Dam, May 1965, Maitland Valley Conservation Authority

APPENDIX A
CONSTRUCTION DRAWINGS

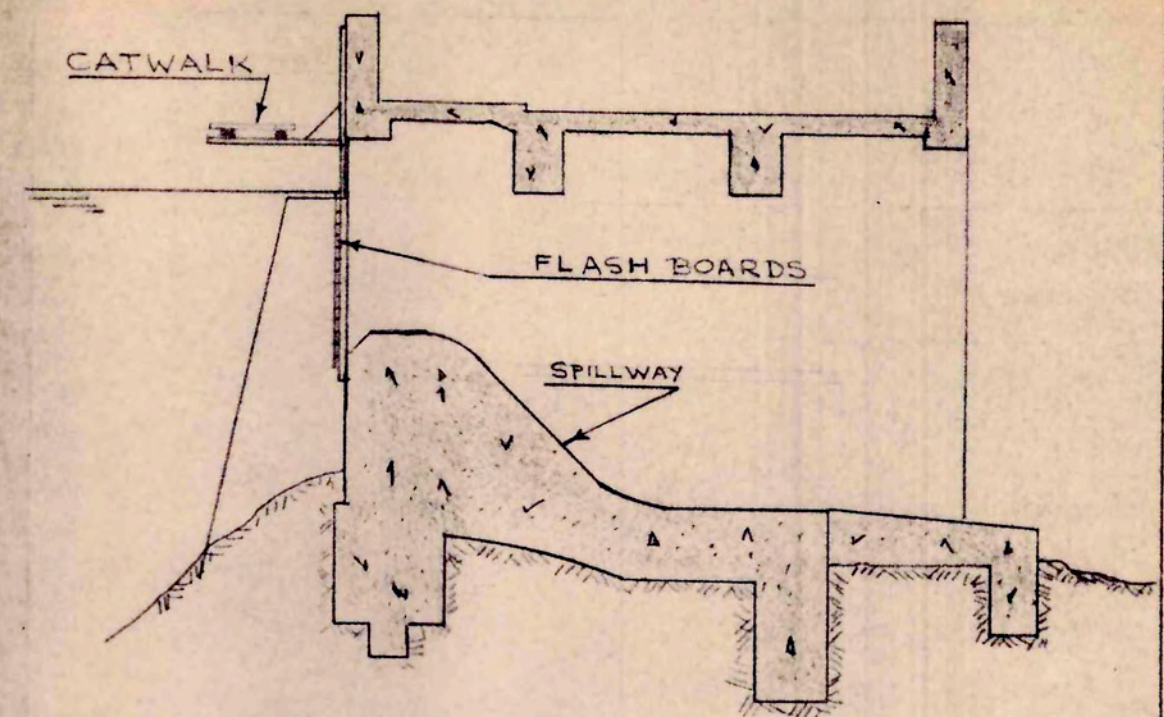
DRAFT



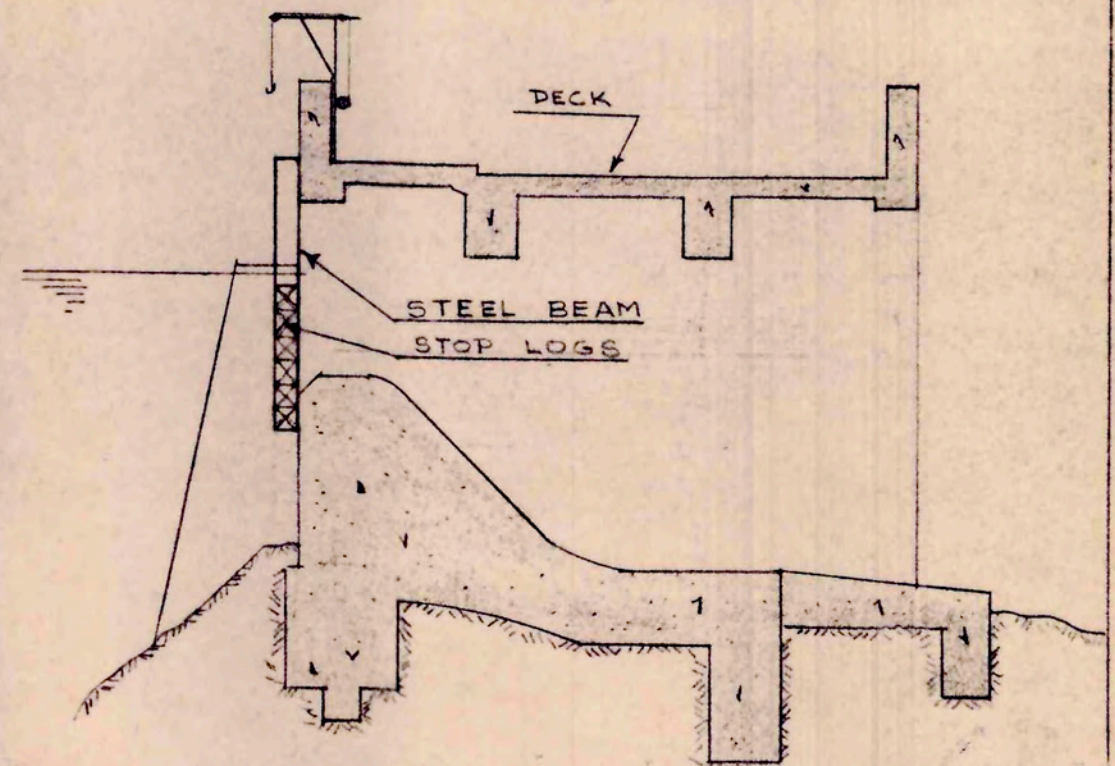
PRESENT



PROPOSED



METHOD



METHOD

SECTION 'A - A'

R.T.

CRYSLER, DAVIS & JORGENSEN, LIMITED
CONSULTING ENGINEERS

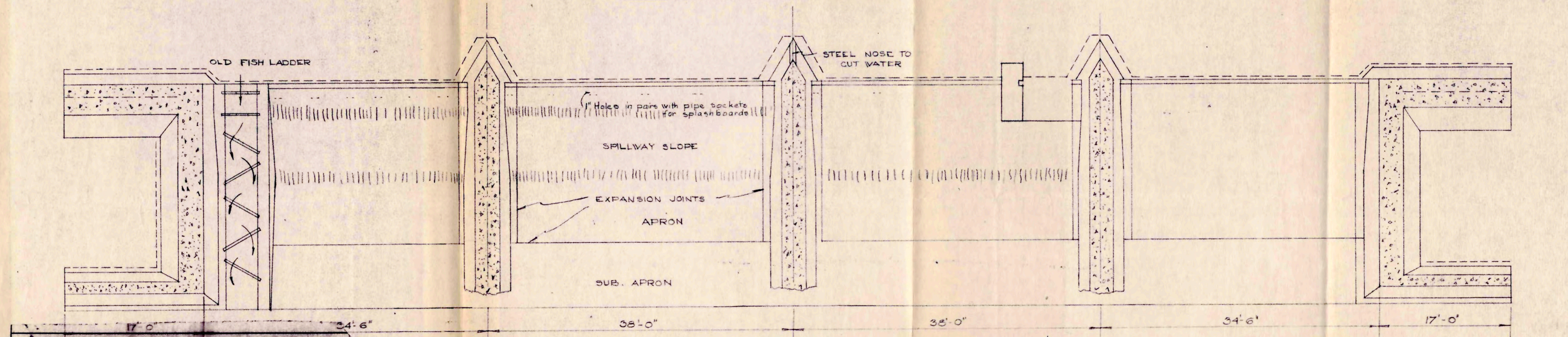
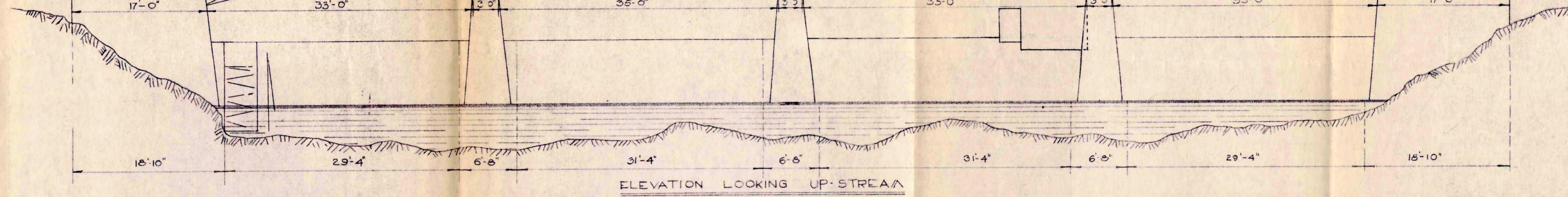
WILLOWDALE, ONTARIO

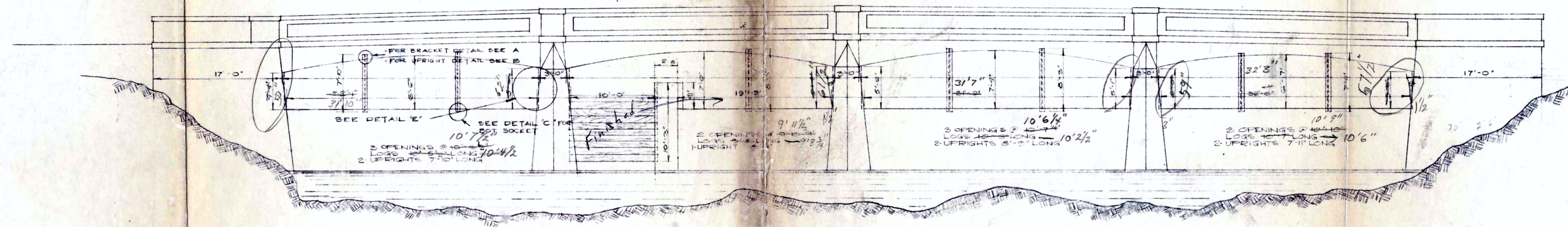


NOTE - DRAWING OF HOWSON
DAM WAS COPIED FROM
PLANS DRAWN BY
FRED B. JAMES, AMEIC.
JUNE 26, 1950.

FIGURE 6

R.T.

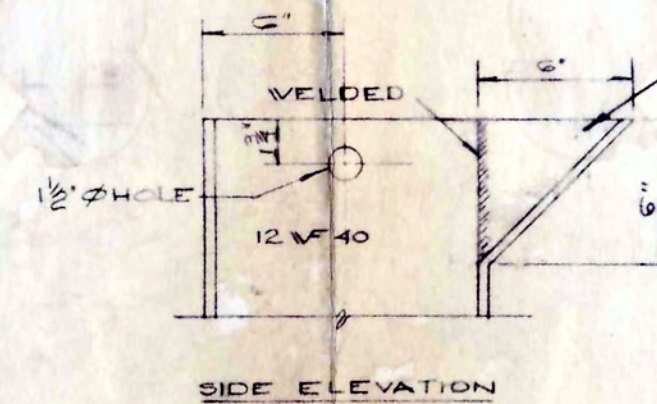




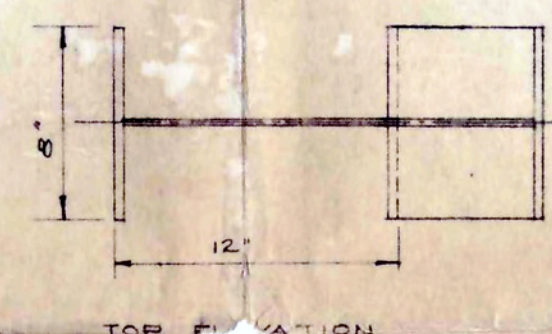
ELEVATION - LOOKING DOWNSTREAM
SCALE 1/8" = 1'-0"



ELEVATION OF UPRIGHT
SCALE 3/4" = 1'-0"

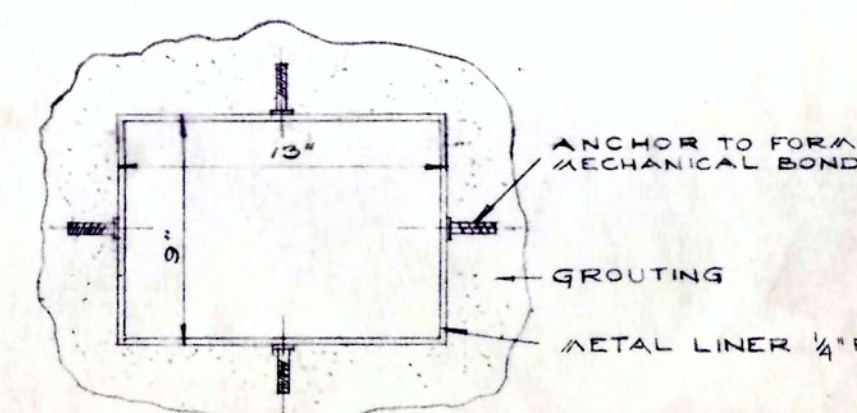


SIDE ELEVATION

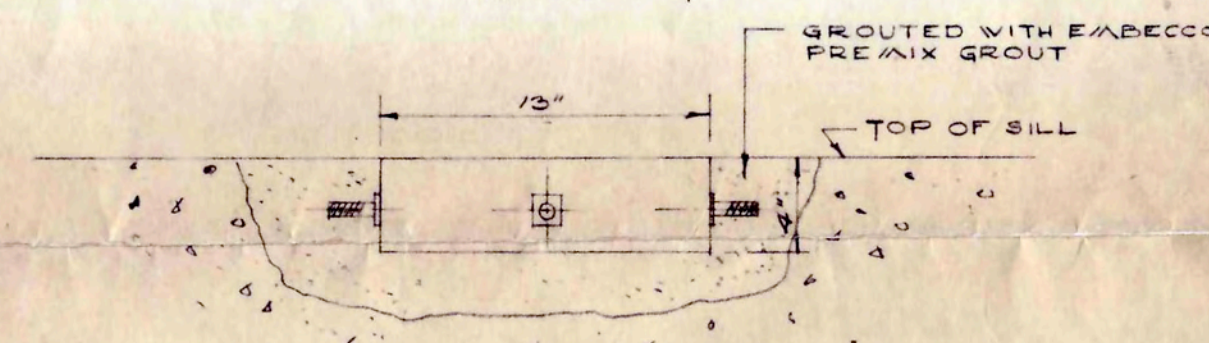


UPRIGHT DETAILS
SCALE 1 1/2" = 1'-0"

DETAIL B

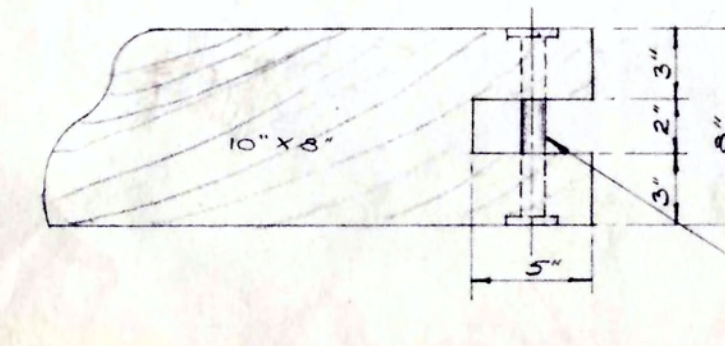


PLAN

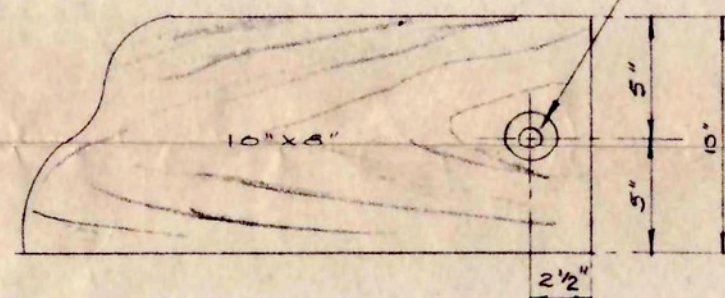


ELEVATION

BOTTOM SOCKET DETAILS - DETAIL C
SCALE 1 1/2" = 1'-0"

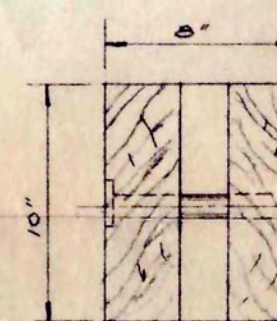


PLAN

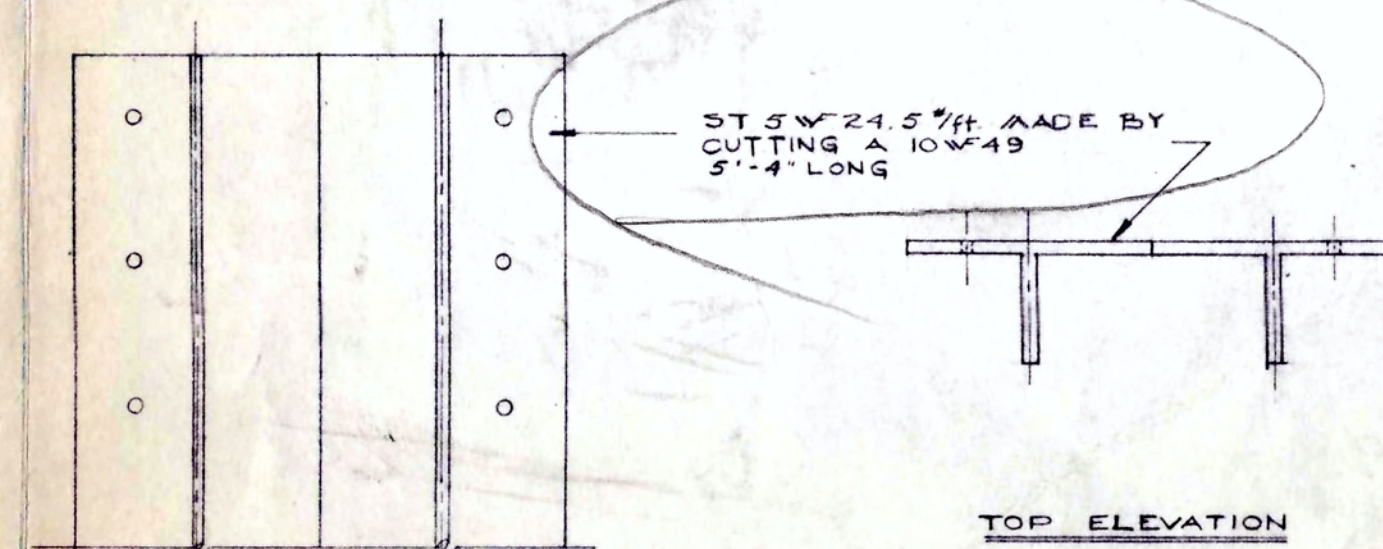


SIDE ELEVATION

STOP LOG END DETAILS
LOGS 10.7' LONG
SCALE 1 1/2" = 1'-0"

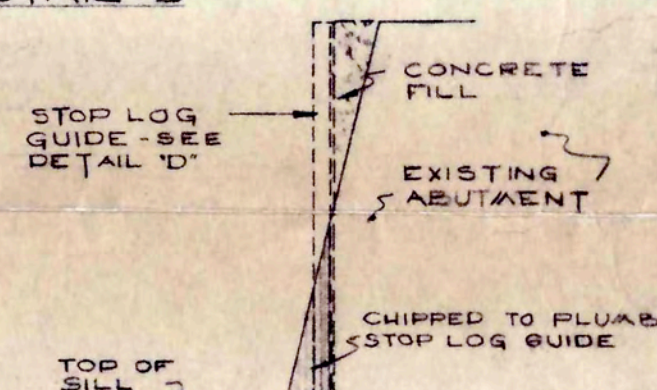


END ELEVATION

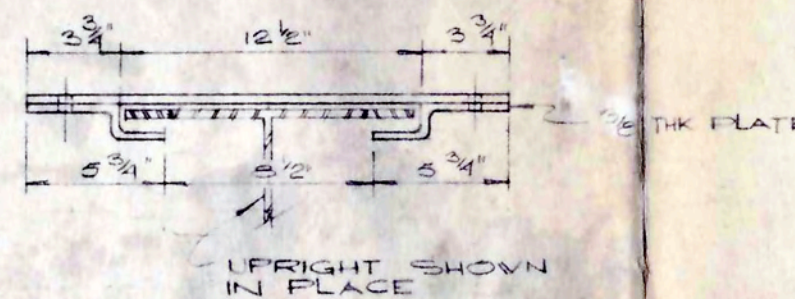


TOP ELEVATION

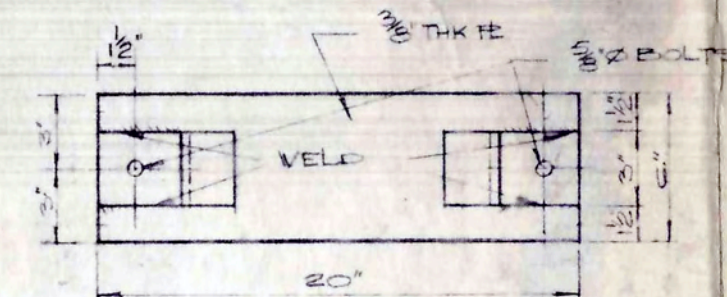
ELEVATION - STOP LOG GUIDE
ON ABUTMENT - DETAIL D



NOTE
CONCRETE FILL BEHIND STOP LOG GUIDE AT ABUTMENTS TO CONTAIN SIDE GULLY DRAIN IN ACCORDANCE TO MANUFACTURER'S SPECIFICATION

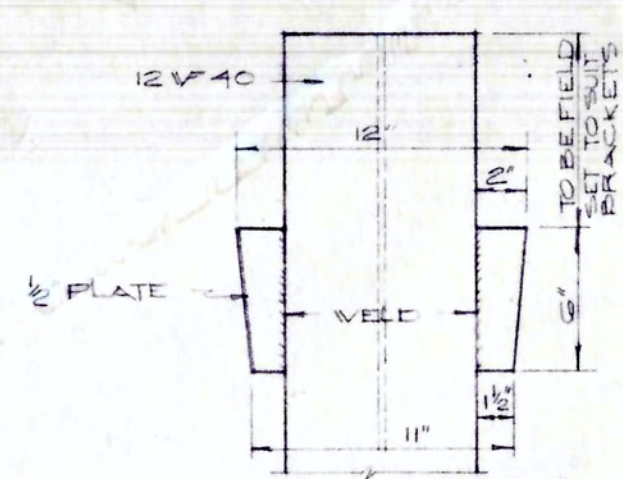


TOP ELEVATION



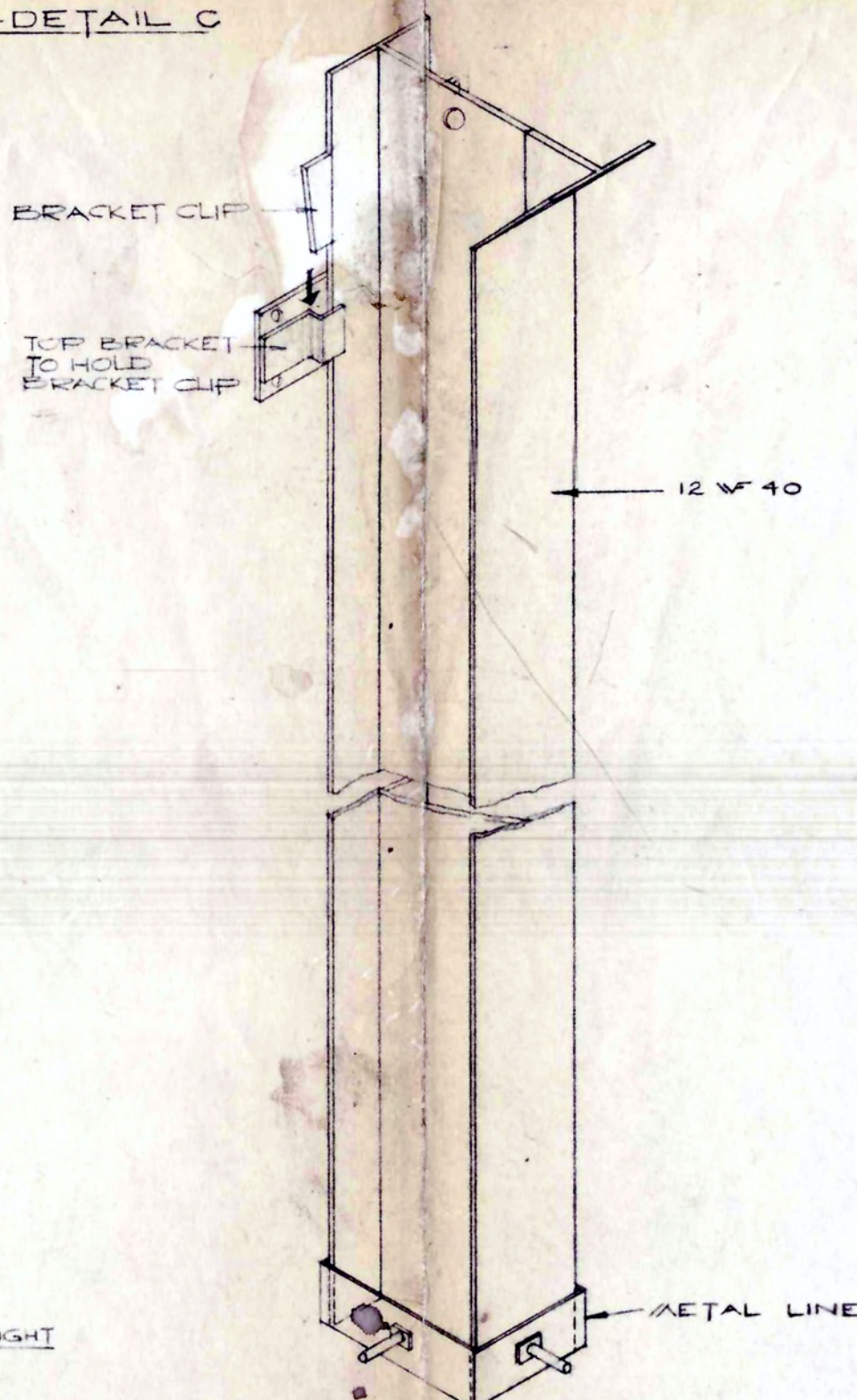
ELEVATION

TOP BRACKET - DETAIL A
SCALE 1 1/2" = 1'-0"

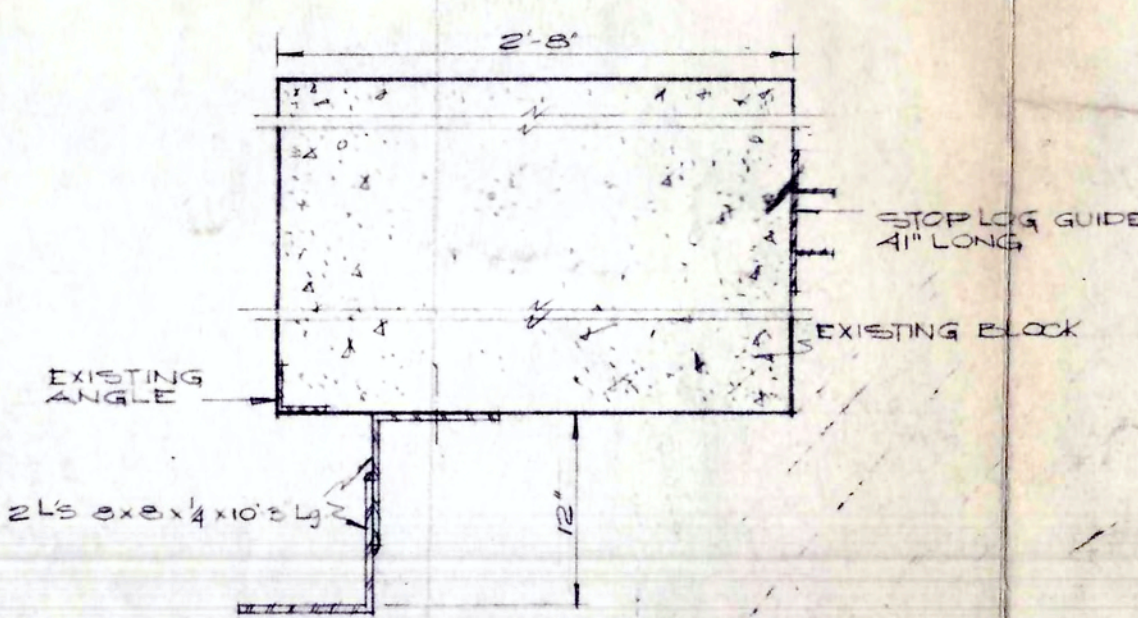


BRACKET CLIPS
SCALE 1 1/2" = 1'-0"

ONE PAIR REQUIRED ON EACH UPRIGHT



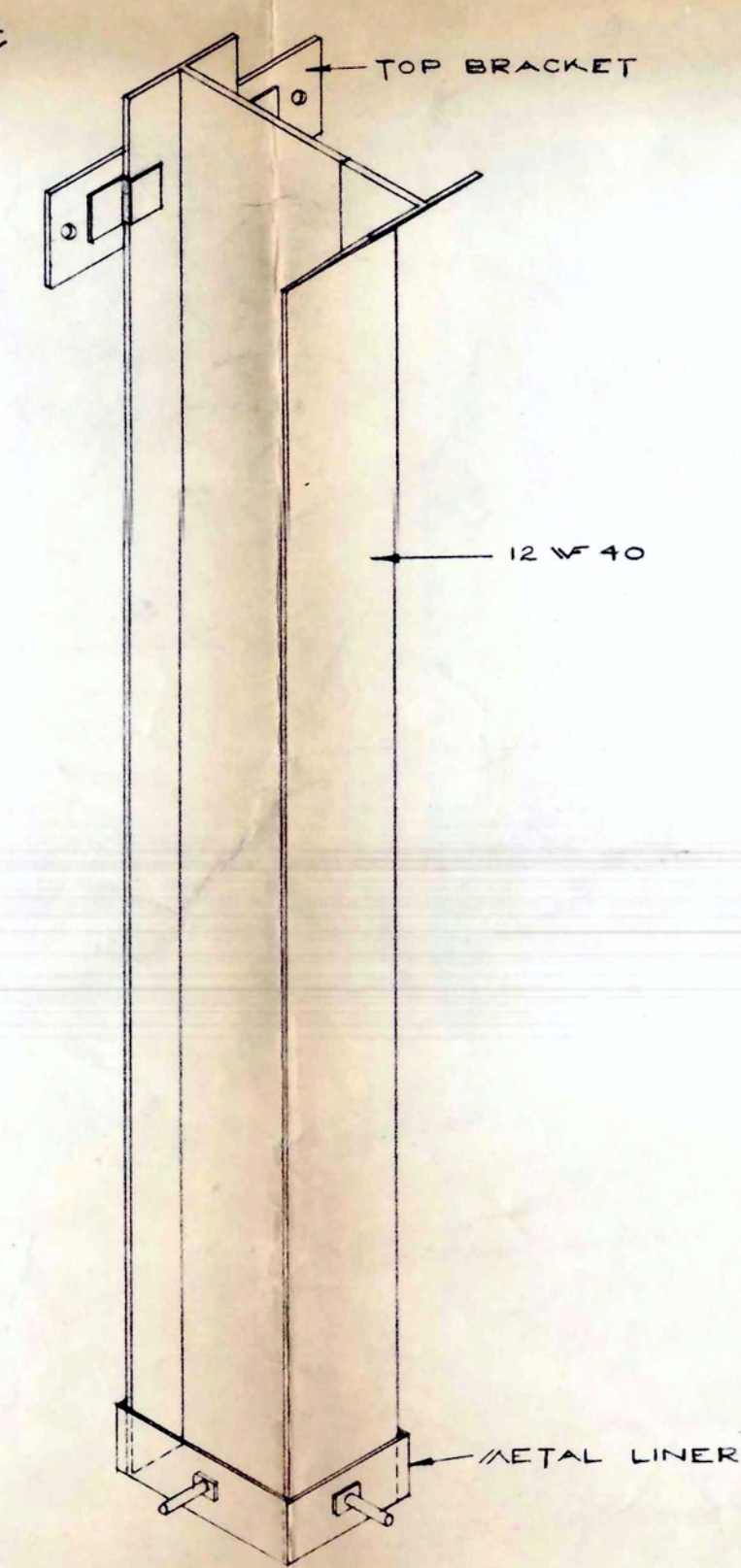
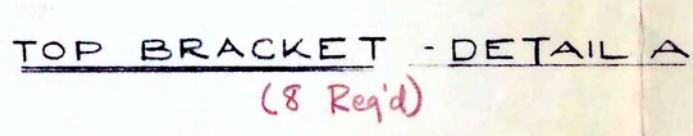
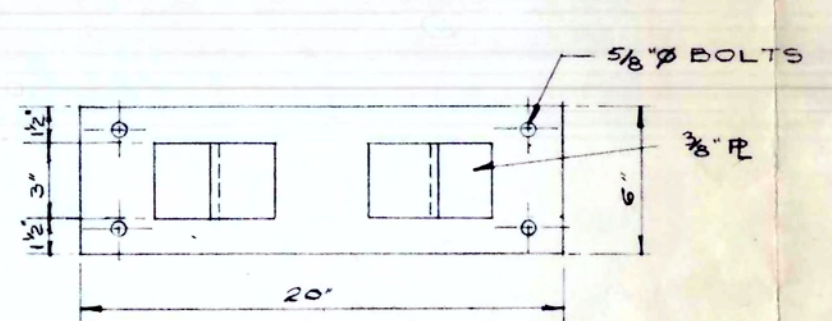
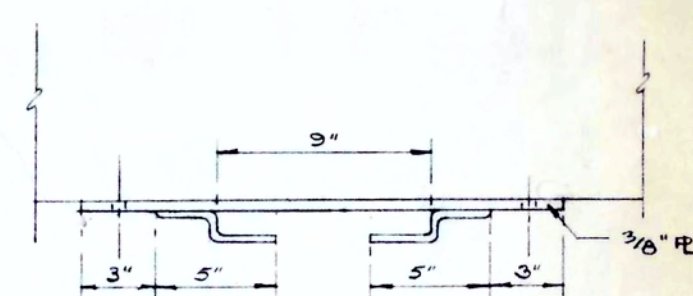
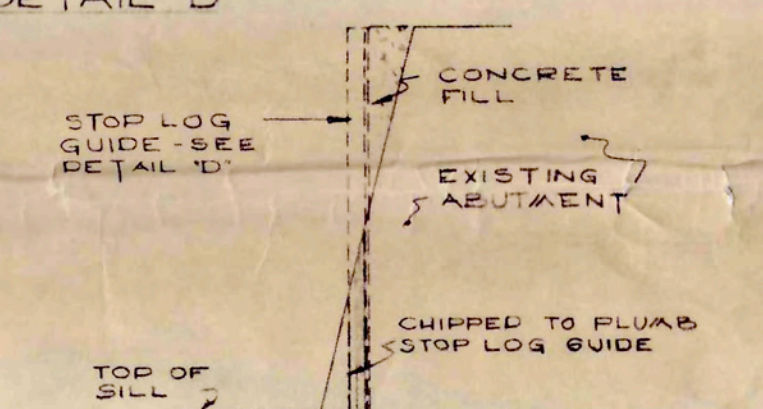
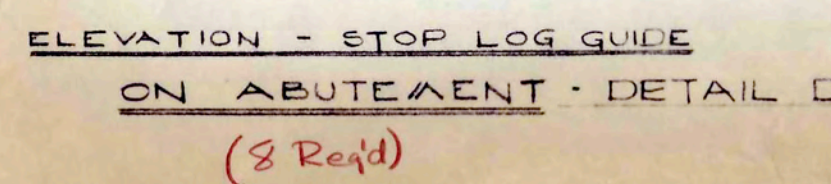
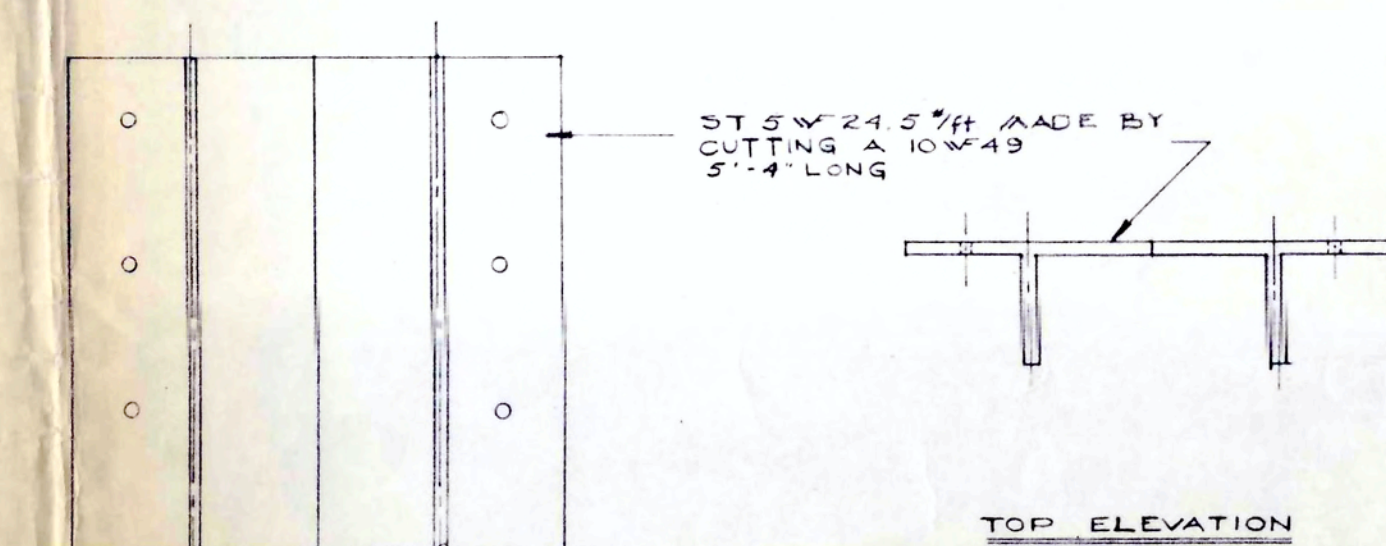
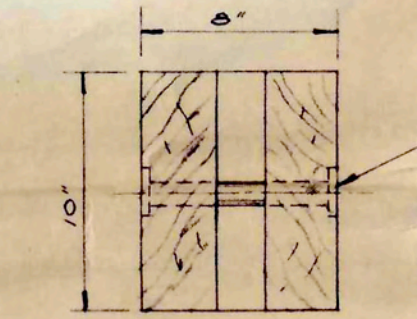
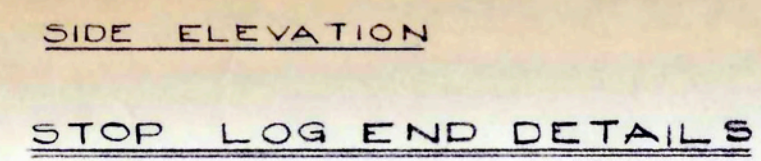
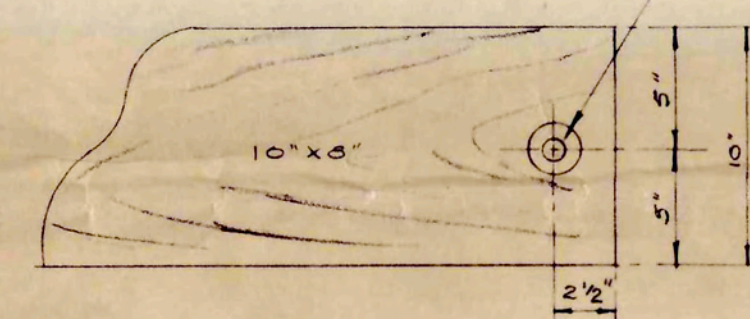
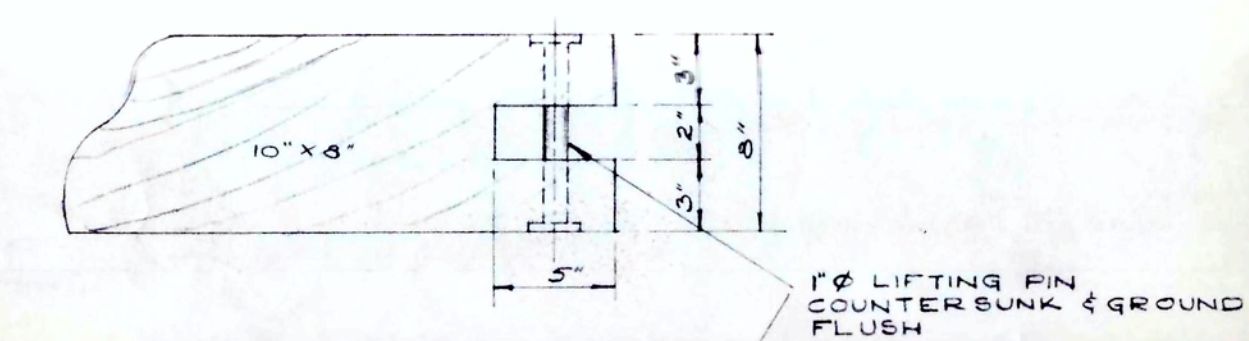
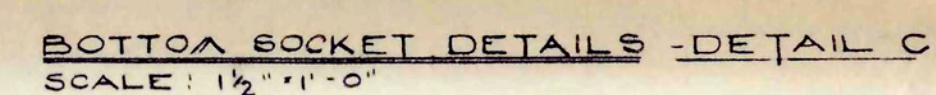
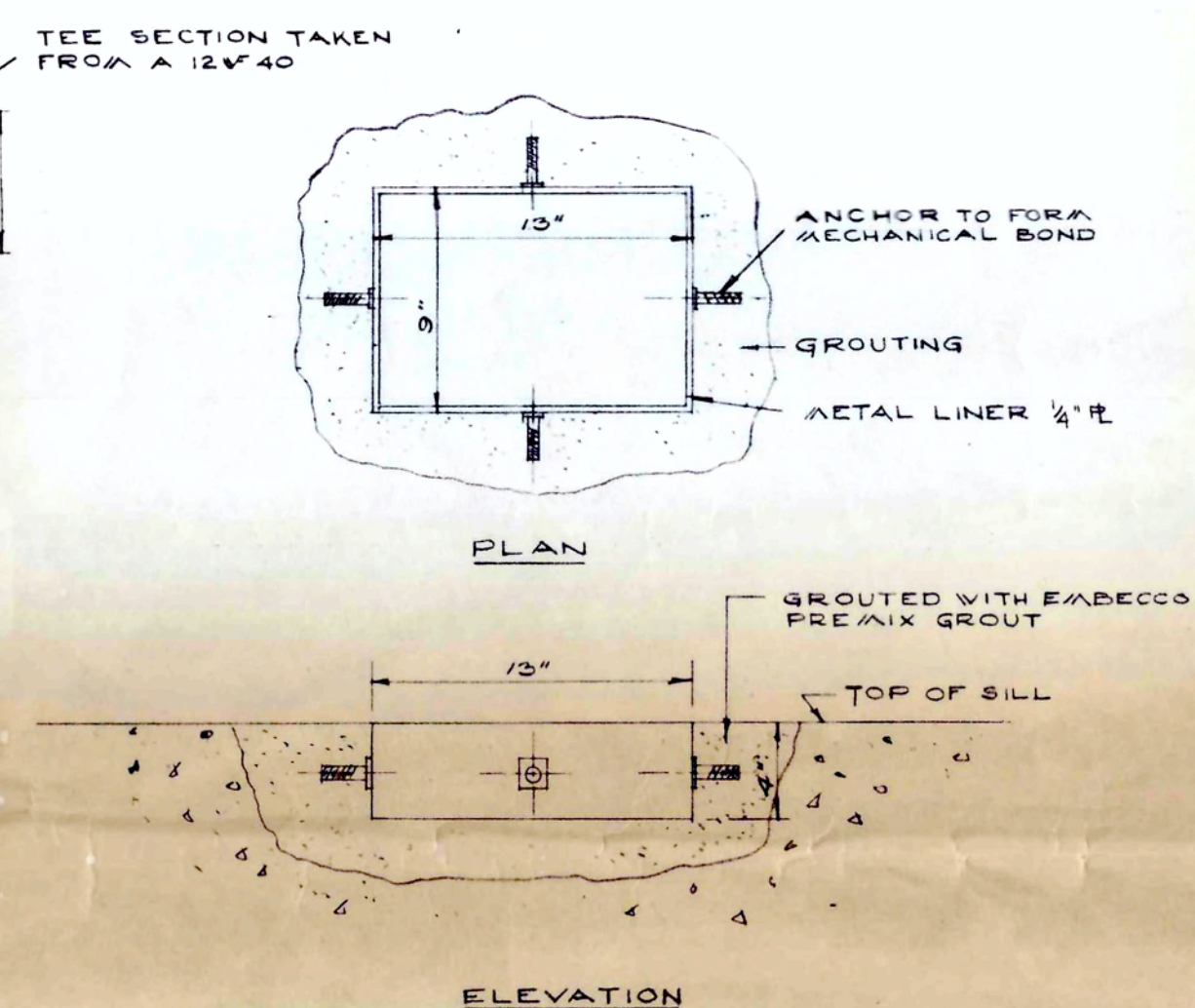
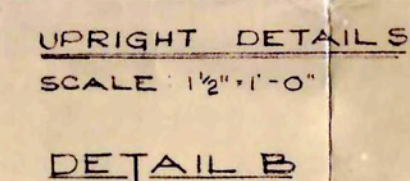
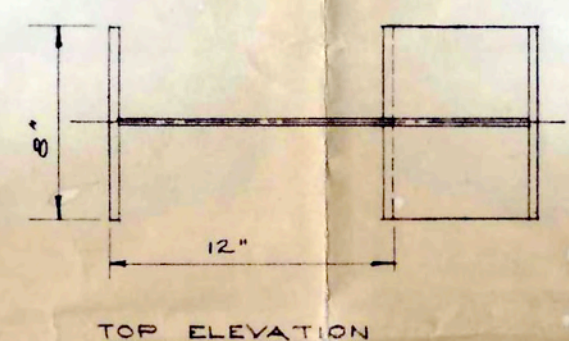
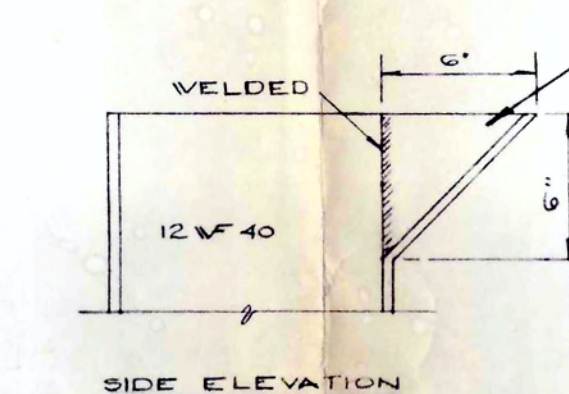
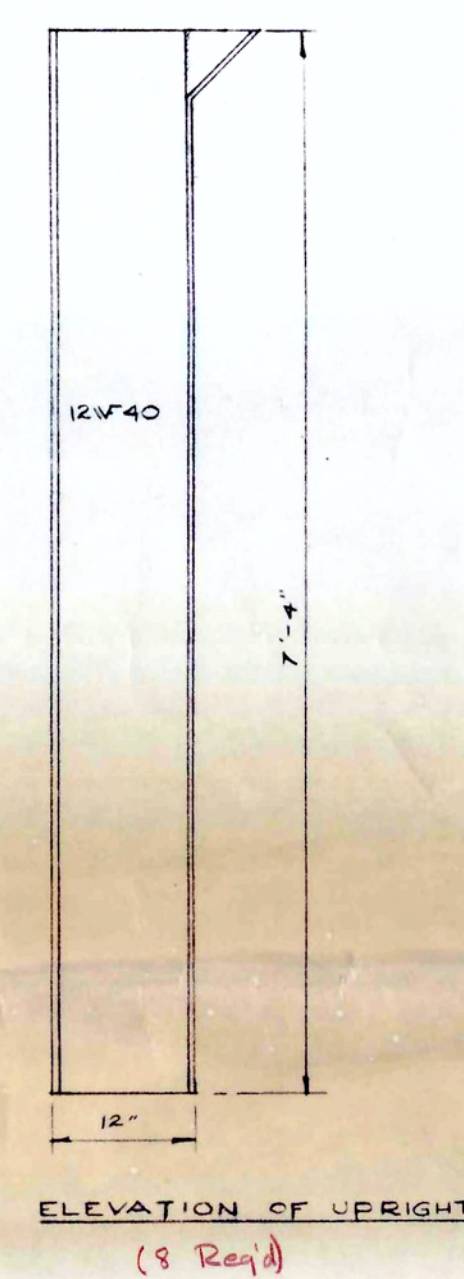
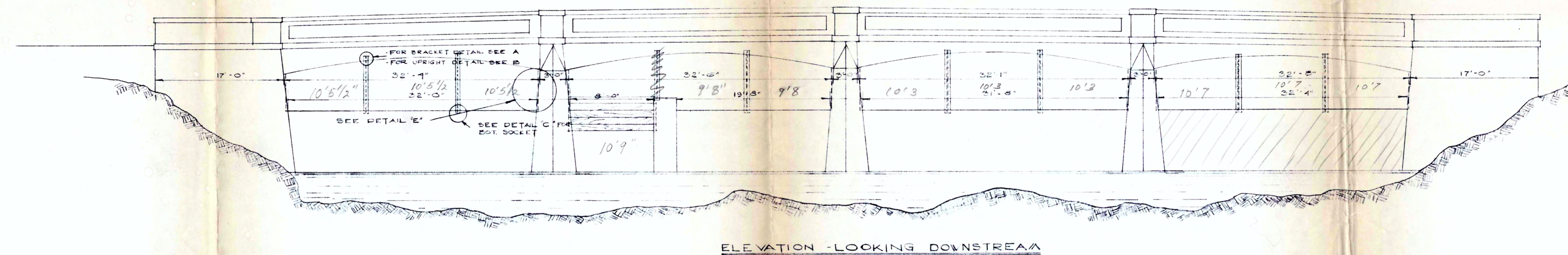
ISOMETRIC OF UPRIGHT
SCALE 1" = 1'-0"





AT LOW LEVEL OPENING
SCALE 1" = 1'-0"

Master		
1	NOV 15/66	CHANGED TOP BRACKET DIMENSIONS IN ELEV - ADDITION OF NEW DETAILS
ISSUE OR REVISION	DATE	BY
MAITLAND VALLEY CONSERVATION AUTHORITY		
HOWSON DAM REVISION		
DETAILS OF STOP LOG GUIDES		
CRYSLER, DAVIS & JORGENSEN, LIMITED		
CONSULTING ENGINEERS		
WILLOWDALE, ONTARIO		
DATE FEB. 2/66		
DRAWN C.S.Z.		
SCALE AS NOTED		
DWG. NO. 6522		

83 plates
22 pins



ISSUE OR REVISION	DATE	<i>Do Not Use - Refer to Master</i>	BY
	MAITLAND VALLEY CONSERVATION AUTHORITY		ISSUED
	HOWSON DAM REVISION		DATE FEB. 2/66
			DRAWN C.S.Z.
	DETAILS OF STOP LOG GUIDES		SCALE AS NOTED
APP'D.	CRYSLER, DAVIS & JORGENSEN, LIMITED CONSULTING ENGINEERS		DWG. NO. 6522-9
CHK'D.			
	WILLOWDALE, ONTARIO		

APPENDIX B
STABILITY CALCULATIONS

DRAFT



DESIGN CALCULATIONS COVER SHEET

Project No. :	17-3212-001	Project Name :	Howson Dam (South Structure)		
File No. :		Discipline :	Structural Engineering		
Calculation Title :	Pier and abutment Stability Analysis Sheet (LRIA - v3.3)				
Calculation No. :	CIV-001	Prepared by :	HS	Date :	Feb. 23, 2018
No. of Sheets :		Checked by :	YF	Date :	April 20, 2018
Supersedes Calc. No. :		Approved by :		Date :	

Calculation Description :

The dam has been reviewed against LRIA technical bulletins

Related Design Concept :

Stability analysis for the structures is carried out using the "Gravity Method".
Six loading cases are utilized in the analyses based on the LRIA Technical Bulletin "Structural Design and Factors of Safety (August 2011).

Reference Codes and Standards :

1. *Design of Small Dams*, Third Edition, U.S. Government Printing Office, Washington, D.C. 1987.
2. Structural Design and Factors of Safety – Technical Bulletin Ontario Ministry of Natural Resources (August 2011)

ENGINEER'S SEAL

Rev. #	Rev. Description	Rev. Author	Date Revised	Checked by	Approved by	Approved Date

► Notes and Figures

Properties of Materials



$$\gamma_w := 9.81 \frac{\text{kN}}{\text{m}^3}$$

Water density

$$\gamma_{\text{conc}} := 23.5 \cdot \frac{\text{kN}}{\text{m}^3}$$

Concrete density adjusted due to combination of the pier and abutment sections.

$$\phi_{\text{cf}} := 23 \cdot \text{deg}$$

Friction angle of concrete/foundation interface

$$c := 0 \text{ MPa}$$

Cohesion at concrete/foundation interface (generally set to 0)

$$f_{t,\text{cf}} := \frac{-c}{2} = 0$$

Tensile strength at concrete/rock interface (generally set to 0, or 0.5 x cohesion). This is a negative number.

$$\gamma_{\text{silt}} := 7.7 \cdot \frac{\text{kN}}{\text{m}^3}$$

Silt density

$$\phi_{\text{silt}} := 20 \cdot \text{deg}$$

Angle of internal friction for silt at rest condition

$$\gamma_{\text{fill}} := 7.7 \cdot \frac{\text{kN}}{\text{m}^3}$$

Backfill density

$$\phi_{\text{fill}} := 30 \cdot \text{deg}$$

Angle of internal friction for backfill at rest condition

$$\gamma_{\text{timber}} := 10 \cdot \frac{\text{kN}}{\text{m}^3}$$

Timber density (for stoplogs)

$$\gamma_{\text{Granular}} := 15 \frac{\text{kN}}{\text{m}^3}$$

Weight of granular material or rip rap on top of section



Water Levels



Usual Summer Operating Levels

Used in LC 1,4,5

$$\text{WL}_{\text{US},\text{Sum}} := 310.9\text{m}$$

Upstream water level (left side)

$$\text{WL}_{\text{DS},\text{Sum}} := 305.27\text{m}$$

Downstream water level (right side)

Usual Winter Operating Levels

Used in LC 2

$$\text{WL}_{\text{US},\text{Win}} := 309.26\text{m}$$

$$\text{WL}_{\text{DS},\text{Win}} := 305.27\text{m}$$

Unusual Flood Discharge Levels

Used in LC 3

$$\text{WL}_{\text{US},\text{IDF}} := 311.9\text{m}$$

$$\text{WL}_{\text{DS},\text{IDF}} := 310.3\text{m}$$



Seismic Accelerations



$$\lambda_{\text{Hor}} := 0.0834$$

Horizontal component of earthquake intensity = ratio of earthquake acceleration to acceleration due to gravity (unitless number)

$$\lambda_{Ver} := \frac{2}{3} \cdot \lambda_{Hor} = 0.056$$

Vertical component of earthquake intensity. CDA recommends a factor between 1/2 and 2/3 of the horizontal acceleration (pg 15 of Seismic Hazard Considerations Technical Bulletin)



Structure Geometry

Input

Note: Enter structure geometry as series of points on X-Y grid. Align structure so that upstream is on the left side. Structure outline is "closed" automatically (last point is assigned same values as first). Ensure that values of ELE.Base.L and ELE.Base.R are adjusted to correspond with the lowest upstream and downstream elevations.

Input X & Y coordinates

$$X := \begin{pmatrix} 0 \\ 7.95 \\ 7.95 \\ 0 \end{pmatrix} \cdot \text{m}$$

$$Y := \begin{pmatrix} 305.27 \\ 305.27 \\ 310.94 \\ 310.94 \end{pmatrix} \cdot \text{m}$$

$$\text{ELEBase.L} := 305.27\text{m}$$

Elevation of left side of base (lowest point)

$$\text{ELEBase.R} := 305.27\text{m}$$

Elevation of right side of base (lowest point)

$$\text{ELETop} := 310.94\text{m}$$

Elevation of top of dam (for hydrostatic, hydrodynamic forces)

$$B := \frac{2.03 + 1.32}{2} \cdot \text{m} = 1.67\text{m}$$

Set unit width of structure (1m if using metric, 1ft if using imperial units)

$$\omega_{US} := 0\text{deg}$$

Incline of upstream face from vertical (positive number in degrees)

$$\omega_{DS} := 0\text{deg}$$

Incline of downstream face from vertical (positive number in degrees)

$$L_{hor} := \max(X) - \min(X) = 7.95\text{m}$$

Horizontal projection of base

$$\alpha := \text{atan}\left(\frac{\text{ELEBase.R} - \text{ELEBase.L}}{L_{hor}}\right) = 0 \cdot \text{deg}$$

Angle of inclination of base. Positive is counter clockwise from the horizontal in the downstream direction

$$L_{incl} := \frac{L_{hor}}{\cos(\alpha)} = 7.95\text{m}$$

Inclined length of concrete-foundation interface

Variables for Combines Structure Model

$$B_{pier} := B = 1.67\text{m}$$

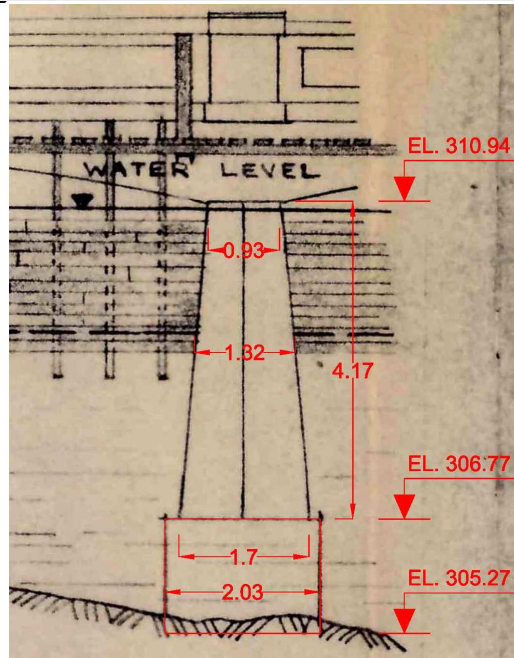
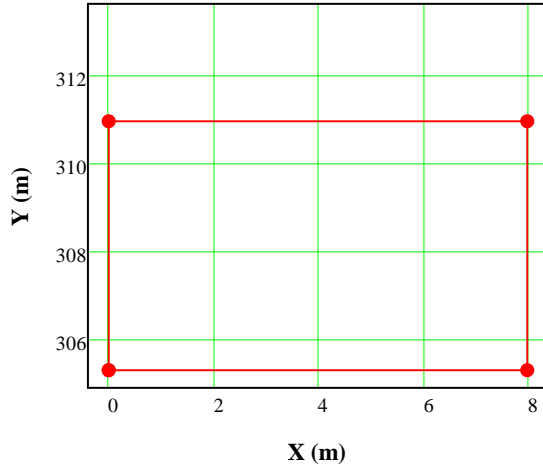
$$L_{incl.pier} := L_{incl} = 7.95\text{m}$$

$$\alpha_{pier} := \alpha$$

Input

Plot Functions

Graphical Representation of Structure



► Computation of Area and Center of Gravity

Gate/Stoplog Geometry



$$X_{log} := 0 \cdot m$$

Horizontal distance from left side ($x=0$) to location of gate/stoplogs

$$ELE_{sill} := 307.13m$$

Elevation of the bottom of the gate/stoplogs

$$ELE_{gate, top} := 310.28m$$

Elevation of top of gate/stoplogs

$$Trib_{gate} := \frac{10 \cdot ft}{2} = 1.52m$$

Tributary width of gates/logs experiencing hydrostatic/hydrodynamic/ice forces

$$W_{gate} := 0m$$

Total width of gate/stoplogs (for calculating weight on slab/rollway)

Forces on Gates/Stoplogs Transferred into Piers

$$Gates_{Sum.Hyd} := 1$$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$$Gates_{Win.Hyd} := 1$$

If gates are present during winter operation, set = 1, otherwise set to 0

$$Gates_{IDF.Hyd} := 1$$

If gates are present during IDF, set = 1, otherwise set to 0

Weight of Gates/Stoplogs bearing on rollway/slab

$$Gates_{Sum.Weight} := 0$$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$$Gates_{Win.Weight} := 0$$

If gates are present during winter operation, set = 1, otherwise set to 0

$$Gates_{IDF.Weight} := 0$$

If gates are present during IDF, set = 1, otherwise set to 0



Weight of Main Structure (D)



$$B_{ave} := \frac{2.03 + 0.93}{2} \cdot m = 1.48 m$$

Average width of the structure for calculating the pier weight

$$Vol_{conc} := Area \cdot B_{ave} = 66.7 \cdot m^3$$

Volume of concrete per unit width of structure

$$W_{conc} := Vol_{conc} \cdot \gamma_{conc} = 1568 \cdot kN$$

Dead load of concrete in structure

$$MA := L_{hor} - X_g = 3.975 m$$

Moment arm is the horizontal distance from right side of base to C.G.

$$M_{conc} := W_{conc} \cdot MA = 6231.8 \cdot kN \cdot m$$

Moment from structure self weight

$$\gamma_{conc} = 23.5 \cdot \frac{kN}{m^3}$$

$$Area = 45.1 m^2$$

$$B = 1.7 m$$

$$L_{hor} = 7.95 m$$

$$X_g = 3.975 m$$

$$Y_g = 308.105 m$$



Weight of Stoplogs (D) - NOT APPLICABLE



Weight of Slab (D)



$$W_{slab} := 11.58 \cdot m$$

Slab width

$$L_{slab} := 7.95 \cdot m$$

Total length of slab

$$S_{thk} := 0.25 m$$

Equivalent slab thickness

$$W_{gir} := 0.55 \cdot m$$

Girder width

$$L_{gir} := 11.58 \cdot m$$

Total length of girder

$$Gir_{thk} := \frac{1 + 0.4}{2} \cdot m = 0.7 m$$

Equivalent girder thickness
(conservative assumption)

$$GirNo := 4$$

Number of girders in each span

$$\gamma_{conc} = 23.5 \cdot \frac{kN}{m^3}$$

$$B = 1.67 m$$

$$L_{hor} = 7.95 m$$

$$ELE_{slab} := 312.48 \cdot m - \frac{L_{slab} \cdot W_{slab} \cdot S_{thk} \cdot \frac{S_{thk}}{2} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk} \cdot \left(\frac{Gir_{thk}}{2} + S_{thk} \right)}{L_{slab} \cdot W_{slab} \cdot S_{thk} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk}} = 312.15 m$$

Elevation of centre of gravity of slab

$$X_{slab} := \frac{L_{slab}}{2} = 3.98 m$$

Horizontal distance from left side (x=0) to centre of slab

$$W_{opening} := 0 m$$

Width of stoplog

$$L_{opening} := 8.23 m$$

opening

Length of stoplog opening

$$X_{opening} := 2.12 m$$

Horizontal distance from left side (x=0) to centre of slab

$$W_{slab1} := \gamma_{conc} \cdot (L_{slab} \cdot W_{slab} \cdot S_{thk} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk}) = 959.9 \cdot kN$$

Dead load from slab (not considering opening)

$$MA_{slab1} := L_{hor} - X_{slab} = 3.975 m$$

Moment arm measured as horizontal distance from centre of slab to right side of base

$$W_{opening} := \gamma_{conc} \cdot L_{opening} \cdot W_{opening} \cdot S_{thk} = 0$$

Weight to be removed from slab due to opening

$$MA_{opening} := L_{hor} - X_{opening} = 5.830 m$$

Moment arm measured as horizontal distance from centre of opening to right side of base

$$W_{slab} := W_{slab1} - W_{opening} = 959.9 kN$$

Net dead load from slab

$$M_{slab} := W_{slab1} \cdot MA_{slab1} - W_{opening} \cdot MA_{opening} = 3815.8 \cdot kN \cdot m$$

Moment from weight of slab



Weight of Tower(D) - NOT APPLICABLE



Weight of Riprap / Granular Material on Top of Section - NOT APPLICABLE

Input coordinates

Calculations

Results

Upstream Hydrostatic Force (H)

Figures

Calculations

Note: If inclined face is present, it is assumed to be linear from heel to water level.

Case 1: Summer Operating Level

$$H := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{Base.L} \\ WL_{US.Sum} - ELE_{Base.L} & \text{otherwise} \end{cases} = 5.630$$

Height of water in front of section

$$P_{US.Sum} := H \cdot \gamma_w = 55.2 \text{ kPa}$$

$$\begin{aligned} WL_{US.Sum} &= 310.900 \text{ m} \\ ELE_{Top} &= 310.940 \text{ m} \\ ELE_{Base.L} &= 305.270 \text{ m} \\ ELE_{Base.R} &= 305.270 \text{ m} \\ \omega_{US} &= 0.0 \\ L_{hor} &= 7.95 \text{ m} \\ B &= 1.67 \text{ m} \end{aligned}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{Top} \\ WL_{US.Sum} - ELE_{Top} & \text{otherwise} \end{cases} = 0.000$$

Height of water above top of section

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 5.630 \text{ m}$$

Inclined length of face under water

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 260.4 \text{ kN}$$

Force due to triangular portion of pressure diagram

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 260.4 \text{ kN}$$

Horizontal component of F1

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

Vertical component of F1

$$ELE_{F1} := ELE_{Base.L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 307.147 \text{ m}$$

Elevation of F1

$$MA_{F1.Hor} := ELE_{F1} - ELE_{Base.R} = 1.877 \text{ m}$$

Moment arm of horizontal component of F1

$$MA_{F1.Ver} := L_{hor} - (ELE_{F1} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

Moment arm of vertical component of F1

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 0.0 \text{ kN}$$

Force due to rectangular portion of pressure diagram

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 0 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base.L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 308.085 \text{ m}$$

$$MA_{F2,Hor} := ELE_{F2} - ELE_{Base,R} = 2.815 \text{ m}$$

$$MA_{F2,Ver} := L_{hor} - (ELE_{F2} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US,Sum,Hor} := F1_{Hor} + F2_{Hor} = 260.4 \text{ kN}$$

$$F_{US,Sum,Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US,Sum,Hor} := F1_{Hor} \cdot MA_{F1,Hor} + F2_{Hor} \cdot MA_{F2,Hor} = 488.7 \text{ kN}\cdot\text{m}$$

$$M_{US,Sum,Ver} := F1_{Ver} \cdot MA_{F1,Ver} + F2_{Ver} \cdot MA_{F2,Ver} = 0 \text{ kN}\cdot\text{m}$$

Horizontal hydrostatic force

Vertical hydrostatic force

Moment due to horizontal component of hydrostatic force

Moment due to vertical component of hydrostatic force

Case 2: Winter Operating Level

$$H := \begin{cases} 0 & \text{if } WL_{US,Win} \leq ELE_{Base,L} \\ WL_{US,Win} - ELE_{Base,L} & \text{otherwise} \end{cases} = 3.990$$

$$P_{US,Win} := H \cdot \gamma_w = 39.1 \text{ kPa}$$

$$WL_{US,Win} = 309.260 \text{ m}$$

$$ELE_{Top} = 310.940 \text{ m}$$

$$ELE_{Base,L} = 305.270 \text{ m}$$

$$ELE_{Base,R} = 305.270 \text{ m}$$

$$\omega_{US} = 0.0$$

$$L_{hor} = 7.95 \text{ m}$$

$$B = 1.67 \text{ m}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US,Win} \leq ELE_{Top} \\ WL_{US,Win} - ELE_{Top} & \text{otherwise} \end{cases} = 0.000$$

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 3.990 \text{ m}$$

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 130.8 \text{ kN}$$

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 130.8 \text{ kN}$$

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F1} := ELE_{Base,L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 306.600 \text{ m}$$

$$MA_{F1,Hor} := ELE_{F1} - ELE_{Base,R} = 1.330 \text{ m}$$

$$MA_{F1,Ver} := L_{hor} - (ELE_{F1} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 0.0 \text{ kN}$$

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 0 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base,L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 307.265 \text{ m}$$

$$MA_{F2,Hor} := ELE_{F2} - ELE_{Base,R} = 1.995 \text{ m}$$

$$MA_{F2,Ver} := L_{hor} - (ELE_{F2} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US,Win,Hor} := F1_{Hor} + F2_{Hor} = 130.8 \text{ kN}$$

$$F_{US,Win,Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US,Win,Hor} := F1_{Hor} \cdot MA_{F1,Hor} + F2_{Hor} \cdot MA_{F2,Hor} = 174 \text{ kN}\cdot\text{m}$$

$$M_{US,Win,Ver} := F1_{Ver} \cdot MA_{F1,Ver} + F2_{Ver} \cdot MA_{F2,Ver} = 0 \text{ kN}\cdot\text{m}$$

Case 3: IDF Level

$$H := \begin{cases} 0 & \text{if } WL_{US,IDF} \leq ELE_{Base,L} \\ WL_{US,IDF} - ELE_{Base,L} & \text{otherwise} \end{cases} = 6.630$$

$$P_{US,IDF} := H \cdot \gamma_w = 65 \text{ kPa}$$

$$WL_{US,IDF} = 311.900 \text{ m}$$

$$ELE_{Top} = 310.940 \text{ m}$$

$$ELE_{Base,L} = 305.270 \text{ m}$$

$$ELE_{Base,R} = 305.270 \text{ m}$$

$$\omega_{US} = 0.0$$

$$L_{hor} = 7.95 \text{ m}$$

$$B = 1.67 \text{ m}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US,IDF} \leq ELE_{Top} \\ WL_{US,IDF} - ELE_{Top} & \text{otherwise} \end{cases} = 0.960$$

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 5.670 \text{ m}$$

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 264.1 \text{ kN}$$

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 264.1 \text{ kN}$$

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F1} := ELE_{Base.L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 307.160 \text{ m}$$

$$MA_{F1.Hor} := ELE_{F1} - ELE_{Base.R} = 1.890 \text{ m}$$

$$MA_{F1.Ver} := L_{hor} - (ELE_{F1} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 89.4 \text{ kN}$$

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 89.4 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base.L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 308.105 \text{ m}$$

$$MA_{F2.Hor} := ELE_{F2} - ELE_{Base.R} = 2.835 \text{ m}$$

$$MA_{F2.Ver} := L_{hor} - (ELE_{F2} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US.IDF.Hor} := F1_{Hor} + F2_{Hor} = 353.6 \text{ kN}$$

$$F_{US.IDF.Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US.IDF.Hor} := F1_{Hor} \cdot MA_{F1.Hor} + F2_{Hor} \cdot MA_{F2.Hor} = 752.8 \text{ kN} \cdot \text{m}$$

$$M_{US.IDF.Ver} := F1_{Ver} \cdot MA_{F1.Ver} + F2_{Ver} \cdot MA_{F2.Ver} = 0 \text{ kN} \cdot \text{m}$$

Calculations

Downstream Hydrostatic Force (H)



Hydrostatic Force on Gates (H)

Calculations

Note: Pressure from tailwater not considered. Calculations assume a flat vertical face

Case 1: Summer operating level

$$H := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{sill} \\ WL_{US.Sum} - ELE_{sill} & \text{otherwise} \end{cases} = 3.770 \quad \text{Height of water in front of gate/stoplogs}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{gate.top} \\ WL_{US.Sum} - ELE_{gate.top} & \text{otherwise} \end{cases} = 0.620 \quad \text{Height of water above top of gate/stoplogs}$$

$$F1 := \frac{(H - H_{above})^2}{2} \cdot \gamma_w \cdot Trib_{gate} = 74.2 \text{ kN} \quad \text{Force due to triangular portion of pressure diagram}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.910 \text{ m} \quad \text{Moment arm}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 29.2 \text{ kN} \quad \text{Force due to rectangular portion of pressure diagram}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 3.435 \text{ m} \quad \text{Moment arm}$$

$$F_{gateH.Sum} := \begin{cases} (F1 + F2) & \text{if } GatesSum.Hyd = 1 \\ 0 & \text{otherwise} \end{cases} = 103.4 \text{ kN} \quad \text{Total hydrostatic force on gate/stoplogs}$$

$$M_{gateH.Sum} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } GatesSum.Hyd = 1 \\ 0 & \text{otherwise} \end{cases} = 316.1 \text{ kN} \cdot \text{m} \quad \text{Moment due to hydrostatic force on gate/stoplogs}$$

GatesSum.Hyd = 1
GatesWin.Hyd = 1
GatesIDF.Hyd = 1
WLUS.Sum = 310.900m
WLUS.Win = 309.260m
WLUS.IDF = 311.900m
ELEsill = 307.130m
ELEgate.top = 310.280m
ELEBase.R = 305.270m
Tribgate = 1.524m
Lhor = 7.95 m

Case 2: Winter operating level

$$H := \begin{cases} 0 & \text{if } WL_{US.Win} \leq ELE_{sill} \\ WL_{US.Win} - ELE_{sill} & \text{otherwise} \end{cases} = 2.130$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Win} \leq ELE_{gate.top} \\ WL_{US.Win} - ELE_{gate.top} & \text{otherwise} \end{cases} = 0.000$$

$$F1 := \frac{(H - H_{above})^2 \cdot \gamma_w}{2} \cdot Trib_{gate} = 33.9 \text{ kN}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.570 \text{ m}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 0.0 \text{ kN}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 2.925 \text{ m}$$

$$F_{gateH.Win} := \begin{cases} (F1 + F2) & \text{if } Gates_{Win.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 33914.3$$

$$M_{gateH.Win} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } Gates_{Win.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 87159.8$$

Case 3: IDF level

$$H := \begin{cases} 0 & \text{if } WL_{US.IDF} \leq ELE_{sill} \\ WL_{US.IDF} - ELE_{sill} & \text{otherwise} \end{cases} = 4.770$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.IDF} \leq ELE_{gate.top} \\ WL_{US.IDF} - ELE_{gate.top} & \text{otherwise} \end{cases} = 1.620$$

$$F1 := \frac{(H - H_{above})^2 \cdot \gamma_w}{2} \cdot Trib_{gate} = 74.2 \text{ kN}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.910 \text{ m}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 76.3 \text{ kN}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 3.435 \text{ m}$$

$$F_{gateH.IDF} := \begin{cases} (F1 + F2) & \text{if } Gates_{IDF.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 150.5 \cdot \text{kN}$$

$$M_{gateH.IDF} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } Gates_{IDF.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 477.9 \cdot \text{kN} \cdot \text{m}$$

 Calculations

Hydraulic Drag Force (H)



Weight of Water Above Section (H) - NOT APPLICABLE

► Input coordinates

► Calculations

► Results

Initial Uplift Forces (U)

► Figures

► Uplift Function Definition

▼ Input and Calculation

Note: Analysis assumes uplift pressure acts perpendicular to the concrete-foundation interface. Uplift pressure is considered positive, but the actual forces are negative when vertically upwards and positive in downstream (right) direction. Crack length is initially set to 0 but may change in subsequent cracked base analysis. Uplift is calculated again in the cracked section analysis and in the post-earthquake load combination.

FactorUL := 1.00

Factor to reduce uplift pressure if required. Set to 1.00 for 100%.

Lcrack0 := 0 · m

Set initial crack length. Measured from left side, parallel to base

PUSUL.Sum := FactorUL · PUS.Sum = 55.2 · kPa

Uplift pressure at upstream (left) side

PDSUL.Sum := FactorUL · PDS.Sum = 0 · kPa

Uplift pressure at downstream (right) side

PUSUL.Win := FactorUL · PUS.Win = 39.1 · kPa

PDSUL.Win := FactorUL · PDS.Win = 0 · kPa

PUSUL.IDF := FactorUL · PUS.IDF = 65 · kPa

PDSUL.IDF := FactorUL · PDS.IDF = 49.3 · kPa

Lincl = 7.95 m

ELEBase.L = 305.270 m

ELEBase.R = 305.270 m

WLUS.Sum = 310.900 m

WLUS.Win = 309.260 m

WLUS.IDF = 311.900 m

WLDS.Sum = 305.270 m

WLDS.Win = 305.270 m

WLDS.IDF = 310.300 m

PUS.Sum = 55.2 · kPa

PDS.Sum = 0.0 · kPa

Case 1: Water at summer operating levels

PU.Sum(x) := PUL(x, Lcrack0, PUSUL.Sum, PDSUL.Sum)

Creates the pressure function

$$FU0.Sum := \int_0^{L_{incl}} PU.Sum(x) \cdot B \, dx = 367.7 \cdot \text{kN}$$

Total uplift force. Calculated as the area under the uplift pressure diagram.

$$MA := L_{incl} - \frac{1}{FU0.Sum} \left(\int_0^{L_{incl}} PU.Sum(x) \cdot x \cdot B \, dx \right) = 5.3 \cdot \text{m}$$

Moment arm of uplift force about the right side of base. Measured parallel to base.

MU0.Sum := FU0.Sum · MA = 1949 · kN · m

Moment from uplift on uncracked section

FU0.Sum.Hor := -FU0.Sum · sin(α) = 0 · kN

Uplift resolved into horizontal and vertical forces for subsequent calculations

FU0.Sum.Ver := -FU0.Sum · cos(α) = -367.7 · kN

Case 2: Water at winter operating levels

PU.Win(x) := PUL(x, Lcrack0, PUSUL.Win, PDSUL.Win)

$$FU0.Win := \int_0^{L_{incl}} PU.Win(x) \cdot B \, dx = 260.6 \cdot \text{kN}$$

$$MA := L_{incl} - \frac{1}{FU0.Win} \left(\int_0^{L_{incl}} PU.Win(x) \cdot x \cdot B \, dx \right) = 5.3 \cdot \text{m}$$

$$\begin{aligned} MU0.Win &:= FU0.Win \cdot MA = 1381.2 \cdot \text{kN} \cdot \text{m} \\ FU0.Win.Hor &:= -FU0.Win \cdot \sin(\alpha) = 0 \cdot \text{kN} \\ FU0.Win.Ver &:= -FU0.Win \cdot \cos(\alpha) = -260.6 \cdot \text{kN} \end{aligned}$$


Case 3: Water at IDF levels


$$PU.IDF(x) := PUL(x, L_{crack0}, PUSUL.IDF, PDSUL.IDF)$$

$$FU0.IDF := \int_0^{L_{incl}} PU.IDF(x) \cdot B \, dx = 761.6 \cdot \text{kN}$$

$$MA := L_{incl} - \frac{1}{FU0.IDF} \left(\int_0^{L_{incl}} PU.IDF(x) \cdot x \cdot B \, dx \right) = 4.16 \, \text{m}$$

$$\begin{aligned} MU0.IDF &:= FU0.IDF \cdot MA = 3165.8 \cdot \text{kN} \cdot \text{m} \\ FU0.IDF.Hor &:= -FU0.IDF \cdot \sin(\alpha) = 0 \cdot \text{kN} \\ FU0.IDF.Ver &:= -FU0.IDF \cdot \cos(\alpha) = -761.6 \cdot \text{kN} \end{aligned}$$

 Input and Calculation

 Plot of Results

Upstream Silt Buildup (S)



Downstream Backfill (S)



Ice Loading (I)



USUAL LOAD CASE

Direct ice load on structure

$$IceLoad_{usual} := 75 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{ice.1.usual} := IceLoad_{usual} B = 125.6 \cdot \text{kN}$$

Force acting on the structure

$$ELE_{ice} := WL_{US}.Win - 0.3 \, \text{m} = 308.96 \, \text{m}$$

Elevation of force (assumed to act at 0.3m below water level)

$$MA := ELE_{ice} - ELE_{Base.R} = 3.7 \, \text{m}$$

Moment arm is vertical distance from force to right side of base

$$M_{ice.1.usual} := F_{ice.1.usual} \cdot MA = 463.6 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

$W_{igate} = 0.00$ $Tribgate = 1.52 \, \text{m}$ $ELE_{Base.R} = 305.270 \, \text{m}$ $WL_{US}.Win = 309.260 \, \text{m}$ $B = 1.67 \, \text{m}$ $GatesWin.Hyd = 1$
--

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{ice.gate.usual} := \begin{cases} 0 & \text{if } GatesWin.Hyd = 0 \\ IceLoad_{usual} \cdot Tribgate & \text{otherwise} \end{cases} = 114.3 \cdot \text{kN}$$

$$M_{ice.gate.usual} := F_{ice.gate.usual} \cdot MA = 421.8 \text{ kN} \cdot \text{m}$$

$$F_{ice.usual} := F_{ice.1.usual} + F_{ice.gate.usual} = 239.9 \text{ kN}$$

$$M_{ice.usual} := M_{ice.1.usual} + M_{ice.gate.usual} = 885.3 \text{ kN} \cdot \text{m}$$

UNUSUAL LOAD CASE

Direct ice load on structure

$$IceLoad := 83.5 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{ice.1} := IceLoad \cdot B = 139.9 \cdot \text{kN}$$

Force acting on the structure

$$M_{ice.1} := F_{ice.1} \cdot MA = 516.1 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{ice.gate} := \begin{cases} 0 & \text{if } GatesWin.Hyd = 0 \\ IceLoad \cdot Tribgate & \text{otherwise} \end{cases} = 127.3 \cdot \text{kN}$$

$$M_{ice.gate} := F_{ice.gate} \cdot MA = 469.6 \text{ kN} \cdot \text{m}$$

$$F_{ice} := F_{ice.1} + F_{ice.gate} = 267.1 \text{ kN}$$

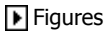
$$M_{ice} := M_{ice.1} + M_{ice.gate} = 985.7 \text{ kN} \cdot \text{m}$$



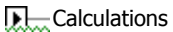
Seismic Forces - Inertia of Structure Dead Load (Q)



Seismic Forces - Hydrodynamic Forces (Q)



Figures



Calculations

Seismic Forces - Dynamic Soil Pressures (Q)



Tensioned Anchors - NOT APPLICABLE



Other Forces - NOT APPLICABLE



Load Case 1. Usual Loading Summer Case (D+H+S+U)

LC.1 - Summary of Forces

Deadloads (D):

$$\begin{aligned} W_{\text{conc}} &= 1567.8 \cdot \text{kN} \\ W_{\text{log.Sum}} &= 0 \\ W_{\text{slab}} &= 959.9 \text{ kN} \\ W_{\text{tower}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{conc}} &= 6231.8 \cdot \text{kN} \cdot \text{m} \\ M_{\text{log.Sum}} &= 0 \\ M_{\text{slab}} &= 3815.8 \text{ kN} \cdot \text{m} \\ M_{\text{tower}} &= 0 \end{aligned}$$

Hydraulic (H):

$$\begin{aligned} F_{\text{US.Sum.Hor}} &= 260.4 \cdot \text{kN} \\ F_{\text{US.Sum.Ver}} &= 0 \cdot \text{kN} \\ F_{\text{DS.Sum.Hor}} &= 0 \text{ kN} \\ F_{\text{DS.Sum.Ver}} &= 0 \text{ kN} \\ F_{\text{gateH.Sum}} &= 103.4 \text{ kN} \\ W_{\text{Water.Above.Sum}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{US.Sum.Hor}} &= 488.7 \cdot \text{kN} \cdot \text{m} \\ M_{\text{US.Sum.Ver}} &= 0 \cdot \text{kN} \cdot \text{m} \\ M_{\text{DS.Sum.Hor}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{DS.Sum.Ver}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{gateH.Sum}} &= 316.1 \text{ kN} \cdot \text{m} \\ M_{\text{Water.Above.Sum}} &= 0 \end{aligned}$$

Soil (S):

$$\begin{aligned} F_{\text{US.silt.Hor}} &= 0 \text{ kN} \\ W_{\text{US.silt}} &= 0 \text{ kN} \\ F_{\text{DS.fill.Hor}} &= 0 \\ W_{\text{DS.fill}} &= 0 \\ W_{\text{Granular.Sum}} &= 0 \text{ kN} \end{aligned}$$

$$\begin{aligned} M_{\text{US.silt.Hor}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{US.silt.Ver}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{DS.fill.Hor}} &= 0 \\ M_{\text{DS.fill.Ver}} &= 0 \\ M_{\text{Granular.Sum}} &= 0 \text{ kN} \cdot \text{m} \end{aligned}$$

Uplift (U):

$$\begin{aligned} F_{\text{U0.Sum.Hor}} &= 0 \cdot \text{kN} \\ F_{\text{U0.Sum.Ver}} &= -367.7 \cdot \text{kN} \end{aligned}$$

$$M_{\text{U0.Sum}} = 1949 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$\begin{aligned} F_{\text{anchor.Hor}} &= 0 \\ F_{\text{anchor.Ver}} &= 0 \\ F_{\text{other.Hor.1}} &= 0 \\ F_{\text{other.Ver.1}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{anchor.Hor}} &= 0 \\ M_{\text{anchor.Ver}} &= 0 \\ M_{\text{other.Hor.1}} &= 0 \\ M_{\text{other.Ver.1}} &= 0 \end{aligned}$$

LC.1 - Combine Forces and Moments

$$F_{\text{hor0}} := (F_{\text{US.Sum.Hor}} - F_{\text{DS.Sum.Hor}} + F_{\text{gateH.Sum}}) + (F_{\text{US.silt.Hor}} - F_{\text{DS.fill.Hor}}) \dots = 363.8 \text{ kN}$$

Sum of horizontal forces

$$F_{\text{ver0}} := (W_{\text{conc}} + W_{\text{log.Sum}} + W_{\text{slab}} + W_{\text{tower}}) + (F_{\text{US.Sum.Ver}} + F_{\text{DS.Sum.Ver}} + W_{\text{Water.Above.Sum}}) \dots = 2160 \text{ kN}$$

Sum of vertical forces

$$F_{\text{parallel0}} := F_{\text{hor0}} \cdot \cos(\alpha) - F_{\text{ver0}} \cdot \sin(\alpha) = 363.8 \cdot \text{kN}$$

Forces acting parallel to uncracked base

$$F_{\text{perp0}} := F_{\text{hor0}} \cdot \sin(\alpha) + F_{\text{ver0}} \cdot \cos(\alpha) = 2160.0 \cdot \text{kN}$$

Forces acting perpendicular to uncracked base

$$M_{\text{stab0}} := (M_{\text{conc}} + M_{\text{log.Sum}} + M_{\text{slab}} + M_{\text{tower}}) + (M_{\text{US.Sum.Ver}} + M_{\text{DS.Sum.Hor}} + M_{\text{DS.Sum.Ver}} + M_{\text{Water.Above.Sum}}) \dots = 10047.6 \text{ kN} \cdot \text{m}$$

Sum of stabilizing moments

$$M_{\text{overtun0}} := (M_{\text{US.Sum.Hor}} + M_{\text{gateH.Sum}}) + (M_{\text{US.silt.Hor}}) + (M_{\text{U0.Sum}}) = 2753.8 \text{ kN} \cdot \text{m}$$

Sum of overturning moments

$$M_{\text{net0}} := M_{\text{stab0}} - M_{\text{overtun0}} = 7293.8 \text{ kN} \cdot \text{m}$$

Net resisting moment

LC.1 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.38 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 7293.8 \text{ kN} \cdot \text{m}$$

$$F_{perp0} = 2160.0 \text{ kN}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 0.6 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 235.4 \text{ kPa}$$

$$q_{min0} = 89 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp0} = 7.95 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens0} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack0} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2159969$$

$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

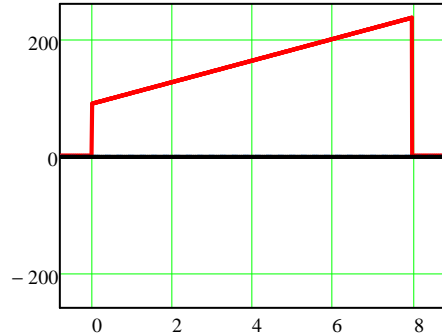
Compression and tension forces in foundation

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

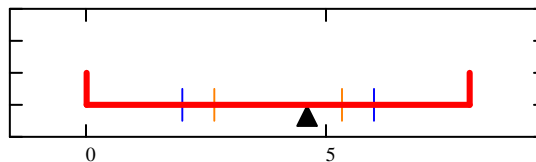
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure, blue lines indicate middle half of base, orange lines indicate middle third of base

LC.1 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 2.52$$

Factor of safety against sliding for specified friction angle

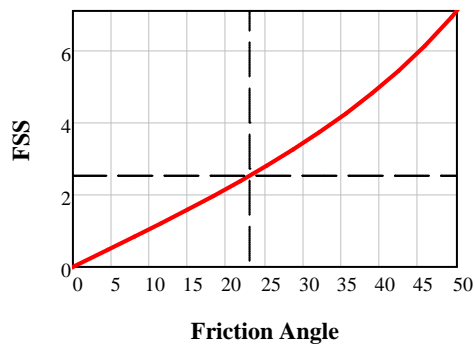
$$\phi_{cf} = 23 \cdot \text{deg}$$

$$c = 0$$

$$L_{incl} = 7.95 \text{ m}$$

$$\alpha = 0 \cdot \text{deg}$$

$$B = 1.67 \text{ m}$$





LC.1 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overturn}$, need to be modified for each load combination.

crackactive := $\begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$ Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 2. Usual Loading Winter Case (D+H+S+U+I)

LC.2 - Summary of Forces

Deadloads (D):

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$W_{log, Win} = 0$	$M_{log, Win} = 0$
$W_{slab} = 959.9 \text{ kN}$	$M_{slab} = 3815.8 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$

Hydraulic (H):

$F_{US, Win, Hor} = 130.8 \cdot \text{kN}$	$M_{US, Win, Hor} = 174 \cdot \text{kN} \cdot \text{m}$
$F_{US, Win, Ver} = 0 \cdot \text{kN}$	$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$F_{DS, Win, Hor} = 0 \text{ kN}$	$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, Win, Ver} = 0 \text{ kN}$	$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH, Win} = 33.9 \text{ kN}$	$M_{gateH, Win} = 87.2 \text{ kN} \cdot \text{m}$
$W_{Water, Above, Win} = 0$	$M_{Water, Above, Win} = 0$

Soil (S):

$F_{US, silt, Hor} = 0 \text{ kN}$	$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US, silt} = 0 \text{ kN}$	$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, fill, Hor} = 0$	$M_{DS, fill, Hor} = 0$
$W_{DS, fill} = 0$	$M_{DS, fill, Ver} = 0$
$W_{Granular, Win} = 0 \text{ kN}$	$M_{Granular, Win} = 0 \text{ kN} \cdot \text{m}$

Uplift (U):

$F_{U0, Win, Hor} = 0 \cdot \text{kN}$	$M_{U0, Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$
$F_{U0, Win, Ver} = -260.6 \cdot \text{kN}$	

Other Forces:

$F_{anchor, Hor} = 0$	$M_{anchor, Hor} = 0$
$F_{anchor, Ver} = 0$	$M_{anchor, Ver} = 0$
$F_{other, Hor, 1} = 0$	$M_{other, Hor, 1} = 0$
$F_{other, Ver, 1} = 0$	$M_{other, Ver, 1} = 0$

Ice (I):

$F_{ice, usual} = 239.9 \cdot \text{kN}$	$M_{ice, usual} = 885.3 \cdot \text{kN} \cdot \text{m}$
--	---

LC.2 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 404.6 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice, usual})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 2267.1 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 404.6 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 2267.1 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 10047.6 \text{ kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice, usual}) = 2527.7 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 7519.9 \text{ kN} \cdot \text{m}$$

LC.2 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.32 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$\begin{aligned} L_{incl} &= 7.95 \text{ m} \\ M_{net0} &= 7519.9 \text{ kN}\cdot\text{m} \\ F_{perp0} &= 2267.1 \text{ kN} \end{aligned}$$

$$e_0 := \frac{L_{incl}}{2} - x_0 = 0.66 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 254.8 \text{ kPa}$$

$$q_{min0} = 85.7 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2267087.6$$

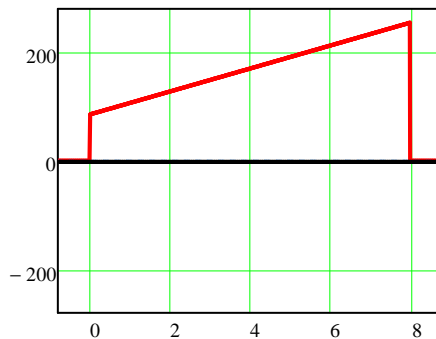
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

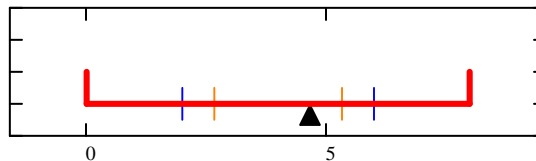
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.2 - Sliding

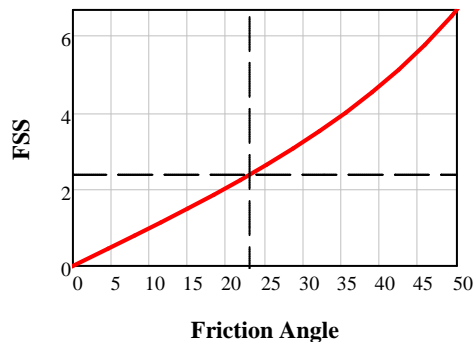
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 2.38$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{incl} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$



LC.2 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


$\text{crackactive} := \begin{cases} 0 & \text{if } L_{\text{crack0}} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 3. Unusual Loading IDF (D+H_{IDF}+S+U_{IDF})

LC.3 - Summary of Forces

Deadloads (D):

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$W_{log.IDF} = 0$	$M_{log.IDF} = 0$
$W_{slab} = 959.9 \text{ kN}$	$M_{slab} = 3815.8 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$

Hydraulic (H):

$F_{US.IDF.Hor} = 353.6 \cdot \text{kN}$	$M_{US.IDF.Hor} = 752.8 \cdot \text{kN} \cdot \text{m}$
$F_{US.IDF.Ver} = 0 \cdot \text{kN}$	$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$F_{DS.IDF.Hor} = 207.9 \text{ kN}$	$M_{DS.IDF.Hor} = 348.5 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Ver} = 0 \text{ kN}$	$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH.IDF} = 150.5 \text{ kN}$	$M_{gateH.IDF} = 477.9 \text{ kN} \cdot \text{m}$
$F_{drag} = 0$	$M_{drag} = 0$
$W_{Water.Above.IDF} = 0$	$M_{Water.Above.IDF} = 0$

Soil (S):

$F_{US.silt.Hor} = 0 \text{ kN}$	$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US.silt} = 0 \text{ kN}$	$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.fill.IDF.Hor} = 0$	$M_{DS.fill.IDF.Hor} = 0$
$W_{DS.fill.IDF} = 0$	$M_{DS.fill.IDF.Ver} = 0$
$W_{Granular.IDF} = 0 \text{ kN}$	$M_{Granular.IDF} = 0 \text{ kN} \cdot \text{m}$

Uplift (U):

$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$	$M_{U0.IDF} = 3165.8 \cdot \text{kN} \cdot \text{m}$
$F_{U0.IDF.Ver} = -761.6 \cdot \text{kN}$	

Other Forces:

$F_{anchor.Hor} = 0$	$M_{anchor.Hor} = 0$
$F_{anchor.Ver} = 0$	$M_{anchor.Ver} = 0$
$F_{other.Hor.1} = 0$	$M_{other.Hor.1} = 0$
$F_{other.Ver.1} = 0$	$M_{other.Ver.1} = 0$

LC.3 - Combine Forces and Moments

$$F_{hor0} := (F_{US.IDF.Hor} - F_{DS.IDF.Hor} + F_{gateH.IDF} + F_{drag}) + (F_{US.silt.Hor} - F_{DS.fill.IDF.Hor}) \dots = 296.2 \text{ kN} \\ + (F_{U0.IDF.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.IDF} + W_{slab} + W_{tower}) + (F_{US.IDF.Ver} + F_{DS.IDF.Ver} + W_{Water.Above.IDF}) \dots = 1766.1 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill.IDF} + W_{Granular.IDF}) + (F_{U0.IDF.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 296.2 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1766.1 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.IDF} + M_{slab} + M_{tower}) + (M_{US.IDF.Ver} + M_{DS.IDF.Hor} + M_{DS.IDF.Ver} + M_{Water.Above.IDF}) \dots = 10396.1 \text{ kN} \cdot \text{m} \\ + (M_{US.silt.Ver} + M_{DS.fill.IDF.Hor} + M_{DS.fill.IDF.Ver} + M_{Granular.IDF}) \dots \\ + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.IDF.Hor} + M_{gateH.IDF} + M_{drag}) + (M_{US.silt.Hor}) + (M_{U0.IDF}) = 4396.5 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 5999.7 \text{ kN} \cdot \text{m}$$

LC.3 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.40 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 0.58 \text{ m}$$

$$\begin{aligned} L_{incl} &= 7.95 \text{ m} \\ M_{net0} &= 5999.7 \text{ kN}\cdot\text{m} \\ F_{perp0} &= 1766.1 \text{ kN} \end{aligned}$$

Stress Calculations

$$q_{max0} = 190.5 \text{ kPa}$$

$$q_{min0} = 74.8 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1766112.3$$

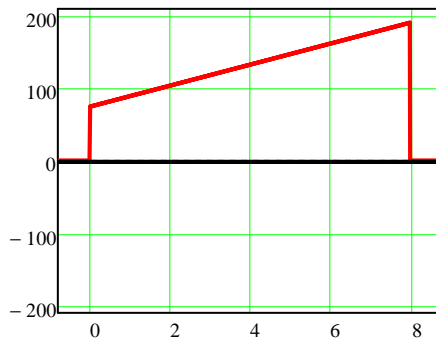
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

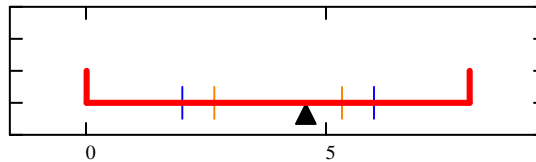
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

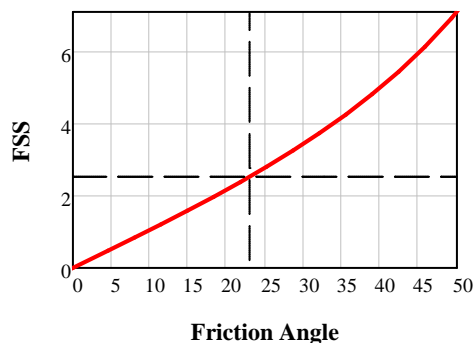
LC.3 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}} \quad \text{Define function to evaluate sliding using a range of friction angles}$$

$$FSS_0(\phi_{cf}) = 2.53$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{incl} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$




LC.3 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


$$\text{crackactive} := \begin{cases} 0 & \text{if } L_{\text{crack0}} = 0 \\ 1 & \text{otherwise} \end{cases}$$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 4. Unusual Loading Winter Case (D+H+S+U+I)

LC.4 - Summary of Forces

Deadloads (D):

$$W_{conc} = 1567.8 \cdot \text{kN}$$

$$W_{log, Win} = 0$$

$$W_{slab} = 959.9 \text{ kN}$$

$$W_{tower} = 0$$

$$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log, Win} = 0$$

$$M_{slab} = 3815.8 \text{ kN} \cdot \text{m}$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US, Win, Hor} = 130.8 \cdot \text{kN}$$

$$F_{US, Win, Ver} = 0 \cdot \text{kN}$$

$$F_{DS, Win, Hor} = 0 \text{ kN}$$

$$F_{DS, Win, Ver} = 0 \text{ kN}$$

$$F_{gateH, Win} = 33.9 \text{ kN}$$

$$W_{Water, Above, Win} = 0$$

$$M_{US, Win, Hor} = 174 \cdot \text{kN} \cdot \text{m}$$

$$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH, Win} = 87.2 \text{ kN} \cdot \text{m}$$

$$M_{Water, Above, Win} = 0$$

Soil (S):

$$F_{US, silt, Hor} = 0 \text{ kN}$$

$$W_{US, silt} = 0 \text{ kN}$$

$$F_{DS, fill, Hor} = 0$$

$$W_{DS, fill} = 0$$

$$W_{Granular, Win} = 0 \text{ kN}$$

$$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, fill, Hor} = 0$$

$$M_{DS, fill, Ver} = 0$$

$$M_{Granular, Win} = 0 \text{ kN} \cdot \text{m}$$

Uplift (U):

$$F_{U0, Win, Hor} = 0 \cdot \text{kN}$$

$$F_{U0, Win, Ver} = -260.6 \cdot \text{kN}$$

$$M_{U0, Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor, Hor} = 0$$

$$F_{anchor, Ver} = 0$$

$$F_{other, Hor, 1} = 0$$

$$F_{other, Ver, 1} = 0$$

$$M_{anchor, Hor} = 0$$

$$M_{anchor, Ver} = 0$$

$$M_{other, Hor, 1} = 0$$

$$M_{other, Ver, 1} = 0$$

Ice (I):

$$F_{ice} = 267.1 \cdot \text{kN}$$

$$M_{ice} = 985.7 \cdot \text{kN} \cdot \text{m}$$

LC.4 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 431.8 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 2267.1 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 431.8 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 2267.1 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 10047.6 \text{ kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice}) = 2628 \text{ kN} \cdot \text{m}$$

$$M_{\text{net}0} := M_{\text{stab}0} - M_{\text{overturn}0} = 7419.6 \text{ kN}\cdot\text{m}$$

LC.4 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{\text{net}0}}{F_{\text{perp}0}} = 3.27 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$\begin{aligned} L_{\text{incl}} &= 7.95 \text{ m} \\ M_{\text{net}0} &= 7419.6 \text{ kN}\cdot\text{m} \\ F_{\text{perp}0} &= 2267.1 \text{ kN} \end{aligned}$$

$$E_0 := \frac{L_{\text{incl}}}{2} - x_0 = 0.70 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{\text{max}0} = 260.5 \text{ kPa}$$

$$q_{\text{min}0} = 80.0 \text{ kPa}$$

$$L_{\text{comp}0} = 7.95 \text{ m}$$

$$L_{\text{tens}0} = 0.00 \text{ m}$$

$$L_{\text{crack}0} = 0.00 \text{ m}$$

$$F_{\text{comp}0} := \begin{cases} F_{\text{perp}0} & \text{if } q_{\text{min}0} \geq 0 \\ \frac{B \cdot q_{\text{max}0} \cdot L_{\text{comp}0}}{2} & \text{otherwise} \end{cases} = 2267087.6$$

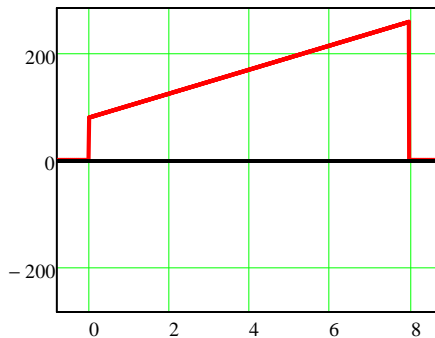
$$F_{\text{tens}0} := \frac{B \cdot q_{\text{min}0} \cdot L_{\text{tens}0}}{2} = 0 \text{ kN}$$

$$\frac{L_{\text{comp}0}}{L_{\text{incl}}} = 100 \cdot \%$$

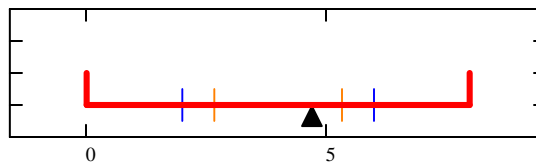
$$\frac{L_{\text{tens}0}}{L_{\text{incl}}} = 0 \cdot \%$$

$$\frac{L_{\text{crack}0}}{L_{\text{incl}}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.4 - Sliding

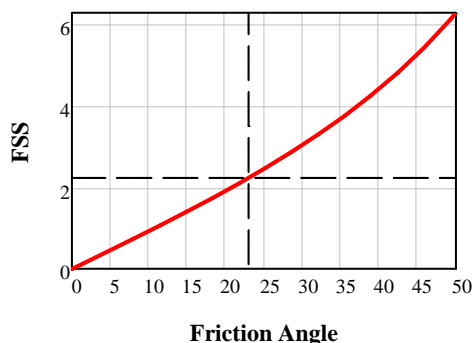
$$FSS_0(\theta) := \frac{F_{\text{comp}0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{\text{comp}0} + \frac{L_{\text{tens}0}}{2} \right)}{F_{\text{parallel}0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 2.23$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{\text{incl}} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$



LC.4 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overturm}$, need to be modified for each load combination.


$crackactive := \begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 5. Extreme Loading Earthquake ($D+H+S+Q+U_Q$)

LC.5 - Summary of Forces

Deadloads (D):

$$W_{conc} = 1567.8 \cdot \text{kN}$$

$$W_{log,Sum} = 0$$

$$W_{slab} = 959.9 \text{ kN}$$

$$W_{tower} = 0$$

$$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log,Sum} = 0$$

$$M_{slab} = 3815.8 \text{ kN} \cdot \text{m}$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US,Sum,Hor} = 260.4 \cdot \text{kN}$$

$$F_{US,Sum,Ver} = 0 \cdot \text{kN}$$

$$M_{US,Sum,Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{US,Sum,Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$F_{DS,Sum,Hor} = 0 \text{ kN}$$

$$F_{DS,Sum,Ver} = 0 \text{ kN}$$

$$F_{gateH,Sum} = 103.4 \text{ kN}$$

$$W_{Water,Above,Sum} = 0$$

$$M_{DS,Sum,Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS,Sum,Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH,Sum} = 316.1 \text{ kN} \cdot \text{m}$$

$$M_{Water,Above,Sum} = 0$$

Soil (S):

$$F_{US,silt,Hor} = 0 \text{ kN}$$

$$W_{US,silt} = 0 \text{ kN}$$

$$F_{DS,fill,Hor} = 0$$

$$W_{DS,fill} = 0$$

$$W_{Granular,EQ} = 0 \text{ kN}$$

$$M_{US,silt,Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US,silt,Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS,fill,Hor} = 0$$

$$M_{DS,fill,Ver} = 0$$

$$M_{Granular,EQ} = 0 \text{ kN} \cdot \text{m}$$

Uplift (U):

$$F_{U0,Sum,Hor} = 0 \cdot \text{kN}$$

$$F_{U0,Sum,Ver} = -367.7 \cdot \text{kN}$$

$$M_{U0,Sum} = 1949 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor,Hor} = 0$$

$$F_{anchor,Ver} = 0$$

$$F_{other,Hor,1} = 0$$

$$F_{other,Ver,1} = 0$$

$$M_{anchor,Hor} = 0$$

$$M_{anchor,Ver} = 0$$

$$M_{other,Hor,1} = 0$$

$$M_{other,Ver,1} = 0$$

Seismic (Q):

$$F_{eq,conc,Hor} = 130.8 \text{ kN}$$

$$M_{eq,conc,Hor} = 370.7 \text{ kN} \cdot \text{m}$$

$F_{eq.conc.Ver} = 87.2 \text{ kN}$

$F_{eq.log.Hor} = 0$

$F_{eq.log.Ver} = 0$

$F_{eq.slabs.Hor} = 80.1 \text{ kN}$

$F_{eq.slabs.Ver} = 53.4 \text{ kN}$

$F_{eq.tower.Hor} = 0$

$F_{eq.tower.Ver} = 0$

$F_{eq.HD.US} = 23.3 \text{ kN}$

$F_{eq.HD.gate} = 9 \text{ kN}$

$F_{eq.silt.Hor} = 0 \text{ kN}$

$F_{eq.silt.Ver} = 0 \text{ kN}$

$F_{eq.fill.Hor} = 0$

$F_{eq.fill.Ver} = 0$

$F_{eq.Granular.Ver} = 0 \text{ kN}$

$F_{eq.Granular.Hor} = 0 \text{ kN}$

$F_{eq.Water.Above.Ver} = 0$

$F_{eq.Water.Above.Hor} = 0$

$M_{eq.conc.Ver} = 346.5 \text{ kN}\cdot\text{m}$

$M_{eq.log.Hor} = 0$

$M_{eq.log.Ver} = 0$

$M_{eq.slabs.Hor} = 550.6 \text{ kN}\cdot\text{m}$

$M_{eq.slabs.Ver} = 212.2 \text{ kN}\cdot\text{m}$

$M_{eq.tower.Hor} = 0$

$M_{eq.tower.Ver} = 0$

$M_{eq.HD.US} = 52.8 \text{ kN}\cdot\text{m}$

$M_{eq.HD.gate} = 32.1 \text{ kN}\cdot\text{m}$

$M_{eq.silt.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.silt.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.fill.Hor} = 0$

$M_{eq.fill.Ver} = 0$

$M_{eq.Granular.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.Granular.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.Water.Above.Ver} = 0$

$M_{eq.Water.Above.Hor} = 0$

LC.5 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 606.9 \text{ kN}$$

$$+ (F_{U0.Sum.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1}) \dots$$

$$+ (F_{eq.conc.Hor} + F_{eq.log.Hor} + F_{eq.slabs.Hor} + F_{eq.tower.Hor} + F_{eq.HD.US} + F_{eq.HD.gate} + F_{eq.silt.Hor} + F_{eq.fill.Hor} + F_{eq.Granular.Hor})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 2019.4 \text{ kN}$$

$$+ (W_{US.silt} + W_{DS.fill} + W_{Granular.EQ}) + (F_{U0.Sum.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1}) \dots$$

$$+ (-F_{eq.conc.Ver} - F_{eq.log.Ver} - F_{eq.slabs.Ver} - F_{eq.tower.Ver} - F_{eq.silt.Ver} - F_{eq.fill.Ver} - F_{eq.Granular.Ver} - F_{eq.Water.Above.Ver})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 606.9 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 2019.4 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 10047.6 \text{ kN}\cdot\text{m}$$

$$+ (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.Sum}) \dots = 4318.7 \text{ kN}\cdot\text{m}$$

$$+ \left(\begin{array}{l} M_{eq.conc.Hor} + M_{eq.conc.Ver} + M_{eq.log.Hor} + M_{eq.log.Ver} + M_{eq.slabs.Hor} \dots \\ + M_{eq.slabs.Ver} + M_{eq.tower.Hor} + M_{eq.tower.Ver} + M_{eq.HD.US} + M_{eq.HD.gate} \dots \\ + M_{eq.silt.Hor} + M_{eq.silt.Ver} + M_{eq.fill.Hor} + M_{eq.fill.Ver} + M_{eq.Granular.Ver} \dots \\ + M_{eq.Granular.Hor} + M_{eq.Water.Above.Ver} + M_{eq.Water.Above.Hor} \end{array} \right)$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 5728.9 \text{ kN}\cdot\text{m}$$

LC.5 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.84 \text{ m}$$

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 5728.9 \text{ kN}\cdot\text{m}$$

$$F_{perp0} = 2019.4 \text{ kN}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 1.14 \text{ m}$$

Stress Calculations

$$q_{max0} = 281.9 \text{ kPa}$$

$$q_{min0} = 21.4 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack.eq} := L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2019428.9$$

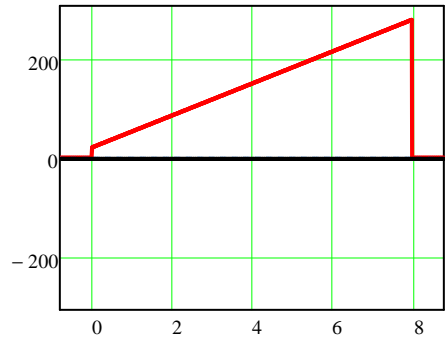
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

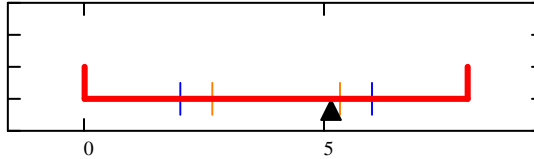
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.5 - Sliding

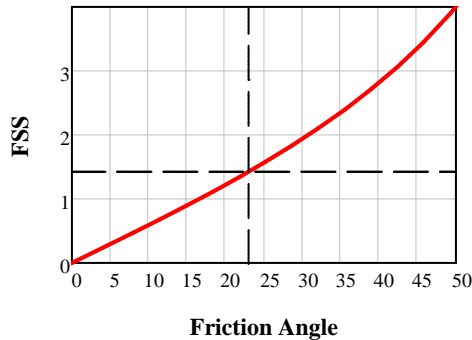
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 7.95 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 1.67 \text{ m}$

$$FSS_0(\phi_{cf}) = 1.41$$

Factor of safety against sliding for specified friction angle



LC.5 - Cracked Base Analysis

Note: Iterative cracked base analysis does not occur during seismic conditions. Initial uplift pressures are assumed to be maintained even if cracking occurs, as per CDA guidelines.

☐ Store results for summary

☐ Store (uncracked) results for Combined Analysis

Load Case 6. Post-Earthquake (D+H+S+U_{PQ})

LC.6(U) - Uplift

Updated uplift calculations

$$L_{\text{crack0}} := L_{\text{crack.eq}} = 0.00 \text{ m}$$

Crack length is set to the resulting crack length from LC.4.

$$P_{U.eq}(x) := P_{UL}(x, L_{\text{crack0}}, P_{USUL.Sum}, P_{DSUL.Sum})$$

$$F_{U0.eq} := \int_0^{L_{\text{incl}}} P_{U.eq}(x) \cdot B \, dx = 367.7 \cdot \text{kN}$$

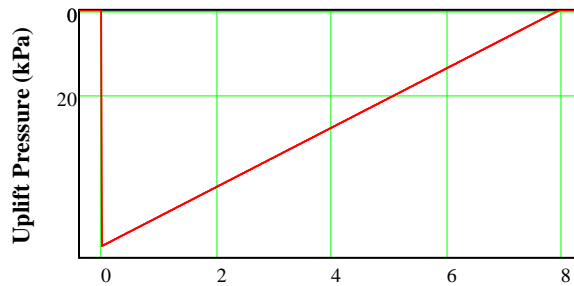
$$MA := L_{\text{incl}} - \frac{1}{F_{U0.eq}} \left(\int_0^{L_{\text{incl}}} P_{U.eq}(x) \cdot x \cdot B \, dx \right) = 5.3 \text{ m}$$

$$M_{U0.eq} := F_{U0.eq} \cdot MA = 1949 \cdot \text{kN} \cdot \text{m}$$

$$F_{U0.eq.Hor} := -F_{U0.eq} \cdot \sin(\alpha) = 0 \cdot \text{kN}$$

$$F_{U0.eq.Ver} := -F_{U0.eq} \cdot \cos(\alpha) = -367.7 \cdot \text{kN}$$

Uplift Pressure Diagram (Uncracked Base)



Updated uplift calculations

LC.6 - Summary of Forces

Deadloads (D):

$$W_{\text{conc}} = 1567.8 \cdot \text{kN}$$

$$W_{\text{log.Sum}} = 0$$

$$W_{\text{slab}} = 959.9 \text{ kN}$$

$$W_{\text{tower}} = 0$$

$$M_{\text{conc}} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{\text{log.Sum}} = 0$$

$$M_{\text{slab}} = 3815.8 \text{ kN} \cdot \text{m}$$

$$M_{\text{tower}} = 0$$

Hydraulic (H):

$$F_{US.Sum.Hor} = 260.4 \cdot \text{kN}$$

$$F_{US.Sum.Ver} = 0 \cdot \text{kN}$$

$$F_{DS.Sum.Hor} = 0 \text{ kN}$$

$$F_{DS.Sum.Ver} = 0 \text{ kN}$$

$$F_{\text{gateH.Sum}} = 103.4 \text{ kN}$$

$$W_{\text{Water.Above.Sum}} = 0$$

$$M_{US.Sum.Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{\text{gateH.Sum}} = 316.1 \text{ kN} \cdot \text{m}$$

$$M_{\text{Water.Above.Sum}} = 0$$

Soil (S):

$$F_{US.silt.Hor} = 0 \text{ kN}$$

$$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$\begin{aligned} W_{US.silt} &= 0 \text{ kN} \\ F_{DS.fill.Hor} &= 0 \\ W_{DS.fill} &= 0 \\ W_{Granular.Post.EQ} &= 0 \text{ kN} \end{aligned}$$

$$\begin{aligned} M_{US.silt.Ver} &= 0 \text{ kN} \cdot \text{m} \\ M_{DS.fill.Hor} &= 0 \\ M_{DS.fill.Ver} &= 0 \\ M_{Granular.Post.EQ} &= 0 \text{ kN} \cdot \text{m} \end{aligned}$$

Uplift (U):

$$\begin{aligned} F_{U0.eq.Hor} &= 0 \cdot \text{kN} \\ F_{U0.eq.Ver} &= -367.7 \cdot \text{kN} \end{aligned}$$

$$M_{U0.eq} = 1949 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$\begin{aligned} F_{anchor.Hor} &= 0 \\ F_{anchor.Ver} &= 0 \\ F_{other.Hor.1} &= 0 \\ F_{other.Ver.1} &= 0 \end{aligned}$$

$$\begin{aligned} M_{anchor.Hor} &= 0 \\ M_{anchor.Ver} &= 0 \\ M_{other.Hor.1} &= 0 \\ M_{other.Ver.1} &= 0 \end{aligned}$$

LC.6 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 363.8 \text{ kN} \\ + (F_{U0.eq.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 2160 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill} + W_{Granular.Post.EQ}) + (F_{U0.eq.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 363.8 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 2160.0 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 10047.6 \text{ kN} \cdot \text{m} \\ + (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.Post.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.eq}) = 2753.8 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 7293.8 \text{ kN} \cdot \text{m}$$

LC.6 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.38 \text{ m}$$

$$e_0 := \frac{L_{incl}}{2} - x_0 = 0.60 \text{ m}$$

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 7293.8 \text{ kN}\cdot\text{m}$$

$$F_{perp0} = 2160.0 \text{ kN}$$

Stress Calculations

$$q_{max0} = 235.4 \text{ kPa}$$

$$q_{min0} = 89.0 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$L_{crack0} := \begin{cases} L_{crack.eq} & \text{if } L_{crack.eq} > L_{crack0} \\ L_{crack0} & \text{otherwise} \end{cases} = 0.00$$

Adjust the crack length to be larger of eq, or post-eq load case.

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2159969$$

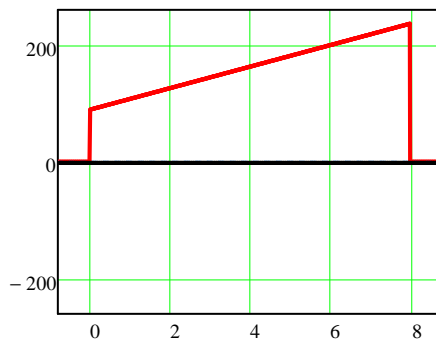
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

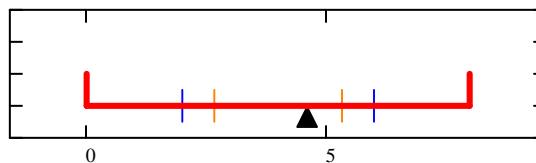
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.6 - Sliding

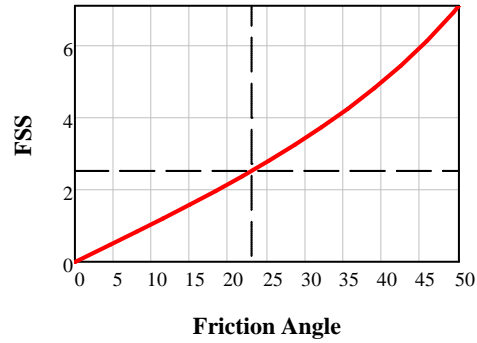
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 7.95 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 1.67 \text{ m}$

$$FSS_0(\phi_{cf}) = 2.52$$


Factor of safety against sliding for specified friction angle





LC.6 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overtum}$, need to be modified for each load combination.

$crackactive := \begin{cases} 1 & \text{if } L_{crack0} > L_{crack.eq} \\ 0 & \text{otherwise} \end{cases} = 0$ *Determines if the cracked analysis should run.*

 Cracked Base Analysis

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Summary of Forces/Moments

Dead Loads (and related seismic)

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$F_{eq.conc.Hor} = 130.8 \text{ kN}$	$M_{eq.conc.Hor} = 370.7 \text{ kN} \cdot \text{m}$
$F_{eq.conc.Ver} = 87.2 \text{ kN}$	$M_{eq.conc.Ver} = 346.5 \text{ kN} \cdot \text{m}$
$W_{log.Sum} = 0$	$M_{log.Sum} = 0$
$W_{log.Win} = 0$	$M_{log.Win} = 0$
$W_{log.IDF} = 0$	$M_{log.Win} = 0$
$F_{eq.log.Hor} = 0$	$M_{eq.log.Hor} = 0$
$F_{eq.log.Ver} = 0$	$M_{eq.log.Ver} = 0$
$W_{slab} = 959.9 \text{ kN}$	$M_{slab} = 3815.8 \text{ kN} \cdot \text{m}$
$F_{eq.slab.Hor} = 80.1 \text{ kN}$	$M_{eq.slab.Hor} = 550.6 \text{ kN} \cdot \text{m}$
$F_{eq.slab.Ver} = 53.4 \text{ kN}$	$M_{eq.slab.Ver} = 212.2 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$
$F_{eq.tower.Hor} = 0$	$M_{eq.tower.Hor} = 0$
$F_{eq.tower.Ver} = 0$	$M_{eq.tower.Ver} = 0$

Soil Loads (and related seismic)

$F_{US.silt.Hor} = 0 \text{ kN}$	$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Hor} = 0 \text{ kN}$	$M_{eq.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US.silt} = 0 \text{ kN}$	$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Ver} = 0 \text{ kN}$	$M_{eq.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.fill.Hor} = 0$	$M_{DS.fill.Hor} = 0$
$F_{eq.fill.Hor} = 0$	$M_{eq.fill.Hor} = 0$
$F_{eq.fill.Ver} = 0$	$M_{eq.fill.Ver} = 0$
$W_{DS.fill} = 0$	$M_{DS.fill.Ver} = 0$
$W_{Granular.Sum} = 0 \text{ kN}$	$M_{Granular.Sum} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.Granular.Ver} = 0 \text{ kN}$	$M_{eq.Granular.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.Granular.Hor} = 0 \text{ kN}$	$M_{eq.Granular.Hor} = 0 \text{ kN} \cdot \text{m}$

Uplift Forces

$F_{U0.Sum} = 367.7 \text{ kN}$	$M_{U0.Sum} = 1949 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Sum.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Sum.Ver} = -367.7 \cdot \text{kN}$	
$F_{U0.Win} = 260.6 \text{ kN}$	$M_{U0.Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Win.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Win.Ver} = -260.6 \cdot \text{kN}$	
$F_{U0.IDF} = 761.6 \text{ kN}$	$M_{U0.IDF} = 3165.8 \cdot \text{kN} \cdot \text{m}$
$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$	
$F_{U0.IDF.Ver} = -761.6 \cdot \text{kN}$	
$F_{U0.eq} = 367.7 \text{ kN}$	$M_{U0.eq} = 1949 \cdot \text{kN} \cdot \text{m}$
$F_{U0.eq.Hor} = 0 \cdot \text{kN}$	
$F_{U0.eq.Ver} = -367.7 \cdot \text{kN}$	

Hydraulic Forces (and related seismic)

$F_{US.Sum.Hor} = 260.4 \cdot \text{kN}$	$M_{US.Sum.Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$
$F_{eq.HD.US} = 23.3 \text{ kN}$	$M_{eq.HD.US} = 52.8 \text{ kN} \cdot \text{m}$
$F_{US.Sum.Ver} = 0 \cdot \text{kN}$	$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Sum} = 0$	$M_{Water.Above.Sum} = 0$
$F_{eq.Water.Above.Ver} = 0$	$M_{eq.Water.Above.Ver} = 0$
$F_{eq.Water.Above.Hor} = 0$	$M_{eq.Water.Above.Hor} = 0$
$F_{US.Win.Hor} = 130.8 \cdot \text{kN}$	$M_{US.Win.Hor} = 174 \cdot \text{kN} \cdot \text{m}$
$F_{US.Win.Ver} = 0 \cdot \text{kN}$	$M_{US.Win.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Win} = 0$	$M_{Water.Above.Win} = 0$
$F_{US.IDF.Hor} = 353.6 \cdot \text{kN}$	$M_{US.IDF.Hor} = 752.8 \cdot \text{kN} \cdot \text{m}$
$F_{US.IDF.Ver} = 0 \cdot \text{kN}$	$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.IDF} = 0$	$M_{Water.Above.IDF} = 0$
$F_{DS.Sum.Hor} = 0 \text{ kN}$	$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Sum.Ver} = 0 \text{ kN}$	$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Hor} = 0 \text{ kN}$	$M_{DS.Win.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Ver} = 0 \text{ kN}$	$M_{DS.Win.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Hor} = 207.9 \text{ kN}$	$M_{DS.IDF.Hor} = 348.5 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Ver} = 0 \text{ kN}$	$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH.Sum} = 103.4 \text{ kN}$	$M_{gateH.Sum} = 316.1 \text{ kN} \cdot \text{m}$
$F_{eq.HD.gate} = 9 \text{ kN}$	$M_{eq.HD.gate} = 32.1 \text{ kN} \cdot \text{m}$
$F_{gateH.Win} = 33.9 \text{ kN}$	$M_{gateH.Win} = 87.2 \text{ kN} \cdot \text{m}$
$F_{gateH.IDF} = 150.5 \text{ kN}$	$M_{gateH.IDF} = 477.9 \text{ kN} \cdot \text{m}$
$F_{drag} = 0$	$M_{drag} = 0$

Ice Loads

$F_{ice.1} = 139.9 \text{ kN}$	$M_{ice.1} = 516.1 \text{ kN} \cdot \text{m}$
$F_{ice.gate} = 127.3 \text{ kN}$	$M_{ice.gate} = 469.6 \text{ kN} \cdot \text{m}$
$F_{ice} = 267.1 \text{ kN}$	$M_{ice} = 985.7 \text{ kN} \cdot \text{m}$
$F_{ice.1.usual} = 125.6 \text{ kN}$	$M_{ice.1.usual} = 463.6 \text{ kN} \cdot \text{m}$
$F_{ice.gate.usual} = 114.3 \text{ kN}$	$M_{ice.gate.usual} = 421.8 \text{ kN} \cdot \text{m}$
$F_{ice.usual} = 239.9 \text{ kN}$	$M_{ice.usual} = 885.3 \text{ kN} \cdot \text{m}$

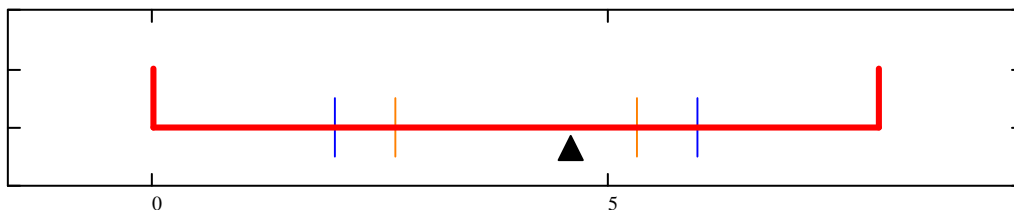
Other Forces:

$F_{anchor.Hor} = 0$	$M_{anchor.Hor} = 0$
$F_{anchor.Ver} = 0$	$M_{anchor.Ver} = 0$
$F_{other.Hor.1} = 0$	$M_{other.Hor.1} = 0$
$F_{other.Ver.1} = 0$	$M_{other.Ver.1} = 0$

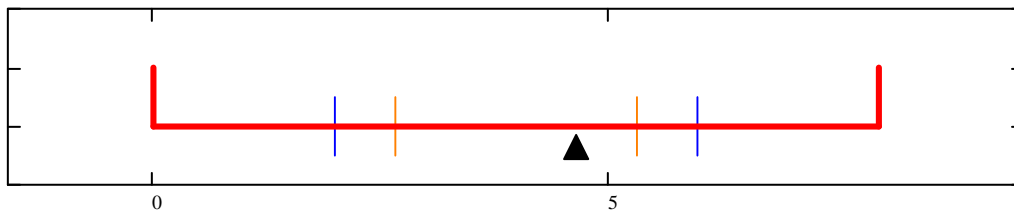
Results of Analysis

	FSS (Φ.cf)	E (m)	x.o (m)	L.comp (m)	% of Base in Compression	L.crack (m)	F.hor (kN)	F.ver (kN)	F.parallel (kN)	F.Perp (kN)	q.max (kPa)
LC.1 - Summer	2.52	0.60	3.38	7.95	100%	0.00	363.8	2,160.0	363.8	2,160.0	235.4
LC.2 - Winter (Usual)	2.38	0.66	3.32	7.95	100%	0.00	404.6	2,267.1	404.6	2,267.1	254.8
LC.3 - IDF	2.53	0.58	3.40	7.95	100%	0.00	296.2	1,766.1	296.2	1,766.1	190.5
LC.4 - Winter (Unusual)	2.23	0.70	3.27	7.95	100%	0.00	431.8	2,267.1	431.8	2,267.1	260.5
LC.5 - EQ	1.41	1.14	2.84	7.95	100%	0.00	606.9	2,019.4	606.9	2,019.4	281.9
LC.6 - Post - EQ	2.52	0.60	3.38	7.95	100%	0.00	363.8	2,160.0	363.8	2,160.0	235.4

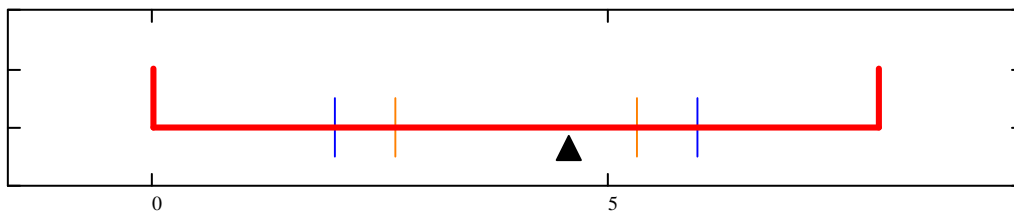
Location of Resultant



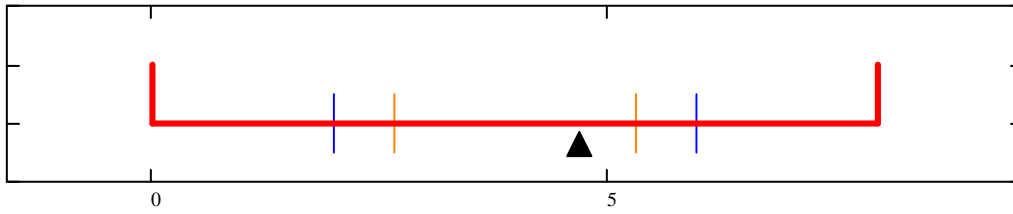
LC 1



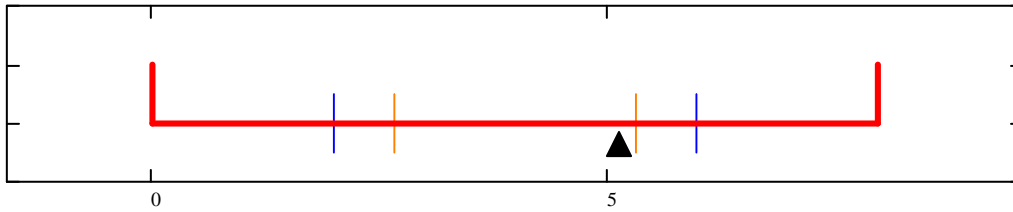
LC 2



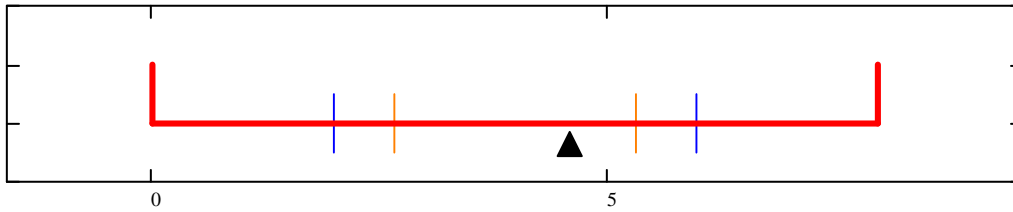
LC 3



LC 4



LC 5



LC 6

DESIGN CALCULATIONS COVER SHEET

Project No. :	17-3212-001	Project Name :	Howson Dam (South Structure)		
File No. :		Discipline :	Structural Engineering		
Calculation Title :	Spillway Stability Analysis Sheet (LRIA - v3.3)				
Calculation No. :	CIV-002	Prepared by :	HS	Date :	Feb. 23, 2018
No. of Sheets :		Checked by :	YF	Date :	April 20,2018
Supersedes Calc. No. :		Approved by :		Date :	

Calculation Description :

The dam has been reviewed against LRIA technical bulletins

Related Design Concept :

Stability analysis for the structures is carried out using the "Gravity Method".
Six loading cases are utilized in the analyses based on the LRIA Technical Bulletin "Structural Design and Factors of Safety (August 2011)".

Reference Codes and Standards :

1. *Design of Small Dams*, Third Edition, U.S. Government Printing Office, Washington, D.C. 1987.
2. Structural Design and Factors of Safety – Technical Bulletin Ontario Ministry of Natural Resources (August 2011)
3. 2009 Parks Canada Directive for Dam Safety Program of Dams and Water-Retaining Structures

ENGINEER'S SEAL

Rev. #	Rev. Description	Rev. Author	Date Revised	Checked by	Approved by	Approved Date

► Notes and Figures

Properties of Materials



$$\gamma_w := 9.81 \frac{\text{kN}}{\text{m}^3}$$

Water density

$$\gamma_{\text{silt}} := 7.7 \frac{\text{kN}}{\text{m}^3}$$

Silt density

$$\gamma_{\text{conc}} := 23.5 \frac{\text{kN}}{\text{m}^3}$$

Concrete density

$$\phi_{\text{silt}} := 20 \cdot \text{deg}$$

Angle of internal friction for silt at rest condition

$$\phi_{\text{cf}} := 23 \cdot \text{deg}$$

Friction angle of concrete/foundation interface

$$\gamma_{\text{fill}} := 7.7 \frac{\text{kN}}{\text{m}^3}$$

Backfill density

$$\phi_{\text{fill}} := 30 \cdot \text{deg}$$

Angle of internal friction for backfill at rest condition

$$c := 0 \text{ MPa}$$

Cohesion at concrete/foundation interface (generally set to 0)

$$\gamma_{\text{timber}} := 10 \frac{\text{kN}}{\text{m}^3}$$

Timber density (for stoplogs)

$$f_{t,cf} := \frac{-c}{2} = 0$$

Tensile strength at concrete/rock interface (generally set to 0, or 0.5 x cohesion). This is a negative number.

$$\gamma_{\text{Granular}} := 0 \frac{\text{kN}}{\text{m}^3}$$

Weight of granular material or rip rap on top of section



Water Levels



Usual Summer Operating Levels *Used in LC 1,4,5*

$$WL_{US,Sum} := 310.9 \text{ m}$$

Upstream water level (left side)

$$WL_{DS,Sum} := 306.06 \text{ m}$$

Downstream water level (right side)

Usual Winter Operating Levels *Used in LC 2*

$$WL_{US,Win} := 309.26 \text{ m}$$

$$WL_{DS,Win} := 306.06 \text{ m}$$

Unusual Flood Discharge Levels *Used in LC 3*

$$WL_{US,IDF} := 311.9 \text{ m}$$

$$WL_{DS,IDF} := 310.3 \text{ m}$$



Seismic Accelerations



$$\lambda_{\text{Hor}} := 0.0834$$

Horizontal component of earthquake intensity = ratio of earthquake acceleration to acceleration due to gravity (unitless number)

$$\lambda_{Ver} := \frac{2}{3} \cdot \lambda_{Hor} = 0.056$$

Vertical component of earthquake intensity. CDA recommends a factor between 1/2 and 2/3 of the horizontal acceleration (pg 15 of Seismic Hazard Considerations Technical Bulletin)



Structure Geometry

Input

Note: Enter structure geometry as series of points on X-Y grid. Align structure so that upstream is on the left side. Structure outline is "closed" automatically (last point is assigned same values as first). Ensure that values of ELE.Base.L and ELE.Base.R are adjusted to correspond with the lowest upstream and downstream elevations.

$$X := \begin{pmatrix} 0 \\ 6.20 \\ 6.20 \\ 3.59 \\ 1.39 \\ 0 \end{pmatrix} \cdot \text{m}$$

$$Y := \begin{pmatrix} 306.06 \\ 306.06 \\ 306.96 \\ 306.96 \\ 309.26 \\ 309.26 \end{pmatrix} \cdot \text{m}$$

Input X & Y coordinates

$$\text{ELEBase.L} := 306.06\text{m}$$

Elevation of left side of base (lowest point)

$$\text{ELEBase.R} := 306.06\text{m}$$

Elevation of right side of base (lowest point)

$$\text{ELETop} := 309.26\text{m}$$

Elevation of top of dam (for hydrostatic, hydrodynamic forces)

$$B := 11.58 \cdot \text{m} - \frac{2.03 + 1.32}{2} \cdot \text{m} = 9.91\text{m}$$

Set unit width of structure (1m if using metric, 1ft if using imperial units)

$$\omega_{US} := 0\text{deg}$$

Incline of upstream face from vertical (positive number in degrees)

$$\omega_{DS} := 0\text{deg}$$

Incline of downstream face from vertical (positive number in degrees)

$$L_{hor} := \max(X) - \min(X) = 6.2\text{m}$$

Horizontal projection of base

$$\alpha := \text{atan}\left(\frac{\text{ELEBase.R} - \text{ELEBase.L}}{L_{hor}}\right) = 0 \cdot \text{deg}$$

Angle of inclination of base. Positive is counter clockwise from the horizontal in the downstream direction

$$L_{incl} := \frac{L_{hor}}{\cos(\alpha)} = 6.2\text{m}$$

Inclined length of concrete-foundation interface

Variables for Combines Structure Model

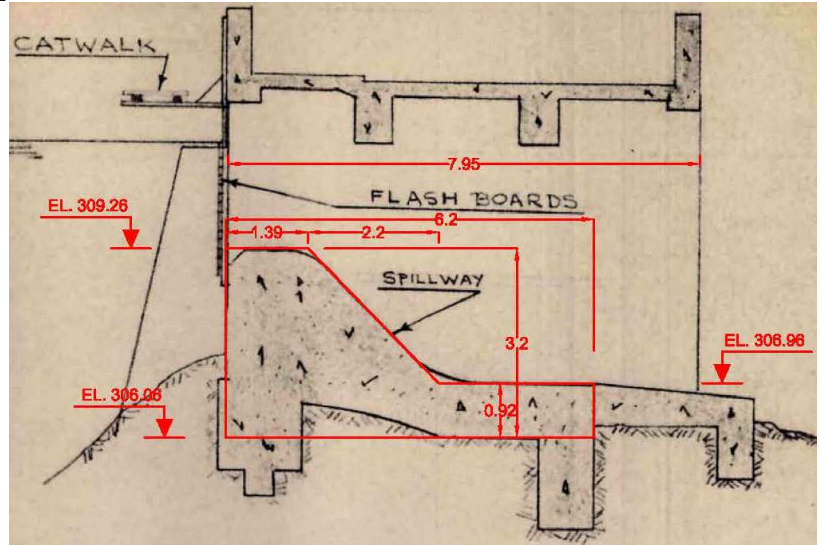
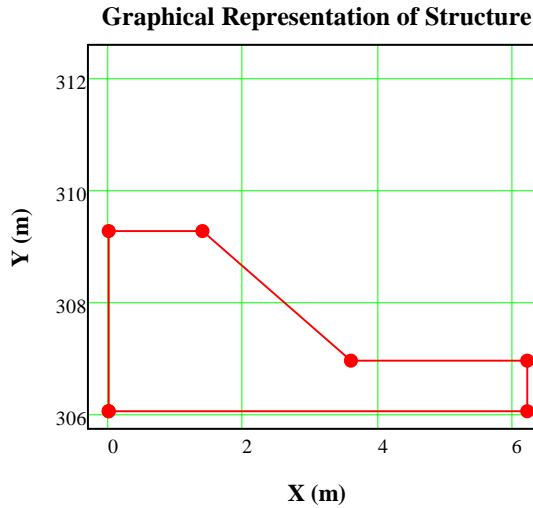
$$B_{roll} := B = 9.91\text{m}$$

$$L_{incl.roll} := L_{incl} = 6.2\text{m}$$

$$\alpha_{roll} := \alpha$$

Input

Plot Functions



► Computation of Area and Center of Gravity

Gate/Stoplog Geometry



$X_{log} := 0 \cdot m$

Horizontal distance from left side ($x=0$) to location of gate/stoplogs

$EL_{E_{sill}} := 309.26m$

Elevation of the bottom of the gate/stoplogs

$EL_{E_{gate, top}} := 309.26m$

Elevation of top of gate/stoplogs

$Trib_{gate} := 0 \cdot m$

Tributary width of gates/logs experiencing hydrostatic/hydrodynamic/ice forces

$W_{gate} := 11.58 \cdot m - \frac{2.03 + 1.32}{2} \cdot m = 9.91 m$

Total width of gate/stoplogs (for calculating weight on slab/rollway)

Forces on Gates/Stoplogs Transferred into Piers

$Gates_{Sum.Hyd} := 0$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$Gates_{Win.Hyd} := 0$

If gates are present during winter operation, set = 1, otherwise set to 0

$Gates_{IDF.Hyd} := 0$

If gates are present during IDF, set = 1, otherwise set to 0

Weight of Gates/Stoplogs bearing on rollway/slab

$Gates_{Sum.Weight} := 1$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$Gates_{Win.Weight} := 1$

If gates are present during winter operation, set = 1, otherwise set to 0

$Gates_{IDF.Weight} := 1$

If gates are present during IDF, set = 1, otherwise set to 0



Weight of Main Structure (D)



Weight of Stoplogs (D)



Weight of Slab (D) - NOT APPLICABLE



Weight of Tower(D) - NOT APPLICABLE



Weight of Riprap / Granular Material on Top of Section - NOT APPLICABLE



Input coordinates



Calculations



Results

Upstream Hydrostatic Force (H)



Figures



Calculations

Downstream Hydrostatic Force (H)



Hydrostatic Force on Gates (H)



Calculations

Hydraulic Drag Force (H)



Weight of Water Above Section (H)



Input coordinates

Reference Coordinates of Structure

$$X_{\text{struct}} = \begin{pmatrix} 0.000 \\ 6.200 \\ 6.200 \\ 3.590 \\ 1.390 \\ 0.000 \\ 0.000 \end{pmatrix} \text{ m} \quad Y_{\text{struct}} = \begin{pmatrix} 306.060 \\ 306.060 \\ 306.960 \\ 306.960 \\ 309.260 \\ 309.260 \\ 306.060 \end{pmatrix} \text{ m}$$

$$WL_{\text{US.Sum}} - ELE_{\text{Top}} = 1.6 \text{ m}$$

$$WL_{\text{US.Win}} - ELE_{\text{Top}} = 0 \text{ m}$$

$$WL_{\text{US.IDF}} - ELE_{\text{Top}} = 2.6 \text{ m}$$

$$\begin{aligned} WL_{\text{US.Sum}} &= 310.900 \text{ m} \\ WL_{\text{DS.Sum}} &= 306.060 \text{ m} \\ WL_{\text{US.Win}} &= 309.260 \text{ m} \\ WL_{\text{DS.Win}} &= 306.060 \text{ m} \\ WL_{\text{US.IDF}} &= 311.900 \text{ m} \\ WL_{\text{DS.IDF}} &= 310.300 \text{ m} \\ ELE_{\text{Base.L}} &= 306.060 \text{ m} \\ ELE_{\text{Base.R}} &= 306.060 \text{ m} \\ ELE_{\text{Top}} &= 309.260 \text{ m} \\ L_{\text{hor}} &= 6.200 \text{ m} \\ B &= 9.905 \text{ m} \end{aligned}$$

Insert coordinates of shape of water above structure

Note: if the water level is below the elevation of the top of the structure, then the arrays below will automatically be set 0 and will not factor into the calculations

$$B_{\text{water.Sum}} := B$$

$$B_{\text{water.Win}} := B$$

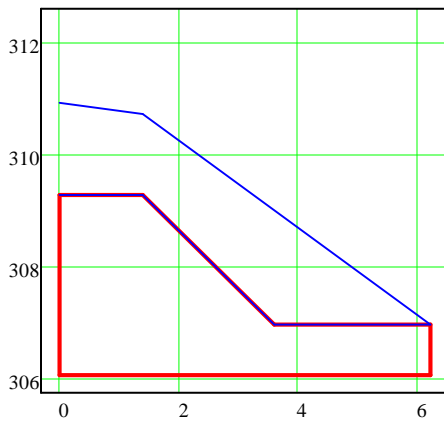
$$X_{\text{water.Sum}} := \begin{pmatrix} 0 \\ 1.39 \\ 6.20 \\ 3.59 \\ 1.39 \\ 0 \\ 0 \end{pmatrix} \text{ m}$$

$$Y_{\text{water.Sum}} := \begin{pmatrix} 310.9 \\ 310.7 \\ 306.96 \\ 306.96 \\ 309.26 \\ 309.26 \\ 309.26 \end{pmatrix} \text{ m}$$

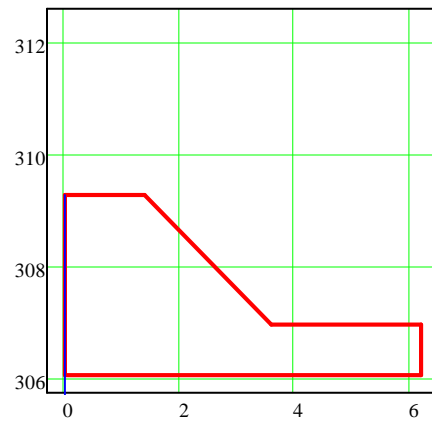
$$X_{\text{water.Win}} := \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \text{ m}$$

$$Y_{\text{water.Win}} := \begin{pmatrix} 309.26 \\ 309.26 \\ 307.15 \\ 307.15 \\ 0 \\ 0 \\ 0 \end{pmatrix} \text{ m}$$

Water Above Structure (Summer)



Water Above Structure (Winter)

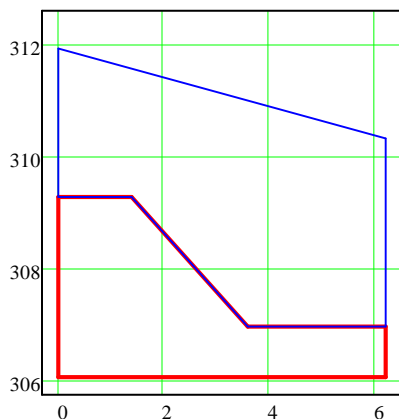


$$B_{\text{water.IDF}} := B$$

$X_{\text{water.IDF}} :=$	0	m
	1.39	
	3.59	
	6.2	
	6.2	
	0	
	0	

$Y_{\text{water.IDF}} :=$	309.26	m
	309.26	
	306.96	
	306.96	
	$\frac{WL_{DS.IDF}}{m}$	
	$\frac{WL_{US.IDF}}{m}$	
	309.26	

Water Above Structure (IDF)



Input coordinates

Calculations

Results

Initial Uplift Forces (U)

Figures

Uplift Function Definition

Input and Calculation

Plot of Results

Upstream Silt Buildup (S)

Downstream Backfill (S) - NOT APPLICABLE

Ice Loading (I)



USUAL LOAD CASE

Direct ice load on structure

$$\text{IceLoad}_{\text{usual}} := 75 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{\text{ice},1,\text{usual}} := \text{IceLoad}_{\text{usual}} B = 742.9 \cdot \text{kN}$$

Force acting on the structure

$$\text{ELE}_{\text{ice}} := \text{WL}_{\text{US.Win}} - 0.3\text{m} = 308.96\text{m}$$

Elevation of force (assumed to act at 0.3m below water level)

$$\text{MA} := \text{ELE}_{\text{ice}} - \text{ELE}_{\text{Base.R}} = 2.9\text{m}$$

Moment arm is vertical distance from force to right side of base

$$M_{\text{ice},1,\text{usual}} := F_{\text{ice},1,\text{usual}} \cdot \text{MA} = 2154.3 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

$$\begin{aligned} W_{\text{igate}} &= 9.91\text{m} \\ \text{Trib}_{\text{gate}} &= 0.00 \\ \text{ELE}_{\text{Base.R}} &= 306.060\text{m} \\ \text{WL}_{\text{US.Win}} &= 309.260\text{m} \\ B &= 9.91\text{m} \\ \text{GatesWin.Hyd} &= 0 \end{aligned}$$

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{\text{ice,gate,usual}} := \begin{cases} 0 & \text{if } \text{GatesWin.Hyd} = 0 \\ \text{IceLoad}_{\text{usual}} \cdot \text{Trib}_{\text{gate}} & \text{otherwise} \end{cases} = 0 \cdot \text{kN}$$

$$M_{\text{ice,gate,usual}} := F_{\text{ice,gate,usual}} \cdot \text{MA} = 0 \cdot \text{kN} \cdot \text{m}$$

$$F_{\text{ice,usual}} := F_{\text{ice},1,\text{usual}} + F_{\text{ice,gate,usual}} = 742.9\text{kN}$$

$$M_{\text{ice,usual}} := M_{\text{ice},1,\text{usual}} + M_{\text{ice,gate,usual}} = 2154.3 \cdot \text{kN} \cdot \text{m}$$

UNUSUAL LOAD CASE

Direct ice load on structure

$$\text{IceLoad} := 83.5 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{\text{ice},1} := \text{IceLoad} B = 827.1 \cdot \text{kN}$$

Force acting on the structure

$$M_{\text{ice},1} := F_{\text{ice},1} \cdot \text{MA} = 2398.5 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{\text{ice,gate}} := \begin{cases} 0 & \text{if } \text{GatesWin.Hyd} = 0 \\ \text{IceLoad} \cdot \text{Trib}_{\text{gate}} & \text{otherwise} \end{cases} = 0 \cdot \text{kN}$$

$$M_{\text{ice,gate}} := F_{\text{ice,gate}} \cdot \text{MA} = 0 \cdot \text{kN} \cdot \text{m}$$

$$F_{\text{ice}} := F_{\text{ice},1} + F_{\text{ice,gate}} = 827.1\text{kN}$$


$$M_{\text{ice}} := M_{\text{ice},1} + M_{\text{ice,gate}} = 2398.5 \cdot \text{kN} \cdot \text{m}$$



Seismic Forces - Inertia of Structure Dead Load (Q)



Seismic Forces - Hydrodynamic Forces (Q)

 Figures

 Calculations

Seismic Forces - Dynamic Soil Pressures (Q)



Tensioned Anchors - NOT APPLICABLE



Other Forces - NOT APPLICABLE



Load Case 1. Usual Loading Summer Case (D+H+S+U)

LC.1 - Summary of Forces

Deadloads (D):

$$\begin{aligned} W_{\text{conc}} &= 2631.9 \cdot \text{kN} \\ W_{\text{log.Sum}} &= 0 \\ W_{\text{slab}} &= 0 \\ W_{\text{tower}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{conc}} &= 10523.8 \cdot \text{kN} \cdot \text{m} \\ M_{\text{log.Sum}} &= 0 \\ M_{\text{slab}} &= 0 \\ M_{\text{tower}} &= 0 \end{aligned}$$

Hydraulic (H):

$$\begin{aligned} F_{\text{US.Sum.Hor}} &= 1007.4 \cdot \text{kN} \\ F_{\text{US.Sum.Ver}} &= 0 \cdot \text{kN} \\ F_{\text{DS.Sum.Hor}} &= 0 \text{ kN} \\ F_{\text{DS.Sum.Ver}} &= 0 \text{ kN} \\ F_{\text{gateH.Sum}} &= 0 \\ W_{\text{Water.Above.Sum}} &= 836.2 \text{ kN} \end{aligned}$$

$$\begin{aligned} M_{\text{US.Sum.Hor}} &= 1346.6 \cdot \text{kN} \cdot \text{m} \\ M_{\text{US.Sum.Ver}} &= 0 \cdot \text{kN} \cdot \text{m} \\ M_{\text{DS.Sum.Hor}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{DS.Sum.Ver}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{gateH.Sum}} &= 0 \\ M_{\text{Water.Above.Sum}} &= 2948.6 \text{ kN} \cdot \text{m} \end{aligned}$$

Soil (S):

$$\begin{aligned} F_{\text{US.silt.Hor}} &= 0 \text{ kN} \\ W_{\text{US.silt}} &= 0 \text{ kN} \\ F_{\text{DS.fill.Hor}} &= 0 \text{ kN} \\ W_{\text{DS.fill}} &= 0 \text{ kN} \\ W_{\text{Granular.Sum}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{US.silt.Hor}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{US.silt.Ver}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{DS.fill.Hor}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{DS.fill.Ver}} &= 0 \text{ kN} \cdot \text{m} \\ M_{\text{Granular.Sum}} &= 0 \end{aligned}$$

Uplift (U):

$$\begin{aligned} F_{\text{U0.Sum.Hor}} &= 0 \cdot \text{kN} \\ F_{\text{U0.Sum.Ver}} &= -1457.9 \cdot \text{kN} \end{aligned}$$

$$M_{\text{U0.Sum}} = 6026 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$\begin{aligned} F_{\text{anchor.Hor}} &= 0 \\ F_{\text{anchor.Ver}} &= 0 \\ F_{\text{other.Hor.1}} &= 0 \\ F_{\text{other.Ver.1}} &= 0 \end{aligned}$$

$$\begin{aligned} M_{\text{anchor.Hor}} &= 0 \\ M_{\text{anchor.Ver}} &= 0 \\ M_{\text{other.Hor.1}} &= 0 \\ M_{\text{other.Ver.1}} &= 0 \end{aligned}$$

LC.1 - Combine Forces and Moments

$$F_{\text{hor0}} := (F_{\text{US.Sum.Hor}} - F_{\text{DS.Sum.Hor}} + F_{\text{gateH.Sum}}) + (F_{\text{US.silt.Hor}} - F_{\text{DS.fill.Hor}}) \dots = 1007.4 \text{ kN} \quad \text{Sum of horizontal forces}$$

$$+ (F_{\text{U0.Sum.Hor}}) + (F_{\text{anchor.Hor}} + F_{\text{other.Hor.1}})$$

$$F_{\text{ver0}} := (W_{\text{conc}} + W_{\text{log.Sum}} + W_{\text{slab}} + W_{\text{tower}}) + (F_{\text{US.Sum.Ver}} + F_{\text{DS.Sum.Ver}} + W_{\text{Water.Above.Sum}}) \dots = 2010.2 \text{ kN} \quad \text{Sum of vertical forces}$$

$$+ (W_{\text{US.silt}} + W_{\text{DS.fill}} + W_{\text{Granular.Sum}}) + (F_{\text{U0.Sum.Ver}}) + (F_{\text{anchor.Ver}} + F_{\text{other.Ver.1}})$$

$$F_{\text{parallel0}} := F_{\text{hor0}} \cdot \cos(\alpha) - F_{\text{ver0}} \cdot \sin(\alpha) = 1007.4 \cdot \text{kN} \quad \text{Forces acting parallel to uncracked base}$$

$$F_{\text{perp0}} := F_{\text{hor0}} \cdot \sin(\alpha) + F_{\text{ver0}} \cdot \cos(\alpha) = 2010.2 \cdot \text{kN} \quad \text{Forces acting perpendicular to uncracked base}$$

$$M_{\text{stab0}} := (M_{\text{conc}} + M_{\text{log.Sum}} + M_{\text{slab}} + M_{\text{tower}}) + (M_{\text{US.Sum.Ver}} + M_{\text{DS.Sum.Hor}} + M_{\text{DS.Sum.Ver}} + M_{\text{Water.Above.Sum}}) \dots = 13472.3 \cdot \text{kN} \cdot \text{m}$$

$$+ (M_{\text{US.silt.Ver}} + M_{\text{DS.fill.Hor}} + M_{\text{DS.fill.Ver}} + M_{\text{Granular.Sum}}) \dots$$

$$+ (M_{\text{anchor.Ver}} + M_{\text{anchor.Hor}} + M_{\text{other.Hor.1}} + M_{\text{other.Ver.1}}) \quad \text{Sum of stabilizing moments}$$

$$M_{\text{overturn0}} := (M_{\text{US.Sum.Hor}} + M_{\text{gateH.Sum}}) + (M_{\text{US.silt.Hor}}) + (M_{\text{U0.Sum}}) = 7372.6 \cdot \text{kN} \cdot \text{m} \quad \text{Sum of overturning moments}$$

$$M_{\text{net0}} := M_{\text{stab0}} - M_{\text{overturn0}} = 6099.8 \cdot \text{kN} \cdot \text{m} \quad \text{Net resisting moment}$$

LC.1 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.03 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$L_{incl} = 6.20 \text{ m}$$

$$M_{net0} = 6099.8 \cdot \text{kN} \cdot \text{m}$$

$$F_{perp0} = 2010.2 \text{ kN}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 0.07 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 34.8 \text{ kPa}$$

$$q_{min0} = 30.7 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp0} = 6.20 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens0} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack0} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2010152.9$$

$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

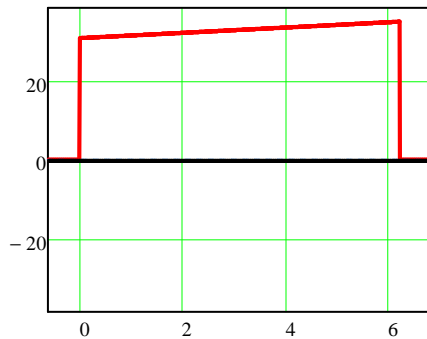
Compression and tension forces in foundation

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

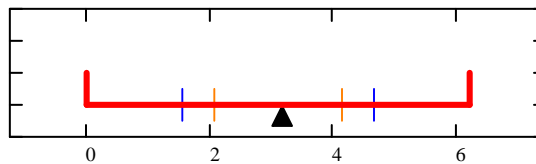
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.1 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}} \quad \text{Define function to evaluate sliding using a range of friction angles}$$

$$FSS_0(\phi_{cf}) = 0.85$$

Factor of safety against sliding for specified friction angle

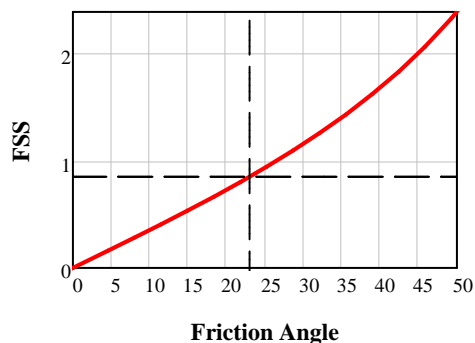
$$\phi_{cf} = 23 \cdot \text{deg}$$

$$c = 0$$

$$L_{incl} = 6.20 \text{ m}$$

$$\alpha = 0 \cdot \text{deg}$$

$$B = 9.91 \text{ m}$$



LC.1 - Cracked Base Analysis

Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overtum}$, need to be modified for each load combination.

crackactive := $\begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

crackactive := 0

No crack due to combination of sections

☒ Cracked Base Calculations

☒ Cracked Base Results

☒ Store results for summary

☒ Store (uncracked) results for Combined Analysis

Load Case 2. Usual Loading Winter Case (D+H+S+U+I)

LC.2 - Summary of Forces

Deadloads (D):

$W_{conc} = 2631.9 \cdot \text{kN}$	$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$
$W_{log, Win} = 0$	$M_{log, Win} = 0$
$W_{slab} = 0$	$M_{slab} = 0$
$W_{tower} = 0$	$M_{tower} = 0$

Hydraulic (H):

$F_{US, Win, Hor} = 497.5 \cdot \text{kN}$	$M_{US, Win, Hor} = 530.7 \cdot \text{kN} \cdot \text{m}$
$F_{US, Win, Ver} = 0 \cdot \text{kN}$	$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$F_{DS, Win, Hor} = 0 \text{ kN}$	$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, Win, Ver} = 0 \text{ kN}$	$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH, Win} = 0$	$M_{gateH, Win} = 0$
$W_{Water, Above, Win} = 0 \text{ kN}$	$M_{Water, Above, Win} = 0 \text{ kN} \cdot \text{m}$

Soil (S):

$F_{US, silt, Hor} = 0 \text{ kN}$	$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US, silt} = 0 \text{ kN}$	$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, fill, Hor} = 0 \text{ kN}$	$M_{DS, fill, Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{DS, fill} = 0 \text{ kN}$	$M_{DS, fill, Ver} = 0 \text{ kN} \cdot \text{m}$
$W_{Granular, Win} = 0$	$M_{Granular, Win} = 0$

Uplift (U):

$F_{U0, Win, Hor} = 0 \cdot \text{kN}$	$M_{U0, Win} = 3984.1 \cdot \text{kN} \cdot \text{m}$
$F_{U0, Win, Ver} = -963.9 \cdot \text{kN}$	

Other Forces:

$F_{anchor, Hor} = 0$	$M_{anchor, Hor} = 0$
$F_{anchor, Ver} = 0$	$M_{anchor, Ver} = 0$
$F_{other, Hor, 1} = 0$	$M_{other, Hor, 1} = 0$
$F_{other, Ver, 1} = 0$	$M_{other, Ver, 1} = 0$

Ice (I):

$F_{ice, usual} = 742.9 \cdot \text{kN}$	$M_{ice, usual} = 2154.3 \cdot \text{kN} \cdot \text{m}$
--	--

LC.2 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 1240.4 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice, usual})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 1668 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 1240.4 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1668.0 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 10523.8 \cdot \text{kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice, usual}) = 6669.2 \cdot \text{kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 3854.6 \cdot \text{kN} \cdot \text{m}$$

LC.2 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.31 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$L_{incl} = 6.20 \text{ m}$$

$$M_{net0} = 3854.6 \cdot \text{kN}\cdot\text{m}$$

$$F_{perp0} = 1668.0 \text{ kN}$$

$$e_0 := \frac{L_{incl}}{2} - x_0 = 0.79 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 47.9 \text{ kPa}$$

$$q_{min0} = 6.4 \text{ kPa}$$

$$L_{comp0} = 6.20 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

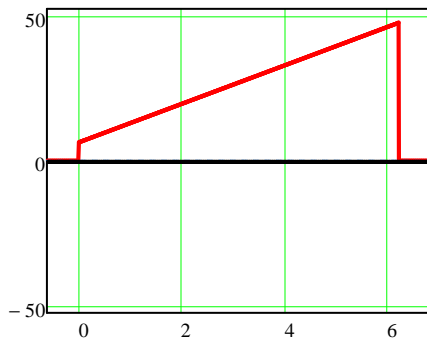
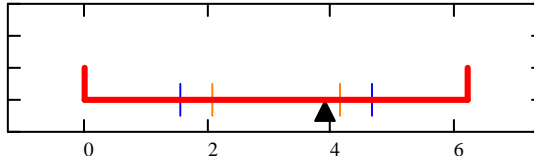
$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1667995.1$$

$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \% \quad \frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base**Location of Resultant**

Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.2 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}} \quad \text{Define function to evaluate sliding using a range of friction angles}$$

$$FSS_0(\phi_{cf}) = 0.57 \quad \text{Factor of safety against sliding for specified friction angle}$$

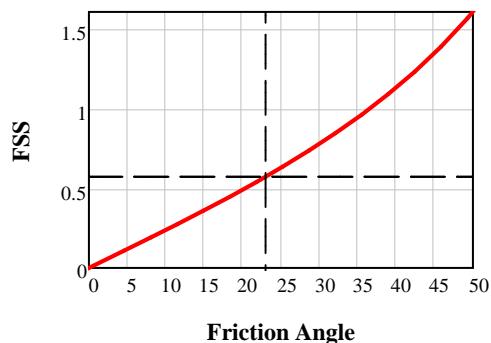
$$\phi_{cf} = 23 \cdot \text{deg}$$

$$c = 0$$

$$L_{incl} = 6.20 \text{ m}$$

$$\alpha = 0 \cdot \text{deg}$$

$$B = 9.91 \text{ m}$$



LC.2 - Cracked Base Analysis

Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


```
crackactive := 0 if Lcrack0 = 0 = 0
              1 otherwise
```


Determines if the cracked analysis should run.

```
crackactive := 0
```

No crack due to combination of sections

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 3. Unusual Loading IDF (D+H_{IDF}+S+U_{IDF})

LC.3 - Summary of Forces

Deadloads (D):

$$W_{conc} = 2631.9 \cdot \text{kN}$$

$$W_{log.IDF} = 0$$

$$W_{slab} = 0$$

$$W_{tower} = 0$$

$$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log.IDF} = 0$$

$$M_{slab} = 0$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US.IDF.Hor} = 1318.4 \cdot \text{kN}$$

$$F_{US.IDF.Ver} = 0 \cdot \text{kN}$$

$$F_{DS.IDF.Hor} = 820.9 \text{ kN}$$

$$F_{DS.IDF.Ver} = 0 \text{ kN}$$

$$F_{gateH.IDF} = 0$$

$$F_{drag} = 0$$

$$W_{Water.Above.IDF} = 1937.6 \text{ kN}$$

$$M_{US.IDF.Hor} = 1844.1 \cdot \text{kN} \cdot \text{m}$$

$$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS.IDF.Hor} = 1048.1 \text{ kN} \cdot \text{m}$$

$$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH.IDF} = 0$$

$$M_{drag} = 0$$

$$M_{Water.Above.IDF} = 5517.5 \text{ kN} \cdot \text{m}$$

Soil (S):

$$F_{US.silt.Hor} = 0 \text{ kN}$$

$$W_{US.silt} = 0 \text{ kN}$$

$$F_{DS.fill.IDF.Hor} = 0 \text{ kN}$$

$$W_{DS.fill.IDF} = 0 \text{ kN}$$

$$W_{Granular.IDF} = 0$$

$$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.fill.IDF.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.fill.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{Granular.IDF} = 0$$

Uplift (U):

$$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$$

$$F_{U0.IDF.Ver} = -3036.3 \cdot \text{kN}$$

$$M_{U0.IDF} = 9910.6 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor.Hor} = 0$$

$$F_{anchor.Ver} = 0$$

$$F_{other.Hor.1} = 0$$

$$F_{other.Ver.1} = 0$$

$$M_{anchor.Hor} = 0$$

$$M_{anchor.Ver} = 0$$

$$M_{other.Hor.1} = 0$$

$$M_{other.Ver.1} = 0$$

LC.3 - Combine Forces and Moments

$$F_{hor0} := (F_{US.IDF.Hor} - F_{DS.IDF.Hor} + F_{gateH.IDF} + F_{drag}) + (F_{US.silt.Hor} - F_{DS.fill.IDF.Hor}) \dots = 497.5 \text{ kN} \\ + (F_{U0.IDF.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.IDF} + W_{slab} + W_{tower}) + (F_{US.IDF.Ver} + F_{DS.IDF.Ver} + W_{Water.Above.IDF}) \dots = 1533.2 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill.IDF} + W_{Granular.IDF}) + (F_{U0.IDF.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 497.5 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1533.2 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.IDF} + M_{slab} + M_{tower}) + (M_{US.IDF.Ver} + M_{DS.IDF.Hor} + M_{DS.IDF.Ver} + M_{Water.Above.IDF}) \dots = 17089.3 \text{ kN} \cdot \text{m} \\ + (M_{US.silt.Ver} + M_{DS.fill.IDF.Hor} + M_{DS.fill.IDF.Ver} + M_{Granular.IDF}) \dots \\ + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.IDF.Hor} + M_{gateH.IDF} + M_{drag}) + (M_{US.silt.Hor}) + (M_{U0.IDF}) = 11754.6 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 5334.6 \text{ kN} \cdot \text{m}$$

LC.3 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.48 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = -0.38 \text{ m}$$

$$L_{incl} = 6.20 \text{ m}$$

$$M_{net0} = 5334.6 \text{ kN} \cdot \text{m}$$

$$F_{perp0} = 1533.2 \text{ kN}$$

Stress Calculations

$$q_{max0} = 34.1 \text{ kPa}$$

$$q_{min0} = 15.8 \text{ kPa}$$

$$L_{comp0} = 6.20 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1533223$$

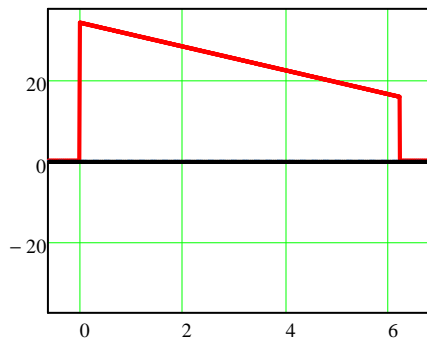
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

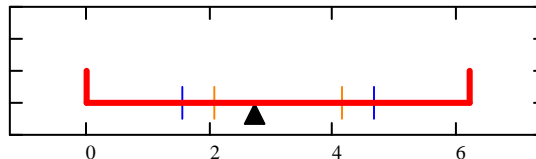
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.3 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}} \quad \text{Define function to evaluate sliding using a range of friction angles}$$

$$FSS_0(\phi_{cf}) = 1.31$$

Factor of safety against sliding for specified friction angle

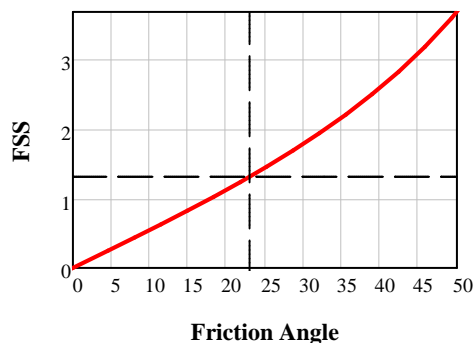
$$\phi_{cf} = 23 \cdot \text{deg}$$

$$c = 0$$

$$L_{incl} = 6.20 \text{ m}$$

$$\alpha = 0 \cdot \text{deg}$$

$$B = 9.91 \text{ m}$$



LC.3 - Cracked Base Analysis

Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


$$\text{crackactive} := \begin{cases} 0 & \text{if } L_{\text{crack}0} = 0 \\ 1 & \text{otherwise} \end{cases}$$


Determines if the cracked analysis should run.

$$\text{crackactive} := 0$$

No crack due to combination of sections

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 4. Unusual Loading Winter Case (D+H+S+U+I)

LC.4 - Summary of Forces

Deadloads (D):

$$W_{conc} = 2631.9 \cdot \text{kN}$$

$$W_{log, Win} = 0$$

$$W_{slab} = 0$$

$$W_{tower} = 0$$

$$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log, Win} = 0$$

$$M_{slab} = 0$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US, Win, Hor} = 497.5 \cdot \text{kN}$$

$$F_{US, Win, Ver} = 0 \cdot \text{kN}$$

$$F_{DS, Win, Hor} = 0 \text{ kN}$$

$$F_{DS, Win, Ver} = 0 \text{ kN}$$

$$F_{gateH, Win} = 0$$

$$W_{Water, Above, Win} = 0 \text{ kN}$$

$$M_{US, Win, Hor} = 530.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH, Win} = 0$$

$$M_{Water, Above, Win} = 0 \text{ kN} \cdot \text{m}$$

Soil (S):

$$F_{US, silt, Hor} = 0 \text{ kN}$$

$$W_{US, silt} = 0 \text{ kN}$$

$$F_{DS, fill, Hor} = 0 \text{ kN}$$

$$W_{DS, fill} = 0 \text{ kN}$$

$$W_{Granular, Win} = 0$$

$$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, fill, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, fill, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{Granular, Win} = 0$$

Uplift (U):

$$F_{U0, Win, Hor} = 0 \cdot \text{kN}$$

$$F_{U0, Win, Ver} = -963.9 \cdot \text{kN}$$

$$M_{U0, Win} = 3984.1 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor, Hor} = 0$$

$$F_{anchor, Ver} = 0$$

$$F_{other, Hor, 1} = 0$$

$$F_{other, Ver, 1} = 0$$

$$M_{anchor, Hor} = 0$$

$$M_{anchor, Ver} = 0$$

$$M_{other, Hor, 1} = 0$$

$$M_{other, Ver, 1} = 0$$

Ice (I):

$$F_{ice} = 827.1 \cdot \text{kN}$$

$$M_{ice} = 2398.5 \cdot \text{kN} \cdot \text{m}$$

LC.4 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 1324.6 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 1668 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 1324.6 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1668.0 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 10523.8 \text{ kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice}) = 6913.3 \text{ kN} \cdot \text{m}$$

$$M_{\text{net}0} := M_{\text{stab}0} - M_{\text{overturn}0} = 3610.4 \text{ kN}\cdot\text{m}$$

LC.4 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{\text{net}0}}{F_{\text{perp}0}} = 2.16 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$\begin{aligned} L_{\text{incl}} &= 6.20 \text{ m} \\ M_{\text{net}0} &= 3610.4 \text{ kN}\cdot\text{m} \\ F_{\text{perp}0} &= 1668.0 \text{ kN} \end{aligned}$$

$$E_0 := \frac{L_{\text{incl}}}{2} - x_0 = 0.94 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{\text{max}0} = 51.7 \text{ kPa}$$

$$q_{\text{min}0} = 2.6 \text{ kPa}$$

$$L_{\text{comp}0} = 6.20 \text{ m}$$

$$L_{\text{tens}0} = 0.00 \text{ m}$$

$$L_{\text{crack}0} = 0.00 \text{ m}$$

$$F_{\text{comp}0} := \begin{cases} F_{\text{perp}0} & \text{if } q_{\text{min}0} \geq 0 \\ \frac{B \cdot q_{\text{max}0} \cdot L_{\text{comp}0}}{2} & \text{otherwise} \end{cases} = 1667995.1$$

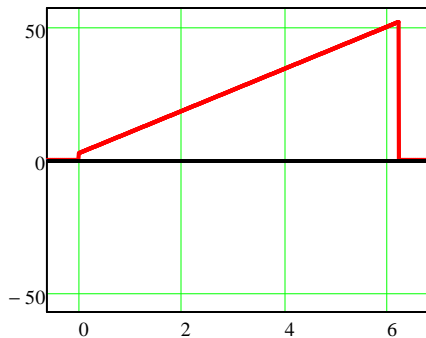
$$F_{\text{tens}0} := \frac{B \cdot q_{\text{min}0} \cdot L_{\text{tens}0}}{2} = 0 \text{ kN}$$

$$\frac{L_{\text{comp}0}}{L_{\text{incl}}} = 100 \cdot \%$$

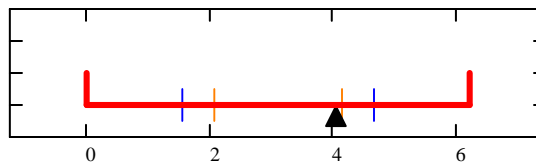
$$\frac{L_{\text{tens}0}}{L_{\text{incl}}} = 0 \cdot \%$$

$$\frac{L_{\text{crack}0}}{L_{\text{incl}}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.4 - Sliding

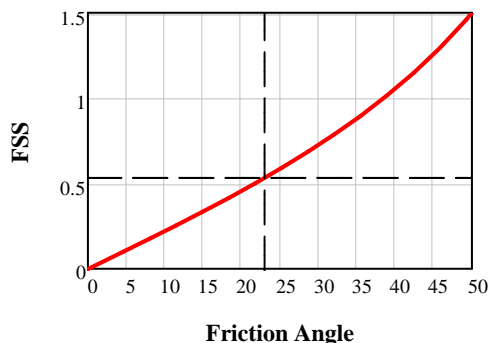
$$FSS_0(\theta) := \frac{F_{\text{comp}0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{\text{comp}0} + \frac{L_{\text{tens}0}}{2} \right)}{F_{\text{parallel}0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 0.53$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{\text{incl}} &= 6.20 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 9.91 \text{ m} \end{aligned}$$



LC.4 - Cracked Base Analysis

Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overturm}$, need to be modified for each load combination.

$crackactive := \begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

$crackactive := 0$

No crack due to combination of sections

Cracked Base Calculations

Cracked Base Results

Store results for summary

Store (uncracked) results for Combined Analysis

Load Case 5. Extreme Loading Earthquake ($D+H+S+Q+U_Q$)

LC.5 - Summary of Forces

Deadloads (D):

$W_{conc} = 2631.9 \cdot \text{kN}$

$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$

$W_{log,Sum} = 0$

$M_{log,Sum} = 0$

$W_{slab} = 0$

$M_{slab} = 0$

$W_{tower} = 0$

$M_{tower} = 0$

Hydraulic (H):

$F_{US,Sum,Hor} = 1007.4 \cdot \text{kN}$

$M_{US,Sum,Hor} = 1346.6 \cdot \text{kN} \cdot \text{m}$

$F_{US,Sum,Ver} = 0 \cdot \text{kN}$

$M_{US,Sum,Ver} = 0 \cdot \text{kN} \cdot \text{m}$

$F_{DS,Sum,Hor} = 0 \text{ kN}$

$M_{DS,Sum,Hor} = 0 \text{ kN} \cdot \text{m}$

$F_{DS,Sum,Ver} = 0 \text{ kN}$

$M_{DS,Sum,Ver} = 0 \text{ kN} \cdot \text{m}$

$F_{gateH,Sum} = 0$

$M_{gateH,Sum} = 0$

$W_{Water,Above,Sum} = 836.2 \text{ kN}$

$M_{Water,Above,Sum} = 2948.6 \text{ kN} \cdot \text{m}$

Soil (S):

$F_{US,silt,Hor} = 0 \text{ kN}$

$M_{US,silt,Hor} = 0 \text{ kN} \cdot \text{m}$

$W_{US,silt} = 0 \text{ kN}$

$M_{US,silt,Ver} = 0 \text{ kN} \cdot \text{m}$

$F_{DS,fill,Hor} = 0 \text{ kN}$

$M_{DS,fill,Hor} = 0 \text{ kN} \cdot \text{m}$

$W_{DS,fill} = 0 \text{ kN}$

$M_{DS,fill,Ver} = 0 \text{ kN} \cdot \text{m}$

$W_{Granular,EQ} = 0$

$M_{Granular,EQ} = 0$

Uplift (U):

$F_{U0,Sum,Hor} = 0 \cdot \text{kN}$

$M_{U0,Sum} = 6026 \cdot \text{kN} \cdot \text{m}$

$F_{U0,Sum,Ver} = -1457.9 \cdot \text{kN}$

Other Forces:

$F_{anchor,Hor} = 0$

$M_{anchor,Hor} = 0$

$F_{anchor,Ver} = 0$

$M_{anchor,Ver} = 0$

$F_{other,Hor,1} = 0$

$M_{other,Hor,1} = 0$

$F_{other,Ver,1} = 0$

$M_{other,Ver,1} = 0$

Seismic (Q):

$F_{eq.conc.Hor} = 219.5 \text{ kN}$

$F_{eq.conc.Ver} = 146.3 \text{ kN}$

$F_{eq.log.Hor} = 0$

$F_{eq.log.Ver} = 0$

$F_{eq.slabs.Hor} = 0$

$F_{eq.slabs.Ver} = 0$

$F_{eq.tower.Hor} = 0$

$F_{eq.tower.Ver} = 0$

$F_{eq.HD.US} = 82.5 \text{ kN}$

$F_{eq.HD.gate} = 0$

$F_{eq.silt.Hor} = 0 \text{ kN}$

$F_{eq.silt.Ver} = 0 \text{ kN}$

$F_{eq.fill.Hor} = 0 \text{ kN}$

$F_{eq.fill.Ver} = 0 \text{ kN}$

$F_{eq.Granular.Ver} = 0$

$F_{eq.Granular.Hor} = 0$

$F_{eq.Water.Above.Ver} = 46.5 \text{ kN}$

$F_{eq.Water.Above.Hor} = 69.7 \text{ kN}$

$M_{eq.conc.Hor} = 257.8 \text{ kN}\cdot\text{m}$

$M_{eq.conc.Ver} = 585.1 \text{ kN}\cdot\text{m}$

$M_{eq.log.Hor} = 0$

$M_{eq.log.Ver} = 0$

$M_{eq.slabs.Hor} = 0$

$M_{eq.slabs.Ver} = 0$

$M_{eq.tower.Hor} = 0$

$M_{eq.tower.Ver} = 0$

$M_{eq.HD.US} = 123.5 \text{ kN}\cdot\text{m}$

$M_{eq.HD.gate} = 0$

$M_{eq.silt.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.silt.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.fill.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.fill.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.Granular.Ver} = 0$

$M_{eq.Granular.Hor} = 0$

$M_{eq.Water.Above.Ver} = 163.9 \text{ kN}\cdot\text{m}$

$M_{eq.Water.Above.Hor} = 191.2 \text{ kN}\cdot\text{m}$

LC.5 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 1309.4 \text{ kN}$$

$$+ (F_{U0.Sum.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1}) \dots$$

$$+ (F_{eq.conc.Hor} + F_{eq.log.Hor} + F_{eq.slabs.Hor} + F_{eq.tower.Hor} + F_{eq.HD.US} + F_{eq.HD.gate} + F_{eq.silt.Hor} + F_{eq.fill.Hor} + F_{eq.Granular.Hor})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 1817.3 \text{ kN}$$

$$+ (W_{US.silt} + W_{DS.fill} + W_{Granular.EQ}) + (F_{U0.Sum.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1}) \dots$$

$$+ (-F_{eq.conc.Ver} - F_{eq.log.Ver} - F_{eq.slabs.Ver} - F_{eq.tower.Ver} - F_{eq.silt.Ver} - F_{eq.fill.Ver} - F_{eq.Granular.Ver} - F_{eq.Water.Above.Ver})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 1309.4 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1817.3 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 13472.3 \text{ kN}\cdot\text{m}$$

$$+ (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.Sum}) \dots = 8694.2 \text{ kN}\cdot\text{m}$$

$$+ \left(\begin{array}{l} M_{eq.conc.Hor} + M_{eq.conc.Ver} + M_{eq.log.Hor} + M_{eq.log.Ver} + M_{eq.slabs.Hor} \dots \\ + M_{eq.slabs.Ver} + M_{eq.tower.Hor} + M_{eq.tower.Ver} + M_{eq.HD.US} + M_{eq.HD.gate} \dots \\ + M_{eq.silt.Hor} + M_{eq.silt.Ver} + M_{eq.fill.Hor} + M_{eq.fill.Ver} + M_{eq.Granular.Ver} \dots \\ + M_{eq.Granular.Hor} + M_{eq.Water.Above.Ver} + M_{eq.Water.Above.Hor} \end{array} \right)$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 4778.1 \text{ kN}\cdot\text{m}$$

LC.5 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.63 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 0.47 \text{ m}$$

$$L_{incl} = 6.20 \text{ m}$$

$$M_{net0} = 4778.1 \text{ kN}\cdot\text{m}$$

$$F_{perp0} = 1817.3 \text{ kN}$$



Stress Calculations

$$q_{max0} = 43.1 \text{ kPa}$$

$$q_{min0} = 16.1 \text{ kPa}$$

$$L_{comp0} = 6.20 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack.eq} := L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1817328.7$$

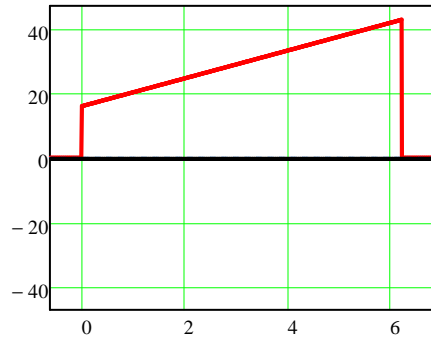
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

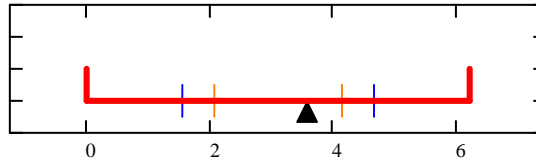
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.5 - Sliding

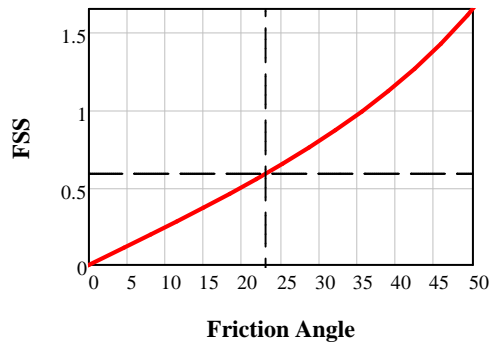
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 6.20 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 9.91 \text{ m}$

$$FSS_0(\phi_{cf}) = 0.59$$

Factor of safety against sliding for specified friction angle



LC.5 - Cracked Base Analysis

Note: Iterative cracked base analysis does not occur during seismic conditions. Initial uplift pressures are assumed to be maintained even if cracking occurs, as per CDA guidelines.

Store results for summary

Store (uncracked) results for Combined Analysis

Load Case 6. Post-Earthquake (D+H+S+U_{PQ})

LC.6(U) - Uplift

 Updated uplift calculations

LC.6 - Summary of Forces

Deadloads (D):

$$W_{conc} = 2631.9 \cdot \text{kN}$$

$$W_{log.Sum} = 0$$

$$W_{slab} = 0$$

$$W_{tower} = 0$$

$$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log.Sum} = 0$$

$$M_{slab} = 0$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US.Sum.Hor} = 1007.4 \cdot \text{kN}$$

$$F_{US.Sum.Ver} = 0 \cdot \text{kN}$$

$$M_{US.Sum.Hor} = 1346.6 \cdot \text{kN} \cdot \text{m}$$

$$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$F_{DS.Sum.Hor} = 0 \text{ kN}$$

$$F_{DS.Sum.Ver} = 0 \text{ kN}$$

$$F_{gateH.Sum} = 0$$

$$W_{Water.Above.Sum} = 836.2 \text{ kN}$$

$$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH.Sum} = 0$$

$$M_{Water.Above.Sum} = 2948.6 \text{ kN} \cdot \text{m}$$

Soil (S):

$$F_{US.silt.Hor} = 0 \text{ kN}$$

$$W_{US.silt} = 0 \text{ kN}$$

$$F_{DS.fill.Hor} = 0 \text{ kN}$$

$$W_{DS.fill} = 0 \text{ kN}$$

$$W_{Granular.Post.EQ} = 0$$

$$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.fill.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.fill.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{Granular.Post.EQ} = 0$$

Uplift (U):

$$F_{U0.eq.Hor} = 0 \cdot \text{kN}$$

$$F_{U0.eq.Ver} = -1457.9 \cdot \text{kN}$$

$$M_{U0.eq} = 6026 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor.Hor} = 0$$

$$F_{anchor.Ver} = 0$$

$$F_{other.Hor.1} = 0$$

$$F_{other.Ver.1} = 0$$

$$M_{anchor.Hor} = 0$$

$$M_{anchor.Ver} = 0$$

$$M_{other.Hor.1} = 0$$

$$M_{other.Ver.1} = 0$$

LC.6 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 1007.4 \text{ kN} \\ + (F_{U0.eq.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 2010.2 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill} + W_{Granular.Post.EQ}) + (F_{U0.eq.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 1007.4 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 2010.2 \cdot \text{kN}$$

$$\begin{aligned} M_{stab0} := & (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 13472.3 \text{ kN}\cdot\text{m} \\ & + (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.Post.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1}) \end{aligned}$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.eq}) = 7372.6 \text{ kN}\cdot\text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 6099.8 \text{ kN}\cdot\text{m}$$

LC.6 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 3.03 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 0.07 \text{ m}$$

$$\begin{aligned} L_{incl} &= 6.20 \text{ m} \\ M_{net0} &= 6099.8 \text{ kN}\cdot\text{m} \\ F_{perp0} &= 2010.2 \text{ kN} \end{aligned}$$

Stress Calculations

$$q_{max0} = 34.8 \text{ kPa}$$

$$q_{min0} = 30.7 \text{ kPa}$$

$$L_{comp0} = 6.20 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$L_{crack0} := \begin{cases} L_{crack.eq} & \text{if } L_{crack.eq} > L_{crack0} \\ L_{crack0} & \text{otherwise} \end{cases} = 0.00$$

Adjust the crack length to be larger of eq, or post-eq load case.

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 2010152.9$$

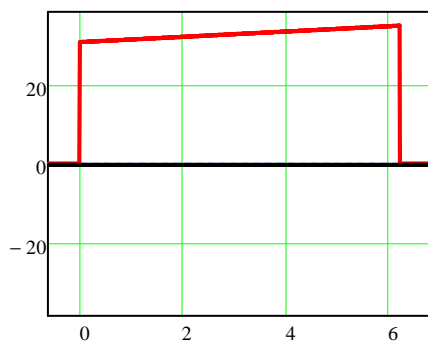
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

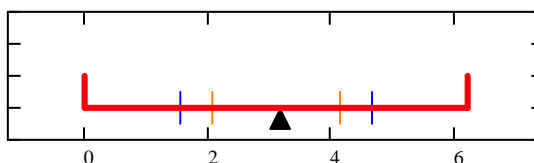
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.6 - Sliding

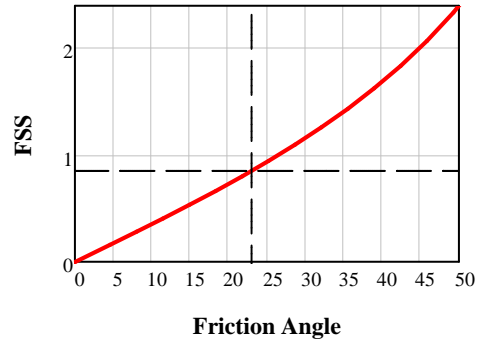
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 6.20 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 9.91 \text{ m}$

$$FSS_0(\phi_{cf}) = 0.85$$


Factor of safety against sliding for specified friction angle





LC.6 - Cracked Base Analysis


Note: This program runs an interactive analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.

```
crackactive :=  $\begin{cases} 1 & \text{if } L_{\text{crack}0} > L_{\text{crack.eq}} \\ 0 & \text{otherwise} \end{cases} = 0$  Determines if the cracked analysis should run.
crackactive := 0
```

 Cracked Base Analysis

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Summary of Forces/Moments

Dead Loads (and related seismic)

$W_{conc} = 2631.9 \cdot \text{kN}$	$M_{conc} = 10523.8 \cdot \text{kN} \cdot \text{m}$
$F_{eq.conc.Hor} = 219.5 \text{ kN}$	$M_{eq.conc.Hor} = 257.8 \text{ kN} \cdot \text{m}$
$F_{eq.conc.Ver} = 146.3 \text{ kN}$	$M_{eq.conc.Ver} = 585.1 \text{ kN} \cdot \text{m}$
$W_{log.Sum} = 0$	$M_{log.Sum} = 0$
$W_{log.Win} = 0$	$M_{log.Win} = 0$
$W_{log.IDF} = 0$	$M_{log.Win} = 0$
$F_{eq.log.Hor} = 0$	$M_{eq.log.Hor} = 0$
$F_{eq.log.Ver} = 0$	$M_{eq.log.Ver} = 0$
$W_{slab} = 0$	$M_{slab} = 0$
$F_{eq.slab.Hor} = 0$	$M_{eq.slab.Hor} = 0$
$F_{eq.slab.Ver} = 0$	$M_{eq.slab.Ver} = 0$
$W_{tower} = 0$	$M_{tower} = 0$
$F_{eq.tower.Hor} = 0$	$M_{eq.tower.Hor} = 0$
$F_{eq.tower.Ver} = 0$	$M_{eq.tower.Ver} = 0$

Soil Loads (and related seismic)

$F_{US.silt.Hor} = 0 \text{ kN}$	$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Hor} = 0 \text{ kN}$	$M_{eq.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US.silt} = 0 \text{ kN}$	$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Ver} = 0 \text{ kN}$	$M_{eq.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.fill.Hor} = 0 \text{ kN}$	$M_{DS.fill.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.fill.Hor} = 0 \text{ kN}$	$M_{eq.fill.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.fill.Ver} = 0 \text{ kN}$	$M_{eq.fill.Ver} = 0 \text{ kN} \cdot \text{m}$
$W_{DS.fill} = 0 \text{ kN}$	$M_{DS.fill.Ver} = 0 \text{ kN} \cdot \text{m}$
$W_{Granular.Sum} = 0$	$M_{Granular.Sum} = 0$
$F_{eq.Granular.Ver} = 0$	$M_{eq.Granular.Ver} = 0$
$F_{eq.Granular.Hor} = 0$	$M_{eq.Granular.Hor} = 0$

Uplift Forces

$F_{U0.Sum} = 1457.9 \text{ kN}$	$M_{U0.Sum} = 6026 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Sum.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Sum.Ver} = -1457.9 \cdot \text{kN}$	
$F_{U0.Win} = 963.9 \text{ kN}$	$M_{U0.Win} = 3984.1 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Win.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Win.Ver} = -963.9 \cdot \text{kN}$	
$F_{U0.IDF} = 3036.3 \text{ kN}$	$M_{U0.IDF} = 9910.6 \cdot \text{kN} \cdot \text{m}$
$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$	
$F_{U0.IDF.Ver} = -3036.3 \cdot \text{kN}$	
$F_{U0.eq} = 1457.9 \text{ kN}$	$M_{U0.eq} = 6026 \cdot \text{kN} \cdot \text{m}$
$F_{U0.eq.Hor} = 0 \cdot \text{kN}$	
$F_{U0.eq.Ver} = -1457.9 \cdot \text{kN}$	

Hydraulic Forces (and related seismic)

$F_{US.Sum.Hor} = 1007.4 \cdot \text{kN}$	$M_{US.Sum.Hor} = 1346.6 \cdot \text{kN} \cdot \text{m}$
$F_{eq.HD.US} = 82.5 \text{ kN}$	$M_{eq.HD.US} = 123.5 \text{ kN} \cdot \text{m}$
$F_{US.Sum.Ver} = 0 \cdot \text{kN}$	$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Sum} = 836.2 \text{ kN}$	$M_{Water.Above.Sum} = 2948.6 \text{ kN} \cdot \text{m}$
$F_{eq.Water.Above.Ver} = 46.5 \text{ kN}$	$M_{eq.Water.Above.Ver} = 163.9 \text{ kN} \cdot \text{m}$
$F_{eq.Water.Above.Hor} = 69.7 \text{ kN}$	$M_{eq.Water.Above.Hor} = 191.2 \text{ kN} \cdot \text{m}$
$F_{US.Win.Hor} = 497.5 \cdot \text{kN}$	$M_{US.Win.Hor} = 530.7 \cdot \text{kN} \cdot \text{m}$
$F_{US.Win.Ver} = 0 \cdot \text{kN}$	$M_{US.Win.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Win} = 0 \text{ kN}$	$M_{Water.Above.Win} = 0 \text{ kN} \cdot \text{m}$
$F_{US.IDF.Hor} = 1318.4 \cdot \text{kN}$	$M_{US.IDF.Hor} = 1844.1 \cdot \text{kN} \cdot \text{m}$
$F_{US.IDF.Ver} = 0 \cdot \text{kN}$	$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.IDF} = 1937.6 \text{ kN}$	$M_{Water.Above.IDF} = 5517.5 \text{ kN} \cdot \text{m}$
$F_{DS.Sum.Hor} = 0 \text{ kN}$	$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Sum.Ver} = 0 \text{ kN}$	$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Hor} = 0 \text{ kN}$	$M_{DS.Win.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Ver} = 0 \text{ kN}$	$M_{DS.Win.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Hor} = 820.9 \text{ kN}$	$M_{DS.IDF.Hor} = 1048.1 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Ver} = 0 \text{ kN}$	$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH.Sum} = 0$	$M_{gateH.Sum} = 0$
$F_{eq.HD.gate} = 0$	$M_{eq.HD.gate} = 0$
$F_{gateH.Win} = 0$	$M_{gateH.Win} = 0$
$F_{gateH.IDF} = 0$	$M_{gateH.IDF} = 0$
$F_{drag} = 0$	$M_{drag} = 0$

Ice Loads

$F_{ice.1} = 827.1 \text{ kN}$	$M_{ice.1} = 2398.5 \text{ kN} \cdot \text{m}$
$F_{ice.gate} = 0$	$M_{ice.gate} = 0$
$F_{ice} = 827.1 \text{ kN}$	$M_{ice} = 2398.5 \text{ kN} \cdot \text{m}$
$F_{ice.1.usual} = 742.9 \text{ kN}$	$M_{ice.1.usual} = 2154.3 \text{ kN} \cdot \text{m}$
$F_{ice.gate.usual} = 0$	$M_{ice.gate.usual} = 0$
$F_{ice.usual} = 742.9 \text{ kN}$	$M_{ice.usual} = 2154.3 \text{ kN} \cdot \text{m}$

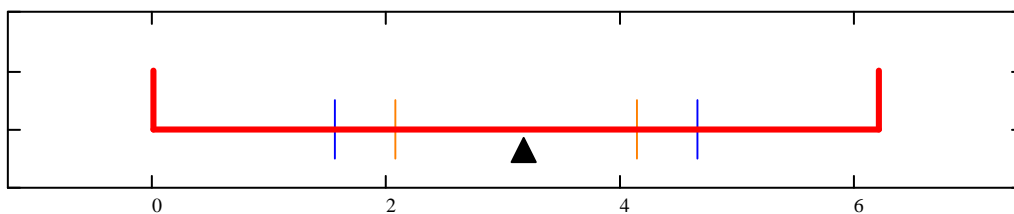
Other Forces:

$F_{anchor.Hor} = 0$	$M_{anchor.Hor} = 0$
$F_{anchor.Ver} = 0$	$M_{anchor.Ver} = 0$
$F_{other.Hor.1} = 0$	$M_{other.Hor.1} = 0$
$F_{other.Ver.1} = 0$	$M_{other.Ver.1} = 0$

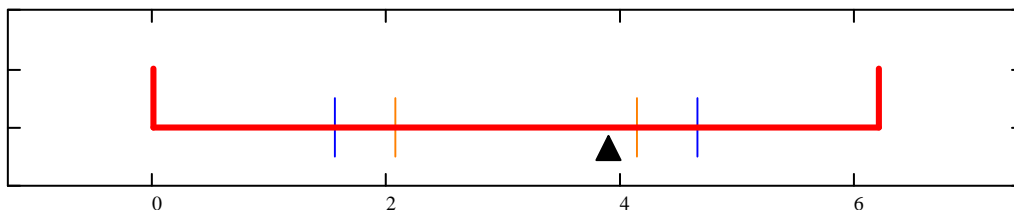
Results of Analysis

	FSS (Φ .cf)	E (m)	x.o (m)	L.comp (m)	% of Base in Compression	L.crack (m)	F.hor (kN)	F.ver (kN)	F.parallel (kN)	F.Perp (kN)	q.max (kPa)
LC.1 - Summer	0.85	0.07	3.03	6.20	100%	0.00	1,007.4	2,010.2	1,007.4	2,010.2	34.8
LC.2 - Winter (Usual)	0.57	0.79	2.31	6.20	100%	0.00	1,240.4	1,668.0	1,240.4	1,668.0	47.9
LC.3 - IDF	1.31	-0.38	3.48	6.20	100%	0.00	497.5	1,533.2	497.5	1,533.2	34.1
LC.4 - Winter (Unusual)	0.53	0.94	2.16	6.20	100%	0.00	1,324.6	1,668.0	1,324.6	1,668.0	51.7
LC.5 - EQ	0.59	0.47	2.63	6.20	100%	0.00	1,309.4	1,817.3	1,309.4	1,817.3	43.1
LC.6 - Post - EQ	0.85	0.07	3.03	6.20	100%	0.00	1,007.4	2,010.2	1,007.4	2,010.2	34.8

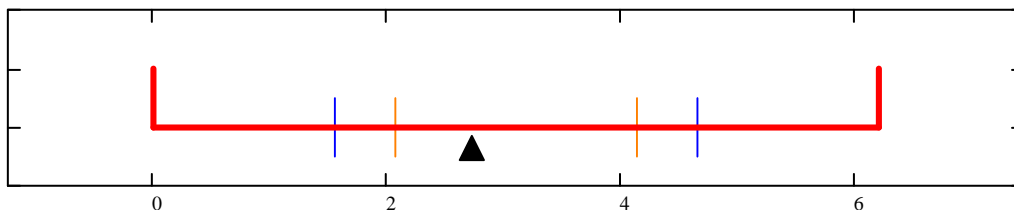
Location of Resultant



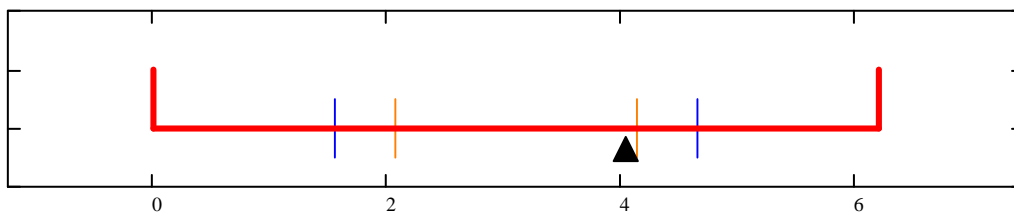
LC 1



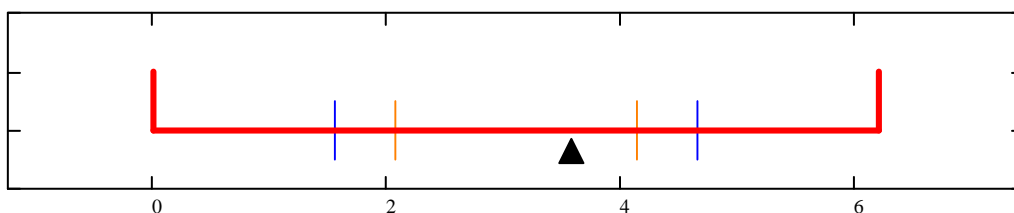
LC 2



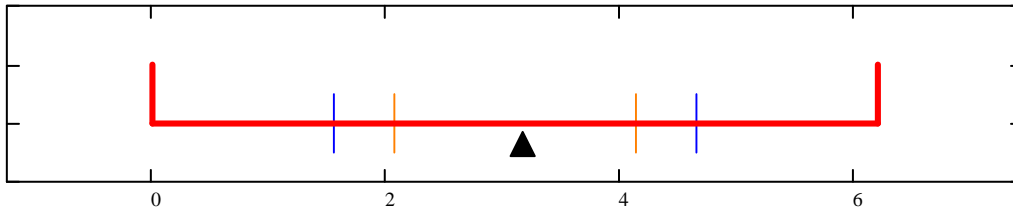
LC 3



LC 4



LC 5



LC 6

DESIGN CALCULATIONS COVER SHEET

Project No. :	17-3212-001	Project Name :	Howson Dam (South Sluiceway)		
File No. :	CIV-003	Discipline :	Structural Engineering		
Calculation Title :	Combined Rollway & Pier Stability Analysis				
Calculation No. :	CIV-003	Prepared by :	HS	Date :	Feb. 23, 2018
No. of Sheets :		Checked by :	YF	Date :	April 20, 2018
Supersedes Calc. No. :		Approved by :		Date :	

Calculation Description :

The dam has been reviewed against LRIA technical bulletins

Related Design Concept :

Stability analysis for the structures is carried out using the "Gravity Method".
Six loading cases are utilized in the analyses based on the LRIA Technical Bulletin "Structural Design and Factors of Safety (August 2011).

Reference Codes and Standards :

1. *Design of Small Dams*, Third Edition, U.S. Government Printing Office, Washington, D.C. 1987.
2. Structural Design and Factors of Safety – Technical Bulletin Ontario Ministry of Natural Resources (August 2011)

ENGINEER'S SEAL


Rev. #	Rev. Description	Rev. Author	Date Revised	Checked by	Approved by	Approved Date

References

Pier

 Reference: P:\Projects\2017\17-3212-001\Design\Struct\HS\MathCad\S Structure\CIV-001 Howson Dam S - Pier Section-HS YF.xmcd(R)

Rollway

 Reference: P:\Projects\2017\17-3212-001\Design\Struct\HS\MathCad\S Structure\CIV-002 Howson Dam S - Sill Section HS YF.xmcd


Properties of Materials


 $\phi_{cf} := 23 \cdot \text{deg}$ *Friction angle of concrete/foundation interface*

 $f_t := 0 \text{ MPa}$ *Tensile strength at concrete/rock interface (generally set to 0). This is a negative number.*


 $c := 0 \text{ MPa}$ *Cohesion at concrete/foundation interface (generally set to 0)*


Geometry of Structures


 $B_{\text{pier}} = 1.67 \text{ m}$


 $B_{\text{roll}} = 9.91 \text{ m}$


Unit width of structure used in calculation sheet


 $L_{\text{incl.pier}} = 7.95 \text{ m}$


 $L_{\text{incl.roll}} = 6.2 \text{ m}$

 $\alpha_{\text{pier}} = 0 \cdot \text{deg}$

 $\alpha_{\text{roll}} = 0 \cdot \text{deg}$

 $B := B_{\text{pier}} + B_{\text{roll}} = 11.6 \text{ m}$

 $L_{\text{incl}} := \frac{L_{\text{incl.pier}} + L_{\text{incl.roll}}}{2} = 7.08 \text{ m}$

 $\alpha_{\text{avg}} := \frac{\alpha_{\text{pier}} + \alpha_{\text{roll}}}{2} = 0 \cdot \text{deg}$

Load Case 1. Usual Loading Summer Case (D+H+S+U)

LC := 1

LC. 1 - Forces from Structures

$$F_{hor.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$F_{ver.pier_{LC}} = 2160 \cdot \text{kN}$$

$$F_{perp.pier_{LC}} = 2160 \cdot \text{kN}$$

$$F_{para.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$M_{net.pier_{LC}} = 7293.8 \cdot \text{kN} \cdot \text{m}$$

$$F_{hor.roll_{LC}} = 1007.4 \text{ kN}$$

$$F_{ver.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1007.4 \cdot \text{kN}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

$$M_{net.roll_{LC}} = 6099.8 \cdot \text{kN} \cdot \text{m}$$

Force acting in horizontal direction on structure

Forces acting in vertical direction on structure

Force acting perpendicular to base from structure

Force acting parallel to base from structure

Length of base in compression

Net resisting moment from structure

LC.1 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1371.2 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 4170.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1371.2 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 4170.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 13393.5 \cdot \text{kN} \cdot \text{m}$$

LC.1 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 3.21 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.33 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 65 \text{ kPa}$$

$$q_{min} = 36.8 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 4170.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

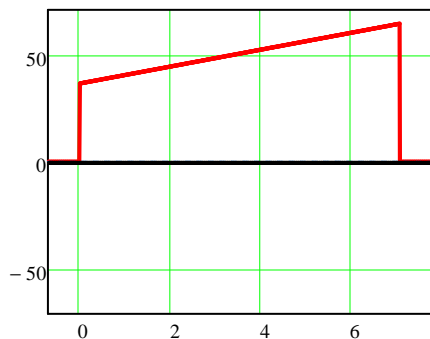
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

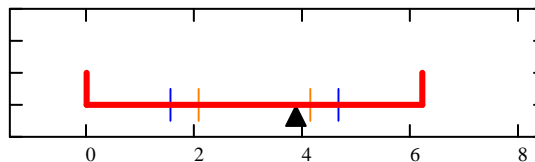
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



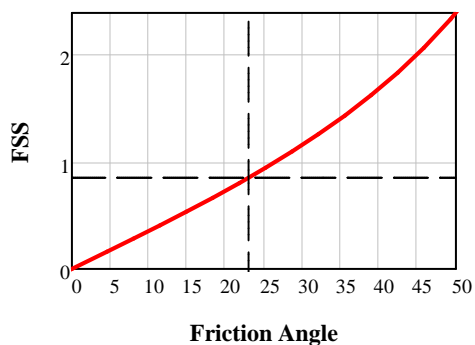
LC.1 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 1.29$$

Factor of safety against sliding for specified friction angle



► Store results for summary

Load Case 2. Usual Loading Winter Case (D+H+S+U+I)

LC := 2

LC. 2 - Forces from Structures

$$F_{hor.pier_{LC}} = 404.6 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 1240.4 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 2267.1 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1668 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 2267.1 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1668 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 404.6 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1240.4 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 7519.9 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 3854.6 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.2 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1645 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3935.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1645.0 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3935.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 11374.5 \cdot \text{kN} \cdot \text{m}$$

LC.2 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.89 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.65 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 74.4 \text{ kPa}$$

$$q_{min} = 21.7 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3935.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

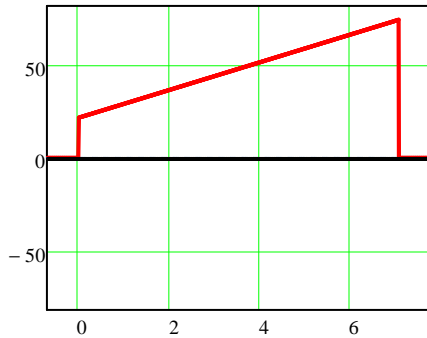
Compression and tension forces in foundation

$$\frac{L_{\text{comp}}}{L_{\text{incl}}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

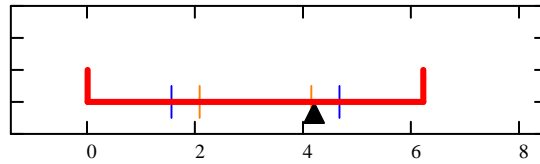
$$\frac{L_{\text{tens}}}{L_{\text{incl}}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{\text{crack}}}{L_{\text{incl}}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



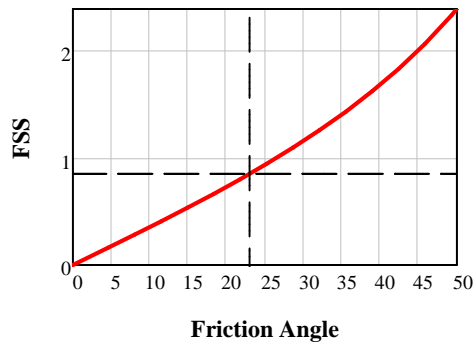
LC.2 - Sliding

$$FSS(\theta) := \frac{F_{\text{comp}} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{\text{comp}} + \frac{L_{\text{tens}}}{2} \right)}{F_{\text{parallel}}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 1.02$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 3. Unusual Loading IDF ($D+H_{IDF}+S+U_{IDF}$)

LC := 3

LC. 3 - Forces from Structures

$$F_{hor.pier_{LC}} = 296.2 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 497.5 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 1766.1 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1533.2 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 1766.1 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1533.2 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 296.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 497.5 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 5999.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 5334.6 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.3 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 793.7 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3299.3 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 793.7 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3299.3 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 11334.3 \cdot \text{kN} \cdot \text{m}$$

LC.3 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 3.44 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.1 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 43.8 \text{ kPa}$$

$$q_{min} = 36.8 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3299.3 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

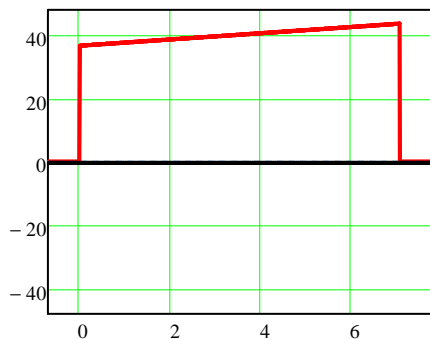
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

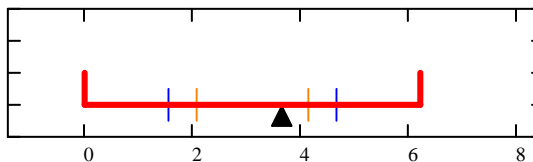
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



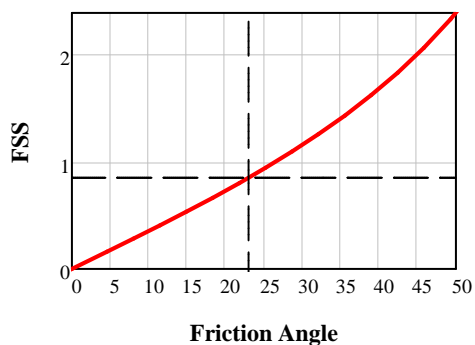
LC.3 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 1.76$$

Factor of safety against sliding for specified friction angle



► Store results for summary

Load Case 4. Unusual Loading Winter Case (D+H+S+U+I)

LC := 4

LC. 4 - Forces from Structures

$$F_{hor.pier_{LC}} = 431.8 \cdot \text{kN}$$

$$F_{ver.pier_{LC}} = 2267.1 \cdot \text{kN}$$

$$F_{perp.pier_{LC}} = 2267.1 \cdot \text{kN}$$

$$F_{para.pier_{LC}} = 431.8 \cdot \text{kN}$$

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$M_{net.pier_{LC}} = 7419.6 \cdot \text{kN} \cdot \text{m}$$

$$F_{hor.roll_{LC}} = 1324.6 \text{ kN}$$

$$F_{ver.roll_{LC}} = 1668 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1668 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1324.6 \cdot \text{kN}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

$$M_{net.roll_{LC}} = 3610.4 \cdot \text{kN} \cdot \text{m}$$

Force acting in horizontal direction on structure

Forces acting in vertical direction on structure

Force acting perpendicular to base from structure

Force acting parallel to base from structure

Length of base in compression

Net resisting moment from structure

LC.4 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1756.4 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3935.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1756.4 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3935.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 11030 \cdot \text{kN} \cdot \text{m}$$

LC.4 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.8 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.73 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 77.9 \text{ kPa}$$

$$q_{min} = 18.1 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3935.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

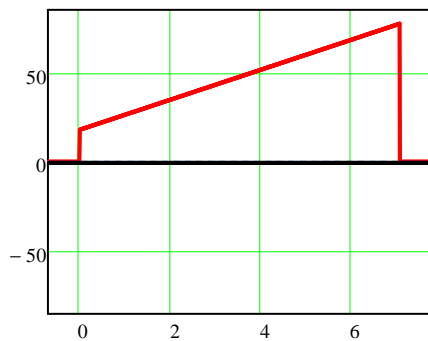
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

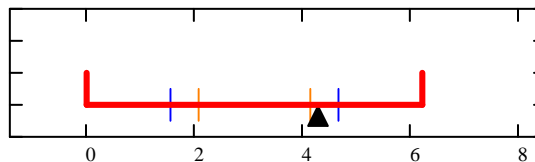
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



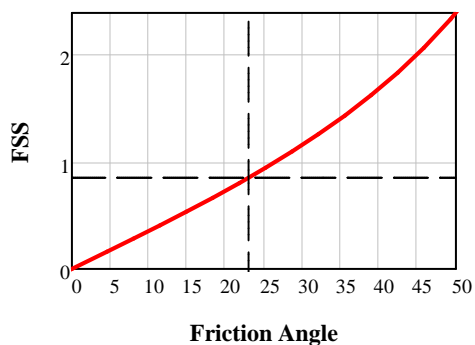
LC.4 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.95$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 5. Extreme Loading Earthquake (D+H+S+Q+U_Q)

LC := 5

LC. 5 - Forces from Structures

$$F_{hor.pier_{LC}} = 606.9 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 1309.4 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 2019.4 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1817.3 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 2019.4 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1817.3 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 606.9 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1309.4 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 5728.9 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 4778.1 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.5 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1916.3 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3836.8 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1916.3 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3836.8 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 10507.1 \cdot \text{kN} \cdot \text{m}$$

LC.5 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.74 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.8 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 78.6 \text{ kPa}$$

$$q_{min} = 15.1 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3836.8 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

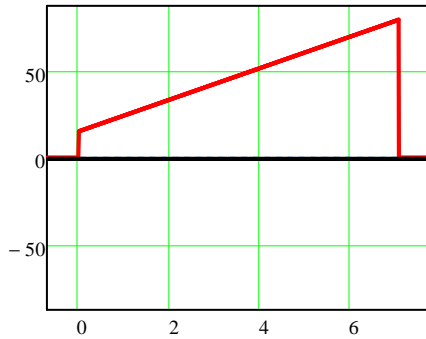
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

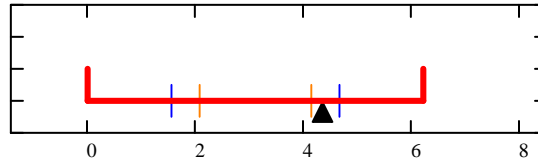
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



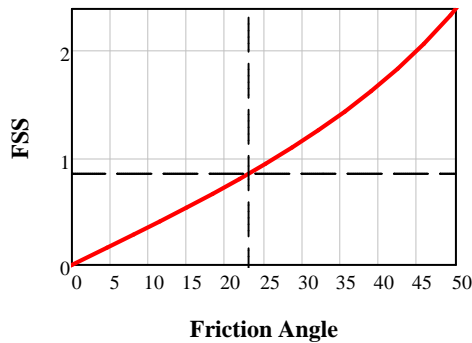
LC.5 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.85$$

Factor of safety against sliding for specified friction angle



Store results for summary

Load Case 6. Extreme Loading Earthquake (D+H+S+Q+U_Q)

$$LC := 6$$

LC. 6 - Forces from Structures

$$F_{hor.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$F_{ver.pier_{LC}} = 2160 \cdot \text{kN}$$

$$F_{perp.pier_{LC}} = 2160 \cdot \text{kN}$$

$$F_{para.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$M_{net.pier_{LC}} = 7293.8 \cdot \text{kN} \cdot \text{m}$$

$$F_{hor.roll_{LC}} = 1007.4 \text{ kN}$$

$$F_{ver.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1007.4 \cdot \text{kN}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

$$M_{net.roll_{LC}} = 6099.8 \cdot \text{kN} \cdot \text{m}$$

Force acting in horizontal direction on structure

Forces acting in vertical direction on structure

Force acting perpendicular to base from structure

Force acting parallel to base from structure

Length of base in compression

Net resisting moment from structure

LC.6 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1371.2 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 4170.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1371.2 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 4170.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 13393.5 \cdot \text{kN} \cdot \text{m}$$

LC.6 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 3.21 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.33 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 65 \text{ kPa}$$

$$q_{min} = 36.8 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 4170.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

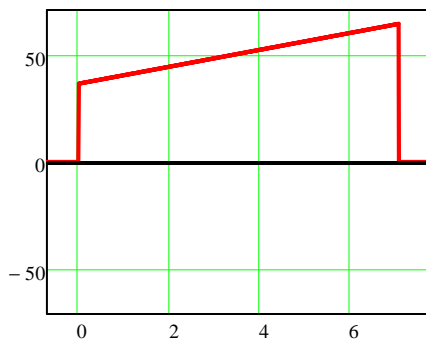
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

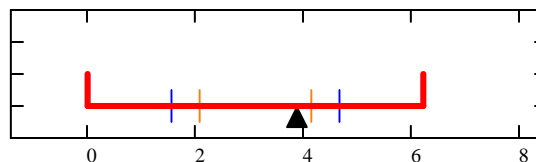
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



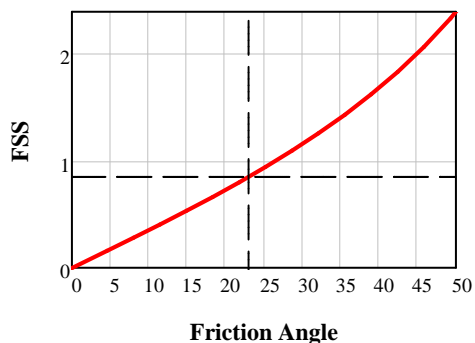
LC.6 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$FSS(\phi_{cf}) = 1.29$

Factor of safety against sliding for specified friction angle

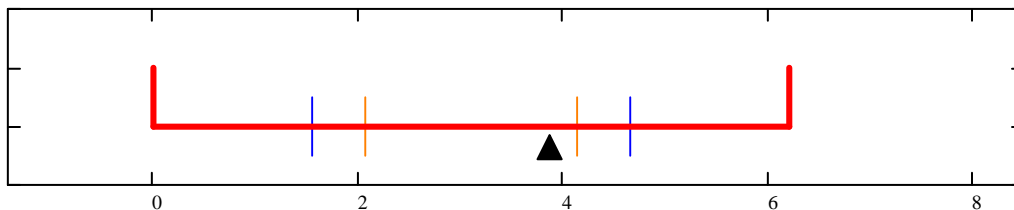


Store results for summary

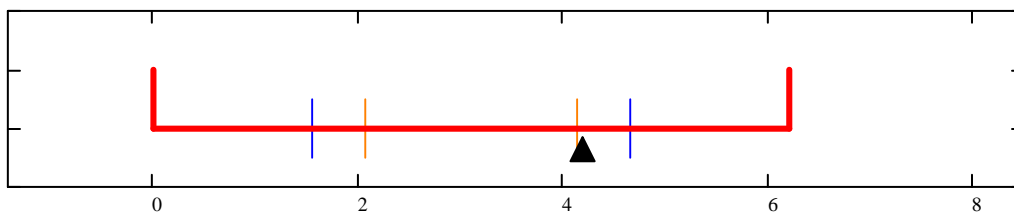
Results of Analysis

	FSS (Φ_{cf})	E (m)	x.o (m)	L.comp (m)	% of Base in Compression	L.crack (m)	F.hor (kN)	F.ver (kN)	F.parallel (kN)	F.Perp (kN)	q.max (kPa)
LC.1 - Summer	1.29	0.33	3.21	7.08	100%	0.00	1,371.2	4,170.1	1,371.2	4,170.1	65.0
LC.2 - Winter (Usual)	1.02	0.65	2.89	7.08	100%	0.00	1,645.0	3,935.1	1,645.0	3,935.1	74.4
LC.3 - IDF	1.76	0.10	3.44	7.08	100%	0.00	793.7	3,299.3	793.7	3,299.3	43.8
LC.4 - Winter (Unusual)	0.95	0.73	2.80	7.08	100%	0.00	1,756.4	3,935.1	1,756.4	3,935.1	77.9
LC.5 - EQ	0.85	0.80	2.74	7.08	100%	0.00	1,916.3	3,836.8	1,916.3	3,836.8	78.6
LC.6 - Post - EQ	1.29	0.33	3.21	7.08	100%	0.00	1,371.2	4,170.1	1,371.2	4,170.1	65.0

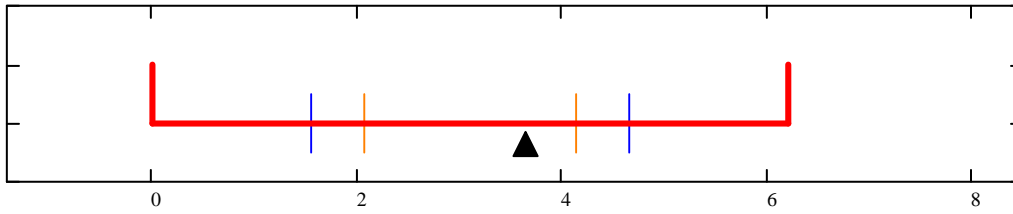
Location of Resultant



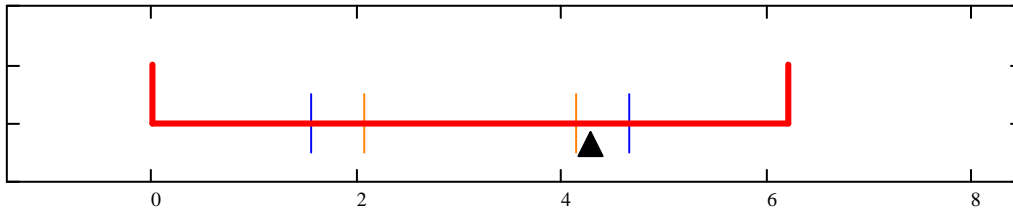
LC 1



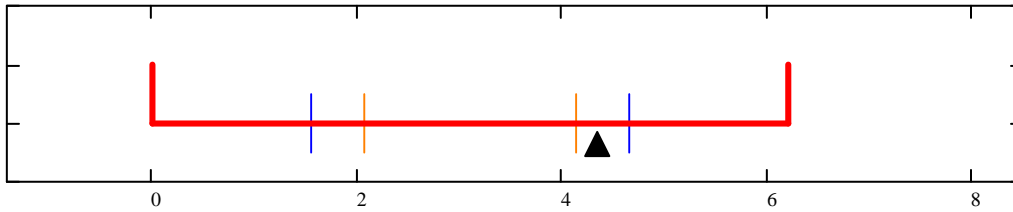
LC 2



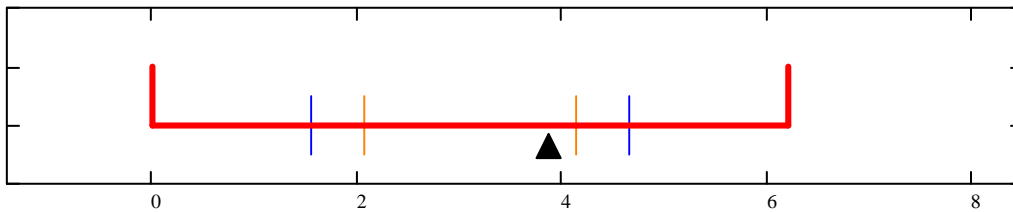
LC 3



LC 4



LC 5



LC 6

DESIGN CALCULATIONS COVER SHEET

Project No. :	17-3212-001	Project Name :	Howson Dam (South Structure)		
File No. :		Discipline :	Structural Engineering		
Calculation Title :	Pier Stability Analysis – Bridge deck to be removed				
Calculation No. :	CIV-004	Prepared by :	HS	Date :	Feb. 23, 2018
No. of Sheets :		Checked by :	YF	Date :	April 20, 2018
Supersedes Calc. No. :		Approved by :		Date :	

Calculation Description :

The dam has been reviewed against LRIA technical bulletins

Related Design Concept :

Stability analysis for the structures is carried out using the "Gravity Method".
Six loading cases are utilized in the analyses based on the LRIA Technical Bulletin "Structural Design and Factors of Safety (August 2011).

Reference Codes and Standards :

1. *Design of Small Dams*, Third Edition, U.S. Government Printing Office, Washington, D.C. 1987.
2. Structural Design and Factors of Safety – Technical Bulletin Ontario Ministry of Natural Resources (August 2011)

ENGINEER'S SEAL

Rev. #	Rev. Description	Rev. Author	Date Revised	Checked by	Approved by	Approved Date

► Notes and Figures

Properties of Materials



$$\gamma_w := 9.81 \frac{\text{kN}}{\text{m}^3}$$

Water density

$$\gamma_{\text{conc}} := 23.5 \cdot \frac{\text{kN}}{\text{m}^3}$$

Concrete density adjusted due to combination of the pier and abutment sections.

$$\phi_{\text{cf}} := 23 \cdot \text{deg}$$

Friction angle of concrete/foundation interface

$$c := 0 \text{ MPa}$$

Cohesion at concrete/foundation interface (generally set to 0)

$$f_{t,\text{cf}} := \frac{-c}{2} = 0$$

Tensile strength at concrete/rock interface (generally set to 0, or 0.5 x cohesion). This is a negative number.

$$\gamma_{\text{silt}} := 7.7 \cdot \frac{\text{kN}}{\text{m}^3}$$

Silt density

$$\phi_{\text{silt}} := 20 \cdot \text{deg}$$

Angle of internal friction for silt at rest condition

$$\gamma_{\text{fill}} := 7.7 \cdot \frac{\text{kN}}{\text{m}^3}$$

Backfill density

$$\phi_{\text{fill}} := 30 \cdot \text{deg}$$

Angle of internal friction for backfill at rest condition

$$\gamma_{\text{timber}} := 10 \cdot \frac{\text{kN}}{\text{m}^3}$$

Timber density (for stoplogs)

$$\gamma_{\text{Granular}} := 15 \frac{\text{kN}}{\text{m}^3}$$

Weight of granular material or rip rap on top of section



Water Levels



Usual Summer Operating Levels

Used in LC 1,4,5

$$WL_{\text{US},\text{Sum}} := 310.9\text{m}$$

Upstream water level (left side)

$$WL_{\text{DS},\text{Sum}} := 305.27\text{m}$$

Downstream water level (right side)

Usual Winter Operating Levels

Used in LC 2

$$WL_{\text{US},\text{Win}} := 309.26\text{m}$$

$$WL_{\text{DS},\text{Win}} := 305.27\text{m}$$

Unusual Flood Discharge Levels

Used in LC 3

$$WL_{\text{US},\text{IDF}} := 311.9\text{m}$$

$$WL_{\text{DS},\text{IDF}} := 310.3\text{m}$$



Seismic Accelerations



$$\lambda_{\text{Hor}} := 0.0834$$

Horizontal component of earthquake intensity = ratio of earthquake acceleration to acceleration due to gravity (unitless number)

$$\lambda_{Ver} := \frac{2}{3} \cdot \lambda_{Hor} = 0.056$$

Vertical component of earthquake intensity. CDA recommends a factor between 1/2 and 2/3 of the horizontal acceleration (pg 15 of Seismic Hazard Considerations Technical Bulletin)



Structure Geometry

Input

Note: Enter structure geometry as series of points on X-Y grid. Align structure so that upstream is on the left side. Structure outline is "closed" automatically (last point is assigned same values as first). Ensure that values of ELE.Base.L and ELE.Base.R are adjusted to correspond with the lowest upstream and downstream elevations.

Input X & Y coordinates

$$X := \begin{pmatrix} 0 \\ 7.95 \\ 7.95 \\ 0 \end{pmatrix} \cdot \text{m}$$

$$Y := \begin{pmatrix} 305.27 \\ 305.27 \\ 310.94 \\ 310.94 \end{pmatrix} \cdot \text{m}$$

$$\text{ELEBase.L} := 305.27 \text{m} \quad \text{Elevation of left side of base (lowest point)}$$

$$\text{ELEBase.R} := 305.27 \text{m} \quad \text{Elevation of right side of base (lowest point)}$$

$$\text{ELETop} := 310.94 \text{m} \quad \text{Elevation of top of dam (for hydrostatic, hydrodynamic forces)}$$

$$B := \frac{2.03 + 1.32}{2} \cdot \text{m} = 1.67 \text{m} \quad \text{Set unit width of structure (1m if using metric, 1ft if using imperial units)}$$

$$\omega_{US} := 0 \text{deg} \quad \text{Incline of upstream face from vertical (positive number in degrees)}$$

$$\omega_{DS} := 0 \text{deg} \quad \text{Incline of downstream face from vertical (positive number in degrees)}$$

$$L_{hor} := \max(X) - \min(X) = 7.95 \text{m}$$

Horizontal projection of base

$$\alpha := \text{atan}\left(\frac{\text{ELEBase.R} - \text{ELEBase.L}}{L_{hor}}\right) = 0 \cdot \text{deg}$$

Angle of inclination of base. Positive is counter clockwise from the horizontal in the downstream direction

$$L_{incl} := \frac{L_{hor}}{\cos(\alpha)} = 7.95 \text{m}$$

Inclined length of concrete-foundation interface

Variables for Combines Structure Model

$$B_{pier} := B = 1.67 \text{m}$$

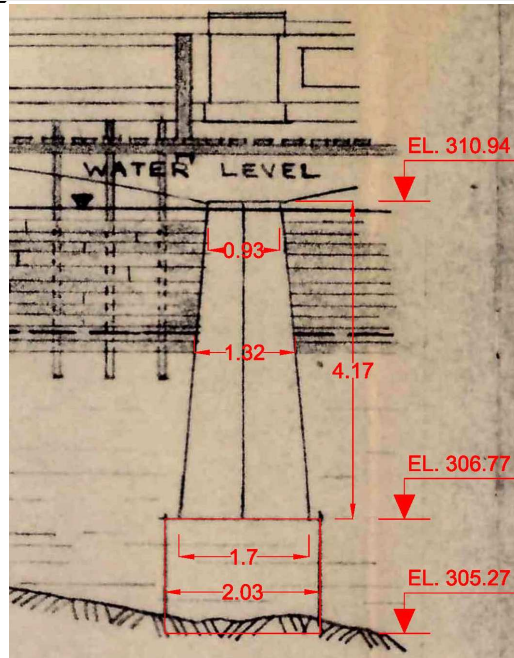
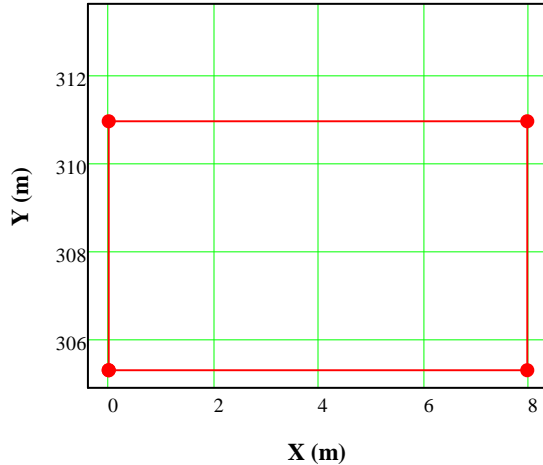
$$L_{incl.pier} := L_{incl} = 7.95 \text{m}$$

$$\alpha_{pier} := \alpha$$

Input

Plot Functions

Graphical Representation of Structure



► Computation of Area and Center of Gravity

Gate/Stoplog Geometry



$$X_{log} := 0 \cdot m$$

Horizontal distance from left side ($x=0$) to location of gate/stoplogs

$$ELE_{sill} := 307.13m$$

Elevation of the bottom of the gate/stoplogs

$$ELE_{gate, top} := 310.28m$$

Elevation of top of gate/stoplogs

$$Trib_{gate} := \frac{10 \cdot ft}{2} = 1.52m$$

Tributary width of gates/logs experiencing hydrostatic/hydrodynamic/ice forces

$$W_{gate} := 0m$$

Total width of gate/stoplogs (for calculating weight on slab/rollway)

Forces on Gates/Stoplogs Transferred into Piers

$$Gates_{Sum.Hyd} := 1$$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$$Gates_{Win.Hyd} := 1$$

If gates are present during winter operation, set = 1, otherwise set to 0

$$Gates_{IDF.Hyd} := 1$$

If gates are present during IDF, set = 1, otherwise set to 0

Weight of Gates/Stoplogs bearing on rollway/slab

$$Gates_{Sum.Weight} := 0$$

If gates are present during summer operation (and earthquake), set = 1, otherwise set to 0

$$Gates_{Win.Weight} := 0$$

If gates are present during winter operation, set = 1, otherwise set to 0

$$Gates_{IDF.Weight} := 0$$

If gates are present during IDF, set = 1, otherwise set to 0



Weight of Main Structure (D)



$$B_{ave} := \frac{2.03 + 0.93}{2} \cdot m = 1.48 m$$

Average width of the structure for calculating the pier weight

$$Vol_{conc} := Area \cdot B_{ave} = 66.7 \cdot m^3$$

Volume of concrete per unit width of structure

$$W_{conc} := Vol_{conc} \cdot \gamma_{conc} = 1568 \cdot kN$$

Dead load of concrete in structure

$$MA := L_{hor} - X_g = 3.975 m$$

Moment arm is the horizontal distance from right side of base to C.G.

$$M_{conc} := W_{conc} \cdot MA = 6231.8 \cdot kN \cdot m$$

Moment from structure self weight

$$\gamma_{conc} = 23.5 \cdot \frac{kN}{m^3}$$

$$Area = 45.1 m^2$$

$$B = 1.7 m$$

$$L_{hor} = 7.95 m$$

$$X_g = 3.975 m$$

$$Y_g = 308.105 m$$



Weight of Stoplogs (D) - NOT APPLICABLE



Weight of Slab (D)



$$W_{slab} := 0.001 \cdot m$$

Slab width

$$L_{slab} := 0.001 \cdot m$$

Total length of slab

$$S_{thk} := 0.001 m$$

Equivalent slab thickness

$$W_{gir} := 0 \cdot m$$

Girder width

$$L_{gir} := 0 \cdot m$$

Total length of girder

$$Gir_{thk} := \frac{1 + 0.4}{2} \cdot m = 0.7 m$$

Equivalent girder thickness
(conservative assumption)

$$GirNo := 4$$

Number of girders in each span

$$\gamma_{conc} = 23.5 \cdot \frac{kN}{m^3}$$

$$B = 1.67 m$$

$$L_{hor} = 7.95 m$$

$$ELE_{slab} := 312.48 \cdot m - \frac{L_{slab} \cdot W_{slab} \cdot S_{thk} \cdot \frac{S_{thk}}{2} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk} \cdot \left(\frac{Gir_{thk}}{2} + S_{thk} \right)}{L_{slab} \cdot W_{slab} \cdot S_{thk} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk}} = 312.48 m$$

Elevation of centre of gravity of slab

$$X_{slab} := \frac{L_{slab}}{2} = 0 m$$

Horizontal distance from left side (x=0) to centre of slab

$$W_{opening} := 0 m$$

Width of stoplog

$$L_{opening} := 8.23 m$$

opening

Length of stoplog opening

$$X_{opening} := 2.12 m$$

Horizontal distance from left side (x=0) to centre of slab

$$W_{slab1} := \gamma_{conc} \cdot (L_{slab} \cdot W_{slab} \cdot S_{thk} + GirNo \cdot L_{gir} \cdot W_{gir} \cdot Gir_{thk}) = 0 \cdot kN$$

Dead load from slab (not considering opening)

$$MA_{slab1} := L_{hor} - X_{slab} = 7.95 m$$

Moment arm measured as horizontal distance from centre of slab to right side of base

$$W_{opening} := \gamma_{conc} \cdot L_{opening} \cdot W_{opening} \cdot S_{thk} = 0$$

Weight to be removed from slab due to opening

$$MA_{opening} := L_{hor} - X_{opening} = 5.83 m$$

Moment arm measured as horizontal distance from centre of opening to right side of base

$$W_{slab} := W_{slab1} - W_{opening} = 0 kN$$

Net dead load from slab

$$M_{slab} := W_{slab1} \cdot MA_{slab1} - W_{opening} \cdot MA_{opening} = 0 \cdot kN \cdot m$$

Moment from weight of slab



Weight of Tower(D) - NOT APPLICABLE



Weight of Riprap / Granular Material on Top of Section - NOT APPLICABLE

Input coordinates

Calculations

Results

Upstream Hydrostatic Force (H)

Figures

Calculations

Note: If inclined face is present, it is assumed to be linear from heel to water level.

Case 1: Summer Operating Level

$$H := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{Base.L} \\ WL_{US.Sum} - ELE_{Base.L} & \text{otherwise} \end{cases} = 5.630$$

Height of water in front of section

$$P_{US.Sum} := H \cdot \gamma_w = 55.2 \text{ kPa}$$

$$\begin{aligned} WL_{US.Sum} &= 310.900 \text{ m} \\ ELE_{Top} &= 310.940 \text{ m} \\ ELE_{Base.L} &= 305.270 \text{ m} \\ ELE_{Base.R} &= 305.270 \text{ m} \\ \omega_{US} &= 0.0 \\ L_{hor} &= 7.95 \text{ m} \\ B &= 1.67 \text{ m} \end{aligned}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{Top} \\ WL_{US.Sum} - ELE_{Top} & \text{otherwise} \end{cases} = 0.000$$

Height of water above top of section

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 5.630 \text{ m}$$

Inclined length of face under water

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 260.4 \text{ kN}$$

Force due to triangular portion of pressure diagram

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 260.4 \text{ kN}$$

Horizontal component of F1

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

Vertical component of F1

$$ELE_{F1} := ELE_{Base.L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 307.147 \text{ m}$$

Elevation of F1

$$MA_{F1.Hor} := ELE_{F1} - ELE_{Base.R} = 1.877 \text{ m}$$

Moment arm of horizontal component of F1

$$MA_{F1.Ver} := L_{hor} - (ELE_{F1} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

Moment arm of vertical component of F1

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 0.0 \text{ kN}$$

Force due to rectangular portion of pressure diagram

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 0 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base.L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 308.085 \text{ m}$$

$$MA_{F2,Hor} := ELE_{F2} - ELE_{Base,R} = 2.815 \text{ m}$$

$$MA_{F2,Ver} := L_{hor} - (ELE_{F2} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US,Sum,Hor} := F1_{Hor} + F2_{Hor} = 260.4 \text{ kN}$$

$$F_{US,Sum,Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US,Sum,Hor} := F1_{Hor} \cdot MA_{F1,Hor} + F2_{Hor} \cdot MA_{F2,Hor} = 488.7 \text{ kN}\cdot\text{m}$$

$$M_{US,Sum,Ver} := F1_{Ver} \cdot MA_{F1,Ver} + F2_{Ver} \cdot MA_{F2,Ver} = 0 \text{ kN}\cdot\text{m}$$

Horizontal hydrostatic force

Vertical hydrostatic force

Moment due to horizontal component of hydrostatic force

Moment due to vertical component of hydrostatic force

Case 2: Winter Operating Level

$$H := \begin{cases} 0 & \text{if } WL_{US,Win} \leq ELE_{Base,L} \\ WL_{US,Win} - ELE_{Base,L} & \text{otherwise} \end{cases} = 3.990$$

$$P_{US,Win} := H \cdot \gamma_w = 39.1 \text{ kPa}$$

$$WL_{US,Win} = 309.260 \text{ m}$$

$$ELE_{Top} = 310.940 \text{ m}$$

$$ELE_{Base,L} = 305.270 \text{ m}$$

$$ELE_{Base,R} = 305.270 \text{ m}$$

$$\omega_{US} = 0.0$$

$$L_{hor} = 7.95 \text{ m}$$

$$B = 1.67 \text{ m}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US,Win} \leq ELE_{Top} \\ WL_{US,Win} - ELE_{Top} & \text{otherwise} \end{cases} = 0.000$$

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 3.990 \text{ m}$$

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 130.8 \text{ kN}$$

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 130.8 \text{ kN}$$

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F1} := ELE_{Base,L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 306.600 \text{ m}$$

$$MA_{F1,Hor} := ELE_{F1} - ELE_{Base,R} = 1.330 \text{ m}$$

$$MA_{F1,Ver} := L_{hor} - (ELE_{F1} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 0.0 \text{ kN}$$

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 0 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base,L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 307.265 \text{ m}$$

$$MA_{F2,Hor} := ELE_{F2} - ELE_{Base,R} = 1.995 \text{ m}$$

$$MA_{F2,Ver} := L_{hor} - (ELE_{F2} - ELE_{Base,L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US,Win,Hor} := F1_{Hor} + F2_{Hor} = 130.8 \text{ kN}$$

$$F_{US,Win,Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US,Win,Hor} := F1_{Hor} \cdot MA_{F1,Hor} + F2_{Hor} \cdot MA_{F2,Hor} = 174 \text{ kN}\cdot\text{m}$$

$$M_{US,Win,Ver} := F1_{Ver} \cdot MA_{F1,Ver} + F2_{Ver} \cdot MA_{F2,Ver} = 0 \text{ kN}\cdot\text{m}$$

Case 3: IDF Level

$$H := \begin{cases} 0 & \text{if } WL_{US,IDF} \leq ELE_{Base,L} \\ WL_{US,IDF} - ELE_{Base,L} & \text{otherwise} \end{cases} = 6.630$$

$$P_{US,IDF} := H \cdot \gamma_w = 65 \text{ kPa}$$

$$WL_{US,IDF} = 311.900 \text{ m}$$

$$ELE_{Top} = 310.940 \text{ m}$$

$$ELE_{Base,L} = 305.270 \text{ m}$$

$$ELE_{Base,R} = 305.270 \text{ m}$$

$$\omega_{US} = 0.0$$

$$L_{hor} = 7.95 \text{ m}$$

$$B = 1.67 \text{ m}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US,IDF} \leq ELE_{Top} \\ WL_{US,IDF} - ELE_{Top} & \text{otherwise} \end{cases} = 0.960$$

$$L_{below} := \frac{H - H_{above}}{\cos(\omega_{US})} = 5.670 \text{ m}$$

$$F1 := \frac{(H - H_{above}) \cdot \gamma_w \cdot L_{below}}{2} \cdot B = 264.1 \text{ kN}$$

$$F1_{Hor} := F1 \cdot \cos(\omega_{US}) = 264.1 \text{ kN}$$

$$F1_{Ver} := F1 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F1} := ELE_{Base.L} + \left(\frac{L_{below}}{3} \right) \cdot \cos(\omega_{US}) = 307.160 \text{ m}$$

$$MA_{F1.Hor} := ELE_{F1} - ELE_{Base.R} = 1.890 \text{ m}$$

$$MA_{F1.Ver} := L_{hor} - (ELE_{F1} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F2 := H_{above} \cdot \gamma_w \cdot L_{below} \cdot B = 89.4 \text{ kN}$$

$$F2_{Hor} := F2 \cdot \cos(\omega_{US}) = 89.4 \text{ kN}$$

$$F2_{Ver} := F2 \cdot \sin(\omega_{US}) = 0 \text{ kN}$$

$$ELE_{F2} := ELE_{Base.L} + \left(\frac{L_{below}}{2} \right) \cdot \cos(\omega_{US}) = 308.105 \text{ m}$$

$$MA_{F2.Hor} := ELE_{F2} - ELE_{Base.R} = 2.835 \text{ m}$$

$$MA_{F2.Ver} := L_{hor} - (ELE_{F2} - ELE_{Base.L}) \tan(\omega_{US}) = 7.950 \text{ m}$$

$$F_{US.IDF.Hor} := F1_{Hor} + F2_{Hor} = 353.6 \text{ kN}$$

$$F_{US.IDF.Ver} := F1_{Ver} + F2_{Ver} = 0 \text{ kN}$$

$$M_{US.IDF.Hor} := F1_{Hor} \cdot MA_{F1.Hor} + F2_{Hor} \cdot MA_{F2.Hor} = 752.8 \text{ kN} \cdot \text{m}$$

$$M_{US.IDF.Ver} := F1_{Ver} \cdot MA_{F1.Ver} + F2_{Ver} \cdot MA_{F2.Ver} = 0 \text{ kN} \cdot \text{m}$$

Calculations

Downstream Hydrostatic Force (H)



Hydrostatic Force on Gates (H)

Calculations

Note: Pressure from tailwater not considered. Calculations assume a flat vertical face

Case 1: Summer operating level

$$H := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{sill} \\ WL_{US.Sum} - ELE_{sill} & \text{otherwise} \end{cases} = 3.770 \quad \text{Height of water in front of gate/stoplogs}$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Sum} \leq ELE_{gate.top} \\ WL_{US.Sum} - ELE_{gate.top} & \text{otherwise} \end{cases} = 0.620 \quad \text{Height of water above top of gate/stoplogs}$$

$$F1 := \frac{(H - H_{above})^2}{2} \cdot \gamma_w \cdot Trib_{gate} = 74.2 \text{ kN} \quad \text{Force due to triangular portion of pressure diagram}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.910 \text{ m} \quad \text{Moment arm}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 29.2 \text{ kN} \quad \text{Force due to rectangular portion of pressure diagram}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 3.435 \text{ m} \quad \text{Moment arm}$$

$$F_{gateH.Sum} := \begin{cases} (F1 + F2) & \text{if } GatesSum.Hyd = 1 \\ 0 & \text{otherwise} \end{cases} = 103.4 \text{ kN} \quad \text{Total hydrostatic force on gate/stoplogs}$$

$$M_{gateH.Sum} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } GatesSum.Hyd = 1 \\ 0 & \text{otherwise} \end{cases} = 316.1 \text{ kN} \cdot \text{m} \quad \text{Moment due to hydrostatic force on gate/stoplogs}$$

GatesSum.Hyd = 1
GatesWin.Hyd = 1
GatesIDF.Hyd = 1
WLUS.Sum = 310.900m
WLUS.Win = 309.260m
WLUS.IDF = 311.900m
ELEsill = 307.130m
ELEgate.top = 310.280m
ELEBase.R = 305.270m
Tribgate = 1.524m
Lhor = 7.95 m

Case 2: Winter operating level

$$H := \begin{cases} 0 & \text{if } WL_{US.Win} \leq ELE_{sill} \\ WL_{US.Win} - ELE_{sill} & \text{otherwise} \end{cases} = 2.130$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.Win} \leq ELE_{gate.top} \\ WL_{US.Win} - ELE_{gate.top} & \text{otherwise} \end{cases} = 0.000$$

$$F1 := \frac{(H - H_{above})^2 \cdot \gamma_w}{2} \cdot Trib_{gate} = 33.9 \text{ kN}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.570 \text{ m}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 0.0 \text{ kN}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 2.925 \text{ m}$$

$$F_{gateH.Win} := \begin{cases} (F1 + F2) & \text{if } Gates_{Win.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 33914.3$$

$$M_{gateH.Win} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } Gates_{Win.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 87159.8$$

Case 3: IDF level

$$H := \begin{cases} 0 & \text{if } WL_{US.IDF} \leq ELE_{sill} \\ WL_{US.IDF} - ELE_{sill} & \text{otherwise} \end{cases} = 4.770$$

$$H_{above} := \begin{cases} 0 & \text{if } WL_{US.IDF} \leq ELE_{gate.top} \\ WL_{US.IDF} - ELE_{gate.top} & \text{otherwise} \end{cases} = 1.620$$

$$F1 := \frac{(H - H_{above})^2 \cdot \gamma_w}{2} \cdot Trib_{gate} = 74.2 \text{ kN}$$

$$MA1 := \left(ELE_{sill} + \frac{H - H_{above}}{3} - ELE_{Base.R} \right) = 2.910 \text{ m}$$

$$F2 := H_{above} \cdot (H - H_{above}) \cdot \gamma_w \cdot Trib_{gate} = 76.3 \text{ kN}$$

$$MA2 := \left(ELE_{sill} + \frac{H - H_{above}}{2} - ELE_{Base.R} \right) = 3.435 \text{ m}$$

$$F_{gateH.IDF} := \begin{cases} (F1 + F2) & \text{if } Gates_{IDF.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 150.5 \cdot \text{kN}$$

$$M_{gateH.IDF} := \begin{cases} (F1 \cdot MA1 + F2 \cdot MA2) & \text{if } Gates_{IDF.Hyd} = 1 \\ 0 & \text{otherwise} \end{cases} = 477.9 \cdot \text{kN} \cdot \text{m}$$

 Calculations

Hydraulic Drag Force (H)



Weight of Water Above Section (H) - NOT APPLICABLE

Input coordinates

Calculations

Results

Initial Uplift Forces (U)

Figures

Uplift Function Definition

Input and Calculation

Note: Analysis assumes uplift pressure acts perpendicular to the concrete-foundation interface. Uplift pressure is considered positive, but the actual forces are negative when vertically upwards and positive in downstream (right) direction. Crack length is initially set to 0 but may change in subsequent cracked base analysis. Uplift is calculated again in the cracked section analysis and in the post-earthquake load combination.

FactorUL := 1.00

Factor to reduce uplift pressure if required. Set to 1.00 for 100%.

Lcrack0 := 0 · m

Set initial crack length. Measured from left side, parallel to base

PUSUL.Sum := FactorUL · PUS.Sum = 55.2 · kPa

Uplift pressure at upstream (left) side

PDSUL.Sum := FactorUL · PDS.Sum = 0 · kPa

Uplift pressure at downstream (right) side

PUSUL.Win := FactorUL · PUS.Win = 39.1 · kPa

PDSUL.Win := FactorUL · PDS.Win = 0 · kPa

PUSUL.IDF := FactorUL · PUS.IDF = 65 · kPa

PDSUL.IDF := FactorUL · PDS.IDF = 49.3 · kPa

Lincl = 7.95 m

ELEBase.L = 305.270 m

ELEBase.R = 305.270 m

WLUS.Sum = 310.900 m

WLUS.Win = 309.260 m

WLUS.IDF = 311.900 m

WLDS.Sum = 305.270 m

WLDS.Win = 305.270 m

WLDS.IDF = 310.300 m

PUS.Sum = 55.2 · kPa

PDS.Sum = 0.0 · kPa

Case 1: Water at summer operating levels

PU.Sum(x) := PUL(x, Lcrack0, PUSUL.Sum, PDSUL.Sum)

Creates the pressure function

$$FU0.Sum := \int_0^{L_{incl}} PU.Sum(x) \cdot B \, dx = 367.7 \cdot \text{kN}$$

Total uplift force. Calculated as the area under the uplift pressure diagram.

$$MA := L_{incl} - \frac{1}{FU0.Sum} \left(\int_0^{L_{incl}} PU.Sum(x) \cdot x \cdot B \, dx \right) = 5.3 \cdot \text{m}$$

Moment arm of uplift force about the right side of base. Measured parallel to base.

MU0.Sum := FU0.Sum · MA = 1949 · kN · m

Moment from uplift on uncracked section

FU0.Sum.Hor := -FU0.Sum · sin(α) = 0 · kN

Uplift resolved into horizontal and vertical forces for subsequent calculations

FU0.Sum.Ver := -FU0.Sum · cos(α) = -367.7 · kN

Case 2: Water at winter operating levels

PU.Win(x) := PUL(x, Lcrack0, PUSUL.Win, PDSUL.Win)

$$FU0.Win := \int_0^{L_{incl}} PU.Win(x) \cdot B \, dx = 260.6 \cdot \text{kN}$$

$$MA := L_{incl} - \frac{1}{FU0.Win} \left(\int_0^{L_{incl}} PU.Win(x) \cdot x \cdot B \, dx \right) = 5.3 \cdot \text{m}$$

$$\begin{aligned} MU0.Win &:= FU0.Win \cdot MA = 1381.2 \cdot \text{kN} \cdot \text{m} \\ FU0.Win.Hor &:= -FU0.Win \cdot \sin(\alpha) = 0 \cdot \text{kN} \\ FU0.Win.Ver &:= -FU0.Win \cdot \cos(\alpha) = -260.6 \cdot \text{kN} \end{aligned}$$


Case 3: Water at IDF levels


$$PU.IDF(x) := PUL(x, L_{crack0}, PUSUL.IDF, PDSUL.IDF)$$

$$FU0.IDF := \int_0^{L_{incl}} PU.IDF(x) \cdot B \, dx = 761.6 \cdot \text{kN}$$

$$MA := L_{incl} - \frac{1}{FU0.IDF} \left(\int_0^{L_{incl}} PU.IDF(x) \cdot x \cdot B \, dx \right) = 4.16 \, \text{m}$$

$$\begin{aligned} MU0.IDF &:= FU0.IDF \cdot MA = 3165.8 \cdot \text{kN} \cdot \text{m} \\ FU0.IDF.Hor &:= -FU0.IDF \cdot \sin(\alpha) = 0 \cdot \text{kN} \\ FU0.IDF.Ver &:= -FU0.IDF \cdot \cos(\alpha) = -761.6 \cdot \text{kN} \end{aligned}$$

 Input and Calculation

 Plot of Results

Upstream Silt Buildup (S)



Downstream Backfill (S)



Ice Loading (I)



USUAL LOAD CASE

Direct ice load on structure

$$IceLoad_{usual} := 75 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{ice.1.usual} := IceLoad_{usual} B = 125.6 \cdot \text{kN}$$

Force acting on the structure

$$ELE_{ice} := WL_{US}.Win - 0.3 \, \text{m} = 308.96 \, \text{m}$$

Elevation of force (assumed to act at 0.3m below water level)

$$MA := ELE_{ice} - ELE_{Base.R} = 3.7 \, \text{m}$$

Moment arm is vertical distance from force to right side of base

$$M_{ice.1.usual} := F_{ice.1.usual} \cdot MA = 463.6 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

$W_{igate} = 0.00$
$Trib_{gate} = 1.52 \, \text{m}$
$ELE_{Base.R} = 305.270 \, \text{m}$
$WL_{US}.Win = 309.260 \, \text{m}$
$B = 1.67 \, \text{m}$
$GatesWin.Hyd = 1$

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{ice.gate.usual} := \begin{cases} 0 & \text{if } GatesWin.Hyd = 0 \\ IceLoad_{usual} \cdot Trib_{gate} & \text{otherwise} \end{cases} = 114.3 \cdot \text{kN}$$

$$M_{ice.gate.usual} := F_{ice.gate.usual} \cdot MA = 421.8 \text{ kN} \cdot \text{m}$$

$$F_{ice.usual} := F_{ice.1.usual} + F_{ice.gate.usual} = 239.9 \text{ kN}$$

$$M_{ice.usual} := M_{ice.1.usual} + M_{ice.gate.usual} = 885.3 \text{ kN} \cdot \text{m}$$

UNUSUAL LOAD CASE

Direct ice load on structure

$$IceLoad := 83.5 \frac{\text{kN}}{\text{m}}$$

Ice loading on structure (enter as kN/m)

$$F_{ice.1} := IceLoad \cdot B = 139.9 \cdot \text{kN}$$

Force acting on the structure

$$M_{ice.1} := F_{ice.1} \cdot MA = 516.1 \cdot \text{kN} \cdot \text{m}$$

Moment about right side of base

Ice load on adjacent gates/stop logs

Note: Ice load in this section acts on the tributary gate width to be transferred into gate slots

$$F_{ice.gate} := \begin{cases} 0 & \text{if } GatesWin.Hyd = 0 \\ IceLoad \cdot Trib_{gate} & \text{otherwise} \end{cases} = 127.3 \cdot \text{kN}$$

$$M_{ice.gate} := F_{ice.gate} \cdot MA = 469.6 \text{ kN} \cdot \text{m}$$

$$F_{ice} := F_{ice.1} + F_{ice.gate} = 267.1 \text{ kN}$$

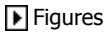
$$M_{ice} := M_{ice.1} + M_{ice.gate} = 985.7 \text{ kN} \cdot \text{m}$$



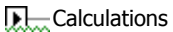
Seismic Forces - Inertia of Structure Dead Load (Q)



Seismic Forces - Hydrodynamic Forces (Q)



Figures



Calculations

Seismic Forces - Dynamic Soil Pressures (Q)



Tensioned Anchors - NOT APPLICABLE



Other Forces - NOT APPLICABLE



Load Case 1. Usual Loading Summer Case (D+H+S+U)

LC.1 - Summary of Forces

Deadloads (D):

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$W_{log.Sum} = 0$	$M_{log.Sum} = 0$
$W_{slab} = 0 \text{ kN}$	$M_{slab} = 0 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$

Hydraulic (H):

$F_{US.Sum.Hor} = 260.4 \cdot \text{kN}$	$M_{US.Sum.Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$
$F_{US.Sum.Ver} = 0 \cdot \text{kN}$	$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$F_{DS.Sum.Hor} = 0 \text{ kN}$	$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Sum.Ver} = 0 \text{ kN}$	$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH.Sum} = 103.4 \text{ kN}$	$M_{gateH.Sum} = 316.1 \text{ kN} \cdot \text{m}$
$W_{Water.Above.Sum} = 0$	$M_{Water.Above.Sum} = 0$

Soil (S):

$F_{US.silt.Hor} = 0 \text{ kN}$	$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US.silt} = 0 \text{ kN}$	$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.fill.Hor} = 0$	$M_{DS.fill.Hor} = 0$
$W_{DS.fill} = 0$	$M_{DS.fill.Ver} = 0$
$W_{Granular.Sum} = 0 \text{ kN}$	$M_{Granular.Sum} = 0 \text{ kN} \cdot \text{m}$

Uplift (U):

$F_{U0.Sum.Hor} = 0 \cdot \text{kN}$	$M_{U0.Sum} = 1949 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Sum.Ver} = -367.7 \cdot \text{kN}$	

Other Forces:

$F_{anchor.Hor} = 0$	$M_{anchor.Hor} = 0$
$F_{anchor.Ver} = 0$	$M_{anchor.Ver} = 0$
$F_{other.Hor.1} = 0$	$M_{other.Hor.1} = 0$
$F_{other.Ver.1} = 0$	$M_{other.Ver.1} = 0$

LC.1 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 363.8 \text{ kN} \quad \text{Sum of horizontal forces}$$

$$+ (F_{U0.Sum.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 1200 \text{ kN} \quad \text{Sum of vertical forces}$$

$$+ (W_{US.silt} + W_{DS.fill} + W_{Granular.Sum}) + (F_{U0.Sum.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 363.8 \cdot \text{kN} \quad \text{Forces acting parallel to uncracked base}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1200.0 \cdot \text{kN} \quad \text{Forces acting perpendicular to uncracked base}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 6231.8 \text{ kN} \cdot \text{m}$$

$$+ (M_{US.silt.Ver} + M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{Granular.Sum}) \dots$$

$$+ (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1}) \quad \text{Sum of stabilizing moments}$$

$$M_{overt0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.Sum}) = 2753.8 \text{ kN} \cdot \text{m} \quad \text{Sum of overturning moments}$$

$$M_{net0} := M_{stab0} - M_{overt0} = 3478 \text{ kN} \cdot \text{m} \quad \text{Net resisting moment}$$

LC.1 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.9 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$\begin{aligned} L_{incl} &= 7.95 \text{ m} \\ M_{net0} &= 3478.0 \text{ kN} \cdot \text{m} \\ F_{perp0} &= 1200.0 \text{ kN} \end{aligned}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 1.08 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 163.3 \text{ kPa}$$

$$q_{min0} = 16.9 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp0} = 7.95 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens0} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack0} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1200030.4$$

$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

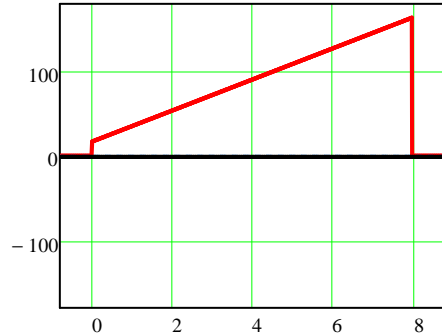
Compression and tension forces in foundation

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

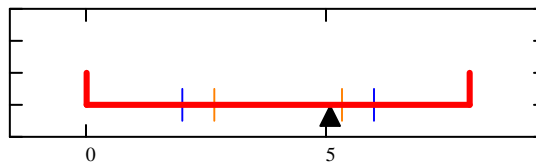
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure, blue lines indicate middle half of base, orange lines indicate middle third of base

LC.1 - Sliding

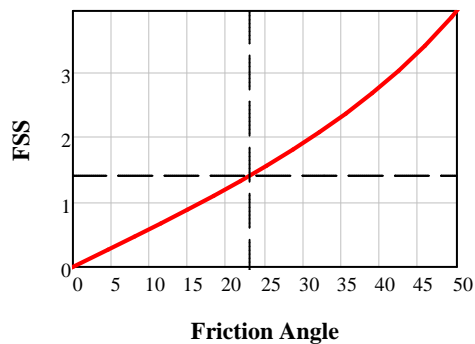
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 1.40$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{incl} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$





LC.1 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overturn}$, need to be modified for each load combination.

crackactive := $\begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$ Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 2. Usual Loading Winter Case (D+H+S+U+I)

LC.2 - Summary of Forces

Deadloads (D):

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$W_{log, Win} = 0$	$M_{log, Win} = 0$
$W_{slab} = 0 \text{ kN}$	$M_{slab} = 0 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$

Hydraulic (H):

$F_{US, Win, Hor} = 130.8 \cdot \text{kN}$	$M_{US, Win, Hor} = 174 \cdot \text{kN} \cdot \text{m}$
$F_{US, Win, Ver} = 0 \cdot \text{kN}$	$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$F_{DS, Win, Hor} = 0 \text{ kN}$	$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, Win, Ver} = 0 \text{ kN}$	$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH, Win} = 33.9 \text{ kN}$	$M_{gateH, Win} = 87.2 \text{ kN} \cdot \text{m}$
$W_{Water, Above, Win} = 0$	$M_{Water, Above, Win} = 0$

Soil (S):

$F_{US, silt, Hor} = 0 \text{ kN}$	$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US, silt} = 0 \text{ kN}$	$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS, fill, Hor} = 0$	$M_{DS, fill, Hor} = 0$
$W_{DS, fill} = 0$	$M_{DS, fill, Ver} = 0$
$W_{Granular, Win} = 0 \text{ kN}$	$M_{Granular, Win} = 0 \text{ kN} \cdot \text{m}$

Uplift (U):

$F_{U0, Win, Hor} = 0 \cdot \text{kN}$	$M_{U0, Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$
$F_{U0, Win, Ver} = -260.6 \cdot \text{kN}$	

Other Forces:

$F_{anchor, Hor} = 0$	$M_{anchor, Hor} = 0$
$F_{anchor, Ver} = 0$	$M_{anchor, Ver} = 0$
$F_{other, Hor, 1} = 0$	$M_{other, Hor, 1} = 0$
$F_{other, Ver, 1} = 0$	$M_{other, Ver, 1} = 0$

Ice (I):

$F_{ice, usual} = 239.9 \cdot \text{kN}$	$M_{ice, usual} = 885.3 \cdot \text{kN} \cdot \text{m}$
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LC.2 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 404.6 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice, usual})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 1307.1 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 404.6 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1307.1 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 6231.8 \text{ kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice, usual}) = 2527.7 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 3704.2 \text{ kN} \cdot \text{m}$$

LC.2 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.83 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 3704.2 \text{ kN} \cdot \text{m}$$

$$F_{perp0} = 1307.1 \text{ kN}$$

$$e_0 := \frac{L_{incl}}{2} - x_0 = 1.14 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max0} = 182.7 \text{ kPa}$$

$$q_{min0} = 13.6 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1307149$$

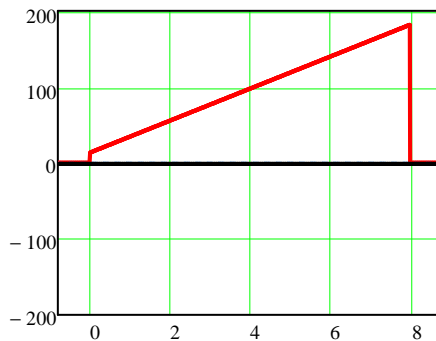
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

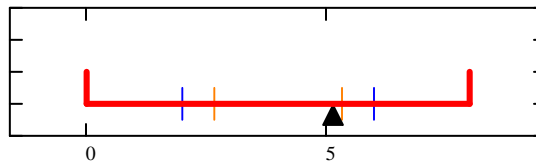
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.2 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 1.37$$

Factor of safety against sliding for specified friction angle

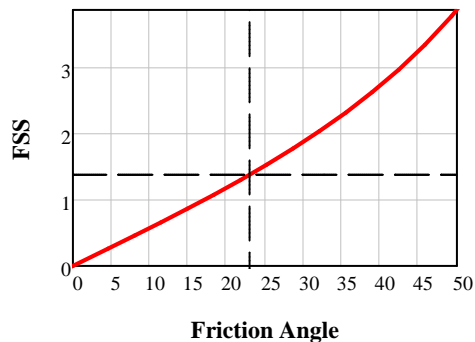
$$\phi_{cf} = 23 \cdot \text{deg}$$

$$c = 0$$

$$L_{incl} = 7.95 \text{ m}$$

$$\alpha = 0 \cdot \text{deg}$$

$$B = 1.67 \text{ m}$$




LC.2 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


$\text{crackactive} := \begin{cases} 0 & \text{if } L_{\text{crack0}} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 3. Unusual Loading IDF (D+H_{IDF}+S+U_{IDF})

LC.3 - Summary of Forces

Deadloads (D):

$$W_{conc} = 1567.8 \cdot \text{kN}$$

$$W_{log.IDF} = 0$$

$$W_{slab} = 0 \text{ kN}$$

$$W_{tower} = 0$$

$$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log.IDF} = 0$$

$$M_{slab} = 0 \text{ kN} \cdot \text{m}$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US.IDF.Hor} = 353.6 \cdot \text{kN}$$

$$F_{US.IDF.Ver} = 0 \cdot \text{kN}$$

$$F_{DS.IDF.Hor} = 207.9 \text{ kN}$$

$$F_{DS.IDF.Ver} = 0 \text{ kN}$$

$$F_{gateH.IDF} = 150.5 \text{ kN}$$

$$F_{drag} = 0$$

$$W_{Water.Above.IDF} = 0$$

$$M_{US.IDF.Hor} = 752.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS.IDF.Hor} = 348.5 \text{ kN} \cdot \text{m}$$

$$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH.IDF} = 477.9 \text{ kN} \cdot \text{m}$$

$$M_{drag} = 0$$

$$M_{Water.Above.IDF} = 0$$

Soil (S):

$$F_{US.silt.Hor} = 0 \text{ kN}$$

$$W_{US.silt} = 0 \text{ kN}$$

$$F_{DS.fill.IDF.Hor} = 0$$

$$W_{DS.fill.IDF} = 0$$

$$W_{Granular.IDF} = 0 \text{ kN}$$

$$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.fill.IDF.Hor} = 0$$

$$M_{DS.fill.IDF.Ver} = 0$$

$$M_{Granular.IDF} = 0 \text{ kN} \cdot \text{m}$$

Uplift (U):

$$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$$

$$F_{U0.IDF.Ver} = -761.6 \cdot \text{kN}$$

$$M_{U0.IDF} = 3165.8 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor.Hor} = 0$$

$$F_{anchor.Ver} = 0$$

$$F_{other.Hor.1} = 0$$

$$F_{other.Ver.1} = 0$$

$$M_{anchor.Hor} = 0$$

$$M_{anchor.Ver} = 0$$

$$M_{other.Hor.1} = 0$$

$$M_{other.Ver.1} = 0$$

LC.3 - Combine Forces and Moments

$$F_{hor0} := (F_{US.IDF.Hor} - F_{DS.IDF.Hor} + F_{gateH.IDF} + F_{drag}) + (F_{US.silt.Hor} - F_{DS.fill.IDF.Hor}) \dots = 296.2 \text{ kN} \\ + (F_{U0.IDF.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.IDF} + W_{slab} + W_{tower}) + (F_{US.IDF.Ver} + F_{DS.IDF.Ver} + W_{Water.Above.IDF}) \dots = 806.2 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill.IDF} + W_{Granular.IDF}) + (F_{U0.IDF.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 296.2 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 806.2 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.IDF} + M_{slab} + M_{tower}) + (M_{US.IDF.Ver} + M_{DS.IDF.Hor} + M_{DS.IDF.Ver} + M_{Water.Above.IDF}) \dots = 6580.4 \text{ kN} \cdot \text{m} \\ + (M_{US.silt.Ver} + M_{DS.fill.IDF.Hor} + M_{DS.fill.IDF.Ver} + M_{Granular.IDF}) \dots \\ + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.IDF.Hor} + M_{gateH.IDF} + M_{drag}) + (M_{US.silt.Hor}) + (M_{U0.IDF}) = 4396.5 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 2183.9 \text{ kN} \cdot \text{m}$$

LC.3 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.71 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 1.27 \text{ m}$$

$$\begin{aligned} L_{incl} &= 7.95 \text{ m} \\ M_{net0} &= 2183.9 \text{ kN}\cdot\text{m} \\ F_{perp0} &= 806.2 \text{ kN} \end{aligned}$$

Stress Calculations

$$q_{max0} = 118.4 \text{ kPa}$$

$$q_{min0} = 2.7 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 806173.7$$

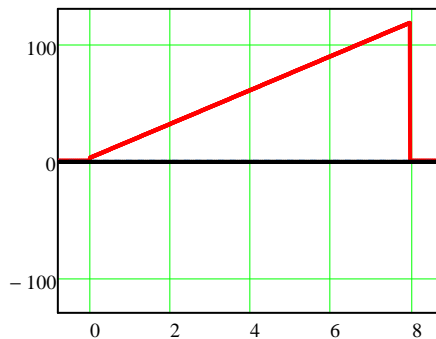
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

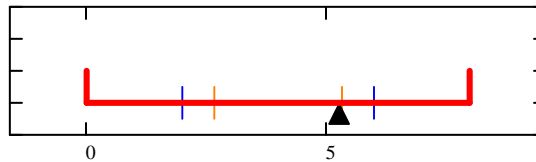
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

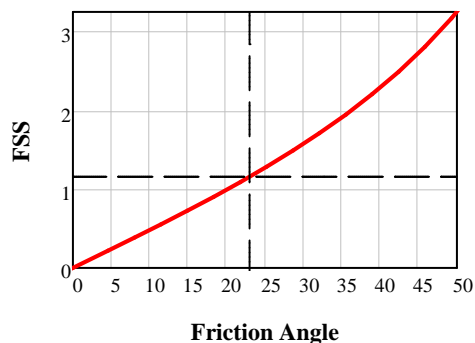
LC.3 - Sliding

$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}} \quad \text{Define function to evaluate sliding using a range of friction angles}$$

$$FSS_0(\phi_{cf}) = 1.16$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{incl} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$




LC.3 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.


$$\text{crackactive} := \begin{cases} 0 & \text{if } L_{\text{crack0}} = 0 \\ 1 & \text{otherwise} \end{cases}$$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 4. Unusual Loading Winter Case (D+H+S+U+I)

LC.4 - Summary of Forces

Deadloads (D):

$$W_{conc} = 1567.8 \cdot \text{kN}$$

$$W_{log, Win} = 0$$

$$W_{slab} = 0 \text{ kN}$$

$$W_{tower} = 0$$

$$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log, Win} = 0$$

$$M_{slab} = 0 \text{ kN} \cdot \text{m}$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US, Win, Hor} = 130.8 \cdot \text{kN}$$

$$F_{US, Win, Ver} = 0 \cdot \text{kN}$$

$$F_{DS, Win, Hor} = 0 \text{ kN}$$

$$F_{DS, Win, Ver} = 0 \text{ kN}$$

$$F_{gateH, Win} = 33.9 \text{ kN}$$

$$W_{Water, Above, Win} = 0$$

$$M_{US, Win, Hor} = 174 \cdot \text{kN} \cdot \text{m}$$

$$M_{US, Win, Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS, Win, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, Win, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH, Win} = 87.2 \text{ kN} \cdot \text{m}$$

$$M_{Water, Above, Win} = 0$$

Soil (S):

$$F_{US, silt, Hor} = 0 \text{ kN}$$

$$W_{US, silt} = 0 \text{ kN}$$

$$F_{DS, fill, Hor} = 0$$

$$W_{DS, fill} = 0$$

$$W_{Granular, Win} = 0 \text{ kN}$$

$$M_{US, silt, Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US, silt, Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS, fill, Hor} = 0$$

$$M_{DS, fill, Ver} = 0$$

$$M_{Granular, Win} = 0 \text{ kN} \cdot \text{m}$$

Uplift (U):

$$F_{U0, Win, Hor} = 0 \cdot \text{kN}$$

$$F_{U0, Win, Ver} = -260.6 \cdot \text{kN}$$

$$M_{U0, Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor, Hor} = 0$$

$$F_{anchor, Ver} = 0$$

$$F_{other, Hor, 1} = 0$$

$$F_{other, Ver, 1} = 0$$

$$M_{anchor, Hor} = 0$$

$$M_{anchor, Ver} = 0$$

$$M_{other, Hor, 1} = 0$$

$$M_{other, Ver, 1} = 0$$

Ice (I):

$$F_{ice} = 267.1 \cdot \text{kN}$$

$$M_{ice} = 985.7 \cdot \text{kN} \cdot \text{m}$$

LC.4 - Combine Forces and Moments

$$F_{hor0} := (F_{US, Win, Hor} - F_{DS, Win, Hor} + F_{gateH, Win}) + (F_{US, silt, Hor} - F_{DS, fill, Hor}) \dots = 431.8 \text{ kN} \\ + (F_{U0, Win, Hor}) + (F_{anchor, Hor} + F_{other, Hor, 1}) + (F_{ice})$$

$$F_{ver0} := (W_{conc} + W_{log, Win} + W_{slab} + W_{tower}) + (F_{US, Win, Ver} + F_{DS, Win, Ver} + W_{Water, Above, Win}) \dots = 1307.1 \text{ kN} \\ + (W_{US, silt} + W_{DS, fill} + W_{Granular, Win}) + (F_{U0, Win, Ver}) + (F_{anchor, Ver} + F_{other, Ver, 1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 431.8 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1307.1 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log, Sum} + M_{slab} + M_{tower}) + (M_{US, Win, Ver} + M_{DS, Win, Hor} + M_{DS, Win, Ver} + M_{Water, Above, Win}) \dots = 6231.8 \text{ kN} \cdot \text{m} \\ + (M_{DS, fill, Hor} + M_{DS, fill, Ver} + M_{US, silt, Ver} + M_{Granular, Win}) + (M_{anchor, Ver} + M_{anchor, Hor} + M_{other, Hor, 1} + M_{other, Ver, 1})$$

$$M_{overturn0} := (M_{US, Win, Hor} + M_{gateH, Win}) + (M_{US, silt, Hor}) + (M_{U0, Win}) + (M_{ice}) = 2628 \text{ kN} \cdot \text{m}$$

$$M_{\text{net}0} := M_{\text{stab}0} - M_{\text{overturn}0} = 3603.8 \text{ kN}\cdot\text{m}$$

LC.4 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{\text{net}0}}{F_{\text{perp}0}} = 2.76 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$\begin{aligned} L_{\text{incl}} &= 7.95 \text{ m} \\ M_{\text{net}0} &= 3603.8 \text{ kN}\cdot\text{m} \\ F_{\text{perp}0} &= 1307.1 \text{ kN} \end{aligned}$$

$$E_0 := \frac{L_{\text{incl}}}{2} - x_0 = 1.22 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{\text{max}0} = 188.4 \text{ kPa}$$

$$q_{\text{min}0} = 7.9 \text{ kPa}$$

$$L_{\text{comp}0} = 7.95 \text{ m}$$

$$L_{\text{tens}0} = 0.00 \text{ m}$$

$$L_{\text{crack}0} = 0.00 \text{ m}$$

$$F_{\text{comp}0} := \begin{cases} F_{\text{perp}0} & \text{if } q_{\text{min}0} \geq 0 \\ \frac{B \cdot q_{\text{max}0} \cdot L_{\text{comp}0}}{2} & \text{otherwise} \end{cases} = 1307149$$

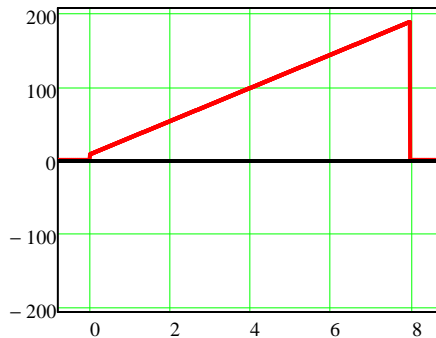
$$F_{\text{tens}0} := \frac{B \cdot q_{\text{min}0} \cdot L_{\text{tens}0}}{2} = 0 \text{ kN}$$

$$\frac{L_{\text{comp}0}}{L_{\text{incl}}} = 100 \cdot \%$$

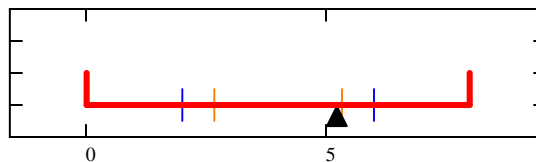
$$\frac{L_{\text{tens}0}}{L_{\text{incl}}} = 0 \cdot \%$$

$$\frac{L_{\text{crack}0}}{L_{\text{incl}}} = 0 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.4 - Sliding

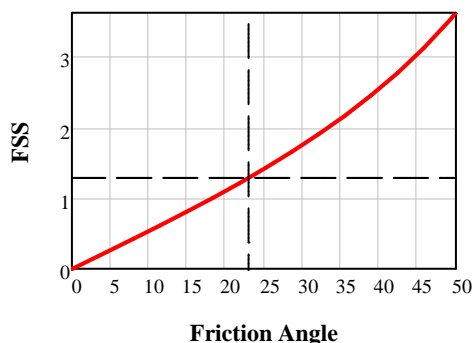
$$FSS_0(\theta) := \frac{F_{\text{comp}0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{\text{comp}0} + \frac{L_{\text{tens}0}}{2} \right)}{F_{\text{parallel}0}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS_0(\phi_{cf}) = 1.28$$

Factor of safety against sliding for specified friction angle

$$\begin{aligned} \phi_{cf} &= 23 \cdot \text{deg} \\ c &= 0 \\ L_{\text{incl}} &= 7.95 \text{ m} \\ \alpha &= 0 \cdot \text{deg} \\ B &= 1.67 \text{ m} \end{aligned}$$



LC.4 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F_{hor} , F_{ver} , $M_{overturn}$, need to be modified for each load combination.

$crackactive := \begin{cases} 0 & \text{if } L_{crack0} = 0 \\ 1 & \text{otherwise} \end{cases}$

Determines if the cracked analysis should run.

 Cracked Base Calculations

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Load Case 5. Extreme Loading Earthquake (D+H+S+Q+U_Q)

LC.5 - Summary of Forces

Deadloads (D):

$$W_{conc} = 1567.8 \cdot \text{kN}$$

$$W_{log,Sum} = 0$$

$$W_{slab} = 0 \text{ kN}$$

$$W_{tower} = 0$$

$$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{log,Sum} = 0$$

$$M_{slab} = 0 \text{ kN} \cdot \text{m}$$

$$M_{tower} = 0$$

Hydraulic (H):

$$F_{US,Sum,Hor} = 260.4 \cdot \text{kN}$$

$$F_{US,Sum,Ver} = 0 \cdot \text{kN}$$

$$F_{DS,Sum,Hor} = 0 \text{ kN}$$

$$F_{DS,Sum,Ver} = 0 \text{ kN}$$

$$F_{gateH,Sum} = 103.4 \text{ kN}$$

$$W_{Water,Above,Sum} = 0$$

$$M_{US,Sum,Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{US,Sum,Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS,Sum,Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS,Sum,Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{gateH,Sum} = 316.1 \text{ kN} \cdot \text{m}$$

$$M_{Water,Above,Sum} = 0$$

Soil (S):

$$F_{US,silt,Hor} = 0 \text{ kN}$$

$$W_{US,silt} = 0 \text{ kN}$$

$$F_{DS,fill,Hor} = 0$$

$$W_{DS,fill} = 0$$

$$W_{Granular,EQ} = 0 \text{ kN}$$

$$M_{US,silt,Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{US,silt,Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS,fill,Hor} = 0$$

$$M_{DS,fill,Ver} = 0$$

$$M_{Granular,EQ} = 0 \text{ kN} \cdot \text{m}$$

Uplift (U):

$$F_{U0,Sum,Hor} = 0 \cdot \text{kN}$$

$$F_{U0,Sum,Ver} = -367.7 \cdot \text{kN}$$

$$M_{U0,Sum} = 1949 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$F_{anchor,Hor} = 0$$

$$F_{anchor,Ver} = 0$$

$$F_{other,Hor,1} = 0$$

$$F_{other,Ver,1} = 0$$

$$M_{anchor,Hor} = 0$$

$$M_{anchor,Ver} = 0$$

$$M_{other,Hor,1} = 0$$

$$M_{other,Ver,1} = 0$$

Seismic (Q):

$$F_{eq,conc,Hor} = 130.8 \text{ kN}$$

$$M_{eq,conc,Hor} = 370.7 \text{ kN} \cdot \text{m}$$

$F_{eq.conc.Ver} = 87.2 \text{ kN}$

$F_{eq.log.Hor} = 0$

$F_{eq.log.Ver} = 0$

$F_{eq.slabs.Hor} = 0 \text{ kN}$

$F_{eq.slabs.Ver} = 0 \text{ kN}$

$F_{eq.tower.Hor} = 0$

$F_{eq.tower.Ver} = 0$

$F_{eq.HD.US} = 23.3 \text{ kN}$

$F_{eq.HD.gate} = 9 \text{ kN}$

$F_{eq.silt.Hor} = 0 \text{ kN}$

$F_{eq.silt.Ver} = 0 \text{ kN}$

$F_{eq.fill.Hor} = 0$

$F_{eq.fill.Ver} = 0$

$F_{eq.Granular.Ver} = 0 \text{ kN}$

$F_{eq.Granular.Hor} = 0 \text{ kN}$

$F_{eq.Water.Above.Ver} = 0$

$F_{eq.Water.Above.Hor} = 0$

$M_{eq.conc.Ver} = 346.5 \text{ kN}\cdot\text{m}$

$M_{eq.log.Hor} = 0$

$M_{eq.log.Ver} = 0$

$M_{eq.slabs.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.slabs.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.tower.Hor} = 0$

$M_{eq.tower.Ver} = 0$

$M_{eq.HD.US} = 52.8 \text{ kN}\cdot\text{m}$

$M_{eq.HD.gate} = 32.1 \text{ kN}\cdot\text{m}$

$M_{eq.silt.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.silt.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.fill.Hor} = 0$

$M_{eq.fill.Ver} = 0$

$M_{eq.Granular.Ver} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.Granular.Hor} = 0 \text{ kN}\cdot\text{m}$

$M_{eq.Water.Above.Ver} = 0$

$M_{eq.Water.Above.Hor} = 0$

LC.5 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 526.8 \text{ kN}$$

$$+ (F_{U0.Sum.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1}) \dots$$

$$+ (F_{eq.conc.Hor} + F_{eq.log.Hor} + F_{eq.slabs.Hor} + F_{eq.tower.Hor} + F_{eq.HD.US} + F_{eq.HD.gate} + F_{eq.silt.Hor} + F_{eq.fill.Hor} + F_{eq.Granular.Hor})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 1112.9 \text{ kN}$$

$$+ (W_{US.silt} + W_{DS.fill} + W_{Granular.EQ}) + (F_{U0.Sum.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1}) \dots$$

$$+ (-F_{eq.conc.Ver} - F_{eq.log.Ver} - F_{eq.slabs.Ver} - F_{eq.tower.Ver} - F_{eq.silt.Ver} - F_{eq.fill.Ver} - F_{eq.Granular.Ver} - F_{eq.Water.Above.Ver})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 526.8 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1112.9 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 6231.8 \text{ kN}\cdot\text{m}$$

$$+ (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.Sum}) \dots = 3555.9 \text{ kN}\cdot\text{m}$$

$$+ \left(\begin{array}{l} M_{eq.conc.Hor} + M_{eq.conc.Ver} + M_{eq.log.Hor} + M_{eq.log.Ver} + M_{eq.slabs.Hor} \dots \\ + M_{eq.slabs.Ver} + M_{eq.tower.Hor} + M_{eq.tower.Ver} + M_{eq.HD.US} + M_{eq.HD.gate} \dots \\ + M_{eq.silt.Hor} + M_{eq.silt.Ver} + M_{eq.fill.Hor} + M_{eq.fill.Ver} + M_{eq.Granular.Ver} \dots \\ + M_{eq.Granular.Hor} + M_{eq.Water.Above.Ver} + M_{eq.Water.Above.Hor} \end{array} \right)$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 2675.9 \text{ kN}\cdot\text{m}$$

LC.5 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.40 \text{ m}$$

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 2675.9 \text{ kN}\cdot\text{m}$$

$$F_{perp0} = 1112.9 \text{ kN}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 1.57 \text{ m}$$

Stress Calculations

$$q_{max0} = 184.2 \text{ kPa}$$

$$q_{min0} = 0.0 \text{ kPa}$$

$$L_{comp0} = 7.21 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack.eq} := L_{crack0} = 0.74 \text{ m}$$

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1112862.9$$

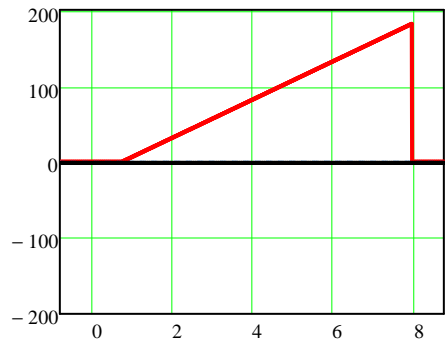
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 90.7 \cdot \%$$

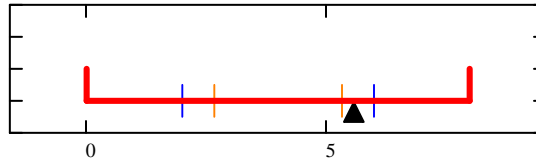
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 9.3 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.5 - Sliding

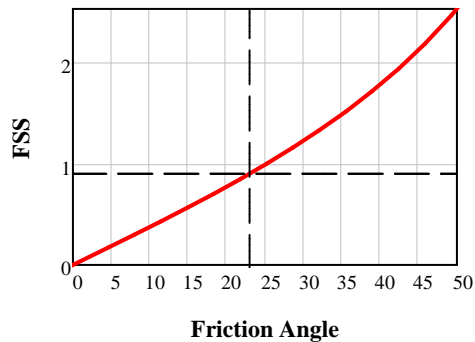
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 7.95 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 1.67 \text{ m}$

$$FSS_0(\phi_{cf}) = 0.90$$

Factor of safety against sliding for specified friction angle



LC.5 - Cracked Base Analysis

Note: Iterative cracked base analysis does not occur during seismic conditions. Initial uplift pressures are assumed to be maintained even if cracking occurs, as per CDA guidelines.

☐ Store results for summary

☐ Store (uncracked) results for Combined Analysis

Load Case 6. Post-Earthquake (D+H+S+U_{PQ})

LC.6(U) - Uplift

Updated uplift calculations

$$L_{\text{crack0}} := L_{\text{crack.eq}} = 0.74 \text{ m}$$

Crack length is set to the resulting crack length from LC.4.

$$P_{U.eq}(x) := P_{UL}(x, L_{\text{crack0}}, P_{USUL.Sum}, P_{DSUL.Sum})$$

$$F_{U0.eq} := \int_0^{L_{\text{incl}}} P_{U.eq}(x) \cdot B \, dx = 401.8 \cdot \text{kN}$$

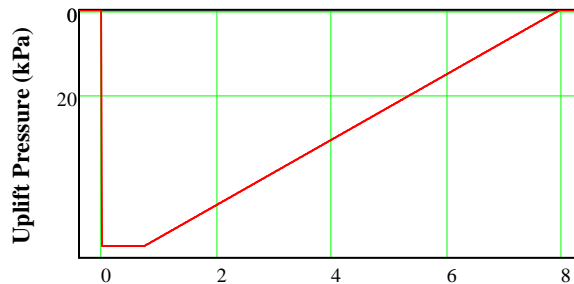
$$MA := L_{\text{incl}} - \frac{1}{F_{U0.eq}} \left(\int_0^{L_{\text{incl}}} P_{U.eq}(x) \cdot x \cdot B \, dx \right) = 5.28 \text{ m}$$

$$M_{U0.eq} := F_{U0.eq} \cdot MA = 2120.9 \cdot \text{kN} \cdot \text{m}$$

$$F_{U0.eq.Hor} := -F_{U0.eq} \cdot \sin(\alpha) = 0 \cdot \text{kN}$$

$$F_{U0.eq.Ver} := -F_{U0.eq} \cdot \cos(\alpha) = -401.8 \cdot \text{kN}$$

Uplift Pressure Diagram (Uncracked Base)



Updated uplift calculations

LC.6 - Summary of Forces

Deadloads (D):

$$W_{\text{conc}} = 1567.8 \cdot \text{kN}$$

$$W_{\text{log.Sum}} = 0$$

$$W_{\text{slab}} = 0 \text{ kN}$$

$$W_{\text{tower}} = 0$$

$$M_{\text{conc}} = 6231.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{\text{log.Sum}} = 0$$

$$M_{\text{slab}} = 0 \text{ kN} \cdot \text{m}$$

$$M_{\text{tower}} = 0$$

Hydraulic (H):

$$F_{US.Sum.Hor} = 260.4 \cdot \text{kN}$$

$$F_{US.Sum.Ver} = 0 \cdot \text{kN}$$

$$F_{DS.Sum.Hor} = 0 \text{ kN}$$

$$F_{DS.Sum.Ver} = 0 \text{ kN}$$

$$F_{\text{gateH.Sum}} = 103.4 \text{ kN}$$

$$W_{\text{Water.Above.Sum}} = 0$$

$$M_{US.Sum.Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$$

$$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$$

$$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$$

$$M_{\text{gateH.Sum}} = 316.1 \text{ kN} \cdot \text{m}$$

$$M_{\text{Water.Above.Sum}} = 0$$

Soil (S):

$$F_{US.silt.Hor} = 0 \text{ kN}$$

$$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$$

$$\begin{aligned} W_{US.silt} &= 0 \text{ kN} \\ F_{DS.fill.Hor} &= 0 \\ W_{DS.fill} &= 0 \\ W_{Granular.Post.EQ} &= 0 \text{ kN} \end{aligned}$$

$$\begin{aligned} M_{US.silt.Ver} &= 0 \text{ kN} \cdot \text{m} \\ M_{DS.fill.Hor} &= 0 \\ M_{DS.fill.Ver} &= 0 \\ M_{Granular.Post.EQ} &= 0 \text{ kN} \cdot \text{m} \end{aligned}$$

Uplift (U):

$$\begin{aligned} F_{U0.eq.Hor} &= 0 \cdot \text{kN} \\ F_{U0.eq.Ver} &= -401.8 \cdot \text{kN} \end{aligned}$$

$$M_{U0.eq} = 2120.9 \cdot \text{kN} \cdot \text{m}$$

Other Forces:

$$\begin{aligned} F_{anchor.Hor} &= 0 \\ F_{anchor.Ver} &= 0 \\ F_{other.Hor.1} &= 0 \\ F_{other.Ver.1} &= 0 \end{aligned}$$

$$\begin{aligned} M_{anchor.Hor} &= 0 \\ M_{anchor.Ver} &= 0 \\ M_{other.Hor.1} &= 0 \\ M_{other.Ver.1} &= 0 \end{aligned}$$

LC.6 - Combine Forces and Moments

$$F_{hor0} := (F_{US.Sum.Hor} - F_{DS.Sum.Hor} + F_{gateH.Sum}) + (F_{US.silt.Hor} - F_{DS.fill.Hor}) \dots = 363.8 \text{ kN} \\ + (F_{U0.eq.Hor}) + (F_{anchor.Hor} + F_{other.Hor.1})$$

$$F_{ver0} := (W_{conc} + W_{log.Sum} + W_{slab} + W_{tower}) + (F_{US.Sum.Ver} + F_{DS.Sum.Ver} + W_{Water.Above.Sum}) \dots = 1166 \text{ kN} \\ + (W_{US.silt} + W_{DS.fill} + W_{Granular.Post.EQ}) + (F_{U0.eq.Ver}) + (F_{anchor.Ver} + F_{other.Ver.1})$$

$$F_{parallel0} := F_{hor0} \cdot \cos(\alpha) - F_{ver0} \cdot \sin(\alpha) = 363.8 \cdot \text{kN}$$

$$F_{perp0} := F_{hor0} \cdot \sin(\alpha) + F_{ver0} \cdot \cos(\alpha) = 1166.0 \cdot \text{kN}$$

$$M_{stab0} := (M_{conc} + M_{log.Sum} + M_{slab} + M_{tower}) + (M_{US.Sum.Ver} + M_{DS.Sum.Hor} + M_{DS.Sum.Ver} + M_{Water.Above.Sum}) \dots = 6231.8 \text{ kN} \cdot \text{m} \\ + (M_{DS.fill.Hor} + M_{DS.fill.Ver} + M_{US.silt.Ver} + M_{Granular.Post.EQ}) + (M_{anchor.Ver} + M_{anchor.Hor} + M_{other.Hor.1} + M_{other.Ver.1})$$

$$M_{overturn0} := (M_{US.Sum.Hor} + M_{gateH.Sum}) + (M_{US.silt.Hor}) + (M_{U0.eq}) = 2925.8 \text{ kN} \cdot \text{m}$$

$$M_{net0} := M_{stab0} - M_{overturn0} = 3306.1 \text{ kN} \cdot \text{m}$$

LC.6 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net0}}{F_{perp0}} = 2.84 \text{ m}$$

$$E_0 := \frac{L_{incl}}{2} - x_0 = 1.14 \text{ m}$$

$$L_{incl} = 7.95 \text{ m}$$

$$M_{net0} = 3306.1 \text{ kN}\cdot\text{m}$$

$$F_{perp0} = 1166.0 \text{ kN}$$

Stress Calculations

$$q_{max0} = 162.9 \text{ kPa}$$

$$q_{min0} = 12.3 \text{ kPa}$$

$$L_{comp0} = 7.95 \text{ m}$$

$$L_{tens0} = 0.00 \text{ m}$$

$$L_{crack0} = 0.00 \text{ m}$$

$$L_{crack0} := \begin{cases} L_{crack.eq} & \text{if } L_{crack.eq} > L_{crack0} \\ L_{crack0} & \text{otherwise} \end{cases} = 0.74$$

Adjust the crack length to be larger of eq, or post-eq load case.

$$F_{comp0} := \begin{cases} F_{perp0} & \text{if } q_{min0} \geq 0 \\ \frac{B \cdot q_{max0} \cdot L_{comp0}}{2} & \text{otherwise} \end{cases} = 1165998.8$$

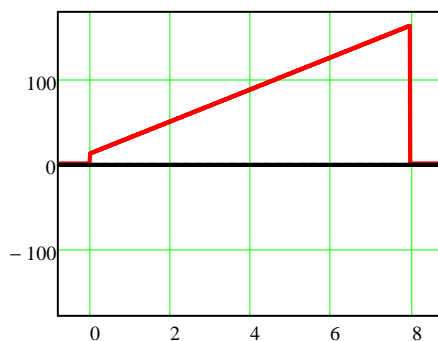
$$F_{tens0} := \frac{B \cdot q_{min0} \cdot L_{tens0}}{2} = 0 \text{ kN}$$

$$\frac{L_{comp0}}{L_{incl}} = 100 \cdot \%$$

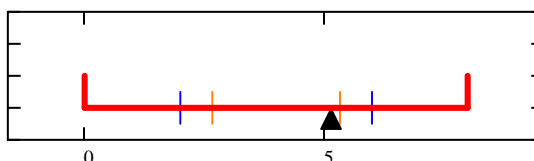
$$\frac{L_{tens0}}{L_{incl}} = 0 \cdot \%$$

$$\frac{L_{crack0}}{L_{incl}} = 9.3 \cdot \%$$

Normal Stresses Acting on Base



Location of Resultant



Red lines indicate extent of structure,
blue lines indicate middle half of base,
orange lines indicate middle third of base

LC.6 - Sliding

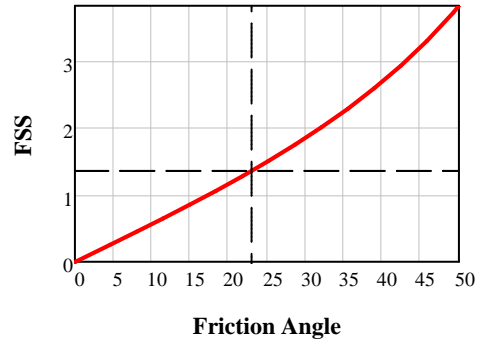
$$FSS_0(\theta) := \frac{F_{comp0} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp0} + \frac{L_{tens0}}{2} \right)}{F_{parallel0}}$$

Define function to evaluate sliding using a range of friction angles

$\phi_{cf} = 23 \cdot \text{deg}$
 $c = 0$
 $L_{incl} = 7.95 \text{ m}$
 $\alpha = 0 \cdot \text{deg}$
 $B = 1.67 \text{ m}$

$$FSS_0(\phi_{cf}) = 1.36$$


Factor of safety against sliding for specified friction angle





LC.6 - Cracked Base Analysis


Note: This program runs an iterative analysis to determine the length of a crack along the concrete-foundation interface. The values for F.hor, F.ver, M.overtum, need to be modified for each load combination.

$$\text{crackactive} := \begin{cases} 1 & \text{if } L_{\text{crack}0} > L_{\text{crack.eq}} \\ 0 & \text{otherwise} \end{cases} = 0$$
 Determines if the cracked analysis should run.

 Cracked Base Analysis

 Cracked Base Results

 Store results for summary

 Store (uncracked) results for Combined Analysis

Summary of Forces/Moments

Dead Loads (and related seismic)

$W_{conc} = 1567.8 \cdot \text{kN}$	$M_{conc} = 6231.8 \cdot \text{kN} \cdot \text{m}$
$F_{eq.conc.Hor} = 130.8 \text{ kN}$	$M_{eq.conc.Hor} = 370.7 \text{ kN} \cdot \text{m}$
$F_{eq.conc.Ver} = 87.2 \text{ kN}$	$M_{eq.conc.Ver} = 346.5 \text{ kN} \cdot \text{m}$
$W_{log.Sum} = 0$	$M_{log.Sum} = 0$
$W_{log.Win} = 0$	$M_{log.Win} = 0$
$W_{log.IDF} = 0$	$M_{log.Win} = 0$
$F_{eq.log.Hor} = 0$	$M_{eq.log.Hor} = 0$
$F_{eq.log.Ver} = 0$	$M_{eq.log.Ver} = 0$
$W_{slab} = 0 \text{ kN}$	$M_{slab} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.slab.Hor} = 0 \text{ kN}$	$M_{eq.slab.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.slab.Ver} = 0 \text{ kN}$	$M_{eq.slab.Ver} = 0 \text{ kN} \cdot \text{m}$
$W_{tower} = 0$	$M_{tower} = 0$
$F_{eq.tower.Hor} = 0$	$M_{eq.tower.Hor} = 0$
$F_{eq.tower.Ver} = 0$	$M_{eq.tower.Ver} = 0$

Soil Loads (and related seismic)

$F_{US.silt.Hor} = 0 \text{ kN}$	$M_{US.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Hor} = 0 \text{ kN}$	$M_{eq.silt.Hor} = 0 \text{ kN} \cdot \text{m}$
$W_{US.silt} = 0 \text{ kN}$	$M_{US.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.silt.Ver} = 0 \text{ kN}$	$M_{eq.silt.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.fill.Hor} = 0$	$M_{DS.fill.Hor} = 0$
$F_{eq.fill.Hor} = 0$	$M_{eq.fill.Hor} = 0$
$F_{eq.fill.Ver} = 0$	$M_{eq.fill.Ver} = 0$
$W_{DS.fill} = 0$	$M_{DS.fill.Ver} = 0$
$W_{Granular.Sum} = 0 \text{ kN}$	$M_{Granular.Sum} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.Granular.Ver} = 0 \text{ kN}$	$M_{eq.Granular.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{eq.Granular.Hor} = 0 \text{ kN}$	$M_{eq.Granular.Hor} = 0 \text{ kN} \cdot \text{m}$

Uplift Forces

$F_{U0.Sum} = 367.7 \text{ kN}$	$M_{U0.Sum} = 1949 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Sum.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Sum.Ver} = -367.7 \cdot \text{kN}$	
$F_{U0.Win} = 260.6 \text{ kN}$	$M_{U0.Win} = 1381.2 \cdot \text{kN} \cdot \text{m}$
$F_{U0.Win.Hor} = 0 \cdot \text{kN}$	
$F_{U0.Win.Ver} = -260.6 \cdot \text{kN}$	
$F_{U0.IDF} = 761.6 \text{ kN}$	$M_{U0.IDF} = 3165.8 \cdot \text{kN} \cdot \text{m}$
$F_{U0.IDF.Hor} = 0 \cdot \text{kN}$	
$F_{U0.IDF.Ver} = -761.6 \cdot \text{kN}$	
$F_{U0.eq} = 401.8 \text{ kN}$	$M_{U0.eq} = 2120.9 \cdot \text{kN} \cdot \text{m}$
$F_{U0.eq.Hor} = 0 \cdot \text{kN}$	
$F_{U0.eq.Ver} = -401.8 \cdot \text{kN}$	

Hydraulic Forces (and related seismic)

$F_{US.Sum.Hor} = 260.4 \cdot \text{kN}$	$M_{US.Sum.Hor} = 488.7 \cdot \text{kN} \cdot \text{m}$
$F_{eq.HD.US} = 23.3 \text{ kN}$	$M_{eq.HD.US} = 52.8 \text{ kN} \cdot \text{m}$
$F_{US.Sum.Ver} = 0 \cdot \text{kN}$	$M_{US.Sum.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Sum} = 0$	$M_{Water.Above.Sum} = 0$
$F_{eq.Water.Above.Ver} = 0$	$M_{eq.Water.Above.Ver} = 0$
$F_{eq.Water.Above.Hor} = 0$	$M_{eq.Water.Above.Hor} = 0$
$F_{US.Win.Hor} = 130.8 \cdot \text{kN}$	$M_{US.Win.Hor} = 174 \cdot \text{kN} \cdot \text{m}$
$F_{US.Win.Ver} = 0 \cdot \text{kN}$	$M_{US.Win.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.Win} = 0$	$M_{Water.Above.Win} = 0$
$F_{US.IDF.Hor} = 353.6 \cdot \text{kN}$	$M_{US.IDF.Hor} = 752.8 \cdot \text{kN} \cdot \text{m}$
$F_{US.IDF.Ver} = 0 \cdot \text{kN}$	$M_{US.IDF.Ver} = 0 \cdot \text{kN} \cdot \text{m}$
$W_{Water.Above.IDF} = 0$	$M_{Water.Above.IDF} = 0$
$F_{DS.Sum.Hor} = 0 \text{ kN}$	$M_{DS.Sum.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Sum.Ver} = 0 \text{ kN}$	$M_{DS.Sum.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Hor} = 0 \text{ kN}$	$M_{DS.Win.Hor} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.Win.Ver} = 0 \text{ kN}$	$M_{DS.Win.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Hor} = 207.9 \text{ kN}$	$M_{DS.IDF.Hor} = 348.5 \text{ kN} \cdot \text{m}$
$F_{DS.IDF.Ver} = 0 \text{ kN}$	$M_{DS.IDF.Ver} = 0 \text{ kN} \cdot \text{m}$
$F_{gateH.Sum} = 103.4 \text{ kN}$	$M_{gateH.Sum} = 316.1 \text{ kN} \cdot \text{m}$
$F_{eq.HD.gate} = 9 \text{ kN}$	$M_{eq.HD.gate} = 32.1 \text{ kN} \cdot \text{m}$
$F_{gateH.Win} = 33.9 \text{ kN}$	$M_{gateH.Win} = 87.2 \text{ kN} \cdot \text{m}$
$F_{gateH.IDF} = 150.5 \text{ kN}$	$M_{gateH.IDF} = 477.9 \text{ kN} \cdot \text{m}$
$F_{drag} = 0$	$M_{drag} = 0$

Ice Loads

$F_{ice.1} = 139.9 \text{ kN}$	$M_{ice.1} = 516.1 \text{ kN} \cdot \text{m}$
$F_{ice.gate} = 127.3 \text{ kN}$	$M_{ice.gate} = 469.6 \text{ kN} \cdot \text{m}$
$F_{ice} = 267.1 \text{ kN}$	$M_{ice} = 985.7 \text{ kN} \cdot \text{m}$
$F_{ice.1.usual} = 125.6 \text{ kN}$	$M_{ice.1.usual} = 463.6 \text{ kN} \cdot \text{m}$
$F_{ice.gate.usual} = 114.3 \text{ kN}$	$M_{ice.gate.usual} = 421.8 \text{ kN} \cdot \text{m}$
$F_{ice.usual} = 239.9 \text{ kN}$	$M_{ice.usual} = 885.3 \text{ kN} \cdot \text{m}$

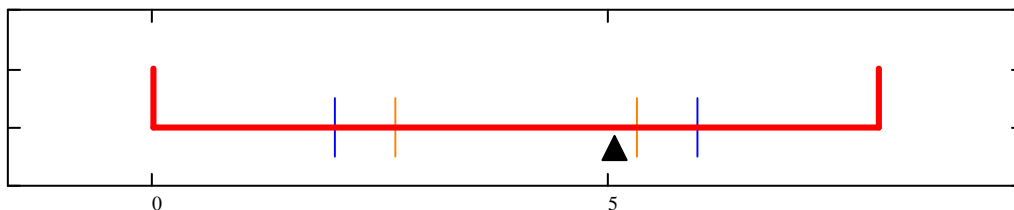
Other Forces:

$F_{anchor.Hor} = 0$	$M_{anchor.Hor} = 0$
$F_{anchor.Ver} = 0$	$M_{anchor.Ver} = 0$
$F_{other.Hor.1} = 0$	$M_{other.Hor.1} = 0$
$F_{other.Ver.1} = 0$	$M_{other.Ver.1} = 0$

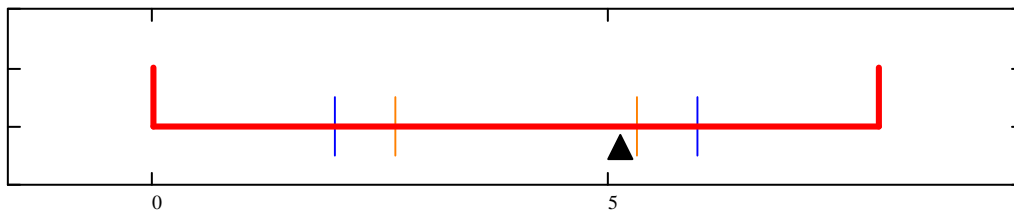
Results of Analysis

	FSS (Φ.cf)	E (m)	x.o (m)	L.comp (m)	% of Base in Compression	L.crack (m)	F.hor (kN)	F.ver (kN)	F.parallel (kN)	F.Perp (kN)	q.max (kPa)
LC.1 - Summer	1.40	1.08	2.90	7.95	100%	0.00	363.8	1,200.0	363.8	1,200.0	163.3
LC.2 - Winter (Usual)	1.37	1.14	2.83	7.95	100%	0.00	404.6	1,307.1	404.6	1,307.1	182.7
LC.3 - IDF	1.16	1.27	2.71	7.95	100%	0.00	296.2	806.2	296.2	806.2	118.4
LC.4 - Winter (Unusual)	1.28	1.22	2.76	7.95	100%	0.00	431.8	1,307.1	431.8	1,307.1	188.4
LC.5 - EQ	0.90	1.57	2.40	7.21	91%	0.74	526.8	1,112.9	526.8	1,112.9	184.2
LC.6 - Post - EQ	1.36	1.14	2.84	7.95	100%	0.74	363.8	1,166.0	363.8	1,166.0	162.9

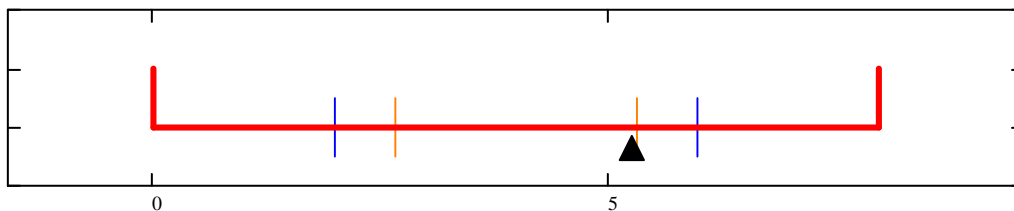
Location of Resultant



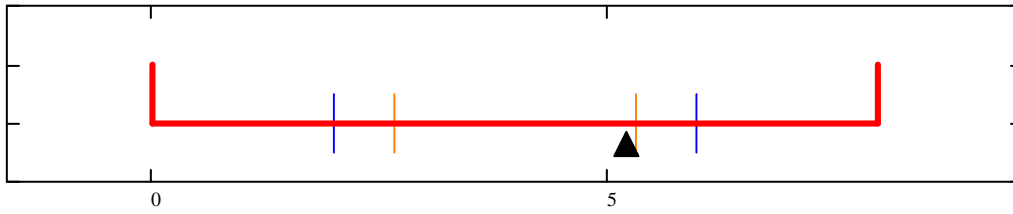
LC 1



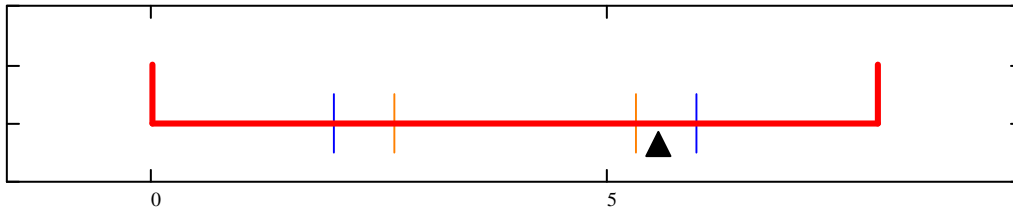
LC 2



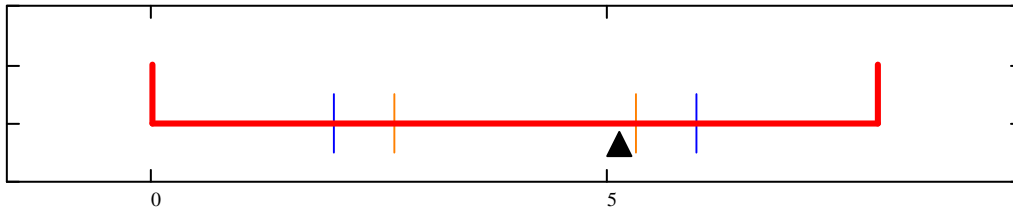
LC 3



LC 4



LC 5



LC 6

DESIGN CALCULATIONS COVER SHEET

Project No. :	17-3212-001	Project Name :	Howson Dam (South Sluiceway)		
File No. :		Discipline :	Structural Engineering		
Calculation Title :	Combined Rollway & Pier Stability Analysis – Bridge Deck Removed				
Calculation No. :	CIV-005	Prepared by :	HS	Date :	Feb. 23, 2018
No. of Sheets :		Checked by :	YF	Date :	April 20, 2018
Supersedes Calc. No. :		Approved by :		Date :	

Calculation Description :

The dam has been reviewed against LRIA technical bulletins

Related Design Concept :

Stability analysis for the structures is carried out using the "Gravity Method".
Six loading cases are utilized in the analyses based on the LRIA Technical Bulletin "Structural Design and Factors of Safety (August 2011).

Reference Codes and Standards :


1. *Design of Small Dams*, Third Edition, U.S. Government Printing Office, Washington, D.C. 1987.
2. Structural Design and Factors of Safety – Technical Bulletin Ontario Ministry of Natural Resources (August 2011)

ENGINEER'S SEAL


Rev. #	Rev. Description	Rev. Author	Date Revised	Checked by	Approved by	Approved Date

References

Pier

 Reference:U:\FMS\17-3212-001\CIV-004 Howson Dam S - Pier (no Deck) -HS YF.xmcd(R)

Rollway

 Reference:P:\Projects\2017\17-3212-001\Design\Struct\HS\MathCad\S Structure\CIV-002 Howson Dam S - Sill Section HS YF.xmcd


Properties of Materials


 $\phi_{cf} := 23 \cdot \text{deg}$ *Friction angle of concrete/foundation interface*

 $f_t := 0 \text{ MPa}$ *Tensile strength at concrete/rock interface (generally set to 0). This is a negative number.*


 $c := 0 \text{ MPa}$ *Cohesion at concrete/foundation interface (generally set to 0)*


Geometry of Structures


 $B_{\text{pier}} = 1.67 \text{ m}$


 $B_{\text{roll}} = 9.91 \text{ m}$


Unit width of structure used in calculation sheet


 $L_{\text{incl.pier}} = 7.95 \text{ m}$

 $L_{\text{incl.roll}} = 6.2 \text{ m}$

 $\alpha_{\text{pier}} = 0 \cdot \text{deg}$

 $\alpha_{\text{roll}} = 0 \cdot \text{deg}$

 $B := B_{\text{pier}} + B_{\text{roll}} = 11.6 \text{ m}$

 $L_{\text{incl}} := \frac{L_{\text{incl.pier}} + L_{\text{incl.roll}}}{2} = 7.08 \text{ m}$

$\alpha_{\text{avg}} := \frac{\alpha_{\text{pier}} + \alpha_{\text{roll}}}{2} = 0 \cdot \text{deg}$

Load Case 1. Usual Loading Summer Case (D+H+S+U)

LC := 1

LC. 1 - Forces from Structures

$$F_{hor.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$F_{ver.pier_{LC}} = 1200 \cdot \text{kN}$$

$$F_{perp.pier_{LC}} = 1200 \cdot \text{kN}$$

$$F_{para.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$M_{net.pier_{LC}} = 3478 \cdot \text{kN} \cdot \text{m}$$

$$F_{hor.roll_{LC}} = 1007.4 \text{ kN}$$

$$F_{ver.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1007.4 \cdot \text{kN}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

$$M_{net.roll_{LC}} = 6099.8 \cdot \text{kN} \cdot \text{m}$$

Force acting in horizontal direction on structure

Forces acting in vertical direction on structure

Force acting perpendicular to base from structure

Force acting parallel to base from structure

Length of base in compression

Net resisting moment from structure

LC.1 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1371.2 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3210.2 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1371.2 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3210.2 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 9577.8 \cdot \text{kN} \cdot \text{m}$$

LC.1 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.98 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.55 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 57.6 \text{ kPa}$$

$$q_{min} = 20.8 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3210.2 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

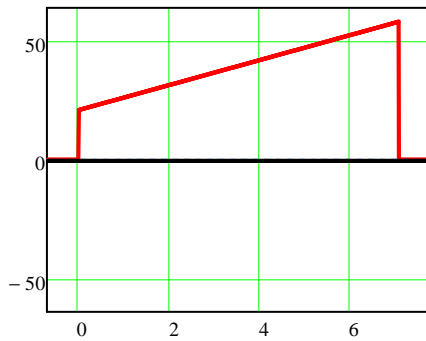
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

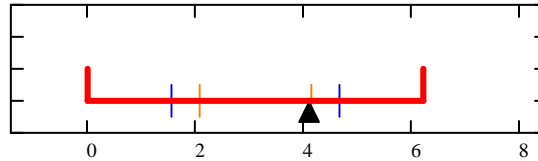
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



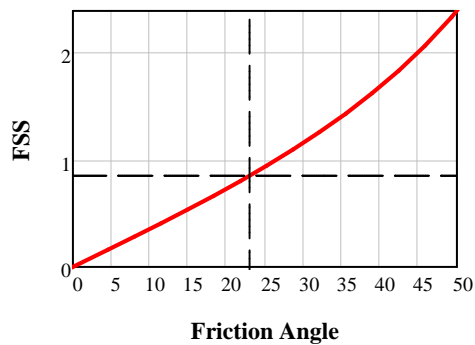
LC.1 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.99$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 2. Usual Loading Winter Case (D+H+S+U+I)

LC := 2

LC. 2 - Forces from Structures

$$F_{hor.pier_{LC}} = 404.6 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 1240.4 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 1307.1 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1668 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 1307.1 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1668 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 404.6 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1240.4 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 3704.2 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 3854.6 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.2 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1645 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 2975.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1645.0 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 2975.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 7558.8 \cdot \text{kN} \cdot \text{m}$$

LC.2 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.54 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 1 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 67 \text{ kPa}$$

$$q_{min} = 5.6 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 2975.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

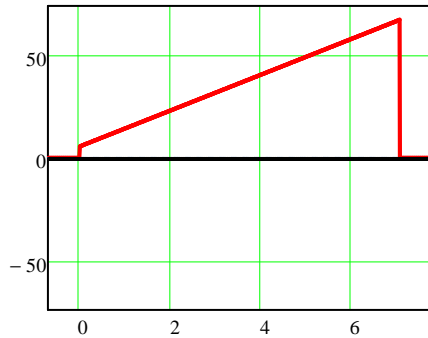
Compression and tension forces in foundation

$$\frac{L_{\text{comp}}}{L_{\text{incl}}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

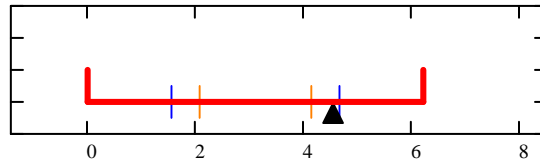
$$\frac{L_{\text{tens}}}{L_{\text{incl}}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{\text{crack}}}{L_{\text{incl}}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



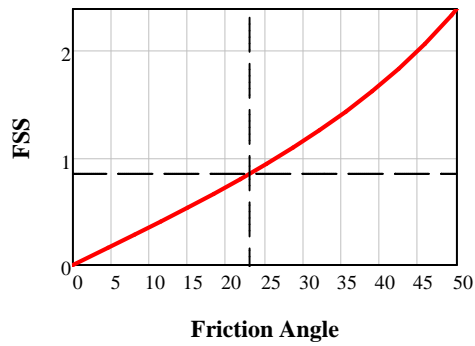
LC.2 - Sliding

$$FSS(\theta) := \frac{F_{\text{comp}} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{\text{comp}} + \frac{L_{\text{tens}}}{2} \right)}{F_{\text{parallel}}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.77$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 3. Unusual Loading IDF ($D+H_{IDF}+S+U_{IDF}$)

LC := 3

LC. 3 - Forces from Structures

$$F_{hor.pier_{LC}} = 296.2 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 497.5 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 806.2 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1533.2 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 806.2 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1533.2 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 296.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 497.5 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 2183.9 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 5334.6 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.3 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 793.7 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 2339.4 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 793.7 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 2339.4 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 7518.6 \cdot \text{kN} \cdot \text{m}$$

LC.3 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 3.21 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.32 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 36.4 \text{ kPa}$$

$$q_{min} = 20.7 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 2339.4 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

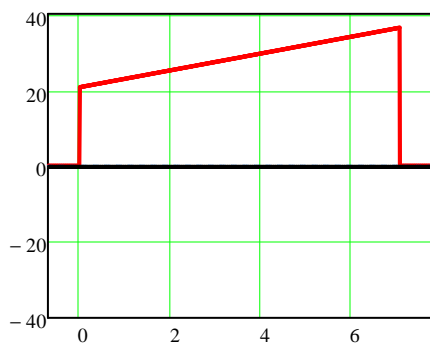
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

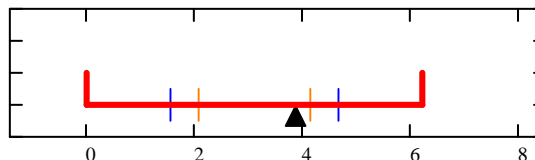
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



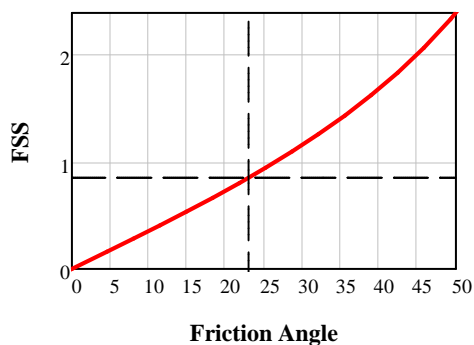
LC.3 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 1.25$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 4. Unusual Loading Winter Case (D+H+S+U+I)

LC := 4

LC. 4 - Forces from Structures

$$F_{hor.pier_{LC}} = 431.8 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 1324.6 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 1307.1 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1668 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 1307.1 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1668 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 431.8 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1324.6 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 3603.8 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 3610.4 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.4 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1756.4 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 2975.1 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1756.4 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 2975.1 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 7214.3 \cdot \text{kN} \cdot \text{m}$$

LC.4 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.42 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 1.11 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 70.6 \text{ kPa}$$

$$q_{min} = 2 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 2975.1 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

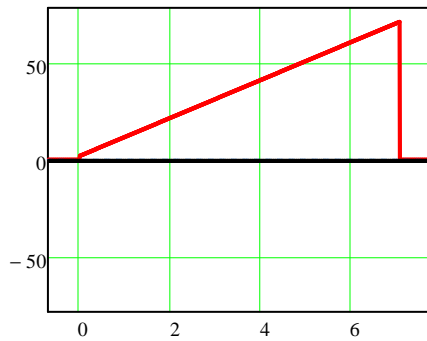
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

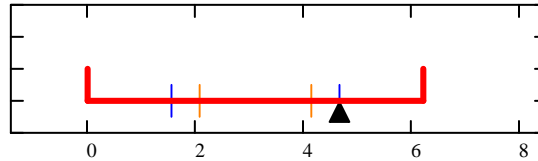
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



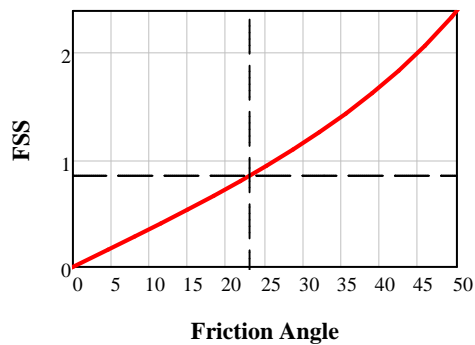
LC.4 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.72$$

Factor of safety against sliding for specified friction angle



☐ Store results for summary

Load Case 5. Extreme Loading Earthquake (D+H+S+Q+U_Q)

LC := 5

LC. 5 - Forces from Structures

$$F_{hor.pier_{LC}} = 526.8 \cdot \text{kN}$$

$$F_{hor.roll_{LC}} = 1309.4 \text{ kN}$$

Force acting in horizontal direction on structure

$$F_{ver.pier_{LC}} = 1112.9 \cdot \text{kN}$$

$$F_{ver.roll_{LC}} = 1817.3 \cdot \text{kN}$$

Forces acting in vertical direction on structure

$$F_{perp.pier_{LC}} = 1112.9 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 1817.3 \cdot \text{kN}$$

Force acting perpendicular to base from structure

$$F_{para.pier_{LC}} = 526.8 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1309.4 \cdot \text{kN}$$

Force acting parallel to base from structure

$$L_{comp.pier_{LC}} = 7.2 \text{ m}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

Length of base in compression

$$M_{net.pier_{LC}} = 2675.9 \cdot \text{kN} \cdot \text{m}$$

$$M_{net.roll_{LC}} = 4778.1 \cdot \text{kN} \cdot \text{m}$$

Net resisting moment from structure

LC.5 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1836.2 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 2930.2 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1836.2 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 2930.2 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 7454.1 \cdot \text{kN} \cdot \text{m}$$

LC.5 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.54 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.99 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 65.9 \text{ kPa}$$

$$q_{min} = 5.6 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 2930.2 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

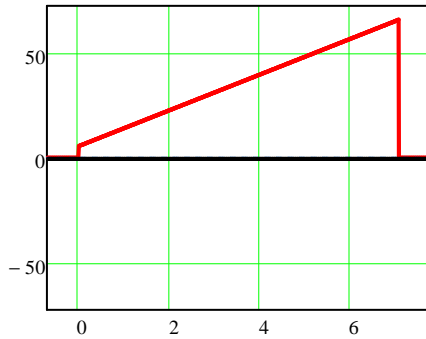
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

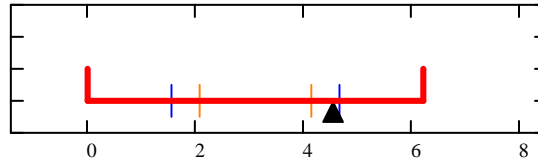
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



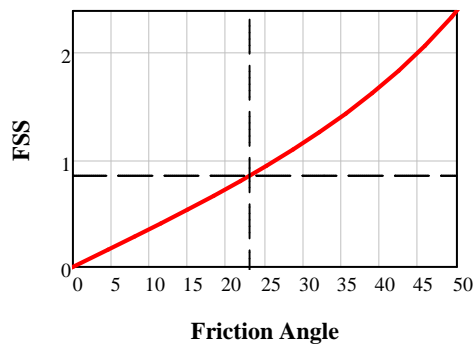
LC.5 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$$FSS(\phi_{cf}) = 0.68$$

Factor of safety against sliding for specified friction angle



Store results for summary

Load Case 6. Extreme Loading Earthquake (D+H+S+Q+U_Q)

$$LC := 6$$

LC. 6 - Forces from Structures

$$F_{hor.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$F_{ver.pier_{LC}} = 1166 \cdot \text{kN}$$

$$F_{perp.pier_{LC}} = 1166 \cdot \text{kN}$$

$$F_{para.pier_{LC}} = 363.8 \cdot \text{kN}$$

$$L_{comp.pier_{LC}} = 8 \text{ m}$$

$$M_{net.pier_{LC}} = 3306.1 \cdot \text{kN} \cdot \text{m}$$

$$F_{hor.roll_{LC}} = 1007.4 \text{ kN}$$

$$F_{ver.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{perp.roll_{LC}} = 2010.2 \cdot \text{kN}$$

$$F_{para.roll_{LC}} = 1007.4 \cdot \text{kN}$$

$$L_{comp.roll_{LC}} = 6.2 \text{ m}$$

$$M_{net.roll_{LC}} = 6099.8 \cdot \text{kN} \cdot \text{m}$$

Force acting in horizontal direction on structure

Forces acting in vertical direction on structure

Force acting perpendicular to base from structure

Force acting parallel to base from structure

Length of base in compression

Net resisting moment from structure

LC.6 - Combine Forces and Moments

$$F_{hor} := F_{hor.pier_{LC}} + F_{hor.roll_{LC}} = 1371.2 \cdot \text{kN}$$

$$F_{ver} := F_{ver.pier_{LC}} + F_{ver.roll_{LC}} = 3176.2 \cdot \text{kN}$$

$$F_{parallel} := F_{hor} \cdot \cos(\alpha_{avg}) + F_{ver} \cdot \sin(\alpha_{avg}) = 1371.2 \cdot \text{kN}$$

$$F_{perp} := -F_{hor} \cdot \sin(\alpha_{avg}) + F_{ver} \cdot \cos(\alpha_{avg}) = 3176.2 \cdot \text{kN}$$

$$M_{net} := M_{net.pier_{LC}} + M_{net.roll_{LC}} = 9405.8 \cdot \text{kN} \cdot \text{m}$$

LC.6 - Resultant and Bearing Stresses

$$x_0 := \frac{M_{net}}{F_{perp}} = 2.96 \text{ m}$$

Distance of resultant from right side of base (measured parallel to base)

$$E := \frac{L_{incl}}{2} - x_0 = 0.58 \text{ m}$$

Eccentricity of resultant (positive is to the right)

Stress Calculations

$$q_{max} = 57.7 \text{ kPa}$$

$$q_{min} = 19.8 \text{ kPa}$$

Maximum/minimum bearing stress before iterative cracked base analysis

$$L_{comp} = 7.08 \text{ m}$$

Length of base in compression before iterative cracked base analysis

$$L_{tens} = 0.00 \text{ m}$$

Length of base in tension before iterative cracked base analysis

$$L_{crack} = 0.00 \text{ m}$$

Length of crack between concrete and base before iterative cracked base analysis

$$F_{comp} := \begin{cases} F_{perp} & \text{if } q_{min} \geq 0 \\ \frac{B \cdot q_{max} \cdot L_{comp}}{2} & \text{otherwise} \end{cases} = 3176.2 \cdot \text{kN}$$

$$F_{tens} := \frac{B \cdot q_{min} \cdot L_{tens}}{2} = 0 \text{ kN}$$

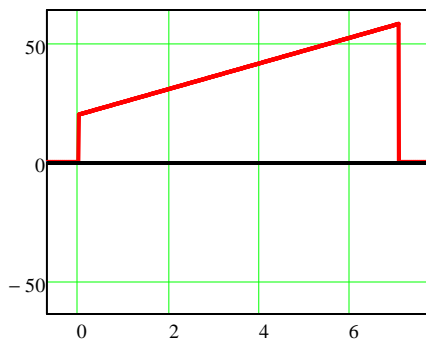
Compression and tension forces in foundation

$$\frac{L_{comp}}{L_{incl}} = 100 \cdot \% \quad \% \text{ of Base in Compression}$$

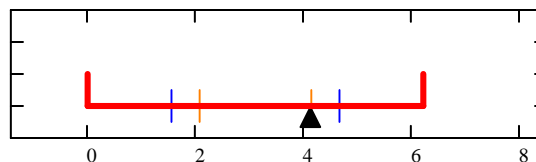
$$\frac{L_{tens}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base in Tension}$$

$$\frac{L_{crack}}{L_{incl}} = 0 \cdot \% \quad \% \text{ of Base Cracked}$$

Normal Stresses Acting on Base



Location of Resultant



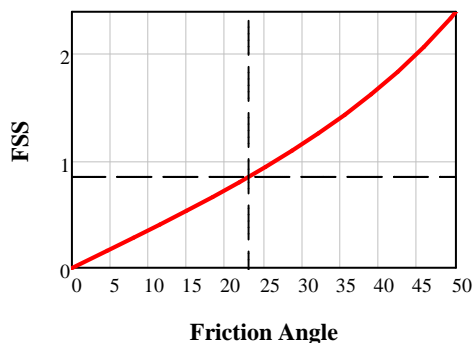
LC.6 - Sliding

$$FSS(\theta) := \frac{F_{comp} \cdot \tan(\theta) + c \cdot B \cdot \left(L_{comp} + \frac{L_{tens}}{2} \right)}{F_{parallel}}$$

Define function to evaluate sliding using a range of friction angles

$FSS(\phi_{cf}) = 0.98$

Factor of safety against sliding for specified friction angle

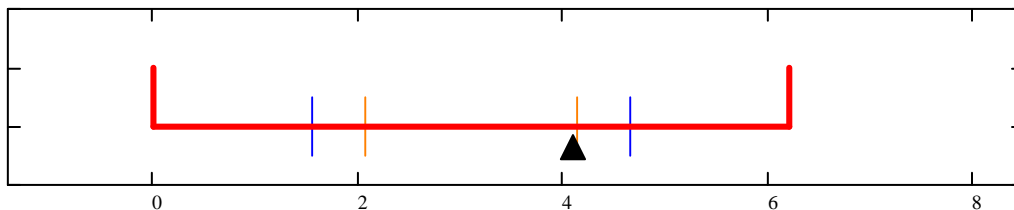


Store results for summary

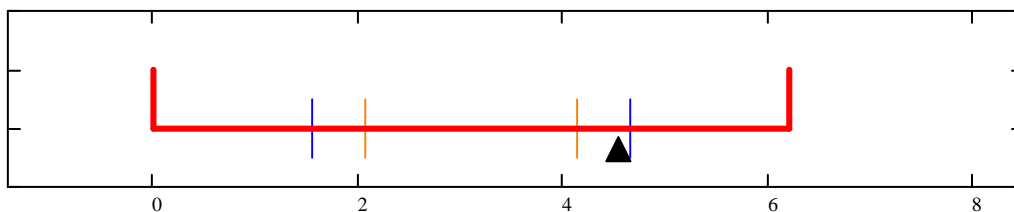
Results of Analysis

	FSS (Φ_{cf})	E (m)	x.o (m)	L.comp (m)	% of Base in Compression	L.crack (m)	F.hor (kN)	F.ver (kN)	F.parallel (kN)	F.Perp (kN)	q.max (kPa)
LC.1 - Summer	0.99	0.55	2.98	7.08	100%	0.00	1,371.2	3,210.2	1,371.2	3,210.2	57.6
LC.2 - Winter (Usual)	0.77	1.00	2.54	7.08	100%	0.00	1,645.0	2,975.1	1,645.0	2,975.1	67.0
LC.3 - IDF	1.25	0.32	3.21	7.08	100%	0.00	793.7	2,339.4	793.7	2,339.4	36.4
LC.4 - Winter (Unusual)	0.72	1.11	2.42	7.08	100%	0.00	1,756.4	2,975.1	1,756.4	2,975.1	70.6
LC.5 - EQ	0.68	0.99	2.54	7.08	100%	0.00	1,836.2	2,930.2	1,836.2	2,930.2	65.9
LC.6 - Post - EQ	0.98	0.58	2.96	7.08	100%	0.00	1,371.2	3,176.2	1,371.2	3,176.2	57.7

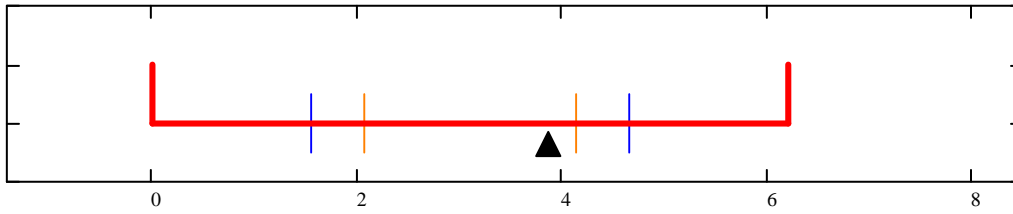
Location of Resultant



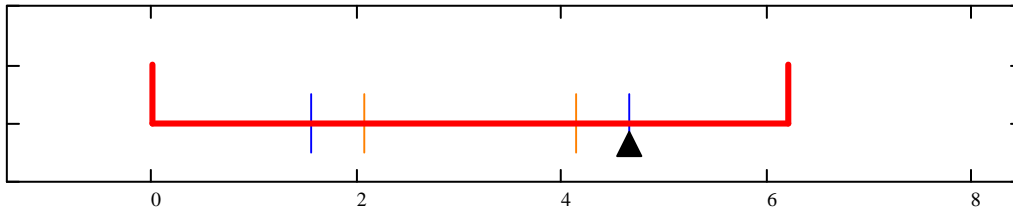
LC 1



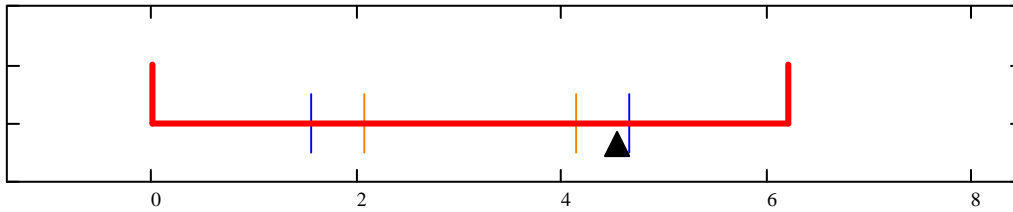
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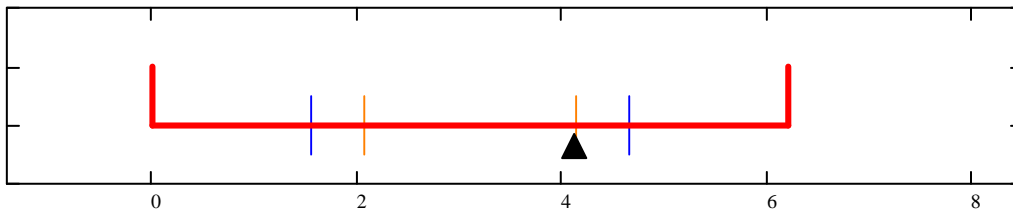
LC 3



LC 4



LC 5



LC 6

APPENDIX C
DAM SAFETY GENERAL INSPECTION (DSGI) SHEETS

DRAFT

DAM SAFETY GENERAL INSPECTION

Site Name: Howson Dam (South structure)

River System: North Maitland River

Dam Component: Concrete Structures

HWL: 311.9 m (IDF from DSA)

TWL: 310.3 m (IDF from DSA)

Description: This section has four sluice bays and an ogee type weir at El. 309.25 m (BM Ross, 2015). The top elevation of the deck of the structure is at El. 312.48 m (geodetic elevation provided by the Township of North Huron). Four bays, from north to south are 10.6 m, 11.5 m, 10.8 m, and 10.7 m in length (BM Ross 2013a).

Purpose: Originally built to prevent flooding and to create a reservoir for recreational use

Length: 54 m

Height: approx. 6.5 m

Width: 6.2 m (deck)

ICC Rating: **High (from DSA)**

Summary of Inspection Observations and Identified Deficiencies:

Recommended Actions:

Item	Summary of Inspection Observations and Identified Deficiencies:	Recommended Actions:
	Concrete of girders and decks in some areas are severely spalled and exposed corroded rebar was evident. Collapse of the bridge could occur resulting in injury or death to the public. Rusted steel girders and decayed timber transverse beams	Required to check the strength of the bridge for pedestrian crossing based on the compressive strength of existing concrete. Replacement or repair is required. Clean the rust on the beams and paint it and replace the decayed timber transverse beams.
	Piers and abutments in some areas are severely spalled and map cracks were evident. The concrete of upstream of pier 1 is mostly destroyed. Collapse of the bridge could occur resulting in injury or death to the public. Some of the stop logs are weathered and decayed.	Required to check the strength of the bridge for pedestrian crossing based on the compressive strength of existing concrete. Replacement or repair is required. Replace the decayed stop logs.
	Upstream and downstream face of the weirs are spalled/severe spalled and undercutting was observed in weir of span 4.	Based on the compressive strength of the concrete the replacement or repair is required. Undercutting would be addressed.
	Severe spalling and map crack were evident in areas of retaining walls.	Based on the compressive strength of the concrete the replacement or repair is required.
Yr-#		

Date of Inspection: November 22, 2017

Date of Last Inspection: **November 20, 2013**

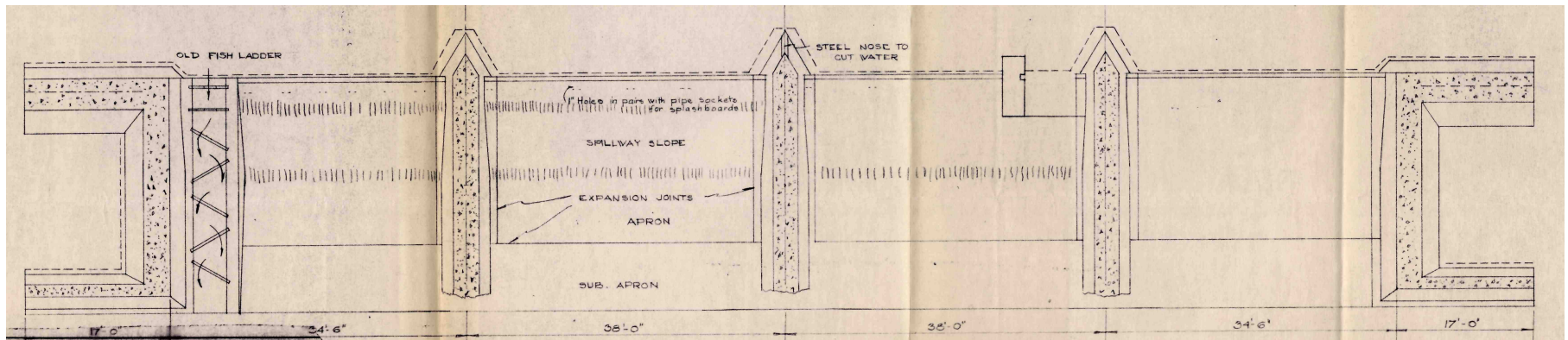
Weather: Cloudy

Persons Present During Inspection: Shan Gnanasunthar - Henry Safavian

DAM SAFETY GENERAL INSPECTION

This is to certify that the above dam has been inspected and the following are the results of this inspection.

Name and Signature of Inspection Leader

SITE or STRUCTURE**Abut. North****Pier 1****Pier 2****Pier 3****Abut. South****N** ←

DAM SAFETY GENERAL INSPECTION

DECK [Photo 1 to 10]

CONDITION	OBSERVATION: SKETCH, MEASURE, PHOTOGRAPH, LOCATE
Surface Condition	The in-situ concrete girders were spalled and disintegrated in many areas. The exposed corroded rebar was evident. Spalling was observed underside of the deck with exposed corroded rebar. Icicles hung from underside of the girders can be an evidence of surface water seepage through the deck. Downstream steel girders rusted in some areas and lost their sections. Decayed areas are observed in wood transverse beams supported by steel beams. Map cracks are observed on the asphalt. Parapet was spalled in some areas with the evidence of exposed rebar.
Condition of Joints	N/A
Movement	None evident
Hand Rails	N/A
Gate Superstructure	N/A
Chainage Markers	N/A

PIERS & ABUTMENTS [Photo 11 to 23]

CONDITION	OBSERVATION: SKETCH, MEASURE, PHOTOGRAPH, LOCATE
Surface Condition	North abutment: Spalling, honeycombing and downstream stressed cracks South abutment: Erosion along with water line as well as pattern cracks and cold joints Piers: Pattern cracks (could be due to Alkaline-Aggregate-Reaction) upstream of all piers, honeycombing, spalling and severe/very severe spalling and severe disintegration. Upstream of pier 1 (from North) is mostly destroyed.
Condition of Joints	N/A
Movement	None evident
Waterline Deterioration	Erosion in few areas.
Beam Seats	N/A
Stop Log/Gate Gains & Covers	Weathering and decay were observed in stop logs.

DAM SAFETY GENERAL INSPECTION**WEIR [Photo 24 to 30]**

CONDITION	OBSERVATION: SKETCH, MEASURE, PHOTOGRAPH, LOCATE
Surface Condition	Spalling/severe spalling upstream and downstream of ogee type weir and spalling on the exposed apron
Condition of Joints	N/A
Movement	None evident
Undercutting	Evident in span 4 (numbering from North)

RETAINING WALL**UPSTREAM FACE [Photo 31 to 33]**

CONDITION	OBSERVATION: SKETCH, MEASURE, PHOTOGRAPH, LOCATE
Surface Condition	Almost entire upstream face of the South retaining wall severely spalled
Condition of Joints	N/A
Movement	None evident
Waterline Deterioration	N/A

DOWNSTREAM FACE [Photo 34 to 36]

CONDITION	OBSERVATION: SKETCH, MEASURE, PHOTOGRAPH, LOCATE
Surface Condition	Severely spalling and pattern cracks (could be due to Alkaline-Aggregate-Reaction) downstream of the South retaining wall
Condition of Joints	N/A
Movement	None evident
Waterline Deterioration	N/A

DAM SAFETY GENERAL INSPECTION

PHOTOS/SKETCHES/FIGURES



Photo 1 – Top of the Deck – Map Crack in Asphalt Looking North



Photo 2 – Spalled Concrete and Exposed Rebar in Parapet - Looking Upstream



Photo 3 – Diagonal Crack in Parapet



Photo 4 – Severe Spalled Concrete with Exposed Corroded Rebar underneath the Deck – Span 4



Photo 5 – Spalling and Exposed Corroded Rebar underside of the Girders and Deck – Span 4 Looking South



Photo 6 – Spalling and Exposed Corroded Rebar underside of the Girders and Deck – Span 2 Looking South



Photo 7 – Icicles underneath the Girders with Severe Spalling and Exposed Corroded Rebar – Span 3



Photo 8 – Severe Spalling and Exposed Corroded rebar underneath the Girder – Span 3 Looking North



Photo 9 – Severe Spalling underneath the Girder – Span 2 Upstream



Photo 10 – Rusted Steel I Beam and Decayed Timber Transverse Beam– Span 1 Looking South



Photo 11 – North Abutment – Looking North



Photo 12 – North Abutment Spalling and Honeycombing – Looking North



Photo 13 – North Abutment wide Crack - Looking Northeast



Photo 14 – South Abutment – Erosion, Joint Cold and Pattern Cracks



Photo 15 – Spalling and Pattern Cracks on Downstream of Piers - Looking South



Photo 16 – Severe Spalling and Honeycombing on Pier 1 (from North) – Looking Southwest



Photo 17 – Severe Spalling and Pattern Cracks on Pier 1 (from North) – Looking South



Photo 18 – Severe Spalling, Honeycombing and Hole in Pier 1 – Looking South



Photo 19 – Severe Spalling, Disintegration and Pattern Cracks on Pier 1 & 2 – Looking North

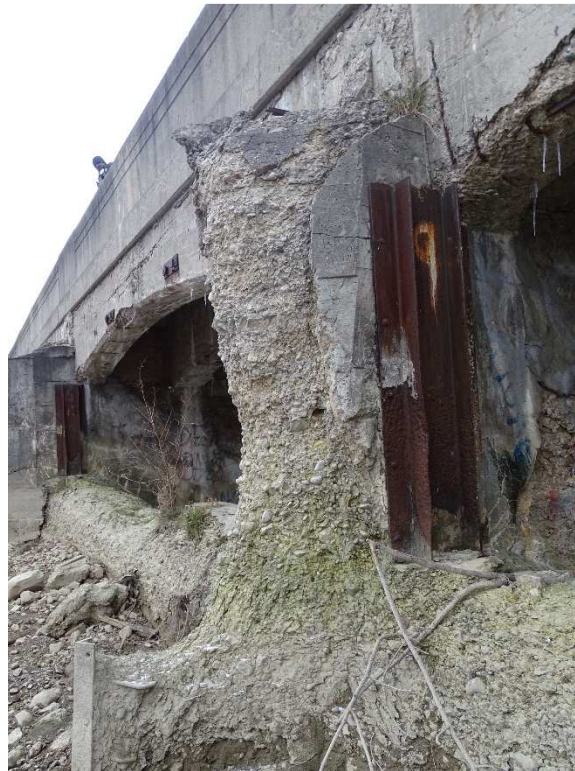


Photo 20 – Destroyed and Very Severe Spalled Concrete - Upstream of Pier 1 Looking South



Photo 21 – Spalling on Pier 2 (from North) – Looking North



Photo 22 – Severe Disintegration, Spalling and Pattern Cracks on Pier 3 – Looking South



Photo 23 – Weathered and Decayed Stop logs – Looking South



Photo 24 – Spalled Concrete – Upstream Weir of Span 1 (from North)



Photo 25 – Spalled Concrete – Downstream Weir of Span 1 Looking South



Photo 26 – Spalled Apron – Span 1 Looking Downstream



Photo 27 – Spalled Concrete – Upstream Weir of Spans 1 & 2 (from North) Looking North



Photo 28 – Spalled Concrete – Upstream Weir of Span 4 (from North)



Photo 29 – Undercutting and Spalled Concrete – Span 4 (from North)



Photo 30 – Spalled Concrete – Upstream Weir Looking North



Photo 31 – North Upstream Retaining Wall – Severe Spalling



Photo 32 – North Upstream Retaining Wall – Severe Spalling



Photo 33 –South Upstream Retaining Wall – Severe Spalling



Photo 34 – North Downstream Retaining Wall - Spalling and Pattern Cracks



Photo 35 – North Downstream Retaining Wall - Spalling and Pattern Cracks

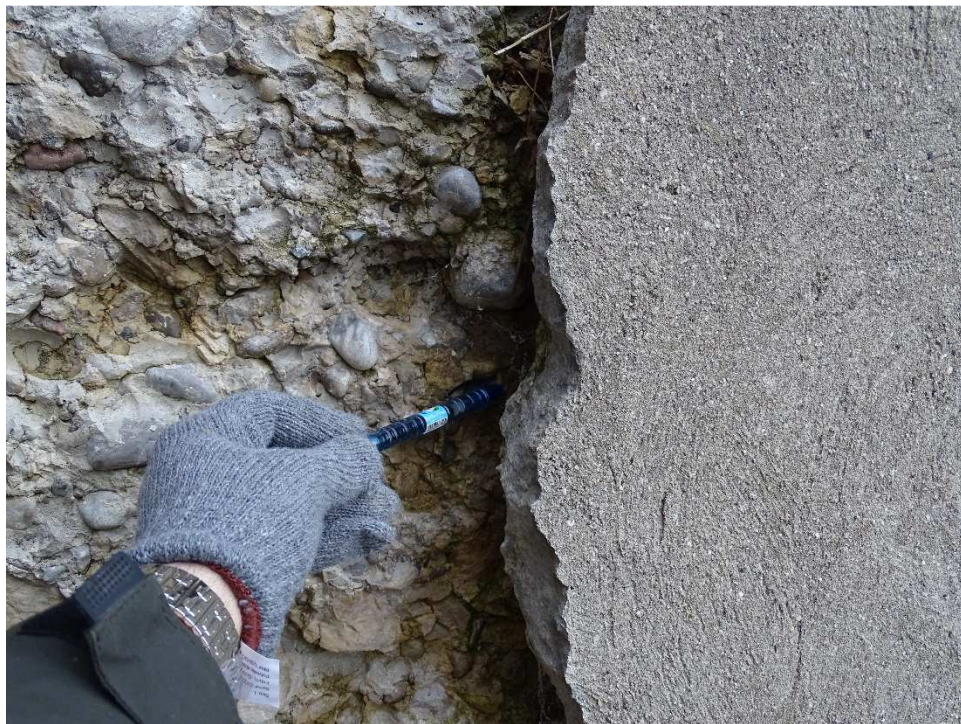


Photo 36 – North Downstream Retaining Wall – Severe Spalling

APPENDIX D
COST ESTIMATE ALTERNATIVES

DRAFT

TABLE D1
COST ESTIMATES DAM DECOMMISSIONING

DESCRIPTION		COST
CONSTRUCTION COSTS (ROUNDED)		\$ 296,000
DESIGN, ENGINEERING AND PERMITTING	12%	\$36,000
CONSTRUCTION COST CONTINGENCY	25%	\$74,000
OWNER'S ADMINISTRATIVE COST (including overhead and project management)	10%	\$30,000
		\$436,000

DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
MOBILIZATION	Lump Sum	1	\$ 28,560	\$ 28,560
DEMOBILIZATION	Lump Sum	1	\$ 14,280	\$ 14,280
ENVIRONMENTAL PROGRAM & ENVIRONMENTAL MONITORING	Month	6	\$ 9,520	\$ 57,120
SITE RESTORATION AND CLEANING	Lump Sum	1	\$ 5,712	\$ 5,712
DEMOLITION OF COFFERDAM AND WATER DIVERSION MEASURES	m ³	680	\$280	\$ 190,400
TOTAL COSTS SITE STUDIES AND CONSTRUCTION				\$ 296,072

TABLE D2
COST ESTIMATES DAM REHABILITATION WITH POST-TENSION ANCHORS

DESCRIPTION		COST
CONSTRUCTION COSTS (ROUNDED)		\$1,952,000
DESIGN, ENGINEERING AND PERMITTING	12%	\$234,000
CONSTRUCTION COST CONTINGENCY	25%	\$488,000
OWNER'S ADMINISTRATIVE COST (including overhead and project management)	10%	\$195,000
		\$2,869,000

DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
MOBILIZATION	Lump Sum	1	\$ 153,798	\$ 153,798
DEMOBILIZATION	Lump Sum	1	\$ 76,899	\$ 76,899
ENVIRONMENTAL PROGRAM & ENVIRONMENTAL MONITORING	Month	1	\$ 76,899	\$ 76,899
GEOTECHNICAL INVESTIGATION	Lump Sum	1	\$ 50,000	\$ 50,000
MATERIAL QUALITY CONTROL - INDEPENDENT LABORATORY	Lump Sum	1	\$ 10,000	\$ 10,000
SITE RESTORATION AND CLEANING	Lump Sum	1	\$ 46,139	\$ 46,139
DEMOLITION OF BRIDGE DECK AND PART OF PIERS	m3	400	\$ 280	\$ 112,000
MODULAR COFFERDAM	kg	4545	\$ 15	\$ 68,175
SEAL MEASURES FOR DIVERSION	Lump Sum	1	\$ 9,800	\$ 9,800
INSTALLATION OF ANCHORS	m	340	\$ 2,000	\$ 680,000
CONCRETE SURFACE REPAIR	m3	167	\$ 4,000	\$ 668,000
TOTAL COSTS SITE STUDIES AND CONSTRUCTION				\$ 1,951,709

TABLE D3
COST ESTIMATES DAM REHABILITATION WITH ADDED MASS

DESCRIPTION		COST
CONSTRUCTION COSTS (ROUNDED)		\$3,116,000
DESIGN, ENGINEERING AND PERMITTING	12%	\$374,000
CONSTRUCTION COST CONTINGENCY	25%	\$779,000
OWNER'S ADMINISTRATIVE COST (including overhead and project management)	10%	\$312,000
		\$4,581,000

DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
MOBILIZATION	Lump Sum	1	\$ 248,415	\$ 248,415
DEMOBILIZATION	Lump Sum	1	\$ 124,208	\$ 124,208
ENVIRONMENTAL PROGRAM & ENVIRONMENTAL MONITORING	Month	1	\$ 124,208	\$ 124,208
GEOTECHNICAL INVESTIGATION	Lump Sum	1	\$ 50,000	\$ 50,000
MATERIAL QUALITY CONTROL - INDEPENDENT LABORATORY	Lump Sum	1	\$ 10,000	\$ 10,000
SITE RESTORATION AND CLEANING	Lump Sum	1	\$ 74,525	\$ 74,525
DEMOLITION OF BRIDGE DECK AND PART OF PIERS	m3	400	\$ 280	\$ 112,000
MODULAR COFFERDAM	kg	9090	\$ 15	\$ 136,350
SEAL MEASURES FOR DIVERSION	Lump Sum	1	\$ 9,800	\$ 9,800
CONCRETE REMOVAL IN WEIRS	cu. m	224	\$ 3,000	\$ 672,000
INSTALLATION OF NEW CONCRETE	cu. m	777	\$ 2,000	\$ 1,554,000
TOTAL COSTS SITE STUDIES AND CONSTRUCTION				\$ 3,115,505

TABLE D4
COST ESTIMATES DAM REPLACEMENT WITH CONCRETE WEIR

DESCRIPTION		COST
CONSTRUCTION COSTS (ROUNDED)		\$4,224,000
DESIGN, ENGINEERING AND PERMITTING	12%	\$507,000
CONSTRUCTION COST CONTINGENCY	25%	\$1,056,000
OWNER'S ADMINISTRATIVE COST (including overhead and project management)	10%	\$422,000
		\$6,209,000

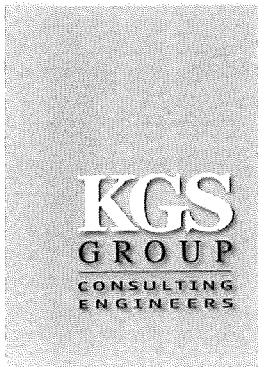
DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
MOBILIZATION	Lump Sum	1	\$ 338,573	\$ 338,573
DEMOBILIZATION	Lump Sum	1	\$ 169,287	\$ 169,287
ENVIRONMENTAL PROGRAM & ENVIRONMENTAL MONITORING	Month	1	\$ 169,287	\$ 169,287
GEOTECHNICAL INVESTIGATION	Lump Sum	1	\$ 50,000	\$ 50,000
MATERIAL QUALITY CONTROL - INDEPENDENT LABORATORY	Lump Sum	1	\$ 10,000	\$ 10,000
SITE RESTORATION AND CLEANING	Lump Sum	1	\$ 101,572	\$ 101,572
REMOVAL OF EXISTING DAM	m ³	680	\$ 280	\$ 190,400
MODULAR COFFERDAM	kg	12810	\$ 15	\$ 192,150
BACKFILL FOR DIVERSION	m ³	308	\$ 50	\$ 15,400
SEAL MEASURES FOR DIVERSION	Lump Sum	1	\$ 8,580	\$ 8,580
NEW CONCRETE STRUCTURE	m ³	1410	\$ 2,000	\$ 2,820,000
RIP RAP	m ³	72	\$ 100	\$ 7,200
SUPPLY AND INSTALLATION OF SHEET PILES	m ²	180	\$ 800	\$ 144,000
DRAIN SYSTEM	unit	4	\$ 2,000	\$ 8,000
TOTAL COSTS SITE STUDIES AND CONSTRUCTION				\$ 4,224,448

TABLE D5
COST ESTIMATES DAM REPLACEMENT WITH NEW EMBANKMENT AND NEW SLUICeway

DESCRIPTION	COST
CONSTRUCTION COSTS (ROUNDED)	\$2,694,000
DESIGN, ENGINEERING AND PERMITTING	12% \$323,000
CONSTRUCTION COST CONTINGENCY	25% \$674,000
OWNER'S ADMINISTRATIVE COST (including overhead and project management)	10% \$269,000
	\$3,960,000

DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
MOBILIZATION	Lump Sum	1	\$ 214,108	\$ 214,108
DEMOBILIZATION	Lump Sum	1	\$ 107,054	\$ 107,054
ENVIRONMENTAL PROGRAM & ENVIRONMENTAL MONITORING	Month	1	\$ 107,054	\$ 107,054
GEOTECHNICAL INVESTIGATION	Lump Sum	1	\$ 50,000	\$ 50,000
MATERIAL QUALITY CONTROL - INDEPENDENT LABORATORY	Lump Sum	1	\$ 10,000	\$ 10,000
SITE RESTORATION AND CLEANING	Lump Sum	1	\$ 64,232	\$ 64,232
DEMOLITION OF BRIDGE DECK AND PART OF PIERS	m ³	680	\$ 280	\$ 190,400
MODULAR COFFERDAM	kg	12810	\$ 15	\$ 192,150
BACKFILL FOR DIVERSION	m ³	308	\$ 50	\$ 15,400
SEAL MEASURES FOR DIVERSION	Lump Sum	1	\$ 8,580	\$ 8,580
EMBANKMENT DAM				
Clearing / Grubbing of vegetation	m ²	2000	\$ 10	\$ 20,000
Subgrade Preparation	m ²	2000	\$ 15	\$ 30,000
Supplying & placing Earth Embankment Backfill (Till Material)	m ³	6200	\$ 30	\$ 186,000
Supplying & Placing Riprap (Upstream Slope)-500 mm thick	m ³	400	\$ 120	\$ 48,000
Supplying & Placing Riprap (Downstream Slope)-500 mm thick	m ³	200	\$ 120	\$ 24,000
Steel Sheet Piling Cut-off	m ²	400	\$ 450	\$ 180,000
Supplying and placing Granular backfill (Crest, 300 mm thick)	m ³	150	\$ 45	\$ 6,750
Turf Mat and seeding	m ²	900	\$ 15	\$ 13,500
SLUICeway STRUCTURE				
New Concrete	m ³	540	\$ 2,000	\$ 1,080,000
Rip Rap	m ³	18	\$ 100	\$ 1,800
Supply and Installation of Sheet Piles	m ²	40	\$ 800	\$ 32,000
Winches and supports	unit	2	\$ 9,000	\$ 18,000
Stoplogs	unit	24	\$ 2,000	\$ 48,000
Metal Railings	m	55	\$ 700	\$ 38,500
Signage	unit	2	\$ 4,000	\$ 8,000
TOTAL COSTS SITE STUDIES AND CONSTRUCTION				\$ 2,693,528





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Kontzamanis Graumann Smith MacMillan Inc.

April 20, 2018

File No. 17-3212-001

Township of North Huron
P.O. Box 90, 274 Josephine Street
Wingham, Ontario
N0G 2W0

ATTENTION: Sean McGhee
Director of Public Works

RE: Howson Dam – Dam Safety Assessment

Dear Mr. McGhee,

Although our scope of work does not include analyses of the bridge structure, but only the dam, we have observed the condition of the bridge associated with the Howson Dam.

This bridge is currently closed to vehicle traffic; but it is open to the public. It is the opinion of our structural engineer that the bridge is not safe for the public.

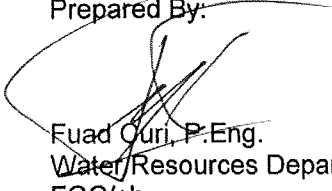
We collected concrete samples on the piers and performed the analyses for the dam that were within our scope of work. We are in the process of preparing the project reports, as I have discussed with you on telephone conversations.

After the review of these analyses and of the data collected in the field, our structural engineer has indicated that he is concerned with the public use of the bridge. I must clarify that this is not the result of a structural analysis of the bridge itself, or its components; but an opinion based on the information available, and reported to you as a prudent measure.


STATEMENT OF LIMITATIONS AND CONDITIONS

This letter has been prepared for the Township of North Huron to whom this letter has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this letter.

Prepared By:


Fuadouri, P.Eng.
Water/Resources Department Head
FGC/ch

Approved By:


Holly Hampton, P.Eng.
Civil/Structural Department Head



TOWNSHIP OF NORTH HURON

REPORT

Item No.

REPORT TO: Reeve Vincent and Members of Council
PREPARED BY: Kirk Livingston, CBO
DATE: 22/05/2018
SUBJECT: Scott Municipal Drain
ATTACHMENTS:

RECOMMENDATION:

THAT the Council of the Township of North Huron hereby appoint R.J. Burnside & Associates Ltd. to prepare a report to fulfil the requirements under Section 78 of the Drainage Act as requested by two separate Notice of Requests for Drain Improvement.

EXECUTIVE SUMMARY

On March 9, 2018, the Clerk for the Township of North Huron received two Notice of Requests for Drain Improvement to the Scott Drain. North Huron Council received both requests at their regular Council meeting on March 19, 2018, and instructed the Clerk for the Township of North Huron to notify Maitland Valley Conservation Authority, OMAFRA and both parties requesting the improvement in accordance with Section 78 (2) of the Drainage Act.

For reference purposes, below is the excerpt of Section 78 of the Drainage Act.

Improving, upon examination and report of engineer

78(1) If a drainage works has been constructed under a by-law passed under this Act or any predecessor of this Act, and the **council** of the municipality that is responsible for maintaining and repairing the drainage works considers it appropriate to undertake one or more of the projects listed in subsection (1.1) for the better use, maintenance or repair of the drainage works or of lands or roads, the municipality may undertake and complete the project in accordance with the report of an **engineer** appointed by it and without the petition required by section 4.

Projects

78(1.1) The projects referred to in subsection (1) are:

1. Changing the course of the drainage works.
2. Making a new outlet for the whole or any part of the drainage works.
3. Constructing a tile drain under the bed of the whole or any part of the drainage works.
4. Constructing, reconstructing or extending embankments, walls, dykes, dams, reservoirs, bridges, pumping stations or other protective works in connection with the drainage works.
5. Otherwise improving, extending to an outlet or altering the drainage works.
6. Covering all or part of the drainage works.
7. Consolidating two or more drainage works.

Notice to conservation authority

78(2) An **engineer** shall not be appointed under subsection (1) until thirty days after a notice advising of the proposed drainage works has been sent to the **secretary-treasurer** of each **conservation authority** that has jurisdiction over any of the lands that would be affected. R.S.O. 1990, c. D.17, s. 78 (2); 2010, c. 16, Sched. 1, s. 2 (28).

Powers and duties of engineer

78(3) The **engineer** has all the powers and shall perform all the duties of an **engineer** appointed with respect to the construction of a drainage works under this Act.

Proceedings

78(4) All proceedings, including appeals, under this section shall be the same as on a report for the construction of a drainage works. R.S.O. 1990, c. D.17, s. 78.

DISCUSSION

Several land owners in the watershed for the Scott Municipal Drain have been working with MVCA since 2005 on a rural storm water management approach to help address the impacts of climate change, improving drainage, water quality and fish habitat, while also attempting to reduce future maintenance.

The request, as submitted, is to undertake approximately 90 metres of open ditch improvements at the bottom end and incorporate fish habitat. The Section 78 report will also incorporate existing infrastructure into a drainage report that will provide direction for future maintenance provisions.

FINANCIAL IMPACT

In accordance with the Drainage Act, 1/3 grant from OMAFRA will be provided to lands assessed as farm tax class. Geoff King from MVCA has also indicated substantial funding acquired from Bruce Power will assist in the project as well.

FUTURE CONSIDERATIONS

Any further costs to the Scott Drain in this area of work and incorporated into the report, will be completed through Section 74 for future maintenance if required

RELATIONSHIP TO STRATEGIC PLAN

Goal #2 Our residents are engaged and well informed.

Goal #4 Our municipality is fiscally responsible and strives for operational excellence.



Kirk Livingston, Drainage Superintendent



Dwayne Evans, CAO

MUNICIPALITY OF NORTH HURON REPORT

TO: North Huron Council
FROM: Geoff King, Stewardship Services Coordinator, Maitland Valley Conservation Authority
DATE: May 6, 2018 (To be presented –May 22, 2018)
SUBJECT: Scott Municipal Drain – Drainage Act - Section 78 Improvement

PURPOSE:

To provide background information to council on the Scott Municipal Drain Demonstration project and the interest of owners (Dale Hussey, Melaine Pletch), to undertake additional channel improvements to the drain as well as incorporating past rural storm water management projects into the report of the municipal drain.

BACKGROUND:

The Scott Municipal Drain project started back in 2005 with the Maitland Valley Conservation Authority working with Murray and Wilma Scott to develop a demonstration site that promotes a system approach to building watershed resiliency. The project incorporates rural storm water management, soil health and green infrastructure to help address the impacts of climate change and increased erosion issues.

The Scott Municipal Drain once contained a healthy trout population and the Scott's had concerns with the need for ongoing maintenance and related costs. Since 2005 the project has incorporated: constructed wetlands, grassed waterways, erosion control berms, nitrate filters, wind breaks, watercourse buffering, diversion berms and natural channel design. The project has proven to be successful in reducing runoff and improving water quality and maintaining base flow, as well as a healthy population of trout have now returned. Also, the municipal drain has proven over the last 13 years that future maintenance should not be required and will save landowners costs for cleanouts.

Tours have been on-going since 2005 and hundreds of people have gained valuable information on the Scott Drain and a system approach to help deal with the impacts of climate change.

To complete the project approximately 90 m of open municipal drain at the outlet into Blyth Creek will require some natural channel work and buffering to improve the open section. This would be undertaken under the Drainage Act under a Section 78 improvement to the drain and would further enhance the system approach and improve the fisheries of the drain.

The Scott Drain is a cold water tributary of the Belgrave Creek that flows into the Maitland River. With the improvements undertaken to date have dramatically improved upstream portion that now sustains brook trout reproduction. Belgrave Creek and its tributaries also provide

critical spawning habitat for salmonids that enter the Maitland River from Lake Huron. Improvements to the drain will increase the productive capacity for migratory trout that support the recreational fishery within the Maitland River and ultimately Lake Huron. Fisheries improvement will include bank stabilization, juvenile cover, spawning habitat and improve water quality.

Funding would also help to incorporate this project and past green infrastructure projects into the report under the Drainage Act. This will ensure that these projects are protected and maintained into the future. It was Murray's vision to ensure his passion to protect the drain would continue into the future and that the fisheries would return to what he had remembered in his youth.

The Maitland Valley Conservation Authority worked with R.J Burnside Engineering, Jeff Dickson, Drainage Engineer and Chris Pfohl, Senior Fisheries Biologist to develop estimated project costs to complete the channel improvements and incorporate the past rural storm water management projects into an updated report for the Scott Drain.

The Conservation Authority applied for funding through Bruce Power for the project and the funding was approved. The Authority received \$70,000 in funding and \$2,400.0 was used to pay for R.J Burnside's staffing costs to develop the estimates. **The Conservation Authority has \$67,600 that would be provided to the municipality to help pay for this project.** The project costs and related funding are documented below.

Estimated Project Costs:

Engineering – Channel	\$15,000
Channel Restoration work	\$25,000
Plant material	\$ 3,000
Signage	\$ 1,000
Engineering – Drainage Act	<u>\$50,000</u>
Cost Estimate	\$94,000

Funding:

Drainage Act grant	\$26,400	(1/3 assessment for Agr lands)
Bruce Power	<u>\$ 67,600</u>	
Funding	\$94,000	





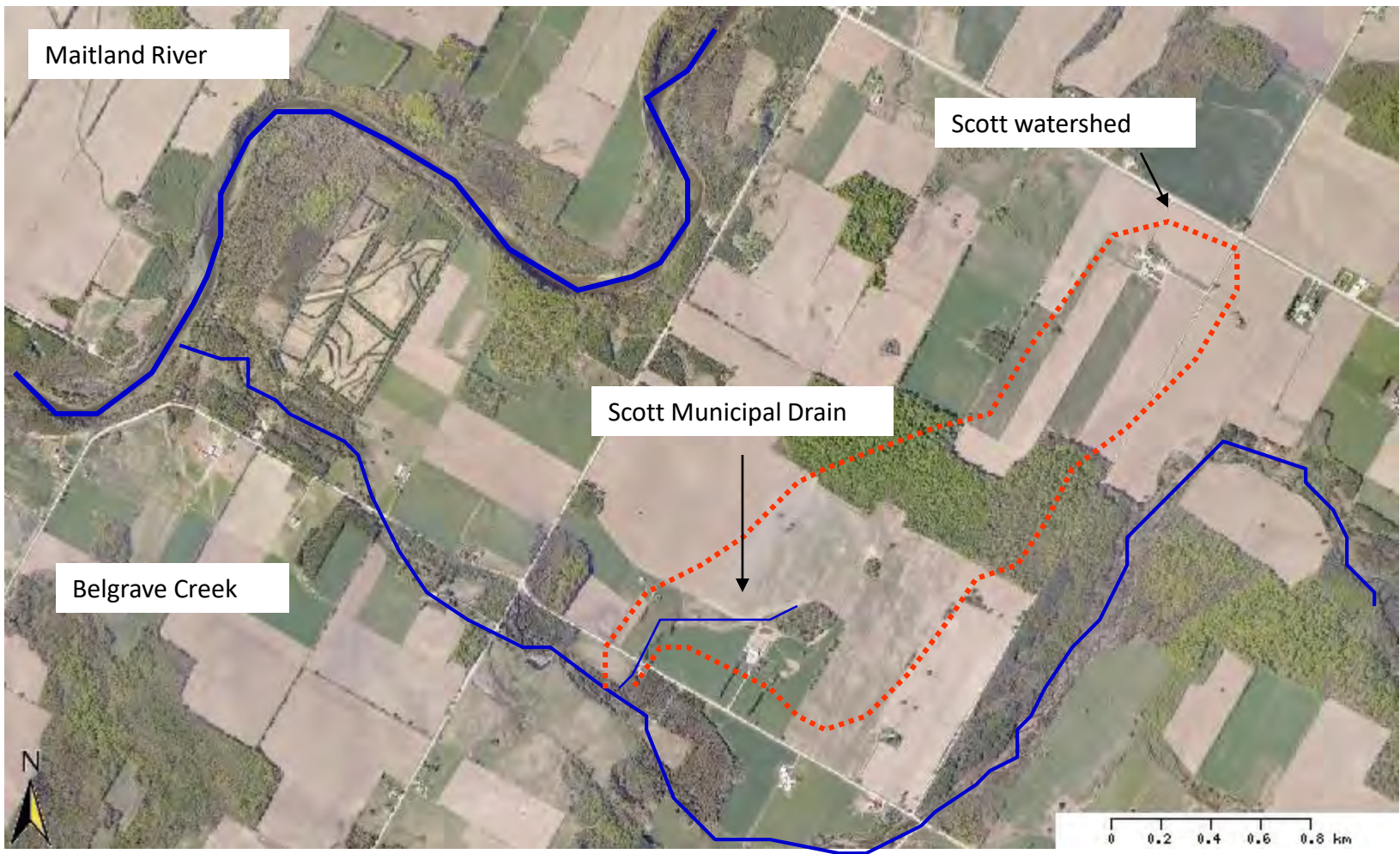
Minister's Award for Environmental Excellence – Murray/ Wilma Scott



Maitland
CONSERVATION

Scott Municipal Drain

Building
Resilience for
Climate Change



Rural Storm Water Management





2006



2016





High flow conditions





16/06/2008

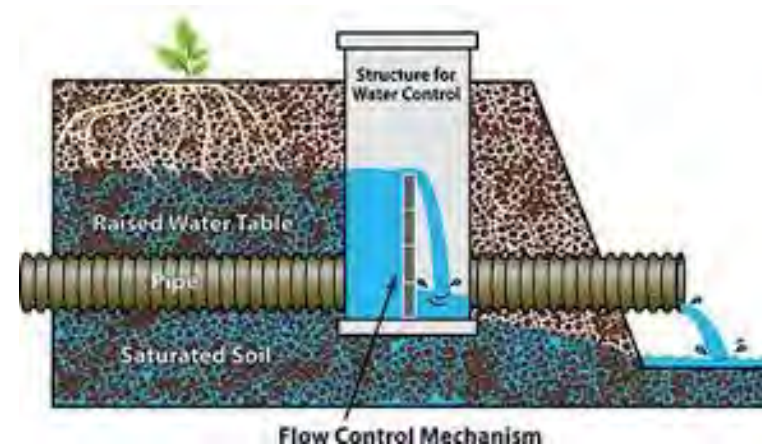




Tile outlet from barn roof



Agri Drain Control Box



French drains that controls flows

2006



06/26/2006

2008



01/04/2008

Diversion berm



Modified Drain Cleanout





Before

04/01/2005



After

10/29/2005

Natural Channel Design – Self Cleaning/ better fish habitat/
improved drainage outlet/reduced cost to maintain and improved
water quality.







23/09/2008

Grassed waterway and diversion berms



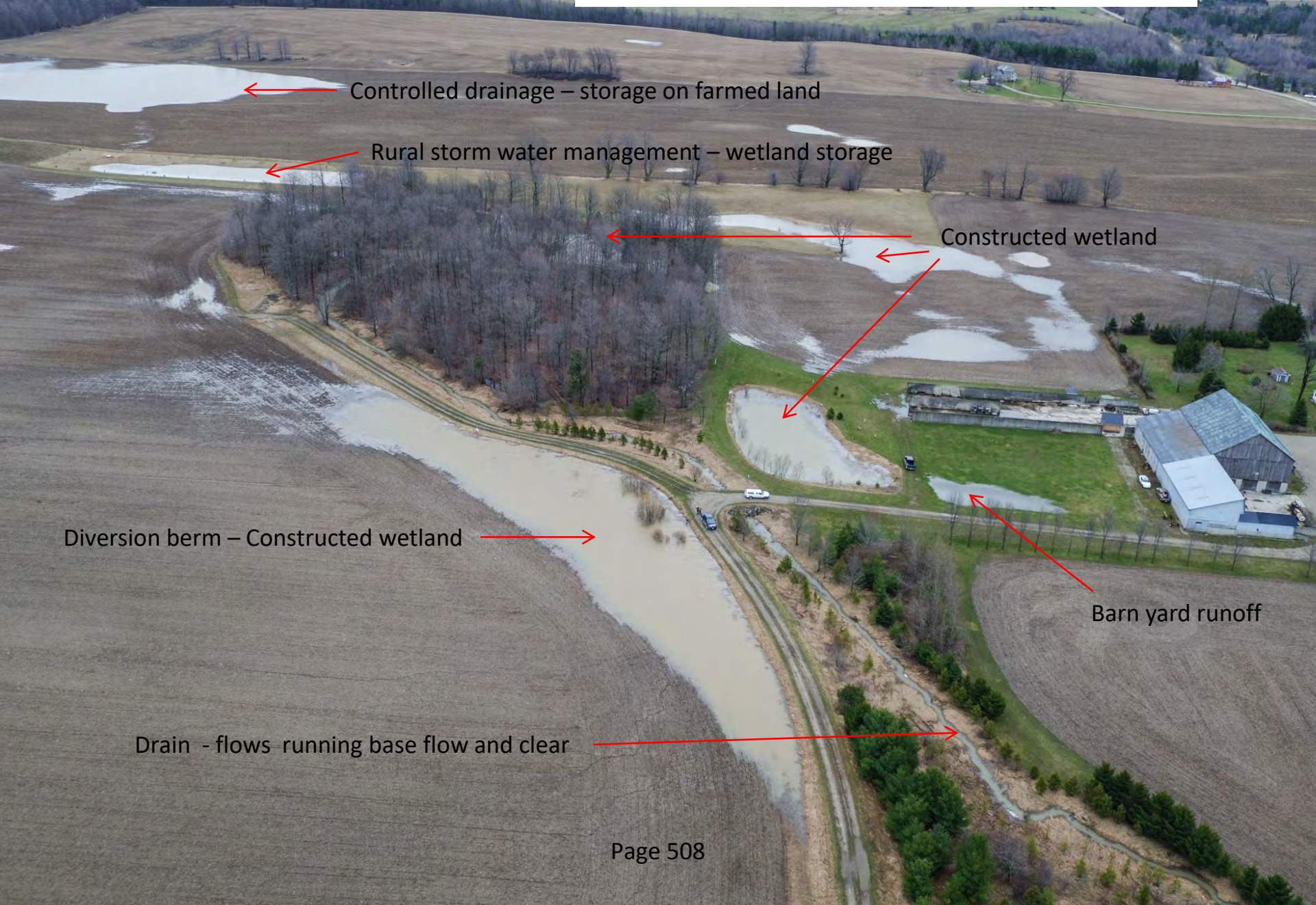
10/16/2006

2008 – Buffering – Natural Channel Design



31/10/2008

Scott Municipal Drain Project – Spring 2016



Controlled drainage – storage on farmed land

Rural storm water management – wetland storage

Constructed wetland

Diversion berm – Constructed wetland

Barn yard runoff

Drain - flows running base flow and clear

Rural Storm Water Management



After



Before

Educational Tours at the Demonstration Project



Murray's People mover



11/09/2006

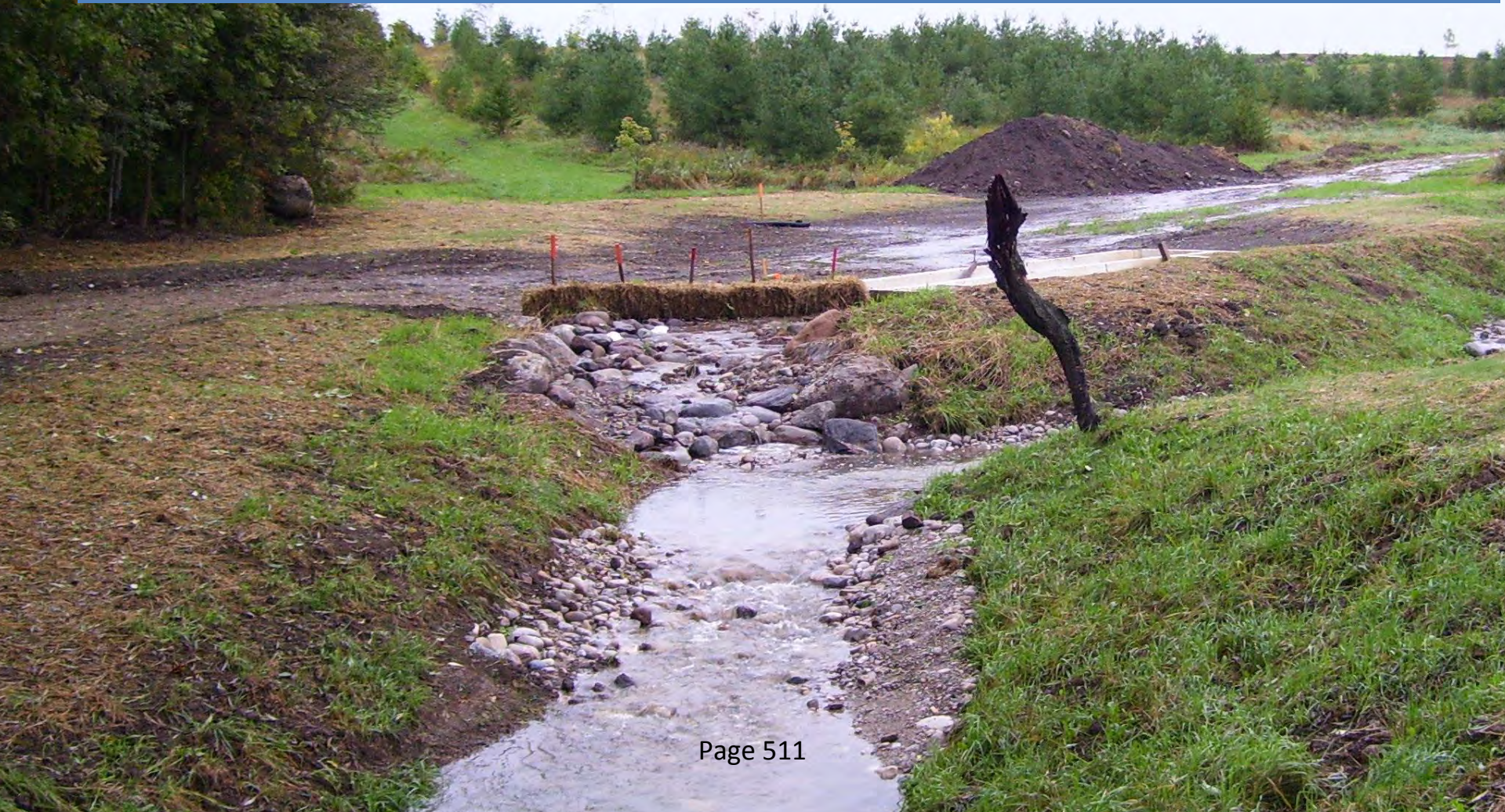


05/07/2007

Section 78 Request – Drainage Act

Open Channel Improvements 90 m

Incorporate Past Rural Storm Water Management Projects
into the Drainage Report



R.J Burnside – Estimate Project Costs

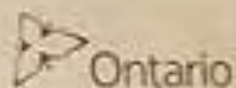
Estimated Project Costs:

Engineering – Channel	\$15,000
Channel Restoration work	\$25,000
Plant material	\$ 3,000
Signage	\$ 1,000
Engineering – Drainage Act	<u>\$50,000</u>
Cost Estimate	\$94,000

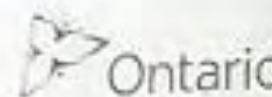
Funding:

Drainage Act grant	\$26,400	(1/3 assessment for Agr lands)
Bruce Power	<u>\$ 67,600</u>	

Funding **\$94,000**



Prix minist
d'excell
envi
mentale



Minister's Award for
Environmental
Excellence

achievement,
in
excellence



MUNICIPALITY OF MORRIS-TURNBERRY

P.O. Box 310, 41342 Morris Road, Brussels, Ontario N0G 1H0
Tel: 519-887-6137 ext. 21 Fax: 519-887-6424 Email: nmichie@morristurnberry.ca



Nancy Michie
Administrator Clerk-Treasurer

RECEIVED

MAY 10 2018

TOWNSHIP OF NORTH HURON

Township of North Huron
c/o Richard Al, Clerk
PO Box 90,
WINGHAM, ON N0G 2W0

May 4, 2018

Enclosed you will find a **Notice of a Proposed Road Closure** for a portion of Road Allowance in the Municipality of Morris-Turnberry, which are located in the County of Huron. A map of the area is attached to identify the location of the road allowance.

A Public Meeting for the proposed Road Closure will be held on:

**Tuesday June 19th , 2018 at 7:30 pm.
at the Morris-Turnberry Municipal Office,
41342 Morris Road
Brussels, Ontario.**

Please forward any comments you may have by the 8th day of June , 2018, as the Council will be considering the proposed Road Closure on Tuesday June 19th, 2018.

Thank you for your cooperation.

Yours truly,

Nancy Michie



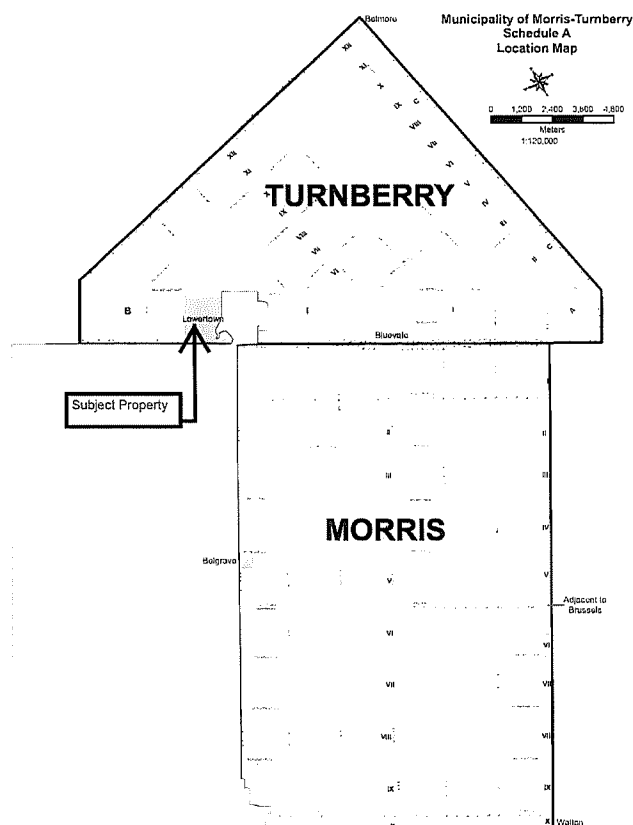
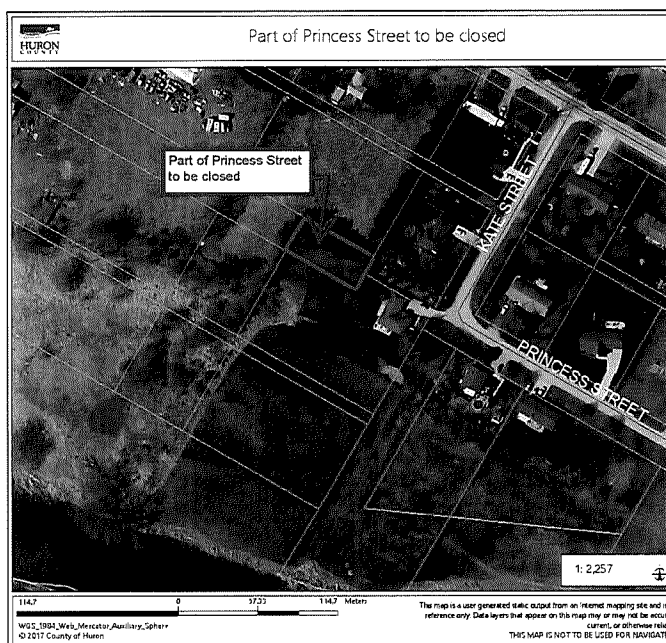
NOTICE FOR A ROAD CLOSING and DISPOSAL OF CERTAIN LANDS

THE CORPORATION OF THE MUNICIPALITY OF MORRIS-TURNBERRY

TAKE NOTICE that the Council of the Corporation of the Municipality of Morris-Turnberry proposes to pass a by-law pursuant to the provisions of the Municipal Act, S.O. 2001 c. 25 Section 34(1) and amendments thereto and pursuant to By-law No. 79-2007, for the stopping up and closing and selling a portion of roadway and
That the following property is surplus to the Municipalities needs and will be disposed of, by the Municipality of Morris-Turnberry.

Lands to be Disposed of:

A) The Lower Town Wingham area: The road allowance, known as 'Princess Street' Plan 410, Wingham; Geographic Township of Turnberry, Municipality of Morris-Turnberry.



- 1. Disposal of Surplus Land:** The roadway has been declared as surplus to the Municipality's needs and will be disposed of by the Municipality of Morris-Turnberry;
- 2. Meeting to consider By-Law:** The Council shall hear any person who claims that his/her land will be prejudicially affected by the by-law and who applies to be heard at the meeting of council scheduled for **Tuesday, June 19th, 2018 at 7:30 pm**, to be held at the Morris-Turnberry Council Chambers, 41342 Morris Road, Brussels, ON ;
- 3. Notice of Interest:** A Notice of Interest in purchasing the property shall be filed by means of a "Letter expressing interest" in the property, which must be filed with the Clerk by 4 pm on the 8th day of June, 2018.

AND FURTHER TAKE NOTICE that the proposed by-law may be examined by all persons interested at the office of the Clerk of the Corporation of the Municipality of Morris-Turnberry during business hours, or on the municipal website www.morristurnberry.ca;

Dated this 4th day of May, 2018

Nancy Michie Administrator Clerk-Treasurer
Municipality of Morris-Turnberry
41342 Morris Road,
PO Box 310,
BRUSSELS, ON NOG 1H0
Email: nmichie@morristurnberry.ca

Telephone: 519-887-6137 Ext 21

Part of Princess Street to be closed



Part of Princess Street
to be closed

Legend

- MTO Connecting Links
- Road Centreline
 - Provincial Highway
 - County Road
 - Municipal Road
 - Future Road
 - Private Road - Not Urban
 - Private Road - Urban
 - Road - Not within Huron
- ▭ Parcel Fabric
- ▭ Municipal Boundary
- ▭ County Boundary
- Layers

1: 2,257



114.7 0 57.33 114.7 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere
© 2017 County of Huron

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Notes

Municipality of Morris-Turner
Schedule A
Location Map

0 1,200 2,400 3,600
 Meters
 1:120,000

TURNBERRY

Belmont

Bluevale

Lowertown

B

A

I XII XI X IX VIII VII VI V IV III II C

Lowerto

MORRIS

Adjacent to
Brussels

Walton



June 2nd
is
National
Health
&
Fitness
Day



Re: National Health & Fitness Day

Hello,

I am contacting you today in the hopes that your community will join the 298 communities across Canada which have proclaimed the first Saturday in June, National Health and Fitness Day (NHFD).

The goal of NHFD is to make Canada the Fittest Nation on Earth! We understand that to accomplish this goal we need the grassroots support of municipalities such as your own.

National Health and Fitness Day was formalized into law after the passing of [Bill S-211](#) in 2014.

To keep the initiative as locally-driven as possible, we encourage communities to pass a proclamation recognizing the first Saturday in June, National Health and Fitness Day, and to offer health and fitness programming on the day. Some communities mark the day by opening their recreational facilities for free to the public, whereas others mark the day by organizing 'fun-runs' or similar low-cost activities.

Given the rising crisis of inactivity Canada, we believe that initiatives such as this are a key step in helping to build healthier and more active communities.

A draft proclamation for your Council can be found below this letter. For more information feel free to contact me, or visit our website: www.NHFDcan.ca

If there's a more appropriate member of your community for this letter to be addressed to, it would be greatly appreciated if you could forward the letter to them.

I would like to thank you for your time, and I look forward to hearing back from you.

Sincerely,

Justin Bergamini
Administrative Support Assistant
Office of Senator Nancy Greene Raine
justin.bergamini@sen.parl.gc.ca
613-995-0307

Proclamation

National Health & Fitness Day June 2, 2018

WHEREAS the Parliament of Canada wishes to increase awareness among Canadians of the significant benefits of physical activity and to encourage Canadians to increase their level of physical activity and their participation in recreational sports and fitness activities;

AND WHEREAS it is in Canada's interest to improve the health of all Canadians and to reduce the burden of illness on Canadian families and on the Canadian health care system;

AND WHEREAS many local governments in Canada have public facilities to promote the health and fitness of their citizens;

AND WHEREAS the Government of Canada wishes to encourage local governments to facilitate Canadian's participation in healthy physical activities;

AND WHEREAS the Government of Canada wishes to encourage the country's local governments, non-government organizations, the private sector and all Canadians to recognize the first Saturday in June as National Health and Fitness Day and to mark the day with local events and initiatives celebrating and promoting the importance and use of local health, recreational, sports and fitness facilities;

AND WHEREAS Canada's mountains, oceans, lakes, forest, parks and wilderness also offer recreational and fitness opportunities;

AND WHEREAS Canadian Environment Week is observed throughout the country in early June, and walking and cycling are great ways to reduce vehicle pollution and improve physical fitness;

AND WHEREAS declaring the first Saturday in June to be National Health and Fitness Day will further encourage Canadians to participate in physical activities and contribute to their own health and well-being;

NOW, ON BEHALF OF Council and the citizens of North Huron, I, Reeve Neil Vincent, do hereby proclaim June 2, 2018 as **National Health & Fitness Day** in the Township of North Huron

Reeve Neil Vincent
Township of North Huron

Date



Elementary School Fair



Elementary School Fair
Joan Vincent, Sponsorship Chair
Wingham, ON
N0G 2W0

May 15, 2018

Reeve Vincent & Municipality of North Huron

The Elementary School Fair Board would like to request that the Municipality of North Huron consider providing letters of support for the School Fair to be submitted along with our application for a TSC Stores Community Agricultural Grant and with our nomination for a Premier's Award for Agri-Food Innovation Excellence. We are submitting to these programs and also exploring other possible applications and fundraising ideas to assist in providing this unique opportunity for our local students and to contribute towards the future longevity of this valuable event.

The TSC Grant is looking for testimonials or letters of support and want community impact.

The Premier's Award is looking for innovative and unique ideas being implemented. To the knowledge of the organizers, the Elementary School Fair is the only remaining School Fair in Ontario and possibly Canada.

The TSC Stores Community Agricultural Grant deadline is May 31, 2018 and any letters should be addressed to: TSC Stores

Attn. Katherine Miller

The deadline for submissions for the Premier's Award for Agri-Food Innovation Excellence is May 25, 2018. Letters should be addressed to:

Premier's Award for Agri-Food Innovation Excellence

OMAFRA

I would appreciate having any letters emailed to me at vinbrofarms@rogers.com by May 23, 2018 so that I can include them in the packages and have them submitted in advance of the deadlines. Thank you for your consideration and if you have any questions please contact me.

PS Sorry about the short time frame.

Sincerely,

Joan Vincent



RECEIVED

MAY 16 2018

TOWNSHIP OF NORTH HURON

April 24, 2018

Township of North Huron
P.O. Box 90, 274 Josephine Street
Wingham ON
N0G 2W0

RE: Invitation to join the "Preferred Autonomous Vehicles Test Corridor"

Mayor & Members of Council:

I am writing to you today to invite you to be a part of OGRA's Municipal Alliance for Connected and Autonomous Vehicles in Ontario (MACAVO) initiative for controlled testing of Autonomous Vehicles (AVs). Under this initiative, we are calling for the creation of a seamless and well-coordinated "Preferred AV Test Corridor", stretching from Windsor to Ottawa. Through this initiative, our aim is to help attract (and retain) AV-related industry and talent in Ontario, which in turn can become a catalyst in helping provide unparalleled socio-economic benefits for all municipalities involved. A more detailed report of the initiative is attached.

OGRA is requesting the following call-to-action by municipalities in Ontario:

1. Identify One (1) municipal point of contact who will be responsible to spearhead all AV-related activities for your municipality, and:
2. Identify the Preferred routes within your municipality

We respectfully request that your council pass the following resolution:

That the _____ of _____ participate in OGRA's Autonomous Vehicle initiative and that this matter be referred to staff to develop a list of preferred routes with the municipality.

On behalf of OGRA thank you for your consideration of this request. Should you have any follow-up questions, please feel free contact myself or Fahad Shuja at Fahad@ogra.org.

Kind regards,

J. W. Tiernay
Executive Director
Ontario Good Roads Association
E: Joe@ogra.org



SACRED HEART

CATHOLIC SCHOOL



RECEIVED

MAY - 7 2018

TOWNSHIP OF NORTH HURON

May 3, 2018

Dear, Council for the Township of North Huron:

In previous years, you so graciously have given a \$50.00 donation to the most improved grade 8 graduating student.

We are asking if you are willing to give toward this award this year. If the request is granted, is there someone who would like to present the award at our Graduation Dinner on June 26th?

If you could please call the office with your decision that would be greatly appreciated.

Thank you,

Vicki Lobb
Office Administrator
Sacred Heart School
Wingham, On
519-357-1090 ext. 1420





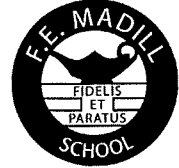
F. E. Madill Secondary School

Box 160, 231 Madill Drive, Wingham, ON N0G 2W0

Tel: 519-357-1800 Fax: 519-357-4137

Guidance Fax 519-357-2813

Web: femadill.com



Mrs. Marie McDade
Principal

Mrs. Janice Shore
Vice-Principal

Mrs. Helena Finch
Vice-Principal

May 4, 2018

North Huron Council,
Township of North Huron,
274 Josephine Street,
Wingham, Ontario.
N0G 2W0

Attention: Township of North Huron

Re: Grade 8 Graduation – Monday, June 25, 2018

On behalf of our Grade 8 graduating classes, we respectfully request any financial assistance that the township would be able to offer.

Our grade 8 students decide on the decorating theme and they also decide what food they would like made available to them during the evening. After the graduation ceremonies the students stay for a dance and we hire a D.J. for the evening. We have a limited school budget, and would appreciate any support that you would be able to offer to enhance the evening celebration for our graduates. If you are able to make a donation please make the cheque payable to F.E.Madill Secondary School.

On behalf of our grade 8 graduating students we would like to say "Thank You" to the North Huron Council for considering our request.

Sincerely,

Marie McDade (Mrs.),
Principal,
F.E.Madill S.S.

/dr

RECEIVED

MAY 11 2018

TOWNSHIP OF NORTH HURON

May 10, 2018

The Corporation of the Town of North Huron
P.O. Box 90, 274 Josephine St.
Wingham, ON N0G 2W0

RE: Wingham Farmers' Market

Dear Members of North Huron Council:

The Wingham Farmers' Market is beginning
our fourth year of operation at Cruickshank
Park on June 6, 2018.

Our purpose as you are aware is to market
local farm, agricultural and craft products.
Ultimately we hope to stimulate interest in
and increase consumption of local products.

Some of our expenses include insurance, rental
of Cruickshank Park (venue for the market), rental
of local storage facilities for our equipment,
additions to the market such as a second
community canopy, a modest payment to
musicians (\$40. per appearance) etc. Our sole
source of income includes vendors' fees
plus an annual fee to join the market.
The barbeque this year will be taken
over by one of our vendors with proceeds
going directly to them.

We are asking your consideration to waive
the fee for a multi vendor license for
the period of the market this year from
June 6 - September 26 (17 weeks). We intend
to improve our market, vary the downtown
shopping experience and create the type
of neighbourhood we all want to live and work in.

Thank you for your consideration to
accomplish our goals.

Respectfully,
Loraine Poulin
Treasurer

THE CORPORATION OF THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 51-2018

A by-law to authorize the Reeve and Clerk to sign, on behalf of Council, an Agreement of Purchase and Sale between the Corporation of the Township of North Huron and 909395 Ontario Inc. for a portion of land legally described as PT 1 LT 6 RP 22R-6630, Wingham Ward, Township of North Huron.

WHEREAS the Municipal Act, 2001, S.O. 2001, c. 25, as amended permits the Councils of all municipalities to enter into certain agreements;

AND WHEREAS the Council of the Corporation of the Township of North Huron has passed By-law No. 25-2008, being a By-law to establish procedures for the sale and disposal of real property;

AND WHEREAS the Council of the Corporation of the Township of North Huron is desirous of executing an Agreement of Purchase and Sale between the Township of North Huron and 909395 Ontario Inc. for a portion of land legally described as PT 1 LT 6 RP 2-6630, Wingham Ward, Township of North Huron;

NOW THEREFORE, the Council of the Corporation of North Huron enacts as follows:

1. That the Reeve and Clerk are hereby authorized to sign on behalf of Council, an Agreement of Purchase and Sale between the Corporation of the Township of North Huron and 909395 Ontario Inc. for a portion of land legally described as PT 1 LT 6 RP 2-6630, Wingham Ward, Township of North Huron.
2. That a copy of the said Agreement is attached hereto and designated as Schedule 'A' to this By-law.
3. That this By-law shall come into force and take effect on the day of the final passing thereof.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk

**Agreement of Purchase and Sale
Commercial****Form 500**

for use in the Province of Ontario

This Agreement of Purchase and Sale dated this 9th day of May, 2018**BUYER**, 909395 ONTARIO INC., agrees to purchase from
(Full legal names of all Buyers)**SELLER**, TOWNSHIP OF NORTH HURON, the following
(Full legal names of all Sellers)**REAL PROPERTY:**Address PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURONfronting on the West side of JOSEPHINE ST.in the TOWN OF WINGHAM NORTH HURON

and having a frontage of more or less by a depth of more or less

and legally described as PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURON andBeing Irregularly Shaped (the "property")
(Legal description of land including easements not described elsewhere)**PURCHASE PRICE:**Dollars (CDN\$) 3,000.00Three Thousand Dollars**DEPOSIT:** Buyer submits Upon Acceptance
(Herewith/Upon Acceptance/as otherwise described in this Agreement)One Hundred Dollars (CDN\$) 100.00by negotiable cheque payable to TOWNSHIP OF NORTH HURON "Deposit Holder" to be held in trust pending completion or other termination of this Agreement and to be credited toward the Purchase Price on completion. For the purposes of this Agreement, "Upon Acceptance" shall mean that the Buyer is required to deliver the deposit to the Deposit Holder within 24 hours of the acceptance of this Agreement. The parties to this Agreement hereby acknowledge that, unless otherwise provided for in this Agreement, the Deposit Holder shall place the deposit in trust in the Deposit Holder's non-interest bearing Real Estate Trust Account and no interest shall be earned, received or paid on the deposit.**Buyer agrees to pay the balance as more particularly set out in Schedule A attached.****SCHEDULE(S) A** **attached hereto form(s) part of this Agreement.**1. **IRREVOCABILITY:** This offer shall be irrevocable by Buyer until 8:00 ~~am~~ pm on
23rd day of May, 2018, after which time, if not accepted, this offer shall be null and void and the deposit shall be returned to the Buyer in full without interest.
(Seller/Buyer)2. **COMPLETION DATE:** This Agreement shall be completed by no later than 6:00 p.m. on the 29th day of June, 2018. Upon completion, vacant possession of the property shall be given to the Buyer unless otherwise provided for in this Agreement.

INITIALS OF BUYER(S):

INITIALS OF SELLER(S):

3. NOTICES: The Seller hereby appoints the Listing Brokerage as agent for the Seller for the purpose of giving and receiving notices pursuant to this Agreement. Where a Brokerage (Buyer's Brokerage) has entered into a representation agreement with the Buyer, the Buyer hereby appoints the Buyer's Brokerage as agent for the purpose of giving and receiving notices pursuant to this Agreement. **Where a Brokerage represents both the Seller and the Buyer (multiple representation), the Brokerage shall not be appointed or authorized to be agent for either the Buyer or the Seller for the purpose of giving and receiving notices.** Any notice relating hereto or provided for herein shall be in writing. In addition to any provision contained herein and in any Schedule hereto, this offer, any counter-offer, notice of acceptance thereof or any notice to be given or received pursuant to this Agreement or any Schedule hereto (any of them, "Document") shall be deemed given and received when delivered personally or hand delivered to the Address for Service provided in the Acknowledgement below, or where a facsimile number or email address is provided herein, when transmitted electronically to that facsimile number or email address, respectively, in which case, the signature(s) of the party (parties) shall be deemed to be original.

FAX No.:
(For delivery of Documents to Seller)

FAX No.:
(For delivery of Documents to Buyer)

Email Address:
(For delivery of Documents to Seller)

Email Address:
(For delivery of Documents to Buyer)

4. CHATELS INCLUDED: N/A

Unless otherwise stated in this Agreement or any Schedule hereto, Seller agrees to convey all fixtures and chattels included in the Purchase Price free from all liens, encumbrances or claims affecting the said fixtures and chattels.

5. FIXTURES EXCLUDED: N/A

6. RENTAL ITEMS (Including Lease, Lease to Own): The following equipment is rented and **not** included in the Purchase Price. The Buyer agrees to assume the rental contract(s), if assumable:

N/A

The Buyer agrees to co-operate and execute such documentation as may be required to facilitate such assumption.

7. HST: If the sale of the property (Real Property as described above) is subject to Harmonized Sales Tax (HST), then such tax shall be in addition to the Purchase Price. The Seller will not collect HST if the Buyer provides to the Seller a warranty that the Buyer is registered under the Excise Tax Act ("ETA"), together with a copy of the Buyer's ETA registration, a warranty that the Buyer shall self-assess and remit the HST payable and file the prescribed form and shall indemnify the Seller in respect of any HST payable. The foregoing warranties shall not merge but shall survive the completion of the transaction. If the sale of the property is not subject to HST, Seller agrees to certify on or before closing, that the transaction is not subject to HST. Any HST on chattels, If applicable, is not included in the Purchase Price.

INITIALS OF BUYER(S):



INITIALS OF SELLER(S):





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8. TITLE SEARCH: Buyer shall be allowed until 6:00 p.m. on the 22nd day of June, 2018, (Requisition Date) to examine the title to the property at his own expense and until the earlier of: (i) thirty days from the later of the Requisition Date or the date on which the conditions in this Agreement are fulfilled or otherwise waived or; (ii) five days prior to completion, to satisfy himself that there

are no outstanding work orders or deficiency notices affecting the property, that its present use (VACANT LAND) may be lawfully continued and that the principal building may be insured against risk of fire. Seller hereby consents to the municipality or other governmental agencies releasing to Buyer details of all outstanding work orders and deficiency notices affecting the property, and Seller agrees to execute and deliver such further authorizations in this regard as Buyer may reasonably require.

9. FUTURE USE: Seller and Buyer agree that there is no representation or warranty of any kind that the future intended use of the property by Buyer is or will be lawful except as may be specifically provided for in this Agreement.

10. TITLE: Provided that the title to the property is good and free from all registered restrictions, charges, liens, and encumbrances except as otherwise specifically provided in this Agreement and save and except for (a) any registered restrictions or covenants that run with the land providing that such are complied with; (b) any registered municipal agreements and registered agreements with publicly regulated utilities providing such have been complied with, or security has been posted to ensure compliance and completion, as evidenced by a letter from the relevant municipality or regulated utility; (c) any minor easements for the supply of domestic utility or telephone services to the property or adjacent properties; and (d) any easements for drainage, storm or sanitary sewers, public utility lines, telephone lines, cable television lines or other services which do not materially affect the use of the property. If within the specified times referred to in paragraph 8 any valid objection to title or to any outstanding work order or deficiency notice, or to the fact the said present use may not lawfully be continued, or that the principal building may not be insured against risk of fire is made in writing to Seller and which Seller is unable or unwilling to remove, remedy or satisfy or obtain insurance save and except against risk of fire (Title Insurance) in favour of the Buyer and any mortgagee, (with all related costs at the expense of the Seller), and which Buyer will not waive, this Agreement notwithstanding any intermediate acts or negotiations in respect of such objections, shall be at an end and all monies paid shall be returned without interest or deduction and Seller, Listing Brokerage and Co-operating Brokerage shall not be liable for any costs or damages. Save as to any valid objection so made by such day and except for any objection going to the root of the title, Buyer shall be conclusively deemed to have accepted Seller's title to the property.

11. CLOSING ARRANGEMENTS: Where each of the Seller and Buyer retain a lawyer to complete the Agreement of Purchase and Sale of the property, and where the transaction will be completed by electronic registration pursuant to Part III of the Land Registration Reform Act, R.S.O. 1990, Chapter L4 and the Electronic Registration Act, S.O. 1991, Chapter 44, and any amendments thereto, the Seller and Buyer acknowledge and agree that the exchange of closing funds, non-registrable documents and other items (the "Requisite Deliveries") and the release thereof to the Seller and Buyer will (a) not occur at the same time as the registration of the transfer/deed (and any other documents intended to be registered in connection with the completion of this transaction) and (b) be subject to conditions whereby the lawyer(s) receiving any of the Requisite Deliveries will be required to hold same in trust and not release same except in accordance with the terms of a document registration agreement between the said lawyers. The Seller and Buyer irrevocably instruct the said lawyers to be bound by the document registration agreement which is recommended from time to time by the Law Society of Upper Canada. Unless otherwise agreed to by the lawyers, such exchange of the Requisite Deliveries will occur in the applicable Land Titles Office or such other location agreeable to both lawyers.

12. DOCUMENTS AND DISCHARGE: Buyer shall not call for the production of any title deed, abstract, survey or other evidence of title to the property except such as are in the possession or control of Seller. If requested by Buyer, Seller will deliver any sketch or survey of the property within Seller's control to Buyer as soon as possible and prior to the Requisition Date. If a discharge of any Charge/Mortgage held by a corporation incorporated pursuant to the Trust And Loan Companies Act (Canada), Chartered Bank, Trust Company, Credit Union, Caisse Populaire or Insurance Company and which is not to be assumed by Buyer on completion, is not available in registrable form on completion, Buyer agrees to accept Seller's lawyer's personal undertaking to obtain, out of the closing funds, a discharge in registrable form and to register same, or cause same to be registered, on title within a reasonable period of time after completion, provided that on or before completion Seller shall provide to Buyer a mortgage statement prepared by the mortgagee setting out the balance required to obtain the discharge, and, where a real-time electronic cleared funds transfer system is not being used, a direction executed by Seller directing payment to the mortgagee of the amount required to obtain the discharge out of the balance due on completion.

13. INSPECTION: Buyer acknowledges having had the opportunity to inspect the property and understands that upon acceptance of this offer there shall be a binding agreement of purchase and sale between Buyer and Seller.

14. INSURANCE: All buildings on the property and all other things being purchased shall be and remain until completion at the risk of Seller. Pending completion, Seller shall hold all insurance policies, if any, and the proceeds thereof in trust for the parties as their interests may appear and in the event of substantial damage, Buyer may either terminate this Agreement and have all monies paid returned without interest or deduction or else take the proceeds of any insurance and complete the purchase. No insurance shall be transferred on completion. If Seller is taking back a Charge/Mortgage, or Buyer is assuming a Charge/Mortgage, Buyer shall supply Seller with reasonable evidence of adequate insurance to protect Seller's or other mortgagee's interest on completion.

INITIALS OF BUYER(S):

INITIALS OF SELLER(S):



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- 15. PLANNING ACT:** This Agreement shall be effective to create an interest in the property only if Seller complies with the subdivision control provisions of the Planning Act by completion and Seller covenants to proceed diligently at his expense to obtain any necessary consent by completion.
- 16. DOCUMENT PREPARATION:** The Transfer/Deed shall, save for the Land Transfer Tax Affidavit, be prepared in registrable form at the expense of Seller, and any Charge/Mortgage to be given back by the Buyer to Seller at the expense of the Buyer. If requested by Buyer, Seller covenants that the Transfer/Deed to be delivered on completion shall contain the statements contemplated by Section 50(22) of the Planning Act, R.S.O.1990.
- 17. RESIDENCY:** (a) Subject to (b) below, the Seller represents and warrants that the Seller is not and on completion will not be a non-resident under the non-residency provisions of the Income Tax Act which representation and warranty shall survive and not merge upon the completion of this transaction and the Seller shall deliver to the Buyer a statutory declaration that Seller is not then a non-resident of Canada;
(b) provided that if the Seller is a non-resident under the non-residency provisions of the Income Tax Act, the Buyer shall be credited towards the Purchase Price with the amount, if any, necessary for Buyer to pay to the Minister of National Revenue to satisfy Buyer's liability in respect of tax payable by Seller under the non-residency provisions of the Income Tax Act by reason of this sale. Buyer shall not claim such credit if Seller delivers on completion the prescribed certificate.
- 18. ADJUSTMENTS:** Any rents, mortgage interest, realty taxes including local improvement rates and unmetered public or private utility charges and unmetered cost of fuel, as applicable, shall be apportioned and allowed to the day of completion, the day of completion itself to be apportioned to Buyer.
- 19. TIME LIMITS:** Time shall in all respects be of the essence hereof provided that the time for doing or completing of any matter provided for herein may be extended or abridged by an agreement in writing signed by Seller and Buyer or by their respective lawyers who may be specifically authorized in that regard.
- 20. PROPERTY ASSESSMENT:** The Buyer and Seller hereby acknowledge that the Province of Ontario has implemented current value assessment and properties may be re-assessed on an annual basis. The Buyer and Seller agree that no claim will be made against the Buyer or Seller, or any Brokerage, Broker or Salesperson, for any changes in property tax as a result of a re-assessment of the property, save and except any property taxes that accrued prior to the completion of this transaction.
- 21. TENDER:** Any tender of documents or money hereunder may be made upon Seller or Buyer or their respective lawyers on the day set for completion. Money shall be tendered with funds drawn on a lawyer's trust account in the form of a bank draft, certified cheque or wire transfer using the Large Value Transfer System.
- 22. FAMILY LAW ACT:** Seller warrants that spousal consent is not necessary to this transaction under the provisions of the Family Law Act, R.S.O.1990 unless the spouse of the Seller has executed the consent hereinafter provided.
- 23. UFFI:** Seller represents and warrants to Buyer that during the time Seller has owned the property, Seller has not caused any building on the property to be insulated with insulation containing ureaformaldehyde, and that to the best of Seller's knowledge no building on the property contains or has ever contained insulation that contains ureaformaldehyde. This warranty shall survive and not merge on the completion of this transaction, and if the building is part of a multiple unit building, this warranty shall only apply to that part of the building which is the subject of this transaction.
- 24. LEGAL, ACCOUNTING AND ENVIRONMENTAL ADVICE:** The parties acknowledge that any information provided by the brokerage is not legal, tax or environmental advice, and that it has been recommended that the parties obtain independent professional advice prior to signing this document.
- 25. CONSUMER REPORTS:** The Buyer is hereby notified that a consumer report containing credit and/or personal information may be referred to in connection with this transaction.
- 26. AGREEMENT IN WRITING:** If there is conflict or discrepancy between any provision added to this Agreement (including any Schedule attached hereto) and any provision in the standard pre-set portion hereof, the added provision shall supersede the standard pre-set provision to the extent of such conflict or discrepancy. This Agreement including any Schedule attached hereto, shall constitute the entire Agreement between Buyer and Seller. There is no representation, warranty, collateral agreement or condition, which affects this Agreement other than as expressed herein. For the purposes of this Agreement, Seller means vendor and Buyer means purchaser. This Agreement shall be read with all changes of gender or number required by the context.
- 27. TIME AND DATE:** Any reference to a time and date in this Agreement shall mean the time and date where the property is located.

INITIALS OF BUYER(S):



INITIALS OF SELLER(S):





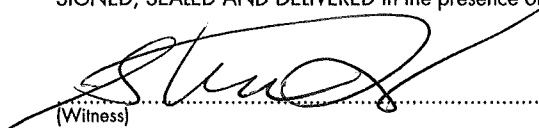
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28. SUCCESSORS AND ASSIGNS: The heirs, executors, administrators, successors and assigns of the undersigned are bound by the terms herein.

SIGNED, SEALED AND DELIVERED in the presence of:

IN WITNESS whereof I have hereunto set my hand and seal:


(Witness)

(Witness)

909395 ONTARIO INC.

(Buyer/Authorized Signing Officer)

(Buyer/Authorized Signing Officer)

(Seal)
(Seal)
(Seal)

DATE 9 May 2018.
DATE _____

I, the Undersigned Seller, agree to the above offer. I hereby irrevocably instruct my lawyer to pay directly to the brokerage(s) with whom I have agreed to pay commission, the unpaid balance of the commission together with applicable Harmonized Sales Tax (and any other taxes as may hereafter be applicable), from the proceeds of the sale prior to any payment to the undersigned on completion, as advised by the brokerage(s) to my lawyer.

SIGNED, SEALED AND DELIVERED in the presence of:

IN WITNESS whereof I have hereunto set my hand and seal:

(Witness)

(Witness)

TOWNSHIP OF NORTH HURON

(Seller/Authorized Signing Officer)

(Seller/Authorized Signing Officer)

(Seal)
(Seal)
(Seal)

DATE _____
DATE _____

SPOUSAL CONSENT: The undersigned spouse of the Seller hereby consents to the disposition evidenced herein pursuant to the provisions of the Family Law Act, R.S.O.1990, and hereby agrees to execute all necessary or incidental documents to give full force and effect to the sale evidenced herein.

(Witness)

(Spouse)

(Seal)

DATE _____

CONFIRMATION OF ACCEPTANCE: Notwithstanding anything contained herein to the contrary, I confirm this Agreement with all changes both typed and written was finally accepted by all parties at _____ a.m./p.m. this _____ day of _____, 20_____.

(Signature of Seller or Buyer)

INFORMATION ON BROKERAGE(S)

Listing Brokerage Wilfred McIntee & Co. Limited Tel.No. (519) 357-2222

STEVE NIXON
(Salesperson / Broker Name)
Co-op/Buyer Brokerage _____ Tel.No. (_____) _____

(Salesperson / Broker Name)

ACKNOWLEDGEMENT

I acknowledge receipt of my signed copy of this accepted Agreement of Purchase and Sale and I authorize the Brokerage to forward a copy to my lawyer.

I acknowledge receipt of my signed copy of this accepted Agreement of Purchase and Sale and I authorize the Brokerage to forward a copy to my lawyer.

(Seller) DATE _____

(Seller) DATE _____
Address for Service _____

Tel.No. (_____) _____
Seller's Lawyer _____
Address _____
Email _____
(_____) _____
Tel.No. (_____) FAX No. _____

(Buyer) DATE _____

(Buyer) DATE _____
Address for Service _____

Tel.No. (_____) _____
Buyer's Lawyer _____
Address _____
Email _____
(_____) _____
Tel.No. (_____) FAX No. _____

FOR OFFICE USE ONLY

COMMISSION TRUST AGREEMENT

To: Co-operating Brokerage shown on the foregoing Agreement of Purchase and Sale:

In consideration for the Co-operating Brokerage procuring the foregoing Agreement of Purchase and Sale, I hereby declare that all moneys received or receivable by me in connection with the Transaction as contemplated in the MLS® Rules and Regulations of my Real Estate Board shall be receivable and held in trust. This agreement shall constitute a Commission Trust Agreement as defined in the MLS® Rules and shall be subject to and governed by the MLS® Rules pertaining to Commission Trust.

DATED as of the date and time of the acceptance of the foregoing Agreement of Purchase and Sale.

Acknowledged by:

(Authorized to bind the Listing Brokerage)

(Authorized to bind the Co-operating Brokerage)



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This Schedule is attached to and forms part of the Agreement of Purchase and Sale between:

BUYER, 909395 ONTARIO INC., and

SELLER, TOWNSHIP OF NORTH HURON

for the purchase and sale of PT 1 LOT 6 OF PLAN 22R-6630 WINGHAM TOWNSHIP OF NORTH HURON in
the TOWN OF WINGHAM dated the 9th day of May 20 18

Buyer agrees to pay the balance as follows:

The Buyer agrees to pay the balance of the purchase price, subject to adjustments, to the Seller on completion of this transaction, with funds drawn on a lawyer's trust account in the form of a bank draft, certified cheque or wire transfer using the Large Value Transfer System.

THIS PARCEL OF LAND WILL MERGE WITH 350 JOSEPHINE ST. WINGHAM ON CLOSING.

BUYER IS PAYING \$3000.00 FOR THIS LAND PLUS ALL COSTS RELATED TO THE
DISBURSEMENT OF THIS PARCEL OF LAND.

This form must be initialed by all parties to the Agreement of Purchase and Sale.

INITIALS OF BUYER(S):



INITIALS OF SELLER(S):





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Wilfred McIntee & Co. Limited



THE CORPORATION OF THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 52-2018

A By-law to adopt a Constitution and Procedure By-law for the
Blyth Business Improvement Area (BIA).

WHEREAS Section 204 of the Municipal Act, 2001, S.O. 2001 c. 25 as amended, provides that a local municipality may designate an area as an improvement area and establish a board of management;

AND WHEREAS the Council of the Corporation of the Township of North Huron has passed By-law No. 46-2011 to establish the Blyth BIA;

AND WHEREAS Section 238 of the Municipal Act, 2001, S.O. 2001, c. 25 as amended, requires that every municipality and local board shall pass a procedure by-law for the governing the calling, place and proceedings of meetings;

NOW THEREFORE, the Council of the Corporation of North Huron enacts as follows:

1. That the Council of the Township of North Huron adopts the Blyth Business Improvement Area (BIA) Constitution and Procedure By-law.
2. That a copy of the said Constitution and Procedure By-law is attached hereto and designated as Schedule 'A' to this By-law.
3. That By-law No. 02-2012 and By-law No. 36-2013 be rescinded as of the date of the passage of this By-law.
4. That this By-law shall come into force and take effect on the day of the final passing thereof.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk



Blyth Business Improvement Area

Constitution and Procedural Bylaws

Revised for Membership Approval on February 22, 2018

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CONSTITUTION

NAME

The name of the organization is "**Blyth Business Improvement Area (BBIA)**".

The membership of the organization elects "the Board of Management for **Blyth Business Improvement Area (BBIA)**" which is in turn is appointed by the Council of **Township of North Huron**.

PURPOSE

The Council of **Township of North Huron** appoints the Board of Management of **Blyth Business Improvement Area (BBIA)** to:

1. Plan and administer activities for the promotion of **BBIA** as an attractive business and shopping area and for the maintenance of the appearance of the Blyth Ward;
2. Engage in strategic planning necessary to address **BBIA** issues;
3. Advocate on behalf of the interests of **BBIA**;
4. Manage the money that is collected by **Township of North Huron** from the required special BIA levy for these activities.

MEMBERSHIP BOUNDARIES

The boundaries of **BBIA** as established by the Council of **Township of North Huron** includes the entire ward of Blyth in the Township of North Huron; geographically defined as the area within:

- . Blyth Road at the South
- . Threshers Lane at the West
- . Anne Street at the East
- . North Street at the North

Being the former
Corporation of the
Village of Blyth Boundaries

DEFINITIONS

In this by-law the following definitions shall apply:

- A. "Adjourn" means to end the meeting. This motion requires a second, is not debatable, is not amendable, requires a majority vote for adoption and cannot be reconsidered.
- B. "Clerk" means the Clerk or designate of the Township of North Huron, as appointed by By-law.
- C. "Closed Session" means a meeting, or portion thereof, closed to the public in accordance with Section # 239 of the Municipal Act, 2001 and Section #5.7 of this By-law.
- D. "Correspondence" includes, but is not limited to, the following: letter, memorandum, report, notice, electronic mail, facsimile, petition, etc., that may require an action or decision of the B.I.A.
- E. "Council" means the Council of the Township of North Huron.
- F. "Councillor" means a person elected or appointed as a Member of Council.
- G. "Meeting" means any regular, special or other meeting of a council, or a local board or of a committee of either of them, where,
 - i. a quorum of members is present, and

- ii. Members discuss or otherwise deal with any matter in a way that materially advances the business or decision-making of the council, local board or committee.
- I. "Chair" means the B.I.A. Member of the Board of Management duly appointed as Chair, or the B.I.A. Board of Management Member who is the presiding officer of the session or meeting.
- J. "Member" means a person representing a ratepayer of the annual Business Improvement Area of the Corporation of the Township of North Huron, Blyth Ward, and who has been duly appointed to the "B.I.A." Board of Management by the Council of the Township of North Huron, or a Township of North Huron Municipal Councillor who has been appointed to the "B.I.A." Board of Management
- K. "Minutes" mean a record of the proceedings of Council or Committee that includes the place, date, time, name of Chair, list of members in attendance and evidence of quorum. Minutes will record the actions taken and decisions made by members at the meeting without note or comment in accordance with Section 239(7) of the Municipal Act.
- L. "Present" means physically in attendance at the meeting. Remote attendance, while permitted, does not contribute to quorum and members attending via remote do not have a vote.
- M. "Township" means the Township of North Huron.
- N. "Pecuniary Interest" includes a direct or indirect financial interest of a member and a financial interest deemed to be that of a member, in accordance with the Municipal Conflict of Interest Act 1990, Section #2 and #3..
- O. "Quorum", as it relates to the "B.I.A." Board of Management and "B.I.A." Committees shall consist of a simple majority of the applicable Members of the respective Board of Management or Committee.
- P. Throughout this By-law, the words "he" and "his" shall, where appropriate, be deemed to also be read as "she" and "her".

PART 2 – GENERAL RULES

In any case for which provision is not made in the Procedural By-laws, the procedure to be followed shall be that indicated in Township of North Huron By-law 116-2017, as amended.

PROCEDURAL BYLAWS and POLICIES

Procedural Bylaws and Policies including, but not limited to, Human Resource and Procurement Policies guide the operations of the Blyth Business Improvement Area.

— · — · — · — · —

The Blyth Business Improvement Area (BBIA) Constitution came into force as approved by a majority of the membership of December 7, 2011. It was amended June 7, 2012. The Constitution was separated into two agreements: Constitution and Procedural Bylaws, February 2018.

PROCEDURAL BYLAWS

BOARD OF MANAGEMENT

The Board of Management of **BBIA** is a standing committee of the Council of **Township of North Huron**.

Each member of the **Blyth Business Improvement Area** has the right to nominate an owner or employee of a business or property (or their designate) to stand for election to the Board of Management of the **BBIA** according to requirements set out in the Municipal Act 2001 and **Township of North Huron** By-law # **NEW NUMBER TO BE ADDED HERE ONCE THIS DOCUMENT RECEIVED.**

Only members and associate members in good standing of BBIA have the right to vote for representatives to the Board of Management of BBIA and to vote on issues brought to a General Meeting of the BBIA.

Board of Management and sub-committee work is on a volunteer basis. Neither Board members nor sub-committee members or their relatives can receive payment for work related to the BIA or its sub-committees apart from budgeted and receipted expenses for materials.

TERMS OF OFFICE

The Board's Term of Office runs concurrently with that of the Municipal Council appointing it – four (4) years, renewed annually at the Annual General Meeting. There is a minimum of seven (7) and a maximum of eleven (11) members appointed to the Board of Management.

RESPONSIBILITIES OF THE BOARD OF MANAGEMENT

The Board of Management is responsible for:

1. Drafting and approving Policies and Procedures to ensure the effective operation of **BBIA** and amending these Policies and Procedures as necessary.
2. Ensuring Board Policies and Procedures are implemented effectively.
3. Acting as a legal entity to enter into contracts required by the activities of the Board, such as the maintenance, beautification, promotion and advertising of the Business Improvement Area.
4. Electing an Executive who will also act as Signing Officers for the Board.
5. Drafting an annual budget for presentation to **BBIA** membership for approval, submitting the approved budget to **Township of North Huron** and implementing the annual budget as approved by the Municipal Council.
6. Ensuring that financial transactions are appropriately carried out, that records of all financial transactions are maintained and that these records are audited annually by the auditing firm specified by **Township of North Huron**.
7. Ensuring that minutes of all Board and Executive meetings are recorded and distributed to **Township of North Huron** and the BIA membership, a minimum of three days in advance of the following Board of Management meeting.
8. Establishing sub-committees and appointing representatives to those sub-committees as required to deal with issues identified by the Board or as requested by the Township of North Huron.
9. Hiring staff to carry out the Board's directives.

10. Maintaining communication with the members regarding its activities, including but not limited to, arranging General Meetings of the membership.
11. All other activities necessary to the effective operation of the Board and the **BBIA**.

APPOINTMENT TO THE BOARD OF MANAGEMENT

The Council of **Township of North Huron** appoints members to the Board as follows:

1. One (1) member appointed from the elected Councillors of the **Township of North Huron**; AND
2. A minimum of six (6) and a maximum of ten (10) members appointed by the members of the **Blyth Ward** from those elected by **BBIA** membership at a General Meeting.

The Board of Management may appoint delegates (with voting privileges) to the Board at its own discretion under the following structure:

1. A maximum of one (1) member appointed as delegate from the Blyth Centre for the Arts
2. A maximum of one (1) member appointed as delegate from the Blyth Service Organizations (e.g. Blyth Lions Club, Royal Canadian Legion Branch 420, Blyth or Legion Ladies Auxiliary to Br.420)
3. A maximum of one (1) member appointed as delegate from the Blyth Church Organizations.
4. A maximum of one (1) member appointed as delegate from the Associate Voting Members.

A majority of the voting members on the Board must be rate-paying members.

Board members may resign by notice in writing that shall be effective upon any time or date requested. Notice must be sent to the Clerk of the Township of North Huron as soon as possible.

VACANCIES

The seat of a member of the Board of Management may become vacant if the member is absent for three (3) consecutive meetings. Upon 30 days notice in writing to the absent member, the Board may pass a motion authorizing the removal of such member and only then will the member cease to be a member of the Board of Management.

Where a vacancy on the Board occurs for any reason, a person qualified to be a member may hold office for the remainder of the term for which his or her predecessor was appointed. Such interim members must be confirmed by a resolution of the Board of Management and appointed by the Council of the **Township of North Huron**.

ELECTIONS

It is the responsibility of **BBIA** members to register their voting delegate before the election process begins. The names of those Board members continuing their term must appear on the ballot. A voting delegate must make nominations from the floor with a seconder. If desired, the Chair for the purpose of counting ballots may appoint one or more scrutineers (who need not be members,). Only one delegate per business member can be nominated for election at any one time.

OFFICERS

The Board of Management will elect the Chair, Vice-Chair, Secretary and Treasurer from within the Board of Management on an annual basis. These officers shall form the Executive Committee. The Executive Committee shall have the authority to act for the Board of Management in the intervals between Board meetings on such matters as may be necessary to conduct the business of the **BBIA**.

There shall be four (4) officers on the Board of Management's, Executive Committee as follows:

Chair shall have the general management and direction, subject to the authority of the Board, of the business and affairs of the **BBIA** and be responsible for setting Board of Management Meeting Agendas.

Vice-chair will assume the duties of the Chair if absence or disability occurs.

Secretary will be responsible for Minutes of all Board of Management and Executive Meetings.

Treasurer will be responsible for Financial Statements and related materials with an account of all transactions being presented to the Board on a monthly basis.

MEMBERSHIP

Each member has one vote regardless of the number of properties or businesses owned by any member.

BOUNDARIES

See the Blyth & Area Business Improvement Area Constitution for specific details of **BBIA** boundaries.

COMMERCIAL & INDUSTRIAL PROPERTY OWNERS

Membership of the organization shall consist of all business (commercial and industrial) property owners and businesses located and/or operating within the designated **Blyth Business Improvement Area** boundaries as well as associate members in good standing.

All businesses within the designated area are assessed for a special levy that is collected by the **BBIA** to support the activities of the **BBIA**. The Levy is not charged on vacant properties in Blyth. For the purposes of this By-Law, vacant is defined as free of all buildings and structures as defined in the Ontario Building Code.

ASSOCIATE MEMBERS

Associate members are representatives from businesses in the area surrounding but not included in existing **BBIA** boundaries. Associate membership is achieved by a paid annual membership fee that is set annually equal to the minimum levy rate.

NEW MEMBERS

All new member businesses are to be presented with a "New Members Kit" personally by a member of the Board of Management. At this time their preferred method of communication – e-mail, fax or phone should be ascertained

DELEGATIONS

Any member of the **BBIA** may ask that issues or items of interest be placed on the agenda of the **BBIA** for discussion and/or resolution. This includes a request to make a deputation or presentation. They may contact any **BBIA** Board member or the Township of North Huron Council Representative by noon on the Friday immediately before the regular meeting date for inclusion of an item on an upcoming agenda.

MEETINGS

BOARD OF MANAGEMENT MEETINGS

Meetings will be at the call of the Chair, a minimum of 7 per fiscal year.

Meetings will be open to any member of the **BBIA** or the public who may attend but may not take part in the proceedings unless invited to do so by the Chair.

ORDER OF BUSINESS/AGENDA

1. Call to Order
2. Confirmation of the Agenda
3. Disclosure of Pecuniary Interest
4. Public Meetings/Delegations
5. Motion to receive minutes of prior meeting
6. Business arising
7. Correspondence
8. Financial Report
9. North Huron Council Report
10. Committee Reports
11. Other Business
12. Closed Session (if required)
13. Adjournment

The agenda will be circulated a minimum 48 hours in advance of the regular meetings (See Annual General Meeting for its specific guidelines). A copy will be shared with the Clerk of the Township of North Huron via email at the same time.

CHAIR VOTING / TIES

At all meetings of the Board every question shall be decided by a majority of the votes cast on the questions, done by a show of hands. The Chair is a voting member of the **BBIA**. A tie vote defeats the motion.

As a committee of the Council, the Board should base their decision-making process and rules of order for meetings on the procedures used by the Council of **Township of North Huron**. The Council uses Robert's Rules of Order as a basis for their proceedings.

In order to represent the entire interests of the **BBIA** membership, decisions regarding the business and operation of the BIA are not made in isolation or by individuals (except where explicitly stated elsewhere in the Constitution or By-Laws) but as a result of shared information, discussion and majority agreement by the Board of Management as a whole and when appropriate, in consultation with its members. Executive Committee meetings, when held, should adhere to a similar intent.

QUORUM.

Quorum is a simple majority.

DECISION-MAKING

Decisions made at a prior time can only be revisited if a request by 2/3 of the Board of Management approve 1) the issue is warranted and 2) allotment of time to do so.

IN CAMERA (CLOSED) SESSIONS

All meetings of the **BBIA** shall be open to the public except as provided for in Section 239 of the Municipal Act, S.O. 2001, or the Ombudsman Act.

The Board may retire to an in camera session to consider matters of finance and personnel provided that prior to moving in camera a resolution is passed stating:

- a) the fact that the Board is convening into closed session; and,
- b) the general nature of the matter to be discussed.

According to Municipal Act, Section #239 the only matters to be considered in camera are as follows:

- a) security of the property of the **BBIA**;
- b) personal matters about an identifiable individual;
- c) proposed or pending acquisition or disposition of land or property by the **BBIA**;
- d) labour relations or employee negotiations;
- e) litigation or potential litigation affecting the **BBIA**;
- f) advice that is subject to solicitor-client privilege.
- g) A matter in respect of which a Council, Board, Committee or other body may hold a closed meeting under another Act;
- h) Information explicitly supplied in confidence to the **BBIA** by Canada, a province or territory or a Crown agency of any of them;
- i) A position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the **BBIA**.

When a Closed Session is necessary, it will be a requirement that the minutes shall be prepared and approved at the next scheduled Closed Session.

The Clerk of the Township of North Huron shall be responsible for maintaining a confidential copy of all original documentation distributed, relating to closed sessions, and for keeping confidential minutes of all closed sessions.

EXECUTIVE MEETINGS

All decisions are subject to approval and ratification at the next Board of Management meeting. A minimum of three executive members must be present to constitute quorum. All meetings of the Executive Committee shall be at the call of the chair to conduct business as necessary. Minutes must be taken and presented at the next Board of Management meeting.

ANNUAL GENERAL MEETINGS AND/OR SPECIAL GENERAL MEETINGS

Before the last day of February in each calendar year the Board of Management will call and hold one Annual General Meeting. At this meeting the budget will be approved by the membership and forwarded to the Township of North Huron for final approval in their annual budget to be passed in March annually.

Membership should receive written notice of the Annual General Meeting not less than 10 days prior to the meeting date and public notice must appear in one (1) local newspaper prior to the meeting date. The accidental omission to give notice to any member, Board member officer or auditor shall not invalidate any action taken at any meeting held pursuant to such notice.

An agenda for the Annual General Meeting with copies of the financial statements (unaudited) of the most recently ended full fiscal year should be distributed to the general membership not less than 10 days prior to the meeting.

At each Annual General Meeting financial statements for the previous year and proposed budgets for the next calendar year must be presented and approved by a majority of the membership present, after which time the figures will be put before Council and the levy requested.

The Board may also call and hold at any time one or more Special General meeting(s) to deal with special issues or to update the organization membership.

All members are entitled to voting privileges at the Annual General Meeting or Special General Meetings, one vote per member. Written proxies only are permitted.

The members may, by resolution passed by at least two thirds (2/3) of the votes cast at a Special Meeting of Members called for that purpose, remove any Member of the Board before the expiration of his/her term of office and may, by majority vote at that meeting, elect any person in his/her place for the remainder of the term.

A petition signed by 10 or more members of **BBIA** is sufficient to order a Special Meeting within 10 days of receipt of that petition by the Executive.

SUB-COMMITTEES

BBIA sub-committees help the Board to plan and administer approved initiatives, projects or to examine specific areas of concern. They operate with the same procedures as the BBIA Board of Management with respect to circulating agendas, minutes, notice of meetings and the like.

Sub-committees propose initiatives and suggest expenditures for approval by the Board. Sub-committees have no independent financial standing and must submit estimated project budgets and basic income and expense reports to the Board. Similarly, if sub-committees contract out work related to their activities the Board must approve the expense and those employed.

Ultimate responsibility for their activities rests with BBIA Board of Management which must therefore receive written reports on sub-committee activities five days prior to the monthly board meeting to be distributed with the Agenda of the upcoming meeting.

Sub-committee members are confirmed by a vote of the BBIA Board of Management. Membership of the BBIA is not required for all sub-committee members; a minimum of one BBIA member in good standing will sit on all sub-committees. As a committee, members are expected to work closely with the Board of Management.

CHAIR IS ABSENT

In the absence of the Chair, or if his/her office is vacant or if he/she refuses to act, the B.I.A. Vice-Chair shall assume the chair, or if the B.I.A. Vice-Chair is not available or is unwilling or unable to act, then the B.I.A. Board of Management may from among its members appoint a Chair who, during such absence or vacancy or refusal to act, shall have the powers of the Chair.

IF NO QUORUM PRESENT

Where a quorum is not present within 20 minutes after the hour fixed for a meeting, the Recording Secretary shall record the names of the Members of the Board of Management present and the meeting shall stand adjourned until the next meeting unless all in attendance agree to continue with the meeting for information and discussion purposes only as no actions can be taken. Notes will be recorded and shared at the next meeting.

DECLARATION OF INTEREST

At the beginning of each meeting, as an agenda item, it shall be the duty of every Board member who is in any way, whether directly or indirectly, interested in a contract or arrangement that may be an item to be discussed by the Board and has some financial benefit to the Board member, either directly or indirectly, to declare this interest and not participate in the discussion and voting. This applies to a personal self-interest and the interests of any spouse, children, parents, parents-in-law or siblings.

MINUTES

Minutes of the B.B.I.A. whether it is closed to the public or not, shall record:

1. The date, time and place of the meeting;
2. The record of attendance of the members;
3. The correction and adoption of the minutes of prior meeting(s);
4. All resolutions and decisions;
5. All the other proceedings of the meeting without note or comment, whether it is closed to the public or not;
6. A list of other business items discussed.

After the minutes have been adopted, they will be signed by the recording secretary.

FINANCES

Fiscal Year: The fiscal year of **BBIA** is from January 1st to December 31st. The proposed budget approved by the membership at the Annual General Meeting must be set out for the new calendar year and be followed without major modifications. Spending and debt may not exceed the time limits of the calendar year, except where approved at a regularly scheduled AGM or Special General Meeting and with the concurrence of **Township of North Huron**.

Expenditures by the Board of Management

BBIA funds can only be used for improvements to publicly owned property, not individual businesses or private properties. The common funds must be used for the common good. Please refer to "Purpose" in the Constitution for an outline of mandated activities.

Any expenditure not approved in the budget over \$200.00 must be approved by a quorum at a Board meeting.

If the expenditure is required to conduct immediate business, then the Executive Committee may be called upon to approve.

Approval of Financial Transactions

Signing authority:

In order to ensure that the **BBIA** can function effectively, and that there is adequate financial control by the Board, there are two levels of approval established for financial transactions.

Level 1: Approval by two of the Officers of the Board of Management

Level 2: Approval by the Board of Management

Level 1 Approval:

An Officer of the **BBIA** can make a financial transaction to a maximum of \$750.00 at the discretion of one (1) additional Officer of the Board without prior consultation with, or approval by, the Board of Management provided that:

- a) the purchase is one that was included in the approved budget; and
- b) the purchase does not result in an overage in the budget item; and
- c) two officers of the Board approve the purchase in writing only;
- d) the purchase is reported to the Board at its next meeting.

Level 2 Approval

An Officer of **BBIA** can make a financial transaction of over \$750.00 only at the direction of the Board and provided that:

- a) the purchase is one that was included in the approved budget and
- b) the purchase has been approved by motion at a meeting of the Board of Management and the approval is documented in the Minutes of the Meeting or
- c) the expense is fixed and pre-approved as in the instance of monthly rent.

Note: If any purchase at Level 1 or Level 2 has not been previously approved in the annual budget, or if it will result in budget overrun, the Board must give its approval prior to such a purchase.

BILL 68

Board of Management members may join a meeting remotely and may participate in discussions but do not count as quorum and do not have a vote on Motions.

Subsection 238 (3.2) of the Municipal Act restricts a member of the board or of a committee from participating electronically in a meeting which is closed to the public.

DECORUM

Every Member when speaking shall address the Chair unless otherwise directed from the Chair. No Member shall speak longer than five (5) minutes on any one question.

SALE OF LAND

Every municipality and local board with authority to sell land shall pass a by-law establishing procedures, including the giving of notice to the public, governing the sale of land. (Municipal Act, 2001, S.O. 2001, c.25, as amended, Section 268).

Before selling any land, every municipality and local board shall:

- a) by by-law or resolution, declare the land to be surplus;
- b) obtain at least one appraisal of the fair market value of the land; and
- c) give notice to the public of the proposed sale.

OTHER PROCEDURES

In the absence of clauses in the Constitution or this By-Law, the Blyth & Area Business Improvement Area (BBIA) will adhere to the Municipal Act and the policies and procedures of the Township of North Huron.

ADOPTED BY BLYTH BUSINESS IMPROVEMENT AREA THIS ____ DAY OF FEBRUARY, 2018 IN THE VILLAGE OF BLYTH.

Chair - Karen Stewart

Secretary - Gil Garratt

ADOPTED BY THE TOWNSHIP OF NORTH HURON THIS ____ DAY OF _____, 2018.

Reeve - Neil Vincent

Clerk - Richard Al

THE CORPORATION OF THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 53-2018

A By-law to implement a minimum and maximum charge for the
Blyth Business Improvement Area.

WHEREAS Section 204 of the Municipal Act, 2001, S.O. 2001 c. 25 as amended, provides that a local municipality may designate an area as an improvement area and establish a board of management;

AND WHEREAS the Council of the Corporation of the Township of North Huron has passed By-law No. 46-2011 to establish the Blyth BIA;

AND WHEREAS Section 208 (3) of the Municipal Act, 2001, S.O. 2001, c. 25 as amended, permits councils of municipalities to establish a minimum or maximum charge or both, expressed for one or more separately assessed properties or categories of separately assessed properties in a prescribed class for a Business Improvement Area;

AND WHEREAS Section 208 (2) of the Municipal Act, 2001, S.O. 2001, c. 25 as amended, states that the municipality may establish a special charge by levy upon rateable property in the improvement area that is in a prescribed business property class and that in council's opinion, derives special benefit from the improvement area, which levy may be calculated using different percentages of the assessment for one or more separately assessed properties or categories of separately assessed properties in the prescribed class if the resulting levy is equitable in accordance with the benefits that, in council's opinion, accrue to the properties from the activities related to the improvement area;

AND WHEREAS the Blyth BIA is desirous of adopting a minimum BIA levy in the amount of \$125.00 and a maximum levy of \$250.00;

AND WHEREAS the Blyth BIA is desirous of adopting a multi-unit minimum levy where the owner will be billed one minimum bill for each separate tenant calculated on the number of eligible tenants listed as required under Section 210 (2) and identified as a clearly delineated or physically separated portion of the building;

NOW THEREFORE, the Council of the Corporation of North Huron enacts as follows:

1. That the Council of the Township of North Huron adopts a minimum Blyth BIA levy in the amount of \$125.00 and a maximum levy of \$250.00.

2. That the Council of the Township of North Huron adopts a multi-unit minimum Blyth BIA levy where the owner will be billed one minimum bill for each separate tenant calculated on the number of eligible tenants listed as required under Section 210 (2) and identified as a clearly delineated or physically separated portion of the building.
3. That this By-law shall come into force and take effect on the day of the final passing thereof.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk

**THE CORPORATION OF THE
TOWNSHIP OF NORTH HURON**

BY-LAW NO. 54-2018

A by-law to authorize the Reeve and Clerk to sign, on behalf of Council, a Memorandum of Understanding between the Corporation of the Township of North Huron and the Alice Munro Festival of the Short Story Committee.

WHEREAS the Municipal Act, 2001, S.O. 2001, c. 25, as amended permits the Councils of all municipalities to enter into certain agreements;

AND WHEREAS the Council of the Corporation of the Township of North Huron is desirous of executing a Memorandum of Understanding, between the Corporation of the Township of North Huron and the Alice Munro Festival of the Short Story Committee;

AND WHEREAS the Council of the Corporation of the Township of North Huron deems it expedient to enter into said Memorandum of Understanding;

NOW THEREFORE, the Council of the Corporation of North Huron enacts as follows:

1. That the Reeve and Clerk are hereby authorized to sign on behalf of Council, a Memorandum of Understanding, between the Corporation of the Township of North Huron and the Alice Munro Festival of the Short Story Committee.
2. That a copy of the said Memorandum of Understanding is attached hereto and designated as Schedule ‘A’ to this By-law.
3. That this By-law shall come into force and take effect on the day of the final passing thereof.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk

MEMORANDUM OF UNDERSTANDING

MEMORANDUM

Dated: , 2018

Between:

The Alice Munro Festival of the Short Story Committee (the Committee)

AND

The Corporation of the Township of North Huron (the Township)

WHERE AS:

The Alice Munro Festival was initiated as an event hosted by the Wingham and District Horticultural Society, and has significant ties to the Town of Wingham both as an established local event, and because of Wingham's ties to Alice Munro;

AND FURTHER THAT the event has expanded in scope to include a planning committee and event that encompasses other communities in Huron County;

AND FURTHER THAT the Township has traditionally supported this event due to its impact on tourism, but no longer is desirous of having the board operate as a Committee of Council;

The parties have come together to establish this Memorandum of Understanding to clarify the roles and responsibilities of each.

THIS MEMORANDUM OF UNDERSTANDING (MOU)

a) COMMENCEMENT

The MOU becomes effective when signed and dated by both parties.

b) DURATION

This MOU will continue indefinitely until terminated in accordance with Section 8 or until such time as the Alice Munro Festival of the Short Story ceases to exist, or until such time as a revision of this Memorandum of Understanding is signed by both parties, replacing this MOU agreement.

c) MODIFICATIONS

Additions or modifications to this MOU must be made in writing and signed by the authorized representatives of both parties.

1. INTENT OF THIS MOU:

- The purpose of this Memorandum is to provide a framework for the relationship between the Alice Munro Festival of the Short Story Committee and the Township of North Huron.

2. THE ROLE OF ALICE MUNRO FESTIVAL OF THE SHORT STORY COMMITTEE

- The role of the Committee is to host an annual event *The Alice Munro Festival of the Short Story*. One day of the event will be hosted in the Town of Wingham due to the historical connection between the author Alice Munro, and the Town of Wingham. Additional days or activities of the event may be hosted in North Huron or in another Huron County community.
- The Committee operates independently of the Township. It is not a Committee of Council or a committee of the Township of North Huron. The committee is responsible for their own activities and finances, and is not covered under Township of North Huron insurance.
- The Committee is responsible for all activities of their volunteers, vendors, guests, and public attending this event.

3. RESPONSIBILITIES OF THE TOWNSHIP OF NORTH HURON AND THE ALICE MUNRO FESTIVAL OF THE SHORT STORY COMMITTEE.

- The Council of the Township of North Huron will consider a financial contribution to the Festival, on an annual basis as part of their budget process. In exchange the Township of North Huron would be recognized as a sponsor of the event.
- Under the provisions of the North Huron Donation and Fee Waiving Policy the committee will be provided with meeting space for planning meetings of the committee. Although the fee for the space is waived, the committee is required to acquire a rental permit from the Township for use of the space.
- Rental fees waived for use of the Town Hall Theatre in Wingham. Although the fee for the space is waived, the committee is required to acquire a rental permit from the Township for use of the space. All conditions under the rental contract must be complied with by the committee. The committee will cooperate with the Township to reduce the "hard costs" associated with the use of

this space. Volunteers of the committee will assist with set up and take down, and return the facility in the condition it was assumed by the Committee.

- The Committee will comply with all Federal, Provincial and Municipal By-Laws and resolutions particularly those pertaining to games of chance, lotteries, gambling, special events, and alcoholic beverages.
- The Committee must apply for any required tent permits or licenses from the Township of North Huron for their event.
- The Committee will assign one position to a North Huron Council Representative on the committee. North Huron Council will appoint that Council Representative annually. Their role is to attend meetings and be a liaison between the Committee and Township Council and staff.
- The Committee is responsible for the conduct and supervision of all persons admitted to the facilities and shall see that all regulations are strictly enforced. The Committee will ensure that all persons admitted to the function being held vacated the permitted facilities and that all privately-owned property and personal affects have been removed by the time specified. Return the facilities to the Township in the condition they were prior to the event.

4. INDEMNITY

- The Alice Munro Festival of the Short Story Committee shall indemnify the Township of North Huron from fines, suits, claims, demands from any loss, damage, or injury suffered by any Committee/Volunteer member resulting from negligence, willful misconduct or default on the part of the Alice Munro Festival of the Short Story Committee.

5. INSURANCE

- The Festival and the Committee are not covered under the Township of North Huron insurance.
- The Alice Munro Festival of the Short Story Committee will obtain its' own liability insurance coverage. Annually the Committee will provide the Township of North Huron with a' proof of insurance certificate', naming the Township of North Huron as an additional insured.
- General Liability insurance is required for Alice Munro Festival of the Short Story with minimum \$5,000,000 limit per occurrence for bodily injury or property damage, showing the Corporation of the Township of North Huron as additional insured and containing cross liability/severability if interest clause.
- Insurance for all equipment rented by the Committee must be covered by the insurance policy.
- Actions of all Committee members and volunteers must be covered under the General Liability policy.
- Vendors and suppliers of the event, operating on Township property, must show proof of their own General Liability insurance with minimum \$2,000,000 limit per occurrence for bodily or property damage, showing the Corporation of the Township of North Huron as additional insured.
- Submit the proof of insurance certificate(s) for review by the Township insurance company to confirm coverage at least 30 days prior to the event.

6. NOTICES

- Notices must be in writing, signed by, or on behalf of the sender. The notices must be addressed to the recipient and delivered to the recipient's address either by pre-paid mail, facsimile or email. Any facsimile or email delivery requires confirmation of receipt by the sender.

7. DISPUTE RESOLUTION

- If a dispute arises regarding the intention and or interpretation of this MOU, the issue shall be resolved between The Alice Munro Festival of the Short Story Committee Chair and the Director of Recreation and Facilities of the Township of North Huron through a discussion. If a resolution cannot be reached, the dispute can be referred to the Council of the Township of North Huron for a decision. Both parties, (the Alice Munro Festival of the Short Story Committee Chair and the Director of Recreation and Facilities of the Township of North Huron) can request the intervention of the Council.

8. TERMINATION

- Either party may terminate this arrangement without cause, by giving at least six (6) months' notice, or any period as may be mutually agreed to, with written notice to the other party.

EXECUTED AS A MEMORANDUM OF UNDERSTANDING

SIGNED for and on behalf of

THE ALICE MUNRO FESTIVAL OF THE SHORT STORY
By

Signature Date:_____

Print Name Date:_____

Witness Date:_____

Print Name: _____

SIGNED for and on behalf of

THE TOWNSHIP OF NORTH HURON

Neil Vincent, Reeve

Date: _____

Richard AI, Clerk

Date: _____

THE CORPORATION OF THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 47-2018

A by-law for the purposes of levying and collecting rates for various purposes and provide for the payment of taxes and to provide for penalty and interest.

WHEREAS Section 290 of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, requires the Council of the local municipality, in each year, to prepare and adopt estimates of all sums required during the year for the purposes of the municipality;

AND WHEREAS Section 312 (2) of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, provides that for the purposes of raising the general local municipality levy, a local municipality shall, each year, pass a by-law levying a separate tax rate, as specified in the by-law, on the assessment in each property class in the local municipality rateable for local municipality purposes;

AND WHEREAS the County of Huron, under the provisions of Section 308, 311 and 312 of the Municipal Act 2001, S.O. 2001, c. 25, as amended, has by By-Law #-2018-018 established a county tax levy and tax ratios for 2018;

AND WHEREAS the Minister of Finance has established the 2018 property tax rates under the Education Act R.S.O. 1990;

AND WHEREAS Section 326 of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, authorizes a municipality to levy and collect amounts for special area rates;

AND WHEREAS Section 342 of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, authorizes a municipality to pass a by-law to set due dates for instalments;

AND WHEREAS Section 345 of the Municipal Act, 2001, S.O. 2001, c. 25, as amended, provides that a municipality may pass a by-law to impose late payment charges for the non-payment of taxes or any instalment by the due date.

NOW THEREFORE, the Council of the Corporation of North Huron enacts as follows:

1. That the 2018 Township of North Huron Budget is hereby adopted with a levy totaling \$5,528,799.93 for general municipal purposes and is attached hereto as Schedule 'A' to this By-law.
2. That the assessment contained in the assessment roll for the Township of North Huron compiled during the year 2017 and returned on December 12, 2017, is hereby adopted and confirmed as the assessment on which taxes for the year 2018 shall be levied.
3. That the tax rates as per Schedule 'B' attached hereto shall be levied and charged in 2018.
4. That the 2018 Wingham BIA Budget is hereby adopted with a levy totaling \$27,500.00 and is attached hereto as Schedule 'C' to this By-law.
5. That the 2018 Blyth BIA Budget is hereby adopted with a levy totaling \$7,500.00 and is attached hereto as Schedule 'D' to this By-law.
6. There shall be two instalments and the due dates for the final taxes shall be September 27, 2018 and November 27, 2018. The total bill shall be reduced by the Interim Tax billing.
7. A penalty of one and one quarter percent (1.25%) per month shall be added to each installment on the first day of default and on the first day of each month thereafter that the default continues, until December 31, 2018.

8. On all taxes of the final tax levy in default on January 1, 2019, interest shall be added at the rate of 1.25% per month for each month or fraction thereof in default.
9. Penalties and interest added on all taxes of the final levy in default shall become due and payable and shall be collected forthwith as if the same had originally been imposed and formed part of such unpaid final tax levy.
10. The Treasurer may mail or cause the same to be mailed (by regular mail or electronic mail) to the residence or place of business of such person indicated on the last revised assessment roll, a written or printed notice specifying the amount of taxes payable.
11. The notice to be mailed under this by-law shall contain the particulars provided for in this by-law and the information required to be entered in the Collector's roll under Section 340 of the Municipal Act, R.S.O., 2001.
12. Nothing in this by-law shall prevent the Treasurer from proceeding at any time with the collection of any tax, or part thereof, in accordance with the provisions of the statutes and by-laws governing the collection of taxes.
13. In the event of any conflict between the provisions of this by-law and any other by-law, the provisions of this by-law shall prevail.
14. Payment of taxes may be made at the Township of North Huron Municipal Office and at most financial institutions. Payments can also be made by telephone/internet banking and monthly pre-authorized payments are also available.
15. This by-law shall come into force and take effect on the day of the final passing thereof.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk

TOWNSHIP OF NORTH HURON



**2018 Draft Budget
May 22, 2018**

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Township of North Huron					
SCHEDULE "A"	2017	2017	2018	Budget \$	Budget - Actual
	Budget	Actuals	Budget	Variance	% Change
Revenue					
General Government					
General Government	1,567,802.00	1,780,692.73	1,603,450.00	35,648.00	-9.95%
Members of Council		1,576.27		-	-100.00%
Administration	135,461.00	110,762.44	46,000.00	(89,461.00)	-58.47%
Rental Property Red Cross				-	
Protection to Persons				-	
Fire	325,078.00	337,120.73	331,367.00	6,289.00	-1.71%
FPO & NH ONLY	5,000.00	630.00	600.00	(4,400.00)	-4.76%
ESTC	208,079.00	134,013.24	25,550.00	(182,529.00)	-80.93%
Police	93,787.00	120,764.20	115,088.00	21,301.00	-4.70%
Conservation Authority				-	
Building Department	156,607.00	159,032.53	149,885.00	(6,722.00)	-5.75%
Property Standards		80.00	100.00	100.00	25.00%
Animal Control	11,800.00	9,320.00	10,600.00	(1,200.00)	13.73%
Emergency Planning				-	
Transportation Services				-	
Public Works (New)	1,394,300.00	1,856,962.50	527,710.00	(866,590.00)	-71.58%
Streetlighting	546,515.00	7,572.75	6,555.00	(539,960.00)	-13.44%
Air Transportation	99,748.00	101,887.94	94,524.00	(5,224.00)	-7.23%
Environmental Services				-	
Sanitary Sewer	1,431,768.00	1,080,594.29	1,126,149.00	(305,619.00)	4.22%
Waterworks	1,721,664.00	1,343,216.16	1,478,352.00	(243,312.00)	10.06%
Storm Sewer					
Waste Diversion/Disposal	282,000.00	392,082.24	332,750.00	50,750.00	-15.13%
Health Services				-	
Cemeteries	114,550.00	98,522.38	113,375.00	(1,175.00)	15.08%
Social & Family Services				-	
Child Care	744,840.00	805,659.09	811,914.00	67,074.00	0.78%
Early Learning	87,276.00	164,355.04	156,378.00	69,102.00	-4.85%
Before & After - Maitland	155,996.00	163,820.40	175,082.00	19,086.00	6.87%
Before & After - Sacred Heart	31,234.00	30,620.47	42,433.00	11,199.00	38.58%
Early Years	86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Recreation & Cultural				-	
Parks - W	15,600.00	18,541.65	5,711.00	(9,889.00)	-69.20%
Parks - B	1,050.00	1,168.31	1,050.00	-	-10.13%
Trailer Park - W	9,778.00	9,943.08	9,778.00	-	-1.66%
Campground - B	22,390.00	36,928.83	27,350.00	4,960.00	-25.94%
Rec Programs	81,477.00	74,787.04	70,480.00	(10,997.00)	-5.76%
Aquatic Programs/Pool	490,919.00	149,668.07	158,332.00	(332,587.00)	5.79%
Fitness Programs/Facility	175,706.00	172,635.21	158,884.00	(16,822.00)	-7.97%
Rec Admin	46,500.00	54,869.26	56,100.00	9,600.00	2.24%
Complex Admin		250.00		-	-100.00%
Arena - W	319,255.00	334,353.46	226,625.00	(92,630.00)	-32.22%
Concession - W	32,800.00	27,513.46	16,000.00	(16,800.00)	-41.85%
Pool - W		332,233.66		-	-100.00%
Fitness - W				-	
KOC Hall	39,500.00	39,800.00	39,500.00	-	-0.75%
Arena - B	142,268.00	144,511.55	128,400.00	(13,868.00)	-11.15%
Concession - B	31,800.00	24,757.42	15,200.00	(16,600.00)	-38.60%
Hall - B	15,284.00	12,490.21	15,284.00	-	22.37%
Arena - E/W	13,305.00	13,794.48	14,029.00	724.00	1.70%
Library - W	15,000.00	15,000.00	15,000.00	-	0.00%
Library - B	9,996.00	9,999.96	9,996.00	-	-0.04%
Museum	20,450.00	21,387.52	8,015.00	(12,435.00)	-62.52%
Memorial Hall	2,493,697.00	2,549,133.21		(2,493,697.00)	-100.00%
Blyth Meeting Room				-	
Community Development			68,008.00	68,008.00	
Planning & Zoning	23,200.00	33,766.98	9,500.00	(13,700.00)	-71.87%
Drainage	15,900.00	18,497.28	17,650.00	1,750.00	-4.58%
Capital Revenue			1,103,992.00	1,103,992.00	
TOTAL REVENUE	13,215,863.00	12,899,762.83	9,457,746.00	(3,758,117.00)	-26.68%
Expenditures					
General Government				-	
General Government	124,804.00	253,727.94	252,785.00	127,981.00	-0.37%
Members of Council	96,000.00	97,668.60	98,000.00	2,000.00	0.34%
Administration	1,062,913.00	1,026,087.07	989,342.00	(73,571.00)	-3.58%
Rental Property Expense				-	
Protection to				-	
Persons & Property				-	
Fire	625,077.00	651,877.61	629,467.00	4,390.00	-3.44%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

	2017	2017	2018	Budget	Budget - Actual
	Budget	Actuals	Budget	Variance	% Change
FPO & NH ONLY	151,494.00	132,611.48	126,596.82	(24,897.18)	-4.54%
ESTC	259,926.00	185,860.24	150,919.00	(109,007.00)	-18.80%
Police	1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
Conservation Authority	84,840.00	84,840.00	86,161.00	1,321.00	1.56%
Building Department	217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%
Property Standards	15,796.00	9,283.87	15,796.00	-	70.14%
Animal Control	6,000.00	1,712.61	4,000.00	(2,000.00)	133.56%
Emergency Planning	5,075.00	8,925.86	4,000.00	(1,075.00)	-55.19%
Transportation Services				-	
Public Works (New)	2,898,211.00	3,323,901.90	2,092,573.11	(805,637.89)	-37.04%
Streetlighting	695,710.00	168,931.63	158,856.00	(536,854.00)	-5.96%
Air Transportation	99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%
Environmental Services				-	
Sanitary Sewer	1,431,768.00	1,080,595.29	1,027,308.00	(404,460.00)	-4.93%
Waterworks	1,721,664.00	1,349,124.98	1,261,379.00	(460,285.00)	-6.50%
Storm Sewer	38,470.00	23,824.17	55,998.00	17,528.00	135.05%
Waste Disposal/Diversion	557,975.00	624,827.61	510,268.00	(47,707.00)	-18.33%
Health Services				-	
Cemeteries	153,477.00	141,303.66	146,133.00	(7,344.00)	3.42%
Social & Family Services				-	
ChildCare	809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
Best Start				-	
Early Learning	91,403.00	148,208.01	141,316.00	49,913.00	-4.65%
Before & After - Maitland	106,177.00	80,243.69	110,411.00	4,234.00	37.59%
Before & After - Sacred Heart	29,446.00	22,633.06	30,672.00	1,226.00	35.52%
Early Years	86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Recreation & Cultural				-	
Parks - W	163,665.00	133,877.44	145,862.00	(17,803.00)	8.95%
Parks - B	48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%
Parks - EW	4,052.00	967.92	3,302.00	(750.00)	241.14%
Trailer Park - W	14,207.00	8,067.90	11,708.00	(2,499.00)	45.12%
Campground - B	68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%
Rec Programs	79,865.00	72,367.59	71,073.00	(8,792.00)	-1.79%
Aquatic Programs/Pool	820,110.00	797,159.52	463,947.00	(356,163.00)	-41.80%
Fitness Programs/Facility	194,333.00	183,295.09	175,712.00	(18,621.00)	-4.14%
Rec Admin	422,577.00	454,144.97	445,434.00	22,857.00	-1.92%
Complex Admin				-	
Arena - W	386,965.00	376,708.51	326,877.00	(60,088.00)	-13.23%
Concession - W	32,140.00	28,122.70	16,852.00	(15,288.00)	-40.08%
Pool - W				-	
Fitness - W				-	
KOC Hall	48,025.00	45,503.31	48,494.00	469.00	6.57%
Arena - B	244,944.00	249,083.12	244,970.00	26.00	-1.65%
Concession - B	31,299.00	24,306.80	15,602.00	(15,697.00)	-35.81%
Hall - B	75,863.00	53,487.31	81,593.00	5,730.00	52.55%
Arena - E/W	51,503.00	52,229.93	53,129.00	1,626.00	1.72%
Library - W	32,561.00	22,838.96	31,838.00	(723.00)	39.40%
Library - B	14,732.00	13,699.09	14,812.00	80.00	8.12%
Museum	48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%
Memorial Hall	2,557,356.00	2,610,992.34	63,571.00	(2,493,785.00)	-97.57%
Blyth Meeting Room				-	
Community Development	184,792.00	172,361.16	253,688.00	68,896.00	47.18%
Planning & Development	20,000.00	23,177.85	25,000.00	5,000.00	7.86%
Drainage	25,200.00	27,261.52	28,400.00	3,200.00	4.18%
Capital Expenditures			1,764,991.00	1,764,991.00	</

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

TOWNSHIP OF NORTH HURON - 2018 AREA RATING SCHEDULE - B							
	WINGHAM	BLYTH	EAST WAWANOSH	TOTAL	TAXATION AMOUNT	FLAT RATE	TOTAL RAISED
EXPENSES							
1. POLICING	1,449,840.00	167,937.00	155,018.00	1,772,795.00			
2. STREETLIGHTING	109,713.00	42,588.00		152,301.00		6,555.00	158,856.00
3. SANITATION				-			
4. RECYCLING							
SUBTOTAL	1,559,553.00	210,525.00	155,018.00	1,925,096.00			
5. COMPLEX				-			
6. LONG TERM				-			
TOTAL	1,559,553.00	210,525.00	155,018.00	1,925,096.00			
REVENUE OFFSETS							
LESS: S/L RESERVES				-			
LESS: OMPF FUNDING			10,000.00	10,000.00			
LESS: OPP REBATE				-			
LESS: POLICE REVENUE	115,088.00			115,088.00			
LESS: WESTARIO	17,200.00			17,200.00			
LESS: RESERVES				-			
LESS: RECYCLING REV				-			
LESS: POLICE RESERVES				-			
LESS: GAS TAX				-			
TOTAL	132,288.00	-	10,000.00	142,288.00			
TOTAL AREA RATED	1,427,265.00	210,525.00	145,018.00	1,782,808.00	3,739,436.93	6,555.00	5,528,799.93
	1,417,440.00					5,528,799.93	
	32,400.00						
	1,449,840.00						

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 General Government Budget							
			2017	2017	2018	Budget \$	Budget - Actual
Revenue			Budget	Actuals	Budget	Variance	% Change
1000	5100	Licences/Permits	5,000.00	5,862.30	5,500.00	500.00	
1000	5101	Marriage Licences	1,200.00	1,404.00	1,500.00	300.00	
1000	5102	Civil Marriages	3,000.00	2,250.00	3,000.00	-	
1000	5105	Fines				-	
1000	5115	Interest Income	37,000.00	53,199.08	37,000.00	-	
1000	5117	Penalty & Interest on Taxes	70,000.00	84,998.83	70,000.00	-	
1000	5118	Interest A/R Program	500.00	115.64	250.00	(250.00)	
1000	5120	Misc Revenue	8,000.00	27,047.17	8,000.00	-	
1000	5125	Transfer from Reserve	16,602.00	16,602.00	17,200.00	598.00	
1000	5125	Transfer from Reserve - SS				-	
1000	5200	Admissions/Rentals	3,000.00	12,568.89	3,000.00	-	
1000	5282	Unconditional Grants - OMPF	1,361,000.00	1,361,000.00	1,395,000.00	34,000.00	
1000	5286	Conditional Grants - Ontario				-	
1000	5288	Conditional Grants - Canada				-	
1000	5700	Tax Certificates	4,500.00	6,670.00	5,000.00	500.00	
9500	4020	Supplemental Revenue	3,000.00	21,659.31	3,000.00	-	
9500	4040	Payments In Lieu	55,000.00	79,483.64	55,000.00	-	
1000	5290	Shared Services - Revenue MT		1,139.05		-	
1000	5950	Sale of Land		106,692.82		-	
			1,567,802.00	1,780,692.73	1,603,450.00	35,648.00	-9.95%
						-	
Expenditures							
						0	
1000	6900	Principal Payment	71,443.00	71,442.99	73,585.00	2,142.00	
1000	6902	Interest Payment	16,764.00	16,764.37	14,777.00	(1,987.00)	
1000	6295	Transfer to General Reserves - Assets		126330.23	127,826.00	127,826.00	
1000	6290	Physician Recruitment	33,097.00	33,097.00	33,097.00	-	
1000	6340	Energy & Environment	3,500.00	3,300.08	3,500.00	-	
1000	6292	Shared Services Expenses - Admin		2,793.27		-	
						-	
			124,804.00	253,727.94	252,785.00	127,981.00	-0.37%
		Civil Marriage/Licences					

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Members of Council Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
1100	5290	Revenue from Other Mun		1,576.27			
Total Revenue				1,576.27			
Expenditures							
1100	6125	Benefits - Part Time	2,000.00	1,803.58	2,000.00	-	
1100	6150	Honorarium	72,000.00	72,519.00	72,000.00	-	
1100	6220	Training/Travel/Workshops	14,000.00	17,500.56	20,000.00	6,000.00	
1100	6292	Misc Expense	2,000.00	2,029.46		(2,000.00)	
1100	6293	Council Contingency	6,000.00	3,816.00	4,000.00	(2,000.00)	
						-	
Total Expenditures			96,000.00	97,668.60	98,000.00	2,000.00	0.34%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Administration Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
1210	5110	Donation - Theatre	1,500.00	7,705.00		(1,500.00)	
1200	5125	Transfer from Reserves	73,849.00	97,960.64	40,000.00	(33,849.00)	
1200	5125	Transfer from Reserves (Election)	24,112.00		5,000.00	(19,112.00)	
1200	5200	Admissions/Rentals	1,000.00	362.50	1,000.00	-	
1200	5280	Grants/Levies OCIF	32,000.00	4,050.00		(32,000.00)	
1200	5280	Trillium - Theatre Balance	3,000.00			(3,000.00)	
1200	5288	Gas Tax - Asset Management				-	
1200	5290	Revenue Other Municipalities - MT		684.30		-	
Total Revenue			135,461.00	110,762.44	46,000.00	(89,461.00)	-58.47%
						-	
						-	
Expenditures							
1200	6100	Salaries - Full Time	516,419.00	474,279.64	434,190.00	(82,229.00)	
1200	6120	Benefits - Full Time	149,762.00	121,194.49	125,915.00	(23,847.00)	
1200	6200	Clothing/Uniforms	910.00	687.74	910.00	-	
1200	6205	Meeting Allowance	5,800.00	4,100.00	5,800.00	-	
1200	6210	Subscriptions/Memberships	5,731.00	5,537.93	5,731.00	-	
1200	6220	Training/Travel/Workshops	16,000.00	15,253.33	16,000.00	-	
1200	6230	Health & Safety	4,800.00	3,684.21	4,800.00	-	
1200	6240	Advertising/Promotion	5,500.00	2,848.01	5,500.00	-	
1200	6255	Postage/Courier	10,500.00	11,206.72	12,600.00	2,100.00	
1200	6260	Phone/Fax/Internet	9,500.00	8,589.40	9,500.00	-	
1200	6265	Lease/Copier Expense	5,500.00	4,330.27	5,500.00	-	
1200	6270	Insurance	10,000.00	7,918.78	7,920.00	(2,080.00)	
1200	6280	Legal/Accounting	30,000.00	44,557.67	50,000.00	20,000.00	
1200	6281	Insurance Deductible Expense	15,000.00	13,859.86	15,000.00	-	
1200	6282	Tax Write-Offs/Refunds	26,000.00	25,597.66	26,000.00	-	
1200	6283	Tax Collection	500.00	413.58	500.00	-	
1200	6284	Bank Fees/Charges	1,815.00	3,101.30	1,815.00	-	
1200	6285	Service Awards	650.00	635.89	125.00	(525.00)	
1200	6286	Election Expense	6,000.00	966.72	24,000.00	18,000.00	
1200	6287	Rental Properties Expense	500.00	456.29	500.00	-	
1200	6290	Materials/Supplies	21,000.00	22,859.47	28,350.00	7,350.00	
1200	6292	Misc Expense		-	4,000.00		
1200	6295	Transfer to Reserves		5,000.00		-	
1200	6330	Inspections/Contracts	1,500.00	22,279.32	1,500.00	-	
1200	6800	Civil Marriage Fees	1,500.00	900.00	1,500.00	-	
1200	6910	Pay Equity/Market Review Study			40,000.00	40,000.00	
		Pay Equity/Market Review Impact			70,000.00	70,000.00	
1200	6910	HR/Recruitment	13,500.00	23,440.12	10,000.00	(3,500.00)	
1200	6915	Asset Management/PSAB	10,000.00	3,012.71	10,000.00	-	
Total Expenditures			868,387.00	826,711.11	917,656.00	49,269.00	11.00%
Townhall Building Expense							
1210	6100	Salaries - Full Time	5,996.00	9,809.35	7,462.00	1,466.00	
1210	6110	Salaries - Part Time	1,353.00	578.21	1,381.00	28.00	
1210	6111	Wages - PW Support	1,083.00	434.52	1,083.00	-	
1210	6120	Benefits - Full Time	1,969.00	2,998.67	2,399.00	430.00	
1210	6127	Benefit -- PW Support	303.00	118.27	303.00	-	
1210	6200	Clothing/Uniforms		0		-	
1210	6260	Phone/Fax/Internet	336.00	309.12	336.00	-	
1210	6270	Insurance	8,775.00	11,838.96	9,221.00	446.00	
1210	6295	Transfer to Reserve		37,772.87		-	
1210	6300	Bldg Repair/Maintenance	7,850.00	5,352.12	11,350.00	3,500.00	
1210	6320	Janitorial Supplies	750.00	537.24	750.00	-	
1210	6330	Inspections/Contracts	16,958.00	17,218.89	15,658.00	(1,300.00)	
1210	6350	Electricity	17,833.00	13,898.09	14,593.00	(3,240.00)	
1210	6360	Water/Sewer	2,100.00	1,638.07	2,100.00	-	
1210	6370	Natural Gas/Heat	3,180.00	3,390.56	2,358.00	(822.00)	
1210	6380	Waste Disposal	742.00	713.57	742.00	-	
1210	6390	SnowPlowing		0		-	
1210	6401	PW Machine Rent	1,950.00	986.68	1,950.00	-	
Total Building Expense			71,178.00	107,595.19	71,686.00	508.00	-33.37%
Total Expense			939,565.00	934,306.30	989,342.00	49,777.00	5.89%
Capital Expense							
1210	0400	Commvalut Backup/Copiers				-	
1210	0300	Townhall Renovations				-	
1210	0300	General Facility Repairs				-	(Moved to Rec Ad)
1210	0300	Facility Condition Assessment				-	
1210	0300	HVAC	45,000.00	39,696.88		(45,000.00)	
1210	0300	Theatre Renovations	78,348.00	52,083.89		(78,348.00)	
Total Capital			123,348.00	91,780.77	-	(123,348.00)	
						-	
Total Operating and Capital			1,062,913.00	1,026,087.07	989,342.00	(73,571.00)	-3.58%
						-	

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Fire Budget						
		2017	2017	2018	Budget \$	Budget - Actual
Revenue		Budget	Actuals	Budget	Variance	% Change
2100	5110 Donations				-	
2100	5125 Transfer from Reserves				-	
2100	5700 Grants/Fees (MVA)				-	
2100	5290 Rev-Other Municipalities	311,078.00	311,078.16	316,367.00	5,289.00	
2100	5700 Rev - Fire Marque/Recoverable	14,000.00	26,042.57	15,000.00	1,000.00	
Total Revenue		325,078.00	337,120.73	331,367.00	6,289.00	-1.71%
Expenditures						
2100	6100 Salaries/Wages - Full Time	84,679.00	80,874.20	65,000.00	(19,679.00)	
2100	6110 Salaries/Wages - Part Time	159,316.00	160,185.46	167,038.00	7,722.00	
2100	6120 Benefits	42,283.00	44,078.63	45,696.00	3,413.00	
2100	6200 Clothing/Uniforms/Bunker Gear	12,695.00	28,543.03	12,715.00	20.00	
2100	6210 Subscriptions/Memberships	509.00	865.56	615.00	106.00	
2100	6220 Training/Travel/Workshops	24,829.00	13,588.75	38,000.00	13,171.00	
2100	6230 Health & Safety	1,018.00	1,056.07	1,070.00	52.00	
2100	6240 Advertising/Promotion	916.00	3,094.06	950.00	34.00	
2100	6250 Office Supplies	662.00	982.43	700.00	38.00	
2100	6255 Postage/Courier	204.00	276.80	300.00	96.00	
2100	6260 Phone/Fax/Internet	2,378.00	2,354.62	2,460.00	82.00	
2100	6265 Lease/Copier	764.00	407.13	720.00	(44.00)	
2100	6270 Insurance	20,697.00	17,258.82	15,590.00	(5,107.00)	
2100	6280 Legal/Accounting	814.00	305.29	800.00	(14.00)	
2100	6285 Service Awards	305.00	69.35	300.00	(5.00)	
2100	6290 Materials/Supplies	17,235.00	21,414.97	16,000.00	(1,235.00)	
2100	6292 Misc		-		-	
2100	6295 Transfer to Reserves	70,010.00	130,702.78	122,040.00	52,030.00	
2100	6330 Inspections/Contracts	2,835.00	2,098.29	2,840.00	5.00	
2100	6335 Dispatch	23,238.00	23,027.23	25,678.00	2,440.00	
2100	6400 Equipment Repair/Maint	36,237.00	21,194.29	35,000.00	(1,237.00)	
2100	6410 Fuel	8,600.00	4,915.04	8,750.00	150.00	
2100	6472 Radio Equipment	9,934.00	6,407.93	11,000.00	1,066.00	
2100	6620 Mutual Aid	480.00	461.44	480.00	-	
2100	6704 Food	1,200.00	2,260.16	2,000.00	800.00	
2100	6790 Generator Expense	1,200.00	-	1,200.00	-	
2100	6795 Public Education	500.00	450.03	500.00	-	
2100	6900 Loan - Principle SCBA	7,578.00	7,578.08	7,800.00	222.00	
2100	6955 Gain/loss on Disposal of Assets		(424.43)		-	
Total Expenditure		531,116.00	574,026.01	585,242.00	54,126.00	1.95%
Wingham Hall						
2110	6100 Salaries - Full time	4,654.00	1,462.80	3,400.00	(1,254.00)	
2110	6111 Wages - PW Support	1,825.00	-	1,825.00	-	
2110	6110 Salaries - Part time	183.00	774.99	187.00	4.00	
2110	6120 Benefits - Full time	1,381.00	440.40	1,018.00	(363.00)	
2110	6127 Benefits - PW Support	511.00	204.71	511.00	-	
2110	6270 Insurance	2,514.00	1,627.56	1,676.00	(838.00)	
2110	6300 Building Repair & Maintenance	3,500.00	-	5,200.00	1,700.00	
2110	6320 Janitorial Supplies	275.00	266.35	275.00	-	
2110	6330 Inspections/Contracts	1,820.00	487.44	1,820.00	-	
2110	6350 Electricity	3,020.00	2,904.37	3,050.00	30.00	
2110	6360 Water/Sewer	850.00	848.27	875.00	25.00	
2110	6370 Natural Gas/Heat	1,900.00	2,075.82	1,900.00	-	
2110	6380 Waste Disposal	25.00	34.98	494.00	469.00	
2110	6390 SnowPlowing/Grass Cutting		-		-	
2110	6401 PW Machinery Rent	3,285.00	1,760.00	3,285.00	-	
Total		25,743.00	12,887.69	25,516.00	(227.00)	97.99%
Blyth Hall						
2115	6100 Salaries - Full time	446.00	399.86	454.00	8.00	
2115	6111 Wages - PW Support	1,146.00	1,372.83	1,145.00	(1.00)	
2115	6110 Salaries - Part time	2,568.00	1,153.35	2,619.00	51.00	
2115	6120 Benefits - Full time	311.00	178.16	342.00	31.00	
2115	6127 Benefits - PW Support	323.00	264.38	323.00	-	
2115	6270 Insurance	1,291.00	1,366.14	1,407.00	116.00	
2115	6300 Building Repair/Maintenance	1,035.00	247.66	1,035.00	-	
2115	6320 Janitorial Supplies	248.00	260.39	248.00	-	
2115	6330 Inspections/Contracts	108.00	-	108.00	-	
2115	6350 Electricity	5,292.00	4,232.85	5,557.00	265.00	
2115	6360 Water/Sewer	476.00	475.98	487.00	11.00	
2115	6370 Natural Gas/Heat		-		-	
2115	6375 Propane	2,925.00	1,374.74	2,925.00	-	
2115	6380 Waste Disposal		-		-	
2115	6390 SnowPlowing/Grass Cutting		-		-	
2115	6401 PW Machinery Rent	2,059.00	2,349.75	2,059.00	-	
Total		18,228.00	13,676.09	18,709.00	481.00	36.80%
Total Operating		575,087.00	600,589.79	629,467.00	54,380.00	
Capital						
2100	500 Pumper/Tanker					
2100	400 Equipment Capital	49,990.00	51,287.82		(49,990.00)	
Total Capital		49,990.00	51,287.82	-	(49,990.00)	
Total Capital and Operating		625,077.00	651,877.61	629,467.00	4,390.00	-3.44%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 FPO & NHONLY BUDGET							
			2017	2017	2018	Budget \$	Budget - Actual
Revenue			Budget	Actuals	Budget	Variance	% Change
2120	5110	Donations					
2120	5125	Transfer from Reserves				-	
2120	5700	Fire Inspection Fees	5,000.00	630.00	600.00	(4,400.00)	
2120	5290	Rev-Other Municipalities				-	
						-	
Total Revenue			5,000.00	630.00	600.00	(4,400.00)	-4.76%
Expenditures							
2120	6110	Wages		2,972.18	6,000.00		
2120	6120	Benefits		316.92	1,740.00	1,740.00	
2120	6210	Subscriptions & Memberships	1,028.00		500.00	(528.00)	
2120	6220	Training/Travel/Workshops		273.41	800.00		
2120	6295	Transfer to Reserve		6,500.00		-	
2120	6330	Inspections & Contracts	25,810.00	5,352.98		(25,810.00)	
2120	6795	Public Education	3,599.00	2,639.16	3,000.00	(599.00)	
2120	6900	Loan Principal - Payouts/Bldg	73,577.00	73,576.82	76,610.80	3,033.80	
2120	6902	Loan Interest - Payouts/Bldg	40,980.00	40,980.01	37,946.02	(3,033.98)	
2120	6955	Gain/Loss on Disposal of Assets				-	
Total Expense			144,994.00	132,611.48	126,596.82	(18,397.18)	-4.54%
						-	
Capital						-	
2120	300	Diesel Exhaust				-	
2120	300	Floor Drain	6,500.00			(6,500.00)	
Total Operating and Capital						-	
			151,494.00	132,611.48	126,596.82	(24,897.18)	-4.54%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 ESTC Training Centre			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
2700	5100	Course Revenue	54,950.00	21,772.35	20,300.00	(34,650.00)	
2700	5103	Contract Instructor Courses	81,174.00			(81,174.00)	
2700	5120	Misc Revenue		110.19		-	
2700	5121	Meal Revenue	21,770.00	1,082.23	250.00	(21,520.00)	
2700	5125	Transfer from Reserve		70,411.27		-	
2700	5132	Donations				-	
2700	5200	Facility Rental	38,325.00	40,106.50	5,000.00	(33,325.00)	
2700	5205	Classroom/Long Term Rental	8,710.00	275.00		(8,710.00)	
2700	5208	PPE Rental	1,150.00			(1,150.00)	
2700	5255	Clothing/Textbook Sales	2,000.00	255.70		(2,000.00)	
2700	5280	Grants/Levies				-	
2700	5900	Loan Proceeds				-	
Total			208,079.00	134,013.24	25,550.00	(182,529.00)	-80.93%
Expenditures						-	
2700	6100	Salaries & Wages	33,750.00	42,613.50	39,798.00	6,048.00	
2700	6110	Wages - Part time	20,150.00	7,387.50		(20,150.00)	
2700	6120	Benefits	9,163.00	6,329.93	7,190.00	(1,973.00)	
2700	6200	Clothing/Uniforms				-	
2700	6210	Subscriptions/Memberships	460.00	134.29	135.00	(325.00)	
2700	6220	Travel/Training	500.00	876.89	880.00	380.00	
2700	6223	Mileage - Instructors	500.00	48.58	50.00	(450.00)	
2700	6224	Meal Expense - Instructors		16.68	50.00	50.00	
2700	6225	Accommodations	1,500.00		500.00	(1,000.00)	
2700	6240	Advertising/Promotion	3,000.00	5,416.29	2,000.00	(1,000.00)	
2700	6250	Office Supplies	2,500.00	1,712.30	500.00	(2,000.00)	
2700	6255	Postage/Courier	100.00	312.51	100.00	-	
2700	6260	Phone/Fax/Internet	1,000.00	1,939.28	2,000.00	1,000.00	
2700	6265	Lease/Copier	1,200.00	1,025.04	1,025.00	(175.00)	
2700	6270	Insurance	4,000.00	2,645.31	4,225.00	225.00	
2700	6284	Legends Software	4,964.00	1,287.73	1,860.00	(3,104.00)	
2700	6290	Materials/Supplies	24,610.00	23,611.88	2,500.00	(22,110.00)	
2700	6295	Transfer to Reserves				-	
2700	6330	Contract - Consulting			2,500.00	2,500.00	
2700	6335	Contracts - Instructors	41,651.00	7,114.00	6,000.00	(35,651.00)	
2700	6350	Hydro - program cost	500.00	398.87	400.00	(100.00)	
2700	6375	Propane - program cost	8,295.00	5,201.68	1,000.00	(7,295.00)	
2700	6400	Equipment Repair/Maintenance	5,000.00	13,257.41	5,000.00	-	
2700	6410	Fuel - Program Diesel	1,400.00	357.76	400.00	(1,000.00)	
2700	6704	Meals - Courses	18,069.00	2,599.14	1,200.00	(16,869.00)	
2700	6790	Clothing (resale)	3,000.00	493.50	-	(3,000.00)	
2700	6900	Loan - Payment Principal @ 55%	26,852.00	26,852.06	27,858.00	1,006.00	
2700	6902	Loan - Interest	20,183.00	20,182.91	19,177.00	(1,006.00)	
2700	6955	Gain/Loss on Disposal		(3,755.21)		-	
Total			232,347.00	168,059.83	126,348.00	(105,999.00)	-24.82%
Building Costs						-	
2710	6100	Salaries - Full time	545.00	272.25	741.00	196.00	
2710	6111	Wages - PW Support	1,401.00	1,409.66	1,401.00	-	
2710	6110	Salaries - Part time	3,139.00	1,872.09	3,201.00	62.00	
2710	6120	Benefits	380.00	298.97	417.00	37.00	
2710	6127	Benefits - PW Support	395.00	323.13	394.00	(1.00)	
2710	6270	Insurance	1,578.00	1,669.74	1,720.00	142.00	
2710	6300	Building Repair/Maintenance	6,065.00	370.81	2,065.00	(4,000.00)	
2710	6320	Janitorial Supplies	303.00	401.91	303.00	-	
2710	6330	Inspections/Contracts	632.00	788.84	852.00	220.00	
2710	6350	Electricity	6,468.00	5,173.46	6,791.00	323.00	
2710	6360	Water/Sewer	582.00	581.70	595.00	13.00	
2710	6375	Propane	3,575.00	1,680.23	3,575.00	-	
2710	6380	Waste Disposal		232.37		-	
2710	6390	Grass Cutting/Snowplowing				-	
2710	6401	PW Machinery Rent	2,516.00	2,725.25	2,516.00	-	
Total			27,579.00	17,800.41	24,571.00	(3,008.00)	38.04%
Capital						-	
2700	300	Burn Building Update				-	
2700	400	Generator				-	
Total Operating & Capital			259,926.00	185,860.24	150,919.00	(109,007.00)	-18.80%
						-	

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Police Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2200	5105	Fines/Parking Revenues	2,000.00	2,958.00	2,200.00	200.00	
2200	5120	Misc Revenue	100.00	13,668.61		(100.00)	
2200	5125	Transfer from Reserves				-	
2200	5280	Court Security/Prisoner Trans	1,187.00	2,682.82	2,888.00	1,701.00	
2200	5286	Conditional Grants - Ontario	90,500.00	101,454.77	110,000.00	19,500.00	
Total Revenue			93,787.00	120,764.20	115,088.00	21,301.00	-4.70%
Expenditures							
2200	6100	Salaries - Full Time	776,104.00	759,312.34	882,541.00	106,437.00	
2200	6120	Benefits - Full Time	194,110.00	201,101.40	264,762.00	70,652.00	
2200	6130	Overtime	45,000.00	54,298.11	70,000.00	25,000.00	
2200	6150	Honorarium	5,000.00	4,020.00	5,000.00	-	
2200	6200	Clothing/Uniforms	5,000.00	4,398.93	5,000.00	-	
2200	6205	Meeting Allowance	600.00	600.00	600.00	-	
2200	6210	Subscriptions/Memberships	1,500.00	973.44	2,000.00	500.00	
2200	6220	Training/Travel/Workshops	6,000.00	5,425.33	9,000.00	3,000.00	
2200	6225	Police Board Expenses	2,000.00	4,436.02	2,500.00	500.00	
2200	6250	Office Supplies	7,500.00	6,451.29	10,000.00	2,500.00	
2200	6260	Phone/Fax/Internet	3,500.00	2,679.76	3,700.00	200.00	
2200	6270	Insurance	13,000.00	12,003.41	14,000.00	1,000.00	
2200	6280	Legal/Accounting	5,000.00	686.88	10,000.00	5,000.00	
2200	6295	Transfer to Reserve	10,000.00	39,000.00	15,000.00	5,000.00	
2200	6400	Equip Repair/Maintenance	9,000.00	35,232.50	12,000.00	3,000.00	
2200	6410	Fuel	15,000.00	15,869.87	20,000.00	5,000.00	
2200	6650	Communication System	40,000.00	31,333.43	47,000.00	7,000.00	
2200	6685	OPTIC	11,000.00	9,235.13	15,000.00	4,000.00	
2200	6686	CISO	3,500.00	2,039.91	3,500.00	-	
2200	6690	OPP Policing	324,116.00	321,051.81	322,955.00	(1,161.00)	
Total Expenditures			1,476,930.00	1,510,149.56	1,714,558.00	237,628.00	13.54%
Police Stn							
2210	6100	Salaries - Full Time	4,231.00	1,452.20	6,474.00	2,243.00	
2210	6111	Wages PW Support	1,083.00	79.18	1,083.00	-	
2210	6110	Salaries - Part Time	200.00	282.52	200.00	-	
2210	6120	Benefits - Full Time	1,261.00	451.66	1,911.00	650.00	
2210	6127	Benefits - PW Support	303.00	81.94	303.00	-	
2210	6270	Insurance	1,892.00	2,003.40	2,063.00	171.00	
2210	6295	Transfer to Reserves		-		-	
2210	6300	Bldg Repair/Maintenance	1,200.00	255.27	750.00	(450.00)	
2210	6320	Janitorial Supplies	300.00	251.04	300.00	-	
2210	6330	Inspections/Contracts	5,135.00	4,348.05	1,416.00	(3,719.00)	
2210	6350	Electricity	8,505.00	6,611.64	6,943.00	(1,562.00)	
2210	6360	Water/Sewer	850.00	826.87	850.00	-	
2210	6370	Natural Gas/Heat	1,100.00	1,016.92	1,100.00	-	
2210	6380	Waste Disposal	494.00	464.13	494.00	-	
2210	6390	SnowPlowing		-		-	
2210	6401	PW Machinery Rent	1,950.00	1,006.69	1,950.00	-	
Total Building Expenditures			28,504.00	19,131.51	25,837.00	(2,667.00)	35.05%
Total Operating Expenditures			1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
Capital							
2210	0300	Garage Upgrades				-	
2210	0500	New Cruiser				-	
Total Capital			-			-	
Total Expense - Operating + Capital			1,505,434.00	1,529,281.07	1,740,395.00	234,961.00	13.80%
2018 Capital					32,400.00		
					1,772,795.00		
					(322,955.00)		
					1,449,840.00		

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Conservation Authority Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Expenditures							
2300	6680	Conservation Levy	84,840.00	84,840.00	86,161.00	1,321.00	
						-	
Total Expenditures			84,840.00	84,840.00	86,161.00	1,321.00	1.56%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Building Department Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2400	5100	Building Permits	70,000.00	66,627.05	70,000.00	-	
2400	5105	Misc Revenue			34,296.00	34,296.00	
2400	5125	Transfer from Reserve				-	
2400	5131	Pool Permits				-	
2400	5132	Sign Permits				-	
2400	5280	Grants (Source Water)	6,575.00	7,725.00		(6,575.00)	
2400	5290	Revenue - Howick	32,880.00	84,680.48		(32,880.00)	
2400	5290	Revenue - MT	47,152.00		41,089.00	(6,063.00)	
2400	5700	Zoning Certificates			4,500.00		
Total Revenues			156,607.00	159,032.53	149,885.00	(6,722.00)	-5.75%
						-	
						-	
Expenditures						-	
2400	6100	Salaries - Full Time	65,704.00	73,019.64	62,732.00	(2,972.00)	
2400	6120	Benefits - Full Time	19,054.00	19,581.15	19,447.00	393.00	
2400	6200	Clothing/Uniforms	300.00	117.07	675.00	375.00	
2400	6210	Subscriptions/Memberships	1,180.00	517.42	1,350.00	170.00	
2400	6220	Training/Travel/Workshops	8,600.00	3,850.12	8,000.00	(600.00)	
2400	6240	Advertising/Promotion	100.00	161.81		(100.00)	
2400	6250	Office Supplies	100.00	1,093.23	500.00	400.00	
2400	6260	Phone/Fax/Internet	720.00	759.98	1,500.00	780.00	
2400	6270	Insurance	380.00	380.00	380.00	-	
2400	6280	Legal/Accounting	7,000.00	4,211.44		(7,000.00)	
2400	6290	Materials/Supplies	1,500.00	161.07	850.00	(650.00)	
2400	6295	Transfer to Reserve		-		-	
2400	6330	Inspections/Contracts	102,500.00	125,443.87	91,939.00	(10,561.00)	
2400	6340	Engineering	5,000.00	-		(5,000.00)	
2400	6400	Equip Repair/Maintenance	2,800.00	534.05		(2,800.00)	Fuel & maintenance
2400	6410	Fuel		1,758.50	3,500.00	3,500.00	
2400	6250	Computer Software	1,000.00		1,100.00	100.00	
2400	6330	Accessibility			500.00	500.00	
2400	6706	Office Rent/Utilities	1,240.00	1,240.00	3,950.00	2,710.00	
Total Expenditures			217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%
						-	
Capital						-	
2400	500	Vehicle Replacement				-	
						-	
Total Operating and Capital			217,178.00	232,829.35	196,423.00	(20,755.00)	-15.64%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Property Standards Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
2410	5133	Inspections		80.00		-	
2410	5105	Misc revenue			100.00	100.00	
Total Revenue				80.00	100.00	100.00	25.00%
Expenditures						-	
2410	6100	Salaries - Full Time	7,240.00	2,112.00	7,240.00	-	
2410	6120	Benefits - Full Time	2,146.00	612.48	2,146.00	-	
2410	6200	Clothing/Uniforms				-	
2410	6210	Subscriptions/Memberships	110.00		110.00	-	
2410	6220	Training/Travel/Workshops	2,600.00		2,600.00	-	
2410	6240	Advertising/Promotion				-	
2410	6250	Office Supplies	300.00	7.80	300.00	-	
2410	6260	Phone/Fax/Internet	200.00		200.00	-	
2410	6280	Legal/Accounting	2,500.00	3,242.74	2,500.00	-	
2410	6330	Inspections/Contracts		3,308.85			
2410	6400	Equip Repair/Maintenance	200.00		200.00	-	
2410	6410	Fuel	500.00		500.00	-	
Total Expenditures			15,796.00	9,283.87	15,796.00	-	70.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Animal Control Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
2500	5100	Licences/Permits	10,000.00	8,635.00	8,800.00	(1,200.00)	
2500	5105	Fines	800.00	685.00	800.00	-	
2500	5280	Livestock Claim Grants	1,000.00		1,000.00	-	
Total Revenue			11,800.00	9,320.00	10,600.00	(1,200.00)	13.73%
						-	
						-	
Expenditures						-	
2500	6280	Legal	1,000.00		500.00	(500.00)	
2500	6290	Materials/Supplies	1,600.00	778.03	800.00	(800.00)	
2500	6660	Animal Control Officer	1,500.00	934.58	1,000.00	(500.00)	
2500	6330	Inspections/Contracts	400.00		200.00	(200.00)	
2500	6670	Livestock Claims	1,500.00		1,500.00	-	
Total Expenditures			6,000.00	1,712.61	4,000.00	(2,000.00)	133.56%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Emergency Planning Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
2600	5125	Transfer from Reserves					
2600	5280	Grants/Levies					
Total Revenue							
Expenditures							
2600	6100	Wages		1,207.78			
2600	6120	Benefits		882.60			
2600	6130	Overtime		4,632.52			
2600	6205	Meeting Allowance					
2600	6220	Training/Travel/Workshops	1,075.00	143.55	500.00	(575.00)	
2600	6290	Materials/Supplies	1,500.00	916.67	1,000.00	(500.00)	
2600	6295	Transfer to Reserve				-	
2600	6401	Machine Rent		560.00		-	
2600	6790	Generator Expense				-	
2600	6795	Public Education	2,500.00		2,500.00	-	
2600	6910	Flood Management		582.74		-	
2600	0400	Generator				-	
Total Expenditures			5,075.00	8,925.86	4,000.00	(1,075.00)	-55.19%

2018 PW Budget				2017	2017	2018	Budget - Actual
				Budget	Actuals	Budget	Variance
Revenue							
3100	5120		Misc Revenue - Developers		14,341.05		
3100	5132		Entrance Permits	5,000.00	2,250.00		
3100	5125		Transfer from Reserve	315,000.00	565,000.00		
3100	5280		Gas Tax	300,000.00	350,000.00		
3100	5280		OCIF - Formula Based	120,000.00	113,276.37		
3100	5290		Shared Services		40,726.12		
3100	5120		Fees & Charges	2,000.00		12,000.00	
3100	5280		Loan Proceeds	270,000.00			
3100	5480		PW Income		32,905.41		
33XX	5480		Equipment Rentals	382,300.00	738,463.55	515,710.00	
Total Revenue				1,394,300.00	1,856,962.50	527,710.00	-71.58%
Expenditures							
			Roads Paved				
3111	6100	HT-1	Wages	14,019.00	10,777.26	8,213.00	
3111	6120	HT-1	Benefits	4,206.00	2,845.78	2,381.77	
3111	6130	HT-1	Overtime	1,558.00	247.57	332.00	
3111	6401	HT-1	Machine Rentals	12,000.00	20,277.50	6,280.00	
3112	6100	HT-2	Wages	7,009.00	15,762.95	8,489.00	
3112	6120	HT-2	Benefits	2,103.00	4,549.33	2,461.81	
3112	6130	HT-2	Overtime	779.00	513.78	590.00	
3112	6401	HT-2	Machine Rentals	6,000.00	47,330.00	42,108.00	
3110	6290		Materials & Supplies	10,000.00	9,684.32	10,000.00	
3110	6330		Contracted Service	10,000.00	51,431.04	10,000.00	
Total				67,674.00	163,419.53	90,855.58	-44.40%
			Roads Unpaved				
3121	6100	LT-1	Wages	49,498.00	6,594.41	6,937.00	
3121	6120	LT-1	Benefits	13,365.00	1,735.82	2,011.73	
3121	6130	LT-1	Overtime		1,293.76	1,735.00	
3121	6401	LT-1	Machine Rentals	66,668.00	19,825.00	6,280.00	
3122	6100	LT-2	Wages	24,750.00	12,731.91	8,468.00	
3122	6120	LT-2	Benefits	6,682.00	2,776.23	2,455.72	
3122	6130	LT-2	Overtime		1,164.61	1,561.00	
3122	6401	LT-2	Machine Rentals	33,333.00	59,452.50	82,740.00	
3120	6290		Materials & Supplies	200,500.00	183,930.72	200,000.00	
3120	6330		Contracted Service	300.00	293.28		
Total				395,096.00	289,798.24	312,188.45	7.73%
			Roads - Bridges & Culverts				
3131	6100	BC	Wages	2,596.00	2,276.36	2,803.00	
3131	6120	BC	Benefits	701.00	599.79	812.87	
3131	6130	BC	Overtime		5.90		
3131	6401	BC	Machine Rentals	6,500.00	5,130.00	7,280.00	
3131	6290	BC	Materials/Supplies		4,815.55	4,000.00	
3131	6330	BC	Contracted Service	7,500.00	2,295.26	3,500.00	
Total				17,297.00	15,122.86	18,395.87	21.64%
			Roads - Traffic Operations & Roadside				
3141	6100	RS-1	Wages	17,306.00	46,168.98	42,693.00	
3141	6120	RS-1	Benefits	4,672.00	11,533.56	12,380.97	
3141	6130	RS-1	Overtime		1,542.22	1,900.00	
3141	6401	RS-1	Machine Rentals	4,332.00	80,260.00	46,891.00	
3143	6100	RS-2	Wages	17,306.00	22,533.87	11,835.00	
3143	6120	RS-2	Benefits	4,672.00	5,988.26	3,432.15	
3143	6130	RS-2	Overtime		549.16	675.00	
3143	6401	RS-2	Machine Rentals	4,332.00	39,905.00	6,280.00	
3144	6100	RS-3	Wages	8,653.00	6,897.04	4,734.00	
3144	6120	RS-3	Benefits	2,336.00	1,842.46	1,372.86	
3144	6130	RS-3	Overtime		89.05	119.00	
3144	6401	RS-3	Machine Rentals	2,166.00	14,287.50	10,000.00	
3140	6290		Materials/Supplies	76,500.00	35,708.05	41,500.00	
3140	6330		Contracted Service	20,700.00	35,454.71	40,000.00	
Total				162,975.00	302,759.86	223,812.98	-26.08%
			Signs & Guardrails				
3146	6100	SD	Wages	8,657.00	7,026.69	2,803.00	
3146	6120	SD	Benefits	2,339.00	1,817.74	812.87	
3146	6130	SD	Overtime		197.74	265.00	
3146	6401	SD	Machine Rentals	2,170.00	10,270.00	7,280.00	
3146	6290	SD	Materials/Supplies				
3146	6330	SD	Contracted Service				
Total				13,166.00	19,312.17	11,160.87	-42.21%
			Winter Control - Except Sidewalks & Parking Lots				
3151	6100	WC	Wages	71,278.00	50,575.28	101,800.00	
3151	6120	WC	Benefits	21,384.00	12,264.48	29,522.00	
3151	6130	WC	Overtime	7,920.00	8,621.39	6,848.00	
3151	6401	WC	Machine Rentals	80,000.00	193,076.05	116,580.00	
3154	6100	WP	Wages	35,639.00	6,791.00	37,129.00	
3154	6120	WP	Benefits	10,692.00	2,049.79	10,767.41	
3154	6130	WP	Overtime	3,960.00	4,080.60	2,895.00	
3154	6401	WP	Machine Rentals	40,000.00	13,400.00	14,560.00	
3150	6290		Materials/Supplies	12,350.00	42,737.24	65,000.00	
3150	6330		Contracted Service	34,000.00	22,522.08	10,000.00	
Total				317,223.00	356,117.91	395,101.41	10.95%
			Winter Control - Sidewalks & Parking Lots				
3161	6100	PL	Wages	12,871.00	6,452.03	30,207.00	
3161	6120	PL	Benefits	4,008.00	1,645.40	8,760.03	
3161	6130	PL	Overtime	1,980.00	826.35	1,595.00	
3161	6401	PL	Machine Rentals	15,000.00	5,800.00	6,280.00	
3163	6100	SW	Wages	12,871.00	6,302.57	19,403.00	
3163	6120	SW	Benefits	4,008.00	1,611.22	5,626.87	
3163	6130	SW	Overtime	1,980.00	748.50		
3163	6401	SW	Machine Rentals	15,000.00	40,180.00	24,340.00	
3160	6290	SW	Materials/Supplies	650.00	8,739.94	1,500.00	
3160	6330	SW	Contracted Service		1,420.39		
Total				68,368.00	73,726.40	97,711.90	32.53%
			Roads Administration				
3180	6100	ADMIN	F/T Salaries/Wages (PWA, ROH-1-4)	78,522.00	97,418.68	59,806.00	
3180	6101	ADMIN	Sick Days	9,000.00	9,264.55	13,088.00	
3180	6102	ADMIN	Stat Days	50,000.00	31,693.97	26,010.00	
3180	6103	ADMIN	Vacation Days	15,000.00	32,152.13	50,129.00	
3180	6104	ADMIN	Bereavement Days	2,350.00	1,248.08	3,913.00	
3180	6105	ADMIN	Patrol Inspection - PAT	2,035.00	10,424.82	21,644.00	
3180	6106	ADMIN	Training / Health and Safety	460.00	7,769.60	26,501.00	
3180	6107	ADMIN	PW Office	15,000.00	31,864.85	50,994.00	

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Streetlighting Budget		2017	2017	2018	Budget \$	Budget - Actual
		Budget	Actuals	Budget	Variance	% Change
Streetlighting Revenue						
01-3400-5450	Humphrey Consumption	2,314.00		2,415.00	101.00	
01-3400-5450	Humphrey S/L Repairs & Maintenance	275.00		250.00	(25.00)	
01-3400-5450	Auburn Consumption	1,157.00		1,260.00	103.00	
01-3400-5450	Auburn S/L Repairs & Maintenance	275.00		170.00	(105.00)	
01-3400-5450	Hutton Heights Consumption	1,405.00		1,365.00	(40.00)	
01-3400-5450	Hutton Heights S/L Repairs & Maint	275.00		300.00	25.00	
01-3400-5450	Whitechurch Consumption	407.00		430.00	23.00	
01-3400-5450	Belgrave Consumption	407.00		365.00	(42.00)	
01-3400-6295	Transfer from reserves				-	
01-3400-5900	Loan Proceeds	540,000.00			(540,000.00)	
Total Revenue		546,515.00		6,555.00	(539,960.00)	
					-	
Wingham Streetlights						
01-3401-6100	Wages	1,500.00	2,566.07	2,250.00	750.00	
01-3401-6120	Benefits	500.00	699.59	585.00	85.00	
01-3401-6130	Overtime	150.00	134.87	-	(150.00)	
01-3401-6290	Materials/Supplies	4,000.00	5,352.48	1,500.00	(2,500.00)	
01-3401-6330	Sub-Contract Exp	4,217.00	7,731.49	1,500.00	(2,717.00)	
01-3401-6350	Hydro	105,000.00	105,087.29	74,365.00	(30,635.00)	
01-3401-6401	Machinery Rent	-	3,780.00	-	-	
01-3401-6295	Transfer to Reserve - Loan Payment			29,513.00	29,513.00	
Total Expense		115,367.00	125,351.79	109,713.00	(5,654.00)	-12.48%
Blyth Streetlights						
01-3402-6100	Wages	600.00	1,753.06	1,174.00	574.00	
01-3402-6120	Benefits	128.00	443.51	305.00	177.00	
01-3402-6130	Overtime	100.00	76.49	-	(100.00)	
01-3402-6290	Materials/Supplies	1,500.00	3,786.09	600.00	(900.00)	
01-3402-6330	Sub-Contract Exp	1,500.00	1,243.30	600.00	(900.00)	
01-3402-6350	Hydro	30,000.00	27,608.67	21,334.00	(8,666.00)	
01-3402-6401	Machinery Rent	-	400.00	-	-	
01-3402-6295	Transfer to Reserve - Loan Payment			18,575.00	18,575.00	
Total Expense		33,828.00	35,311.12	42,588.00	8,760.00	20.61%
Humphrey Streetlights						
01-3403-6100	Wages	50.00		-	(50.00)	
01-3403-6120	Benefits	15.00		-	(15.00)	
01-3403-6290	Materials/Supplies	124.00	62.48	150.00	26.00	
01-3403-6330	Sub-Contract Exp	100.00		100.00	-	
01-3403-6350	Hydro	2,300.00	2,229.74	2,415.00	115.00	
Total Expense		2,589.00	2,292.22	2,665.00	76.00	16.26%
Auburn Streetlights						
01-3404-6100	Wages	50.00	24.46		(50.00)	
01-3404-6120	Benefits	15.00	6.72	-	(15.00)	
01-3404-6290	Materials/Supplies	67.00	62.48	70.00	3.00	
01-3404-6330	Sub-Contract Exp	100.00		100.00	-	
01-3404-6350	Hydro	1,200.00	1,020.17	1,260.00	60.00	
01-3404-6401	Machine Rent		40.00			
Total Expense		1,432.00	1,153.83	1,430.00	(2.00)	23.9%
Hutton Heights Streetlights						
01-3405-6100	Wages	50.00		-	(50.00)	
01-3405-6120	Benefits	15.00		-	(15.00)	
01-3405-6290	Materials/Supplies	215.00	62.49	200.00	(15.00)	
01-3405-6330	Sub-Contract Exp	100.00		100.00	-	
01-3405-6350	Hydro	1,300.00	1,346.46	1,365.00	65.00	
Total Expense		1,680.00	1,408.95	1,665.00	(15.00)	18.17%
Whitechurch Streetlights						
01-3406-6350	Hydro	407.00	160.39	430.00	23.00	
Total Expense		407.00	160.39	430.00	23.00	168.10%
Belgrave Streetlights						
Expense					-	
01-3407-6100	Wages	50.00	36.69	-	(50.00)	
01-3407-6120	Benefits	10.00	5.85	-	(10.00)	
01-3407-6350	Hydro	347.00		365.00	18.00	
Total Expense		407.00	42.54	365.00	(42.00)	
					-	
Total Expenditures		155,710.00	165,720.84	158,856.00	3,146.00	-4.14%
					-	
Capital LED Program		540,000.00	3,210.79		(540,000.00)	
					-	
Total Operating & Capital		695,710.00	168,931.63	158,856.00	(536,854.00)	-5.96%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Air Transportation Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
3500	5125	Transfer from Reserves	6,700.00	6,700.00		(6,700.00)	
3500	5200	Rentals	7,748.00	68,264.05	7,724.00	(24.00)	
3500	5200	Land Lease Rental	59,800.00		59,800.00	-	
3500	5255	Sales	23,500.00	25,418.29	25,000.00	1,500.00	
3500	5260	Vending		5.60		-	
3500	5280	Grants/Levies	2,000.00	1,500.00	2,000.00	-	
Total Revenue			99,748.00	101,887.94	94,524.00	(5,224.00)	-7.23%
Expenditures							
3500	6100	Salaries - Full Time	3,766.00	4,311.84	3,841.00	75.00	
3500	6111	Wages - PW Support	3,455.00	16,792.13	3,455.00	-	
3500	6110	Salaries - Part Time	15,508.00	4,877.70	15,819.00	311.00	
3500	6120	Benefits - Full Time	3,729.00	2,014.14	3,803.00	74.00	
3500	6127	Benefits - PW Works Support	975.00	987.14	975.00	-	
3500	6200	Clothing/Uniforms	150.00	-	150.00	-	
3500	6205	Meeting Allowance	300.00	-	300.00	-	
3500	6210	Subscriptions/Memberships	950.00	759.00	950.00	-	
3500	6220	Training/Travel/Workshops	862.00	452.88	862.00	-	
3500	6240	Advertising/Promotion		-		-	
3500	6250	Office Supplies	50.00	31.31	50.00	-	
3500	6260	Phone/Fax/Internet	1,356.00	1,372.22	1,356.00	-	
3500	6270	Insurance	6,263.00	5,070.60	5,219.00	(1,044.00)	
3500	6290	Materials/Supplies	500.00	289.46	800.00	300.00	
3500	6295	Transfer to Reserve		6,700.00		-	
3500	6300	Bldg Repair/Maintenance	6,950.00	7,356.63	7,150.00	200.00	
3500	6310	Taxes	6,700.00	7,962.82	8,201.00	1,501.00	
3500	6320	Janitorial Supplies	200.00	136.34	200.00	-	
3500	6330	Inspections/Contracts	9,750.00	2,041.81	4,550.00	(5,200.00)	
3500	6350	Electricity	9,200.00	7,767.80	8,156.00	(1,044.00)	
3500	6390	SnowPlowing		-		-	
3500	6401	PW Machinery Rent	6,200.00	14,810.00	6,200.00	-	
3500	6410	Fuel	22,992.00	23,851.07	24,000.00	1,008.00	
Total Expenditures			99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%
						-	
3500	300	Roof Repair					
Total Capital							
Total Capital + Operating			99,856.00	107,584.89	96,037.00	(3,819.00)	-10.73%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Sanitary Sewer Budget - Wingham			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
4100	5115	Interest Income	10,000.00	19,932.81	10,000.00	-	
4100	5120	Misc Revenue	1,000.00	487.50	500.00	(500.00)	
4100	5125	Transfer from Reserve	462,694.00	43,349.48	107,404.00	(355,290.00)	
4100	5280	Grants/Levies (CWWF)	45,000.00	83,591.11	74,745.00	29,745.00	
4100	5600	Wingham Residential	390,370.00	401,113.71	402,000.00	11,630.00	
4100	5605	Blyth Residential	121,334.00	125,064.28	125,000.00	3,666.00	
4100	5620	Wingham Commerical	59,740.00	59,481.09	60,000.00	260.00	
4100	5625	Blyth Commercial	21,630.00	25,124.29	25,000.00	3,370.00	
4100	5630	Installations/Connections	5,000.00	3,500.00	5,000.00	-	
4100	5675	Long Term Reserve	298,500.00	302,063.13	300,000.00	1,500.00	
4100	5680	Frontage & Connection	6,500.00	6,536.89	6,500.00	-	
4100	5685	Braemar Agreement	10,000.00	10,350.00	10,000.00	-	
						-	
Total Revenue			1,431,768.00	1,080,594.29	1,126,149.00	(305,619.00)	4.22%
Expenditures - Administration							
4100	6100	Salaries - Full Time	83,738.00	55,885.22	84,374.00	636.00	
4100	6120	Benefits - Full Time	24,288.00	13,934.28	24,469.00	181.00	
4100	6130	Overtime		1,237.39		-	
4100	6220	Training/Travel/Workshops	750.00	206.23	750.00	-	
4100	6230	Health & Safety				-	
4100	6240	Advertising/Promotion				-	
4100	6250	Office Supplies				-	
4100	6260	Phone/Fax/Internet				-	
4100	6270	Insurance	11,000.00	16,562.69	16,955.00	5,955.00	
4100	6280	Legal/Accounting	500.00		500.00	-	
4100	6288	Bad Debt Expense	14,934.00	14,933.83	2,000.00	(12,934.00)	
4100	6290	Materials/Supplies	2,500.00	5,184.31	2,500.00	-	
4100	6292	Misc Expense	6,500.00		2,500.00	(4,000.00)	
4100	6295	Transfer to Reserve				-	
4100	6295	Transfer to Long Term Reserve	298,500.00	305,563.13	300,000.00	1,500.00	
4100	6300	Bldg Repair/Maintenance				-	
4100	6310	Taxes	30,000.00	33,987.56	34,000.00	4,000.00	
4100	6330	Inspections/Contracts				-	
4100	6330	Veolia Contract	250,000.00	258,425.30	255,000.00	5,000.00	
4100	6340	Engineering	4,500.00			(4,500.00)	
4100	6401	Machinery Rental	9,000.00			(9,000.00)	
4100	6513	Billing & Collecting		6,379.56	6,500.00	6,500.00	
4100	6514	Distribution/Collection Maintenance		115,507.21		-	
4100	6515	Sludge Disposal				-	
4100	6910	Wingham/Blyth Systems Master Plan	60,000.00	14,597.16	99,660.00	39,660.00	
						-	
Total Expenditures			796,210.00	842,403.87	829,208.00	32,998.00	-1.57%
Wingham Sewer							
4105	6100	Salaries & Wages	10,385.00	9,296.50	5,000.00	(5,385.00)	
4105	6120	Benefits	2,818.00	2,208.26	1,300.00	(1,518.00)	
4105	6260	Phone/Fax/Internet	1,900.00	1,773.39	2,000.00	100.00	
4105	6290	Materials/Supplies	22,646.00	18,560.45	10,000.00	(12,646.00)	
4105	6330	Inspections/Contracts	3,350.00	470.64	3,500.00	150.00	
4105	6350	Electricity	70,000.00	72,730.87	75,000.00	5,000.00	
4105	6401	Machinery Rentals			2,500.00		
4105	6514	Distribution/Collection Maintenance			30,000.00	30,000.00	
				26,395.00		-	
Total Wingham Sewer			111,099.00	131,435.11	129,300.00	18,201.00	-1.62%
Blyth Sewer							
4150	6100	Salaries & Wages	5,192.00	1,340.82	5,000.00	(192.00)	
4150	6120	Benefits	1,388.00	360.87	1,300.00	(88.00)	
4150	6260	Phone/Fax/Internet	1,075.00	1,051.40	2,500.00	1,425.00	
4150	6290	Materials/Supplies	11,154.00	8,454.88	7,500.00	(3,654.00)	
4150	6330	Inspections/Contracts	1,650.00		1,500.00	(150.00)	
4150	6350	Electricity	40,000.00	35,460.90	42,500.00	2,500.00	
4150	6260	Water/Sewer	1,500.00	1,057.68	1,500.00	-	
4150	6401	Machinery Rentals		2,960.00	2,000.00	2,000.00	
4150	6514	Distribution/Collection Maintenance			5,000.00		
Total Blyth Sewer			61,959.00	50,686.55	68,800.00	6,841.00	35.74%
		2017 Capital	462,500.00	56,069.76		(462,500.00)	
Total Sewer			1,431,768.00	1,080,595.29	1,027,308.00	(404,460.00)	(0.05)

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Waterworks Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
4300	5115	Interest Income	8,000.00	33,604.56	10,000.00	2,000.00	
4300	5120	Misc Revenue	-	8,040.46	5,000.00	5,000.00	
4300	5125	Transfer from Reserve	408,979.00	171,860.93	278,507.00	(130,472.00)	
4300	5125	Transfer from Reserve OCIF				-	
4300	5280	Grants - SWP/CWWF	199,215.00	18,069.24	67,545.00	(131,670.00)	
4300	5600	Wingham Residential	428,480.00	428,618.81	438,000.00	9,520.00	
4300	5605	Blyth Residential	194,670.00	196,063.05	202,000.00	7,330.00	
4300	5610	East Wawanosh Residential	12,500.00	12,966.66	13,700.00	1,200.00	
4300	5620	Wingham Commercial	103,000.00	100,739.22	106,000.00	3,000.00	
4300	5625	Blyth Commercial	16,480.00	22,636.63	21,000.00	4,520.00	
4300	5630	Installations/Connections/Developers	5,000.00	2,500.00	5,000.00	-	
4300	5640	Fire Protection Revenue	4,100.00	4,237.64	4,100.00	-	
4300	5645	Late Payment Revenue	5,740.00	13,943.41	9,000.00	3,260.00	
4300	5650	Billing Revenue	25,000.00	16,513.40	6,500.00	(18,500.00)	
4300	5675	Long Term Reserve	310,500.00	313,422.15	312,000.00	1,500.00	
Total Revenue			1,721,664.00	1,343,216.16	1,478,352.00	(243,312.00)	10.06%
Expenditures							
Administration							
4300	6100	Salaries - Full Time	102,480.00	102,892.44	88,400.00	(14,080.00)	
4300	6120	Benefits - Full Time	29,645.00	23,063.05	23,357.00	(6,288.00)	
4300	6130	Overtime		1,357.83		-	
4300	6220	Training/Travel/Workshops	2,750.00	206.23	2,700.00	(50.00)	
4300	6240	Advertising/Promotion		124.44		-	
4300	6250	Office Supplies		301.97	750.00	750.00	
4300	6260	Phone/Fax/Internet	4,500.00	2,883.05	4,500.00	-	
4300	6270	Insurance	16,000.00	11,842.85	15,435.00	(565.00)	
4300	6280	Legal/Accounting	500.00	268.96	500.00	-	
4300	6288	Bad Debt Expense	18,252.00	18,252.40	1,000.00	(17,252.00)	
4300	6290	Materials/Supplies				-	
4300	6292	Misc Expense	27,300.00	3,557.03	27,300.00	-	
4300	6295	Transfer to Long Term Reserve	310,500.00	315,922.15	312,000.00	1,500.00	
4300	6310	Taxes	5,500.00	3,868.76	5,500.00	-	
4300	6330	Inspections/Contracts				-	
4300	6335	Veolia Contract	375,000.00	401,257.88	382,500.00	7,500.00	
4300	6340	Engineering	2,000.00		2,000.00	-	
4300	6401	Machinery Rental	10,000.00		10,000.00	-	
4300	6513	Billing/Collecting		12,768.07	13,000.00	13,000.00	
4300	6514	Distribution/Collection Maintenance		8,470.00		-	
4300	6516	M-T - Belgrave Water	32,340.00	31,815.77	33,000.00	660.00	
4300	6517	Source Water Protection	4,215.00	11,249.19	10,015.00	5,800.00	
4300	6910	Wingham/Blyth Master Plan	60,000.00	12,516.70	90,060.00	30,060.00	
4300	6955	Gain/Loss on Disposal of Assets		5,908.82		-	
			1,000,982.00	968,527.59	1,022,017.00	21,035.00	5.52%
Wingham Water							
4305	6100	Salaries & Wages	10,437.00	2,680.24	6,339.00	(4,098.00)	
4305	6120	Benefits	2,817.00	602.01	1,648.00	(1,169.00)	
4305	6250	Office Supplies		577.80	750.00	750.00	
4305	6260	Phone/Fax/Internet		6,342.15	5,400.00	5,400.00	
4305	6290	Materials/supplies	16,616.00	11,505.70	12,000.00	(4,616.00)	
4305	6330	Inspections/Contracts	23,517.00		24,000.00	483.00	
4305	6350	Electricity	80,400.00	42,861.12	83,000.00	2,600.00	
4305	6360	Water/Sewer	1,000.00	827.91	1,000.00	-	
4305	6401	Machinery Rent		2,395.00			
4305	6514	Distribution Maintenance	20,100.00	2,889.52	19,500.00	(600.00)	
Total Wingham Water System			154,887.00	70,681.45	153,637.00	(1,250.00)	117.37%
Blyth Water							
4350	6100	Salaries & Wages	5,140.00	1,383.87	6,330.00	1,190.00	
4350	6120	Benefits	1,388.00	364.37	1,645.00	257.00	
4350	6130	Overtime		77.46			
4350	6250	Office Supplies				-	
4350	6260	Phone/Fax/Internet		5,098.28	2,750.00	2,750.00	
4350	6290	Materials/supplies	8,184.00	2,188.33	6,000.00	(2,184.00)	
4350	6330	Inspections/Contracts	11,583.00		12,000.00	417.00	
4350	6350	Electricity	39,600.00	27,122.40	44,000.00	4,400.00	
4350	6360	Water/Sewer				-	
4350	6401	Machinery Rent		1,695.00			
4350	6514	Distribution Maintenance	9,900.00		13,000.00	3,100.00	
Total Blyth Water System			75,795.00	37,929.71	85,725.00	9,930.00	126.01%
2017 Capital			490,000.00	271,986.23		(490,000.00)	
Total Operating Expense			1,231,664.00	1,349,124.98	1,261,379.00	(460,285.00)	-6.50%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Storm Sewer Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
Expenditures							
Wingham Storm							
4200	6100	Salaries - Full Time	17,307.00	2,951.51	17,500.00	193.00	
4200	6120	Benefits - Full Time	4,499.00	579.72	4,550.00	51.00	
4200	6130	Overtime		152.28			
4200	6330	Inspections/Contracts		12,453.14	14,000.00	14,000.00	
4200	6401	Machinery Rental	3,700.00	5,300.00	2,500.00	(1,200.00)	
						-	
Total			25,506.00	21,436.65	38,550.00	13,044.00	79.83%
Blyth Storm							
4210	6100	Salaries - Full Time	8,654.00	211.00	10,276.00	1,622.00	
4210	6120	Benefits - Full Time	2,510.00	56.25	2,672.00	162.00	
4210	6290	Materials/Supplies		191.64			
4210	6330	Inspections/Contracts		1,808.63	3,500.00	3,500.00	
4210	6401	Machinery Rental	1,800.00	120.00	1,000.00	(800.00)	
						-	
Total			12,964.00	2,387.52	17,448.00	4,484.00	630.80%
Total Storm System			38,470.00	23,824.17	55,998.00	17,528.00	135.05%
2017 shown for comparison - included in PW budger for 2017							

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Waste Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Landfill Administration							
4810	5125	Transfer from Reserves	30,000.00	30,000.00	30,000.00	-	
4810	5280	Grants - WDO	40,000.00	50,444.61	40,000.00	-	
4810	5400	Bag Tags	110,000.00	107,178.00	110,000.00	-	
4810	5420	Recycling Revenue - Blue Box	10,000.00	1,730.91	2,500.00	(7,500.00)	
4810	5480	Machinery Rental Income	20,000.00	14,465.00	20,000.00	-	
Wingham Landfill							
4820	5410	Tipping Fees	72,000.00	174,548.65	120,000.00	48,000.00	
4820	5412	Scrap Metal		4,259.73	2,500.00	2,500.00	
4820	5413	e-Waste		1,116.04	250.00	250.00	
4820	5414	Shingles		8,339.30	7,500.00	7,500.00	
						-	
Total Revenue			282,000.00	392,082.24	332,750.00	50,750.00	-15.13%
Expenses							
Curbside Collection							
4800	6498		125,000.00	113,117.76	101,788.00	(23,212.00)	
4800	6499		97,500.00	91,078.23	93,499.00	(4,001.00)	
Total Curbside			222,500.00	204,195.99	195,287.00	(27,213.00)	
Landfill Administration						-	
4810	6100	Salaries & Wages	14,120.00	13,651.70	11,293.00	(2,827.00)	
4810	6120	Benefits	4,095.00	3,355.59	2,214.00	(1,881.00)	
4810	6220	Training	850.00	1,054.06	1,000.00	150.00	
4810	6250	Office Supplies	1,500.00	1,442.64	1,200.00	(300.00)	
4810	6255	Postage/Courier	400.00	396.60	400.00	-	
4810	6260	Phone/Fax/Internet	200.00	465.48	800.00	600.00	
4810	6270	Insurance	10,000.00	10,562.69	10,630.00	630.00	
4810	6295	Transfer to Reserve	30,000.00	105,000.00		(30,000.00)	
4810	6300	Building Repair/Maintenance	1,000.00	1,174.26	1,200.00	200.00	
4810	6310	Taxes	5,000.00	22,615.87	14,400.00	9,400.00	
4810	6340	Engineering	7,050.00			(7,050.00)	
4810	6490	Operating Expense	2,500.00	647.86	2,500.00	-	
Total Administration			76,715.00	160,366.75	45,637.00	(31,078.00)	-71.54%
Wingham Landfill							
4820	6100	Salaries & Wages	35,276.00	53,204.46	39,081.00	3,805.00	
4820	6120	Benefits	9,515.00	9,685.33	10,161.00	646.00	
4820	6292	Concrete Disposal	30,000.00	39,177.60	30,000.00	-	
4820	6330	Inspections/Contracts	4,500.00	15,081.41	4,500.00	-	
4820	6350	Electricity	2,000.00	1,210.78	1,400.00	(600.00)	
4820	6401	Machinery Rental	20,000.00	15,192.50	20,000.00	-	
4820	6400	Equipment Repair & Maintenance	8,024.00			(8,024.00)	
4820	6410	Fuel	300.00			(300.00)	
4820	6490	Operating Cost	20,000.00	22,928.61	20,000.00	-	
4820	6492	Annual Costs	24,500.00	12,107.14	25,800.00	1,300.00	
4820	6494	Pest Control	1,000.00	1,655.56	1,500.00	500.00	
4820	6910	Studies - Off Site Investigation	45,000.00		26,457.00	(18,543.00)	
Total Wingham Landfill			200,115.00	170,243.39	178,899.00	(21,216.00)	5.08%
E/W Landfill							
4830	6100	Salaries & Wages	500.00	201.80	500.00	-	
4830	6120	Benefits	145.00	25.13	145.00	-	
4830	6330	Inspections/Contracts	3,000.00	5,108.66	3,000.00	-	
4830	6492	Annual Costs	15,000.00	2,039.80	16,800.00	1,800.00	
Total E/W Landfill			18,645.00	7,375.39	20,445.00	1,800.00	177.21%
						-	
B/H Landfill						-	
4840	6490	Operating Cost	40,000.00	40,000.00	40,000.00	-	-
4840		Machine Expense		42,646.09	30,000.00		
						-	
Total Waste Expense			557,975.00	624,827.61	510,268.00	(47,707.00)	-18.33%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Cemetery Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
54XX	5110	Donations	100.00	20.00	100.00	-	
54XX	5120	Misc Revenue	1,000.00	75.00	100.00	(900.00)	
54XX	5125	Transfer from Reserve				-	
54XX	5280	Grants/Levies	500.00			(500.00)	
54XX	5290	Revenue - Other Municipalities	25,000.00	16,666.72	25,000.00	-	
54XX	5300	Plots Sales	20,000.00	13,055.00	20,000.00	-	
54XX	5305	Grave Openings	27,000.00	37,575.00	27,000.00	-	
54XX	5310	Storage Vault Rental		1,200.00		-	
54XX	5315	Vault Installation	600.00		750.00	150.00	
54XX	5320	Ontario Licence Fee				-	
54XX	5370	Perpetual Care Interest	5,000.00	3,374.17	5,000.00	-	
54XX	5375	Monument Care Interest	350.00	126.49	425.00	75.00	
54XX	5480	Machinery Rental Revenue	35,000.00	26,430.00	35,000.00	-	
Total Revenue			114,550.00	98,522.38	113,375.00	(1,175.00)	15.08%
Expenditures							
Wingham Cemetery							
5400	6100	Salaries - Full Time	28,750.00	36,938.62	30,270.00	1,520.00	
5400	6120	Benefits - Full Time	7,937.00	9,533.01	8,778.00	841.00	
5400	6200	Clothing/Uniforms	240.00		250.00	10.00	
5400	6210	Subscriptions/Memberships	300.00	91.43	300.00	-	
5400	6220	Training/Travel/Workshops	780.00	974.40	1,000.00	220.00	
5400	6230	Health & Safety	120.00		120.00	-	
5400	6250	Office Supplies		9.97	-	-	
5400	6260	Phone/Fax/Internet	660.00	1,048.13	900.00	240.00	
5400	6270	Insurance	960.00	1,076.90	1,100.00	140.00	
5400	6280	Legal				-	
5400	6290	Materials/Supplies	9,000.00	145.86	9,200.00	200.00	
5400	6292	Misc Expense	3,000.00	1,119.50	2,500.00	(500.00)	
5400	6295	Transfer to Reserve	4,500.00	4,500.00	4,500.00	-	
5400	6300	Building Repair/Maintenance	6,000.00		6,500.00	500.00	
5400	6340	Engineering				-	
5400	6350	Electricity	1,020.00	1,151.74	1,200.00	180.00	
5400	6400	Equip Repair/Maintenance	9,000.00			(9,000.00)	
5400	6401	Machinery Rentals	20,719.00	43,960.00	20,000.00	(719.00)	
5400	6410	Fuel				-	
5400	6870	Foundations				-	
5400	6950	Depreciation				-	
5400	6955	Gain/Loss on Disposal				-	
Total Expenditures			92,986.00	100,549.56	86,618.00	(6,368.00)	-13.86%
Blyth Cemetery							
5410	6100	Salaries - Full Time	19,166.00	9,212.22	19,136.00	(30.00)	
5410	6120	Benefits - Full Time	5,292.00	2,407.17	5,549.00	257.00	
5410	6200	Clothing/Uniforms	160.00		160.00	-	
5410	6210	Subscriptions/Memberships	200.00	91.43	200.00	-	
5410	6220	Training/Travel/Workshops	520.00	488.45	520.00	-	
5410	6230	Health & Safety	80.00		80.00	-	
5410	6250	Office Supplies		9.98	-	-	
5410	6260	Phone/Fax/Internet	440.00	335.88	500.00	60.00	
5410	6270	Insurance	640.00	530.40	600.00	(40.00)	
5410	6280	Legal		145.17		-	
5410	6290	Materials/Supplies	6,000.00	818.05	6,000.00	-	
5410	6292	Misc Expense	2,000.00	223.50	2,000.00	-	
5410	6295	Transfer to Reserve	3,000.00	3,000.00	3,000.00	-	
5410	6300	Building Repair/Maintenance	4,000.00	7,326.72	4,500.00	500.00	
5410	6330	Inspections/Contracts		35.84		-	
5410	6340	Engineering				-	
5410	6350	Electricity	680.00		750.00	70.00	
5410	6400	Equip Repair/Maintenance	3,000.00			(3,000.00)	
5410	6401	Machinery Rentals	13,813.00	12,345.00	13,500.00	(313.00)	
5410	6410	Fuel				-	
5410	6870	Foundations				-	
5410	6950	Depreciation				-	
5410	6955	Gain/Loss on Disposal				-	
Total Expenditures			58,991.00	36,969.81	56,495.00	(2,496.00)	52.81%
Closed Cemeteries							
5420	6100	Salaries & Wages	800.00	334.69	2,000.00	1,200.00	
5420	6120	Benefits	232.00	96.61	520.00	288.00	
5420	6401	Machinery Rentals	468.00	435.00	500.00	32.00	
Total			1,500.00	866.30	3,020.00	1,520.00	
54XX		Machine Costs		2,917.99		-	
Total Cemeteries Expenses			153,477.00	141,303.66	146,133.00	(7,344.00)	3.42%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 ChildCare Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
6400	5120	Misc Revenue		10,000.00	10,000.00		
6400	5125	Transfer from Reserve				-	
6400	5205	Revenue from Parents	418,475.00	447,867.62	440,267.00	21,792.00	
6400	5505	Fee Subsidy (County)	139,492.00	140,039.11	146,756.00	7,264.00	
6400	5510	Program Assistant				-	
6400	5515	Direct Operating Grant	127,987.00	143,251.70	155,188.00	27,201.00	
6400	5520	Health & Safety Grant	872.00	2,616.89		(872.00)	
6400	5521	Wage Enhancement	49,194.00	52,886.77	48,203.00	(991.00)	
6400	5525	Early Years Admin Fee	8,820.00	8,997.00	11,500.00	2,680.00	
Total Revenue			744,840.00	805,659.09	811,914.00	67,074.00	0.78%
						-	
Expenditures						-	
6400	6100	Salaries - Full Time	582,478.00	646,821.30	599,140.00	16,662.00	
6400	6120	Benefits - Full Time	124,802.00	120,348.88	138,529.00	13,727.00	
6400	6200	Clothing/Uniforms	1,000.00	702.42	1,000.00	-	
6400	6220	Training/Travel/Workshops	2,000.00	2,740.58	2,500.00	500.00	
6400	6250	Office Supplies	5,000.00	4,550.00	5,000.00	-	
6400	6270	Insurance	2,205.00	2,475.93	2,534.00	329.00	
6400	6295	Transfer to Reserve		10,000.00		-	
6400	6700	Program Occupancy	3,500.00	4,342.39	6,500.00	3,000.00	
6400	6702	Program Supplies	4,000.00	3,878.14	4,000.00	-	
6400	6704	Food	25,000.00	21,804.18	28,000.00	3,000.00	
6400	6710	Health & Safety	872.00	3,611.70		(872.00)	
Total Program Expenditures			750,857.00	821,275.52	787,203.00	36,346.00	-4.15%
						-	
Expenditures - Building						-	
6410	6100	Salaries - Full Time	5,325.00	5,858.94	6,116.00	791.00	
6410	6110	Salaries - Part Time	732.00	476.85	746.00	14.00	
6410	6111	Wages - PW Support	1,750.00	522.56	1,750.00	-	
6410	6120	Benefits - Full Time	1,669.00	1,816.49	1,900.00	231.00	
6410	6127	Benefits - PW Support	490.00	150.74	490.00	-	
6410	6270	Insurance	1,272.00	1,345.68	1,387.00	115.00	
6410	6295	Transfer to Reserves		-		-	
6410	6300	Bldg Repair/Maintenance	4,200.00	4,675.30	5,700.00	1,500.00	
6410	6320	Janitorial Supplies	5,200.00	5,569.58	5,800.00	600.00	
6410	6330	Inspections/Contracts	21,164.00	19,780.21	19,699.00	(1,465.00)	
6410	6350	Electricity	9,848.00	7,229.91	7,590.00	(2,258.00)	
6410	6360	Water/Sewer	1,400.00	1,304.59	1,400.00	-	
6410	6370	Natural Gas/Heat	1,600.00	1,838.53	1,600.00	-	
6410	6380	Waste Disposal	742.00	713.57	742.00	-	
6410	6390	SnowPlowing		-		-	
6410	6401	PW Machinery Rent	3,150.00	1,720.00	3,150.00	-	
6410	6708					-	
Total Building Expenditures			58,542.00	53,002.95	58,070.00	(472.00)	9.56%
						-	
Total Operating			809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
						-	
Capital						-	
6410	0300	Flooring				-	
6410	0300	Roof Repairs				-	
Total Capital			-			-	
						-	
Total Operating + Capital			809,399.00	874,278.47	845,273.00	35,874.00	-3.32%
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying							
Billable days - takes off two week shutdown, three week allowable vacation days							
Calculated estimating							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Early Learning Site								
			2017	2017	2018	Budget \$	Budget - Actual	
			Budget	Actuals	Budget	Variance	% Change	
Revenue								
6500	5205	Revenue from Parents	49,713.00	91,262.92	100,788.00	51,075.00		
6500	5505	Fee Subsidy (County)	16,571.00	52,100.04	33,596.00	17,025.00		
6500	5510	Program Assistant				-		
6500	5515	Direct Operating Grant	13,579.00	13,579.08	13,579.00	-		
6500	5520	Health & Safety Grant				-		
6500	5521	Wage Enhancement	7,413.00	7,413.00	8,415.00	1,002.00		
Total Revenue			87,276.00	164,355.04	156,378.00	69,102.00	-4.85%	
						-		
						-		
Expenditures								
6500	6100	Salaries - Full Time	67,554.00	112,090.00	107,006.00	39,452.00		
6500	6110	Salaries - Part Time				-		
6500	6120	Benefits - Full Time	16,719.00	20,391.00	23,550.00	6,831.00		
6500	6200	Clothing/Uniforms	130.00		260.00	130.00		
6500	6220	Training/Travel/Workshops	350.00	363.43	500.00	150.00		
6500	6250	Office Supplies	400.00	1,950.50	850.00	450.00		
6500	6700	Program Occupancy	500.00	631.97	500.00	-		
6500	6702	Program Supplies	750.00	482.83	650.00	(100.00)		
6500	6704	Food	5,000.00	12,298.28	8,000.00	3,000.00		
6500	6706	Rent				-		
6500	6710	Health & Safety Project				-		
Total Expenditures			91,403.00	148,208.01	141,316.00	49,913.00	-4.65%	
		Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying						
		Billable days - takes off two week shutdown, three week allowable vacation days						
		Increased this program to 16 children instead of 8 as we have kept two groups up there steady year round.						
		This is why revenue and costs are all increased.						

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Before & After Program Budget			2017	2017	2018	Budget \$	Budget - Actual
Maitland Campus			Budget	Actuals	Budget	Variance	% Change
Revenue							
6600	5205	Revenue from Parents	93,825.00	85,185.66	106,125.00	12,300.00	
6600	5505	Fee Subsidy (County)	31,275.00	46,200.63	35,375.00	4,100.00	
6600	5510	Program Assistant		855.97		-	
6600	5515	Direct Operating Grant	26,179.00	26,861.14	26,179.00	-	
6600	5521	Wage Enhancement	4,717.00	4,717.00	7,403.00	2,686.00	
Total Revenue			155,996.00	163,820.40	175,082.00	19,086.00	6.87%
						-	
						-	
Expenditures						-	
6600	6110	Salaries - Part Time	83,261.00	59,004.11	86,550.00	3,289.00	
6600	6125	Benefits - Part Time	12,916.00	8,876.75	13,861.00	945.00	
6600	6702	Program Supplies	3,000.00	4,364.08	3,000.00	-	
6600	6704	Food	7,000.00	7,998.75	7,000.00	-	
6600	6708	Administration Fee				-	
Total Expenditures			106,177.00	80,243.69	110,411.00	4,234.00	37.59%
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying							
Billable days 40 weeks and used am and pm calculations							
Revenue based on							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Before & After Program Budget								
Sacred Heart Campus			2017	2017	2018	Budget \$	Budget - Actual	
			Budget	Actuals	Budget	Variance	% Change	
Revenue								
6700	5205	Revenue from Parents	17,550.00	20,655.43	26,600.00	9,050.00		
6700	5505	Fee Subsidy (County)	5,850.00	2,080.56	6,650.00	800.00		
6700	5510	Program Assistant				-		
6700	5515	Direct Operating Grant	5,817.00	5,867.48	5,817.00	-		
6700	5521	Wage Enhancement	2,017.00	2,017.00	3,366.00	1,349.00		
Total Revenue			31,234.00	30,620.47	42,433.00	11,199.00	38.58%	
						-		
						-		
Expenditures						-		
6700	6110	Salaries - Part Time	23,621.00	17,974.75	24,720.00	1,099.00		
6700	6120	Benefits - Part Time	4,075.00	1,926.73	4,202.00	127.00		
6700	6702	Program Supplies	750.00	1,667.99	750.00	-		
6700	6704	Food	1,000.00	1,063.59	1,000.00	-		
6700	6708	Administration Fee				-		
Total Expenditures			29,446.00	22,633.06	30,672.00	1,226.00	35.52%	
Parent Revenue and Fee Subsidy = Total spaces estimated to sell in 2018 estimated 1/4 fee subsidy 3/4 full fee paying								
Billable days 40 weeks and used am and pm calculations								
Revenue based on								
		\						

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 EarlyON Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
6800	5125	Transfer from Reserve			20,000.00		
6800	5290	Rev-Huron County	82,440.00	102,590.00	115,000.00	32,560.00	
6800	5521	Wage Enhancement	4,043.00	1,856.79		(4,043.00)	
Total Revenue			86,483.00	104,446.79	135,000.00	48,517.00	29.25%
						-	
						-	
Expenditures						-	
6800	6110	Salaries - Part Time	55,718.00	52,143.88	69,750.00	14,032.00	
6800	6125	Benefits - Part Time	9,530.00	9,721.52	13,996.00	4,466.00	
6800	6220	Training/Travel/Workshops	5,000.00	5,506.30	7,000.00	2,000.00	
6800	6295	Transfer to Reserve		20,000.00		-	
6800	6702	Program Supplies	6,488.00	8,078.09	12,754.00	6,266.00	
6800	6706	Rent	750.00	-		(750.00)	
6800	6708	Administration Fee	8,997.00	8,997.00	11,500.00	2,503.00	
6800		EarlyON Capacity Building			20,000.00		
Total Expenditures			86,483.00	104,446.79	135,000.00	48,517.00	29.25%
Revenue 100% County funded.							

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - W Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7100	5110	Donations					
7100	5125	Transfer from Reserve	10,000.00	10,000.00		(10,000.00)	
7100	5200	Admissions/Rentals	5,600.00	5,988.63	5,711.00	111.00	
7100	5280	Grants		2,553.02		-	
Total Revenue			15,600.00	18,541.65	5,711.00	(9,889.00)	-69.20%
						-	
						-	
Expenditures						-	
7100	6100	Salaries - Full Time	45,160.00	31,863.04	46,063.00	903.00	
7100	6110	Salaries - Part Time	7,758.00	8,811.11	8,400.00	642.00	
7100	6111	Wages - PW Support	14,000.00	12,584.12	14,000.00	-	
7100	6120	Benefits - Full Time	14,415.00	11,788.49	14,786.00	371.00	
7100	6127	Benefits - PW Support	4,000.00	2,234.94	4,000.00	-	
7100	6200	Clothing/Uniforms	75.00	114.82	100.00	25.00	
7100	6210	Subscriptions/Memberships	140.00	-	140.00	-	
7100	6220	Training/Travel/Workshops	1,430.00	165.00	1,300.00	(130.00)	
7100	6230	Health & Safety		-		-	
7100	6240	Advertising/Promotion	500.00	-	500.00	-	
7100	6260	Phone/Fax/Internet		-		-	
7100	6270	Insurance	4,230.00	4,006.21	4,138.00	(92.00)	
7100	6290	Materials/Supplies	2,800.00	4,570.71	2,000.00	(800.00)	
7100	6295	Transfer to Reserve		10,000.00		-	
7100	6300	Bldg Repair/Maintenance	10,500.00	3,755.15	6,000.00	(4,500.00)	
7100	6310	Taxes	505.00	531.87	505.00	-	
7100	6320	Janitorial Supplies	400.00	413.69	400.00	-	
7100	6330	Inspections/Contracts	2,300.00	2,102.98	2,300.00	-	
7100	6350	Electricity	4,190.00	2,747.13	2,888.00	(1,302.00)	
7100	6360	Water/Sewer	4,162.00	3,343.44	3,942.00	(220.00)	
7100	6400	Equip Repair/Maintenance	4,500.00	1,966.67	4,500.00	-	
7100	6401	PW Machinery Rent	25,000.00	28,520.00	25,000.00	-	
7100	6405	Fleet Expense	400.00	400.00	400.00	-	
7100	6410	Fuel	3,200.00	565.46	1,000.00	(2,200.00)	
7100	6745	Flowers/Planters	4,000.00	3,392.61	3,500.00	(500.00)	
7100	6950	Studies - Master Plan				-	
7100	6708			-		-	
Total Expenditures			153,665.00	133,877.44	145,862.00	(7,803.00)	8.95%
				-		-	
						-	
Capital						-	
7100	0200	Wayward Signs	10,000.00			(10,000.00)	
Total Capital			10,000.00			(10,000.00)	
						-	
						-	
Total Operating + Capital			163,665.00	133,877.44	145,862.00	(17,803.00)	8.95%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7110	5110	Donations					
7110	5125	Transfer from Reserves					
7110	5200	Admissions/Rentals	1,050.00	1,168.31	1,050.00	-	
Total Revenue			1,050.00	1,168.31	1,050.00	-	-10.13%
						-	
						-	
						-	
Expenditures						-	
7110	6100	Salaries - Full Time	2,805.00	2,514.31	4,039.00	1,234.00	
7110	6110	Salaries - Part Time	11,284.00	9,258.11	11,199.00	(85.00)	
7110	6111	Wages - PW Support	2,800.00	5,134.34	2,800.00	-	
7110	6120	Benefits - Full Time	2,732.00	1,717.44	3,075.00	343.00	
7110	6127	Benfits - PW Support	800.00	1,209.80	800.00	-	
7110	6200	Clothing/Uniforms		-		-	
7110	6210	Subscriptions/Memberships	70.00	-	70.00	-	
7110	6220	Training/Travel/Workshops	150.00	-	150.00	-	
7110	6240	Advertising & Promotion	200.00	-	200.00	-	
7110	6260	Phone/Fax/Internet		-		-	
7110	6270	Insurance	1,029.00	848.71	876.00	(153.00)	
7110	6290	Materials/Supplies	4,000.00	1,905.68	2,000.00	(2,000.00)	
7110	6295	Transfer to Reserve		-		-	
7110	6300	Bldg Repair/Maintenance	6,350.00	4,709.65	7,350.00	1,000.00	
7110	6320	Janitorial Supplies		-		-	
7110	6330	Inspections/Contracts	1,755.00	1,013.51	1,755.00	-	
7110	6350	Electricity	1,000.00	950.97	1,000.00	-	
7110	6360	Water/Sewer		-		-	
7110	6400	Equipment Repair/Maintenance	2,000.00	465.37	650.00	(1,350.00)	
7110	6401	Machinery Rent	5,000.00	6,900.00	5,000.00	-	
7110	6405	Fleet Expense	3,691.00	3,691.00	3,691.00	-	
7110	6410	Fuel	900.00	290.99	300.00	(600.00)	
7110	6745	Flowers/Planters	2,400.00	2,281.01	2,500.00	100.00	
7110	6708					-	
Total Expenditures			48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%
						-	
						-	
						-	
Total Capital						-	
						-	
Total Operating + Capital			48,966.00	42,890.89	47,455.00	(1,511.00)	10.64%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Trailer Park - W Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7120	5200	Contracts/Utility Costs	6,478.00	9,943.08	6,478.00	-	
7120	5200	Admissions/Rentals	3,300.00		3,300.00	-	
Total Revenue			9,778.00	9,943.08	9,778.00	-	-1.66%
						-	
						-	
Expenditures						-	
7120	6100	Salaries - Full Time	1,342.00	844.98	1,369.00	27.00	
7120	6110	Salaries - Part Time		-		-	
7120	6111	Wages - PW Support	500.00	97.84	500.00	-	
7120	6120	Benefits - Full Time	389.00	216.88	397.00	8.00	
7120	6127	Benefits - PW Support	140.00	15.59	140.00	-	
7120	6240	Advertising/Promotion		-		-	
7120	6250	Office Supplies		-		-	
7120	6260	Phone/Fax/Internet		-		-	
7120	6270	Insurance	558.00	609.46	624.00	66.00	
7120	6300	Bldg Repair/Maintenance	2,500.00	287.72	1,500.00	(1,000.00)	
7120	6310	Taxes		-		-	
7120	6320	Janitorial Supplies		-		-	
7120	6330	Inspections/Contracts		-		-	
7120	6350	Electricity	7,000.00	5,117.75	5,376.00	(1,624.00)	
7120	6360	Water/Sewer	878.00	877.68	902.00	24.00	
7120	6380	Waste Disposal		-	900.00	900.00	
7120	6401	PW Machinery Rent	900.00	-		(900.00)	
7120	6950	Depreciation		-		-	
						-	
Total Expenditures			14,207.00	8,067.90	11,708.00	(2,499.00)	45.12%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Campground - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7130	5110	Donations		300.00		-	
7130	5200	Admissions/Rentals	22,390.00	36,628.83	27,350.00	4,960.00	
Total Revenue			22,390.00	36,928.83	27,350.00	4,960.00	-25.94%
						-	
						-	
Expenditures						-	
7130	6100	Salaries - Full Time	13,200.00	5,478.00	9,425.00	(3,775.00)	
7130	6110	Salaries - Part Time	5,208.00	4,726.61	9,646.00	4,438.00	
7130	6111	Wages - PW Support	3,080.00	2,174.59	3,080.00	-	
7130	6120	Benefits - Full Time	4,713.00	2,017.28	4,373.00	(340.00)	
7130	6127	Benefits - PW Support	880.00	557.40	880.00	-	
7130	6200	Clothing/Uniforms	100.00	-	-	(100.00)	
7130	6230	Health & Safety		-		-	
7130	6240	Advertising/Promotion	850.00	261.04	850.00	-	
7130	6270	Insurance	4,307.00	2,475.93	2,535.00	(1,772.00)	
7130	6290	Materials/Supplies	500.00	191.22	500.00	-	
7130	6295	Transfer to Reserve		33,057.83		-	
7130	6300	Bldg Repair/Maintenance	10,700.00	7,977.69	10,700.00	-	
7130	6320	Janitorial Supplies	2,300.00	2,118.14	2,300.00	-	
7130	6330	Inspections and Contracts				-	
7130	6350	Electricity	14,228.00	11,304.00	11,869.00	(2,359.00)	
7130	6360	Water/Sewer	878.00	877.68	902.00	24.00	
7130	6375	Natural Gas/Heat	200.00		200.00	-	
7130	6380	Waste Disposal	1,900.00	260.38	1,900.00	-	
7130	6400	Equip Repair/Maintenance		8.04		-	
7130	6401	PW Machinery Rentals	5,500.00	9,655.00	5,500.00	-	
7130	6410	Fuel	300.00	242.00	300.00	-	
						-	
Total Expenditures			68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%
Total Operating + Capital			68,844.00	83,382.83	64,960.00	(3,884.00)	-22.09%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Parks - EW Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7140	5110	Donations					
7140	5125	Transfer from Reserves					
7140	5200	Admissions/Rentals					
Total Revenue							
Expenditures							
7140	6100	Salaries - Full Time					
7140	6110	Salaries - Part Time					
7140	6111	Wages - PW Support	650.00	133.73	650.00	-	
7140	6120	Benefits - Full Time				-	
7140	6127	Benefits - PW Support	182.00	31.40	182.00	-	
7140	6200	Clothing/Uniforms				-	
7140	6210	Subscriptions/Memberships				-	
7140	6220	Training/Travel/Workshops				-	
7140	6240	Advertising & Promotion				-	
7140	6260	Phone/Fax/Internet				-	
7140	6270	Insurance				-	
7140	6290	Materials/Supplies	500.00		500.00	-	
7140	6295	Transfer to Reserve				-	
7140	6300	Bldg Repair/Maintenance				-	
7140	6320	Janitorial Supplies	50.00		50.00	-	
7140	6330	Inspections/Contracts	1,500.00	682.79	750.00	(750.00)	
7140	6350	Administration Overhead				-	
7140	6360	Water/Sewer				-	
7140	6400	Equipment Repair/Maintenance				-	
7140	6401	Machinery Rentals	1,170.00	120.00	1,170.00	-	
7140	6410	Fuel				-	
7140	6745	Flowers/Planters				-	
7140	6708	Administration Overhead				-	
Total Expenditures			4,052.00	967.92	3,302.00	(750.00)	241.14%
						-	
						-	
Total Operating + Capital			4,052.00	967.92	3,302.00	(750.00)	241.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Rec Programs Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7210	5125	Transfer from Reserves					
7210	5205	Program Registrations	81,477.00	71,709.04	70,480.00	(10,997.00)	
7210	5280	Grants		3,078.00			
Total Revenue			81,477.00	74,787.04	70,480.00	(10,997.00)	-5.76%
						-	
						-	
Expenditures						-	
7210	6100	Salaries - Full Time	7,317.00	7,317.00	6,530.00	(787.00)	
7210	6110	Salaries - Part Time	41,139.00	44,375.86	34,332.00	(6,807.00)	
7210	6125	Benefits - Part Time	9,116.00	5,391.85	7,730.00	(1,386.00)	
7210	6200	Clothing/Uniforms	520.00	348.00	520.00	-	
7210	6210	Subscriptions/memberships	400.00		400.00	-	
7210	6220	Training/Travel/Workshops	1,448.00	110.00	1,448.00	-	
7210	6240	Advertising/Promotion	400.00		400.00	-	
7210	6250	Office Supplies	100.00		100.00	-	
7210	6260	Phone/Fax	336.00	337.44	336.00	-	
7210	6290	Materials/Supplies	17,589.00	11,971.95	15,477.00	(2,112.00)	
7210	6295	Transfer to Reserve				-	
7210	6335	Contracts - Instructors	1,500.00	2,515.49	3,800.00	2,300.00	
7210	6400	Equip Repair/Maintenance				-	
7210	6708					-	
Total Expenditures			79,865.00	72,367.59	71,073.00	(8,792.00)	-1.79%

**TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET**

2018 Aquatic Budget							
			2017	2017	2018	Budget \$	Budget - Actual
Program			Budget	Actuals	Budget	Variance	% Change
Revenue							
7320	5125	Transfer from Reserve	182,000.00	182,000.00	1,000.00	(181,000.00)	
7220	5200	Admissions/Rentals	23,404.00	32,672.15	9,612.00	(13,792.00)	
7220	5205	Program Registrations	75,411.00	64,314.34	72,093.00	(3,318.00)	
7220	5210	Memberships/Pass	59,104.00	50,771.40	57,001.00	(2,103.00)	
7220	5255	Sales	1,000.00	1,660.18	1,000.00	-	
7220	5270	Rentals		250.00	17,626.00		
7320	5280	Trillum Grant	150,000.00	150,233.66		(150,000.00)	
Total Revenue			490,919.00	481,901.73	158,332.00	(332,587.00)	-67.14%
						-	
						-	
Expenditures						-	
7220	6100	Salaries - Full Time	50,268.00	54,006.07	51,273.00	1,005.00	
7220	6110	Salaries - Part Time	101,684.00	93,875.00	116,349.00	14,665.00	
7220	6120	Benefits - Full Time	31,864.00	23,607.35	34,649.00	2,785.00	
7220	6200	Clothing/Uniforms	1,234.00	812.31	1,234.00	-	
7220	6210	Subscriptions/Memberships	686.00	596.50	1,059.00	373.00	
7220	6220	Training/Travel/Workshops	1,803.00	260.90	1,803.00	-	
7220	6240	Advertising/Promotion				-	
7220	6250	Office Supplies	700.00	206.23	700.00	-	
7220	6290	Materials/Supplies	9,400.00	9,382.65	8,434.00	(966.00)	
7220	6295	Transfer to Reserve				-	
7220	6400	Equip Repair/Maintenance	1,450.00	3,084.51	2,850.00	1,400.00	
7220	6708	Administration Overhead				-	
7220	6790	Clothing Sales	1,000.00		1,000.00	-	
Total Program Expenditures			200,089.00	185,831.52	219,351.00	19,262.00	18.04%
						-	
						-	
Pool W - Building						-	
Expenditures						-	
7320	6100	Salaries - Full Time	31,181.00	23,942.73	31,804.00	623.00	
7320	6110	Salaries - Part Time	14,787.00	14,220.64	15,563.00	776.00	
7320	6111	Wages - Public Works Support	870.00	432.88	870.00	-	
7320	6120	Benefits - Full Time	11,556.00	8,704.84	11,869.00	313.00	
7320	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7320	6200	Clothing/Uniforms	230.00	214.19	230.00	-	
7320	6220	Training/Travel/Workshops	900.00	413.96	900.00	-	
7320	6230	Health & Safety		300.00	300.00	300.00	
7320	6260	Phone/Fax/Internet				-	
7320	6270	Insurance	3,150.00	3,519.22	3,789.00	639.00	
7320	6290	Materials/Supplies	9,000.00	13,057.72	18,200.00	9,200.00	
7320	6295	Transfer to Reserve		98,488.51	35,500.00	35,500.00	
7320	6300	Bldg Repair/Maintenance	5,238.00	5,162.94	6,363.00	1,125.00	
7320	6320	Janitorial Supplies	2,400.00	2,363.13	2,400.00	-	
7320	6330	Inspections/Contracts	6,177.00	7,078.64	4,645.00	(1,532.00)	
7320	6350	Electricity	76,000.00	72,365.11	77,178.00	1,178.00	
7320	6360	Water/Sewer	4,042.00	3,874.00	4,242.00	200.00	
7320	6370	Natural Gas/Heat	7,260.00	5,999.65	7,260.00	-	
7320	6380	Waste Disposal	1,625.00	1,319.95	1,625.00	-	
7320	6390	SnowPlowing				-	
7320	6400	Equip Repair/Maintenance	17,100.00	20,052.15	20,050.00	2,950.00	
7320	6401	Machinery Rental	1,563.00	1,526.25	1,563.00	-	
Total Building Expenditures			193,324.00	283,119.51	244,596.00	51,272.00	-13.61%
						-	
Total Operating (Program + Building)			393,413.00	468,951.03	463,947.00	70,534.00	-1.07%
						-	
Capital						-	
7320	0300	Capital Improvements	426,697.00	328,208.49		(426,697.00)	
7320	0300	Repair Pool Tiles				-	
7320	0300	To Reserves - move				-	
7320	300	Pool Liner				-	
Total Capital			426,697.00	328,208.49	-	(426,697.00)	-100.00%
						-	
						-	
Total Operating + Capital			820,110.00	797,159.52	463,947.00	(356,163.00)	-41.80%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Fitness Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7240	5125	Transfer from Reserve	4,000.00	4,000.00		(4,000.00)	
7240	5200	Admissions/Rentals		713.84		-	
7240	5205	Program Registrations	8,430.00	5,277.71	1,974.00	(6,456.00)	
7240	5210	Memberships/Pass	163,276.00	162,472.33	156,910.00	(6,366.00)	
7240	5255	Sales				-	
7240	5280	Grants		171.33			
Total Revenue			175,706.00	172,635.21	158,884.00	(16,822.00)	-7.97%
						-	
						-	
Program Expense						-	
7240	6100	Salaries - Full Time	47,561.00	38,679.17	48,512.00	951.00	
7240	6110	Salaries - Part Time	37,756.00	49,118.00	33,031.00	(4,725.00)	
7240	6120	Benefits - Full Time	20,211.00	18,964.37	19,684.00	(527.00)	
7240	6200	Clothing/Uniforms	200.00	169.10	130.00	(70.00)	
7240	6210	Subscriptions/Memberships	1,134.00	842.10	1,014.00	(120.00)	
7240	6220	Training/Travel/Workshops	2,035.00	1,688.06	2,035.00	-	
7240	6240	Advertising/Promotion		358.73		-	
7240	6250	Office Supplies	750.00	772.48	550.00	(200.00)	
7240	6290	Materials/Supplies	400.00	248.65	380.00	(20.00)	
7240	6295	Transfer to Reserve				-	
7240	6300	Bldg Repair/Maintenance				-	
7240	6330	Inspections/Contracts	12,165.00	6,404.68	6,550.00	(5,615.00)	
7240	6400	Equip Repair/Maintenance	2,260.00	1,992.78	2,080.00	(180.00)	
7240	6708	Administration Overhead				-	
Total Program Expense			124,472.00	119,238.12	113,966.00	(10,506.00)	-4.42%
						-	
						-	
Fitness Building - Expenses						-	
						-	
7325	6100	Salaries - Full Time	9,917.00	9,341.31	10,115.00	198.00	
7325	6110	Salaries - Part Time	870.00	10,196.34	11,541.00	10,671.00	
7325	6111	Wages - PW Support	10,844.00	432.88	870.00	(9,974.00)	
7325	6120	Benefits - Full Time	4,719.00	4,239.07	4,895.00	176.00	
7325	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7325	6200	Clothing/Uniforms				-	
7325	6260	Phone/Fax/Internet				-	
7325	6270	Insurance	3,342.00	3,519.22	3,789.00	447.00	
7325	6290	Materials/Supplies				-	
7325	6295	Transfer to Reserve				-	
7325	6300	Bldg Repair/Maintenance	3,143.00	3,111.46	3,818.00	675.00	
7325	6320	Janitorial Supplies	1,600.00	1,648.60	1,600.00	-	
7325	6330	Inspections and Contracts	6,177.00	6,933.90	4,645.00	(1,532.00)	
7325	6350	Electricity	8,000.00	7,737.01	8,124.00	124.00	
7325	6360	Water/Sewer	2,021.00	1,936.94	2,121.00	100.00	
7325	6370	Natural Gas/Heat	4,620.00	3,817.94	4,620.00	-	
7325	6380	Waste Disposal	1,625.00	1,430.05	1,625.00	-	
7325	6390	SnowPlowing				-	
7325	6400	Equip Repair/Maintenance	2,175.00	1,528.00	2,175.00	-	
7325	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
Total Building Expenses			60,861.00	57,481.97	61,746.00	885.00	7.42%
						-	
Total Operating (Program + Building)			185,333.00	176,720.09	175,712.00	(9,621.00)	
						-	
Capital						-	
						-	
7240	0400	Cross Trainer	9,000.00	6,575.00		(9,000.00)	
Total Capital			9,000.00	6,575.00		(9,000.00)	
						-	
						-	
Total Operating + Capital			194,333.00	183,295.09	175,712.00	(18,621.00)	-4.14%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Rec Admin Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7301	5120	Misc Revenue	300.00	648.62	300.00	-	
7301	5125	Transfer from Reserves	45,000.00	45,000.00	50,000.00	5,000.00	
7301	5215	Gift Certificates		964.43			
7301	5250	Advertising	1,200.00	8,256.21	5,800.00	4,600.00	
Total Revenue			46,500.00	54,869.26	56,100.00	9,600.00	2.24%
						-	
						-	
Expenditures						-	
7301	6100	Salaries - Full Time	186,371.00	231,783.88	221,531.00	35,160.00	
7301	6110	Salaries - Part Time	27,353.00	35,790.04	11,322.00	(16,031.00)	
7301	6120	Benefits - Full Time	66,631.00	66,825.95	62,832.00	(3,799.00)	
7301	6200	Clothing/Uniforms	856.00	443.66	756.00	(100.00)	
7301	6205	Meeting Allowance	1,600.00	1,604.65	1,600.00	-	
7301	6210	Subscriptions/Memberships	225.00	425.00	225.00	-	
7301	6220	Training/Travel/Workshops	3,500.00	4,058.55	3,500.00	-	
7301	6230	Health & Safety	1,000.00	923.29	1,400.00	400.00	
7301	6240	Advertising/Promotion	15,700.00	17,414.94	14,400.00	(1,300.00)	
7301	6250	Office Supplies	9,151.00	9,181.54	9,150.00	(1.00)	
7301	6255	Postage/Courier	1,651.00	1,097.11	1,650.00	(1.00)	
7301	6260	Phone/Fax/Internet	7,672.00	5,361.73	7,672.00	-	
7301	6270	Insurance - Facility Users		1,893.52		-	
7301	6280	Legal/Accounting	6,000.00	1,856.52	4,000.00	(2,000.00)	
7301	6295	Transfer to Reserve	20,000.00	20,000.00	20,000.00	-	
7301	6330	Inspections/Contracts	14,099.00	15,037.27	19,628.00	5,529.00	
7301	6400	Equip Repair/Maintenance	1,000.00	1,389.95	1,000.00	-	
7301	6405	Fleet Expense	14,768.00		14,768.00	-	
7301	6910	Recreation Master Plan			50,000.00	50,000.00	
Total Expenditures			377,577.00	415,087.60	445,434.00	67,857.00	7.31%
						-	
7860		Rec Special Events		1,986.79		-	
						-	
7301	0600	Business machines				-	
7301	0600	Upgrade - Legends Software	45,000.00	37,070.58		(45,000.00)	
						-	
Total Capital			45,000.00	37,070.58	-	(45,000.00)	-100.00%
						-	
						-	
Total Operating + Capital			422,577.00	454,144.97	445,434.00	22,857.00	-1.92%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena - W Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7310	5125	Transfer from Reserve	97,255.00	97,255.00		(97,255.00)	
7310	5200	Admissions		3,076.58		-	
7310	5250	Advertising	8,700.00	9,855.23	9,800.00	1,100.00	
7310	5260	Vending		23.70	25.00	25.00	
7310	5270	Room Space Rental	14,300.00	14,627.55	14,800.00	500.00	
7310	5275	Ice Rentals	129,000.00	139,141.55	132,000.00	3,000.00	
7310	5280	Grants		373.85			
7310	5290	Rev-Other Municipalities	70,000.00	70,000.00	70,000.00	-	
7310	5900	Loan Proceeds				-	
Total Revenue			319,255.00	334,353.46	226,625.00	(92,630.00)	-32.22%
						-	
Expenditures						-	
7310	6100	Salaries - Full Time	77,507.00	67,183.23	79,057.00	1,550.00	
7310	6110	Salaries - Part Time	23,659.00	24,235.48	24,132.00	473.00	
7310	6111	Wages - PW Support	870.00	432.87	870.00	-	
7310	6120	Benefits - Full Time	26,499.00	21,722.99	27,029.00	530.00	
7310	6127	Benefits - PW Support	245.00	82.98	245.00	-	
7310	6200	Clothing/Uniforms	730.00	989.96	2,380.00	1,650.00	
7310	6210	Subscriptions/Memberships	330.00		330.00	-	
7310	6220	Training/Travel/Workshops	1,700.00	2,199.13	1,700.00	-	
7310	6230	Health & Safety	500.00	528.50	600.00	100.00	
7310	6240	Advertising/Promotion	400.00		400.00	-	
7310	6250	Office Supplies	300.00	34.65	100.00	(200.00)	
7310	6260	Phone/Fax/Internet				-	
7310	6270	Insurance	3,342.00	3,519.24	3,789.00	447.00	
7310	6295	Transfer to Reserve	5,000.00	22,372.61	25,000.00	20,000.00	
7310	6300	Bldg Repair/Maintenance	10,475.00	11,008.30	12,725.00	2,250.00	
7310	6320	Janitorial Supplies	4,000.00	3,665.75	4,000.00	-	
7310	6330	Inspections/Contracts	3,427.00	6,438.41	3,725.00	298.00	
7310	6350	Electricity	98,000.00	94,779.25	99,519.00	1,519.00	
7310	6360	Water/Sewer	4,042.00	3,874.02	4,242.00	200.00	
7310	6370	Natural Gas/Heat	5,280.00	4,363.36	5,280.00	-	
7310	6375	Propane	1,776.00	1,546.26	1,776.00	-	
7310	6380	Waste Disposal	3,250.00	2,860.00	3,250.00	-	
7310	6390	SnowPlowing					
7310	6400	Equip Repair/Maintenance	16,630.00	23,277.81	24,980.00		
7310	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
7310	6410	Fuel				-	
7310	6740	Socan	185.00	185.07	185.00	-	
7310	6900	Loan Principal				-	
7310	6902	Loan Interest				-	
7310	6708	Administration Overhead				-	
Total Expenditures			289,710.00	296,826.12	326,877.00	37,167.00	10.12%
						-	
Capital						-	
						-	
7310	0300	Building Water Intrusion	97,255.00	79,882.39		(97,255.00)	
Total Capital			97,255.00	79,882.39	-	(97,255.00)	
						-	
						-	
Total Operating + Capital			386,965.00	376,708.51	326,877.00	(60,088.00)	-13.23%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Concession - W Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7315	5255	Sales	30,000.00	22,911.35	11,500.00	(18,500.00)	
7315	5260	Vending	2,800.00	4,602.11	4,500.00	1,700.00	
Total Revenue			32,800.00	27,513.46	16,000.00	(16,800.00)	-41.85%
						-	
						-	
Expenditures						-	
7315	6100	Salaries - Full Time	4,146.00	3,559.69	1,990.00	(2,156.00)	
7315	6110	Salaries - Part Time	10,593.00	9,295.27	6,720.00	(3,873.00)	
7315	6120	Benefits - Full Time	1,801.00	1,718.54	1,142.00	(659.00)	
7315	6200	Clothing/Uniforms	150.00	33.00		(150.00)	
7315	6220	Training/Travel/Workshops	50.00		-	(50.00)	
7315	6240	Advertising/Promotion	250.00		-	(250.00)	
7315	6290	Materials/Supplies	15,000.00	13,451.20	7,000.00	(8,000.00)	
7315	6400	Equip Repair/Maintenance	150.00	65.00		(150.00)	
7315	6708					-	
Total Expenditures			32,140.00	28,122.70	16,852.00	(15,288.00)	-40.08%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 KOC Hall Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7330	5205	User Fees	27,000.00	27,300.00	27,000.00	-	
7330	5205	Loan Payment	12,500.00	12,500.00	12,500.00	-	
Total Revenue			39,500.00	39,800.00	39,500.00	-	-0.75%
						-	
						-	
Expenditures						-	
7330	6100	Salaries - Full Time	1,426.00	248.88	1,455.00	29.00	
7330	6111	Wages - PW Support	870.00	432.88	870.00	-	
7330	6120	Benefits - Full Time	385.00	76.66	393.00	8.00	
7330	6127	Benefits - PW Support	245.00	83.00	245.00	-	
7330	6270	Insurance	2,506.00	2,639.41	2,209.00	(297.00)	
7330	6295	Transfer to Reserves	12,500.00	12,500.00	12,500.00	-	
7330	6300	Bldg Repair/Maintenance	2,095.00	4,410.44	2,545.00	450.00	
7330	6330	Inspections/Contracts	200.00	144.73	200.00	-	
7330	6350	Electricity	18,000.00	18,545.75	18,279.00	279.00	
7330	6360	Water/Sewer	895.00	894.93	895.00	-	
7330	6370	Natural Gas/Heat	4,840.00	3,999.92	4,840.00	-	
7330	6390	SnowPlowing				-	
7330	6400	Equip Repair/Maintenance	2,500.00	0.46	2,500.00	-	
7330	6401	Machinery Rentals	1,563.00	1,526.25	1,563.00	-	
Total Expenditures			48,025.00	45,503.31	48,494.00	469.00	6.57%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7340	5110	Donations		2,000.00			
7340	5125	Transfer from Reserves	14,668.00	14,668.80		(14,668.00)	
7340	5200	Admissions	400.00	524.76	500.00	100.00	
7340	5250	Advertising	5,800.00	5,140.78	5,200.00	(600.00)	
7340	5255	Sales	200.00	420.00	400.00	200.00	
7340	5270	Room Space Rental	2,600.00	3,758.13	3,700.00	1,100.00	
7340	5275	Ice Rentals	102,600.00	97,027.08	102,600.00	-	
7340	5280	Grants/Levies		4,972.00			
7340	5290	Rev-Other Municipalities	16,000.00	16,000.00	16,000.00	-	
Total Revenue			142,268.00	144,511.55	128,400.00	(13,868.00)	-11.15%
						-	
						-	
Expenditures						-	
7340	6100	Salaries - Full Time	39,666.00	38,783.81	39,113.00	(553.00)	
7340	6110	Salaries - Part Time	29,090.00	32,625.88	30,085.00	995.00	
7340	6111	Wages - PW Support	913.00	4,371.87	913.00	-	
7340	6120	Benefits - Full Time	16,449.00	13,003.77	16,457.00	8.00	
7340	6127	Benefits - PW Support	256.00	1,088.52	256.00	-	
7340	6200	Clothing/Uniforms	380.00	177.00	1,480.00	1,100.00	
7340	6210	Subscriptions/Memberships	330.00		330.00	-	
7340	6220	Training/Travel/Workshops	1,029.00		1,029.00	-	
7340	6230	Health & Safety	750.00	410.36	750.00	-	
7340	6240	Advertising/Promotion	500.00		500.00	-	
7340	6250	Office Supplies	300.00	239.40	300.00	-	
7340	6260	Phone/Fax/Internet	691.00	886.72	691.00	-	
7340	6270	Insurance	4,527.00	4,806.29	4,942.00	415.00	
7340	6295	Transfer to Reserve	5,000.00	5,000.00	20,000.00	15,000.00	
7340	6300	Bldg Repair/Maintenance	2,000.00	1,292.49	2,000.00	-	
7340	6320	Janitorial Supplies	2,000.00	1,724.29	2,000.00	-	
7340	6330	Inspections/Contracts	4,180.00	5,809.51	4,180.00	-	
7340	6350	Electricity	60,160.00	63,044.91	66,196.00	6,036.00	
7340	6360	Water/Sewer	3,050.00	2,669.67	3,050.00	-	
7340	6375	Propane	19,125.00	20,369.34	23,250.00	4,125.00	
7340	6380	Waste Disposal	1,100.00	1,211.41	1,200.00	100.00	
7340	6390	SnowPlowing		22.08		-	
7340	6400	Equip Repair/Maintenance	26,555.00	22,658.75	24,355.00	(2,200.00)	
7340	6401	Machinery Rentals	1,643.00	2,560.00	1,643.00	-	
7340	6410	Fuel	250.00	243.05	250.00	-	
7340	6708	Administration Overhead				-	
Total Expenditures			219,944.00	222,999.12	244,970.00	25,026.00	9.85%
						-	
						-	
Capital						-	
						-	
7340		Arena Lights	25,000.00	26,084.00		(25,000.00)	
						-	
Total Capital			25,000.00	26,084.00	-	(25,000.00)	-100%
						-	
						-	
Total Operating + Capital			244,944.00	249,083.12	244,970.00	26.00	-1.65%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Concession - B Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7345	5520	Vending	6,800.00	5,121.35	5,200.00	(1,600.00)	
7345	5525	Sales	25,000.00	19,636.07	10,000.00	(15,000.00)	
Total Revenue			31,800.00	24,757.42	15,200.00	(16,600.00)	-38.60%
						-	
						-	
Expenditures						-	
7345	6100	Salaries - Full Time				-	
7345	6110	Salaries - Part Time	12,862.00	9,148.55	5,856.00	(7,006.00)	
7345	6120	Benefits - Full Time	2,187.00	909.63	996.00	(1,191.00)	
7345	6200	Clothing/Uniforms	150.00			(150.00)	
7345	6220	Training/Travel/Workshops	50.00		-	(50.00)	
7345	6230	Health & Safety				-	
7345	6290	Materials/Supplies	15,500.00	14,248.62	8,750.00	(6,750.00)	
7345	6300	Bldg Repair/Maintenance	550.00			(550.00)	
7345	6708	Administration Overhead				-	
Total Expenditures			31,299.00	24,306.80	15,602.00	(15,697.00)	-35.81%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Hall - B Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7350	5125	Transfer from Reserves					
7350	5200	Admissions/Rentals	7,884.00	12,178.81	7,884.00	-	
7350	5255	Sales	7,400.00	311.40	7,400.00	-	
7350	5280	Grants/Levies (Trillium)				-	
Total Revenue			15,284.00	12,490.21	15,284.00	-	22.37%
Expenditures							
7350	6100	Salaries - Full Time	5,610.00	5,610.78	6,732.00	1,122.00	
7350	6110	Salaries - Part Time	15,683.00	7,137.18	16,438.00	755.00	
7350	6111	Wages - PW Support	913.00	114.32	913.00	-	
7350	6120	Benefits - Full Time	4,293.00	2,191.78	4,747.00	454.00	
7350	6127	Benefits - PW Support	256.00	13.75	256.00	-	
7350	6200	Clothing/Uniforms	350.00	115.04	350.00	-	
7350	6220	Training/Travel/Workshops	963.00		963.00	-	
7350	6230	Health & Safety	250.00	147.17	250.00	-	
7350	6250	Office Supplies	300.00	188.30	300.00	-	
7350	6260	Phone/Fax/Internet	220.00	443.04	220.00	-	
7350	6270	Insurance	4,527.00	4,806.28	4,942.00	415.00	
7350	6290	Materials/Supplies	6,000.00	362.27	6,000.00	-	
7350	6295	Transfer to Reserve				-	
7350	6300	Bldg Repair/Maintenance	2,000.00	629.75	2,000.00	-	
7350	6320	Janitorial Supplies	2,000.00	1,490.41	2,000.00	-	
7350	6330	Inspections/Contracts	2,105.00		2,105.00	-	
7350	6350	Electricity	15,040.00	15,761.17	16,549.00	1,509.00	
7350	6360	Water/Sewer	3,050.00	2,669.67	3,050.00	-	
7350	6375	Propane	5,375.00	6,373.34	6,750.00	1,375.00	
7350	6380	Waste Disposal	1,100.00	1,161.44	1,200.00	100.00	
7350	6390	SnowPlowing				-	
7350	6400	Equip Repair/Maintenance	4,000.00	1,526.55	4,000.00	-	
7350	6401	Machinery Rentals	1,643.00	2,560.00	1,643.00	-	
7350	6740	Socan	185.00	185.07	185.00	-	
7350	6708	Administration Overhead				-	
Total Expenditures			75,863.00	53,487.31	81,593.00	5,730.00	52.55%
						-	
Capital						-	
7350	300	Roof Repairs				-	
Total Capital						-	
						-	
Total Operating and Capital			75,863.00	53,487.31	81,593.00	5,730.00	52.55%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Arena E/W - Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7360	5125	Transfer from Reserves				-	
7360	5200	Admissions/Rentals	13,305.00	13,794.48	14,029.00	724.00	
			13,305.00	13,794.48	14,029.00	724.00	1.70%
Total Revenue							
Expenditures							
7360	6100	Salaries - Full Time					
7360	6110	Salaries - Part Time					
7360	6120	Benefits - Full Time					
7360	6125	Benefits - Part Time					
7360	6130	Overtime					
7360	6200	Clothing/Uniforms					
7360	6210	Subscriptions/Memberships					
7360	6220	Training/Travel/Workshops					
7360	6230	Health & Safety					
7360	6240	Advertising/Promotion					
7360	6250	Office Supplies					
7360	6260	Phone/Fax/Internet					
7360	6270	Insurance	1,511.00	1,650.11	1,689.00	178.00	
7360	6280	Legal/Accounting					
7360	6290	Materials/Supplies					
7360	6300	Bldg Repair/Maintenance					
7360	6310	Taxes					
7360	6320	Janitorial Supplies					
7360	6330	Inspections/Contracts	49,992.00	50,579.82	51,440.00	1,448.00	
7360	6340	Engineering					
7360	6350	Electricity					
7360	6360	Water/Sewer					
7360	6370	Natural Gas/Heat					
7360	6375	Propane					
7360	6380	Waste Disposal					
7360	6390	SnowPlowing					
7360	6400	Equip Repair/Maintenance					
7360	6410	Fuel					
Total Expenditures			51,503.00	52,229.93	53,129.00	1,626.00	1.72%
Total Operating + Capital			51,503.00	52,229.93	53,129.00	1,626.00	1.72%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Library - W Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
7710	5125	Transfer from Reserves				-	
7710	5200	Admissions/Rentals				-	
7710	5290	Rev-Other Municipalities	15,000.00	15,000.00	15,000.00	-	
Total Revenue			15,000.00	15,000.00	15,000.00	-	0.00%
Expenditures							
7710	6100	Salaries - Full Time	6,667.00	1,886.42	6,801.00	134.00	
7710	6110	Salaries - Part Time		308.43		-	
7710	6111	Wages - PW Support	1,084.00	282.52	1,084.00	-	
7710	6120	Benefits - Full Time	1,933.00	620.26	1,972.00	39.00	
7710	6127	Benefits - PW Support	303.00	81.92	303.00	-	
7710	6270	Insurance	2,457.00	2,651.27	2,721.00	264.00	
7710	6295	Transfer to Reserve				-	
7710	6300	Bldg Repair/Maintenance	1,000.00	1,410.10	2,000.00	1,000.00	
7710	6320	Janitorial Supplies	450.00	305.52	450.00	-	
7710	6330	Inspections/Contracts	6,365.00	6,591.49	6,365.00	-	
7710	6350	Electricity	6,800.00	4,586.65	4,816.00	(1,984.00)	
7710	6360	Water/Sewer	1,058.00	1,086.89	1,082.00	24.00	
7710	6370	Natural Gas/Heat	2,000.00	1,716.81	1,800.00	(200.00)	
7710	6380	Waste Disposal	494.00	464.05	494.00	-	
7710	6390	SnowPlowing				-	
7710	6401	Machinery Rental	1,950.00	846.63	1,950.00	-	
7710	6708					-	
Total Expenditures			32,561.00	22,838.96	31,838.00	(723.00)	39.40%
						-	
7710	300	Windows/exterior painting				-	
7710	300	Flooring/paint				-	
Total Capital						-	
						-	
Total Operating + Capital			32,561.00	22,838.96	31,838.00	(723.00)	39.40%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Library - B Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7720	5290	Rev-Other Municipalities	9,996.00	9,999.96	9,996.00	-	
Total Revenue			9,996.00	9,999.96	9,996.00	-	-0.04%
Expenditures							
7720	6100	Salaries - Full Time				-	
7720	6110	Salaries - Part Time	1,902.00	1,561.07	1,940.00	38.00	
7720	6120	Benefits - Full Time	323.00	118.33	330.00	7.00	
7720	6260	Phone/Fax/Internet				-	
7720	6295	Transfer to Reserve				-	
7720	6300	Bldg Repair/Maintenance	300.00		300.00	-	
7720	6320	Janitorial Supplies	325.00	303.13	325.00	-	
7720	6330	Inspections/Contracts	11,882.00	11,716.56	11,917.00	35.00	
7720	6708	Administration Overhead				-	
Total Expenditures			14,732.00	13,699.09	14,812.00	80.00	8.12%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Museum Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7810	5110	Donations	50.00	25.00		(50.00)	
7810	5120	Misc Revenue/Gift Shop	200.00	227.00		(200.00)	
7810	5125	Transfer from Reserves	15,000.00	15,000.00	8,015.00	(6,985.00)	
7810	5200	Admissions/Rents	4,000.00	4,596.52		(4,000.00)	
7810	5210	Memberships/Pass				-	
7810	5255	Fundraising Revenue	500.00			(500.00)	
7810	5280	Grants/Levies	700.00	1,539.00		(700.00)	
Total Revenue			20,450.00	21,387.52	8,015.00	(12,435.00)	-62.52%
						-	
Expenditures						-	
7810	6100	Salaries - Full Time				-	
7810	6110	Salaries - Part Time	6,500.00	5,785.14		(6,500.00)	
7810	6120	Benefits - Full Time	910.00	644.04		(910.00)	
7810	6210	Subscriptions/Memberships				-	
7810	6240	Advertising/Promotion	1,200.00	182.00		(1,200.00)	
7810	6250	Office Supplies				-	
7810	6260	Phone/Fax/Internet	400.00	304.59	400.00	-	
7810	6270	Insurance	780.00	824.29	845.00	65.00	
7810	6290	Materials/Supplies	1,200.00	783.44		(1,200.00)	
7810	6760	Fundraising Expense	500.00	716.80		(500.00)	
7810	6762	Collection Restoration				-	
7810	6764	Outreach Development				-	
7810	6766	Exhibit Expense				-	
7810	6768	Gift Shop	200.00			(200.00)	
Total Expenditures			11,690.00	9,240.30	1,245.00	(10,445.00)	-86.53%
						-	
Bldg Expense						-	
7815	6100	Salaries - Full Time	5,325.00	4,043.24	2,716.00	(2,609.00)	
7815	6110	Salaries - Part Time	951.00	432.06	485.00	(466.00)	
7815	6120	Benefits - Full Time	1,706.00	1,290.49	870.00	(836.00)	
7815	6270	Insurance	1,668.00	1,690.20	1,741.00	73.00	
7815	6295	Transfer to Reserve		7,926.42		-	
7815	6300	Bldg Repair/Maintenance	3,000.00	489.75	490.00	(2,510.00)	
7815	6320	Janitorial Supplies	300.00	6.99	30.00	(270.00)	
7815	6330	Inspections/Contracts	660.00	240.00	660.00	-	
7815	6350	Electricity	4,600.00	2,894.84	1,672.00	(2,928.00)	
7815	6360	Water/Sewer	1,100.00	841.78	842.00	(258.00)	
7815	6370	Natural Gas/Heat	2,500.00	2,865.88	1,467.00	(1,033.00)	
7815	6380	Waste Disposal	494.00	456.64	-	(494.00)	
7815	6708	Administration Overhead				-	
7815	6910	Facility Condition Assessment	15,000.00	7,073.58	8,015.00	(6,985.00)	
Total Expenditures			37,304.00	30,251.87	18,988.00	(18,316.00)	-37.23%
						-	
Total Operating			48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%
						-	
						-	
Total Operating + Capital			48,994.00	39,492.17	20,233.00	(28,761.00)	-48.77%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Memorial Hall Budget			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7850	5120	Misc Revenue		2,263.05			
7850	5125	Transfer from Reserve - Bank Balance	26,784.00			(26,784.00)	
7850	5125	Transfer from Reserve - Twsp Balance	481,206.00	337,322.79		(481,206.00)	
7850	5200	Admissions/Rentals				-	
7850	5110	14/19 - Prov Grant	1,543,604.00	1,841,720.59		(1,543,604.00)	
7850	5288	Federal Grants	367,827.00	367,826.78		(367,827.00)	
7850	5110	14/19 Contribution (Committed)	74,276.00			(74,276.00)	
Total Revenue			2,493,697.00	2,549,133.21		(2,493,697.00)	-100.00%
						-	
Expenditures						-	
7850	6100	Salaries - Full Time	1,320.00	1,486.12	1,346.00	26.00	
7850	6110	Salaries - Part Time		1,500.32		-	
7850	6120	Benefits - Full Time	383.00	556.82	390.00	7.00	
7850	6230	Health & Safety				-	
7850	6260	Phone/Fax/Internet				-	
7850	6270	Insurance	9,256.00	9,850.55	10,135.00	879.00	
7850	6291	Special Project - Trillium				-	
7850	6295	Transfer to Reserves	50,000.00	78,098.42	50,000.00	-	
7850	6300	Bldg Repair/Maintenance	1,700.00	41.29	1,700.00	-	
7850	6320	Janitorial Supplies				-	
7850	6330	Inspections/Contracts	1,000.00	967.58		(1,000.00)	
7850	6350	Electricity				-	
7850	6360	Water/Sewer				-	
7850	6370	Natural Gas/Heat				-	
7850	6375	Propane				-	
7850	6708			(280.50)		-	
Total Expenditures			63,659.00	92,220.60	63,571.00	(88.00)	-31.07%
						-	
Capital						-	
7850	0300	Memorial Hall - Phase 1	2,493,697.00	2,518,771.74		(2,493,697.00)	
7850	0300	Huron Geomatics				-	
Total Capital			2,493,697.00	2,518,771.74	-	(2,493,697.00)	-100.00%
						-	
Total Operating + Capital			2,557,356.00	2,610,992.34	63,571.00	(2,493,785.00)	-97.57%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Economic Development Budget							
			2017	2017	2018	Budget \$	Budget - Actual
			Budget	Actuals	Budget	Variance	% Change
Revenue							
7900	5110	Donations				-	
7900	5125	Transfer from Reserves				-	
7900	5205	Program Registrations				-	
7900	5280	Grants - Libro "In It to Win It"			20,000.00	20,000.00	
7900	5280	Grants - BIA's			5,000.00		
7900	5280	Grants - Huron Futures Corp			1,000.00		
7900	5280	Grants - Main Street Revitalization			42,008.00		
7900	5290	Rev - Other Municipalities				-	
Total Revenue					68,008.00	68,008.00	0
						-	
						-	
Expenditures						-	
7900	6100	Salaries - Full Time	60,060.00	60,410.46	31,000.00	(29,060.00)	
7900	6110	Salaries - Part Time				-	
7900	6120	Benefits	17,417.00	16,558.57	8,980.00	(8,437.00)	
7900	6130	Overtime		49.50			
7900	6200	Clothing/Uniforms	130.00	117.07		(130.00)	
7900	6205	Meeting Allowance	450.00	111.94	250.00	(200.00)	
7900	6210	Subscriptions/Memberships	1,250.00	740.05	1,300.00	50.00	
7900	6220	Training/Travel/Workshops	4,000.00	2,731.96	1,000.00	(3,000.00)	
7900	6240	Advertising/Promotion	22,000.00	21,905.82	20,375.00	(1,625.00)	
7900	6250	Office Supplies	1,000.00	646.23	1,000.00	-	
7900	6255	Postage/Courier	400.00		130.00	(270.00)	
7900	6260	Phone/Fax/Internet	1,500.00	878.90	900.00	(600.00)	
7900	6290	Materials/Supplies	3,750.00	2,057.93	1,500.00	(2,250.00)	
7900	6291	Ec Development Committee			2,500.00	2,500.00	
7900	6292	Alice Munro	4,500.00	3,500.00	3,500.00	(1,000.00)	
7900	6293	Special Projects	6,000.00	3,674.66	1,500.00	(4,500.00)	
7900	6294	Special Projects	6,500.00	2,500.00	45,910.00	39,410.00	
7900	6296	Special Project - Main St. Revitalization			42,008.00		
7900	6297	Special Projects - Libro Prosperity Project			36,000.00		
7900	6295	Transfer to Reserve				-	
7900	6750	Community Partnership	53,335.00	53,710.00	53,335.00	-	
7900	6752	Web Site Update	2,500.00	2,768.07	2,500.00	-	
						-	
Total Expenditures			184,792.00	172,361.16	253,688.00	68,896.00	47.18%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Planning & Development Budget							
			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
8100	5120	Misc Revenue - Developers	15,000.00	17,702.98		(15,000.00)	
8100	5125	Transfer from Reserve				-	
8100	5700	Tax Certificates	3,700.00	5,150.00	5,000.00	1,300.00	
8100	5710	Planning Applications	4,500.00	10,914.00	4,500.00	-	
Total Revenue			23,200.00	33,766.98	9,500.00	(13,700.00)	-71.87%
						-	
						-	
Expenditures						-	
8100	6100	Salaries - Full Time	10,000.00	10,000.00	10,000.00	-	
8100	6120	Benefits - Full Time	2,500.00	2,500.00	2,500.00	-	
8100	6210	Subscriptions/Memberships				-	
8100	6220	Training/Travel/Workshops				-	
8100	6240	Advertising/Promotion	1,000.00		1,000.00	-	
8100	6250	Office Supplies				-	
8100	6280	Legal/Accounting	1,500.00	4,101.51	1,500.00	-	
8100	6290	Materials/Supplies				-	
8100	6295	Transfer to Reserves				-	
8100	6330	Inspections/Contracts				-	
8100	6340	Engineering	5,000.00	6,576.34	10,000.00	5,000.00	
Total Expenditures			20,000.00	23,177.85	25,000.00	5,000.00	7.86%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Drainage Budget			2017 Budget	2017 Actuals	2018 Budget	Budget \$ Variance	Budget - Actual % Change
Revenue							
8500	5286	Conditional Grants - Drainage	7,500.00	10,127.81	9,250.00	1,750.00	
8500	5800	Tile Drain Loan Revenue	8,400.00	8,369.47	8,400.00	-	
8500	5800	Drainage - A/R				-	
Total Revenue			15,900.00	18,497.28	17,650.00	1,750.00	-4.58%
						-	
Expenditures						-	
8500	6100	Salaries - Full Time	15,000.00	355.27		(15,000.00)	
8500	6120	Benefits - Full Time		85.48		-	
8500	6210	Subscriptions/Memberships	300.00		-	(300.00)	
8500	6220	Training/Travel/Workshops	1,500.00	287.14	1,500.00	-	
8500	6250	Office Supplies			-	-	
8500	6280	Legal/Accounting			-	-	
8500	6290	Materials/Supplies			-	-	
8500	6330	Inspections/Contracts		18,164.16	18,500.00	18,500.00	
8500	6800	Tile Drain Loan Payment	8,400.00	8,369.47	8,400.00	-	
						-	
Total Expenditures			25,200.00	27,261.52	28,400.00	3,200.00	4.18%

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Borrowing - Principal & Interest Payments							
		Original	Dec 31/17				
	Yr Paid	Loan	Balance	Principal	Interest	Total	Term
Grader	2026	242,000	170,327	7,689.39	3,294.99	10,984.38	15
				7,852.40	3,131.98	10,984.38	
RINC	2022	264,000	154,989	13,451.15	2,355.83	15,806.98	10
				13,655.61	1,956.06	15,611.67	
2009 Roads	2021	293,000	145,402	15,547.01	2,165.07	17,712.08	10
				15,389.30	1,872.78	17,262.08	
2016 P & I		799,000	470,718	73,584.86	14,776.71	88,361.57	
						-	
Sub-total				73,584.86	14,776.71	88,361.57	
Training Centre	2032	1,200,000	1,001,209.76	25,092.28	17,666.79	42,759.07	20
				25,557.74	17,201.33	42,759.07	
Fire Payouts	2026	838,000	589,811	26,626.90	11,409.93	38,036.83	15
				27,191.39	10,845.44	38,036.83	
2017 Total		2,837,000	2,061,739	178,053.17	71,900.20	249,953.37	
ESTC/Fire Dept Split							
Training Centre		1,200,000		25,092.28	17,666.79	42,759.07	
				25,557.74	17,201.33	42,759.07	
				50,650.02	34,868.12	85,518.14	
55% ESTC		55%		27,857.51	19,177.47	47,034.98	
45% Fire Dept		45%		22,792.51	15,690.65	38,483.16	
				50,650.02	34,868.12	85,518.14	
Fire				26,626.90	11,409.93	38,036.83	
				27,191.39	10,845.44	38,036.83	
				22,792.51	15,690.65	38,483.16	
				76,610.80	37,946.02	114,556.82	

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Capital Spending										
	Budget	Grant	Long Term	Reserves	User	Gas Tax	Taxation	Donations/ Other	Total	Difference
		Funding	Borrowing		Fees					
Mill Street - Phase 3 OCIF Top Up									-	-
Westmoreland St - Final Cover	30,273.00	30,273.00							30,273.00	-
Arthur Street - Phase 2	52,745.00	52,745.00							52,745.00	-
Rural Roads - Tar & Chip Program	101,760.00	101,760.00							101,760.00	-
Equipment Purchase - Mower	25,440.00						25,440.00		25,440.00	-
Trackless Sidewalk Machine	101,760.00						101,760.00		101,760.00	-
Howson Dam EA	69,610.00			69,610.00					69,610.00	-
Cemetery Software - Stone Orchard	50,091.00			50,091.00					50,091.00	-
Wingham Cemetery - Niche Wall	40,000.00			28,410.00			11,590.00		40,000.00	-
S/L LED Conversion Project	421,508.00		421,508.00						421,508.00	
Summit Drive - LED Streetlight Project	40,000.00		40,000.00						40,000.00	
Sewer - Arthur Street - Phase 2	64,841.00				64,841.00				64,841.00	-
Sewer - Equipment Upgrades	34,000.00				34,000.00				34,000.00	-
Water - Equipment Upgrades	30,000.00				30,000.00				30,000.00	
Water - Arthur Street	186,973.00				186,973.00				186,973.00	-
Police - Firearms	14,400.00						14,400.00		14,400.00	
Police - Uniforms/Equip Additional officers	18,000.00						18,000.00			
Townhall Theatre - Renovations	38,000.00			38,000.00					38,000.00	
Wayward Signs	10,000.00			10,000.00					10,000.00	-
Fire Hall Grates	8,000.00			6,500.00			1,500.00		8,000.00	-
Police Roof	26,000.00			20,000.00			6,000.00		26,000.00	-
Day Care Roof - Engineering	25,000.00			18,750.00			6,250.00		25,000.00	-
Day Care - Washroom Renovation	35,000.00	35,000.00							35,000.00	
Fitness - Treadmill #1	10,000.00						10,000.00		10,000.00	-
Fitness/Squash - HVAC	35,000.00						35,000.00		35,000.00	-
Floor Scrubber	7,500.00						7,500.00		7,500.00	-
Multi-purpose Cleaning Machine	6,500.00			6,500.00					6,500.00	
Legends Software	5,000.00			5,000.00					5,000.00	
CO Monitors for Arena	10,000.00						10,000.00		10,000.00	-
Complex - Roof Leaks - Fitness Area	113,000.00			15,255.00			97,745.00		113,000.00	-
Memorial Hall - Renovation Project	154,590.00			133,690.00				20,900.00	154,590.00	-
Total Capital	1,764,991.00	219,778.00	461,508.00	401,806.00	315,814.00	-	345,185.00	20,900.00	1,764,991.00	-
		219,778.00								
		461,508.00								
		401,806.00								
		20,900.00								
		1,103,992.00								

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

2018 Capital Budget			
	Roads	Revenue	Expense
02-3100-0793	Westmoreland St - Final Cover		30,273.00
02-3100-5280	OCIF Formual Base	30,273.00	
02-3100-0794	Phase 2 - Arthur Street		52,745.00
02-3100-5280	OCIF Formula Base	52,745.00	
02-3100-0707	Rural Tar & Chip Program		101,760.00
02-3100-5280	OCIF Formula Base	101,760.00	
02-3100-0400	Equipment Purchase - Mower		25,440.00
02-3100-0400	Trackless Sidewalk Machine (used)		101,760.00
02-3100-1200	Howson Dam EA		69,610.00
02-3100-5125	Transfer from Reserves	69,610.00	
02-5400-0600	Cemetery - Stone Orchard Software		50,091.00
02-5400-5125	Transfer from Reserves	50,091.00	
02-5400-0200	Wingham Cemetery - Niche Wall		40,000.00
02-5400-5125	Transfer from Reserves	28,410.00	
02-3400-0450	S/L LED Conversion Project		421,508.00
02-3400-5900	Loan Proceeds	421,508.00	
02-3400-0450	Summit Drive Streetlight Project		40,000.00
02-3400-5900	Loan Proceeds	40,000.00	
	Total Roads	794,397.00	933,187.00
	Sewer		
02-4100-0400	Equipment Upgrades		34,000.00
02-4100-0794	Arthur Street		64,841.00
	Total Sewer	-	98,841.00
	Water		
02-4300-0400	Equipment Upgrades		30,000.00
02-4300-0794	Arthur Street		186,973.00
	Total Water	-	216,973.00
	Total Water/Sewer		315,814.00
02-2200-0400	Police - Firearms		14,400.00
02-2200-0400	Uniforms/Equipment Additional officers		18,000.00
	Total Police		32,400.00
	Recreation & Facilities		
02-1210-0300	Theatre Renovations		38,000.00
02-1210-5125	Transfer from Reserve	38,000.00	
02-7100-0200	Wayward Signs		10,000.00
02-7100-5125	Transfer from Reserve	10,000.00	
02-2120-0300	Fire Hall Grates		8,000.00
02-2120-5125	Transfer from Reserve	6,500.00	
02-2210-0300	Police Roof		26,000.00
02-2210-5125	Transfer from Reserve	20,000.00	
02-6410-0300	Day Care Roof - Engineering		25,000.00
02-6410-5125	Transfer from Reserve	18,750.00	
02-6410-0300	Day Care - Washroom Renovation		35,000.00
02-6410-5290	Grant - County of Huron	35,000.00	
02-7240-0400	Fitness - Treadmill #1		10,000.00
02-7325-0300	Fitness Squash HVAC		35,000.00
02-7310-0400	Multi-purpose Cleaning Machine		6,500.00
02-7310-5125	Transfer from Reserve	6,500.00	
02-7310-0400	Floor Scrubber		7,500.00
02-7301-0600	Legends Software		5,000.00
02-7301-5125	Transfer from Reserve	5,000.00	
02-7310-0400	CO Monitors for Arena		10,000.00
02-7310-0300	Roof Leaks (Fitness Area)		113,000.00
02-7310-5125	Transfer from Reserve	15,255.00	
02-7850-0306	Memorial Hall - Twsp Other		149,590.00
02-7850-0303	Memorial Hall -Twsp Consulting		5,000.00
02-7850-5125	Memorial Hal - Transfer from Reserves	133,690.00	
02-7850-	Memorial Hall - Donations	20,900.00	
	Total Recreation & Facilities	309,595.00	483,590.00
	Total Capital	1,103,992.00	1,764,991.00

2018 DRAFT BUDGET

[illegible]

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

Township of North Huron			13.03%						
2018 Taxes vs 2017 Tax Examples									
Wingham			Assessment	Municipal	County	Education	Total Rate	Total Tax	
2018		006-022		148,500	0.01418319	0.00478507	0.00170000	0.02066826	3,069.24
2017	RT		2.24%	145,250	0.01278324	0.00495408	0.00179000	0.01952732	2,836.34
									232.89
2018		019-036		178,000	0.01418319	0.00478507	0.00170000	0.02066826	3,678.95
2017	RT		3.19%	172,500	0.01278324	0.00495408	0.00179000	0.01952732	3,368.46
									310.49
2018		016-101		305,500	0.01418319	0.00478507	0.00170000	0.02066826	6,314.15
2017	RT		0.41%	304,250	0.01278324	0.00495408	0.00179000	0.01952732	5,941.19
									372.97
2018				825,000	0.01560151	0.00526358	0.01055893	0.03142402	25,924.82
2017	CT	001-043	1.13%	815,750	0.01406157	0.00544949	0.01071388	0.03022494	24,655.99
									1,268.82
Blyth									
2018		005-04701	4.24%	123,000	0.01066317	0.00478507	0.00170000	0.01714824	2,109.23
2017	RT			118,000	0.01018527	0.00495408	0.00179000	0.01692935	1,997.66
									111.57
2018		003-023	2.52%	274,500	0.01066317	0.00478507	0.00170000	0.01714824	4,707.19
2017	RT			267,750	0.01018527	0.00495408	0.00179000	0.01692935	4,532.83
									174.36
East Wawanosh									
2018		010-014	6.16%	69,800	0.00926412	0.00478507	0.00170000	0.01574919	1,099.29
2017	RT			65,750	0.00888333	0.00495408	0.00179000	0.01562741	1,027.50
									71.79
2018			14.99%	663,200	0.00231603	0.00119627	0.00042500	0.00393730	2,611.22
2017	FT			576,750	0.00222083	0.00123852	0.00044750	0.00390685	2,253.28
									357.94

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	3,739,437	Base Rate							
TAX RATE CALCULATIONS											
	Township of North Huron										
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)				
	Returned										
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of				
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax				
	1999 Current Value Based Assessment	Class (excludes rail/municipal Act or as per	(col. 3 X's (1 - col. 4))	(col. 2 X's col. 5)	rate (calculated below) X's Col. 5	(col. 2 X's col. 7)					
res/farm (RT)	339,331,090	1.000000	0.00%	0.000000	339,331,090	0.00818334	\$2,776,862				
multi-res (MT)	9,850,550	1.100000	0.00%	1.100000	10,835,605	0.00900167	\$88,671				
farmlands (FT)	209,742,659	0.250000	0.00%	0.250000	52,435,665	0.00204584	\$429,099				
commercial (CT)	35,165,594	1.100000	0.00%	1.100000	38,682,153	0.00900167	\$316,549				
industrial (IT)	9,965,920	1.100000	0.00%	1.100000	10,962,512	0.00900167	\$89,710				
pipeline (PT)	4,284,196	0.700000	0.00%	0.700000	2,998,937	0.00572834	\$24,541				
managed forests (TT)	2,431,256	0.250000	0.00%	0.250000	607,814	0.00204584	\$4,974				
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0				
	610,771,265				455,853,776		\$3,730,407				
res/farm farmland class I (R1)	122,100	0.250000	0.00%	0.250000	30,525	0.00204584	250				
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00818334	0				
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00818334	0				
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00900167	0				
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00900167	0				
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00900167	0				
commercial excess/vacant unit (CU)	370,500	1.100000	30.00%	0.770000	285,285	0.00630117	2,335				
commercial vacant land (CX)	857,166	1.100000	30.00%	0.770000	660,018	0.00630117	5,401				
industrial excess/vacant unit (IU)	29,100	1.100000	30.00%	0.770000	22,407	0.00630117	183				
industrial vacant land (IX)	102,750	1.100000	30.00%	0.770000	79,118	0.00630117	647				30,973,125.00
industrial (IH)	23,750	1.100000	0.00%	1.100000	26,125	0.00900167	214 **				2,981,225.00
	1,505,366				1,103,477		9,030				33,954,350.00
Total Returned Assess.	612,276,631				456,957,254		\$3,739,437				
Levy Requirements											
net levy =	3,739,437										
			(col. 6 Total)								
TOTAL MUNICIPAL	3,739,437	divided by	456,957,254	equals	Res/Farm Tax Rate	0.00818334					
Updated April 3/2017											

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	1,427,265	Wingham Ward				
TAX RATE CALCULATIONS								
	Township of North Huron							
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)	
	Returned							
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of	
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax	
1999-Current Value Based Assessment Class (excludes rail) Municipal Act or as prescribed in col. 3 X's (1 - col. 4) (col. 2 X's col. 5) calculated below X's (col. 2 X's col. 7)								
	192,435,594	1.000000	0.00%	0.000000	192,435,594	0.00599985	\$1,154,585	
res/farm (RT)	192,435,594	1.000000	0.00%	0.000000	192,435,594	0.00599985	\$1,154,585	
multi-res (MT)	7,972,050	1.100000	0.00%	1.100000	8,769,255	0.00659984	\$52,614	
farmlands (FT)	38,650	0.250000	0.00%	0.250000	9,663	0.00149996	\$58	
commercial (CT)	24,455,246	1.100000	0.00%	1.100000	26,900,771	0.00659984	\$161,401	
industrial (IT)	7,816,500	1.100000	0.00%	1.100000	8,598,150	0.00659984	\$51,588	
pipeline (PT)	740,933	0.700000	0.00%	0.700000	518,653	0.00419990	\$3,112	
managed forests (TT)	0	0.250000	0.00%	0.250000	0	0.00149996	\$0	
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0	
	233,458,973				237,232,085		\$1,423,357	
res/farm farmland class I (R1)	0	0.250000	0.00%	0.250000	0	0.00149996	0	
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00599985	0	
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00599985	0	
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00659984	0	
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00659984	0	
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00659984	0	
commercial excess/vacant unit (CU)	109,550	1.100000	30.00%	0.770000	84,354	0.00461989	506	
commercial vacant land (CX)	570,500	1.100000	30.00%	0.770000	439,285	0.00461989	2,636	
industrial excess/vacant unit (IU)	29,100	1.100000	30.00%	0.770000	22,407	0.00461989	134	
industrial vacant land (IX)	102,750	1.100000	30.00%	0.770000	79,118	0.00461989	475	21,802,700.00
industrial (IH)	23,750	1.100000	0.00%	1.100000	26,125	0.00659984	157	2,652,546.00
	835,650				651,288		3,908	24,455,246.00
Total Returned Assess.	234,294,623				237,883,373		\$1,427,265	
Levy Requirements								
net levy =	1,427,265							
			(col. 6 Total)					
TOTAL MUNICIPAL	1,427,265	divided by	237,883,373	equals	Res/Farm Tax Rate	0.00599985		
Agrees to Assessment Roll								

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	210,525	Blyth Ward					
TAX RATE CALCULATIONS									
	Township of North Huron								
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)		
	Returned								
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of		
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax		
1999-Current Value Based Ass Class (excludes rail/municipal Act or as pres				(col. 3 X's (1 - col. 4))	(col. 2 X's col. 5)	(calculated below) X's C	(col. 2 X's col. 7)		
res/farm (RT)	72,853,835	1.000000	0.00%	0.000000	72,853,835	0.00247983	\$180,665		
multi-res (MT)	1,878,500	1.100000	0.00%	1.100000	2,066,350	0.00272782	\$5,124		
farmlands (FT)	961,150	0.250000	0.00%	0.250000	240,288	0.00061996	\$596		
commercial (CT)	6,852,938	1.100000	0.00%	1.100000	7,538,232	0.00272782	\$18,694		
industrial (IT)	1,470,500	1.100000	0.00%	1.100000	1,617,550	0.00272782	\$4,011		
pipeline (PT)	518,468	0.700000	0.00%	0.700000	362,928	0.00173588	\$900		
managed forests (TT)		0.250000	0.00%	0.250000	0	0.00061996	\$0		
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0		
	84,535,391				84,679,182		\$209,990		
res/farm farmland class I (R1)	110,000	0.250000	0.00%	0.250000	27,500	0.00061996	68		
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00247983	0		
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00247983	0		
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00272782	0		
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00272782	0		6,711,538.00
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00272782	0		141,400.00
commercial excess/vacant unit (C)	34,650	1.100000	30.00%	0.770000	26,681	0.00190947	66		6,852,938.00
commercial vacant land (CX)	209,666	1.100000	30.00%	0.770000	161,443	0.00190947	400		
industrial excess/vacant unit (IU)		1.100000	30.00%	0.770000	0	0.00190947	0		
industrial vacant land (IX)	0	1.100000	30.00%	0.770000	0	0.00190947	0		
	354,316				215,623		535		
Total Returned Assess.	84,889,707				84,894,805		\$210,525		
Levy Requirements									
net levy =	210,525								
			(col. 6 Total)						
TOTAL MUNICIPAL	210,525	divided by	84,894,805	equals	Res/FarmTax Rate	0.00247983			
Agrees to Assessment Roll									

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

SCHEDULE 1		net levy =	145,018	E/W Ward					
TAX RATE CALCULATIONS									
	Township of North Huron								
(COLUMN 1)	(COLUMN 2)	(COLUMN 3)	(COLUMN 4)	(COLUMN 5)	(COLUMN 6)	(COLUMN 7)	(COLUMN 8)		
	Returned								
Description	Assessment	Transition	Tax	Weighted	Weighted	Tax Rate	Proof of		
		Ratio	Reductions	Ratio	Assessment	Residential and farm	Tax		
1999-Current Value Based Assessment Class (excludes rail) as prescribed by Municipal Act or as prescribed by Council				(col. 3 X's (1 - col. 4))	(col. 2 X's col. 5)	calculated below X's	(col. 2 X's col. 7)		
res/farm (RT)	74,041,661	1.000000	0.00%	0.000000	74,041,661	0.00108078	\$80,023		
multi-res (MT)		1.100000	0.00%	1.100000	0	0.00118886	\$0		
farmlands (FT)	208,742,859	0.250000	0.00%	0.250000	52,185,715	0.00027019	\$56,401		
commercial (CT)	3,857,410	1.100000	0.00%	1.100000	4,243,151	0.00118886	\$4,586		
industrial (IT)	678,920	1.100000	0.00%	1.100000	746,812	0.00118886	\$807		
pipeline (PT)	3,024,795	0.700000	0.00%	0.700000	2,117,357	0.00075655	\$2,288		
managed forests (TT)	2,431,256	0.250000	0.00%	0.250000	607,814	0.00027019	\$657		
utility & distribution (UT)			0.00%	0.000000	0	0.00000000	\$0		
	292,776,901				133,942,509		\$144,762		
res/farm farmland class I (R1)	12,100	0.250000	0.00%	0.250000	3,025	0.00027019	3		
res/farm farmland class II (R4)	0	1.000000	0.00%	1.000000	0	0.00108078	0		
res/farm farmland class III (R7)		1.000000	0.00%	1.000000	0	0.00108078	0		3,157,328.00
multi-res. farmland class I (M1)		1.100000	0.00%	1.100000	0	0.00118886	0		700,082.00
multi-res. farmland class II (M4)		1.100000	0.00%	1.100000	0	0.00118886	0		3,857,410.00
multi-res. farmland class III (M7)		1.100000	0.00%	1.100000	0	0.00118886	0		
commercial excess/vacant unit (CU)	226,300	1.100000	30.00%	0.770000	174,251	0.00083220	188		
commercial vacant land (CX)	77,000	1.100000	30.00%	0.770000	59,290	0.00083220	64		
industrial excess/vacant unit (IU)	0	1.100000	30.00%	0.770000	0	0.00083220	0		
industrial vacant land (IX)	0	1.100000	30.00%	0.770000	0	0.00083220	0		
	315,400				236,566		256		
Total Returned Assess.	293,092,301				134,179,075		\$145,018		
Levy Requirements									
net levy =	145,018								
			(col. 6 Total)						
TOTAL MUNICIPAL	145,018	divided by	134,179,075	equals	Res/FarmTax Rate	0.00108078			
Agrees to Assessment Roll									

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

TOWNSHIP OF NORTH HURON - 2018 Assessment					
RTC		WINGHAM	BLYTH	E/W	TOTAL
RT		192,435,594.00	72,853,835.00	74,041,661.00	339,331,090.00
MT		7,972,050.00	1,878,500.00		9,850,550.00
FT		38,650.00	961,150.00	208,742,859.00	209,742,659.00
CT/ST		21,802,700.00	6,711,538.00	3,157,328.00	31,671,566.00
XT		2,652,546.00	141,400.00	700,082.00	3,494,028.00
IT/LT		7,816,500.00	1,470,500.00	678,920.00	9,965,920.00
PT		740,933.00	518,468.00	3,024,795.00	4,284,196.00
TT				2,431,256.00	2,431,256.00
R1			110,000.00	12,100.00	122,100.00
CU		109,550.00	34,650.00	226,300.00	370,500.00
CX		570,500.00	209,666.00	77,000.00	857,166.00
IU		29,100.00			29,100.00
IX		102,750.00			102,750.00
IH		23,750.00			23,750.00
TAXABLE		234,294,623.00	84,889,707.00	293,092,301.00	612,276,631.00
PIL		975,150.00	900,800.00	2,213,350.00	4,089,300.00
EXEMPT		32,306,623.00	5,895,150.00	5,978,394.00	44,180,167.00
TOTAL		267,576,396.00	91,685,657.00	301,284,045.00	660,546,098.00
Agrees to Assessment Roll					

TOWNSHIP OF NORTH HURON
2018 DRAFT BUDGET

TOWNSHIP OF NORTH HURON - BY-LAW #47-2018 SCHEDULE B																	
2018 TOTAL TAX LEVY																	

Schedule 'C' to By-law No. 47-2018

Wingham Business Improvement Area
Draft Budget
For the year ended December 31, 2018

REVENUE

Membership fees	27,500
Total revenue	<u>27,500</u>

EXPENSES

Administration

OBIAA membership	250	
2018 OBIAA Conference	2,000	
Annual General Meeting/Information Sessions	500	
Audit	850	
Office Supplies, Postage, etc.	<u>500</u>	4,100

Projects

Christmas Lights	2,500	
Curb Appeal	500	
Community Events and Sponsorship	750	
Wingham BIA Advertising	8,000	
Community Cash	750	
Festival of Lanterns	750	
Christmas Greenery	500	
Main Street music (amplifier & 4 speakers)	1,750	
Curb appeal special project	4,400	
Website	1,000	
Entrepreneur development	<u>2,500</u>	23,400

Total Expenses	<u>27,500</u>
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Schedule 'D' to By-law No. 47-2018
Blyth Business Improvement Area Budget 2018

*Revised
May 2/2018*

		<u>Budget</u>	
INCOME		Expenses covered by BBIA Levy	
	BBIA Levy	7,500.00	
	Associate Memberships	1,200.00	
	Total From Membership	8,700.00	
Animation Projects			
Blyth Artisan Market			
	Vendor Fees	3,000.00	
	RTO4 Animation Grant	3,500.00	
	In-Kind Supplies	500.00	
	In-Kind Advertising	1,000.00	
	Total Blyth Artisan Market	8,000.00	
Hometown Holiday Weekend			
	Jazz Concert Tickets	3,800.00	
	RTO4 Animation Grant	2,000.00	
	Dinner & Dance Tickets	3,750.00	
	Charity Run	1,250.00	
	Makers' Market (Vendor Fees)	180.00	
	A Christmas Carol Reading tix	1,520.00	
	Parade Sponsors	3,500.00	
	Total Hometown Holiday Weekend Revenue	16,000.00	
Building Blyth's OnLine Brand			
	RTO4 Animation Grant	3,500.00	
	Total Building Blyth's OnLine Brand	3,500.00	
Destination Storytelling - Historic Plaques & Projects			
	RTO4 Animation Grant	3,500.00	
	Plaque Sales to Building Owners	2,000.00	
	Total Destination Storytelling - Historic Plaques	5,500.00	
Donations/Fundraising			
	BIG Idea Fund		
	Donations		
	Total Donations/Fundraising	0.00	
Sign Board Rental		600.00	
Transfer From Reserves		5,275.00	
Total Income		47,575.00	
EXPENSES			
Animation Projects			
Blyth Artisan Market Expenses			
	Co-ordinator	4,000.00	
	Marketing	2,000.00	
	Entertainment	4,000.00	625.00
	Supplies	1,500.00	
	Total Blyth Artisan Market Expenses	11,500.00	
Hometown Holiday Weekend			
	Jazz Concert Expense	2,000.00	
	Children's Movie	1,500.00	
	Dinner & Dance Expense	2,250.00	
	Charity Run	1,250.00	
	Christmas Parade	3,500.00	
	A Christmas Carol Reading tix	2,000.00	
	Marketing	2,000.00	
	Total Hometown Holiday Weekend Expenses	14,500.00	
Building Blyth's OnLine Brand			
	Website Design & Set-up	5,000.00	2,500.00
	Social Media Setup	2,000.00	1,000.00
	Total Building Blyth's OnLine Brand Expenses	7,000.00	
Destination Storytelling - Historic Plaques & Projects			
	Researcher	3,500.00	
	Editor	700.00	
	Plaques, Portraits (Incl Installation)	2,500.00	
	Design Fees & Portraits	800.00	
	Web Page content & design	1,500.00	
	Launch	200.00	
	Total Destination Storytelling - Historic Plaques	9,200.00	
Flower Me Blyth Project Support (Pick-a-Posie)		2,000.00	
MARKETING			
	Advertising & Promotion - Blyth	1,800.00	
	Website & Social Media	200.00	
	Total MARKETING Expenses	2,000.00	2,000.00
ADMINISTRATION			
	Meeting Expenses	100.00	
	Office Supplies	150.00	
	BBIA Registration & Conference	150.00	
	Bank Service Charges	125.00	
	Audit Expense	850.00	
	Total ADMINISTRATION Expenses	1,375.00	1,375.00
Total Expense		47,575.00	7,500.00
Net Surplus/(Deficit)		0.00	

THE CORPORATION OF THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 48-2018

A by-law to establish salary ranges for municipal employees of the
Corporation of the Township of North Huron.

WHEREAS the Council of the Corporation of the Township of North Huron passed Resolution M467/17, contracting Gallagher McDowall Associates to undertake a Pay Equity and Compensation Review;

AND WHEREAS the Municipal Act, 2001, S.O. 2001, c. 25, Section 5 (3), as amended provides that a municipal power, including a municipality's capacity, rights, power and privileges under section 9, shall be exercised by by-law;

AND WHEREAS the Council of the Corporation of the Township of North Huron deems it appropriate to pass a by-law to establish salary ranges for municipal employees of the Corporation of the Township of North Huron;

NOW THEREFORE, the Council of the Corporation of the Township of North Huron enacts as follows:

1. That the "2018 Salary Grid" as attached hereto as Schedule 'A' of this By-law is hereby adopted.
2. This by-law shall come into force and take effect on May 28th, 2018.

READ A FIRST AND SECOND TIME THIS 22nd DAY OF MAY, 2018.

READ A THIRD TIME AND PASSED THIS 22nd DAY OF MAY, 2018.

CORPORATE SEAL

Neil G. Vincent, Reeve

Richard Al, Clerk

Township of North Huron
2018 Proposed Salary Grid

Similar Value Group	McD Job Code	Job Title (listed in alphabetical order within Similar Value Group)	Hours Annual	2018 PROPOSED SALARY RANGES - HOURLY \$ (2017 PROPOSED SALARY RANGES + 1.5%)					Job Rate Step 5 100%	Band Spread Diff %
				Step 1 80%	Step 2 85%	Step 3 90%	Step 4 95%			
13	1	CAO/Deputy Clerk	1,950	\$111,384	\$118,346	\$125,307	\$132,269	\$139,230		
			hourly	\$57.12	\$60.69	\$64.26	\$67.83	\$71.40	14%	
12			hourly	\$50.12	\$53.25	\$56.39	\$59.52	\$62.65	16%	
11	6	Director of Public Works	2,080	\$89,673	\$95,278	\$100,882	\$106,487	\$112,091		
			hourly	\$43.11	\$45.81	\$48.50	\$51.20	\$53.89	6%	
10	3	Director of Finance/Treasurer	1,950	\$79,498	\$84,466	\$89,435	\$94,403	\$99,372		
	5	Director of Fire & Emergency Services	1,950	\$79,498	\$84,466	\$89,435	\$94,403	\$99,372		
	4	Director of Recreation & Facilities	1,950	\$79,498	\$84,466	\$89,435	\$94,403	\$99,372		
			hourly	\$40.77	\$43.32	\$45.86	\$48.41	\$50.96	7%	
9	7	Clerk/Manager of IT	1,950	\$74,396	\$79,046	\$83,696	\$88,346	\$92,996		
			hourly	\$38.15	\$40.54	\$42.92	\$45.31	\$47.69	6%	
8	9	Manager of Child Care Services	1,950	\$70,434	\$74,836	\$79,238	\$83,640	\$88,043		
	8	Public Works Operations Supervisor	2,080	\$75,130	\$79,825	\$84,521	\$89,216	\$93,912		
			hourly	\$36.12	\$38.38	\$40.64	\$42.89	\$45.15	25%	
7	51	Building Inspector	1,950	\$56,160	\$59,670	\$63,180	\$66,690	\$70,200		
	12	Deputy Treasurer/Payroll Clerk	1,950	\$56,160	\$59,670	\$63,180	\$66,690	\$70,200		
	11	Facility Manager - Blythe & Wingham	2,080	\$59,904	\$63,648	\$67,392	\$71,136	\$74,880		
	15	Principal of ESTC	1,950	\$56,160	\$59,670	\$63,180	\$66,690	\$70,200		
			hourly	\$28.80	\$30.60	\$32.40	\$34.20	\$36.00	18%	
6	24	Aquatics Supervisor	1,950	\$47,689	\$50,670	\$53,650	\$56,631	\$59,612		
	19	Fire Prevention Officer (PT)	416	\$10,174	\$10,810	\$11,445	\$12,081	\$12,717		
	25	Fitness Supervisor	1,950	\$47,689	\$50,670	\$53,650	\$56,631	\$59,612		
	17	Lead Hand (Roads & PW)	2,080	\$50,868	\$54,048	\$57,227	\$60,406	\$63,586		
	43	Lead Hand Cemetery / Roads Operator	2,080	\$50,868	\$54,048	\$57,227	\$60,406	\$63,586		
			hourly	\$24.46	\$25.98	\$27.51	\$29.04	\$30.57	15%	
5	20	Administrative Assistant	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	16	Administrative Assistant Public Works	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	30	Assistant to CAO	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	22	Early Childhood Educator	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	26	Rec. Admin. Assistant/Programmer	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	34	Recreation Clerical & Marketing Assistant	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
	28	Recreation Operator 2	2,080	\$44,246	\$47,011	\$49,776	\$52,542	\$55,307		
	39	Roads & Landfill Operator	2,080	\$44,246	\$47,011	\$49,776	\$52,542	\$55,307		
	27	Roads Operator	2,080	\$44,246	\$47,011	\$49,776	\$52,542	\$55,307		
	21	Treasury Assistant	1,950	\$41,480	\$44,073	\$46,665	\$49,258	\$51,851		
			hourly	\$21.27	\$22.60	\$23.93	\$25.26	\$26.59	40%	
4	31	Child Care Clerical Assistant (PT)	1,040		\$16,752	\$17,737	\$18,723	\$19,708		
	23	Early Childhood Educator (PT)	varies		\$16.11	\$17.06	\$18.00	\$18.95		
	32	Food Service Person	1,482		\$23,871	\$25,276	\$26,680	\$28,084		
	36	General Labourer	2,080		\$33,504	\$35,474	\$37,445	\$39,416		
	38	Landfill Attendant (PT)	1,144		\$18,427	\$19,511	\$20,595	\$21,679		
	29	Recreation Operator 1 (PT)	1,032		\$16,623	\$17,601	\$18,579	\$19,556		
	37	Wingham Airport Operator (PT)	832		\$13,401	\$14,190	\$14,978	\$15,766		
			hourly		\$16.11	\$17.06	\$18.00	\$18.95	18%	

Township of North Huron
2018 Proposed Salary Grid

Similar Value Group	McD Job Code	Job Title (listed in alphabetical order within Similar Value Group)	Hours Annual	2018 PROPOSED SALARY RANGES - HOURLY \$ (2017 PROPOSED SALARY RANGES + 1.5%)					Job Rate Step 5 100%	Band Spread Diff %
				Step 1	Step 2	Step 3	Step 4			
				80%	85%	90%	95%			
3	33	Fitness Instructor (PT)	780			\$11,700	\$12,090	\$12,480		
	46	Head Instructor Lifeguard (PT)	varies			\$15.00	\$15.50	\$16.00		
	35	Recreation Clerical Assistant (PT)	1,040			\$15,600	\$16,120	\$16,640		
	45	Senior Instructor Lifeguard (PT)	varies			\$15.00	\$15.50	\$16.00		
	49	Summer Day Camp Supervisor (PT)	varies			\$15.00	\$15.50	\$16.00		
			hourly			\$15.00	\$15.50	\$16.00	7%	
2	42	Concession Supervisor (PT)	varies			\$14.00	\$14.50	\$15.00		
	47	Instructor Lifeguard (PT)	varies			\$14.00	\$14.50	\$15.00		
	48	Recreation Facility Attendant (PT)	varies			\$14.00	\$14.50	\$15.00	7%	
1	44	Assistant Instructor Lifeguard (PT)	varies					\$14.00		

Notes:

1. The 2018 proposed salary ranges are based on the 2017 proposed salary ranges plus 1.5% increase, except for Similar Value Groups 1 to 3 for part-time jobs.
2. The part-time 2018 proposed salary ranges for Similar Value Groups 1 to 3 have been established to reflect minimum wage and relativity to the pay rates of the adjacent pay bands.
3. For Similar Value Groups 4 to 14, there is a 5% differential between the pay rates (based on a % of step 5/job rate).
4. For Similar Value Groups 1 to 3 (part-time jobs), there is a \$0.50 differential between the pay rates.
5. Where applicable, the student minimum wage is \$13.15 in 2018.

THE TOWNSHIP OF NORTH HURON

BY-LAW NO. 55-2018

A By-law of the Township of North Huron To confirm generally previous actions of the Council of the Township of North Huron

THEREFORE the Council of the Corporation of the Township of North Huron enacts as follows:

1. The actions of the Council of the Corporation of the Township of North Huron at its meeting on May 22, 2018, be confirmed.
2. Execution by the Reeve and the Clerk of all Deeds, Instruments, and other Documents necessary to give effect to any such Resolution, Motion or other action and the affixing of the Corporate Seal, to any such Deed, Instruments, or other Documents is hereby authorized and confirmed.
3. This By-law shall come into force and takes effect on the date of its final passing.

READ A FIRST AND SECOND TIME this 22nd day of May, 2018.

READ A THIRD TIME AND FINALLY PASSED this 22nd day of May, 2018.

Neil Vincent, Reeve

SEAL

Richard Al, Clerk