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## **Appendix A**

Stakeholder Consultation Plan

MUNICIPALITY OF CENTRE HASTINGS

ONTARIO CLEAN WATER AGENCY

MADOC

WATER, WASTEWATER AND STORMWATER MASTER PLAN

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

**PUBLIC CONSULTATION PLAN**

FINAL – NOVEMBER 13, 2023

Submitted by:



Suite 203  
863 Princess Street  
Kingston, ON Canada  
K7L 5N4

JLR 32508-000



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## **1.0 INTRODUCTION**

The Ontario Clean Water Agency (OCWA) is managing a Class Environmental Assessment (Class EA) Master Plan exercise on behalf of the Municipality of Centre Hastings (the Municipality). The intent of the Master Plan is to identify existing conditions, residual capacity in the current system, and future upgrades to the water supply, wastewater, and stormwater infrastructure to accommodate future growth in Madoc.

The Master Plan is proceeding in accordance with the requirements of the Ontario Municipal Class EA, October 2000, as amended in 2015 and 2023. Public Consultation is a key element of the Master Plan process. As a result, this Public Consultation Plan has been developed to ensure that the public and other stakeholders have the opportunities to be involved and to provide comments throughout the Master Plan.

## **2.0 KEY CONSIDERATIONS**

Upon review of the background materials, several considerations likely to impact the implementation of the public consultation plan emerged. They represent both opportunities and constraints for engagement and influence how this public consultation plan is structured. These considerations include the following:

- The public consultation activity will seek meaningful inputs from the municipal staff, Council, local developers, major industries, and other stakeholders. Approval and buy-in on key milestone deliverables from Council must be obtained. Final approval of project deliverables will be obtained from the OCWA and the Municipality.
- The Municipality may experience increased development pressures as the Master Plan project progresses.
- The Municipality currently provides water and wastewater services beyond the Village boundary, into the Township of Madoc. It is anticipated that cross-municipal services to future developments will continue. The Study Area has been adjusted to include all potential developments to be serviced by Village's water and wastewater infrastructure.
- It will be essential to engage key stakeholders that govern the compliance and operation of the water, wastewater and stormwater system (e.g., OCWA, Ministry of the Environment, Conservation and Parks) or may influence the outcome of the planning process (e.g., indigenous communities).

- All public notices will be in English and in compliance with AODA guidelines.

### **3.0 CONSULTATION OBJECTIVES**

The research and analysis conducted during the development of this public consultation plan have led to the identification of the following objectives for the consultation process for the Master Plan:

- Compile a comprehensive list of stakeholders, including the MECP's Government Review Team and the Municipality's key local stakeholders.
- Analyze the stakeholder list to identify level of influence / anticipated involvement, consultation strategies, and timing. The list will be updated as the Master Plan progresses.
- Provide easy ways for the public and key stakeholders to learn about the Master Plan process using the Municipal Website, social media, newspaper (if available) and publishing project contacts.
- Host the Phase 1 Public Information Centre (PIC) in Winter 2023/2024 to obtain public buy-in at the initial stage of the Master Plan.
- Host the Phase 2 PIC in Spring 2024 to be followed by a presentation to Council in Spring/Summer 2024 to present findings and recommendations from the Master Plan.
- Encourage engagement at the PICs so that the Project Team can understand local concerns and issues.
- Facilitate effective communication with local stakeholders, regulatory agencies, and the public through AODA compliant notices by mail, email, newspaper advertisements, and the Municipal Website/social media.
- Compile feedback from the public and key stakeholders obtained from communication with the Municipality, public responses to notifications, emails, PIC comments and meetings for the Project Team's review and understanding.

### **4.0 TARGET GROUPS FOR CONSULTATION**

To satisfy the objectives of this public consultation plan, target groups should be identified. The list will generally consist of the Municipality's Stakeholder List and the MECP's Government Review Team. The Project Team will identify key stakeholders

and anticipated level of involvement, jurisdictions, and consultation strategies. As the Master Plan unfolds, additional target groups may be identified and included. Critical audiences would generally include the following and will be confirmed upon finalizing the stakeholder register:

The general public, including:

- Property owners adjacent to the water treatment plants, sewage lagoons, elevated tank, and sewage pumping stations;
- Local residents and business owners;
- Local developers;
- Affected indigenous communities, and
- Local fire department

Government organizations and agencies, including:

- Neighboring Municipalities
- County Staff
- Ministry of the Environment, Conservation and Parks (MECP)
- Hastings Prince Edward Public Health (HPEPH)
- Infrastructure Ontario (IO)
- Ministry of Agriculture, Food and Rural Affairs (MAFRA)
- Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)
- Ministry of Indigenous Affairs (IAO)
- Ministry of Municipal Affairs and Housing (MMAH)
- Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF)
- Ministry of Solicitor General (MSG)
- Ontario Provincial Police (OPP)
- Fisheries and Oceans Canada (DFO)

- Impact Assessment Agency of Canada (IAAC)

## **5.0 ACCESSIBILITY STANDARD FOR CUSTOMER SERVICE**

It will be critical throughout the Master Plan that services are provided in accordance with the Accessibility for Ontarians with Disabilities Act (AODA). This includes having respect for persons with a disability and using all reasonable efforts to ensure they have an equal opportunity to obtain and provide input.

Throughout the Master Plan, the consulting team will:

- Ensure PIC and other consultation activities, when conducted in-person, are held in buildings with barrier-free access; and
- Work with the Municipality in providing accessible formats and communications supports, upon request.

## **6.0 KEY MESSAGES**

Consistent messages with the appropriate tone and content will improve understanding among target audiences. The message statements listed below are built on a current understanding of the existing audiences, constraints, opportunities, and environmental concerns surrounding the Master Plan. These messages should be communicated throughout the Master Plan and refined, as required, as it unfolds.

- To make important servicing decisions, an implementable plan is required by the Municipality and property owners. Given the critical nature of the water, wastewater and stormwater infrastructure, the ultimate planned solution(s) need to ensure the systems are reliable and robust such that it can accommodate existing and future servicing needs.
- OCWA, the Municipality and consulting team members are committed to this Master Plan and are placing an emphasis on a seamless, open, transparent, and traceable Master Plan process.

## **7.0 RECOMMENDED STAKEHOLDER CONSULTATION ACTIVITIES**

A variety of public consultation vehicles and mechanisms are recommended to achieve the objectives of this public consultation plan. Care has been taken in selecting activities that recognize the needs of the local community and government organizations along with their specific information requirements.

## 7.1 Technical Steering Committee (TSC)

To facilitate the consultation process and communications between OCWA, JLR team and the Municipality, a TSC will be formed. The TSC will comprise of:

<b>Name</b>	<b>Agency</b>	<b>Project Role</b>
Typhany Choinard	Municipality	CAO
Alexander Kelly	Municipality	Director of Finance
Kevin Hart	Municipality	Director of Public Works
Ethan Griffith	Municipality	Environmental Supervisor
Jose Casal	OCWA	Project Manager
Amber Coupland	OCWA	Operations Manager
Justin Cassidy	OCWA	Operator
Matthew Morkem	JLR	Project Principal
Susan Shi	JLR	Project Manager

## 7.2 Consultation Meetings

The Project Team anticipates hosting up to three (3) virtual 1-hour meetings with the key stakeholders, such as the MECP, indigenous groups, industry developers, residents, landowners, and local special interest groups.

## 7.3 Public Information Centres (PICs)

PICs, either in-person or virtually, provide a good mechanism for the local community to be informed about and comment on the Master Plan. One (1) PIC will be conducted at the end of Phase 1 and one (1) PIC will be conducted near the end of Phase 2.

Both PICs will be designed to be welcoming and provide an opportunity for residents to speak directly with the consulting team, OCWA, and Municipal Staff. The appropriate PIC format and delivery method (in-person vs. virtual) will be dictated by the complexity of the alternatives, length of slides, accessibility requirements, and public health restrictions at the time of the PIC. The format can take a variety of forms such as formal presentations with a question-and-answer session and/or display boards with informal one-on-one discussions, etc. Residents will be encouraged to complete comment sheets to provide feedback to the consulting team.

The Phase 1 PIC will be conducted following the Municipality's review of the Draft Master Plan Phase 1 Report (i.e., Design Basis Memo, level of service definition and Problem / Opportunity Statement). The Phase 1 Report will present the current state of infrastructure and any identified shortfalls in providing services to committed future developments. The public, agencies, and other interest groups (e.g., Council Members, etc.) will be given an opportunity to review and comment on the information presented. The Consulting Team will compile comments collected during the PIC to help inform recommendations in the Master Plan Report.

The Phase 2 PIC will be conducted following the Municipality's review of the Draft Master Plan report. The Draft Master Plan report will provide alternative future servicing options and an evaluation matrix to present the preferred solution. Once staff and public comments are incorporated, we will provide a presentation to Council outlining the outcome of this critical juncture. Subject to Council concurrence, the Master Plan Report will be finalized by incorporating review comments and a Notice of Master Plan Completion will be placed on record for a 30-day review period, during which time any unresolved issues may be addressed.

#### **7.4 Ongoing Promotion and Consultation**

To engage the public and other stakeholders, Master Plan and PIC notices should be placed in the information pages of local newspapers (if required), Municipality's website and posted at the Municipal office. Notices will also be direct mailed/emailed to identified stakeholders, agencies, and adjacent property owners. Master Plan notices could also be provided to the Municipal Council to allow Councillors to inform their constituents about the Master Plan. Phone calls will be made to all interested Indigenous and First Nations groups to confirm that formal notices have been received.

#### **7.5 Website and Social Media**

To assist the public in obtaining information about the Master Plan and to provide an ongoing mechanism for feedback to the consulting team, the Municipality should provide space on their website and/or social media for the Master Plan. Information for the website and social media should include notices for the PIC, reports/executive summaries, technical memos and contact information.

#### **7.6 Opportunities to Comment**

At all public meetings, the public and other stakeholders will be encouraged to leave comments following the meeting. Following each consultation activity, a report would be

written that summarizes and records the comments and input received from the participants.

At the beginning of the Master Plan, email and voice mail feedback tools will be established to provide the public and other stakeholders with numerous avenues to provide input and ask questions. These feedback tools will be promoted on all communications materials.

Additional informal meetings may be required, and could be considered if local residents or the business community appear disengaged or dissatisfied with the extent or frequency of consultation activities.

### **7.7 Timing of Public Consultation**

The following schedule lists anticipated dates of key stakeholder consultation activities. These dates are subject to change as the Master Plan moves forward and based on the level of project interest shown by stakeholders.

<b>Activity</b>	<b>Anticipated Date</b>
Notice of Commencement	November 2023
Phase 1 PIC	Winter 2023/2024
Phase 2 PIC	Spring 2024
Council Presentation	Spring/Summer 2024
Notice of Master Plan Completion	Summer 2024

### **8.0 EVALUATION MECHANISMS**

The following activities should be undertaken to evaluate the effectiveness of this public consultation plan:

- Reviewing attendance numbers at the PIC;
- Requesting formal and informal feedback on the consultation process at the PIC, Council meetings and on the study website;
- Tracking the number of visits to the study website and evaluating changes in traffic that occur in response to consultation events (e.g., mailing or emailing out notices); and
- Examining the number and content of emails received from the public and other stakeholders.



## **9.0 CONCLUSIONS**

The activities contained in this public consultation plan reflect the need to have an enhanced outreach program for local residents and regulatory agencies throughout the Master Plan process. The public consultation plan has been developed ensure that the public and other stakeholders are meaningful participants in the Master Plan process.

Maintaining a clear, transparent, and inclusive consultation process will help to ensure that meaningful dialogue takes place so that innovative and achievable servicing strategies can be realized.

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**Appendix B**

Notice of Commencement

# Notice of Study Commencement

## Madoc Water, Wastewater and Stormwater Master Plan

The Municipality of Centre Hastings has initiated a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater and Stormwater Master Plan for Madoc.

### How Will This Affect Me?

The Master Plan study is assessing various options to improve the performance and reliability of the water, wastewater and stormwater infrastructure to ensure they can be relied upon to accommodate current and future flows generated within the urban boundary of Madoc.

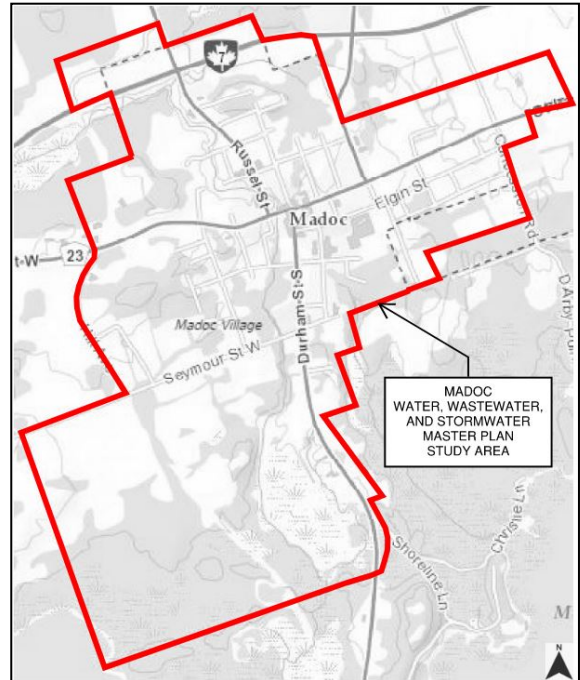
Public and agency consultation is a key part of the Master Planning process. Based on your input, the Master Plan study will identify preferred solution(s) that will benefit the community over the short, mid, and long terms.

### How Do I Get More Information?

Two Public Information Centres will be held in 2024 prior to confirming the preferred servicing solutions. In the meantime, the study team will review background information and determine alternative solutions. You can contact a member of the study team listed below with any questions or to provide input on the Master Plan study. Updates will also be provided throughout the Master Plan study on the Municipality's website.

Susan Jingmiao Shi, P.Eng., M.Eng.  
Senior Environmental Engineer  
J.L. Richards & Associates Limited  
203-863 Princess Street  
Kingston, ON K7L 5N4  
sshi@jlrichards.ca

Jose Casal, M.Sc., P.Eng., PMP  
Senior Specialist / Project Manager  
Ontario Clean Water Agency  
2085 Hurontario Street, 5<sup>th</sup> floor  
Mississauga, ON L5A 4G1  
JCasal@ocwa.ca



This study is being conducted according to the requirements of Approach 1 of a Master Plan under the Ontario Municipal Class Environmental Assessment process (October 2000, as amended in 2015 and 2023).

This Notice was issued on December 4<sup>th</sup>, 2023.

# Notice of Study Commencement

## Amendment #1

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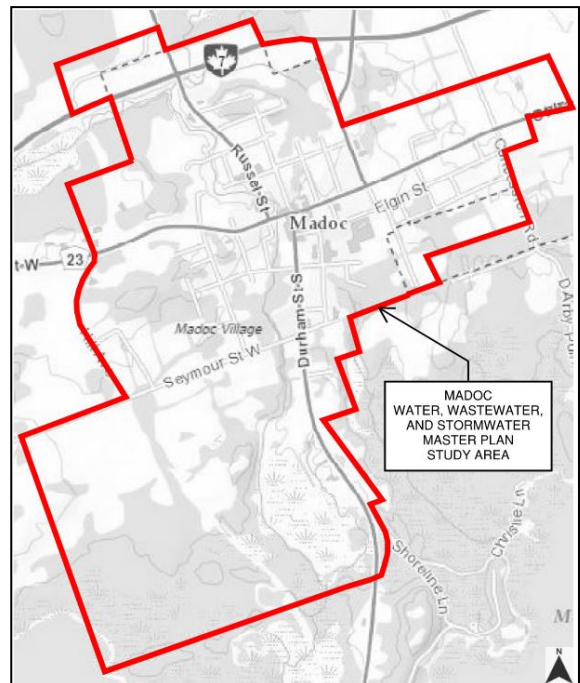
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Susan Jingmiao Shi, P.Eng., M.Eng.  
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Allison Mokracki, P.Eng.  
Water and Wastewater Engineer  
Ontario Clean Water Agency  
2085 Hurontario Street, 5<sup>th</sup> floor  
Mississauga, ON L5A 4G1  
amokracki@ocwa.com



This study is being conducted according to the requirements of Approach 1 of a Master Plan under the Ontario Municipal Class Environmental Assessment process (October 2000, as amended in 2015 and 2023).

This Notice was issued on January 2<sup>nd</sup>, 2024.

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## **Appendix C**

Stakeholder Responses and  
Mailing List

**STAKEHOLDER REVIEW AGENCY LIST**  
**Madoc Water, Wastewater and Stormwater Master Plan**

Agency	Category	Name	Title	Email	Address	Delivery Preference
Ministry of the Environment, Conservation, and Parks Environmental Assessment Branch	MECP Agency Review team			eanotification.eregion@ontario.ca		Via Streamlined EA process
Project Review Unit - Eastern Region Environmental Assessment Branch Ministry of the Environment, Conservation and Parks	MECP Agency Review team	Jon orpana	Regional Environmental Planner	jon.orpana@ontario.ca	1259 Gardiners Rd. PO Box 22032 Kingston ON K7M 8S5	1 copy
Quinte Conservation Authority	MECP Agency Review team			info@quinteconservation.ca cc: Adickens@quinteconservation.ca	2061 Old Highway 2, Belleville ON K8N 4Z2	Electronic - Email
Ontario Power Generation	MECP Agency Review team	Tammy Wong	Sr. Environment Specialist Corporate EHS Programs	tammy.wong@opg.com	700 University Avenue Toronto ON M5G 1X6	Email
Ministry of Mines	MECP Agency Review team	Tracey Burton	Manager (A) Strategic Support Unit - Mines and Minerals Division	T: 705-918-1609 tracey.burton@ontario.ca	Willet Green Miller Centre, 2nd Flr 933 Ramsey Lake Rd Sudbury ON P3E 6B5	Email
Ministry of Mines	MECP Agency Review team	Melanie Johnson	Strategic Initiatives Lead Strategic Support Unit Mines and Minerals Division	T: 705-698-5041 melanie.johnson@ontario.ca	Willet Green Miller Centre, 2nd Flr 933 Ramsey Lake Rd Sudbury ON P3E 6B5	Email
HydroOne	MECP Agency Review team			SecondaryLandUse@HydroOne.com		Electronic - Email
Ministry of Indigenous Affairs	MECP Agency Review team					Contact MECP to determine if the Ministry of Indigenous Affairs should be notified
Ontario Provincial Police	MECP Agency Review team	Jennifer Davey	Administrative Assistant, Research and Program Evaluation Unit / Research Planning & Analysis Section	jennifer.davey@opp.ca	777 Memorial Avenue Orillia ON L3V 7V3	Downloading preferred
Ministry of Health and Long Term Care - Hastings Prince Edward Health Unit	MECP Agency Review team	Dr. Ethan Tounishey	Medical Officer of Health		179 North Park Street Belleville, ON K8P 4P1	1 Hard Copy
Ministry of Citizenship and Multiculturalism - Heritage, Tourism and Culture Division	MECP Agency Review team	Karla Barboza	Team Lead (A), Heritage Planning Unit Programs and Services Br	karla.barboza@ontario.ca	400 University Ave, 5th Floor Toronto ON M7A 2R9	Electronic - Email
Ministry of Citizenship and Multiculturalism- Tourism Policy and Research Branch	MECP Agency Review team	Katie Crowley	Regional Development Advisor - Tourism   Regional Services Bra	katie.crowley@ontario.ca	Ministry of Tourism, Culture and Sport 300 Water Street, 2nd Floor, South Tower Peterborough, ON K9H 8M5	email
Ministry of Citizenship and Multiculturalism- Tourism Policy and Research Branch	MECP Agency Review team	James (Jim) Antler	Policy Advisor, Tourism Policy Unit	james.antler@ontario.ca	447 McKeown Avenue, Suite 203 North Bay ON P1B 9S9	Email - Electronic
Ministry of Municipal Affairs and Housing	MECP Agency Review team	Michael Elms	Manager, Community Planning and Development, Eastern Ontario Services Office	michael.elms@ontario.ca	8 Estate Lane (Rockwood House) Kingston ON K7M 9A8	1 hard copy
Infrastructure Ontario	MECP Agency Review team	Joanna Brown	Environmental Specialist	joanna.brown@infrastructureontario.ca	14 Gable Lane Kingston ON K7M 9A7	Email - Electronic
Infrastructure Ontario	MECP Agency Review team	Ainsley Davidson	Director (A) - Land Use Planning, Development Planning	ainsley.davidson@infrastructureontario.ca	1 Dundas St. W., Suite 2000 Toronto ON M5G 1Z3	Email - Electronic
Infrastructure Ontario	MECP Agency Review team	Joanna Craig	Portfolio Analyst	joanna.craig@infrastructureontario.ca cc: notbcereview@infrastructureontario.ca	1 Dundas St. W., Suite 2000 Toronto ON M5G 1Z3	Email - Electronic
Ministry of Northern Development, Mines, Natural Resources and Forestry - Natural Resources and Forestry	MECP Agency Review team	Keith Johnston	Environmental Planning Team Lead(A) Strategic and Indigenous P	keith.johnston@ontario.ca	Whitney Block Rm 5520 99 Wellesley St W Toronto ON M7A 1W3	Email - Electronic
Ministry of Northern Development, Mines, Natural Resources and Forestry - Natural Resources and Forestry - Southern Region	MECP Agency Review team			SRPlanning@ontario.ca Amanda: T: 705-313-0507		Email - Electronic Report + Notifications
Ministry of Solicitor General	MECP Agency Review team	Robert Greene	Director Ministry of the Solicitor General	robert.greene@ontario.ca	25 Grosvenor Street, 13th Flr Toronto ON M7A 1Y6	Contact to see if they have an interest in the EA
Impact Assessment Agency of Canada	MECP Agency Review team	Anjala Puvananathan	Regional Director, Ontario Regional Office	anjala.puvananathan@iaac-aeic.gc.ca	55 York Street, Suite 600 Toronto ON M5J 1R7	Electronic (USB) version preferred
Environment and Climate Change Canada	MECP Agency Review team	Rob Clavering	Manager - Environmental Assessment Section Environmental Protection Branch – Ontario Region Environment and Climate Change Canada	T: 416-458-9670 robert.clavering@ec.gc.ca	4905 Dufferin St. Downsview ON M3H 5T4	Electronic (USB or download) version preferred

**STAKEHOLDER REVIEW AGENCY LIST**  
**Madoc Water, Wastewater and Stormwater Master Plan**

Fisheries and Oceans Canada – Communication Branch	MECP Agency Review team				200 Kent Street, 13 <sup>th</sup> Floor, Station 13E228, Ottawa ON K1A 0E6	Consult DFO (if DFO review required).
Ministry of Agriculture, Food, and Rural Affairs	MECP Agency Review team	Jocelyn Beatty	Land Use Policy & Stewardship Food Safety and Environmental Policy Branch Ministry of Agriculture, Food & Rural Affairs	omafra.eanotices@ontario.ca	Elora Resource Centre 6484 Wellington Rd 7 – Unit 10 Elora ON N0B 1S0	Email omafra.eanotices@ontario.ca as initial step prior to circulating documents.
Fire Services - Centre Hastings	MECP Agency Review team	Derek Snider	Fire Chief	dsnider@centrehastings.com	244 St Lawrence St W Madoc, ON	Email
Transport Canada	MECP Agency Review team			EnviroOnt@tc.gc.ca		Contact to see if they have an interest in the EA.
Metis	Aboriginal Group			mno@metisnation.org	Suite 1100 – 66 Slater Street Ottawa, Ontario K1P 5H1	Email
Mohawks of the Bay of Quinte	Aboriginal Group	RODRICK DONALD M	Chief	613-396-3424	24 MEADOW DRIVE TYENDINGA MOHAWK TERRITORY, Ontario K0K1X0	Mail
Alderville First Nation	Aboriginal Group	James Marsden	Chief	jmarsden@alderville.ca	11696 Second Line P.O. Box 48 Rosedale ON K0K 2X0	Email
Curve Lake First Nation	Aboriginal Group	Keith Knott	Chief	keithk@curvelake.ca	22 Winookeeda Road Curve Lake ON K0L 1R0	Email
Hiawatha First Nation	Aboriginal Group	Laurie Carr	Chief	chiefcarr@hiawathafn.ca	123 Paudash Street R.R. #2 KEENE ON K0L 2G0	Email
Mississaugas of Scugog Island	Aboriginal Group	Kelly LaRocca	Chief	klarocca@scugogfirstnation.com	22521 Island Road Port Perry ON L9L 1B6	Email
Kawartha Nishnawbe First Nation	Aboriginal Group	Kris Nahrgang	Chief	Rknahrgang@gmail.com	257 Big Cedar Lake Road Big Cedar ON K0L 2H0	Email
Williams Treaty First Nation	Aboriginal Group	Karry Sandy-Mackenzie	Williams Treaty First Nation Claims Coordinator		8 Creswick Court BARRIE ON L4M 2S7	Mail
Huron Wendat FN	Aboriginal Group		Admin	administration@wendake.ca	255 Place Chef Michel Laveau Wendake, QC G0A 4V0	Email
Madoc Township	Neighbouring Municipality	Lloyd Blackburn	Mayor	343-645-5515 blackburnl@hastingscounty.com Township Office: Phone: (613) 473-2677 Fax: (613) 473-5580	15651 Highway 62 Eldorado, Ontario K0K 1Y0	Email
County of Hastings	Neighbouring Municipality	Connor Dorey	CAO	doreyc@hastingscounty.com (613) 966-1311 ext. 3204	Hastings County Administration Building 235 Pinnacle St., P.O. Bag 4400 Bellefleur, ON K8N 2A0	Email
Moir Lake Property Owners Association	Local Interest Groups and Developers	Joe Kaehler	President	613-827-8690 jkaehler@hotmail.co.uk		Email
Morey Carpentry	Local Interest Groups and Developers	Matthew Morey and Sam	Owner	matt@morecarpentry.ca	2149 Quin-Mo-Lac Rd, Tweed ON K0K3J0	Email
Golf Vista Homes Corp.	Local Interest Groups and Developers	John Spina	Owner	john@mdtrgroup.com, steven@mdtrgroup	16-7681 Highway 27, Vaughan ON L4L4M5	Email
2403496 Ontario Inc. (Bonter's Development)	Local Interest Groups and Developers	Robert and Shelley Bonter	Owners	sbonter@hpedsb.on.ca	PO Box 568 220 St Lawrence St E, Madoc ON K0K2K0	Mail
Eesa Construction Inc (Moir Meadow's Development)	Local Interest Groups and Developers	Joseph Remislar	Agent	remislar@rogers.com	Unit 8-1345 Morningside Ave, Scarborough ON M1B5K3	Email
Danford Construction Ltd. (Deer Creek Homestead and Maud Street)	Local Interest Groups and Developers	Al Danford	Owner	info@danfordconstructionltd.com	PO Box 749 326 Durham Street South, Madoc ON K0K2K0	Email
Danford Homes Inc. (Deer Creek Homestead)	Local Interest Groups and Developers	Chris Rashotte / Steven	Agents	info@danfordconstruction.com	PO Box 220, Tweed ON K0K3J0	Mail

**STAKEHOLDER REVIEW AGENCY LIST**  
**Madoc Water, Wastewater and Stormwater Master Plan**

Famsworth Construction Ltd (95 Rollins Street Development)	Local Interest Groups and Developers	Andy Famsworth	Owner	andygunning@gmail.com	PO Box 88, Stirling ON K0K3E0	Email
Patricia Kincaid	Local Interest Groups and Developers	Patricia Kincaid			RR1 Gilmour ON K0L1W0	Mail
Frank Converso	Local Interest Groups and Developers	Frank Converso			30 Rockview Gardens Ave, Concord ON L4K2J6	Mail
Gardens Retirement Developments Inc. (Bonjour Blvd Retirement Home)	Local Interest Groups and Developers	Bill Mardimae	Owner	bill@gardensdevelopments.com	12 Kensington Drive, Richmond Hill ON L4E 3M9	Email
1000532819 Ontario Corp (Wellington St / Duncan St Development)	Local Interest Groups and Developers				15 Wellington St, Brockville ON K6V1N8	Mail
Octate Inc and 12447304 Canada Inc. (Bonjour Blvd and A&W)	Local Interest Groups and Developers	Ken Issac		Ken.kiarh@outlook.com	Unit B-6445 Kennedy Rd, Mississauga ON L5T2W4	Email
1000325925 Ontario Inc. (Commercial Development East of McDonalds)	Local Interest Groups and Developers				12 Murdoch Crt, Lindsay ON K9V6L4	Mail



## Regine Climaco

---

**From:** Jose Casal <JCasal@ocwa.com>  
**Sent:** December 18, 2023 9:31 AM  
**To:** 'Leclerc, Erika (MCM)'  
**Cc:** Barboza, Karla (She/Her) (MCM); Susan Jingmiao Shi; Regine Climaco; Allison Mokracki  
**Subject:** RE: MCM Response - Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan  
**Attachments:** 2023-12-15\_MadocWWWStormwaterMP\_MCMIInitialLetter.pdf; 2023-12-04 MadocMP\_NofCommencement.pdf

**[CAUTION]** This email originated from outside JLR. Do not click links or open attachments unless you recognize the sender and know the content is safe. Do not forward suspicious emails, if you are unsure, please send a separate message to Helpdesk.

Good morning Erika,

Thank you for your email. Please note that the main OCWA contact for this Master Plan is my colleague Allison Mokracki (she has been copied in this email). I'm sure she will address MCM comments together with Susan (JLR). Please note that we are in the process of updating the contact info in the NOC.

Happy Holidays and Happy New Year.

Cheers



Jose A. Casal, M.Sc., (B.Eng.), P.Eng., PMP  (He/Him)  
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**From:** Leclerc, Erika (MCM) <Erika.Leclerc2@ontario.ca>  
**Sent:** December-15-23 2:06 PM  
**To:** Regine Climaco <rclimaco@jlrichards.ca>  
**Cc:** Barboza, Karla (She/Her) (MCM) <Karla.Barboza@ontario.ca>; Susan Jingmiao Shi <sshi@jlrichards.ca>; Jose Casal <JCasal@ocwa.com>  
**Subject:** MCM Response - Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Regine Climaco,

Thank you for sending the Notice of Study Commencement for the above-mentioned project to the Ministry of Citizenship and Multiculturalism (MCM). Please find attached MCM's initial letter on this project.

Please do not hesitate to contact us if you have any questions.

Kind regards,

**Erika Leclerc** (she/her)  
Heritage Planner, Heritage Planning Unit  
Ministry of Citizenship and Multiculturalism  
416.305.0757  
[erika.leclerc2@ontario.ca](mailto:erika.leclerc2@ontario.ca)

---

**From:** Regine Climaco <[rclimaco@jlrichards.ca](mailto:rclimaco@jlrichards.ca)>  
**Sent:** December 4, 2023 2:05 PM  
**To:** Barboza, Karla (She/Her) (MCM) <[Karla.Barboza@ontario.ca](mailto:Karla.Barboza@ontario.ca)>  
**Cc:** Susan Jingmiao Shi <[sshi@jlrichards.ca](mailto:sshi@jlrichards.ca)>  
**Subject:** Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello,

The Municipality of Centre Hastings has retained J.L. Richards & Associates Limited to initiate a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

The attached Notice of Study Commencement is being sent to agencies and organizations that may have an interest in this study.

Comments on this study should be sent to the project team by email or mail as provided in the Notice of Commencement.

Thank you,

**Regine Climaco**, EIT  
Civil Engineering Intern

J.L. Richards & Associates Limited  
203 - 863 Princess Street, Kingston, ON K7L 5N4  
Direct: 343-306-0065



**Ministry of Citizenship  
and Multiculturalism**

Heritage Planning Unit  
Heritage Branch  
Citizenship, Inclusion and  
Heritage Division  
5th Flr, 400 University Ave  
Tel.: 416-305-0757

**Ministère des Affaires civiques  
et du Multiculturalisme**

Unité de la planification relative au  
patrimoine  
Direction du patrimoine  
Division des affaires civiques, de  
l'inclusion et du patrimoine  
Tél.: 416-305-0757



December 15, 2023

EMAIL ONLY

Susan Jingmiao Shi, P.Eng., M.Eng.  
Senior Environmental Engineer  
J.L. Richards & Associates Limited  
203-863 Princess Street  
Kingston, ON K7L 5N4  
[sshi@jlrichards.ca](mailto:sshi@jlrichards.ca)

**MCM File** : **0020802**  
**Proponent** : **Municipality of Centre Hastings**  
**Subject** : **Municipal Class Environmental Assessment – Notice of Study  
Commencement – Master Plan Approach #1**  
**Project** : **Water, Wastewater and Stormwater Master Plan**  
**Location** : **Municipality of Centre Hastings, County of Hastings**

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Dear Susan Jingmiao Shi:

Thank you for providing the Ministry of Citizenship and Multiculturalism (MCM) with the Notice of Study Commencement for this project.

MCM's interest in this master plan relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources and cultural heritage landscapes.

MCM understands that master plans are long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. The Municipal Class Environmental Assessment (MCEA) outlines a framework for master plan and associated studies which should recognize the planning and design Process of this Class EA, and should incorporate the key principles of successful environmental assessment planning identified in Section A.1.1. The master planning process will, at minimum, address Phases 1 and 2 of the Planning and Design Process of the MCEA.

This letter provides advice on how to incorporate consideration of cultural heritage in the above-mentioned master planning process by outlining the technical cultural heritage studies and the level of detail required to address cultural heritage in master plans. In accordance with the MCEA, cultural heritage resources should be identified early in the process in order to determine known and potential resources and potential impacts.

## **Master Plan Summary**

The Municipality of Centre Hastings has initiated a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater and Stormwater Master Plan for Madoc. The Master Plan study is assessing various options to improve the performance and reliability of the water, wastewater and stormwater infrastructure to ensure they can be relied upon to accommodate current and future flows generated within the urban boundary of Madoc.

## **Identifying Cultural Heritage Resources**

MCM understands that the master plan would typically be done at a broad level of assessment thereby requiring more detailed investigations at the project-specific level. Therefore, a description of the existing conditions related to cultural heritage resources needs to be included in the master plan document.

## **Archaeological Resources**

The existing conditions sub-section should indicate if the master plan includes areas of archaeological potential or not and acknowledge that archaeological assessments will be required for future project-specific projects. The proponents should refer to an archaeological management plan or a data sharing agreement, should they exist. In their absence, the Ministry's screening checklists can help determine whether archaeological assessments will be needed for subsequent project undertakings: [Criteria for Evaluating Archaeological Potential](#) and [Criteria for Evaluating Marine Archaeological Potential](#) (if shoreline or in-water works are proposed).

A statement should be included that archaeological assessments are to be undertaken by an archaeologist licensed under the Ontario Heritage Act and that archaeological assessment reports must be submitted for MCM review prior to the completion of the environmental assessment and prior to any ground disturbance. Some municipalities may also elect to have a Stage 1 archaeological assessment undertaken for a master plan area.

## **Built Heritage Resources and Cultural Heritage Landscapes**

MCM recommends that an Existing Conditions Report be undertaken by a qualified person, which will include a historical summary of the study area's development, identifying all known or potential built heritage resources and cultural heritage landscapes within the study area. The findings of the existing conditions report should be included in the existing conditions subsection of the master plan document.

Community input should be sought to identify locally recognized and potential cultural heritage resources. Sources include, but are not limited to, Municipal Heritage Committees, community heritage registers, historical societies and other local heritage organizations.

Cultural heritage resources are often of critical importance to Indigenous communities. Indigenous communities may have knowledge that can contribute to the identification of cultural heritage resources, and any engagement with Indigenous communities should include a discussion about known or potential cultural heritage resources that are of value to them.

## **Subsequent Municipal Class EA Undertakings**

The recommendations outlined above can be used in support of any future technical cultural heritage studies required for any Schedule B and C MCEA undertakings identified within the master planning area. Technical cultural heritage studies are to be undertaken by a qualified person who has expertise, recent experience, and knowledge relevant to the type of cultural heritage resources being considered and the nature of the activity being proposed. Please advise MCM whether any technical cultural heritage studies will be completed for this master plan and provide them to MCM before issuing a Notice of Completion.

Please note that the responsibility for administration of the *Ontario Heritage Act* and matters related to cultural heritage have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Individual staff roles and contact information remain unchanged. Please continue to send any notices, report and/or documentation to both Karla Barboza and myself.

- Karla Barboza, Team Lead - Heritage | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-660-1027 | [karla.barboza@ontario.ca](mailto:karla.barboza@ontario.ca)
- Erika Leclerc, Heritage Planner | Heritage Planning Unit (Citizenship and Multiculturalism) | 416-305-0757 | [erika.leclerc2@ontario.ca](mailto:erika.leclerc2@ontario.ca)

Thank you for consulting MCM on this project. Please continue to do so through the master plan process and contact me for any questions or clarification.

Sincerely,

Erika Leclerc  
Heritage Planner  
[Erika.leclerc2@ontario.ca](mailto:Erika.leclerc2@ontario.ca)

Copied to: Jose Casal, Senior Specialist/Project Manager, Ontario Clean Water Agency  
Regine Climaco, Civil Engineering Intern, J.L. Richards & Associates Limited  
Karla Barboza, MCM

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. The Ministry of Citizenship and Multiculturalism (MCM) makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MCM be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out an archaeological assessment, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33* requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with *Ontario Regulation 30/11* the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological resources, the Ministry of Citizenship and Multiculturalism should also be notified (at [archaeology@ontario.ca](mailto:archaeology@ontario.ca)) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.

## Regine Climaco

---

**From:** Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>  
**Sent:** December 4, 2023 2:55 PM  
**To:** Regine Climaco  
**Cc:** Susan Jingmiao Shi  
**Subject:** RE: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan  
**Attachments:** Copy of streamlined\_ea\_project\_information\_form.xlsx; Instructions for Providing Class EA Notices to the Ministry of the Environment Conservation and Parks.pdf

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Hello Regnie,

Thanks for the chat earlier.

Again to highlight the notice should have a reference to the FIPPA MFIPPA for the collection of information per Appendix 6 of the MCEA parent document. MECP should also be provided with a Project Information File in Excel format for this project which has been standard practice since May 1<sup>st</sup> 2018 as attached by consultants and proponents.

Thanks in advance.

Jon

Jon K. Orpana [hear name](#)  
Regional Environmental Planner  
Environmental Assessment Branch  
Ministry of the Environment, Conservation and Parks  
Kingston Regional Office  
PO Box 22032, 1259 Gardiners Road  
Kingston, Ontario  
K7M 8S5

Phone: (613) 548-6918  
Fax: (613) 548-6908  
Email: [jon.orpana@ontario.ca](mailto:jon.orpana@ontario.ca)

---

**From:** Regine Climaco <rclimaco@jlrichards.ca>

**Sent:** December 4, 2023 1:50 PM

**To:** Orpana, Jon (MECP) <Jon.Orpana@ontario.ca>

**Cc:** Susan Jingmiao Shi <sshi@jlrichards.ca>

**Subject:** Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

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Hello,

The Municipality of Centre Hastings has retained J.L. Richards & Associates Limited to initiate a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

The attached Notice of Study Commencement is being sent to agencies and organizations that may have an interest in this study.

Comments on this study should be sent to the project team by email or mail as provided in the Notice of Commencement.

Thank you,

**Regine Climaco**, EIT  
Civil Engineering Intern

J.L. Richards & Associates Limited  
203 - 863 Princess Street, Kingston, ON K7L 5N4  
Direct: 343-306-0065



**J.L. Richards  
& Associates Limited**  
ENGINEERS • ARCHITECTS • PLANNERS



Platinum  
member

Ministry of the Environment,  
Conservation and Parks

*Environmental Assessment Branch*

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Tel.: 416 314-8001  
Fax.: 416 314-8452

Ministère de l'Environnement, de la  
Protection de la nature et des Parcs

*Direction des évaluations  
environnementales*

Rez-de-chaussée  
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Toronto [ON M4V 1P5](#)  
Tél. : 416 314-8001  
Télééc. : 416 314-8452



December 14, 2023

BY EMAIL ONLY

Municipality of Center Hastings

Attention: Jose Casal, M.Sc., P.Eng., PMP  
Senior Specialist / Project Manager  
Ontario Clean Water Agency  
Email: [JCasal@ocwa.ca](mailto:JCasal@ocwa.ca)

Re: **Municipality of Center Hastings, Madoc  
Water, Wastewater and Stormwater Master Plan  
Municipal Class Environmental Assessment  
Response to Notice of Commencement**

Dear Jose Casal,

This letter is in response to the Notice of Commencement for the above noted project issued on December 4<sup>th</sup>, 2023.

## **INTRODUCTION**

The Municipality of Center Hastings has initiated a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

## **STUDY PROCESS**

The Master Plan Study is assessing various options to improve the performance and reliability of the water, wastewater and stormwater infrastructure to ensure they can be relied upon to accommodate current and future flows generated within the urban boundary of Madoc.

The Master Plan study will identify preferred solution(s) that will benefit the community over the short, mid and long terms.

The TMP will be conducted in accordance with the Master Planning process (Preliminary Phases 1 and 2) as outlined in the Municipal Class Environmental Assessment (October 2000, amended 2007, 2011, 2015 and 2023) by the Municipal Engineers Association, which is an approved process under the Ontario Environmental Assessment Act. The TMP will follow "Approach #1" of the Master Planning process, which provides a broad level of assessment that would become the basis for, and be used in support of, future investigations for specific municipal capital projects.



Approach #1 involves the Master Plan being done at a broad level of assessment thereby requiring more detailed investigations at the project-specific level in order to fulfil the Municipal Class EA documentation requirements for the specific Schedule B and C projects identified within the Master Plan. The Master Plan would therefore become the basis for, and be used in support of, future investigations for the specific Schedule B and C projects identified within it. Schedule B projects would require the filing of the Project file for public review while Schedule C projects would have to fulfil Phases 3 and 4 prior to filing an Environmental Study Report for public review.

## **BACKGROUND**

Once the Master Plan report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the Proponent, prior to being approved by the municipality. As the Section 16 Order provisions only apply to specific projects completing the Class EA process and not the Master Plan document itself, there are no Section 16 Order provisions at the time of completion of the Master Plan for approach #1. Projects identified in the Master Plan will be subject to Section 16 Order provisions at the time of filing of a Project File or Environmental Study Report.

The attached “Areas of Interest” document provides guidance regarding the ministry’s interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada’s *Constitution Act* 1982. Where the Crown’s duty to consult is triggered in relation to the proposed project, **the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit. The following Indigenous Communities represent the communities to be consulted through this TMP process:

- **Curve Lake First Nation**
- **Alderville First Nation**
- **Mississaugas of Scugog Island First Nation**
- **Hiawatha First Nation**
- **Kawartha Nishnawbe**
- **Huron-Wendat- if the project has the potential to impact archaeological resources.**

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "[Code of Practice for Consultation in Ontario's Environmental Assessment Process](#)". Additional information related to Ontario's Environmental Assessment Act is available online at: [www.ontario.ca/environmentalassessments](http://www.ontario.ca/environmentalassessments).

**Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.**

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances subsequent to initial discussions with the communities identified by MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right
- Consultation with Indigenous communities or other stakeholders has reached an impasse
- An Order request is expected on the basis of impacts to Aboriginal or treaty rights

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

---

Should you or any members of your project team have any questions regarding the material above, please contact me at [jon.orpana@ontario.ca](mailto:jon.orpana@ontario.ca)

Yours truly,



Regional Environmental Assessment Coordinator – Eastern Region

cc

Cathy Chisholm, District Manager, Kingston District Office, MECP  
Email: [cathy.chisholm@ontario.ca](mailto:cathy.chisholm@ontario.ca)

Susan Jingmiao, P. Eng., M.Eng.  
Senior Environmental Engineer  
J.L. Richards and Associates  
Email: [sshi@jlrichards.ca](mailto:sshi@jlrichards.ca)

Attach: Areas of Interest

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with  
Aboriginal Communities

The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019)

## AREAS OF INTEREST (v. August 2022)

*It is suggested that you check off each section after you have considered / addressed it.*

### **Planning and Policy**

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
  - Projects located in MECP Central, **Eastern** or West Central Region may be subject to [A Place to Grow: Growth Plan for the Greater Golden Horseshoe \(2020\)](#).
  - Projects located in MECP Central or **Eastern** Region may be subject to the [Oak Ridges Moraine Conservation Plan \(2017\)](#) or the [Lake Simcoe Protection Plan \(2014\)](#).
  - Projects located in MECP Central, Southwest or West Central Region may be subject to the [Niagara Escarpment Plan \(2017\)](#).
  - Projects located in MECP Central, **Eastern**, Southwest or West Central Region may be subject to the [Greenbelt Plan \(2017\)](#).
  - Projects located in MECP Northern Region may be subject to the [Growth Plan for Northern Ontario \(2011\)](#).
- The [Provincial Policy Statement \(2020\)](#) contains policies that protect Ontario's natural heritage and water resources. **Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.**
- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

### **Source Water Protection**

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e. systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.
- If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.
- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.
- In order to determine if this project is occurring within a vulnerable area, proponents can use this mapping tool: <http://www.applications.ene.gov.on.ca/swp/en/index.php>. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the “Map Legend” bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.
- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to [Conservation Ontario's website](#) where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in [section 1.1 of Ontario Regulation 287/07](#) made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional “local” threat activities, as approved by the MECP.

□ **Climate Change**

The document "[Considering Climate Change in the Environmental Assessment Process](#)" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of projects under a Class EA or EA Act Regulation to:**

1. Consider during the assessment of alternative solutions and alternative designs, the following:
  - a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
  - b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "[Community Emissions Reduction Planning: A Guide for Municipalities](#)" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

#### **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern.
- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:
  - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
  - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
  - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
  - A discussion of potential mitigation measures.
- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.
- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to [Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities](#) report prepared for Environment Canada. March 2005.
- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

- Noise associated with a proposed transformer station should be evaluated. Note that any noise monitoring and assessment should be conducted in accordance with the requirements of MECP guidelines, such as MECP Publication NPC-233, “*Information to be Submitted for Approval of Stationary Sources of Sound*”.
- In order to address potential noise impacts of the transformer station, it may be necessary to first monitor ambient noise levels prior to the installation of the transformer station, and to then conduct a noise assessment after the transformer station is installed and operational. Depending on the results of these studies and the proximity to sensitive receptors, remedial measures may be needed to address noise generated by the transformer station.

□ **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.
- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
  - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
  - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
  - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNR), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features.

□ **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario’s Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at <https://www.ontario.ca/page/species-risk>.
- The Client’s Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.
- For any questions related to subsequent permit requirements, SAR Considerations etc., proponents / consultants should contact [SAROntario@ontario.ca](mailto:SAROntario@ontario.ca).

## □ **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.
- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's [Stormwater Management Planning and Design Manual \(2003\)](#) should be referenced in the report and utilized when designing stormwater control methods.
- A Stormwater Management Plan prepared as part of the Class EA process should include:
  - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
  - Watershed information, drainage conditions, and other relevant background information
  - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
  - Information on maintenance and monitoring commitments.
- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

## □ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.
- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.
- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential



impacts. For example, where construction of transmission towers is proposed, any pile driving into the subsurface that is required for steel pile type tower foundations, particularly to the bedrock surface at depth, may have an adverse effect on local groundwater resources.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information.
- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.
- Groundwater should be protected from the potential for spills, dewatering and wood pole preservative during construction. A plan should be in place for preventing and dealing with spills. All spills that could potentially cause damage to the environment should be reported to the Spills Action Centre of the Ministry of the Environment, Conservation and Parks at 1-800-268-6060.

#### □ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled “[On-Site and Excess Soil Management](#)” (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don’t go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit <https://www.ontario.ca/page/handling-excess-soil>.
- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP’s current guidance document titled “[Management of Excess Soil – A Guide for Best Management Practices](#)” (2014).
- All waste generated during construction must be disposed of in accordance with ministry requirements

#### □ **Contaminated Sites**

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the [MECP’s D-4 guideline](#) for land use considerations near landfills and dumps.
- Resources available may include regional/local municipal official plans and data; provincial data on [large landfill sites](#) and [small landfill sites](#); Environmental Compliance Approval information for waste disposal sites on [Access Environment](#).

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada’s [website](#)).
- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry’s Spills Action Centre must be contacted in such an event.
- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Consideration of potential environmental contamination should be given following regulatory guidance where the project involves decommissioning of facilities. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.
- Where poles are being removed that have been chemically treated, we recommend that the proponent consider soil testing to determine the extent of any related soil contamination. Soil testing may be contingent on factors such as proximity to water bodies or wetlands, proximity to wells, locations where poles are being removed but not replaced, and the treatment chemicals used (i.e. chromated copper arsenate (CCA) or creosote). In the case of poles which have been treated with CCA or creosote, testing for arsenic, copper and creosote should be completed.

□ **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.
- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.
- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP’s Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.
- We recommend referring to the ministry’s [environmental land use planning guides](#) to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

□ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.
- The proponent's construction and post-construction effects monitoring strategies and programs must be documented in the report.
- The proponent must consider cumulative effects when planning projects. The assessment will include the proposed undertaking and any other proposed undertakings in the immediate project area where documentation is available (e.g. other environmental assessments).

□ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Guide to Environmental Assessment Requirements for Electricity Projects to include full documentation).
- Please include the full stakeholder distribution/consultation list in the documentation.

□ **Class EA Process**

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to a Section 16 Order request under the *Environmental Assessment Act*, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**
- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.
- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.
- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.
- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at <http://www.ontario.ca/environment-and-energy/environment-and-energy>. We encourage you to review all the available guides and to reference any relevant information in the report.

### **Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020**

Once the report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address (for projects in MECP Southwest Region, the email is [eanotification.swregion@ontario.ca](mailto:eanotification.swregion@ontario.ca)).

The public has the ability to request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

Minister  
Ministry of Environment, Conservation and Parks  
777 Bay Street, 5th Floor  
Toronto ON M7A 2J3  
[minister.mecp@ontario.ca](mailto:minister.mecp@ontario.ca)

and

Director, Environmental Assessment Branch  
Ministry of Environment, Conservation and Parks  
135 St. Clair Ave. W, 1st Floor  
Toronto ON, M4V 1P5  
[EABDirector@ontario.ca](mailto:EABDirector@ontario.ca)

## A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

### DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

**Aboriginal communities** – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

**Consultation** – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

**Crown** – the Ontario Crown, acting through a particular ministry or ministries.

**Procedural aspects of consultation** – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

**Proponent** – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

### I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

### II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

### **III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS**

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

### **IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS**

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

**a) What might a proponent be required to do in carrying out the procedural aspects of consultation?**

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;
- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

**b) What documentation and reporting does the Crown need from the proponent?**

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;
- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

### **c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?**

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

## **V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?**



Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;
- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigate any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

## **VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?**

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

## Regine Climaco

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**From:** Sharlene Richardson <SRichardson@quinteconservation.ca>  
**Sent:** December 15, 2023 12:26 PM  
**To:** Susan Jingmiao Shi; jcasal@ocwa.ca  
**Cc:** Paul McCoy; Planning; Regine Climaco  
**Subject:** Notice of Study Commencement: Madoc Water, Wastewater and Stormwater Master Plan  
**Attachments:** PLP37-23\_MadocEA.pdf

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Good Afternoon,

Quinte Conservation has received the Notice of Study Commencement for the Water, Wastewater and Stormwater Master Plan for Madoc, as initiated by the Municipality of Centre Hastings. Quinte Conservation staff have reviewed the study area and would like to offer the comments in the attached letter for your information and reference. Should you have any questions at all, please do not hesitate to contact our office.

Best regards,  
Sharlene



**Sharlene Richardson** (she/her)

Regulations Officer

**P:** 613-968-3434 or 613-354-3312

**E:** [srichardson@quinteconservation.ca](mailto:srichardson@quinteconservation.ca)

RR#2, 2061 Old Hwy #2, Belleville, ON K8N 4Z2

[QuinteConservation.ca](http://QuinteConservation.ca) | [QuinteSourceWater.ca](http://QuinteSourceWater.ca)



*Working, living, and learning on the traditional territories of the Anishinabek, Huron-Wendat, and Haudenosaunee (Iroquois) peoples.*

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Disclaimer: This is intended for the addressee indicated above. It may contain information that is privileged, confidential, or otherwise protected from disclosure under the Municipal Freedom of Information and Privacy Protection Act. If you have received this in error, please notify us immediately.

**VIA EMAIL**

December 15, 2023

Susan Jingmiao Shi, P.Eng., M.Eng.  
Senior Environmental Engineer  
J.L. Richards & Associates Limited  
203-863 Princess Street  
Kingston, ON  
K7L 5N4

Jose Casal M.Sc., P.Eng., PMP  
Senior Specialist/Project Manager  
Ontario Clean Water Agency  
2085 Hurontario St. 5<sup>th</sup> floor  
Mississauga, ON  
jcasal@owca.ca

**Re: Notice of Study Commencement: Madoc, Wastewater and Stormwater Master Plan  
Our File: PLP0037-2023**

Quinte Conservation has received notification that the Municipality of Centre Hastings has retained J.L. Richards & Associates Ltd. to initiate a Master Plan in accordance with Approach 1 of the Municipal Engineers Association Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc. We would like to offer the following comments in response to the notice:

1. Quinte Conservation Authority regulates development within and adjacent to Deer Creek, unevaluated wetlands and the Madoc Wetland Provincially Significant Wetland (PSW) by virtue of Ontario Regulation #319/09 - Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. As part of this program area, our office has floodplain modelling, mapping, and/or reports available for review for Deer Creek as well as the "Unnamed Creek" as part of the North-East Quadrant Study.
2. Quinte Conservation does not maintain any natural heritage reports, mapping or inventories for the study area. However, staff have been involved with baseflow/water quality monitoring and the Provincial Groundwater Monitoring Network (PGMN) within the study area. Information on the results and information from that monitoring may be made available upon request.
3. The area involved in this municipal class environmental assessment falls within the Village of Madoc's WHPA A and B for the source water protection of their drinking water supply. For more information on these areas and any further review required please contact Amy Dickens at 613-968-3434 ext. 132 or [adickens@quinteconservation.ca](mailto:adickens@quinteconservation.ca).
4. As per O. Reg. 596/22 this office no longer provides comments on water quality as part of our stormwater management review. Municipalities must continue to follow the Ministry of the Environment Stormwater Management Planning and Design Manual March 2003 for stormwater quality requirements. Staff will continue to provide comments on stormwater quantity.

Our staff look forward to continued involvement with this environmental assessment process. Quinte Conservation would appreciate a copy of the final Environmental Assessment document for our records once available. Should you require any further information, please contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. McCoy', followed by a period.

For:  
Paul McCoy  
Planning & Regulations Manager

/pm

## Regine Climaco

---

**From:** ONT Environment / Environnement ONT <EnviroOnt@tc.gc.ca>  
**Sent:** December 15, 2023 8:39 AM  
**To:** Regine Climaco  
**Cc:** Susan Jingmiao Shi  
**Subject:** RE: [External/Externe]: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan  
**Attachments:** 32508-000 - Madoc MP Class EA NOC -EnglishV3\_FINAL.pdf

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Greetings,

Thank you for your correspondence.

Please note Transport Canada does not require receipt of all Individual or Class EA related notifications. We request that project proponents self-assess whether their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at [www.tbs-sct.gc.ca/dfpr-rbif/](http://www.tbs-sct.gc.ca/dfpr-rbif/); **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada\* available at <http://www.tc.gc.ca/eng/acts-regulations/menu.htm>.

Proposed projects that will occur on federal property (including reserve lands or lands owned by federal departments other than Transport Canada) will be subject to an Impact Assessment per Section 82 of the *Impact Assessment Act, 2019* prior to exercising a federal power (including full or partial funding), and/or performing a function or duty (e.g. regulatory approval or issuance of a lease) in relation to that project.

If the criteria above do not apply, Transport Canada's Environmental Assessment program should not be included in any further correspondence, and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded to: [EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca) with a **brief description of Transport Canada's expected role**.

\*Below is a summary of the most common Acts that apply to projects in an Environmental Assessment context:

- **Canadian Navigable Waters Act (CNWA)** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across navigable waters set out under the Act. The Navigation Protection Program administers the CNWA through the review and authorization of works affecting navigable waters. Information about the Program, CNWA and approval process is available at: <http://www.tc.gc.ca/eng/programs-621.html>. Inquiries can be directed to [NPPONT-PPNONT@tc.gc.ca](mailto:NPPONT-PPNONT@tc.gc.ca) or by calling (519) 383-1863.
- **Railway Safety Act (RSA)** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about

the Program is available at: <https://www.tc.gc.ca/eng/railsafety/menu.htm>. Inquiries can be directed to [RailSafety@tc.gc.ca](mailto:RailSafety@tc.gc.ca) or by calling (613) 998-2985.

- **Transportation of Dangerous Goods Act (TDGA)** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: <https://www.tc.gc.ca/eng/tdg/safety-menu.htm>. Inquiries can be directed to [TDG-TMDOntario@tc.gc.ca](mailto:TDG-TMDOntario@tc.gc.ca) or by calling (416) 973-1868.
- **Aeronautics Act** – this Act and the associated Canadian Aviation Regulations (CARs) govern civil aviation in Canada. Transport Canada should be notified of projects involving aerodromes and associated structures, or activities that could affect aviation safety. Elevated structures, such as wind turbines and communication towers, are examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. Additional guidance can be found in the *Land Use In The Vicinity of Aerodromes* publication, available at: <https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm>. Information about Transport Canada’s Civil Aviation program can be found at: <https://tc.canada.ca/en/aviation>. Inquires can be directed to [aviation.ont@tc.gc.ca](mailto:aviation.ont@tc.gc.ca) or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

**Environmental Assessment Program, Ontario Region**

Transport Canada / Government of Canada / 4900 Yonge St., Toronto, ON M2N 6A5

[EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca)

**Programme d'évaluation environnementale, Région de l'Ontario**

Transports Canada / Gouvernement du Canada / 4900, rue Yonge, Toronto, ON, M2N 6A5

[EnviroOnt@tc.gc.ca](mailto:EnviroOnt@tc.gc.ca)

---

**From:** Regine Climaco <rclimaco@jlrichards.ca>

**Sent:** Monday, December 04, 2023 2:12 PM

**To:** ONT Environment / Environnement ONT <EnviroOnt@tc.gc.ca>

**Cc:** Susan Jingmiao Shi <sshi@jlrichards.ca>

**Subject:** [External/Externe]: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

Hello,

The Municipality of Centre Hastings has retained J.L. Richards & Associates Limited to initiate a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

The attached Notice of Study Commencement is being sent to agencies and organizations that may have an interest in this study.

Comments on this study should be sent to the project team by email or mail as provided in the Notice of Commencement.

Thank you,

**Regine Climaco, EIT**  
Civil Engineering Intern

J.L. Richards & Associates Limited  
203 - 863 Princess Street, Kingston, ON K7L 5N4  
Direct: 343-306-0065



# Notice of Study Commencement

## Madoc Water, Wastewater and Stormwater Master Plan

The Municipality of Centre Hastings has initiated a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater and Stormwater Master Plan for Madoc.

### How Will This Affect Me?

The Master Plan study is assessing various options to improve the performance and reliability of the water, wastewater and stormwater infrastructure to ensure they can be relied upon to accommodate current and future flows generated within the urban boundary of Madoc.

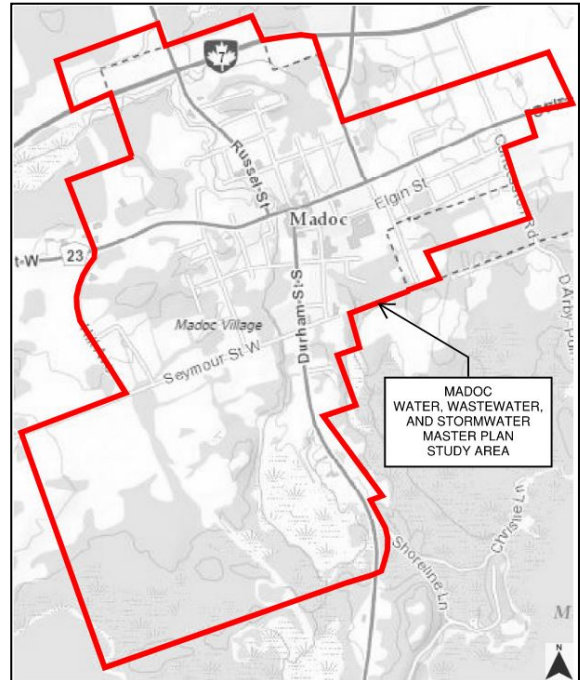
Public and agency consultation is a key part of the Master Planning process. Based on your input, the Master Plan study will identify preferred solution(s) that will benefit the community over the short, mid, and long terms.

### How Do I Get More Information?

Two Public Information Centres will be held in 2024 prior to confirming the preferred servicing solutions. In the meantime, the study team will review background information and determine alternative solutions. You can contact a member of the study team listed below with any questions or to provide input on the Master Plan study. Updates will also be provided throughout the Master Plan study on the Municipality's website.

Susan Jingmiao Shi, P.Eng., M.Eng.  
Senior Environmental Engineer  
J.L. Richards & Associates Limited  
203-863 Princess Street  
Kingston, ON K7L 5N4  
sshij@lrichards.ca

Jose Casal, M.Sc., P.Eng., PMP  
Senior Specialist / Project Manager  
Ontario Clean Water Agency  
2085 Hurontario Street, 5<sup>th</sup> floor  
Mississauga, ON L5A 4G1  
JCasal@ocwa.ca



This study is being conducted according to the requirements of Approach 1 of a Master Plan under the Ontario Municipal Class Environmental Assessment process (October 2000, as amended in 2015 and 2023).

This Notice was issued on December 4<sup>th</sup>, 2023.



## Regine Climaco

---

**From:** Susan Jingmiao Shi  
**Sent:** December 6, 2023 2:31 PM  
**To:** Joe Kaehler; Regine Climaco  
**Cc:** JCasal@ocwa.com  
**Subject:** RE: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

Hello Joe,

Thanks for reaching out.

We are in the initial stages of the Master Planning exercise and will reach out once more information becomes available.

Our next point of contact will happen at the end of Class EA Phase 1 once we define the existing conditions and servicing constraints for water, wastewater and storm. There is an opportunity for you to attend an in-person Public Information Centre to discuss your organization's specific concerns.

Regards,

---

**From:** Joe Kaehler <jkaehler@hotmail.co.uk>  
**Sent:** Wednesday, December 6, 2023 11:15 AM  
**To:** Regine Climaco <rclimaco@jlrichards.ca>  
**Cc:** Susan Jingmiao Shi <sshi@jlrichards.ca>  
**Subject:** Re: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

**[CAUTION]** This email originated from outside JLR. Do not click links or open attachments unless you recognize the sender and know the content is safe. Do not forward suspicious emails, if you are unsure, please send a separate message to Helpdesk.

As President of the Moria Lake Property Owners Association (MLPOA).

There is always interest in obtaining information on the wastewater/storm water impact to our 200+ members on Moria Lake.

Moria lake is just south of your designated area of planning.

The area you are investigating is a main tributary to Moria lake thus a potential source of pollutants from Madoc village.

We would like to receive all findings, and work with your team to implement best practices.

Kindest regards,

Joe Kaehler  
MLPOA President  
393 Mile Point Lane  
Madoc Ontario K0K 2K0

613-827-8690

---

**From:** Regine Climaco <[rclimaco@jlrichards.ca](mailto:rclimaco@jlrichards.ca)>

**Sent:** December 4, 2023 2:40 PM

**To:** [jkaehler@hotmail.co.uk](mailto:jkaehler@hotmail.co.uk) <[jkaehler@hotmail.co.uk](mailto:jkaehler@hotmail.co.uk)>

**Cc:** Susan Jingmiao Shi <[sshi@jlrichards.ca](mailto:sshi@jlrichards.ca)>

**Subject:** Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

Hello,

The Municipality of Centre Hastings has retained J.L. Richards & Associates Limited to initiate a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

The attached Notice of Study Commencement is being sent to agencies and organizations that may have an interest in this study.

Comments on this study should be sent to the project team by email or mail as provided in the Notice of Commencement.

Thank you,

**Regine Climaco, EIT**  
Civil Engineering Intern

J.L. Richards & Associates Limited  
203 - 863 Princess Street, Kingston, ON K7L 5N4  
Direct: [343-306-0065](tel:343-306-0065)



## Regine Climaco

---

**From:** Regine Climaco  
**Sent:** December 5, 2023 9:52 AM  
**To:** Crowley, Katie (MTCS)  
**Cc:** Susan Jingmiao Shi  
**Subject:** RE: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

Hi Katie,

Thanks for reaching out.  
I've added you to our mailing list for future master plan updates.

Kind regards,  
Regine

---

**From:** Crowley, Katie (MTCS) <Katie.Crowley@ontario.ca>  
**Sent:** Tuesday, December 5, 2023 9:38 AM  
**To:** Regine Climaco <rclimaco@jlrichards.ca>  
**Subject:** FW: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

**[CAUTION]** This email originated from outside JLR. Do not click links or open attachments unless you recognize the sender and know the content is safe. Do not forward suspicious emails, if you are unsure, please send a separate message to Helpdesk.

Hi Regine,  
Nice to e-meet you.  
My name is Katie Crowley, I am the Tourism Advisor with the RTO8/9 areas.  
James sends me these types of updates and we thought it might be a good idea for me to be included on your email list.  
If that works, I appreciate it.  
Take care,

### **Katie Crowley**

Regional Development Advisor - Tourism | Regional Services Branch  
Ministry of Tourism, Culture and Sport  
300 Water Street, 2nd Floor, South Tower  
Peterborough, ON K9H 8M5  
**Phone:** (705) 761-6748 **Email:** [katie.crowley@ontario.ca](mailto:katie.crowley@ontario.ca)

Please contact me if you require this email or any of the attached materials in an alternate format.

---

**From:** Antler, James (MTCS) <[James.Antler@ontario.ca](mailto:James.Antler@ontario.ca)>  
**Sent:** December 4, 2023 4:39 PM

**To:** Crowley, Katie (MTCS) <[Katie.Crowley@ontario.ca](mailto:Katie.Crowley@ontario.ca)>  
**Cc:** DeSousa, Adam (MTCS) <[Adam.DeSousa@ontario.ca](mailto:Adam.DeSousa@ontario.ca)>  
**Subject:** FW: Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

Katie:

Another project for you to be aware of. If you want to get on the project mailing list, I'd say contact Regine below.

Jim

---

**From:** Regine Climaco <[rclimaco@jlrichards.ca](mailto:rclimaco@jlrichards.ca)>  
**Sent:** December 4, 2023 2:05 PM  
**To:** Antler, James (MTCS) <[James.Antler@ontario.ca](mailto:James.Antler@ontario.ca)>  
**Cc:** Susan Jingmiao Shi <[sshi@jlrichards.ca](mailto:sshi@jlrichards.ca)>  
**Subject:** Notice of Study Commencement: Madoc Water, Wastewater, and Stormwater Master Plan

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello,

The Municipality of Centre Hastings has retained J.L. Richards & Associates Limited to initiate a Master Planning process in accordance with Approach 1 of the Municipal Engineers Association (MEA) Class Environmental Assessment (Class EA) to develop a Water, Wastewater, and Stormwater Master Plan for Madoc.

The attached Notice of Study Commencement is being sent to agencies and organizations that may have an interest in this study.

Comments on this study should be sent to the project team by email or mail as provided in the Notice of Commencement.

Thank you,

**Regine Climaco**, EIT  
Civil Engineering Intern

J.L. Richards & Associates Limited  
203 - 863 Princess Street, Kingston, ON K7L 5N4  
Direct: 343-306-0065



## Regine Climaco

---

**From:** Susan Jingmiao Shi  
**Sent:** December 5, 2023 9:12 AM  
**To:** Jose Casal; steven@mdtrgroup.com  
**Cc:** Regine Climaco  
**Subject:** RE: MDTR group request to be added to the mailing list

Hello Steven,

Thank you for your interest in this project.

We will add you to our distribution list to receive further updates on the Master Plan.

Thank you!  
Susan

---

**From:** Steven Ramjass <[steven@mdtrgroup.com](mailto:steven@mdtrgroup.com)>  
**Sent:** December-05-23 8:13 AM  
**To:** Jose Casal <[JCasal@ocwa.com](mailto:JCasal@ocwa.com)>; [sshi@glrichards.com](mailto:sshi@glrichards.com)  
**Subject:** Madoc - Water, Wastewater, and Stormwater Master Plan

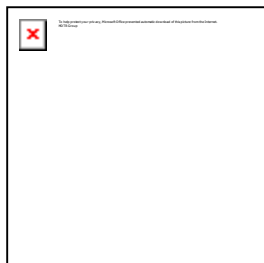
**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Morning Susan & Jose,

In regards to the Notice of Commencement, could we be added to a mailing list to receive updates on this master plan?

Thanks,  
Steven

**Steven Ramjass**  
Planner



E: [steven@mdtrgroup.com](mailto:steven@mdtrgroup.com)  
O: [905-265-1976 ext 2600](tel:905-265-1976)  
F: 905-265-1979

[www.mdtrgroup.com](http://www.mdtrgroup.com)



[7681 Hwy 27 | Unit 16 | Woodbridge | ON | L4L 4M5](https://www.google.com/maps/place/7681+Hwy+27+Unit+16+Woodbridge+ON/L4L+4M5)

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# PIC#1 Sign in Sheet

## Madoc Water, Wastewater and Stormwater Master Plan

Name	Postal Code
Doug and Rita Evans	K0K2K0
Jon Bruce	K0K2K0
Michael Gery	K0K2K0
Fred and Grace Tough	K0K2K0
April Spatola	K0K2K0
Roy Kelley	K0K2K0
Marianne Leger	K0K2K0
Jennifer Diaz	K7M 8N2
Elaine Woodland	K7M 8N2
Shawn Lavender	K0K2K0
Clara Hopkins	K0K2K0
Rhyan Lavender	K0K2K0
Eric Sandford	K0K2K0
Tom Deline	K0K2K0

---

## **Appendix D**

Water Model

Date: January 18, 2024  
 To: Municipality of Centre Hastings  
 From: Tatyana Roumie, EIT  
 Annie Williams, P.Eng.  
 CC: Regine Climaco, EIT  
 Susan Shi, P.Eng.  
 Subject: Madoc Water Master Plan – Hydraulic Water Model  
 JLR No.: 32508-000

Background

J.L. Richards & Associates Limited (JLR) was retained by the Village of Madoc to develop a hydraulic water model in support of a Water, Wastewater, and Stormwater Master Plan in accordance with Approach 1 of the Municipal Class Environmental Assessment (MCEA) framework.

The purpose of the following Water section of the Master Plan is to confirm long-term security of supply, ensure adequate distribution to existing developments, identify residual capacity in the current system, and identify areas of deficiencies. The methodology associated with this study comprises of developing a new water model based on the existing GIS data and record drawings provided by the Village.

Water Distribution System and Water Supply

The water distribution system models the Village of Madoc. The drinking water system for the Village is supplied by two groundwater wells. Rollins Well (Well 3) is the main water supply and Marmora Well (Well 4) is a standby well. Additionally, each well has a high lift pump. There is also an elevated tower with a volume of 1,250 m<sup>3</sup>.

Watermain Distribution Network

The Village’s hydraulic water model was built using Bentley’s WaterCAD® software platform. The scaled water distribution network was imported from GIS data consisting of pipes, junctions, and hydrants. The information within the GIS data included pipe diameters, materials, and lengths. In accordance with the Ministry of the Environment, Conservation and Parks (MECP) design guidelines, the actual inside pipe diameters were modelled as follows:

**Table 1: Pipe Diameters**

Nominal Diameter (mm)	Inside Diameter (mm) (PVC, Ductile Iron)
50	50
100	108
150	155
200	204
250	250
300	297



Roughness coefficients or Hazen-Williams C-Factors were developed based on past experience and from the work done by Peter A. Lamont, entitled “Common pipe flow formulas compared with the theory of roughness” published in the American Water Works Association (AWWA) Journal in May 1981. Based on available information, consideration was given to pipe material and approximate pipe age. The modelled C-Factors are presented in the table below.

**Table 2: C-Factors**

Material	Installation Year	C-Factor for Nominal Diameter (mm)					
		50	100	150	200	250	300
Polyvinyl Chloride (PVC)	All	100	100	100	110	110	120
Cas Iron (C/I)	All	100	105	105	106	107	107
Ductile Iron (D/I)	All	100	105	105	106	107	107
Polyethylene	All	100	100	100	110	110	120
Copper	All	100	100	100	110	110	120
High Density Polyethylene (HDPE)	All	100	100	100	110	110	120
Unknown	All	100	100	100	110	110	120

Junction and hydrant topographical elevations were obtained from LiDAR-based DEM (digital elevation model) data.

Tank, Wells and Pumping Stations

LiDAR-based DEM (digital elevation model) data was not provided for the pumps and wells; therefore, they were approximated using the same elevations as the nearest junction node. The well stations and pumping stations were modelled based on information shown on the following drawings:

- Madoc 2 Rollins St Plan and Profile, Drawing No. 2 dated June 1987 prepared by Totten Sims Hubicki Associates
- Madoc Well 4 IFC Mech. Set, Drawing SP1, Rev. 3 dated April 12, 2018, prepared by Greer Galloway Consulting Engineers

Pump curves were obtained from the pump manufacturer’s (GrundFos) online website given the make and model of the pumps. The same pump curve was applied to both pumps in the system as the Village data specified the same make and model for both pumps. Please refer to Attachment 1 for the pump curve.

Watermain lengths were scaled in the model, however the following watermains were manually input based on record drawings mentioned above as no GIS data was provided:

- Watermain length and diameter between pump at Well #4 and connection to system.
- Watermain length and diameter between pump at Well #3 and connection to system.

The water tower elevations were provided from a drawing received from the Village (refer to Attachment 2 for water tower elevations). The normal operating level was calculated from OCWA's Start and Stop setpoints of 83% to 92%. The LWL of 83% full (HGL= 218.76 m) is the initial water elevation for the tank used in the model. The watermain length and size between the tank and street watermain was manually input in the model based on the information provided in the drawing (refer to Attachment 3).

The following table summarizes the water tower operating levels input in the model.

**Table 1: Water Tower Operating Levels**

Description	Tower Elevation (m)
Base Elevation	181.82
Low Water Level	218.76
High Water Level	219.86
Maximum Water Level	220.83

Water Demands

The modelled water demands were based on Annual Reports which consisted of monthly average day and maximum day demand data over five (5) years (2017 – 2021) provided by the Village. Flow data from only Well #3 was considered in the years between 2017 – 2020. From 2020 to 2021, flow data from both wells, Well #3 and Well #4 were considered. The MECP peaking factor in accordance with Table 3-1 of their design guidelines was used to estimate the total peak hour demand. Based on the estimated existing service population of 1,500 people, a peaking factor of 1.5 x maximum day demand was used for the peak hour demand.

The water demands for the high-water users were deducted from the total Village demands and assigned to the nearest nodes (refer to Attachment 4). The remaining water demands were calculated by multiplying the remaining average day demand per unit with the number of units assigned to each junction.

Ten (10) high water users were also accounted for in Madoc. The Village provided multiple consumption readings (average day demand) for these ten users. The average of these readings for each user is listed in Attachment 5. The maximum day peaking factor of 2.08 was calculated by taking the ratio of the maximum day demand over the average day demand from the Annual Reports. The maximum day demand for the top ten high water users was calculated using a peaking factor of 2.08 x average day demand. The peak hour peaking factor of 1.5 was based on the MECP design guidelines (Table 3-1) for an estimated existing service population of 1,500 people. The peak hour demand for the top ten water users was calculated as 1.5 x maximum day demand.

The table below summarizes the total water demands for the Village. Please refer to Attachment 5 for a detailed list of the top ten water users.

**Table 4: Water Demand Summary**

Water User	Water Demand Scenario		
	Average Day (L/s)	Maximum Day (L/s)	Peak Hour (L/s)
The Village of Madoc (Including high water users)	5.13	10.67	16.01

Model Scenarios and Design Criteria

The newly constructed hydraulic water model was used to simulate the performance of the current system under existing steady-state flow conditions. The following operating conditions were assumed for these simulations:

- The existing average day, maximum day plus fire flow, and peak hour scenarios assume that the pump (PMP-3 in WaterCAD) is operating at Well #3 and the other pump (PMP-4 in WaterCAD) is offline at the standby Well #4, while the water tower level is at 218.76 m (normal low operating level provided from OCWA).

Note that under the average day, maximum day and peak hour scenarios, the following MECP Design Guidelines are applicable:

- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi), and in occupied areas shall not exceed 552 kPa (80 psi).
- Maximum Day: Pressure is to be within the range of 345 kPa (50 psi) and 480 kPa (70 psi).
- Maximum Day + Fire Flow: Residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi).
- Peak Hour: Pressure is to be above 275 kPa (40 psi).

A summary of the results of these simulations is provided in Table 2.

**Table 2: Hydraulic Water Model Results – Existing Conditions**

Demand Scenario	General Results	Notes
Average Day	Good. Pressure Range: 276- 569 kPa	Most junction nodes experience pressures between 350 kPa and 552 kPa.
Maximum Day + Fire Flow	Good. Fire Flow Availability: 22-500 L/s	Most hydrant nodes experience fire flows above 45 L/s, which is the minimum required fire flow per the Ontario Building Code (OBC) for a typical two-storey home.
Peak Hour	Good. Pressure Range: 276-566 kPa	Most junction nodes experience pressures between 350 kPa and 552 kPa.

The following tables summarize the model results under existing conditions for the Village of Madoc based on the percentage of junctions in the model within each stated pressure range or available fire flow range. Model schematics for all scenarios are included in Attachment 6.

Average Day Demand

Table 3 presents the average day simulation results.

**Table 3: Hydraulic Water Model Results - Average Day Demand**

Average Day Demand			Percentage of Junctions
Pressure Range (kPa)			Existing Conditions
Less than	276		0.0%
276	up to	350	3.9%
350	up to	400	12.6%
400	up to	450	23.3%
450	up to	500	30.1%
500	up to and incl.	552	26.2%
Greater than	552		3.9%

Under average day demand, the table above shows that most junction nodes experience pressures between 350 kPa and 552 kPa, and a smaller percentage of the junction nodes experience pressures above 552 kPa. System pressures under existing conditions are found to be above the minimum recommended pressure of 275 kPa (40 psi), in accordance with the MECP Design Guidelines. Four (4) junction nodes located on Durham Street South (J-60, J-62, and J-70) and Seymour Street West (J-36) experience pressures above 552 kPa due to their low topographic elevations.

Maximum Day Plus Fire Flow

**Table 4** presents the maximum day plus fire flow simulation results.

**Table 4: Hydraulic Water Model Results – Maximum Day Demand + Fire Flow**

Maximum Day Demand + Fire Flow			Percentage of Hydrants
Fire Flow Range (L/s)			Existing Conditions
	Less than	30	0.9%
30	up to	45	1.9%
45	up to	67	14.0%
67	up to	83	8.4%
83	up to	100	6.5%
100	up to	117	9.3%
117	up to	150	13.1%
150	up to and incl.	200	32.7%
	Greater than or equal to	200	13.1%

Under maximum day demand plus fire flow, the table above shows that most hydrant nodes experience fire flows above 45 L/s, which is the minimum required fire flow per the Ontario Building Code (OBC) for a typical two-storey home. A smaller percentage of the hydrant nodes experience fire flows below the minimum OBC requirement. These hydrant nodes have low fire flow availability as they are located at dead end watermains on Russel Street (H-5), St. Lawrence Street East (H-2) and St. Peters Street North (H-54).

Peak Hour Demand

**Table 5** presents the peak hour simulation results.

**Table 5: Hydraulic Water Model Results – Peak Hour Demand**

Peak Hour Demand			Percentage of Junctions
Pressure Range (kPa)			Existing Conditions
	Less than	276	0.0%
276	up to	350	3.9%
350	up to	400	13.6%
400	up to	450	22.3%
450	up to	500	35.9%
500	up to and incl.	552	21.4%
	Greater than	552	2.9%

Under peak hour demand, the table above shows that most junction nodes experience pressures between 350 kPa and 552 kPa, and a smaller percentage of the junction nodes experience pressures below 350 kPa or above 552 kPa. System pressures under existing conditions are found to be above the minimum recommended pressure of 275 kPa (40 psi), in

accordance with the MECP Design Guidelines. Two (2) junction nodes located on Durham Street S (J-70) and Seymour Street W (J-36) experience pressures above 552 kPa due to their low topographic elevations.

Hydrant Testing

The hydrant testing data provided by the Village (refer to Attachment 7) was compared to the model results for various locations across the system. Although it was found that there is a minor discrepancy in the static pressures between the hydrant testing and the water model, the results were generally found to be representative of real-world conditions. It was also found that there is a larger discrepancy between the dynamic pressures under fire flow from the hydrant testing and the water model. The findings are summarized in the table below.

**Table 6: Comparison of Hydrant Testing Field Data with Water Model**

Static Pressure				
Hydrant Testing ID	Hydrant Testing Pressure (psi)	WaterCAD ID	WaterCAD Pressure (psi)	Pressure Discrepancy (psi)
H-96	56	H-61	64	8
H-49	61	H-84	65	4
H-52	68	H-87	72	4
H-85	77	H-36	80	3
H-38	47	H-106	50	3
H-45	59	H-105	62	3
H-21	68	H-76	73	5
H-87	77	H-30	81	4
Dynamic Pressure				
H-35	54	H-103	58	4
H-55	40	H-73	47	7
H-04	57	H-35	68	11

Overall, the model is expected to be a useful tool in assessing the Village’s water distribution system. The Village could consider implementing a water model calibration to ensure that the results from the field data and water model align more closely.

Conclusion

Based on the model results, the overall existing water distribution system is operating in general accordance with the pressure and flow recommendations of the current MECP Water Design Guidelines.

It is recommended that the Village update their water model periodically as new and better information becomes available over time regarding watermain rehabilitation or extensions and system operation. A pressure and flow monitoring field testing program in support of a model validation exercise would be beneficial in further refining the model’s ability to accurately simulate real world conditions. Development of an extended period simulation (EPS) scenario within the model would also be beneficial in assessing water quality aspects of the distribution system.

Should you have any questions, please do not hesitate to contact the undersigned.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Reviewed by:

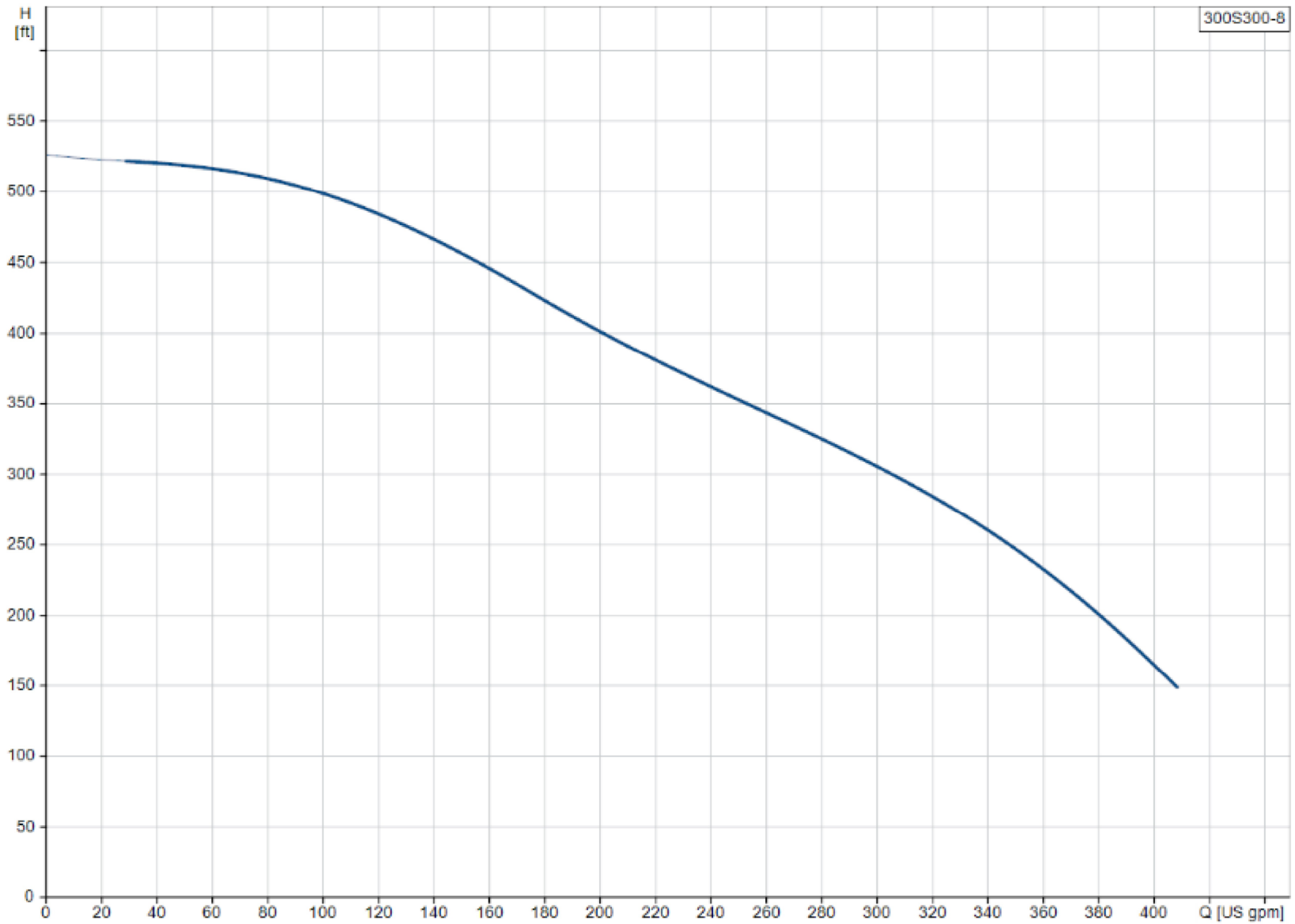
Tatyana Roumie, EIT  
Civil Engineering Intern

Annie Williams, P.Eng.  
Senior Civil Engineer

**ATTACHMENT 1**

DRAFT

# PERFORMANCE



Pumped liquid = Water  
Liquid temperature during operation = 68 °F  
Density = 62.29 lb/ft<sup>3</sup>



## Village of Madoc Water Model PMP-3 and PMP-4 (Pump Curve)

### Element Details

ID	1076	Notes
Label	Pumps 1 and 2	

### Pump Curve

Flow (L/s)	Head (m)
2	159.59
4	157.82
7	151.51
9	141.40
12	127.26
14	115.14
17	104.03
19	90.15
22	77.52
24	62.12
26	46.52

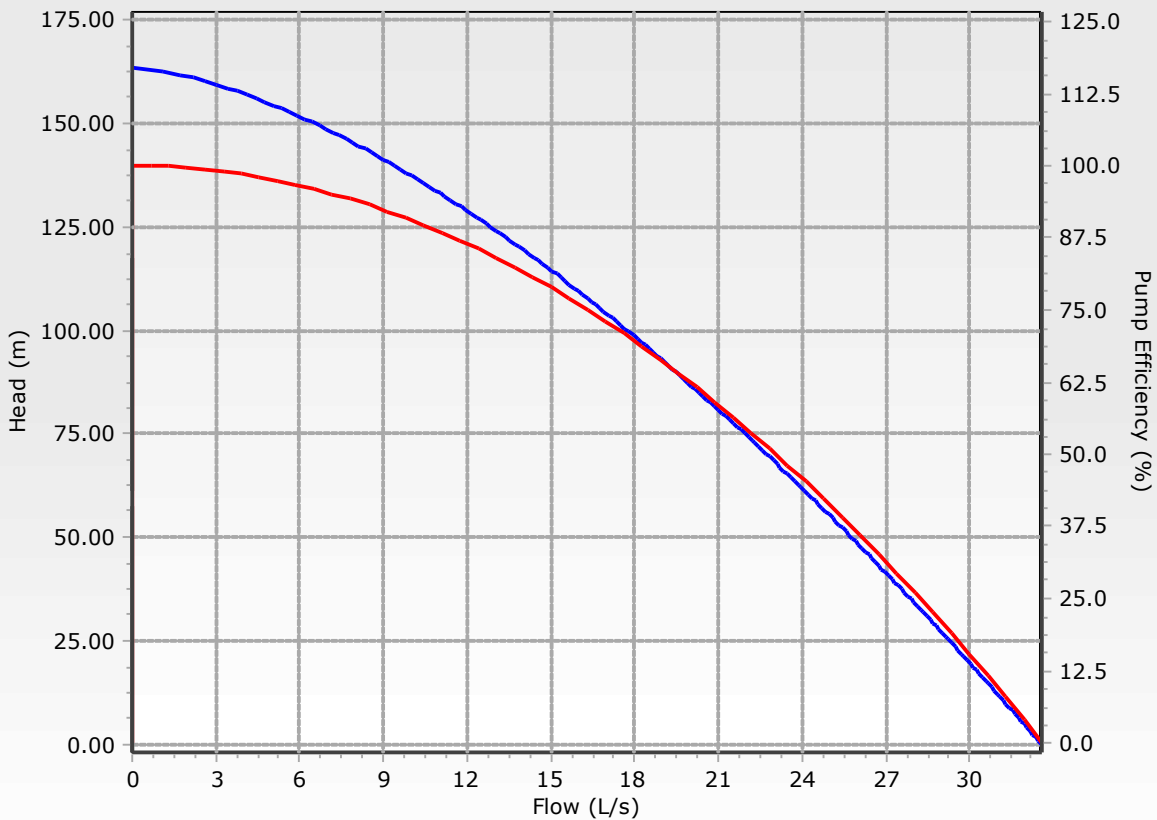
### Pump Efficiency Type

Pump Efficiency Type	Best Efficiency Point	Motor Efficiency	100.0 %
BEP Efficiency	100.0 %	Is Variable Speed Drive?	False
BEP Flow	0 L/s		

### Transient (Physical)

Inertia (Pump and Motor)	0.000 kg·m <sup>2</sup>	Specific Speed	SI=25, US=1280
Speed (Full)	0 rpm	Reverse Spin Allowed?	True

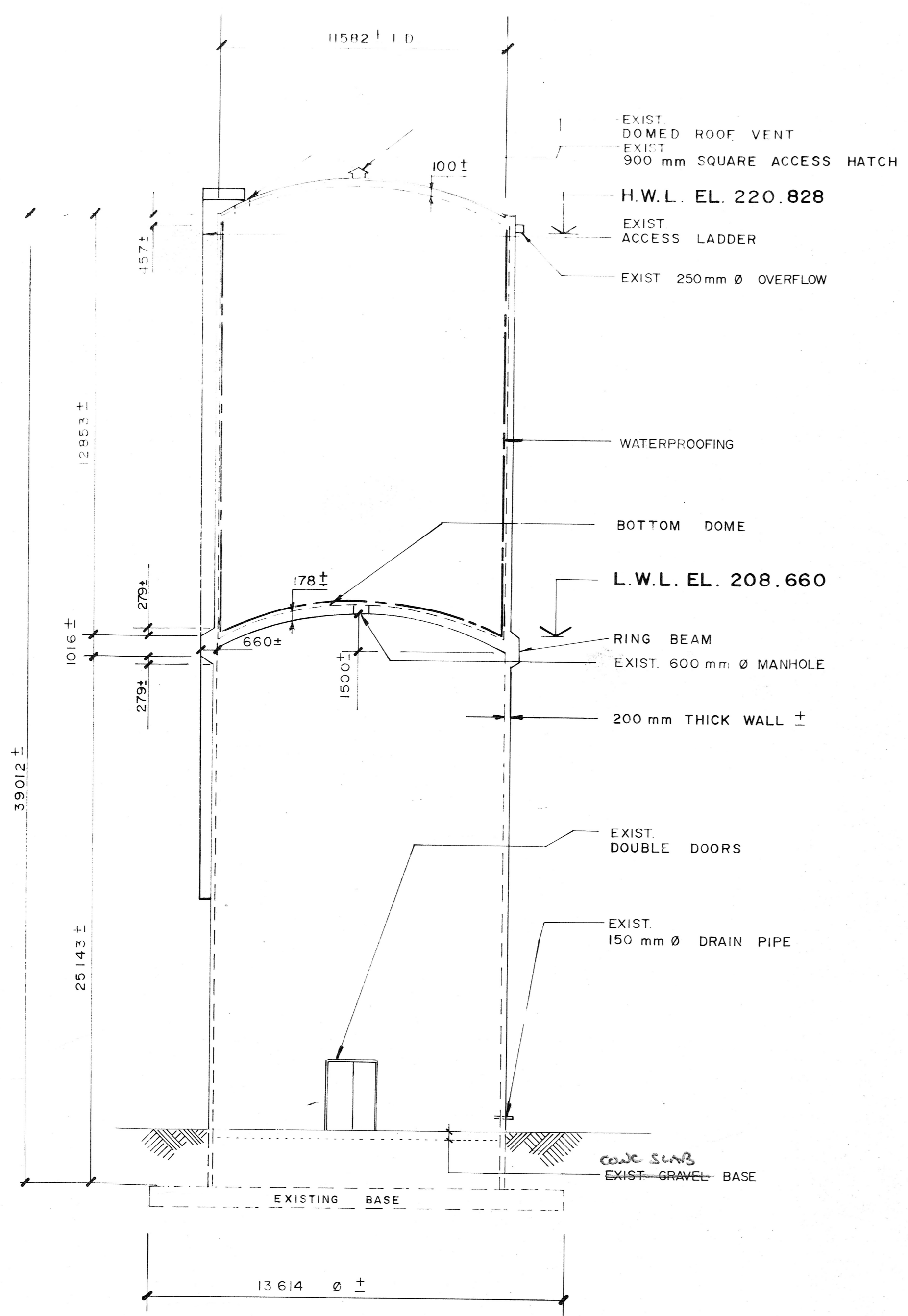
Graph



**ATTACHMENT 2**

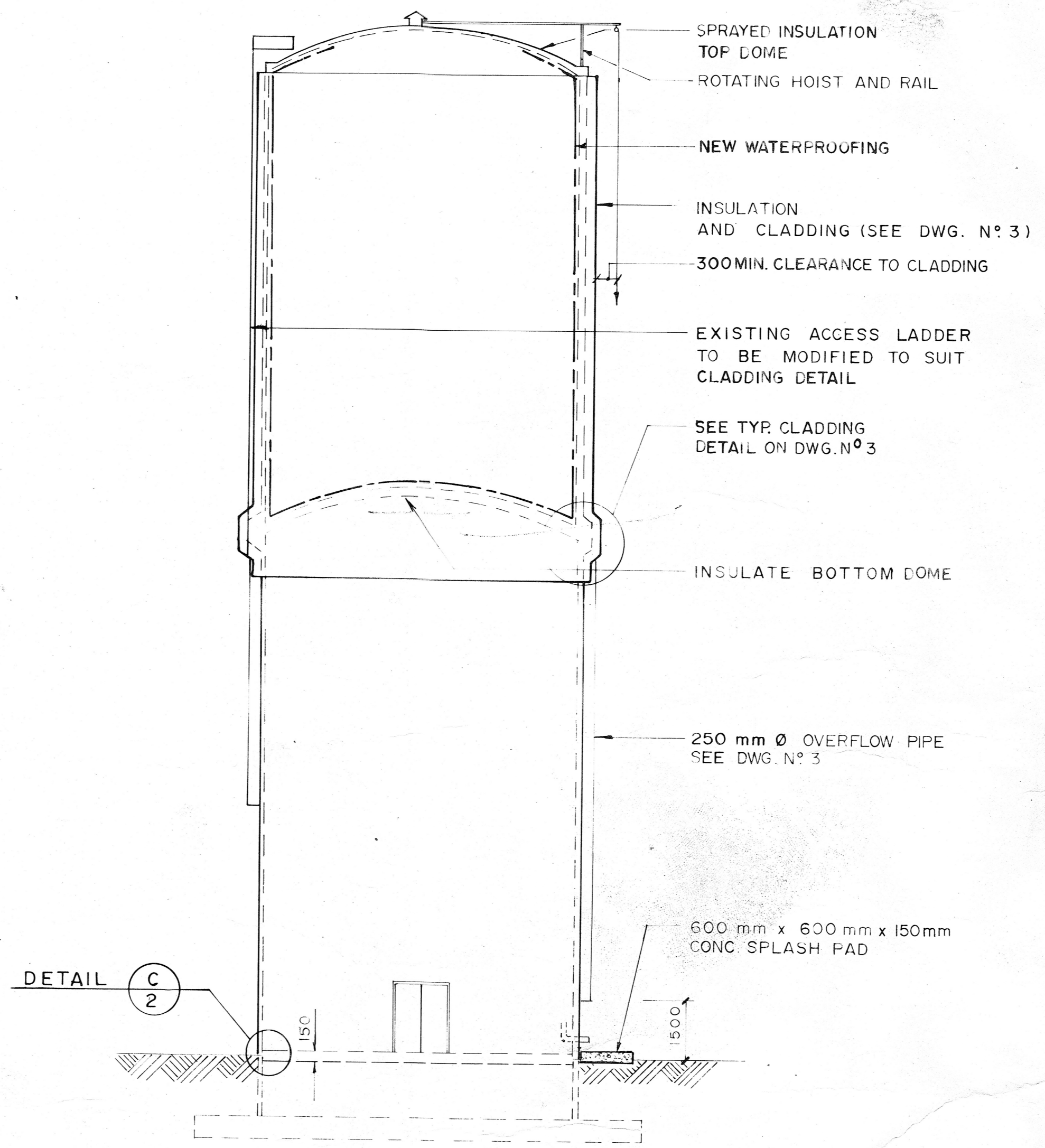
DRAFT



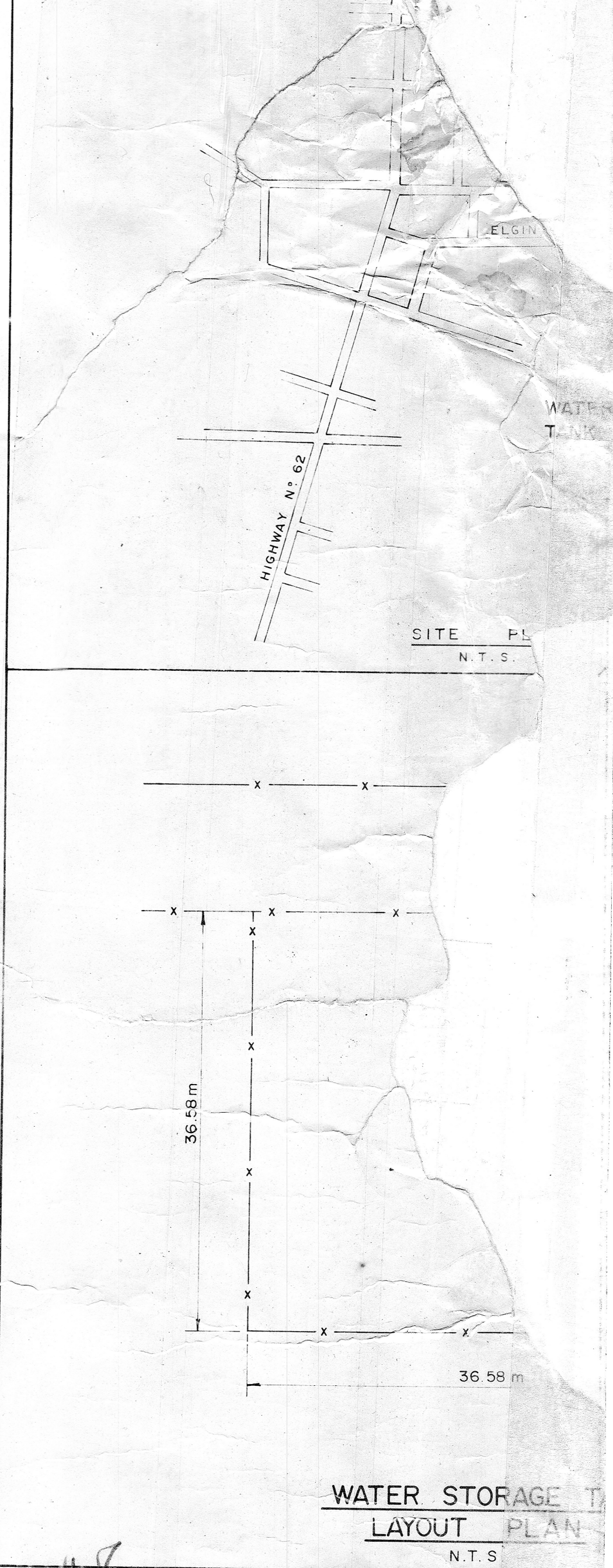


**EXIST. ELEVATION**

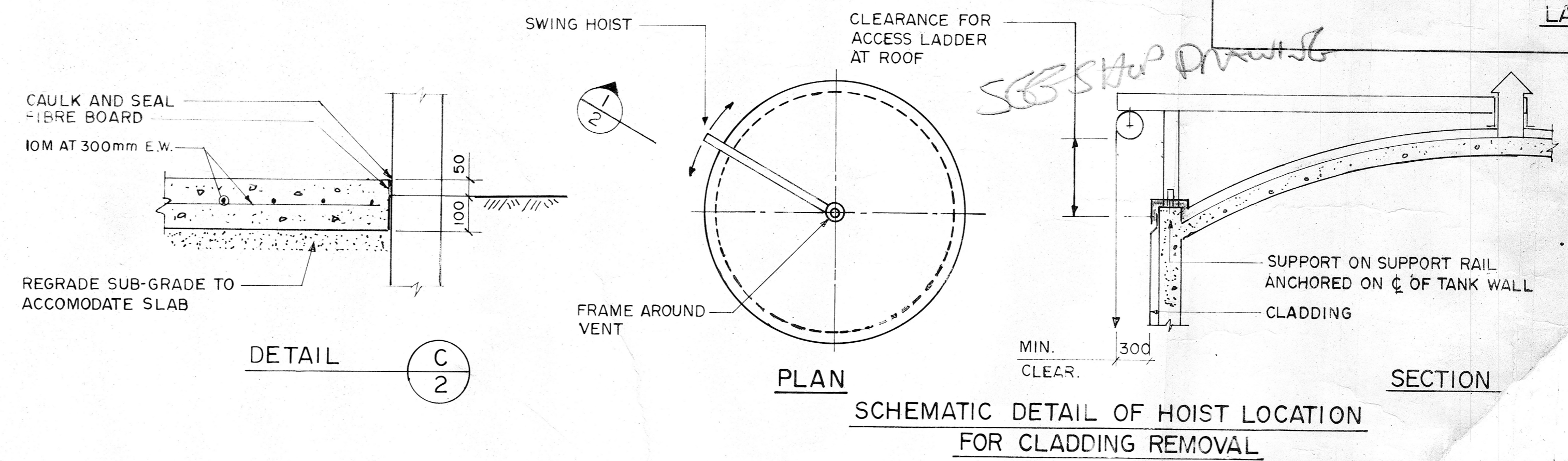
- NOTES:**
1. CAPACITY OF EXISTING TANK 1250 m<sup>3</sup>.
  2. REFER TO SPECIFICATIONS FOR REPAIR PROCEDURES. ALL MATERIALS USED SHALL BE IN STRICT CONFORMANCE WITH THE MANUFACTURERS SPECIFICATIONS.
  3. INFORMATION CONTAINED IN THIS DWG IS OBTAINED FROM DWG'S 1 TO 8 INCLUSIVE DATED JUNE 1980 PREPARED BY CAZALY ASSOCIATES LTD.
  4. CONTRACTOR SHALL MAKE HIS ASSESSMENT OF ANY NEW FIELD CONDITIONS MAKE NECESSARY ADJUSTMENT IN THE FIELD TO SUIT THE PROPOSED REHABILITATION.
  5. ALL CONCRETE SHALL CONFORM TO CSA A23 SERIES.
  6. CONCRETE SHALL BE 25 MPa AT 28 DAYS.
  7. ALL EXPOSED STEEL SHALL BE GALVANIZED.
  8. CARE SHALL BE TAKEN NOT TO CUT OR DAMAGE ANY POST-TENSION TENDONS & REINFORCEMENTS, LOCATE THE TENDONS BEFORE INSTALLING ANY ANCHORS.
  9. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG'S 1 TO 3.



**PROPOSED ELEVATION**

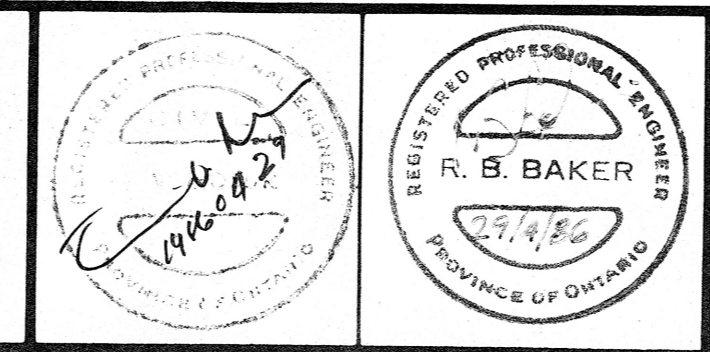


**WATER STORAGE TANK LAYOUT PLAN N.T.S.**



**SCHEMATIC DETAIL OF HOIST LOCATION FOR CLADDING REMOVAL**

**totten sims hubicki associates**  
**ENGINEERS ARCHITECTS AND PLANNERS**  
 COBOURG WHITBY KINGSTON TORONTO BRACEBRIDGE BROCKVILLE OTTAWA



No.	DATE	BY	REVISION

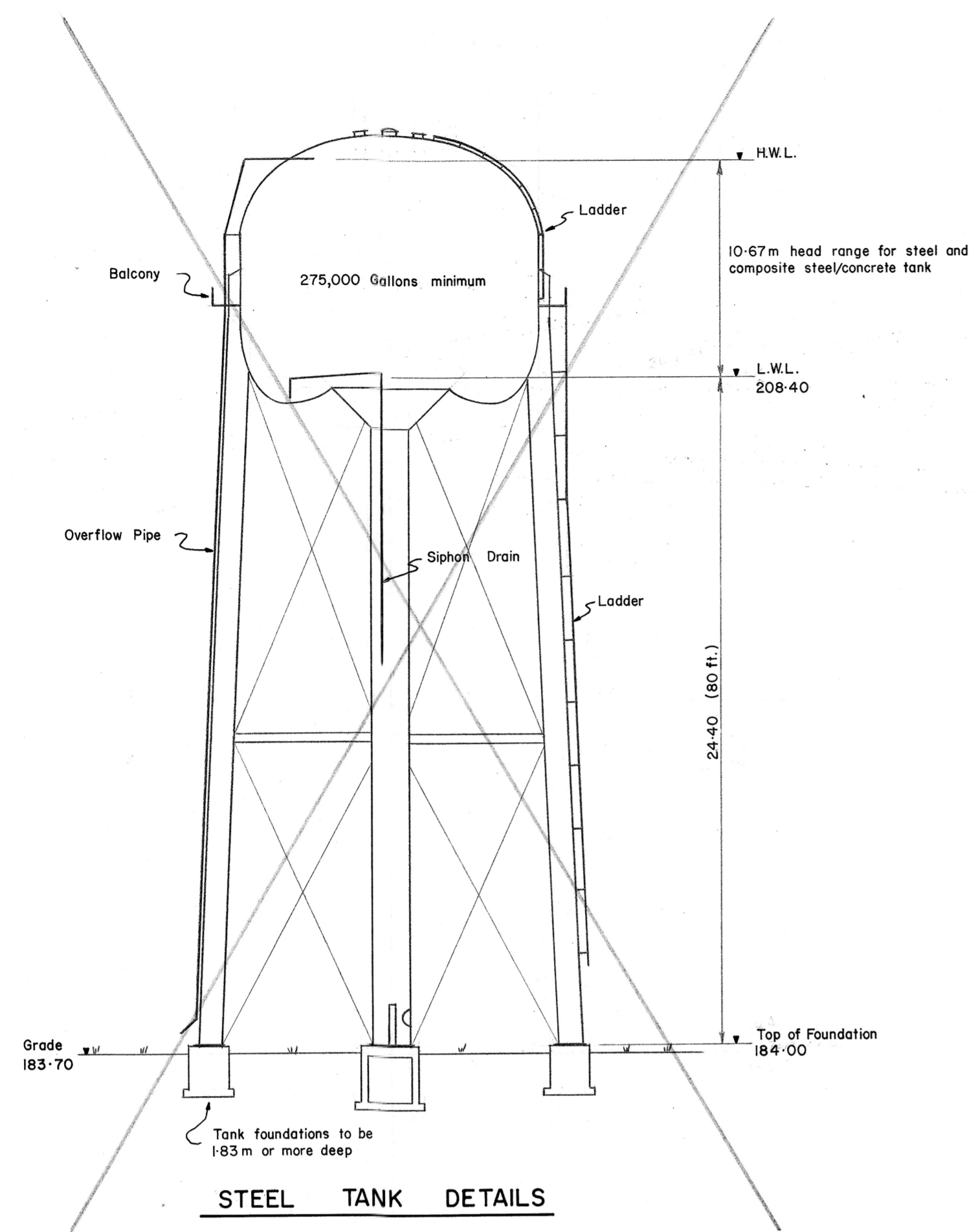
DESIGNED	T.V.M./A.G.G.
DRAWN	P.R.S.
CHECKED	A.G.G.
APPROVED	R.B.B.
SCALE	N.T.S.

MINISTRY  
VII



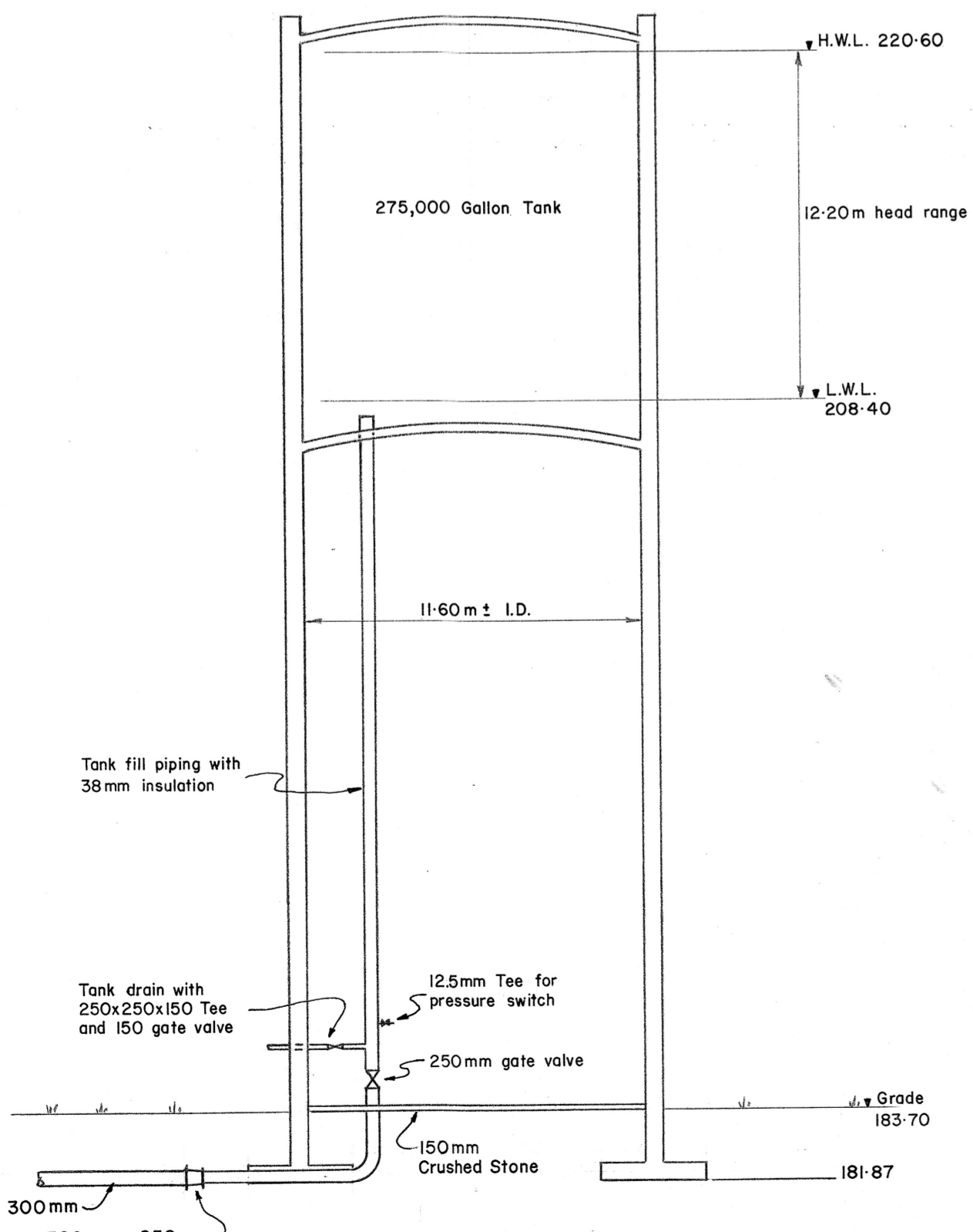
**ATTACHMENT 3**

DRAFT



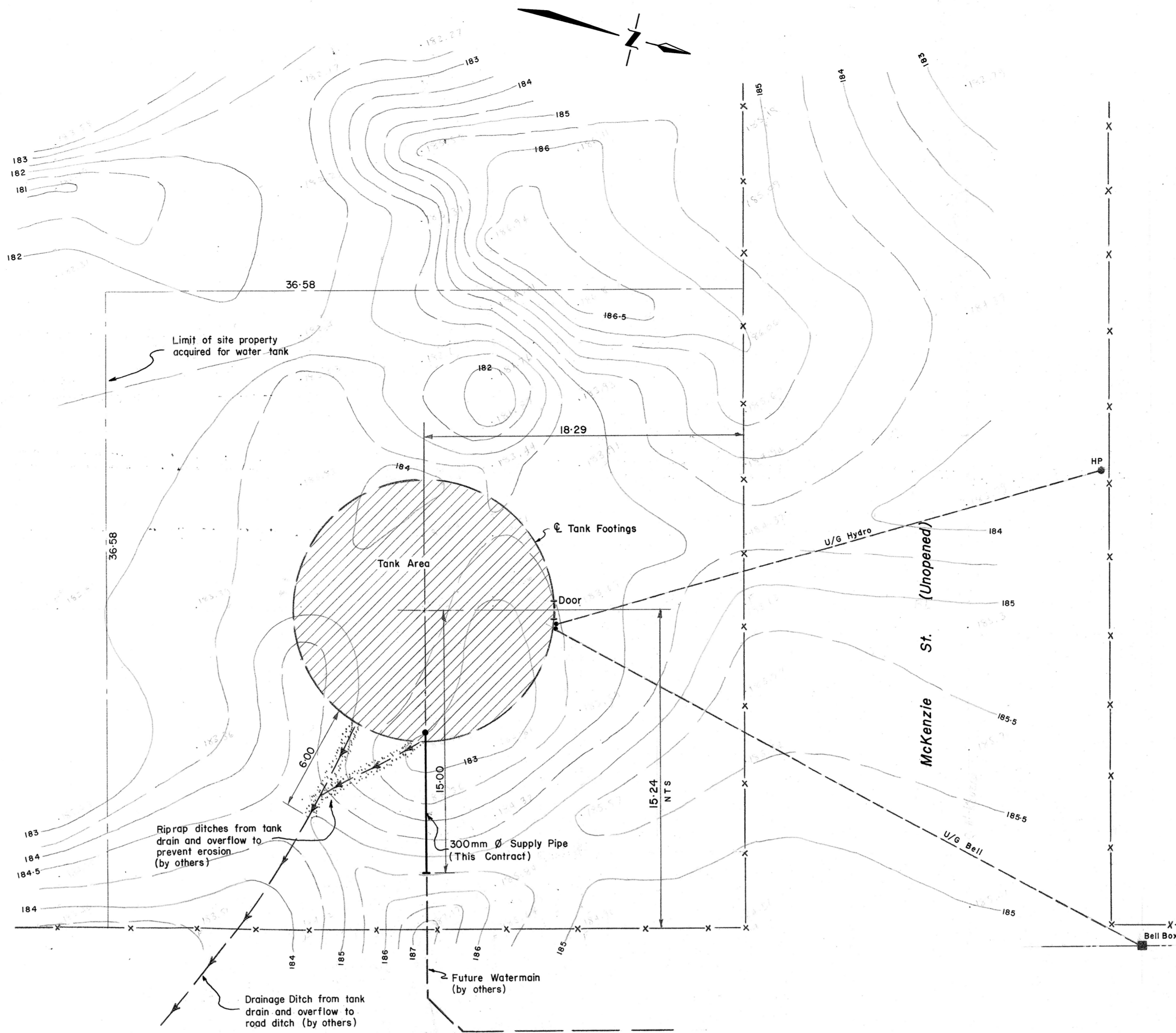
**STEEL TANK DETAILS**

Note: Tenderers may submit prices for concrete pedestal mounted steel tanks



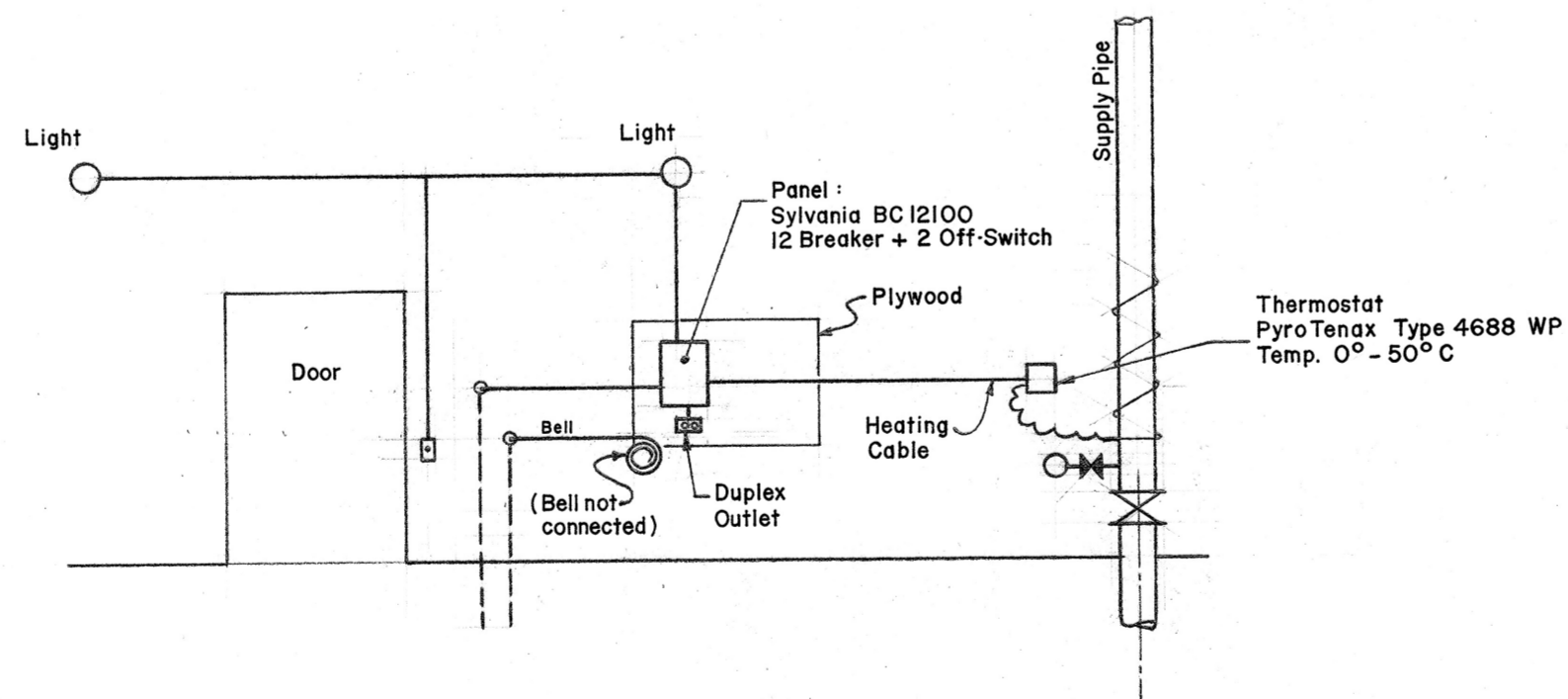
**CONCRETE TANK DETAILS**

SCALE - 1:200

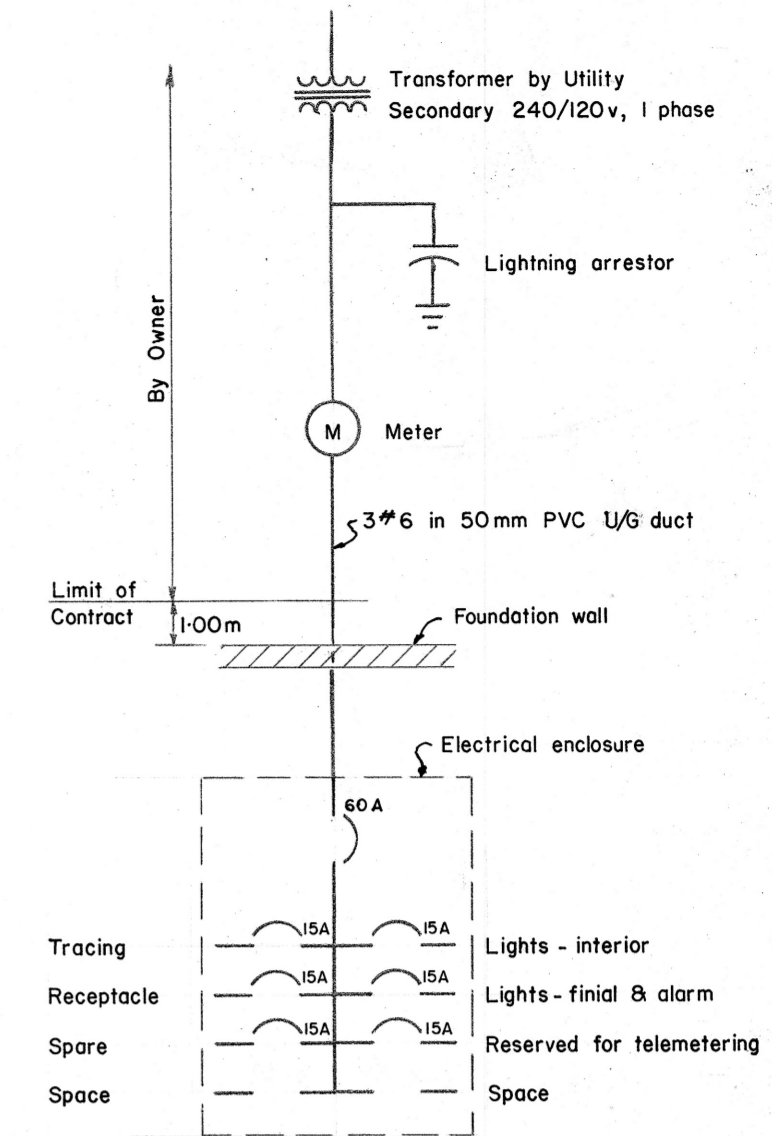


**SITE PLAN**

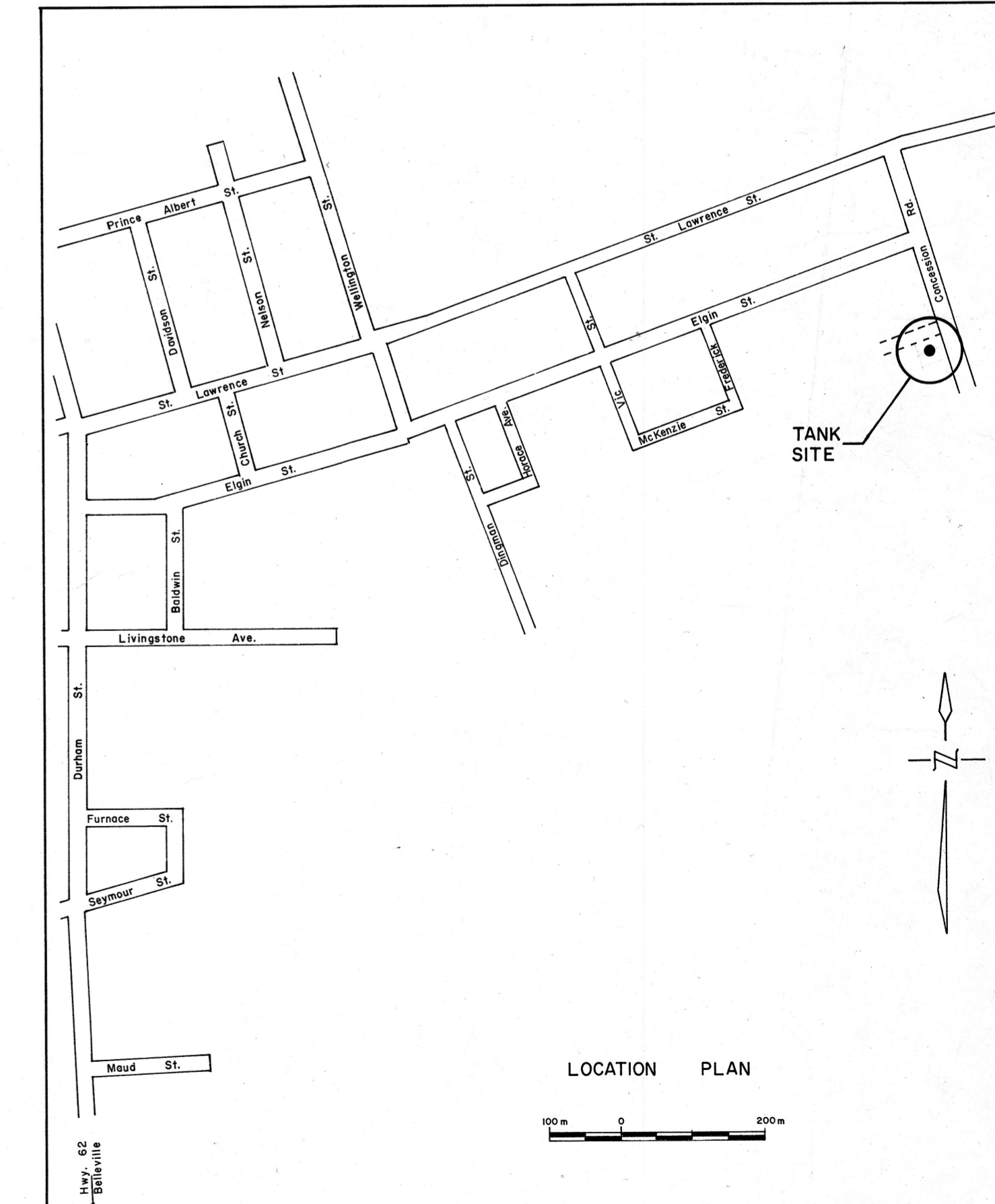
SCALE - 1:200



**INTERIOR ELEVATION**

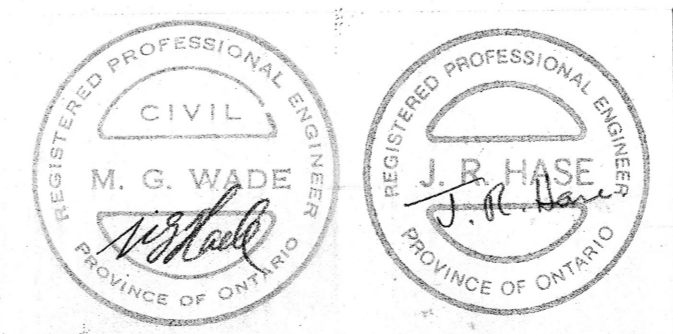


**ELECTRICAL LINE DIAGRAM**

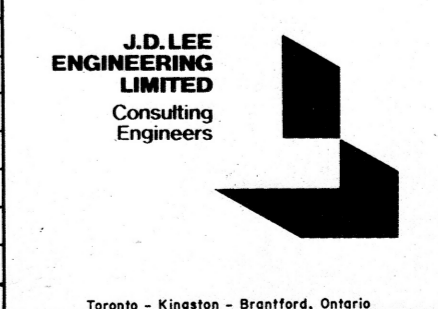


**LOCATION PLAN**

**THIS DRAWING IS APPROVED FOR CONSTRUCTION PURPOSES**  
 By *J. D. Lee* Date *80.06.2* Job No. *1371*  
**J. D. LEE ENGINEERING LIMITED**



No.	Date	Revision	CHK.
3	81-01-13	As-Built	
2	80-04-25	Electrical diagram	
1	80-04-16	Concrete tank and revised operating levels	



Project	ELEVATED WATER TANK				
Client	VILLAGE OF MADOC				
Title	SITE PLAN				
Design	J.D.L.	Date	80-02-20	Scale	1:200
Drawn	J.D.L.	Checked	J.R.H.	Drawing No.	1276 C
				Revision	3
				Job No.	1328
				Sheet	1



**ATTACHMENT 4**

DRAFT

		EXISTING DEMANDS (2023)									
		Average Day Demand				Maximum Day Demand				Peak Hour Demand	
Node Number	Node Number	Number of Units	ADD for Units (L/s)	ADD for HW Users (L/s)	Total Average Day Demand (L/s)	MDD for Units (L/s)	MDD for HW Users (L/s)	Total Maximum Day Demand (L/s)	PHD for Units (L/s)	PHD for HW Users (L/s)	Total Peak Hour Demand (L/s)
J-1	1	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-5	5	7	0.0479	0.0271	0.0750	0.0095	0.0563	0.1558	0.1493	0.0844	0.2338
J-6	6	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-7	7	2	0.0137	0.1004	0.1141	0.0284	0.2088	0.2372	0.0427	0.3132	0.3558
J-9	9	14	0.0958		0.0958	0.1991	0.0000	0.1991	0.2986	0.0000	0.2986
J-10	10	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-11	11	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-12	12	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-13	13	8	0.0547		0.0547	0.1138	0.0000	0.1138	0.1706	0.0000	0.1706
J-14	14	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-15	15	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-16	16	9	0.0616		0.0616	0.1280	0.0000	0.1280	0.1920	0.0000	0.1920
J-17	17	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-18	18	4	0.0274		0.0274	0.0569	0.0000	0.0569	0.0853	0.0000	0.0853
J-19	19	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-20	20	10	0.0684		0.0684	0.1422	0.0000	0.1422	0.2133	0.0000	0.2133
J-21	21	0	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
J-22	22	10	0.0684		0.0684	0.1422	0.0000	0.1422	0.2133	0.0000	0.2133
J-23	23	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-25	25	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-26	26	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-27	27	15	0.1026		0.1026	0.2133	0.0000	0.2133	0.3199	0.0000	0.3199
J-28	28	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-29	29	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-30	30	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-31	31	8	0.0547		0.0547	0.1138	0.0000	0.1138	0.1706	0.0000	0.1706
J-32	32	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-33	33	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-34	34	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-35	35	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-36	36	28	0.1915		0.1915	0.3981	0.0000	0.3981	0.5972	0.0000	0.5972
J-37	37	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-38	38	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-39	39	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-40	40	10	0.0684	0.0213	0.0897	0.1422	0.0443	0.1865	0.2133	0.0665	0.2798
J-41	41	9	0.0616		0.0616	0.1280	0.0000	0.1280	0.1920	0.0000	0.1920
J-42	42	6	0.0410	0.0212	0.0623	0.0853	0.0441	0.1294	0.1280	0.0662	0.1941
J-43	43	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-44	44	4	0.0274		0.0274	0.0569	0.0000	0.0569	0.0853	0.0000	0.0853
J-45	45	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-46	46	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-47	47	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-48	48	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-49	49	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-50	50	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-51	51	14	0.0958		0.0958	0.1991	0.0000	0.1991	0.2986	0.0000	0.2986
J-52	52	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-53	53	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-54	54	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-55	55	3	0.0205	0.0551	0.0756	0.0427	0.1145	0.1572	0.0640	0.1717	0.2357
J-56	56	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-57	57	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-58	58	10	0.0684		0.0684	0.1422	0.0000	0.1422	0.2133	0.0000	0.2133
J-60	60	9	0.0616		0.0616	0.1280	0.0000	0.1280	0.1920	0.0000	0.1920
J-61	61	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-62	62	3	0.0205	0.0801	0.1006	0.0427	0.1665	0.2092	0.0640	0.2498	0.3138
J-63	63	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-64	64	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-65	65	16	0.1094		0.1094	0.2275	0.0000	0.2275	0.3413	0.0000	0.3413
J-66	66	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-67	67	4	0.0274		0.0274	0.0569	0.0000	0.0569	0.0853	0.0000	0.0853
J-68	68	6	0.0410	0.0874	0.1284	0.0853	0.1817	0.2670	0.1280	0.2725	0.4005
J-69	69	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-70	70	6	0.0410	0.0152	0.0562	0.0853	0.0316	0.1169	0.1280	0.0474	0.1753
J-72	72	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-73	73	9	0.0616		0.0616	0.1280	0.0000	0.1280	0.1920	0.0000	0.1920
J-74	74	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-75	75	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-76	76	9	0.0616		0.0616	0.1280	0.0000	0.1280	0.1920	0.0000	0.1920
J-77	77	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-78	78	5	0.0342		0.0342	0.0711	0.0000	0.0711	0.1066	0.0000	0.1066
J-79	79	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-80	80	11	0.0752		0.0752	0.1564	0.0000	0.1564	0.2346	0.0000	0.2346
J-81	81	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-82	82	12	0.0821		0.0821	0.1706	0.0000	0.1706	0.2559	0.0000	0.2559
J-83	83	3	0.0205		0.0205	0.0427	0.0000	0.0427	0.0640	0.0000	0.0640
J-84	84	16	0.1094		0.1094	0.2275	0.0000	0.2275	0.3413	0.0000	0.3413
J-85	85	11	0.0752		0.0752	0.1564	0.0000	0.1564	0.2346	0.0000	0.2346
J-86	86	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-87	87	8	0.0547		0.0547	0.1138	0.0000	0.1138	0.1706	0.0000	0.1706
J-88	88	17	0.1163		0.1163	0.2417	0.0000	0.2417	0.3626	0.0000	0.3626
J-89	89	6	0.0410		0.0410	0.0853	0.0000	0.0853	0.1280	0.0000	0.1280
J-90	90	14	0.0958		0.0958	0.1991	0.0000	0.1991	0.2986	0.0000	0.2986
J-91	91	8	0.0547		0.0547	0.1138	0.0000	0.1138	0.1706	0.0000	0.1706
J-92	92	22	0.1505	0.0195	0.1700	0.3128	0.0406	0.3534	0.4692	0.0609	0.5301
J-93	93	22	0.1505		0.1505	0.3128	0.0000	0.3128	0.4692	0.0000	0.4692
J-94	94	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-95	95	19	0.1300		0.1300	0.2702	0.0000	0.2702	0.4053	0.0000	0.4053
J-96	96	16	0.1094		0.1094	0.2275	0.0000	0.2275	0.3413	0.0000	0.3413
J-97	97	16	0.1094		0.1094	0.2275	0.0000	0.2275	0.3413	0.0000	0.3413
J-98	98	12	0.0821		0.0821	0.1706	0.0000	0.1706	0.2559	0.0000	0.2559
J-99	99	15	0.1026		0.1026	0.2133	0.0000	0.2133	0.3199	0.0000	0.3199
J-100	100	21	0.1436		0.1436	0.2986	0.0000	0.2986	0.4479	0.0000	0.4479
J-101	101	2	0.0137		0.0137	0.0284	0.0000	0.0284	0.0427	0.0000	0.0427
J-103	103	7	0.0479		0.0479	0.0995	0.0000	0.0995	0.1493	0.0000	0.1493
J-104	104	1	0.0068		0.0068	0.0142	0.0000	0.0142	0.0213	0.0000	0.0213
J-105	105	4	0.0274		0.0274	0.0569	0.0000	0.0569	0.0853	0.0000	0.0853
<b>Total</b>		<b>688</b>	<b>4.71</b>	<b>0.427</b>	<b>5.13</b>	<b>9.78</b>	<b>0.89</b>	<b>10.67</b>	<b>14.67</b>	<b>1.33</b>	<b>16.01</b>

Total Avg Day Demand	5.13	L/s
HW Users Avg Day Demand	0.43	L/s
Remaining Avg Day Demand	4.71	L/s
Remaining Avg Day Demand per Unit	0.01	L/s
	590.98	L/d
Total Maximum Day Demand	10.67	L/s
Max Day Peaking Factor	2.08	PF
PHD Peaking Factor for Residential Units	1.50	PF
Residential Peak Hour Demand	14.67	L/s
Total PHD	16.01	L/s

**ATTACHMENT 5**

DRAFT



**Table 4: Top Ten High Water Users**

<b>Water User</b>	<b>Water Demand Scenario</b>		
	<b>Average Day (L/s)</b>	<b>Maximum Day (L/s)</b>	<b>Peak Hour (L/s)</b>
14118 Highway 62	0.10	0.21	0.32
24 Seymour	0.03	0.06	0.09
56-64 Durham	0.06	0.12	0.18
40 Elgin	0.09	0.19	0.29
103 St Lawrence	0.02	0.04	0.06
161 Russel	0.02	0.04	0.06
76A Duncan	0.02	0.04	0.06
231 Durham	0.05	0.10	0.15
245 St Lawrence	0.03	0.06	0.09
313 Durham	0.02	0.04	0.06

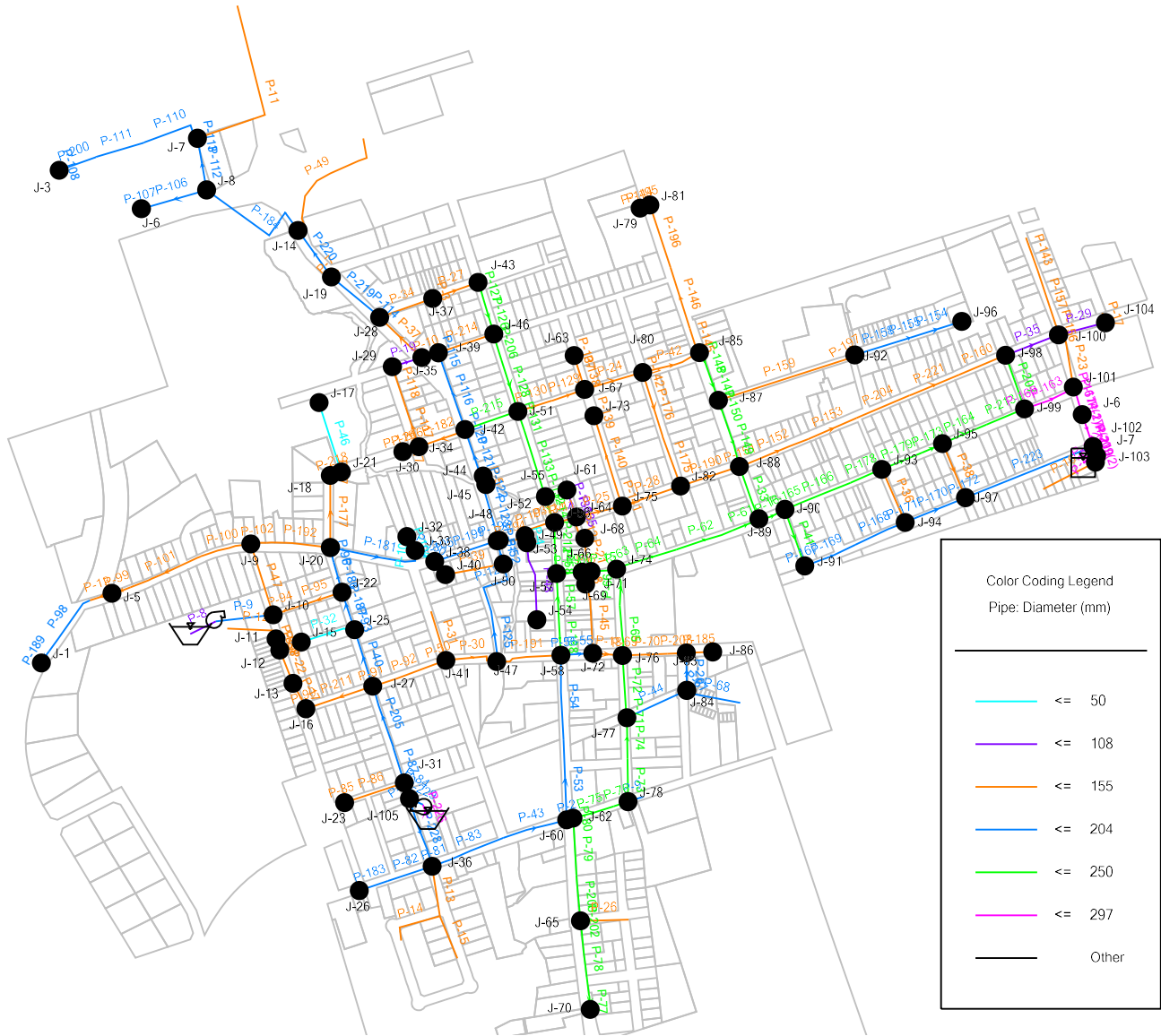
**ATTACHMENT 6**

DRAFT

# Village of Madoc Water Model

## Model Schematic

### Junctions

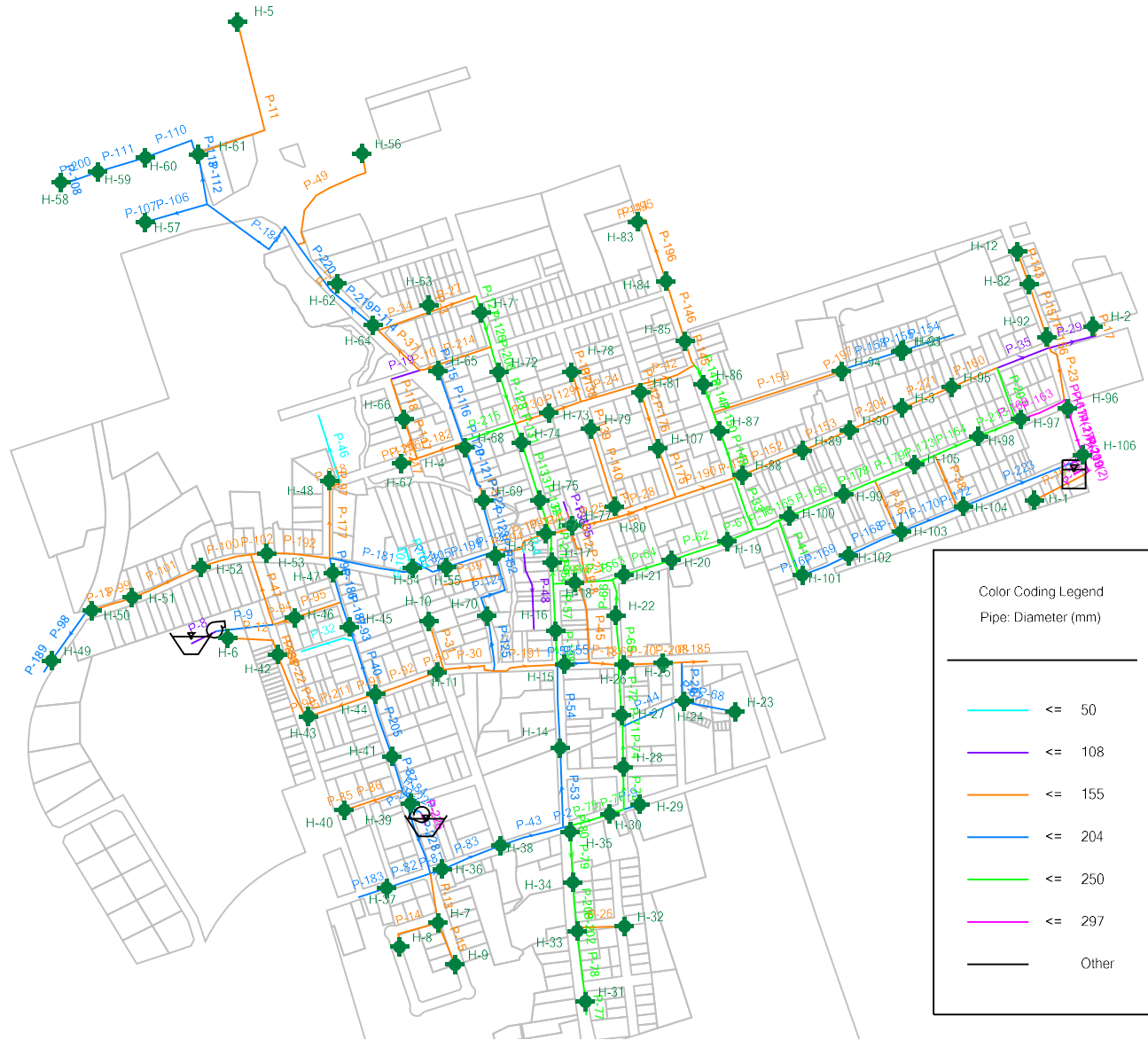


Color Coding Legend	
Pipe: Diameter (mm)	
<span style="color: cyan;">—</span>	<= 50
<span style="color: purple;">—</span>	<= 108
<span style="color: orange;">—</span>	<= 155
<span style="color: blue;">—</span>	<= 204
<span style="color: green;">—</span>	<= 250
<span style="color: magenta;">—</span>	<= 297
<span style="color: black;">—</span>	Other

# Village of Madoc Water Model

## Model Schematic

### Hydrants



Color Coding Legend	
Pipe: Diameter (mm)	
<span style="color: cyan;">—</span>	<= 50
<span style="color: purple;">—</span>	<= 108
<span style="color: orange;">—</span>	<= 155
<span style="color: blue;">—</span>	<= 204
<span style="color: green;">—</span>	<= 250
<span style="color: magenta;">—</span>	<= 297
<span style="color: black;">—</span>	Other

**Village of Madoc Water Model**  
**Overall Model**  
**Junction Elevations Table**

ID	Label	Elevation (m)
30	J-1	174.16
34	J-3	176.92
39	J-5	174.71
40	J-6	172.99
41	J-7	174.00
42	J-8	171.80
46	J-9	173.87
47	J-10	173.87
48	J-11	180.16
49	J-12	179.82
51	J-13	174.37
52	J-14	171.06
53	J-15	179.79
54	J-16	170.37
57	J-17	171.83
59	J-18	172.80
61	J-19	172.25
62	J-20	174.34
66	J-21	170.30
67	J-22	180.51
69	J-23	170.33
71	J-25	178.88
74	J-26	167.20
76	J-27	169.60
78	J-28	172.02
79	J-29	171.64
81	J-30	170.29
82	J-31	167.46
83	J-32	177.28
84	J-33	178.38
85	J-34	170.61
86	J-35	172.99
92	J-36	162.27
93	J-37	175.18
94	J-38	176.41
95	J-39	174.17
97	J-40	172.94
98	J-41	167.41
99	J-42	171.31
102	J-43	179.18
103	J-44	169.78
104	J-45	169.08
106	J-46	173.90
108	J-47	164.07
109	J-48	168.84
110	J-49	168.73
111	J-50	165.61
113	J-51	176.14
116	J-52	168.21
117	J-53	167.45
118	J-54	168.14
119	J-55	171.21

**Village of Madoc Water Model**  
**Overall Model**  
**Junction Elevations Table**

ID	Label	Elevation (m)
121	J-56	168.12
124	J-57	167.44
128	J-58	168.79
130	J-60	162.90
131	J-61	169.35
132	J-62	162.64
133	J-63	177.16
134	J-64	167.61
135	J-65	168.17
137	J-66	165.81
138	J-67	177.20
139	J-68	166.94
140	J-69	165.55
141	J-70	161.27
142	J-71	165.51
143	J-72	169.48
144	J-73	171.51
146	J-74	165.46
147	J-75	169.20
148	J-76	166.19
149	J-77	164.49
150	J-78	163.52
152	J-79	175.66
154	J-80	173.60
157	J-81	177.02
162	J-82	167.27
164	J-83	166.05
166	J-84	166.73
167	J-85	169.43
168	J-86	166.35
171	J-87	168.20
172	J-88	167.94
174	J-89	168.79
175	J-90	167.97
176	J-91	168.69
179	J-92	173.31
180	J-93	179.52
181	J-94	175.79
183	J-95	177.04
186	J-96	180.03
188	J-97	174.49
189	J-98	180.64
191	J-99	180.50
193	J-100	182.31
195	J-101	179.95
197	J-102	183.47
198	J-103	183.44
199	J-104	185.99
1043	J-105	165.58
1060	J-6	181.08
1078	J-7	183.45

**Village of Madoc Water Model**  
**Overall Model**  
**Hydrant Elevations Table**

ID	Label	Elevation (m)
201	H-1	180.52
212	H-2	186.09
216	H-3	181.42
246	H-4	170.22
252	H-5	176.32
269	H-6	172.38
279	H-7	162.89
280	H-8	162.61
281	H-9	163.39
475	H-10	171.83
476	H-11	167.01
479	H-12	184.42
487	H-13	168.68
490	H-14	164.27
493	H-15	168.77
496	H-16	169.38
499	H-17	168.00
502	H-18	165.82
505	H-19	167.34
508	H-20	167.33
511	H-21	165.83
514	H-22	164.86
517	H-23	164.18
518	H-24	166.47
521	H-25	165.59
524	H-26	166.21
527	H-27	164.97
530	H-28	164.09
533	H-29	165.70
534	H-30	162.29
537	H-31	161.27
540	H-32	170.21
541	H-33	167.71
544	H-34	170.58
547	H-35	163.12
550	H-36	163.19
553	H-37	163.51
556	H-38	162.82
559	H-39	165.81
562	H-40	170.18
565	H-41	165.96
568	H-42	179.69
571	H-43	170.07
577	H-44	170.33
580	H-45	182.01
583	H-46	177.02
586	H-47	174.96
589	H-48	172.40
592	H-49	174.34
595	H-50	174.50
596	H-51	175.20
599	H-52	174.16

**Village of Madoc Water Model**  
**Overall Model**  
**Hydrant Elevations Table**

ID	Label	Elevation (m)
602	H-53	173.44
791	H-54	178.26
794	H-55	174.59
797	H-56	173.35
798	H-57	173.01
801	H-58	176.81
804	H-59	176.36
807	H-60	175.76
810	H-61	173.93
813	H-62	172.28
814	H-63	175.67
816	H-64	172.81
819	H-65	174.78
822	H-66	170.69
825	H-67	170.22
828	H-68	171.23
831	H-69	170.87
834	H-70	163.97
837	H-71	174.75
840	H-72	173.22
843	H-73	181.90
846	H-74	178.51
849	H-75	172.88
852	H-76	168.19
855	H-77	167.64
858	H-78	177.49
861	H-79	171.25
864	H-80	168.89
867	H-81	173.24
870	H-82	183.29
873	H-83	175.56
876	H-84	173.18
879	H-85	170.61
882	H-86	169.28
885	H-87	168.04
888	H-88	168.07
891	H-89	168.88
894	H-90	172.14
897	H-91	179.42
900	H-92	182.73
903	H-93	178.97
906	H-94	172.97
909	H-95	181.42
912	H-96	179.49
915	H-97	180.26
918	H-98	180.61
921	H-99	176.81
924	H-100	168.04
927	H-101	169.51
930	H-102	174.95
933	H-103	175.76
936	H-104	174.66



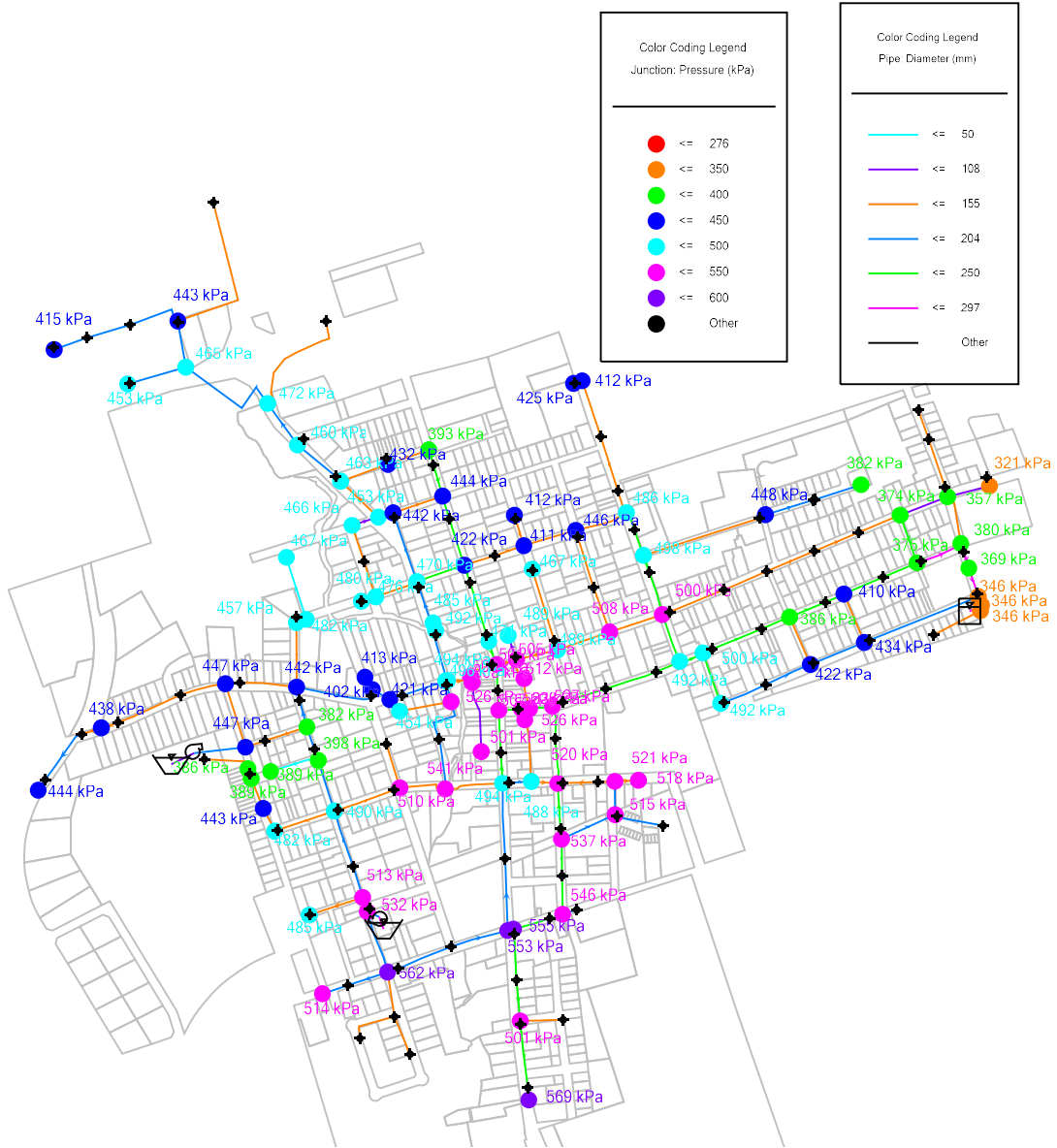
**Village of Madoc Water Model**  
**Overall Model**  
**Hydrant Elevations Table**

ID	Label	Elevation (m)
939	H-105	175.14
942	H-106	183.61
947	H-107	168.65

# Village of Madoc Water Model

## Existing Conditions - Average Day Demand

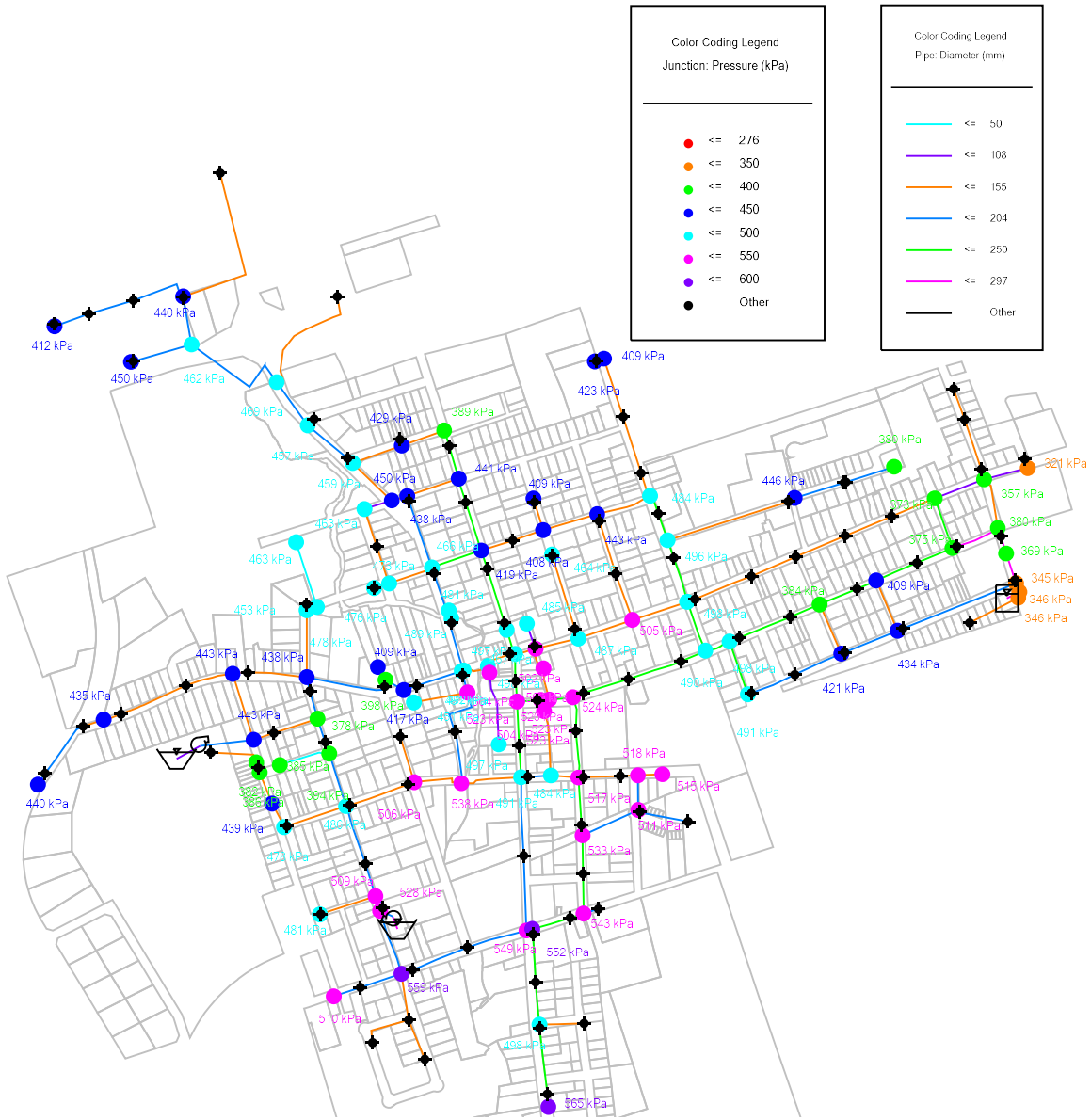
### 1 Pump On, Water Tower HGL= 218.76 m



# Village of Madoc Water Model

## Existing Conditions - Peak Hour Demand

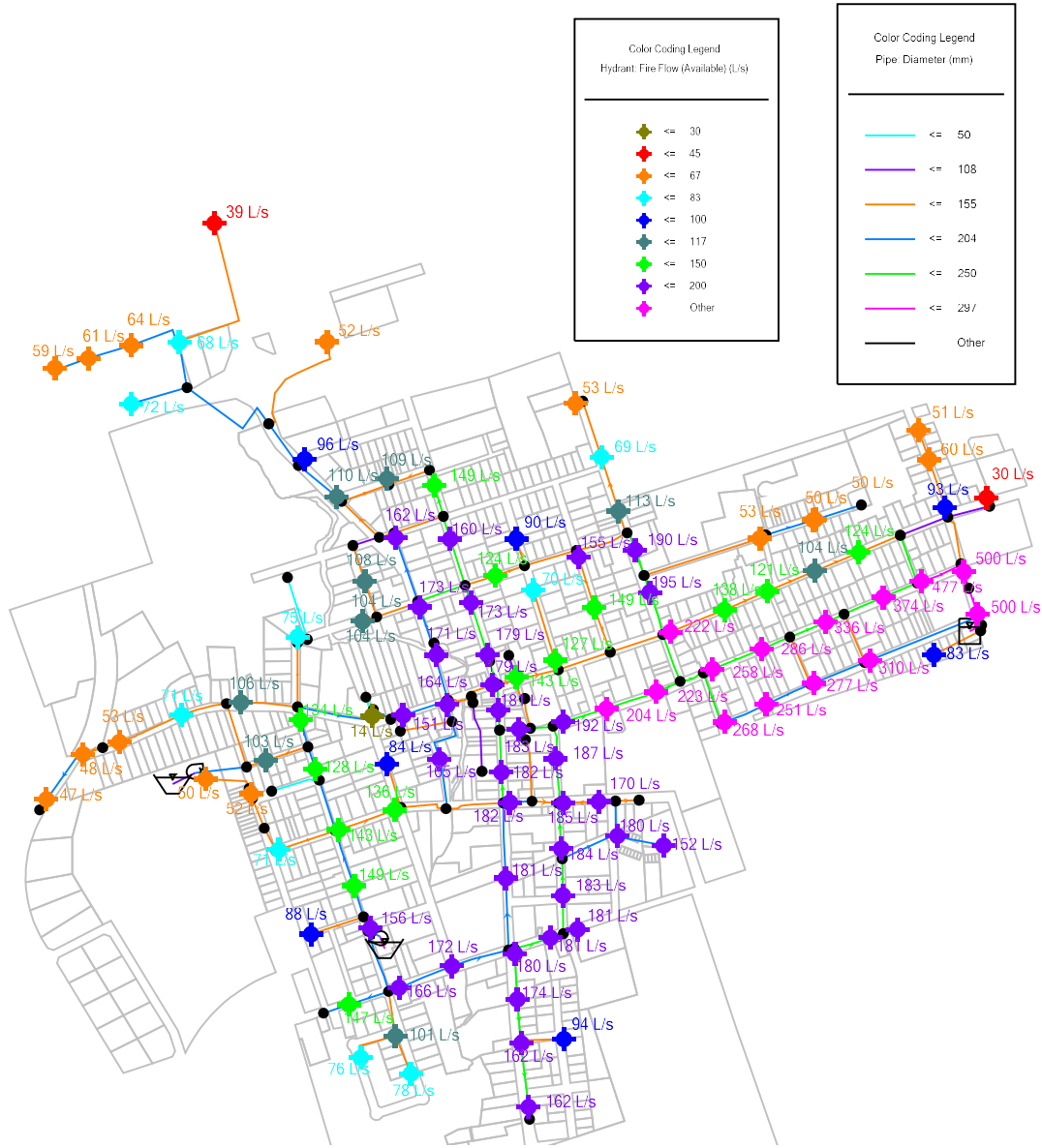
### 1 Pump On, Water Tower HGL= 218.76 m



# Village of Madoc Water Model

## Existing Conditions - Maximum Day Demand + Fire Flow

### 1 Pump On, Water Tower HGL= 218.76 m



**ATTACHMENT 7**

DRAFT

**NICHOL WATER SERVICES**  
**2023 FIRE FLOW TESTING PROGRAM**  
 Centre Hastings

Total Flowed (m3) 395  
 Total # of Tests 84  
 # of Tests Completed 84  
 Project Completion - % 100.0

Test Information				Test Hydrant #1										Flow Hydrant #1				
Date	Time	Map #	Hydrant Type	Hydrant ID	Static Pressure psi	Residual Pressure psi	Pressure Drop psi	Pressure Drop %	Rated Pressure psi	Rated Flow usgpm	NFPA-251 COLOUR CODE	Hydrant ID	Flowed Ports	Nozzle Coefficient	Diffuser Coefficient	Nozzle Diameter inches	Pilot Pressure psi	Calculated Flow usgpm
02-10-23	7:40am	1	Madoc Century	29	59.7	17.1	42.6	71.4	20	458	RED	100	1	0.9	0.829	2.5	11.7	476
02-10-23	7:45am	1	Madoc Darling	27	60.0	23.3	36.7	61.2	20	499	RED	100	1	0.9	0.829	2.5	11.7	476
02-10-23	8:10am	2	Madoc Darling	26	59.7	38.3	21.4	35.8	20	760	ORANGE	28	1	0.9	0.829	2.5	15.3	544
02-10-23	8:15am	2	Madoc Darling	25	61.0	49.3	11.7	19.2	20	1071	GREEN	28	1	0.9	0.829	2.5	15.3	544
02-10-23	8:25am	3	Madoc Darling	24	59.4	47.6	8.4	15.2	20	1722	BLUE	25	1	0.9	0.829	2.5	12.4	792
02-10-23	8:35am	4	Madoc Century	23	61.3	38.8	22.5	36.7	20	1252	GREEN	24	2	0.9	0.829	2.5	10.5	902
02-10-23	8:35am	4	Madoc Century	22	61.9	53.8	11.1	15.9	20	2030	BLUE	24	2	0.9	0.829	2.5	10.5	902
02-10-23	8:45am	5	Madoc Century	21	61.8	51.1	16.5	24.3	20	2466	BLUE	22	2	0.9	0.829	2.5	24.9	1389
02-10-23	8:45am	5	Madoc Century	12	68.7	52.9	15.8	23.0	20	2550	BLUE	22	2	0.9	0.829	2.5	24.9	1389
02-10-23	9:0am	6	Madoc Century	66	68.2	55.8	13.4	19.4	20	2830	BLUE	13	2	0.9	0.829	2.5	25.2	1397
02-10-23	9:05am	6	Madoc Century	14	69.8	62.2	7.6	10.9	20	3855	BLUE	13	2	0.9	0.829	2.5	25.2	1397
02-10-23	9:15am	7	Madoc Darling	13	70.2	57.8	12.4	17.7	20	2771	BLUE	66	2	0.9	0.829	2.5	21.9	1302
02-10-23	10:20am	8	Madoc Century	15	61.9	49.1	13.8	20.3	20	2763	BLUE	14	2	0.9	0.829	2.5	25.7	1411
02-10-23	10:20am	8	Madoc Century	16	61.5	52.5	11.2	17.6	20	2955	BLUE	14	2	0.9	0.829	2.5	25.7	1411
02-10-23	10:30am	9	Madoc Darling	17	57.9	30.9	22	41.6	20	1392	GREEN	16	2	0.9	0.829	2.5	16.2	1120
02-10-23	10:30am	9	Madoc Darling	18	58.1	36.8	21.3	26.5	20	1741	BLUE	16	2	0.9	0.829	2.5	12.1	968
02-10-23	10:45am	10	Madoc Century	30	48.0	41.3	7.3	15.0	20	1351	GREEN	32	1	0.9	0.829	2.5	21.4	644
02-10-23	11:00am	11	Madoc Century	29	52.6	50.9	1.7	3.2	20	4771	BLUE	30	2	0.9	0.829	2.5	12.1	968
02-10-23	11:15am	12	Madoc Century	19	50.9	46.5	4.6	9.0	20	2617	BLUE	18	2	0.9	0.829	2.5	11.3	936
02-10-23	11:30am	13	Madoc Century	98	57.6	28.3	29.5	51.2	20	704	ORANGE	99	1	0.9	0.829	2.5	19.7	638
02-10-23	11:30am	13	Madoc Century	97	58.9	30.3	28.6	48.6	20	729	ORANGE	99	1	0.9	0.829	2.5	19.7	638
02-10-23	11:45am	14	Madoc Century	108	56.9	34.9	22	38.7	20	778	ORANGE	97	1	0.9	0.829	2.5	17.9	589
02-10-23	11:45am	14	Madoc Century	96	55.5	32.3	23.2	41.8	20	741	ORANGE	97	1	0.9	0.829	2.5	17.9	589
02-10-23	12:00pm	15	Madoc Century	59	62.4	38.8	23.6	37.7	20	1716	BLUE	60	2	0.9	0.829	2.5	20.1	1248
02-10-23	12:00pm	15	Madoc Century	63	57.3	40.1	17.2	30.0	20	1895	BLUE	60	2	0.9	0.829	2.5	20.1	1248
02-10-23	12:05pm	16	Madoc Century	60	62.5	41.9	20.6	33.0	20	1461	GREEN	59	2	0.9	0.829	2.5	12.6	988
02-10-23	12:05pm	16	Madoc Century	61	61.7	41.9	19.8	31.3	20	1920	BLUE	59	2	0.9	0.829	2.5	12.6	988
02-10-23	12:15pm	17	Madoc Darling	67	65.2	46.7	18.5	28.4	20	1644	BLUE	66	2	0.9	0.829	2.5	13.3	1015
02-10-23	12:25pm	18	Madoc Century	62	63.9	48.4	15.5	24.3	20	2128	BLUE	61	2	0.9	0.829	2.5	19	1213
02-10-23	12:25pm	18	Madoc Century	64	65.7	45.5	15.2	22.5	20	2171	BLUE	61	2	0.9	0.829	2.5	19	1213
02-10-23	12:35pm	19	Madoc Century	11	58.7	48.6	9.5	16.4	20	2856	BLUE	63	2	0.9	0.829	2.5	23.5	1349
02-10-23	12:35pm	19	Madoc Century	10	59.6	50.9	9	15.1	20	3003	BLUE	63	2	0.9	0.829	2.5	23.5	1349
02-10-23	12:50pm	20	Madoc Century	8	64.2	46.2	18	26.5	20	3029	BLUE	11	2	0.9	0.829	2.5	31.4	1559
02-10-23	12:50pm	20	Madoc Century	8	61.4	51.5	9.9	16.1	20	3377	BLUE	11	2	0.9	0.829	2.5	31.4	1559
02-10-23	2:00pm	21	Madoc Century	55	50.1	40.4	9.7	19.4	20	1701	BLUE	64	2	0.9	0.829	2.5	11	923
02-10-23	2:00pm	21	Madoc Century	54	62.4	47.6	9.1	14.5	20	1281	GREEN	64	2	0.9	0.829	2.5	4	929
02-10-23	2:30pm	22	Madoc Darling	53	67.1	56.9	10.2	15.2	20	1832	BLUE	54	2	0.9	0.829	2.5	8.3	802
02-10-23	2:30pm	23	Madoc Darling	49	61.2	57.8	25.4	41.5	20	1204	GREEN	92	2	0.9	0.829	2.5	11.1	927
02-10-23	2:30pm	23	Madoc Darling	50	61.7	60.1	10.9	16.7	20	2001	BLUE	92	2	0.9	0.829	2.5	11.1	927
02-10-23	2:30pm	24	Madoc Darling	51	66.7	59.8	8.8	13.2	20	3065	BLUE	50	2	0.9	0.829	2.5	20	1245
02-10-23	2:30pm	24	Madoc Darling	52	68.3	60.4	7.9	11.8	20	3989	BLUE	50	2	0.9	0.829	2.5	20	1245
02-10-23	2:35am	1	Madoc Century	48	63.5	45.4	18.1	27.4	20	1672	BLUE	95	2	0.9	0.829	2.5	25.7	1465
02-10-23	2:35am	1	Madoc Century	94	14	32.5	21.5	39.8	20	1310	GREEN	95	2	0.9	0.829	2.5	13.5	1023
02-10-23	2:35am	2	Madoc Century	37	34.1	30.5	3.6	6.7	20	4732	BLUE	36	2	0.9	0.829	2.5	25.5	1405
02-10-23	2:35am	2	Madoc Century	38	46.7	44.5	2.4	5.1	20	5162	BLUE	36	2	0.9	0.829	2.5	25.5	1405
02-10-23	2:40am	3	Madoc Century	35	59	54.3	4.7	8.0	20	4474	BLUE	34	2	0.9	0.829	2.5	26.3	1427
02-10-23	2:40am	3	Madoc Century	36	68.6	56.8	3.7	6.1	20	5283	BLUE	34	2	0.9	0.829	2.5	26.3	1427
02-10-23	2:50am	4	Madoc Century	34	58.8	55	3.8	6.5	20	4751	BLUE	35	2	0.9	0.829	2.5	23.7	1355
02-10-23	2:50am	4	Madoc Century	33	66.9	62.4	4.5	6.7	20	4804	BLUE	35	2	0.9	0.829	2.5	23.7	1355
02-10-23	2:50am	5	Madoc Century	46	51.7	48.8	2.9	5.6	20	4413	BLUE	45	2	0.9	0.829	2.5	19	1213
02-10-23	2:50am	5	Madoc Century	47	51.7	49.3	2.4	4.6	20	4888	BLUE	45	2	0.9	0.829	2.5	19	1213
02-10-23	2:55am	6	Madoc Century	44	56.5	53	1.5	9.7	20	3996	BLUE	43	2	0.9	0.829	2.5	26.7	1438
02-10-23	2:55am	6	Madoc Century	45	59.3	55	4.3	7.3	20	4750	BLUE	43	2	0.9	0.829	2.5	26.7	1438
02-10-23	10:15am	7	Madoc Century	42	71	61.3	9.7	13.7	20	3550	BLUE	41	2	0.9	0.829	2.5	27.1	1449
02-10-23	10:15am	7	Madoc Century	43	70.2	63.1	7.1	10.1	20	4166	BLUE	41	2	0.9	0.829	2.5	27.1	1449
02-10-23	10:25am	8	Madoc Century	41	69.9	59.3	10.6	15.2	20	3263	BLUE	42	2	0.9	0.829	2.5	25.8	1414
02-10-23	10:25am	8	Madoc Century	40	71.8	61.6	10.2	14.2	20	3399	BLUE	42	2	0.9	0.829	2.5	25.8	1414
02-10-23	10:35am	9	Madoc Century	39	70.9	65.1	5.8	8.2	20	4733	BLUE	40	2	0.9	0.829	2.5	27.7	1465
02-10-23	10:35am	9	Madoc Century	67	73.5	66.4	6.1	8.4	20	4683	BLUE	40	2	0.9	0.829	2.5	27.7	1465
02-10-23	10:50am	10	Madoc Century	91	72.2	49	23.2	32.1	20	1962	BLUE	90	2	0.9	0.829	2.5	20.7	1266
02-10-23	10:50am	10	Madoc Darling	71	73.6	51.9	21.7	29.5	20	2063	BLUE	90	2	0.9	0.829	2.5	20.7	1266
02-10-23	11:00am	11	Madoc Century	69	73.6	54.1	19.5	26.5	20	2454	BLUE	70	2	0.9	0.829	2.5	26.1	1422
02-10-23	11:00am	11	Madoc Century	68	71.4	52.2	19.2	26.9	20	2420	BLUE	70	2	0.9	0.829	2.5	26.1	1422
02-10-23	11:10am	12	Madoc Century	70	74.7	55.5	19.2	25.7	20	2261	BLUE	69	2	0.9	0.829	2.5	21.3	1284
02-10-23	11:10am	12	Madoc Century	87	77	58.7	18.3	23.8	20	2272	BLUE	69	2	0.9	0.829	2.5	21.3	1284
02-10-23	12:15pm	13	Madoc Century	6	66.5	53	13.2	19.7	20	2752	BLUE	72	2	0.9	0.829	2.5	24.9	1389
02-10-23	12:15pm	13	Madoc Century	68	68	55.3	12.7	18.7	20	2847	BLUE	72	2	0.9	0.829	2.5	24.9	1389
02-10-23	12:25pm	14	Madoc Century	5	74.6	59.8	14.8	19.8	20	3279	BLUE	4	2	0.9	0.829	2.5	33.9	1620
02-10-23	12:25pm	14	Madoc Century	72	67.4	53.9	13.5	20.0	20	3193	BLUE	4	2	0.9	0.829	2.5	33.9	1620
02-10-23	12:35pm	15	Madoc Century	3	68.8	49	20.6	32.4	20	2327	BLUE	2	2	0.9	0.829	2.5	31.1	1552
02-10-23	12:35pm	15	Madoc Century	4	75.8	61.8	18.6	24.5	20	2809	BLUE	2	2	0.9	0.829	2.5	31.1	1552
02-10-23	2:00pm	16	Madoc Century	2	69	46.6	22.4	32.5	20	2275	BLUE	1	2	0.9	0.829	2.5	28.7	1491
02-10-23	2:00pm	17	Madoc Century	305	77	49.6	27.1	35.2	20	2071	BLUE	104	2	0.9	0.829	2.5	24.8	1386
02-10-23	2:00pm																	





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**Appendix E**  
Wastewater Model





## Existing Madoc SPS Sanitary Sewer Calculation Sheet

LOCATION	DRAINAGE AREA DISCRPTION													OUTLET PIPE DATA											
	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS		POPULATION			$\Sigma$	q	M	PEAK FLOW	$\Sigma$	IA	Q	SIZE	SLOPE	CAP	Q/Qfull	VELOCITY	LENGTH	FALL	OUTLET PIPE DATA	
	From	To	No.	Ha			Ppha	P	P(1000)	P(1000)	(l/cap/d)		(l/s)	Area (ha)	(l/s)	(l/s)	(mm)	(%)	(l/s)		(m/s)	(m)	(m)	U/S	D/S
Victoria St.	SANI-247	SANI-183	A58-A59	0.36	A58-A59		14	5	0.005	0.005	350	4.00	0.08	0.36	0.05	0.13	200	5.1%	74.19	0.00	2.36	44.52	2.278	174.707	172.429
Mckenzie St.	SANI-183	SANI-182	A60	0.24	A50-A60		0	0	0.000	0.045	-	-	-	4.41	-	-	-	-	-	-	-	-	-	-	-
Mckenzie St.	SANI-183	SANI-182	A61	0.25	A50-A61		14	3	0.003	0.048	350	4.00	0.79	4.66	0.65	1.45	200	0.4%	20.72	0.07	0.66	91	0.363	172.369	172.006
Mckenzie St.	SANI-182	SANI-181	A62	0.99	A50-A62		14	13	0.013	0.061	350	4.00	1.02	5.65	0.79	1.81	200	3.7%	62.91	0.03	2.00	73	2.686	171.986	169.3
Mckenzie St.	SANI-181	SANI-180	-	0	A50-A62		0	0	0.000	0.061	350	4.00	1.02	5.65	0.79	1.81	200	5.4%	76.38	0.02	2.43	53.24	2.887	169.32	166.433
Dingman St.	SANI-180	SANI-179	A63-A64	0.65	A50-A64		14	9	0.009	0.070	350	4.00	1.16	6.3	0.88	2.04	200	0.2%	14.17	0.14	0.45	84.12	0.157	166.423	166.266
Dingman St.	SANI-179	SANI-167	A65	0.2	A50-A65		14	3	0.003	0.073	350	4.00	1.21	6.5	0.91	2.12	200	1.8%	43.72	0.05	1.39	39.68	0.705	166.206	165.501
Elgin St.	SANI-167	SANI-166	A66	0.32	A35-A66		14	4	0.004	0.163	350	4.00	2.70	13.92	1.95	4.65	250	0.3%	33.10	0.14	0.67	52.3	0.162	165.491	165.329
Elgin St.	SANI-166	SANI-165	A67	0.2	A1-A67		14	3	0.003	0.474	350	3.99	7.81	37.31	5.22	13.04	350	0.4%	93.22	0.14	0.97	102.35	0.418	164.789	164.371
Elgin St.	SANI-165	SANI-161	A68	0.39	A1-A68		14	5	0.005	0.479	-	-	-	37.7	-	-	-	-	-	-	-	-	-	-	-
Elgin St.	SANI-165	SANI-161	A69	5.05	A1-A69		46	234	0.234	0.713	350	3.89	11.48	42.75	5.99	17.47	350	0.2%	64.68	0.27	0.67	102.74	0.202	163.651	163.449
Davidson St.	SANI-241	SANI-240	A70	0.82	A70		14	11	0.011	0.011	350	4.00	0.18	0.82	0.11	0.30	200	0.6%	26.08	0.01	0.83	68.15	0.431	173.318	172.887
Prince Albert St. E	SANI-240	SANI-227	A71	0.95	A70-A71		14	13	0.013	0.024	350	4.00	0.40	1.77	0.25	0.65	200	1.9%	45.14	0.01	1.44	123.33	2.336	172.847	170.511
Nelson St.	SANI-227	SANI-252	A72-A73	0.73	A70-A73		14	10	0.010	0.034	350	4.00	0.56	2.5	0.35	0.91	200	0.7%	26.53	0.03	0.84	52.74	0.345	170.451	170.106
Nelson St.	SANI-252	SANI-230	A74-A75	0.86	A70-A75		14	12	0.012	0.046	350	4.00	0.76	3.36	0.47	1.23	200	3.9%	64.80	0.02	2.06	81.17	3.168	170.066	166.898
Nelson St.	SANI-230	SANI-224	A76	0.91	A70-A76		14	12	0.012	0.058	350	4.00	0.96	4.27	0.60	1.56	200	0.4%	19.84	0.08	0.63	106.02	0.388	166.868	166.48
St. Lawrence St.	SANI-225	SANI-224	A77	1.5	A77		14	20	0.020	0.020	350	4.00	0.34	1.5	0.21	0.55	200	0.5%	22.82	0.02	0.73	93.39	0.452	166.832	166.38
St. Lawrence St.	SANI-224	SANI-223	A78	0.36	A70-A78		14	5	0.005	0.083	350	4.00	1.38	6.13	0.86	2.24	200	0.2%	15.60	0.14	0.50	70.74	0.16	166.36	166.2
Church St.	SANI-223	SANI-161	A79	0.41	A70-A79		80	33	0.033	0.116	350	4.00	1.92	6.54	0.92	2.84	200	0.8%	29.42	0.10	0.94	114.5	0.921	166.17	165.249
Church St.	SANI-223	SANI-161	A80	0.36	A70-A80		14	5	0.005	0.121	350	4.00	2.00	6.9	0.97	2.97	200	0.8%	29.42	0.10	0.94	114.5	0.921	166.17	165.249
Elgin St.	SANI-161	SANI-154	A81	0.2	A1-A81		14	3	0.003	0.837	350	3.85	13.33	49.85	6.98	20.31	350	0.3%	81.53	0.25	0.85	95.39	0.298	163.369	163.071
Elgin St.	SANI-161	SANI-154	A82	1.66	A1-A82		0	0	0.000	0.837	350	3.85	13.33	51.51	7.21	20.54	350	0.3%	81.53	0.25	0.85	95.39	0.298	163.369	163.071
Baldwin St.	SANI-154	SANI-152	A83	0.16	A1-A83		14	2	0.002	0.839	350	3.85	13.36	51.67	7.23	20.59	350	0.9%	137.42	0.15	1.43	66.48	0.59	163.041	162.451
Baldwin St.	SANI-152	SANI-145	A84	0.21	A1-A84		14	3	0.003	0.842	350	3.85	13.40	51.88	7.26	20.66	350	0.3%	84.60	0.24	0.88	108.51	0.365	162.391	162.026
Livingstone Ave. E	SANI-149	SANI-148	A85	0.85	A85		14	12	0.012	0.012	350	4.00	0.19	0.85	0.12	0.31	250	1.1%	61.54	0.01	1.25	95.99	1.028	163.577	162.549
Livingstone Ave. E	SANI-148	SANI-145	A86	0.7	A85-A86		14	10	0.010	0.021	350	4.00	0.35	1.55	0.22	0.57	250	2.6%	95.00	0.01	1.94	91.03	2.323	162.479	160.156
Baldwin St.	SANI-145	SANI-245	A87	0.25	A1-A87		14	3	0.003	0.867	-	-	-	53.68	-	-	-	-	-	-	-	-	-	-	-
Baldwin St.	SANI-145	SANI-245	A88	0.56	A1-A88		0	0	0.000	0.867	350	3.84	13.76	54.24	7.59	21.36	350	0.3%	84.00	0.25	0.87	82.93	0.275	162.046	161.771
Baldwin St.	SANI-245	SANI-144	A89-A90	0.38	A1-A90		14	5	0.005	0.872	350	3.84	13.84	54.62	7.65	21.49	350	0.4%	86.90	0.25	0.90	25.92	0.092	161.761	161.669
Richardson Lane	SANI-321	SANI-244	A91	1.6	A91		14	22	0.022	0.022	350	4.00	0.36	1.6	0.22	0.58	200	0.5%	22.11	0.03	0.70	74.62	0.339	162.654	162.315
Richardson Lane	SANI-244	SANI-144	A92	0.49	A91-A92		0	0	0.000	0.022	350	4.00	0.36	2.09	0.29	0.65	200	0.4%	20.51	0.03	0.65	124.24	0.486	162.275	161.789
Baldwin St.	SANI-144	SANI-143	A94	1.6	A1-A92,A94		14	22	0.022	0.915	-	-	-	58.31	-	-	-	-	-	-	-	-	-	-	-
Baldwin St.	SANI-144	SANI-143	A93	0.11	A1-A94		0	0	0.000	0.915	350	3.82	14.48	58.42	8.18	22.66	350	0.3%	74.08	0.31	0.77	109.33	0.282	161.669	161.387
Furnace St.	SANI-143	SANI-3	A95	0.54	A1-A95		14	7	0.007	0.922	350	3.82	14.59	58.96	8.25	22.84	350	0.2%	67.42	0.34	0.70	116.09	0.248	161.377	161.129
Durham St.	SANI-5	SANI-4	A96-A98	2.01	A96-A98		14	27	0.027	0.027	350	4.00	0.45	2.01	0.28	0.73	200	3.9%	64.81	0.01	2.06	55.22	2.156	164.898	162.742
Durham St.	SANI-4	SANI-3	A99-A100	0.96	A96-A100		14	13	0.013	0.040	350	4.00	0.67	2.97	0.42	1.08	200	2.2%	48.13	0.02	1.53	74.92	1.613	162.722	161.109
Durham St.	SANI-3	SANI-94	A101	0.58	A1-A101		80	46	0.046	1.009	350	3.80	15.85	62.51	8.75	24.61	350	0.2%	64.98	0.38	0.68	101.8	0.202	161.089	160.887
Seymour St. E	SANI-312	SANI-246	A102	0.77	A102		80	62	0.062	0.062	350	4.00	1.02	0.77	0.11	1.13	200	4.2%	67.11	0.02	2.14	59.6	2.495	163.711	161.216
Seymour St. E	SANI-313	SANI-246	A103	0.69	A102-A103		14	9	0.009	0.071	350	4.00	1.17	1.46	0.20	1.38	200	4.2%	67.11	0.02	2.14	59.6	2.495	163.711	161.216
Seymour St. E	SANI-246	SANI-94	A104	0.32	A102-A104		80	26	0.026	0.097	350	4.00	1.60	1.78	0.25	1.85	250	0.4%	37.53	0.05	0.76	100.18	0.399	161.176	160.777
Seymour St. E	SANI-246	SANI-94	A105	0.68	A102-A105		14	9	0.009	0.106	350	4.00	1.75	2.46	0.34	2.10	250	0.4%	37.53	0.06	0.76	100.18	0.399	161.176	160.777
Durham St.	SANI-128	SANI-94	A106	0.55	A106		14	0	0.000	0.000	-	-	-	0.55	-	-	-	-	-	-	-	-	-	-	-
Durham St.	SANI-128	SANI-94	A107	1.34	A106-A107		14	18	0.018	0.018	350	4.00	0.30	1.89	0.26	0.57	200	6.2%	81.75	0.01	2.60	124.85	7.757	168.544	160.787
Seymour St. W	SANI-94	SANI-95	A108	0.24	A1-A108		14	3	0.003	1.136	350	3.76	17.69	67.1	9.39	27.09	350	0.4%	87.56	0.31	0.91	94.91	0.342	160.777	160.435
Bonjour Blvd.	SANI-270	SANI-319																							
Bonjour Blvd.	SANI-271	SANI-319																							
Bonjour Blvd.	SANI-319	SANI-269	A109	0.17	A109																				



## Existing Madoc SPS Sanitary Sewer Calculation Sheet

LOCATION	DRAINAGE AREA DISCRPTION															OUTLET PIPE DATA									
	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS	POPULATION				$\Sigma$	q	M	PEAK FLOW	$\Sigma$	IA	Q	SIZE	SLOPE	CAP	Q/Qfull	VELOCITY	LENGTH	FALL	OUTLET PIPE DATA	
	From	To	No.	Ha		Ppha	P	P(1000)	P(1000)	(l/cap/d)		(l/s)	Area (ha)	(l/s)	(l/s)	(mm)	(%)	(l/s)		(m/s)	(m)	(m)	U/S	D/S	
Bonjour Blvd.	SANI-268	SANI-267	A111	0.21	A109-A111	0	0	0.000	0.000	350	4.00	0.00	0.61	0.09	0.09	200	0.6%	24.57	0.00	0.78	90.37	0.507	173.256	172.749	
Bonjour Blvd.	SANI-267	SANI-266	-	0	A109-A111	0	0	0.000	0.000	350	4.00	0.00	0.61	0.09	0.09	200	12.1%	114.02	0.00	3.63	11.27	1.362	172.779	171.417	
Bonjour Blvd.	SANI-266	SANI-317	A112	0.48	A109-A112	80	38	0.038	0.038	350	4.00	0.64	1.09	0.15	0.79	200	1.5%	40.29	0.02	1.28	110.56	1.668	171.177	169.509	
Bonjour Blvd.	SANI-266	SANI-317	A113	0.08	A109-A113	0	0	0.000	0.038	350	4.00	0.64	1.17	0.16	0.80	200	1.5%	40.29	0.02	1.28	110.56	1.668	171.177	169.509	
ROW	SANI-264	SANI-317	A114	0.59	A114	80	47	0.047	0.047	350	4.00	0.78	0.59	0.08	0.86	200	3.5%	61.19	0.01	1.95	59.55	2.073	171.522	169.449	
ROW	SANI-317	SANI-318	-	0	A109-A114	0	0	0.000	0.086	350	4.00	1.42	1.76	0.25	1.66	200	1.1%	34.40	0.05	1.09	6	0.066	169.429	169.363	
ROW	SANI-28	SANI-27	A115	0.65	A115	80	52	0.052	0.052	350	4.00	0.86	0.65	0.09	0.95	200	0.7%	27.85	0.03	0.89	97.79	0.705	170.558	169.853	
ROW	SANI-27	SANI-318	-	0	A115	0	0	0.000	0.052	350	4.00	0.86	0.65	0.09	0.95	200	0.9%	31.71	0.03	1.01	46	0.43	169.803	169.373	
ROW	SANI-318	SPS-1	-	0	A109-A115	0	0	0.000	0.138	350	4.00	2.28	2.41	0.34	2.61	200	0.6%	25.04	0.10	0.80	4.46	0.026	169.323	169.297	
Russel St.	SPS-1	SANI-23	-	0	-	0	0	0.000	0.000	0	0.00	0.00	0	0.00	10.00	0	0.0%	0.00	0.00	0.00	0	0	0	0	
ROW	SANI-320	SPS-3	A116	1.82	A116	80	146	0.146	0.146	350	4.00	2.41	1.82	0.25	2.66	200	3.4%	60.50	0.04	1.93	5.26	0.179	170.274	170.095	
ROW	SPS-3	SANI-22	-	0	-	0	0	0.000	0.000	0	0.00	0.00	0	0.00	7.50	0	0.0%	0.00	0.00	0.00	0	0	0	0	
Russel St.	SANI-22	SANI-23	A117	0.9	A117,SPS-3	80	72	0.072	0.072	350	4.00	1.19	0.9	0.13	8.82	250	0.5%	40.81	0.22	0.83	19.11	0.09	170.245	170.155	
Russel St.	SANI-23	SANI-24	A118	1.17	SPS-1,SPS-3,A117-A118	80	94	0.094	0.166	350	4.00	2.74	2.07	0.29	20.53	250	0.3%	33.43	0.61	0.68	105.04	0.332	170.115	169.783	
Russel St.	SANI-23	SANI-24	A119	0.26	SPS-1,SPS-3,A117-A119	14	4	0.004	0.169	350	4.00	2.80	2.33	0.33	20.63	250	0.3%	33.43	0.62	0.68	105.04	0.332	170.115	169.783	
Russel St.	SANI-24	SANI-21	A120	0.29	SPS-1,SPS-3,A117-A120	0	0	0.000	0.169	-	-	-	2.62	-	-	-	-	-	-	-	-	-	-	-	
Russel St.	SANI-24	SANI-21	A121	0.05	SPS-1,SPS-3,A117-A121	14	1	0.001	0.170	350	4.00	2.81	2.67	0.37	20.68	250	0.1%	16.23	SURCHARGED	0.33	24.18	0.018	169.773	169.755	
Gladstone St.	SANI-316	SANI-18	A122	0.09	A122	14	1	0.001	0.001	350	4.00	0.02	0.09	0.01	0.03	200	5.7%	78.31	0.00	2.49	28.31	1.614	176.718	175.104	
Gladstone St.	SANI-18	SANI-19	A123	0.85	A122-A123	14	12	0.012	0.013	350	4.00	0.21	0.94	0.13	0.34	200	2.2%	48.80	0.01	1.55	84.87	1.879	173.314	171.435	
Gladstone St.	SANI-19	SANI-20	A124	0.57	A122-A124	14	8	0.008	0.021	350	4.00	0.34	1.51	0.21	0.55	200	2.2%	49.14	0.01	1.56	66.64	1.496	171.405	169.909	
Gladstone St.	SANI-20	SANI-21	-	0	A122-A124	0	0	0.000	0.021	350	4.00	0.34	1.51	0.21	0.55	200	1.7%	42.67	0.01	1.36	10.87	0.184	169.889	169.705	
Russel St.	SANI-21	SANI-34	A125	0.23	SPS-1,SPS-3,A117-A125	14	3	0.003	0.193	350	4.00	3.20	4.41	0.62	21.32	250	0.4%	36.82	0.58	0.75	106.94	0.41	169.665	169.255	
Russel St.	SANI-21	SANI-34	A126	0.35	SPS-1,SPS-3,A117-A126	80	28	0.028	0.221	350	4.00	3.66	4.76	0.67	21.83	250	0.4%	36.82	0.59	0.75	106.94	0.41	169.665	169.255	
Russel St.	SANI-34	SANI-35	A127	0.25	SPS-1,SPS-3,A117-A127	80	20	0.020	0.241	350	4.00	4.00	5.01	0.70	22.20	250	0.02%	9.11	SURCHARGED	0.19	12.78	0.003	169.235	169.232	
Durham St. N	SANI-17	SANI-16	A128-A129	1.51	A128-A129	14	21	0.021	0.021	350	4.00	0.34	1.51	0.21	0.55	200	1.9%	45.31	0.01	1.44	99.5	1.899	172.693	170.794	
Durham St. N	SANI-14	SANI-15	A130	0.79	A130	14	11	0.011	0.011	350	4.00	0.18	0.79	0.11	0.29	200	4.2%	66.88	0.00	2.13	49.26	2.048	173.087	171.039	
Durham St. N	SANI-15	SANI-16	A131	0.83	A130-A131	14	11	0.011	0.022	350	4.00	0.36	1.62	0.23	0.59	200	0.3%	16.82	0.04	0.54	85.52	0.225	171.019	170.794	
Queen Victoria St. E	SANI-16	SANI-33	A132	0.87	A128-A132	14	12	0.012	0.054	350	4.00	0.90	4	0.56	1.46	250	0.4%	39.58	0.04	0.81	117.17	0.519	170.704	170.185	
Queen Victoria St. E	SANI-33	SANI-35	A133-A134	0.36	A128-A134	14	5	0.005	0.059	350	4.00	0.98	4.36	0.61	1.59	250	2.1%	85.69	0.02	1.75	44.93	0.933	170.165	169.232	
Queen Victoria St. W	SANI-35	SANI-45	A135	0.22	SPS-1,SPS-3,A117-A135	14	3	0.003	0.304	350	4.00	5.02	9.59	1.34	23.87	200	0.4%	21.28	SURCHARGED	0.68	63.66	0.268	169.112	168.844	
Madawaska St.	SANI-45	SANI-44	A136	0.82	SPS-1,SPS-3,A117-A136	14	11	0.011	0.315	350	-	-	10.41	-	-	-	-	-	-	-	-	-	-	-	
Madawaska St.	SANI-45	SANI-44	A137	0.16	SPS-1,SPS-3,A117-A137	80	13	0.013	0.328	350	4.00	5.42	10.57	1.48	24.40	200	0.5%	22.20	SURCHARGED	0.71	86.01	0.394	168.794	168.4	
Madawaska St.	SANI-44	SANI-42	A138	0.28	SPS-1,SPS-3,A117-A138	14	4	0.004	0.331	350	4.00	5.48	10.85	1.52	24.50	250	0.6%	45.45	0.54	0.93	75.84	0.443	168.38	167.937	
Madawaska St.	SANI-44	SANI-42	A139	0.09	SPS-1,SPS-3,A117-A139	80	7	0.007	0.339	350	4.00	5.60	10.94	1.53	24.63	250	0.6%	45.45	0.54	0.93	75.84	0.443	168.38	167.937	
St. Lawrence St. W	SANI-76	SANI-75	A140	1.6	A140	80	128	0.128	0.128	350	4.00	2.12	1.6	0.22	2.34	250	1.1%	62.89	0.04	1.28	50.07	0.56	173.091	172.531	
St. Lawrence St. W	SANI-76	SANI-75	A141	0.87	A140-A141	100	87	0.087	0.215	350	4.00	3.56	2.47	0.35	3.90	250	1.1%	62.89	0.06	1.28	50.07	0.56	173.091	172.531	
St. Lawrence St. W	SANI-76	SANI-75	A142	0.75	A140-A142	14	10	0.010	0.225	350	4.00	3.73	3.22	0.45	4.18	250	1.1%	62.89	0.07	1.28	50.07	0.56	173.091	172.531	
St. Lawrence St. W	SANI-75	SANI-74	A143	1.05	A140-A143	14	14	0.014	0.239	350	4.00	3.96	4.27	0.60	4.56	250	1.0%	58.72	0.08	1.20	75.27	0.734	172.531	171.797	
St. Lawrence St. W	SANI-74	SANI-73	A144	1.73	A140-A144	14	23	0.023	0.263	350	4.00	4.35	6	0.84	5.19	250	0.4%	36.00	0.14	0.73	107.79	0.395	171.787	171.392	
St. Lawrence St. W	SANI-73	SANI-72	A145	1.06	A140-A145	14	14	0.014	0.277	350	4.00	4.59	7.06	0.99	5.58	250	0.3%	33.27	0.17	0.68	81.79	0.256	171.372	171.116	
Rollins St.	SANI-85	SANI-81	A146	0.35	A146	14	5	0.005	0.005	-	-	-	0.35	-	-	-	-	-	-	-	-	-	-	-	
Rollins St.	SANI-85	SANI-81	A272	0.1	A272	0	0	0.000	0.005	350	4.00	0.08	0.45	0.06	0.14	200	1.0%	32.03	0.00	1.02	33.13	0.316	178.464	178.148	
Marmora St.	SANI-81	SANI-82	A147	0.27	A146-147,A272	14	4	0.004	0.008	350	4.00	0.14	0.72	0.10	0.24	200	0.1%	12.34	0.02	0.39	33.22	0.047	178.038	177.991	
Marmora St.	SANI-82	SANI-83	A148	0.26	A146-148,A272	14	4	0.004	0.012	350	4.00	0.20	0.98	0.14	0.33	200	7.5%	90.05	0.00	2.87	33.52	2.527	177.951	175.424	
Marmora St.	SANI-83	SANI-84	A149	0.67	A146-149,A272	14	9	0.009	0.021	350	4.00	0.35	1.65	0.23	0.58	200	4.3%	68.13	0.01	2.17	92.85	4.006	175.384	171.378	
Marmora St.	SANI-77-1	SANI-84	A150	0.57	A150	0	0	0.000	0.000	350	4.00	0.00	0.57	0.08	0.08										

## Existing Madoc SPS Sanitary Sewer Calculation Sheet

LOCATION	DRAINAGE AREA DISCRPTION														OUTLET PIPE DATA										
	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS	POPULATION				$\Sigma$	q	M	PEAK FLOW	$\Sigma$	IA	Q	SIZE	SLOPE	CAP	Q/Qfull	VELOCITY	LENGTH	FALL	OUTLET PIPE DATA	
	From	To	No.	Ha		Ppha	P	P(1000)	P(1000)	(l/cap/d)		(l/s)	Area (ha)	(l/s)	(l/s)	(mm)	(%)	(l/s)		(m/s)	(m)	(m)	U/S	D/S	
Rollins St.	SANI-80	SANI-79	A155	0.33	A155	14	4	0.004	0.004	350	4.00	0.07	0.33	0.05	0.12	200	2.3%	49.96	0.00	1.59	34.83	0.808	173.4	172.592	
Rollins St.	SANI-80	SANI-79	-	0	A155	0	0	0.000	0.004	350	4.00	0.07	0.33	0.05	0.12	200	2.0%	46.21	0.00	1.47	14.41	0.286	172.572	172.286	
St. Lawrence St. W	SANI-63	SANI-64	A156	2.5	A156	14	34	0.034	0.034	-	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	
St. Lawrence St. W	SANI-63	SANI-64	A157	0.07	A156-A157	0	0	0.000	0.034	-	-	-	2.57	-	-	-	-	-	-	-	-	-	-	-	
St. Lawrence St. W	SANI-63	SANI-64	A158	0.42	A156-A158	80	34	0.034	0.068	350	4.00	1.12	2.99	0.42	1.54	200	5.8%	78.85	0.02	2.51	120	6.936	177.492	170.556	
Whytock Ave.	SANI-64	SANI-66	A159	0.33	A140-A159,A272	14	4	0.004	0.412	350	4.00	6.81	15.63	2.19	9.00	250	0.7%	48.98	0.18	1.00	70.3	0.477	170.466	169.989	
Whytock Ave.	SANI-66	SANI-68	A160	0.86	A140-A160,A272	14	12	0.012	0.423	350	4.00	7.00	16.49	2.31	9.31	250	1.1%	63.13	0.15	1.29	71.79	0.809	169.939	169.13	
Whytock Ave.	SANI-313	SANI-68	A161	0.34	A161	14	5	0.005	0.005	350	4.00	0.08	0.34	0.05	0.12	200	5.9%	79.91	0.00	2.54	27.68	1.643	171.023	169.38	
ROW	SANI-70	SANI-69	A162	0.25	A162	80	20	0.020	0.020	350	4.00	0.33	0.25	0.04	0.37	100	1.4%	6.09	0.06	0.77	68.65	0.953	171.684	170.731	
ROW	SANI-69	SANI-68	-	0	A162	0	0	0.000	0.020	350	4.00	0.33	0.25	0.04	0.37	100	1.0%	5.10	0.07	0.65	121.34	1.181	170.721	169.54	
Prince Albert ST. W	SANI-68	SANI-43	A163	0.62	A140-A163,A272	0	0	0.000	0.448	350	4.00	7.41	17.7	2.48	9.89	250	-	129.75	0.08	1.32	-	-	-	-	
Prince Albert ST. W	SANI-43	SANI-42	A164	0.66	A140-A164,A272	14	9	0.009	0.457	350	3.99	7.55	18.36	2.57	10.12	250	0.1%	20.62	0.49	0.42	90.62	0.109	168.056	167.947	
Prince Albert ST. W	SANI-42	SANI-41	A165-A166	0.31	SPS-1,SPS-3,A117-A166,A272	14	4	0.004	0.800	350	3.86	12.77	29.61	4.15	34.42	250	0.5%	42.89	0.80	0.87	97.46	0.507	167.917	167.41	
Prince Albert ST. W	SANI-42	SANI-41	A167	0.46	SPS-1,SPS-3,A117-A167,A272	80	37	0.037	0.836	350	3.85	13.32	30.07	4.21	35.03	250	0.5%	42.89	0.82	0.87	97.46	0.507	167.917	167.41	
Russel St.	SANI-37	SANI-41	A168	0.63	A168	14	9	0.009	0.009	350	4.00	0.14	0.63	0.09	0.23	250	3.8%	116.22	0.00	2.37	79.56	3.039	170.459	167.42	
Russel St.	SANI-37	SANI-41	A169	0.43	A168-A169	80	34	0.034	0.043	350	4.00	0.71	1.06	0.15	0.86	250	3.8%	116.22	0.01	2.37	79.56	3.039	170.459	167.42	
Prince Albert St. W	SANI-13	SANI-41	A170	0.74	A170	14	10	0.010	0.010	350	4.00	0.17	0.74	0.10	0.27	200	6.3%	82.08	0.00	2.61	91.71	5.743	173.533	167.79	
Russel St.	SANI-41	SANI-47	A171	0.56	SPS-1,SPS-3,A117-A171,A272	80	45	0.045	0.934	-	-	-	32.43	-	-	-	-	-	-	-	-	-	-	-	
Russel St.	SANI-41	SANI-47	A172	0.1	SPS-1,SPS-3,A117-A172,A272	0	0	0.000	0.934	350	3.82	14.76	32.53	4.55	36.81	250	0.1%	20.06	SURCHARGED	0.41	80	0.091	167.38	167.289	
Russel St.	SANI-47	SANI-48	-	0	SPS-1,SPS-3,A117-A172,A272	0	0	0.000	0.934	350	3.82	14.76	32.53	4.55	36.81	250	0.6%	47.80	0.77	0.97	16.87	0.109	167.289	167.18	
Russel St.	SANI-48	SANI-49	-	0	SPS-1,SPS-3,A117-A172,A272	0	0	0.000	0.934	350	3.82	14.76	32.53	4.55	36.81	250	0.1%	17.84	SURCHARGED	0.36	24.44	0.022	167.18	167.158	
Russel St.	SANI-49	SANI-50	A173	0.21	SPS-1,SPS-3,A117-A173,A272	80	17	0.017	0.951	350	3.81	15.01	32.74	4.58	37.09	250	0.1%	21.62	SURCHARGED	0.44	15.89	0.021	167.158	167.137	
Russel St.	SANI-50	SANI-53	A174-A175	0.72	SPS-1,SPS-3,A117-A175,A272	80	58	0.058	1.009	350	3.80	15.85	33.46	4.68	38.03	250	0.4%	36.01	SURCHARGED	0.73	99.8	0.366	167.117	166.751	
St. Lawrence St. W	SANI-62	SANI-52	A176-A179	1.21	A176-A179	14	16	0.016	0.016	350	4.00	0.27	1.21	0.17	0.44	250	6.0%	146.05	0.00	2.98	125.23	7.554	174.902	167.348	
St. Lawrence St. W	SANI-62	SANI-52	A180	0.08	A176-A180	80	6	0.006	0.023	350	4.00	0.38	1.29	0.18	0.56	250	6.0%	146.05	0.00	2.98	125.23	7.554	174.902	167.348	
St. Lawrence St. W	SANI-52	SANI-53	-	0	A176-A180	0	0	0.000	0.023	350	4.00	0.38	1.29	0.18	0.56	250	2.5%	93.94	0.01	1.91	21.92	0.547	167.328	166.781	
Champlain St.	SANI-53	SANI-120	A181	0.15	SPS-1,SPS-3,A117-A181,A272	80	12	0.012	1.043	350	3.79	16.35	34.9	4.89	38.74	250	7.9%	166.81	0.23	3.40	40.35	3.175	166.701	163.526	
ROW	SANI-61	SANI-121	A182,A184	0.74	A182,A184	14	10	0.010	0.010	-	-	-	0.74	-	-	-	-	-	-	-	-	-	-	-	
ROW	SANI-61	SANI-121	A183	0.13	A182-A184	0	0	0.000	0.010	350	4.00	0.17	0.87	0.12	0.29	200	6.2%	81.87	0.00	2.61	99.47	6.198	171.353	165.155	
ROW	SANI-121	SANI-120	A185	0.11	A182-A185	80	9	0.009	0.019	350	4.00	0.31	0.98	0.14	0.45	200	5.9%	79.41	0.01	2.53	27.79	1.629	165.115	163.486	
Prince Albert St. E	SANI-243	SANI-242	A186	0.58	A186	14	8	0.008	0.008	350	4.00	0.13	0.58	0.08	0.21	200	3.6%	62.26	0.00	1.98	45.38	1.635	179.798	178.163	
Prince Albert St. E	SANI-242	SANI-239	A187	0.16	A186-A187	14	2	0.002	0.010	350	4.00	0.17	0.74	0.10	0.27	200	8.7%	96.55	0.00	3.07	31.54	2.733	178.173	175.44	
Davidson St.	SANI-239	SANI-238	-	0	A186-A187	0	0	0.000	0.010	350	4.00	0.17	0.74	0.10	0.27	200	12.7%	117.09	0.00	3.73	55.92	7.127	175.43	168.303	
Davidson St.	SANI-238	SANI-237	A188	0.39	A186-A188	14	5	0.005	0.015	350	4.00	0.25	1.13	0.16	0.41	200	5.7%	78.29	0.01	2.49	15.06	0.858	168.253	167.395	
Davidson St.	SANI-237	SANI-236	A189	0.63	A186-A189	14	9	0.009	0.024	350	4.00	0.40	1.76	0.25	0.64	200	0.5%	22.57	0.03	0.72	60.59	0.287	167.355	167.068	
Davidson St.	SANI-236	SANI-221	A190	0.44	A186-A190	80	35	0.035	0.059	-	-	-	2.2	-	-	-	-	-	-	-	-	-	-	-	
Davidson St.	SANI-236	SANI-221	A191	0.34	A186-A191	14	5	0.005	0.064	350	4.00	1.05	2.54	0.36	1.41	200	0.4%	19.94	0.07	0.63	108.17	0.4	167.068	166.668	
St. Lawrence St. E	SANI-221	SANI-232	A192	0.41	A186-A192	14	6	0.006	0.069	350	4.00	1.15	2.95	0.41	1.56	200	1.0%	33.54	0.05	1.07	97.65	1.021	166.658	165.637	
St. Lawrence St. E	SANI-221	SANI-232	A193-A194	0.96	A186-A194	80	77	0.077	0.146	350	4.00	2.42	3.91	0.55	2.96	200	1.0%	33.54	0.09	1.07	97.65	1.021	166.658	165.637	
ROW	SANI-235	SANI-234	A195	0.58	A195	80	46	0.046	0.046	350	4.00	0.77	0.58	0.08	0.85	220	3.4%	77.45	0.01	2.04	50.12	1.681	167.681	166	
St. Lawrence St. E	SANI-234	SANI-232	-	0	A195	0	0	0.000	0.046	350	4.00	0.77	0.58	0.08	0.85	220	0.3%	22.92	0.04	0.60	11.23	0.033	165.9	165.867	
ROW	SANI-232	SANI-160	A196	0.14	A186-A196	80	11	0.011	0.204	350	4.00	3.37	4.63	0.65	4.02	200	1.1%	34.98	0.11	1.11	35.61	0.405	165.607	165.202	
ROW	SANI-160	SANI-159	-	0	A186-A196	0	0	0.000	0.204	350	4.00	3.37	4.63	0.65	4.02	200	0.7%	27.67	0.15	0.88	12.08	0.086	165.132	165.046	
ROW	SANI-159	SANI-158	A197	0.39	A186-A197	80	31	0.031	0.235	350	4.00	3.89	5.02	0.70	4.59	200	1.5%	39.71	0.12	1.26	26.6	0.39	165.006	164.616	
ROW	SANI-158	SANI-157	-	0	A186-A197	0	0	0.000	0.235	350	4.00	3.89	5.02	0.70	4.59	200	0.2%	13.23	0.35	0.42	41.18	0.067	164.586	164.519	
Elgin St.	SANI-157	SANI-155	A198	0.1	A186-A198	14	1	0.001	0.236	350	4.00	3.91	5.12	0.72	4.63	200	0.5%	23.02	0.20	0.73	18.68				



# Existing Madoc SPS Sanitary Sewer Calculation Sheet



LOCATION	DRAINAGE AREA DISCRPTION				POPULATION										OUTLET PIPE DATA											
	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS			POPULATION			Σ	q	M	PEAK FLOW	Σ	IA	Q	SIZE	SLOPE	CAP	Q/Qfull	VELOCITY	LENGTH	FALL	OUTLET PIPE DATA	
	From	To	No.	Ha				Ppha	P	P(1000)	P(1000)	(l/cap/d)	(l/s)	Area (ha)	(l/s)	(l/s)	(mm)	(%)	(l/s)		(m/s)	(m)	(m)	U/S	D/S	
ROW	SANI-8	SANI-59	A204	0.58	A186-A204			80	46	0.046	0.392	350	4.00	6.49	7.38	1.03	7.53	250	0.5%	42.41	0.18	0.86	20.25	0.103	164.168	164.065
ROW	SANI-59	SANI-58	-	0	A186-A204			0	0	0.000	0.392	350	4.00	6.49	7.38	1.03	7.53	250	0.3%	31.95	0.24	0.65	36.73	0.106	164.025	163.919
ROW	SANI-58	SANI-57	-	0	A186-A204			0	0	0.000	0.392	350	4.00	6.49	7.38	1.03	7.53	250	1.0%	59.34	0.13	1.21	33.24	0.331	163.879	163.548
St. Lawrence St. W	SANI-11	SANI-54	A206-A207	1.73	A206-A207			14	23	0.023	0.023	-	-	-	1.73	-	-	-	-	-	-	-	-	-	-	-
St. Lawrence St. W	SANI-11	SANI-54	A208,A205	1.05	A205-A208			80	84	0.084	0.107	350	4.00	1.78	2.78	0.39	2.17	250	0.7%	48.16	0.05	0.98	61.45	0.403	166.918	166.515
ROW	SANI-54	SANI-57	A209	0.59	A205-A209			80	47	0.047	0.155	350	4.00	2.56	3.37	0.47	3.03	250	4.9%	131.49	0.02	2.68	57.62	2.817	166.305	163.488
ROW	SANI-57	SANI-120	-	0	A186-A209			0	0	0.000	0.547	350	3.95	8.95	10.75	1.51	10.46	250	0.4%	37.56	0.28	0.77	43.11	0.172	163.458	163.286
Champlain St.	SANI-120	SANI119	A210	0.1	SPS-1,SPS-3,A117-A210,A272			14	1	0.001	1.611	350	3.66	24.37	46.73	6.54	48.41	200	0.8%	30.03	SURCHARGED	0.96	36.61	0.307	163.276	162.969
Champlain St.	SANI-119	SANI-118	A211	0.23	SPS-1,SPS-3,A117-A211,A272			0	0	0.000	1.611	350	3.66	24.37	46.96	6.57	48.44	200	0.4%	19.66	SURCHARGED	0.63	50.67	0.182	162.949	162.767
Champlain St.	SANI-118	SANI-117	A212	0.77	SPS-1,SPS-3,A117-A212,A272			14	10	0.010	1.621	350	3.65	24.51	47.73	6.68	48.70	200	0.6%	25.53	SURCHARGED	0.81	90.44	0.548	162.757	162.209
Champlain St.	SANI-117	SANI-122	A213	0.12	SPS-1,SPS-3,A117-A213,A272			14	2	0.002	1.623	350	3.65	24.54	47.85	6.70	48.74	200	0.6%	25.47	SURCHARGED	0.81	59.05	0.356	162.199	161.843
Francis St.	SANI-276	SANI-275	A214	0.22	A214			14	3	0.003	0.003	350	4.00	0.05	0.22	0.03	0.08	200	6.7%	85.13	0.00	2.71	17.07	1.15	178.033	176.883
Francis St.	SANI-275	SANI-315	A215	0.28	A214-A215			14	4	0.004	0.007	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-
Francis St.	SANI-275	SANI-315	A216	0.37	A214-A216			0	0	0.000	0.007	350	4.00	0.11	0.87	0.12	0.23	200	8.8%	97.28	0.00	3.10	54.49	4.794	176.853	172.059
Francis St.	SANI-315	SANI-92	A217	0.1	A214-A217			14	1	0.001	0.008	350	4.00	0.13	0.97	0.14	0.27	200	6.3%	82.49	0.00	2.63	19.21	1.215	172.029	170.814
Francis St.	SANI-92	SANI-91	A218	0.24	A214-A218			14	3	0.003	0.011	350	4.00	0.19	1.21	0.17	0.36	200	8.8%	97.45	0.00	3.10	44.96	3.969	170.784	166.815
Francis St.	SANI-314	SANI-91	A219	0.36	A219			14	5	0.005	0.005	350	4.00	0.08	0.36	0.05	0.13	200	0.5%	23.54	0.01	0.75	40.58	0.209	168.544	168.335
Livingstone Ave. W	SANI-91	SANI-90	A220	0.56	A214-A220			14	8	0.008	0.024	350	4.00	0.40	2.13	0.30	0.69	200	1.1%	33.90	0.02	1.08	41.46	0.443	166.765	166.322
Livingstone Ave. W	SANI-90	SANI-89	A221	0.88	A214-A221			14	12	0.012	0.036	350	4.00	0.59	3.01	0.42	1.01	200	0.9%	31.88	0.03	1.01	98.83	0.934	166.312	165.378
Rollins St.	SANI-87	SANI-88	A224	0.29	A224			0	0	0.000	0.000	-	-	-	0.29	-	-	-	-	-	-	-	-	-	-	-
Rollins St.	SANI-87	SANI-88	A222-A223,A225	1.61	A222-A225			14	22	0.022	0.022	350	4.00	0.36	1.9	0.27	0.63	200	9.3%	100.02	0.01	3.18	58.76	5.464	176.24	170.776
Rollins St.	SANI-88	SANI-89	-	0	A222-A225			0	0	0.000	0.022	350	4.00	0.36	1.9	0.27	0.63	200	8.9%	97.84	0.01	3.11	60.55	5.388	170.746	165.358
Rollins St.	SANI-109	SANI-110	A226	1.03	A226			14	14	0.014	0.014	350	4.00	0.23	1.03	0.14	0.38	200	5.9%	79.33	0.00	2.53	57.81	3.382	164.598	161.216
Rollins St.	SANI-112	SANI-110	A227-A230	0.71	A227-A230			14	10	0.010	0.010	350	4.00	0.16	0.71	0.10	0.26	200	3.1%	57.59	0.00	1.83	42.55	1.312	162.508	161.196
Rollins St.	SANI-110	SPS-2	-	0	A226-A230			0	0	0.000	0.024	350	4.00	0.39	1.74	0.24	0.63	200	0.1%	9.33	0.07	0.30	14.82	0.012	161.116	161.104
Rollins St.	SPS-2	SANI-89	-	0	-			0	0	0.000	0.000	0	0.00	0.00	0	0.00	13.00	100	0.0%	0.00	0.00	0.00	0	0	0	0
Livingstone Ave. W	SANI-89	SANI-93	A231	1.65	A214-A225,SPS-2,A231			14	22	0.022	0.080	350	4.00	1.33	6.56	0.92	15.24	250	0.3%	33.09	0.46	0.67	111.45	0.345	165.228	164.883
Livingstone Ave. W	SANI-93	SANI-113	-	0	A214-A225,SPS-2,A231			0	0	0.000	0.080	350	4.00	1.33	6.56	0.92	15.24	250	1.1%	63.11	0.24	1.29	47.77	0.538	164.553	164.015
St. Peters St. S	SANI-303	SANI-114	A232-A233	1.12	A232-A233			14	15	0.015	0.015	350	4.00	0.25	1.12	0.16	0.41	200	9.6%	101.47	0.00	3.23	41.36	3.959	169.655	165.696
St. Peters St. S	SANI-114	SANI-113	A234	0.43	A232-A234			14	6	0.006	0.021	350	4.00	0.35	1.55	0.22	0.57	200	1.6%	41.50	0.01	1.32	75.02	1.201	165.346	164.145
Livingstone Ave. W	SANI-113	SANI-115	A235	0.3	A214-A225,SPS-2,A231-235			14	4	0.004	0.105	350	4.00	1.74	8.41	1.18	15.92	250	3.7%	114.39	0.14	2.33	50	1.85	163.995	162.145
Livingstone Ave. W	SANI-115	SANI-116	A236	0.75	A214-A225,SPS-2,A231-236			14	10	0.010	0.115	350	4.00	1.91	9.16	1.28	16.19	250	0.5%	41.62	0.39	0.85	33.07	0.162	162.115	161.953
Livingstone Ave. W	SANI-116	SANI-122	A237	0.49	A214-A225,SPS-2,A231-237			14	7	0.007	0.122	350	4.00	2.02	9.65	1.35	16.37	250	0.1%	17.15	0.95	0.35	24.05	0.02	161.933	161.913
Livingstone Ave. W	SANI-122	SANI-125	-	0	A117-A225,SPS-1,SPS-2,SPS-3,A231-A237,A272			0	0	0.000	1.745	350	3.63	26.21	57.5	8.05	64.76	300	-	75.94	0.85	1.07	-	-	-	-
Livingstone Ave. E	SANI-146	SANI-7	A238	0.63	A238			14	9	0.009	0.009	350	4.00	0.14	0.63	0.09	0.23	200	2.5%	51.71	0.00	1.65	62.48	1.553	168.064	166.511
Livingstone Ave. W	SANI-7	SANI-124	A239	0.63	A238-A239			14	9	0.009	0.017	-	-	-	1.26	-	-	-	-	-	-	-	-	-	-	-
Livingstone Ave. W	SANI-7	SANI-124	A240	0.33	A238-A240			80	26	0.026	0.044	350	4.00	0.72	1.59	0.22	0.94	250	0.8%	52.36	0.02	1.07	51.08	0.396	166.501	166.105
Livingstone Ave. W	SANI-124	SANI-123	A241	0.36	A238-A241			14	5	0.005	0.048	350	4.00	0.80	1.95	0.27	1.07	250	6.3%	148.73	0.01	3.03	35.33	2.21	166.095	163.885
Livingstone Ave. W	SANI-123	SANI-125	-	0	A238-A241			0	0	0.000	0.048	350	4.00	0.80	1.95	0.27	1.07	250	8.7%	175.22	0.01	3.57	14.26	1.238	162.995	161.757
ROW	SANI-125	SANI-261	-	0	A117-A225,SPS-1,SPS-2,SPS-3,A231-A241,A272			0	0	0.000	1.793	350	3.62	26.87	59.45	8.32	65.70	300	0.3%	55.84	SURCHARGED	0.79	59.08	0.197	161.707	161.51
ROW	SANI-261	SANI-126	-	0	A117-A225,SPS-1,SPS-2,SPS-3,A231-A241,A272			0	0	0.000	1.793	350	3.62	26.87	59.45	8.32	65.70	300	0.4%	62.16	SURCHARGED	0.88	99.22	0.41	161.49	161.08
ROW	SANI-126	SANI-262	-	0	A117-A225,SPS-1,SPS-2,SPS-3,A231-A241,A272			0	0	0.000	1.793	350	3.62	26.87	59.45	8.32	65.70	300	0.3%	56.25	SURCHARGED	0.80	69.16	0.234	161.05	160.816
ROW	SANI-262	SANI-99	A242	1.98	A117-A225,SPS-1,SPS-2,SPS-3,A231-A242,A272			80	158	0.158	1.952	350	3.59	29.02	61.43	8.60	68.12	300	0.4%	61.22	SURCHARGED	0.87	65.61	0.263	160.806	160.543
ROW	SANI-99	SANI-95	-	0	A117-A225,SPS-1,SPS-2,SPS-3,A231-A242,A272			0	0	0.000	1.952	350	3.59	29.02	61.43	8.60	68.12	300	0.3%	50.76	SURCHARGED	0.72	60.98	0.168	160.523	160.355
Colborne St.	SANI-108	SANI-107	A243	2.19	A243			14	30	0.030	0.030	350	4.00	0.49	2.19	0										

# Existing Madoc SPS Sanitary Sewer Calculation Sheet



		DRAINAGE AREA DISCRPTION											OUTLET PIPE DATA												
LOCATION	MANHOLE		INCREMENTAL AREA		CONTRIBUTING AREAS	POPULATION				Σ	q	M	PEAK FLOW	Σ	IA	Q	SIZE	SLOPE	CAP	Q/Qfull	VELOCITY	LENGTH	FALL	OUTLET PIPE DATA	
	From	To	No.	Ha		Ppha	P	P(1000)	P(1000)															(l/cap/d)	(l/s)
Colborne St.	SANI-107	SANI-106	A244	0.2	A243-A244	14	3	0.003	0.032	350	4.00	0.54	2.39	0.33	0.87	200	1.1%	34.94	0.02	1.11	37.9	0.43	165.235	164.805	
Rollins St.	SANI-106	SANI-105	A245	0.83	A243-A245	14	11	0.011	0.044	350	4.00	0.72	3.22	0.45	1.17	200	0.9%	30.46	0.04	0.97	87.64	0.756	164.715	163.959	
Rollins St.	SANI-105	SANI-305	A246	0.26	A243-A246	14	4	0.004	0.047	350	4.00	0.78	3.48	0.49	1.27	200	4.6%	70.23	0.02	2.24	59.95	2.749	163.936	161.187	
Rollins St.	SANI-305	SANI-104	A247	0.17	A243-A247	14	2	0.002	0.050	350	4.00	0.82	3.65	0.51	1.33	200	0.3%	18.39	0.07	0.59	28	0.088	161.187	161.099	
Seymour St. W	SANI-307	SANI-308	A248	1.31	A248	0	0	0.000	0.000	350	4.00	0.00	1.31	0.18	0.18	300	0.4%	58.33	0.00	0.83	20.34	0.074	161.386	161.312	
Seymour St. W	SANI-308	SANI-309	A249-A250	0.56	A248-A250	14	8	0.008	0.008	350	4.00	0.13	1.87	0.26	0.39	300	0.2%	43.67	0.01	0.62	72.58	0.148	161.302	161.154	
Seymour St. W	SANI-309	SANI-104	-	0	A248-A250	0	0	0.000	0.008	350	4.00	0.13	1.87	0.26	0.39	300	0.3%	50.73	0.01	0.72	5.45	0.015	161.094	161.079	
Rollins St.	SANI-306	SANI-302	A251-A252	1.01	A251-A252	14	14	0.014	0.014	350	4.00	0.23	1.01	0.14	0.37	200	0.4%	21.42	0.02	0.68	45.03	0.192	161.559	161.367	
Rollins St.	SANI-302	SANI-104	-	0	A251-A252	0	0	0.000	0.014	350	4.00	0.23	1.01	0.14	0.37	200	0.3%	19.07	0.02	0.61	43.77	0.148	161.347	161.199	
Seymour St. W	SANI-104	SANI-103	A253	0.19	A243-A253	14	3	0.003	0.073	350	4.00	1.22	6.72	0.94	2.16	300	0.1%	34.03	0.06	0.48	38.76	0.048	161.049	161.001	
Seymour St. W	SANI-103	SANI-101	A254-A255	1.1	A243-A255	14	15	0.015	0.088	-	-	-	7.82	-	-	-	-	-	-	-	-	-	-	-	
Seymour St. W	SANI-103	SANI-101	A256	0.05	A243-A256	0	0	0.000	0.088	350	4.00	1.46	7.87	1.10	2.56	300	0.2%	44.88	0.06	0.63	118.38	0.255	160.991	160.736	
Seymour St. W	SANI-101	SANI-96	-	0	A243-A256	0	0	0.000	0.088	350	4.00	1.46	7.87	1.10	2.56	150	-	22.27	0.12	0.63	-	-	-	-	
Seymour St. W	SANI-96	SANI-95	-	0	A243-A256	0	0	0.000	0.088	350	4.00	1.46	7.87	1.10	2.56	300	0.3%	50.97	0.05	0.72	3.24	0.009	160.614	160.605	
ROW	SANI-95	SANI-100	-	0	A1-A256,SPS-1,SPS-2,SPS-3,A272	0	0	0.000	3.177	350	3.42	44.96	136.4	19.10	94.56	350	0.1%	48.31	SURCHARGED	0.50	10.03	0.011	160.345	160.334	
ROW	SANI-100	SANI-142	-	0	A1-A256,SPS-1,SPS-2,SPS-3,A272	0	0	0.000	3.177	350	3.42	44.96	136.4	19.10	94.56	350	0.3%	86.13	SURCHARGED	0.90	124.18	0.433	160.324	159.891	
ROW	SANI-142	SANI-141	-	0	A1-A256,SPS-1,SPS-2,SPS-3,A272	0	0	0.000	3.177	350	3.42	44.96	136.4	19.10	94.56	350	0.2%	61.30	SURCHARGED	0.64	75.32	0.133	159.891	159.758	
ROW	SANI-141	SANI-140	-	0	A1-A256,SPS-1,SPS-2,SPS-3,A272	0	0	0.000	3.177	350	3.42	44.96	136.4	19.10	94.56	350	0.3%	82.55	SURCHARGED	0.86	79.3	0.254	159.758	159.504	
ROW	SANI-140	SANI-138	-	0	A1-A256,SPS-1,SPS-2,SPS-3,A272	0	0	0.000	3.177	350	3.42	44.96	136.4	19.10	94.56	350	0.3%	80.77	SURCHARGED	0.84	88.72	0.272	159.494	159.222	
Maud St.	SANI-304	SANI-132	A257	0.33	A257	14	4	0.004	0.004	350	4.00	0.07	0.33	0.05	0.12	200	0.7%	27.89	0.00	0.89	18.39	0.133	166.777	166.644	
Maud St.	SANI-132	SANI-131	A258-A259	1.45	A257-A259	0	0	0.000	0.004	-	-	-	1.78	-	-	-	-	-	-	-	-	-	-	-	
Maud St.	SANI-132	SANI-131	A260	0.39	A257-A260	14	5	0.005	0.010	350	4.00	0.16	2.17	0.30	0.47	200	0.02%	4.05	0.11	0.13	52.38	0.008	166.584	166.576	
Maud St.	SANI-131	SANI-130	A261	0.16	A257-A261	14	2	0.002	0.012	350	4.00	0.20	2.33	0.33	0.52	200	3.5%	61.79	0.01	1.97	44.55	1.581	166.416	164.835	
Durham St.	SANI-129	SANI-130	A262	1.34	A262	14	18	0.018	0.018	-	-	-	1.34	-	-	-	-	-	-	-	-	-	-	-	
Durham St.	SANI-129	SANI-130	A263-A264	0.16	A262-A264	0	0	0.000	0.018	350	4.00	0.30	1.5	0.21	0.51	200	4.4%	69.01	0.01	2.20	56.44	2.499	167.344	164.845	
Durham St.	SANI-130	SANI-133	A265	0.22	A257-A265	14	3	0.003	0.033	350	4.00	0.55	4.05	0.57	1.12	250	4.2%	121.83	0.01	2.48	62.59	2.627	164.685	162.058	
Durham St. S	SANI-133	SANI-134	A266-A268	1.18	A257-A268	14	16	0.016	0.049	350	4.00	0.81	5.23	0.73	1.55	250	3.7%	113.79	0.01	2.32	60.36	2.21	162.028	159.818	
Durham St. S	SANI-134	SANI-136	A269-A270	0.91	A257-A270	14	12	0.012	0.062	350	4.00	1.02	6.14	0.86	1.88	250	0.4%	38.80	0.05	0.79	56.84	0.242	159.808	159.566	
ROW	SANI-136	SANI-138	A271	0.28	A257-A271	100	28	0.028	0.090	350	4.00	1.48	6.42	0.90	2.38	250	0.2%	28.20	0.08	0.57	81.82	0.184	159.546	159.362	
ROW	SANI-138	SANI-139	-	0	A1-A272,SPS-1,SPS-2,SPS-3	0	0	0.000	3.266	350	3.41	46.09	142.82	19.99	96.58	350	0.3%	83.41	SURCHARGED	0.87	53.21	0.174	159.192	159.018	
ROW	SANI-139	SANI-263	-	0	A1-A272,SPS-1,SPS-2,SPS-3	0	0	0.000	3.266	350	3.41	46.09	142.82	19.99	96.58	350	0.4%	90.90	SURCHARGED	0.94	5.15	0.02	158.588	158.568	
ROW	SANI-263	SANI-254	-	0	A1-A272,SPS-1,SPS-2,SPS-3	0	0	0.000	3.266	350	3.41	46.09	142.82	19.99	96.58	350	0.1%	55.94	SURCHARGED	0.58	129.85	0.191	158.248	158.057	
ROW	SANI-254	SANI-255	-	0	A1-A272,SPS-1,SPS-2,SPS-3	0	0	0.000	3.266	350	3.41	46.09	142.82	19.99	96.58	350	0.2%	67.84	SURCHARGED	0.71	153.48	0.332	158.047	157.715	
ROW	SANI-255	SANI-256	-	0	A1-A272,SPS-1,SPS-2,SPS-3	0	0	0.000	3.266	350	3.41	46.09	142.82	19.99	96.58	350	0.2%	68.28	SURCHARGED	0.71	152.89	0.335	157.705	157.37	

**DEISGN PARAMETERS**

Mannings n	0.013	
Infiltration Rate	0.14	l/s/ha
Students	820	
Average Daily Flow (q)		
Residential	350	l/cap/day
Industrial	35000	l/ha/day
Commercial	28000	l/ha/day
School	100	l/student/day

Population Density	
Residential	14 Ppha
Industrial	100 Ppha
Commercial	80 Ppha
School	46 Ppha

= Refer to the Inverted Siphons sheet for the details.

**Designed By:**

**Prabhkaran Singh Cheema**

**Checked By:**

**Matthew Morkem, P.Eng**

**Dwg. Reference:**  
Figure 15

**PROJECT:**

**MADOC INFRASTRUCTURE CAPACITY ASSESSMENT**

**LOCATION:**

**MADOC, ON, CANADA**

**Project Number:**  
32508

**Date:**  
7-Mar-24

# Existing Madoc Inverted Siphons Calculation Sheet

Resource: [Inverted Siphon, Depressed Sewer, Design Calculations \(Imnoeng.com\)](http://Imnoeng.com)

Variable Descriptions	
$V_i$	Velocity in Siphon Sewer
$D_i$	Diameter of Siphon Sewer
$n_s$	Mannings n coefficient of Siphon Sewer
$S_s$	Allowable Hydraulic Gradeline for the Siphon Sewers
$E$	Main Invert Difference Between Inlet & Outlet Chamber
$L_s$	Total length of Siphon Sewer (Not Horizontal distance)

Equations	
$V_i = \frac{S_s^{1/2}}{n_s} \left( \frac{D_i}{4} \right)^{2/3}$	
$S_s = \frac{E}{L_s}$	

## Seymour St. 2 Siphons - 150 mm diameter

### Known Data

Variable	Value	Unit
$D_i$	0.15	m
$n_s$	0.013	
$L_s$	46	m
Upstream Main Invert	160.946	m
Downstream Main Invert	160.7	m

### Calculations

$$E = \text{Upstream Main Invert} - \text{Downstream Main Invert}$$

$$E = 160.946 \text{ m} - 160.7 \text{ m}$$

$$E = \mathbf{0.246 \text{ m}}$$

$$S_s = \frac{0.246 \text{ m}}{46 \text{ m}}$$

$$S_s = \mathbf{0.0053}$$

$$V_i = \frac{0.0053478^{1/2}}{0.013} \left( \frac{0.15}{4} \right)^{2/3}$$

$$V_i = \mathbf{0.63 \text{ m/s}}$$

### Notes / Assumptions

## Prince Albert St. W SANI-68 to SANI-43 - 2 Siphons, 250 mm dia.

### Known Data

Variable	Value	Unit
$D_i$	0.25	m
$n_s$	0.013	
$L_s$	89.91	m
Upstream Main Invert	169.13	m
Downstream Main Invert	168.06	m
		76.62m Horizontal Length
		169.54 (Highest Inv.)

### Calculations

$$E = \text{Upstream Main Invert} - \text{Downstream Main Invert}$$

$$E = 169.13 \text{ m} - 168.06 \text{ m}$$

$$E = \mathbf{1.07}$$

$$S_s = \frac{1.07 \text{ m}}{89.91 \text{ m}}$$

$$S_s = \mathbf{0.0119}$$

$$V_i = \frac{0.0119006^{1/2}}{0.013} \left( \frac{0.25}{4} \right)^{2/3}$$

$$V_i = \mathbf{1.32 \text{ m/s}}$$

### Notes / Assumptions

$L_s$  not available - utilized horizontal distance and assumed same ratio of horizontal distance to actual distance as first siphon

Therefore:

First Siphon Horizontal Distance	39.20
First Siphon $L_s$	46.00
Percentage of Increase	0.17
This Siphon Horizontal Dist.	76.62
Assumed $L_s$	89.91

## Livingstone Avenue W SANI-122 to SANI-125 - 1 Siphon, 300mm dia

### Known Data

Variable	Value	Unit
$D_i$	0.30	m
$n_s$	0.013	
$L_s$	21.08	m
Upstream Main Invert	161.84	m
Downstream Main Invert	161.71	m
		17.96m Horizontal Length
		161.91 (Highest Inv.)

### Calculations

$$E = \text{Upstream Main Invert} - \text{Downstream Main Invert}$$

$$E = 161.84 \text{ m} - 161.71 \text{ m}$$

$$E = \mathbf{0.13}$$

$$S_s = \frac{0.13 \text{ m}}{21.08 \text{ m}}$$

$$S_s = \mathbf{0.0062}$$

$$V_i = \frac{0.006167^{1/2}}{0.013} \left( \frac{0.30}{4} \right)^{2/3}$$

$$V_i = \mathbf{1.07 \text{ m/s}}$$

### Notes / Assumptions

$L_s$  not available - utilized horizontal distance and assumed same ratio of horizontal distance to actual distance as first siphon

First Siphon Horizontal Distance	39.20
First Siphon $L_s$	46.00
Percentage of Increase	0.17
This Siphon Horizontal Dist.	17.96
Assumed $L_s$	21.08

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**Appendix F**  
Stormwater Model



# Existing Madoc Storm Sewer Calculation Sheet



STREET	MANHOLE		AREA No.	Ha	CONTRIBUTING AREAS	RUNOFF DATA						PIPE DATA								
	From	To				C	AC	$\sum$ AC	Tc (min.)	I (mm/hr)	Q (L/s)	Size (mm)	Slope (%)	Capacity (L/s)	Q/Q <sub>full</sub>	Velocity (m/s)	Length (m)	Fall (m)	U/S Invert (m)	D/S Invert (m)
St. Lawrence St. E	STO-194	STO-87	A1	1.03	A1	0.68	0.696	0.696	20	45	87.94	375	0.40%	110.53	0.80	1.00	78	0.31	179.45	179.14
St. Lawrence St. E	STO-87	STO-88	A2	0.72	A1-A2	0.55	0.396	1.092	21.3	44	132.12	375	0.47%	119.79	SURCHARGED	1.08	70.7	0.33	179.11	178.78
St. Lawrence St. E	STO-88	STO-89	A3	1.05	A1-A3	0.47	0.493	1.585	22.4	42	185.17	375	3.08%	307.79	0.60	2.79	63.6	1.96	178.75	176.79
St. Lawrence St. E	STO-89	STO-90	A4	0.81	A1-A4	0.50	0.406	1.991	22.8	42	229.88	400	6.09%	514.11	0.45	4.09	104.2	6.35	176.78	170.43
St. Lawrence St. E	STO-90	STO-91	A5	0.96	A1-A5	0.60	0.579	2.569	23.2	41	292.89	400	3.57%	393.41	0.74	3.13	76.5	2.73	170.42	167.69
St. Lawrence St. E	STO-91	STO-93	A6	1.52	A1-A6	0.50	0.762	3.332	23.6	41	375.21	450	0.66%	232.28	SURCHARGED	1.46	91.9	0.61	167.5	166.89
St. Lawrence St. E	STO-93	STO-96	A7	0.94	A1-A7	0.64	0.601	3.933	24.6	39	429.63	450	0.49%	199.30	SURCHARGED	1.25	83.9	0.41	166.87	166.46
St. Lawrence St. E	STO-96	Ditch	A8-A11	4.35	A1-A8,A11	0.53	2.316	6.249	25.8	38	661.85	450	0.76%	248.91	SURCHARGED	1.57	87.9	0.67	166.46	165.79
Wellington St.	CB-187	CB-193	A9	3.1	A9	0.59	1.837	1.837	20.0	45	232.26	600	2.23%	917.32	0.25	3.24	56.9	1.27	168.64	167.37
Wellington St.	CB-193	Ditch	-	0	A9	0.00	0.000	1.837	20.3	45	229.91	600	0.72%	520.80	0.44	1.84	6.95	0.05	167.36	167.31
Elgin St.	STO-48	STO-47	A10-A12	3.31	A1-A12	0.60	1.979	10.065	25.8	38	1761.53	600	0.10%	195.15	SURCHARGED	0.69	19.8	0.02	165.21	165.19
ROW	STO-47	STO-52	-	0	A1-A12	0.00	0.000	10.065	26.2	38	1747.92	650	0.89%	718.87	SURCHARGED	2.17	68.2	0.61	165.14	164.53
ROW	STO-52	STO-54	A13	5.13	A1-A13	0.65	3.325	13.390	26.8	37	2076.41	650	0.65%	610.76	SURCHARGED	1.84	133.2	0.86	164.53	163.67
ROW	STO-54	STO-55	-	0	A1-A13	0.00	0.000	13.390	28.0	36	2034.51	650	0.18%	322.65	SURCHARGED	0.97	33.3	0.06	163.67	163.61
Duncun St.	STO-432	STO-431	A32	2.11	A32	0.27	0.564	0.564	20.0	45	71.29	250	2.05%	85.14	0.84	1.73	16.1	-0.33	178.7	179.03
Duncun St.	STO-431	STO-104	A33	1.23	A32-A33	0.49	0.603	1.167	20.2	45	146.68	250	1.54%	73.92	SURCHARGED	1.51	106.8	1.65	178.59	176.94
ROW	STO-104	STO-457	-	0	A32-A33	0.00	0.000	1.167	21.3	43	140.95	350	1.33%	168.23	0.84	1.75	42.1	0.56	176.78	176.22
ROW	STO-104	STO-457	-	0	A32-A33	0.00	0.000	1.167	21.7	43	139.13	400	0.43%	136.14	SURCHARGED	1.08	58.5	0.25	176.13	175.88
Durham St. N	STO-450	STO-448	A16	2.07	A16	0.46	0.949	0.949	20.0	45	119.99	300	0.63%	76.76	SURCHARGED	1.09	39.2	0.247	172.709	172.462
Durham St. N	STO-448	CB-33	-	0	A16	0.00	0.000	0.949	20.6	45	117.53	400	0.20%	92.05	SURCHARGED	0.73	21.5	0.042	172.462	172.42
Durham St. N	CB-33	CB-31	A34	0.85	A16,A34	0.47	0.398	1.347	21.1	44	164.09	400	0.71%	175.30	0.94	1.39	24.7	0.175	172.391	172.216
Russel St.	STO-5	STO-6	A17	1.48	A17	0.62	0.911	2.258	20.0	45	285.45	450	0.96%	278.65	SURCHARGED	1.75	33.5	0.32	171.11	170.79
Russel St.	STO-6	STO-7	A18	1.25	A16-A18,A34	0.85	1.065	3.322	20.3	45	415.42	450	0.71%	240.48	SURCHARGED	1.51	50.6	0.36	170.58	170.22
Russel St.	STO-7	STO-441	A35	1.38	A16-A18,A34-A35	0.71	0.979	4.302	20.9	44	527.79	600	1.50%	752.27	0.70	2.66	96.6	1.45	170.18	168.73
Davidson St.	CB-209	CB-208	A19	2.58	A19	0.67	1.727	1.727	20.0	45	218.29	300	0.93%	93.46	SURCHARGED	1.32	36.4	0.34	168.52	168.18
Davidson St.	CB-208	CB-300	A36	0.48	A19,A36	0.62	0.298	2.025	20.5	45	251.95	300	0.18%	41.18	SURCHARGED	0.58	38.6	0.07	168.18	168.11
Davidson St.	CB-300	CB-204	-	0	A19,A36	0.00	0.000	2.025	21.6	43	242.86	300	0.23%	46.84	SURCHARGED	0.66	34.1	0.08	168.09	168.01
Davidson St.	CB-204	CB-202	-	0	A19,A36	0.00	0.000	2.025	22.4	42	236.33	300	0.10%	30.73	SURCHARGED	0.43	19.8	0.02	167.99	167.97
Davidson St.	CB-202	STO-438	A37	0.48	A19,A36-A37	0.73	0.353	2.377	23.2	41	271.11	300	10.27%	309.87	0.87	4.38	14.9	1.53	167.97	166.44
St. Lawrence St. E	STO-438	STO-439	A20	1.78	A19-A20,A36-A37	0.76	1.350	3.727	23.2	41	424.31	450	0.30%	156.80	SURCHARGED	0.99	105.8	0.32	166.44	166.12
St. Lawrence St. E	STO-439	STO-444	A21	1.61	A19-A21,A36-A37	0.90	1.449	5.176	25.0	39	559.50	450	0.61%	223.08	SURCHARGED	1.40	83.3	0.51	166.09	165.58
St. Lawrence St. E	STO-444	STO-442	-	0	A19-A21,A36-A37	0.00	0.000	5.176	26.0	38	544.54	450	0.72%	241.70	SURCHARGED	1.52	9.74	0.07	165.58	165.51
ROW	STO-442	STO-443	-	0	A19-A21,A36-A37	0.00	0.000	5.176	26.1	38	542.98	450	3.14%	505.25	SURCHARGED	3.18	12.1	0.38	165.46	165.08
St. Lawrence St. W	STO-10	STO-9	A38	1.31	A38	0.66	0.866	0.866	20.0	45	109.45	300	5.55%	227.75	0.48	3.22	108	5.991	173.978	167.987
St. Lawrence St. W	STO-9	CB-76	A39	0.23	A38-A39	0.90	0.207	1.073	20.6	45	133.03	450	3.94%	565.71	0.24	3.56	42.9	1.689	167.977	166.288
Elgin St.	STO-447	STO-44	A40	0.97	A40	0.79	0.771	0.771	20.0	45	97.47	300	2.55%	154.48	0.63	2.19	33.7	0.86	165.56	164.7
Elgin St.	STO-44	STO-436	-	0	A40	0.00	0.000	0.771	20.3	45	96.60	300	0.80%	86.61	SURCHARGED	1.23	70.8	0.568	164.68	164.112
Baldwin St.	STO-436	STO-139	A22	2.47	A40,A22	0.74	1.831	2.602	21.2	44	315.62	400	0.83%	189.67	SURCHARGED	1.51	21.7	0.18	163.86	163.68
Baldwin St.	STO-139	STO-137	-	0	A40,A22	0.00	0.000	2.602	21.5	43	313.15	450	1.46%	343.99	0.91	2.16	31.6	0.46	163.65	163.19
Baldwin St.	STO-137	STO-135	A23	2.08	A40,A22-A23	0.41	0.848	3.450	21.7	43	411.98	600	0.90%	582.33	0.71	2.06	37.8	0.34	163.19	162.85
Baldwin St.	STO-135	STO-40	A41	0.48	A40-A41,A22-A23	0.79	0.381	3.831	22.0	43	452.98	750	0.17%	465.19	0.97	1.05	63	0.11	162.85	162.74
Baldwin St.	STO-40	CB-133	A24	1.12	A40-A41,A22-A24	0.68	0.767	4.598	23.0	41	527.07	750	0.05%	257.79	SURCHARGED	0.58	37.3	-0.02	162.74	162.76
Baldwin St.	CB-133	STO-35	-	0	A40-A41,A22-A24	0.00	0.000	4.598	24.1	40	510.66	750	0.40%	706.12	0.72	1.60	69.6	0.28	162.76	162.48

Baldwin St.	CB-133	STO-454	-	0	A40-A41,A22-A24	0.00	0.000	4.598	24.8	39	500.16	750	0.65%	899.90	0.56	2.04	35.2	0.23	162.48	162.25
Baldwin St.	STO-24	STO-26	A42	0.68	A42	0.68	0.465	0.465	20.0	45	58.80	400	0.78%	184.11	0.32	1.47	49.9	0.39	163.48	163.09
Baldwin St.	STO-26	STO-28	A25	0.74	A42,A25	0.52	0.388	0.854	20.6	45	105.82	600	1.81%	825.05	0.13	2.92	7.2	0.13	162.99	162.86
Baldwin St.	STO-28	CB-131	-	0	A42,A25	0.00	0.000	0.854	20.6	45	105.67	600	1.98%	864.03	0.12	3.06	5.05	0.1	162.86	162.76
Baldwin St.	CB-131	CB-131-outlet-pipe	-	0	A42,A25	0.00	0.000	0.854	20.6	44	105.57	600	0.87%	574.20	0.18	2.03	52.6	0.46	162.71	162.25
St. Lawrence St. W	CB-92	CB-93	A43	0.31	A43	0.60	0.187	0.187	20.0	45	23.60	350	0.42%	94.31	0.25	0.98	59.8	0.25	173.26	173.01
St. Lawrence St. W	CB-93	CB-94	A44	0.39	A43-A44	0.58	0.226	0.413	21.0	44	50.42	350	0.34%	85.24	0.59	0.89	102.5	0.35	172.99	172.64
St. Lawrence St. W	CB-94	CB-95	A45	0.83	A43-A45	0.60	0.501	0.914	22.9	41	105.00	400	0.90%	197.63	0.53	1.57	85.5	0.77	172.61	171.84
St. Lawrence St. W	CB-95	CB-96	-	0	A43-A45	0.00	0.000	0.914	23.9	40	102.19	400	1.11%	219.52	0.47	1.75	24.3	0.27	171.57	171.3
St. Lawrence St. W	CB-96	STO-11	A29	0.73	A43-A45,A29	0.60	0.437	1.351	24.1	40	149.98	400	0.58%	159.03	0.94	1.27	92.6	0.54	171.21	170.67
St. Lawrence St. W	STO-11	STO-112	A31	1.57	A43-A45,A29,A31	0.52	0.823	2.174	25.3	39	233.22	450	0.80%	255.26	0.91	1.60	76.1	0.61	170.64	170.03
St. Lawrence St. W	STO-112	STO-113	A30	1.05	A43-A45,A29-A31	0.53	0.559	2.733	26.1	38	286.93	450	0.94%	275.83	SURCHARGED	1.73	101.5	0.95	170.03	169.08
Livingstone Ave. W	CB-18	CB-116	A46	0.68	A46	0.76	0.520	0.520	20.0	45	65.70	300	0.84%	88.61	0.74	1.25	13.1	0.11	167.78	167.67
Livingstone Ave. W	CB-116	CB-115	A47	0.19	A46-A47	0.68	0.130	0.650	20.2	45	81.65	300	0.74%	83.15	0.98	1.18	28.4	0.21	167.67	167.46
Livingstone Ave. W	CB-115	STO-403	-	0	A46-A47	0.00	0.000	0.650	20.6	45	80.53	300	5.76%	232.02	0.35	3.28	63.4	3.65	167.46	163.81
Durham St. S	CB-15	CB-14	A26	0.77	A26	0.56	0.428	0.428	20.0	45	54.17	300	4.35%	201.65	0.27	2.85	54.5	2.37	165.89	163.52
Durham St. S	CB-14	CB-11	A48	0.48	A26,A48	0.53	0.253	0.681	20.3	45	85.16	300	3.71%	186.34	0.46	2.64	54.4	2.02	163.51	161.49
Durham St. S	CB-11	STO-440	A49	0.4	A26,A48-A49	0.63	0.250	0.931	20.7	44	115.08	350	3.01%	252.89	0.46	2.63	17.2	0.517	161.48	160.963
Durham St. S	STO-440	STO-434	-	0	A26,A48-A49	0.00	0.000	0.931	20.8	44	114.65	500	0.99%	376.37	0.30	1.92	15.4	0.153	160.963	160.81
ROW	CB-3	CB-4	A50	2.2	A50	0.61	1.331	1.331	20.0	45	168.31	400	0.55%	154.95	SURCHARGED	1.23	22.4	0.124	161.375	161.251
ROW	CB-4	CB-5	-	0	A50	0.00	0.000	1.331	20.3	45	166.55	400	1.13%	221.20	0.75	1.76	5.85	-0.066	161.251	161.317
ROW	CB-5	STO-434	-	0	A50	0.00	0.000	1.331	20.4	45	166.24	400	12.25%	728.86	0.23	5.80	1.69	0.207	161.317	161.11
Durham St. S	STO-434	CB-6	A52	0.49	A26,A48-A50,A52	0.87	0.424	2.687	20.4	45	335.47	500	0.28%	198.49	SURCHARGED	1.01	30.4	0.084	160.79	160.706
Durham St. S	CB-122	CB-119	A27	0.63	A27	0.70	0.443	0.443	20.0	45	55.99	300	11.19%	323.42	0.17	4.58	45.2	5.056	169.723	164.667
Durham St. S	CB-119	CB-6	A51	0.65	A27,A51	0.52	0.335	0.778	20.2	45	97.83	300	3.52%	181.53	0.54	2.57	112.4	3.961	164.667	160.706
Durham St. S	CB-6	CB-8	-	0	A27,A51	0.00	0.000	3.465	20.2	45	435.54	600	0.10%	190.79	SURCHARGED	0.67	7.25	0.007	160.686	160.679
ROW	CB-8	STO-445	A28	2.1	A26-A28,A48-A52	0.62	1.307	4.772	20.2	45	599.84	600	0.34%	356.01	SURCHARGED	1.26	105.6	0.355	160.659	160.304
ROW	STO-445	STO-446	-	0	A26-A28,A48-A52	0.00	0.000	4.772	21.6	43	572.39	600	0.94%	595.45	0.96	2.11	31.9	0.3	160.304	160.004
Durham St. S	CB-123	CB-125	A53	0.64	A53	0.62	0.399	0.399	20.0	45	50.39	300	5.36%	223.84	0.23	3.17	65.6	3.515	167.19	163.675
Durham St. S	CB-125	CB-128	A54	0.28	A53-A54	0.72	0.202	0.601	20.3	45	75.02	300	4.02%	193.85	0.39	2.74	64.1	2.576	163.665	161.089
Durham St. S	CB-128	STO-435	A55	0.47	A53-A55	0.60	0.283	0.884	20.7	44	108.95	300	2.06%	138.85	0.78	1.96	43.7	0.901	161.079	160.178
Durham St. S	STO-435	CB-129	A56	0.58	A53-A56	0.49	0.282	1.166	21.1	44	141.96	300	1.27%	109.02	SURCHARGED	1.54	16.6	0.211	160.138	159.927
Durham St. S	CB-129	STO-12	-	0	A53-A56	0.00	0.000	1.166	21.3	44	141.12	300	3.85%	189.74	0.74	2.68	23.3	0.897	159.907	159.01
Dancon Ave.	STO-137	STO-131	A58	0.6	A58	0.63	0.378	0.378	20.0	45	47.76	350	0.31%	81.00	0.59	0.84	97.3	0.3	161.198	160.898
Rollins St.	STO-131	STO-124	A57	0.63	A57-A58	0.69	0.435	0.812	21.9	43	96.31	600	0.17%	250.67	0.38	0.89	40.2	0.067	160.858	160.791
Rollins St.	STO-122	STO-124	A59	1.41	A59	0.60	0.853	0.853	20.0	45	107.84	450	0.13%	104.04	SURCHARGED	0.65	41.3	0.055	160.366	160.311
ROW	STO-124	STO-123	-	0	A57-A59	0	0.000	0.812	21.9	43	192.63	600	1.46%	740.74	0.26	2.62	2.13	-0.031	160.301	160.332
ROW	STO-123	STO-128	A60-A61	0.5	A57-A61	0.55	0.273	0.273	21.9	43	128.72	600	0.36%	366.56	0.35	1.30	66.5	0.237	160.322	160.085
ROW	STO-128	STO-127	-	0	A57-A61	0.00	0.000	0.273	22.8	42	127.87	600	0.23%	293.44	0.44	1.04	16.2	0.037	160.085	160.048

<b>DESIGN PARAMETERS</b>						<b>Designed By:</b> <b>Prabhkaran Singh Cheema</b>					<b>PROJECT:</b> <b>MADOC INFRASTRUCTURE CAPACITY ASSESSMENT</b>														
Mannings n      0.013						<b>Checked By:</b> <b>Matthew Morkem, P.Eng</b>					<b>LOCATION:</b> <b>MADOC, ON, CANADA</b>														
i= A*T^B											<b>Dwg. Reference:</b> Figure 20					<b>Project Number:</b> 32508					<b>Date:</b> 2024-02-07				
<b>Intensity parameters for Madoc</b>		<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>																			
A=		21.1	28	32.5	38.2	42.4																			
B=		-0.699	-0.699	-0.699	-0.699	-0.699																			

Group	Surface Composition	Area (ha)	Grouped Area	Grassed Percentage	Paved Percentage	Weighted Ronoff Coefficient (C)
A1	Paved	0.674	1.03	35%	65%	0.675
	Grass	0.356				
A2	Paved	0.333	0.72	54%	46%	0.551
	Grass	0.387				
A3	Paved	0.354	1.05	66%	34%	0.469
	Grass	0.696				
A4	Paved	0.313	0.81	61%	39%	0.501
	Grass	0.497				
A5	Paved	0.521	0.96	46%	54%	0.603
	Grass	0.439				
A6	Paved	0.596	1.54	61%	39%	0.502
	Grass	0.944				
A7	Paved	0.563	0.94	40%	60%	0.639
	Grass	0.377				
A8,A11	Paved	1.89	4.35	57%	43%	0.532
	Grass	2.46				
A9	Paved	1.634	3.1	47%	53%	0.593
	Grass	1.466				
A10,A12	Paved	1.772	3.31	46%	54%	0.598
	Grass	1.538				
A13	Paved	3.143	5.13	39%	61%	0.648
	Grass	1.987				
A32	Paved	0.056	2.11	97%	3%	0.267
	Grass	2.054				
A33	Paved	0.454	1.23	63%	37%	0.490
	Grass	0.776				
A16	Paved	0.664	2.07	68%	32%	0.459
	Grass	1.406				
A34	Paved	0.396	1.18	66%	34%	0.468
	Grass	0.784				
A17	Paved	0.832	1.48	44%	56%	0.615
	Grass	0.648				
A18	Paved	1.157	1.25	7%	93%	0.852
	Grass	0.093				
A35	Paved	0.976	1.38	29%	71%	0.710
	Grass	0.404				
A19	Paved	1.664	2.58	36%	64%	0.669
	Grass	0.916				
A36	Paved	0.274	0.48	43%	57%	0.621
	Grass	0.206				
A37	Paved	0.358	0.48	25%	75%	0.735
	Grass	0.122				
A20	Paved	1.392	1.78	22%	78%	0.758
	Grass	0.388				
A21	Paved	1.61	1.61	0%	100%	0.900
	Grass	0				
A38	Paved	0.828	1.31	37%	63%	0.661
	Grass	0.482				
A39	Paved	0.23	0.23	0%	100%	0.900
	Grass	0				
A40	Paved	0.813	0.97	16%	84%	0.795
	Grass	0.157				
A22	Paved	1.867	2.47	24%	76%	0.741
	Grass	0.603				
A23	Paved	0.505	2.08	76%	24%	0.408
	Grass	1.575				
A41	Paved	0.401	0.48	16%	84%	0.793
	Grass	0.079				
A24	Paved	0.749	1.12	33%	67%	0.685
	Grass	0.371				
A42	Paved	0.454	0.68	33%	67%	0.684
	Grass	0.226				
A25	Paved	0.313	0.74	58%	42%	0.525
	Grass	0.427				
A43	Paved	0.168	0.31	46%	54%	0.602
	Grass	0.142				
A44	Paved	0.198	0.39	49%	51%	0.580
	Grass	0.192				
A45	Paved	0.452	0.83	46%	54%	0.604
	Grass	0.378				
A29	Paved	0.391	0.73	46%	54%	0.598
	Grass	0.339				
A30	Paved	0.456	1.05	57%	43%	0.532
	Grass	0.594				
A31	Paved	0.663	1.57	58%	42%	0.524
	Grass	0.907				
A46	Paved	0.538	0.68	21%	79%	0.764
	Grass	0.142				

A47	Paved	0.127	0.19	33%	67%	0.684
	Grass	0.063				
A26	Paved	0.363	0.77	53%	47%	0.556
	Grass	0.407				
A48	Paved	0.204	0.48	58%	43%	0.526
	Grass	0.276				
A49	Paved	0.231	0.4	42%	58%	0.625
	Grass	0.169				
A50	Paved	1.202	2.2	45%	55%	0.605
	Grass	0.998				
A27	Paved	0.439	0.63	30%	70%	0.703
	Grass	0.191				
A51	Paved	0.266	0.65	59%	41%	0.516
	Grass	0.384				
A28	Paved	0.974	1.7	43%	57%	0.622
	Grass	0.726				
A52	Paved	0.464	0.49	5%	95%	0.866
	Grass	0.026				
A53	Paved	0.367	0.64	43%	57%	0.623
	Grass	0.273				
A54	Paved	0.203	0.28	28%	73%	0.721
	Grass	0.077				
A55	Paved	0.255	0.47	46%	54%	0.603
	Grass	0.215				
A56	Paved	0.211	0.58	64%	36%	0.486
	Grass	0.369				
A57	Paved	0.406	0.6	32%	68%	0.690
	Grass	0.194				
A58	Paved	0.368	0.63	42%	58%	0.630
	Grass	0.262				
A59	Paved	0.77	1.41	45%	55%	0.605
	Grass	0.64				
A60	Paved	0.233	0.51	54%	46%	0.547
	Grass	0.277				





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