ATLANTIC CANADA WATER AND WASTEWATER ASSOCIATION (ACWWA)

Request for Proposals

Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines

Sealed bids submitted on the included bid form on a vendor identified envelope marked:

RFP Issued Date: February 6, 2019
RFP Submission Date & Time: February 26, 2019 4:30 pm

Submit to:
Clara Shea
Atlantic Canada Water & Wastewater Association
Box 28141
Dartmouth, Nova Scotia
B2W 6E2
contact@acwwa.ca

Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed. Bids received after the date and time specified shall be rejected.

Electronic bids are acceptable but hard copies must follow via courier.

PROPONENT'S SUBMISSION SHEET

The undersigned hereby acknowledges that he/she, as an officer of the stated corporation, has read and understands the specifications, requirements, and proposed agreement regarding the **Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines Project**. He/she further acknowledges that the seller's proposed services fully meet or exceed those as specified. Additionally, the Proponent agrees that all its bid documents and responses to the aforementioned RFP will, at the option of ACWWA, become a legally binding and essential portion of the final contract between the successful Proponent and ACWWA.

The following information must be completed to ensure tender acceptance.

*ADDENDA No. _____ to _____ INCLUSIVE WERE CAREFULLY EXAMINED.

DATED THIS _____ DAY OF _____, 2019.

PROPONENT'S COMPANY NAME: _____

ADDRESS: _____

_____

CITY/ PROVINCE: _____ POSTAL CODE: _____

PHONE NO.: _____ FAX NO.: _____

EMAIL ADDRESS: _____

WEBSITE: _____

CONTACT NAME (please print): _____

TITLE (please print): _____ PHONE NO.: _____

AUTHORIZED SIGNATURE: _____

HST REGISTRATION NO: _____

*** The proponent shall list and initial all addenda received during the period and shall take them into consideration when preparing their bid submission. A signed copy of each Addendum must be included with the bid submission. Failure to comply may be cause for rejection of bid submission.**

ACWWA RESERVES THE RIGHT TO REJECT ANY OR ALL SUBMISSIONS. THE LOWEST OR ANY SUBMISSION WILL NOT NECESSARLIY BE ACCEPTED.

Contents

1 INTRODUCTION

The Atlantic Canada Water & Wastewater Association is soliciting proposals for engineering services to provide for the inclusion of Climate Resiliency in Municipal Infrastructure into and with the updating of the following guideline documents:

- Atlantic Canada Guidelines for the Supply, Treatment, Storage, Distribution, and Operation of Drinking Water Supply Systems (2004) (Water Guidelines)
- Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment, and Disposal (2006) (Wastewater Guidelines)

The bidding proponent must have experience and qualifications in the following areas of expertise:

- Investigation and design of municipal water and wastewater infrastructure in Atlantic Canada;
- Climate resilience for municipal infrastructure;
- Project management and stakeholder engagement;
- Preparation of guidelines;
- Preparation and presentation of educational courses;
- Facilitation of small and large meetings and workshops consisting of multi-disciplinary teams and interest groups, and
- Preparation and presentation of technical papers at conferences.

2 BACKGROUND

The Atlantic Canada Water & Wastewater Association (ACWWA) is a Section of the American Water Works Association (AWWA) and a Member Association of the Water Environment Federation (WEF). As the local water and wastewater industry association, the ACWWA's vision is to be recognized as the leading resource on water and wastewater in Atlantic Canada. Therefore, it is incumbent upon us that we direct change and provide our members with current and relevant information now and into the future.

In order to achieve this vision, our goals are to provide relevant resources that are widely valued by the water and wastewater industry and to promote the development and implementation of innovative technologies and approaches in the water and wastewater industry. This requires our commitment to the continual renewal of policies and guidelines to ensure our members and other water and wastewater stakeholders are provided with relevant and updated information as it pertains to delivering and maintaining a high level of confidence in the integrity of public infrastructure.

The Water Guidelines were created by the ACWWA in 2004 and the Wastewater Guidelines were created by Environment Canada in 2006. In addition to being dated, the ACWWA has identified the impact of climate change/effects on existing and proposed water infrastructure as a key issue, and therefore the inclusion of a chapter on climate resilience and the provision of capacity building are key components of the project and will provide value to our members. All four Atlantic Provinces are in support of this project and have committed cash and/or in-kind funds. Representatives from each of the four provinces will be involved as committee members throughout the project.

In order to undertake these needed updates and inclusion of climate resiliency, the ACWWA applied for and received capital funding (~50%) for the project under Natural Resources Canada's (NRCan) Building

Regional Adaptation Capacity and Expertise (BRACE) program. Capital funding has also been approved by New Brunswick, Nova Scotia, and Prince Edward Island, and those three provinces, plus Newfoundland and Labrador, Halifax Water, City of Charlottetown, and ACWWA have approved in-kind contributions that are matched by the NRCan capital funds.

3 PROJECT DESCRIPTION

3.1 Project Information

Project Title: Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines
Project Location: Atlantic Canada
Client: ACWWA

Team Leads and Committee Chairs:

- Drinking Water: Wendy Krkosek, Ph.D., P.Eng., Water Quality Manager, Halifax Water
- Wastewater: Richard MacEwen, FEC, P.Eng., Manager, Water and Sewer Utility, City of Charlottetown

Project Committees for both drinking water and wastewater:

- John Lam, Nova Scotia Environment Representative
- Sylvie Morton, P.Eng., New Brunswick Department of Environment and Local Government Representative
- Morley Foy, P. Eng., Prince Edward Island Communities, Land and Environment Representative
- Deneen Spracklin, P.Eng., Newfoundland and Labrador Department of Municipal Affairs and Environment Representative

The ACWWA will provide the original guidelines in PDF format to the successful consultant. Permission has been given by Environment Canada to update the Wastewater Guidelines.

3.2 Project Objectives

The objectives of the project are to incorporate climate resilience when investigating, designing, approving, constructing, and operating municipal water and wastewater infrastructure in Atlantic Canada, and to build climate adaptation capacity through training workshops, webinars and dissemination of information.

A new chapter on Climate Resilience is to be produced for inclusion into each of the Guidelines, and existing sections are to be updated to include climate resilience requirements. The update is to include a jurisdictional review for relevant materials, and/or reference up-to-date provincial regulatory requirements, and reflect advancements in water and wastewater treatment processes and technology. Stakeholder input throughout the project will be considered by the proponent for inclusion into the updated guidelines.

The target audience for the completed guidelines includes municipalities (utilities and/or public works), consulting engineers, private developers and provincial regulators, all of which utilize the Water and Wastewater Guidelines for infrastructure projects. Adaptation action will result from the identification of climate resilience requirements by the engineers (consulting or in-house) through use of the

Guidelines, approval to proceed by the owner, design of the infrastructure by the engineer, and review/approval of the design submission by provincial regulators.

Workshops, webinars and conference presentations are part of and to be held during the project to obtain input from stakeholders (i.e. consultants, equipment suppliers, managers of utilities and regulators), and to provide capacity building to the practitioners around climate resilience awareness for water/wastewater infrastructure design. Application of the updated guidelines, workshops, webinars and conference presentations will increase adaptation action and provide guidance for inclusion of climate resilience when projects are undertaken.

3.3 Proponents Team

This Request for Proposals is for a qualified engineering consulting company with experience in the investigation and design of water and wastewater systems in Atlantic Canada. Experience should include, but not be limited to, the following:

- Knowledge of climate resilience requirements in the investigation, design, and operation of municipal water infrastructure;
- Familiarity with the existing Water and Wastewater Guidelines as well as design guidelines and standards, and/or reference documents in other jurisdictions;
- Knowledge of the regulatory requirements in all four Atlantic Canada provinces;
- Evaluation, development, and design of all aspects of water and wastewater infrastructure included in both the Water and Wastewater Guidelines;
- Preparation and delivery of a Capacity Building Program; and
- Experience facilitating meetings and workshops of multi-disciplinary teams and stakeholders in small and large groups.

4 PROPONENT ACTIVITIES AND DELIVERABLES

4.1 General Requirements

- The consulting company shall be licensed to practice in all four Atlantic Canada provinces.
- Project meetings will be held in Halifax, Nova Scotia; Charlottetown, Prince Edward Island; St. John's, Newfoundland & Labrador; and Fredericton, New Brunswick.
- The Guidelines will be updated in Microsoft Word format with a final version prepared as a searchable and indexed Adobe PDF.
- The Capacity Building Education Program will be prepared in Microsoft PowerPoint.
- The successful Proponent shall execute the scope of work and proposed project schedule, as provided in the funding application to BRACE, attached as Appendix A.
- The Successful Proponent shall be responsible for required NRCan reporting throughout the project term on a quarterly basis or as required by NRCan. This includes both progress reporting and quarterly accounting and advance funding projections. A quarterly financial reporting template is provided in Appendix B.
- The capital funding received for the Project from NRCan must be matched by in-kind and other cash contributions as outlined in the project budget in Appendix A. The successful Proponent will be required to track these contributions for all project partners and ensure adequate engagement and in-kind activity occurs to support the level of requested funds from NRCan. The Proponent will

establish a method of monitoring the level of in-kind contributions, and will report the findings to the Project Committee Chairs at least quarterly or as required by NRCan.

4.2 Project Administration / Management

- The successful Proponent shall be responsible for all aspects of coordination and project management and shall designate, in writing, a project manager. All coordination of services between the Team Leads/ACWWA and the successful Proponent shall be the responsibility of the respective project managers;
- The ACWWA expects the Proponent to keep the project within scope, budget, and on schedule and to ensure that appropriate quality control / quality assurance practices are used to provide the best product possible to the ACWWA, its members and the water and wastewater industry as a whole;
- The successful proponent shall develop a template and monitor and track in-kind and cash contributions of time, travel and expenses from individuals or groups associated with the project, treating in-kind contributions the same as chargeable time and expenses in terms of tracking. Expenses will be incorporated into NRCan quarterly reporting templates for submission (Provided as Appendix B), and
- The proponent shall identify and manage risks associated with the project scope, cost, quality and schedule.

4.3 Activities Associated with the Project

- Confirm client requirements and objectives at project outset;
- Initiate meetings, workshops, webinars and conference presentations;
- Maintain all project documentation and track deletions, additions and edits to the existing Guidelines;
- Engage in proactive and thorough communication with the Team Leads throughout the duration of the project;
- Provide written project updates to the Team Leads and the ACWWA at least quarterly or as required by NRCan requirements. The updates are to include specific status updates on schedule and budget. In Gantt chart format the project progress is to be tracked against the original schedule utilizing Microsoft Project;
- Schedule, facilitate and record the meetings, workshops, webinars and conference calls with the Team Leads, committees and the relevant stakeholders throughout the updating process; and
- Ensure all project changes are discussed and approved by the Team Leads in advance of proceeding with the work.

4.4 Key Deliverables

- Updated Water and Wastewater Guidelines that incorporate advances in water and wastewater treatment processes and technologies, up-to-date regulatory requirements, and address and incorporate climate resiliency in a Microsoft Word document and a searchable and indexed Adobe PDF document. Methodology, work plan and schedule are provided in Appendix A;
- Develop a Capacity Building Program to ensure that all water and wastewater practitioners are aware of and have the opportunity to provide input on the specific updates that relate to consideration of climate resilience;
- Coordinate, attend and record a minimum of four meetings with the Project Committee, with one in each of the four Atlantic Provinces:
    - A kick-off meeting with the Project Committee;

    - Two meetings to present and discuss Guideline Drafts;
    - One meeting to present the Final Guidelines;
- Deliver a minimum of four (4) workshops with a target of 50 participants each, one in each of the four provinces;
- Deliver a minimum of four (4) webinars (two for each Guideline) with a target of 75 participants each.
    - Webinars must be provided through a common medium such that there can be audience participation and questions. Webinars must be recorded for availability on the ACWWA website for future access.
- Disseminate the completed Guidelines through:
    - Respective provincial consulting engineer organizations
    - Respective public works/municipal engineer organizations
    - Respective provincial regulators through the review and approval of projects
    - Presentation at a special session at the annual ACWWA and Maritime Provinces Water and Wastewater Association (MPWWA) conferences:
        - Anticipating Spring 2021: MPWWA Charlottetown, PEI
        - Anticipating Fall 2021: ACWWA St. Johns, NL
    - Presentation at national knowledge-sharing events in 2020: Adaptation Canada Conference and Canadian Water and Wastewater Association Annual Conference
- Attend and present at two national knowledge-sharing events:
    - Anticipating 2020 Adaptation Canada Conference
    - Anticipating 2020 CWWA Annual Conference
- Provide recorded information including reports, surveys, plans, meeting minutes and correspondence;
- Provide regular written project updates outlining progress for the project including a highlight of required action and decision items for the Project Committee and any anticipated causes for delays in progress;
- Provide a tracking log of all changes and additions to both Guidelines that are made throughout the project. The log will need to be a part of the updated guidelines; and
- Document any project changes (scope, schedule, budget and quality impacts) including correspondence reflecting the ACWWA's approval prior to proceeding with the proposed changes.

4.5 Work Plan

The successful proponent shall execute all aspects of the project, including work plan and schedule as provided in the proposal submitted to NRCan and attached as Appendix A.

5 INFORMATION FOR PROPONENTS

5.1 Ownership of Atlantic Canada Water Supply Guidelines

The ownership of the Atlantic Canada Water Supply Guidelines will rest entirely with ACWWA. The successful proponent is prohibited from reproducing or using any portion of the prepared and delivered material as their own without the ACWWA's written approval.

5.2 Project Budget

The funded project maximum budget is **$325,000 including tax** with $318,116 from NRCan and $36,000 in provincial cash contributions minus travel costs for project leads at $28,491 . The total project costs must be matched by in-kind contributions as outlined in Appendix A. Total project chargeable time and expenses must not exceed tracking of in-kind and other cash contributions. Any overages associated

with chargeable time and expenses will not be covered by the ACWWA and will need to be considered in-kind contributions by the successful Proponent.

The ACWWA accepts no liability for any costs or expenses incurred by the Proponent in responding to this RFP, responses to clarification requests and re-submittals, potential meetings, interviews, subsequent negotiations, or any other cost incurred prior to the execution of an Agreement by the ACWWA and the Proponent. By submitting a Proposal, the Proponent agrees that it shall prepare the required materials and undertake the required investigations at its own expense and with the express understanding that it cannot make any claims whatsoever for reimbursement from the ACWWA for any costs and expenses associated with the RFP process in any manner whatsoever or under any circumstances including, without limitation, the rejection of all or any of the Proposals or cancellation of the RFP or the contract.

5.3 Proposal Submission

The Proposal shall include, but not be limited to, the following:

1. **Proposed Project Understanding and Implementation Plan**
    - Demonstrate understanding of assignment and deliverables and the nature of the work required to meet project objectives, including:
        - Incorporation of climate resilience for municipal infrastructure into the updates of existing Atlantic Canada Water and Wastewater Guidelines;
        - Preparing and attending Project Meetings and associated workshops;
        - Preparing and presenting webinars;
        - Preparing and presenting at national knowledge-sharing workshops;
    - Provide a schedule in Gantt chart format for major tasks and deliverables based on the proposed schedule in Appendix A.
2. **Company Experience and Project Team Qualifications**
    - Background, experience, and qualifications of the Company (or Companies) submitting the Proposal;
    - Background, experience, and qualifications of the Project Team in relation to specific topics in the project and identification of a Project Manager
    - Names of any subconsultant firms to be retained to complete assignments and descriptions of merits of their participation and description of their qualifications;
    - Experience Examples:
        - Experience #1 - Facilitation of workshops with 50 or greater people from Multi-disciplinary backgrounds and interest groups
        - Experience #2 – Design of Supply, Treatment, Storage, Distribution, and Operation of Drinking Water Supply Systems in Atlantic Canada
        - Experience #3 – Design of Collection, Treatment and Disposal of Wastewater Systems in Atlantic Canada
        - Experience #4 – Demonstrated incorporation of climate resilience requirements in the investigation, design, and operation of municipal water/wastewater infrastructure
    - Time-Task Matrix indicating the Proponent's Team Members, their roles, responsibilities and planned hours and hourly wage.
3. **Valued-added components or features to the project scope that the Proponent may be able to include**
4. **Project Management Approach to Scope, Schedule, Budget and Quality of Deliverables**

5. **Financial proposal for execution of the project, including the approach for monitoring and reporting of chargeable time, in-kind and cash contributions to the project**

5.4 RFP Contacts

Questions about this RFP should be directed to the individuals listed below **in writing only**. Information that is obtained from any other source is not official and may be inaccurate.

- Wendy Krkosek, Water Quality Manager, Halifax Water, wendyk@halifaxwater.ca
- Richard MacEwen, Manager, Water & Sewer Utility, City of Charlottetown, rmacewen@charlottetown.ca

5.5 Confidentiality

- All information, whether transmitted orally, electronically or in written form which the Proponent or the Proponent's representatives have received and may receive from ACWWA for the purpose of the proposal and/or in the process of performing the terms of a contract resulting from a proposal submission and which may include, but is not limited to, all data, reports, interpretations, statements (financial or otherwise), specifications, performance and/or technical information is confidential. The selected proposer agrees not to release or in any way cause to release any confidential information of the ACWWA unless they have been specifically approved to do so in writing.

- The ACWWA may, at its sole discretion, disclose Confidential Information to the Proponent or the Proponent's representatives for the purposes of the RFP process. Notwithstanding any such disclosure, the Confidential Information shall remain the sole and exclusive property of the ACWWA and the ACWWA shall retain all right, title and interest in and to the Confidential Information. The Proponent and the Proponent's representatives shall use the Confidential Information solely and exclusively for purposes of the RFP process.

- Without limiting the generality of the permitted use of the Confidential Information, neither the Proponent nor the Proponent's representatives shall use the Confidential Information for the purpose of achieving any commercial or financial benefit. In addition, neither the Proponent nor the Proponent's representatives shall publish, reproduce, copy, disseminate or disclose the Confidential Information to others without the ACWWA's prior written consent, which may be withheld for any reason.

- The Proponent shall keep a record of all Confidential Information furnished to it and to its representatives and of the location of such Confidential Information. The Proponent shall make every reasonable effort to secure the Confidential Information and the Proponent shall return all Confidential Information provided to the Proponent and its representatives immediately to the ACWWA upon request and in any event immediately upon completion or cessation of the RFP process. **The Proponent shall submit a statement in this RFP explicitly detailing the measures proposed to achieve this confidentiality and confirming a commitment to the ACWWA's information security. The Proponent's statement shall include a commitment to ensuring that all its representatives will comply with and are bound by the terms and conditions of this confidentiality commitment.**

5.6 Address for Submission

The proposals shall be delivered in a sealed envelope marked:

"Request for Proposals Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines"

no later than 4:30 pm February 26 to:

Clara Shea
Atlantic Canada Water and Wastewater Association
Box 28141
131 Shrewsbury Road
Dartmouth, NS
B2W 6E2
Phone: (902) 434-6002
Fax: (902) 435-7796
E-Mail: contact@acwwa.ca

Under no circumstance will proposals received after the Submission Closing Date and Time be accepted.

5.7 Hard Copies

All proposals must be received electronically before the submission deadline, with one hard copy to follow by courier. No facsimile transmissions will be accepted. Amendments to the original document will be accepted by email, if received before the Submission Closing Date and Time. Originals must be couriered to ACWWA so that they may be attached to the original hard copy for validity.

5.8 Proposal Evaluation

- Proposals will be evaluated on the basis of all information provided by the Proponent. Each proposal will be reviewed to determine if the proposal is responsive to the submission requirements outlined in the RFP. Failure to comply with these requirements may deem the proposal non-responsive.
- In recognition of the importance of the procedure by which a Proponent may be selected, the following criteria outline the primary considerations to be used in the evaluation and consequent awarding of this project (not in any order).
- These criteria are intended to provide guidance to the ACWWA in determining best value. The ACWWA reserves the right to award the contract to the qualified firm with the highest assessed or best-value proposal.
- Selection of a proposal will be based on the following criteria and any other relevant information provided by the Proponent in the submission. ACWWA reserves the right to prioritize and weigh the importance of each *sub-criterion* within the identified Technical criteria confidentially.

Criteria	**Weight**	**Score**

Technical		
Project Understanding and Implementation Plan	15%	
Company Experience and Project Team Qualifications	50%	
Value-added Components	10%	
Project Management	15%	
Financial	10%	
Total	**100%**	

- The evaluation process will be carried out by an evaluating committee who will establish the ranking of all proposals received. Proponents may be invited to make a presentation to the evaluating committee. Proponents must be prepared to make a presentation and must have members of the proposed project team participate in the presentation. The evaluation committee may use this opportunity to discuss the submitted proposal and request clarification of information provided in the proposal submission. Proponents are encouraged to provide and additional information that may be relevant in the evaluation of their proposal.
- Following review of all proposals and presentations or questions during the review, the evaluating committee will produce a recommendation to the ACWWA Board of Directors.
- The Financial component shall exclude HST. Do not include any Provincial or Federal sales tax. All prices to be quoted in Canadian dollars.

5.9 Award of Proposals

- The ACWWA reserves the right to modify the terms of the Request for Proposal at any time at its sole discretion.
- This Request for Proposal should not be construed as a contract to purchase goods or services.
- The ACWWA is not bound to accept the lowest priced or any proposal of those submitted. Proposals will be assessed considering the evaluation criteria.
- Subsequent to the submission of proposals, interviews may be conducted with some of the

proponents, but there will be no obligation to receive further information, whether written or oral from any proponent.

- The ACWWA will not be obligated in any manner to any proponent whatsoever until a written contract has been duly executed relating to an approved proposal.
- Neither acceptance of a proposal nor execution of a contract will constitute approval of any activity or development contemplated in any proposal that requires any approval, permit or license pursuant to any federal, provincial, regional district or municipal statute, regulation or by-law.
- Provided that at least one of the received proposals meets the approval of the Evaluation Team, a recommendation on Contract award will be made on the basis of the evaluation and overall

best value to the ACWWA and its members. All awards are subject to the approval of the ACWWA Board of Directors and the availability of funds.

- Written communication to the Successful Proponent of notification of award shall result in a binding Contract without further action by either party. The ACWWA may accept an offer whether or not there are negotiations after its receipt. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the ACWWA.

6 GENERAL INFORMATION

6.1 Billing and Payment Terms

Payment shall be based on Net 30 Days from date of invoice or receipt of goods/services, whichever is later. Invoices are to be accompanied with the progress reports and sent to:

ACWWA
Box 28141
Dartmouth, NS
B2W 6E2
Attn: Clara Shea
contact@acwwa.ca

6.2 Termination

Termination for Convenience: The ACWWA may terminate a contract, in whole or in part, whenever the ACWWA determines that such a termination is in the best interest of the ACWWA, without showing cause, upon giving written notice to the proponent. The ACWWA shall pay all reasonable costs incurred by the proponent up to the date of termination; however, in no event shall the proponent be paid an amount which exceeds the proposed price for the work performed. The proponent shall not be reimbursed for any profits which may have been anticipated but which have not been earned up to the date of termination.

Termination for Default: When the proponent has not performed, or has unsatisfactorily performed, the contract, the ACWWA may terminate the contract for default. Upon termination for default, payment will be withheld at the discretion of the ACWWA. Failure on the part of the proponent to fulfill the contractual obligations shall be considered just cause for termination of the contract. The proponent will be paid for work satisfactorily performed prior to termination, less any excess costs incurred by the ACWWA in re-procuring and completing the work.

6.3 Non-assignment of Contract

The successful proponent shall not assign the contract, or any portion thereof, except upon the written approval of the ACWWA.

6.4 Contract Agreement

The successful proponent will be required to enter into a contract agreement with the ACWWA. The contract will be based on the ACEC 36 contract template.

6.5 Governing Law

This RFP and all activities connected therewith shall be governed in all respects by the laws of the Province of Nova Scotia and the laws of Canada applicable therein.

6.6 False or Misleading Information

If there is any evidence of misleading or false information in any Proposal, the ACWWA may reject that Proposal.

6.7 Conflict of Interest

The Proponent and members of the Proponent are requested to disclose any conflict of interest, real or perceived, which exists now or which may in the opinion of the Proponent exist in the future. If the ACWWA believes the conflict of interest will affect the project outcome, the ACWWA reserves the right to disqualify the Proponent.

Appendix A – Proposal submission to NRCAN

Appendix B – Quarterly Financial Reporting Template from NRCAN

ATLANTIC CANADA
WATER & WASTEWATER ASSOCIATION
American Water Works Association Atlantic Canada Section
Water Environment Federation

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

Application to BRACE

1. Project Title

Incorporating climate resilience for municipal infrastructure into the updates of existing Atlantic Canada Water and Wastewater Design Guidelines.

2. Project Lead

Two Guidelines will be updated in this project:

- The *"Atlantic Canada Guidelines for the Supply, Treatment, Storage, Distribution, and Operation of Drinking Water Supply Systems (2004)"*.
- The *"Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment, and Disposal (2006)"*.

The project lead is the Atlantic Canada Water and Wastewater Association (ACWWA). The team leads are members of and represent the Atlantic Canada Water and Wastewater Association (ACWWA). The team leads are as follows:

Atlantic Canada Water Supply Guidelines	Atlantic Canada Wastewater Guidelines
Wendy Krkosek, Ph.D., P.Eng. Water Quality Manager Halifax Water 455 Cowie Hill Road PO Box 8388 RPO CSC Halifax NS B3K 5M1 902-483-4432 wendyk@halifaxwater.ca	Richard MacEwen, FEC, P. Eng. Manager, Water and Sewer Utility City of Charlottetown PO Box 98, 199 Queen Street Charlottetown, PEI C1A 7K2 902-629-4014 rmacewen@charlottetown.ca

3. Names, Affiliations and Roles of other key people working on the project

The updates to the Guidelines will be conducted by Guideline Consultants to be selected through a competitive Request for Proposals for each of the water and wastewater guidelines. Both projects will be managed by a Project Committee, with a Chair representing a Utility and ACWWA, and members representing Regulators. Proposed Project Committee members are as follows:

- Atlantic Canada Water Supply Guidelines
  - Chair- Wendy Krkosek, Ph.D., P.Eng., Halifax Water
  - Nova Scotia Environment Representative: Angelina Polegato
  - New Brunswick Department of Environment and Local Government Representative: Sylvie Morton, P.Eng.
  - Prince Edward Island Communities, Land and Environment Representative: Morley Foy, P.Eng.

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  - Newfoundland and Labrador Department of Municipal Affairs and Environment Representative: Deneen Spracklin, P.Eng.

- Atlantic Canada Wastewater Guidelines
  - Chair- Richard MacEwen, FEC, P.Eng., City of Charlottetown
  - Nova Scotia Environment Representative: Stefan Fury, P.Eng.
  - New Brunswick Department of Environment and Local Government Representative: Sylvie Morton, P.Eng.
  - Prince Edward Island Communities, Land and Environment Representative: Morley Foy, P.Eng.
  - Newfoundland and Labrador Department of Municipal Affairs and Environment Representative: Deneen Spracklin, P.Eng.

4. Objective of the Project

The objectives of the project are to incorporate climate resilience when investigating, designing, approving, constructing, and operating municipal water and wastewater infrastructure in Atlantic Canada and to build adaptation capacity through training workshops, webinars and dissemination of information.

The target audience includes municipalities (utilities and/or public works), consulting engineers, private developers and provincial regulators, all of which utilize the Atlantic Canada Water and Wastewater Guidelines for water and wastewater infrastructure projects. Adaptation action will result from the identification of climate resilience requirements by the engineers (consulting or in-house) through use of the guidelines, approval to proceed by the municipality or utility, design of the infrastructure by the engineer, and review/approval of the design by provincial regulators.

Workshops and conference presentation will be held during the project to obtain input from stakeholders (i.e. consultants, equipment suppliers, managers of utilities and regulators), and to provide capacity building to the practitioners around climate resilience awareness for water and wastewater infrastructure design. Application of the updated guidelines, workshops, and conference presentations will increase adaptation action and provide guidance for inclusion of climate resilience when projects are undertaken.

5. Outputs and Outcomes

Expected outputs include the following:

- Updated water and wastewater Guidelines that incorporate climate resiliency.
- Development of a Capacity Building Program to ensure that all water and wastewater practitioners are aware of and have the opportunity to provide input on the specific updates that relate to consideration of climate resilience.
  - Delivery of four workshops with a target of 50 participants each in each of the four provinces as described in the workplan.
  - Delivery of 4 webinars (two for each guideline) with a target of 75 participants each.
    - Webinars will be provided through a medium such as Go-To Meetings so that there can be audience participation and questions. Webinars will be recorded and archived on the ACWWA website for future access. One webinar for each of the guidelines will be scheduled between the 2nd and 3rd meetings and a second for each guideline between the 3rd and 4th meetings.

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Box 28141 Dartmouth, NS

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- Dissemination of the completed Guidelines through:
  - Respective provincial consulting engineer organizations
  - Respective public works/municipal engineer organizations
  - Respective provincial regulators through the review and approval of projects
  - Presentation at a special session at the annual ACWWA and Maritime Provinces Water and Wastewater Association (MPWWA) conferences:
    - Spring 2021: MPWWA Charlottetown, PEI
    - Fall 2021: ACWWA St. Johns, NL
  - Presentation at national knowledge-sharing events in 2020: Adaptation Canada Conference and Canadian Water and Wastewater Association Annual Conference.

An outcome of the project will include the sharing of the completed Guidelines with Federal, Provincial, and Municipal governments, consultants, private developers, practitioners in the water/wastewater industry, and equipment vendors who supply, install and/or operate water and wastewater infrastructure. The key outcome, however, will be the knowledge gained by the users, through workshops, webinars, and conferences, that will ensure that new water and wastewater infrastructure decisions incorporate climate adaptation considerations at the investigation, design, and operations phases of the project.

6. Methodology

The updates to the Guidelines will be conducted by Guideline Consultants to be selected through a competitive Request for Proposals process for each of the water and wastewater guidelines. Each of the Guideline updates will be managed by a separate Project Committee consisting of regulatory and/or municipal utility personnel, as discussed in section 3.

Committee meetings will be held in each of the four provinces throughout the course of the project for the Guideline Consultants to present the progress and solicit input from Committee members.

Committee meetings will incorporate town hall type of workshops with stakeholders to present the project and to solicit input and feedback on the existing and proposed technical requirements, allowing an opportunity for stakeholders to discuss issues related to climate resilience.

The current guidelines do not include issues around climate resilience, and so it is up to individual projects to determine how to incorporate climate resilience, if at all. This approach is akin to constantly reinventing the wheel. The use of the updated Guidelines will ensure that due consideration for overall design requirements, and specific climate resilience are considered from the beginning of the process and through a consistent process. The Guidelines will provide a framework for designers to develop technically sound designs to incorporate climate resilience and to provide technical justification which would support decisions by regulators in the approval process.

NRCan will be invited to attend key meetings and events to create opportunities for the regional participants to gain from the national perspective, and for NRCan to observe the interactions at the regional level.

Progress and impact during the project will be measured by feedback received at workshops, webinars, and conferences. An exit questionnaire will be provided at the completion of webinars, workshops, and conferences in an effort to quantify knowledge and interest, the level of understanding of climate resilience prior to the event, and the level of understanding of the need to include climate resilience, after the event. When available, output and outcome indicators to be prepared by BRACE will be incorporated into the quantification process.

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

Progress and impact at the end of the project will be measured by the regulatory process that requires water and wastewater infrastructure designs to be reviewed and approved by provincial regulators. Proponents of submissions deemed to be in non-compliance with the requirements of the guidelines will be advised of such by the regulators.

Success will be evaluated by participation of stakeholders throughout the process, monitoring the level of feedback from practitioners in the industry during the Capacity Building Program and responses to questionnaires distributed through water and wastewater associations in the region.

7. Work Plan

a. Tasks

The following work plan will be followed after ACWWA has awarded the contracts to the selected Guideline Consultants. It is expected that the work plan will be similar for both the Water Supply Guidelines and the Wastewater Guidelines.

Task 001 Startup Meeting (1)

A Startup Meeting will be held at the commencement of each of the two projects. The location for the Startup Meeting will be as determined by the Committees. For the purpose of this proposal, we have assumed the meeting location for the Startup Meeting will be in Halifax, NS. The intent is to rotate the locations of each of the four planned meetings during the course of the work to allow equal access by stakeholders in each province. Additionally, the committee meetings for the two guidelines will be held on consecutive days, to economize on travel time and expenses.

The purpose of the Startup Meetings will be to introduce the Guideline Consultants to the Project Committee members, to review the proposals, and to identify and discuss sections of the Guidelines that require updating. This meeting will also allow for the discussion of requirements that are not uniform in all four provinces.

A comprehensive discussion will be required on climate resilience to ensure that the requirements are properly addressed.

The format and the font of the Guidelines will be agreed upon.

The meeting should conclude with the Guideline Consultants having clear direction on how to proceed with the required updates.

A town hall type of workshop will be held to coincide with the Committee Meeting. The workshop will cover both Guidelines. Stakeholders will be notified and encouraged to attend through local water and wastewater associations and other organizations. A priority will be to introduce and discuss climate resilience, and to gauge the level of experience by the attendees.

Task 002 Guidelines Updates, Draft #1

The Guideline Consultants will conduct a jurisdictional review to determine whether climate resilience has been incorporated into design guidelines elsewhere, as well as other relevant documents such as the Engineers Canada publication “National Guideline: Principles of Climate Adaptation and Mitigation for Engineers” and the guidelines currently under development by National Research Council to improve the resilience of infrastructure to flooding. This review will be used to guide the process for updating the guidelines to take advantage of existing information and successful approaches. Through a series of phone calls, interviews and surveys, the Guideline Consultants will collect information from other jurisdictions, compile a summary of errors/omissions and comments on the current Guidelines from stakeholders, identify missing sections, and complete a first draft of

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

the updates. The draft will include a new chapter on climate resilience, and references to climate resilience where applicable throughout the guidelines.

The work will include development of a knowledge mobilization plan to guide efforts in soliciting input from end-users, the consultation process during development of the guidelines and dissemination of information following completion of the guidelines.

A digital copy of the draft will be forwarded to the Project Committee members for review and comments.

Task 003 Draft #1 Review Meeting (2)

Following review of the Guideline Updates Draft #1, the Project Committees and the Guideline Consultants will meet to discuss the document and proposed changes chapter by chapter. We have assumed that this meeting will be in Charlottetown, PE. This is considered as a critical meeting to ensure that the updates are in accordance with the respective provincial and utility requirements.

In addition, this will be the first opportunity for the Project Committees to review and discuss the new chapter on Climate Resilience. It is expected that this chapter will result in substantial discussions. It is expected that requirements from the four provinces will differ and the goal will be to have direction on path forward resolved during the meeting.

A workshop will be scheduled to coincide with the Committee Meetings. As per the Startup Meeting in Halifax, stakeholders will be notified and encouraged to attend through local water and wastewater associations and other organizations. A priority will be to introduce and discuss climate resilience, and to gauge the level of experience by the attendees.

Task 004 Guidelines Updates, Draft #2

The Guideline Consultants will address comments received during Meeting/Workshop 2 and produce Draft 2 of the Guidelines. A digital copy of the draft will be forwarded to the Project Committee members for review and comments.

Task 005 Draft #2 Review Meeting (3)

The Project Committee and the Guideline Consultants will meet to review Draft #2 in St. John's, NL. At this point it is assumed that there will be general agreement with the contents and direction of the Guidelines.

A workshop will be scheduled to coincide with the Committee Meetings. As per the previous meetings/workshops in Halifax and Charlottetown, stakeholders will be notified and encouraged to attend through local water and wastewater associations and other organizations. A priority will be to introduce and discuss climate resilience, and to gauge the level of experience by the attendees.

Task 006 Final Guidelines

The Guideline Consultants will address comments received during Meeting/Workshop 3 and produce the Final Guidelines. A digital copy of the Final Guidelines will be forwarded to the Project Committee members for review and comments.

Task 007 Final Guidelines Review Meeting (4)

At 90% completion, the Project Committee and the Guideline Consultants will meet in Fredericton, NB, to review the document.

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
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A workshop will be scheduled to coincide with the Committee Meetings. As per previous meetings, stakeholders will be notified and encouraged to attend through local water and wastewater associations and other organizations. A priority will be to introduce and discuss climate resilience, and to gauge the level of experience by the attendees.

Comments from the Meeting/Workshop 4 will be incorporated into the final documents.

The Final Guidelines will be provided in digital format, for dissemination to the industry by ACWWA, provincial agencies, and other water and wastewater associations.

Task 008 Capacity Building Program

A Capacity Building Program will be integrated into the development of the Guidelines, in consultation with the Project Committee. This will include raising awareness of climate resilience, the distribution of the updated guidelines, identification of required changes to regulatory requirements including time lines for compliance with new requirements, and as appropriate, discussions with stakeholders with projects currently "in the queue" for design or regulatory approvals.

This program will include stakeholder engagement in workshops held during the development of the updates for the Guidelines, solicitation of feedback and input from stakeholders, dissemination of the finished updated Guidelines by ACWWA and other local water and wastewater associations.

Webinars and course offerings will be planned and coordinated by ACWWA as part of their ongoing continuing education courses, led by the selected Guideline Consultants. Current continuation education courses include one to two day small systems seminars and four day education courses, both targeting certified operators. The target audience for the webinars will be Public Works/Utility engineers, and consulting engineers. The webinar notifications will be included in the education packages mailed out by ACWWA twice per year. In addition, ACWWA will advise the membership of the proposed webinars after the award of the contract to the Project Consultants, and will advise that the Project Consultant will be soliciting comments and/or feedback on experiences with both the Guidelines and current status of including climate resiliency in the investigation and design of water and wastewater infrastructure. The scope of the workshops will be flexible, but the focus will be to solicit feedback on the use of the Guidelines, to discuss how climate change has impacted existing infrastructure, and to discuss how climate resiliency is to be incorporated into the investigation, design, and operation, of water and wastewater infrastructure.

The goal of the workshops will be to ensure that Public Works/Utility engineers, and consulting engineers, are fully aware of the need to include climate resiliency into the investigation and design of water and wastewater infrastructure and are able to provide feedback based on experience with climate change resiliency as it relates to water/wastewater infrastructure design.

Task 009 Participation in National Knowledge-sharing Events

Two national knowledge-sharing events will be attended. It is proposed that attendees include the Team Leads and the Guideline Consultants, with invitation to committee members. The Conferences will provide opportunities to observe progress on climate resilience requirements at the national level, and to share progress experienced in Atlantic Canada. It is assumed that the Guideline Consultants will present the status of the Atlantic Canada project at the Conferences.

The Team Leads and Guideline Consultants will be able to network with peers on a national level, and share the knowledge at the municipal/provincial level.

Section Office: Clara Shea
Box 28141 Dartmouth, NS

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Potential knowledge-sharing events include the Adaptation Canada Conference (February 2020) and the Canadian Water and Wastewater Association Annual Conference (2020).

b. Schedule

The project will start once funding is in place. The timeline of the project will also depend on securing in-kind and cash contributions, which may need to be adjusted, depending on the contribution received from NRCan. The project is estimated to have an approximate 23-month duration, spanning three fiscal years. Milestone dates are provided below for reference only and schedule is provided in Appendix B.

Target Milestone Dates

Year 1 Quarter 3 (October – December 2018)	
NRCan funding finalized	December 2018
Year 1 Quarter 4 (January – March 2019)	
Provincial and municipal funding finalized	January 2019
Terms of Reference issued for updating Guidelines	January 2019
Guideline Consultants selected and notified	February 2019
Mobilization by Guideline Consultants	March 2019
Year 2 Quarter 1 (April – June 2019)	
Startup Meeting 1	April 2019
Capacity Building Program	May 2019 – May 2021
Webinars, outreach, dissemination of presentation materials	May 2019 – July 2021
Year 2 Quarter 2 (July – September 2019)	
Meeting 2	September 2019
Year 2 Quarter 3 (October – December 2019)	
Capacity Building Program	May 2019 – May 2021
Webinars, outreach, dissemination of presentation materials	May 2019 – July 2021
Year 2 Quarter 4 (January – March 2020)	
Meeting 3	February 2020
Guideline development continuation	January to March 2020
Year 3 Quarters 1 – 3 (April - December 2020)	
Meeting 4	August 2020
National Adaptation Conferences (2 in Canada)	To be determined

Section Office: Clara Shea
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P (902) 434-6002, F (902)

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www.acwwa.ca

8. Capacity of the Team to deliver the Project

CVs of the Team Leads for the Water and Wastewater Guidelines are attached in Appendix A.

9. Capacity of Organization to deliver the Project

The project proponent is the Atlantic Canada Water and Wastewater Association (ACWWA).

The ACWWA is a section of the American Water Works Association (AWWA) and a Member Association of Water Environment Federation (WEF). With more than 600 water professionals from Atlantic Canada, ACWWA provides training and information that keeps members current in the rapidly advancing water profession. Established in 1881, AWWA is the largest nonprofit, scientific and educational association dedicated to managing and treating the world's most important resource - water. With approximately 50,000 members, it provides solutions to improve public health, protect the environment, strengthen the economy and enhance quality of life. AWWA is represented in Canada, USA, Mexico and Puerto Rico. ACWWA is one of five sections in Canada. WEF is a not-for-profit technical and educational organization of 36,000 individual members and 75 affiliated Member Associations (MAs) representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, its mission is to connect water professionals; enrich the expertise of water professionals; increase the awareness of the impact and value of water; and provide a platform for water sector innovation. ACWWA is one of five MAs in Canada.

ACWWA's experience in the management of funds includes the development of the Water Supply Guidelines in 2003/2004 with a budget of $75,000. The Association organizes training and education courses with an annual budget in the $200,000 range and the management of the annual ACWWA Conference with a budget of $200,000. This conference rotates in different venues throughout Atlantic Canada and the conference budget is separate from the ACWWA budget.

ACWWA's budget, without the conference budget, is in the vicinity of $320,000 per year. The financial transactions are conducted by the ACWWA Executive Director, and overseen/approved by a Secretary Treasurer who reports to the Board on a quarterly basis. The Executive Director holds diplomas in business and accounting. The financial transactions are reviewed by a Certified Accountant on a regular basis, and an audited statement, based on general accounting principles, is submitted on a yearly basis. The audited statement is presented for approval to the Board and general membership on an annual basis.

10. Budget

The budget is presented in Appendix C.

11. Partnering/stakeholder involvement and Letters of Support

One measurement of success in this project is the acceptance of the updated Guidelines by the end-users. Currently, the existing guidelines are not uniformly used by all consultants, regulators, utilities and developers in all four provinces. The approach that is proposed for this project intends to engage these stakeholders in the process, to provide access to the development of the updates for each Guideline, to solicit input and feedback throughout the project, and to build capacity through webinars, courses and conferences. The stakeholder engagement includes notification of the intention by ACWWA to update the Guidelines, invitation of stakeholders to attend webinars and workshops to provide input and feedback, dissemination of the final updated Guidelines through ACWWA and other water and wastewater associations, webinars and continuing education courses to present the revised Guidelines. Documentation of financial and in-kind support are provided in Appendix D.

ATLANTIC CANADA
WATER & WASTEWATER ASSOCIATION
American Water Works Association Atlantic Canada Section
Water Environment Federation

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

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Appendix A - CVs for Team Leads for Water and Wastewater Guidelines

ATLANTIC CANADA
WATER & WASTEWATER ASSOCIATION
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Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

Appendix B - Proposed Schedule

ATLANTIC CANADA
WATER & WASTEWATER ASSOCIATION
American Water Works Association Atlantic Canada Section
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Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

Appendix C - Proposed Budget

ATLANTIC CANADA
WATER & WASTEWATER ASSOCIATION
American Water Works Association Atlantic Canada Section
Water Environment Federation

Section Office: Clara Shea
Box 28141 Dartmouth, NS

P (902) 434-6002, F (902)

contact@acwwa.ca
www.acwwa.ca

Appendix D - Documentation of financial and in-kind support

Wendy Krkosek
B.A.Sc., Ph.D., P.Eng.

Halifax Water, 455 Cowie Hill Rd.
PO Box 8388, RPO CSC
Halifax, NS, Canada B3K 5M1
902.483.4432 wendyk@halifaxwater.ca

HIGHLIGHTS

- Professional Engineer with a Ph.D. in water treatment, and 14 years experience in drinking water quality management and research.
- Significant experience with current drinking water quality challenges in Halifax and experience reviewing water quality regulations in Atlantic Canada and beyond.
- Proven track record pursuing grants from international, national and local funding agencies (> $6M from 2008-2014) and 9 years experience in interdisciplinary research project management, including 12 peer reviewed journal publications

ENGINEERING & RESEARCH EXPERIENCE

Halifax Water, Water Quality Manager, December 2015-December 2016, Dec 2017 - Present

Management of Research and Operational Water Quality Program

- Manage a team of 6 full time employees and 2 summer students to execute internal water quality investigations and routine monitoring programs for source water quality, treatment processes and distribution water quality. Manage water quality section budgets.
- Manage research partnership with the NSERC/Halifax Water Industrial Research Chair in Water Quality and Treatment at Dalhousie University, a $750,000/yr research program
- Provide technical support to treatment plant operators with respect to plant optimization for 7 different drinking water treatment facilities.
- Manage response to customer water quality issues, including lead, taste & odour, fluoride and others
- Direct investigations into non-compliance results from water quality sampling, and coordinate response with Halifax Water staff and provincial regulator.
- Participate in committees as required and review capital projects for impacts on water quality.
- Develop standard operating procedures and update the Emergency Response Plan.

Water Quality Research and Treatment Improvements

- Monitor and manage distribution system water quality, and conduct studies and develop plans for chlorination optimization.
- Coordinate and review work of consultants and researchers including, geosmin source tracking, paleolimnology assessment of lake sediments, and Water Research Foundation 4555 on biofiltration.

Development and Implementation of Water Quality Plans

- Develop and implement 5 year water quality master plans to provide research direction based on operational and regulatory goals.
- Execute a comprehensive lead service line replacement program, which involves removing all lead service lines from the distribution system, integrating science and research into policy, optimizing corrosion control, identifying options for financial enabling mechanisms and development of extensive public outreach and engagement tools.

Dalhousie University, Centre for Water Resources Studies
Project Manager and Research Engineer, October 2008-2017

- Successful proposal development for over $6M in grants and contracts awarded over 9 years. Conducted research and managed awarded grants and contracts related to drinking water and wastewater treatment and policy.
- **Research Engineer** for NSERC IRC in Water Quality and Treatment. Tasks included meeting with Chair partners to discuss and present current research, research planning, reporting and renewal proposal development.
- **Program Coordinator** for NSERC CREATE: STEWARD ($1.65M), involved working with faculty at Queens and Dalhousie to develop the program, admit graduate students, design curriculum, and organize monthly webinars, annual symposia and short courses for team members.

- **Project Manager** for Nunavut Wastewater Treatment Research contract with the Government of Nunavut ($3.5M), which involved liaising with the client, planning and coordinating logistics of field work in Nunavut, developing capacity for water quality analysis at the Northern Water Quality Laboratory in Iqaluit, performing field studies and ensuring deliverables and deadlines were met.
- **Research Engineer** for CWRS involvement with the First Nations Clean Water Initiative – Atlantic Region, a project worth $2M. Involved in numerous aspects of the development of novel drinking water and wastewater delivery system for 33 Atlantic First Nations communities using a regional based model and regionally developed regulations.

Dalhousie University, Department of Civil and Resource Engineering
PhD Candidate, January 2004 – December 2013. (Part-time from 2008-2013)

- Thesis topic: "Removal and Transformation of Gemfibrozil, a Pharmaceutically Active Compound (PhAC) in Wastewater Treatment." Resulted in 3 publications.

University of Waterloo Civil Engineering Department
Research Assistant, NSERC Chair for Drinking Water Treatment, (2002 - 2003)

- Involved in various aspects of the Canadian Water Network project entitled Pathogen Loadings at Drinking Water Intakes on a Heavily Impacted River: Assessing Urban and Agricultural Inputs.

UNDERGRADUATE CO-OP INDUSTRIAL EXPERIENCE

- Jacques Whitford Environment, Ltd. Markham, ON - Environmental Field Technician, (2000-2002)
- Komex•H2O Science•Inc, Huntington Beach, California – Jr. Environmental Engineer (1999-2000)
- Environment Canada – Oil, Gas and Energy Branch, Hull, Quebec - Student Engineer (1998)

EDUCATION

- Ph.D., Civil and Resource Engineering, Dalhousie University (2013)
- B.A.Sc., Environmental (Civil) Engineering, Minor in Biology and Option in Water Resources, Dean's Honour list, University of Waterloo (2003)

PROFESSIONAL SERVICE AND ASSOCIATIONS

- Registered as a Professional Engineer with Engineers Nova Scotia
- Member of American Water Works Association
- Member of Atlantic Canada Water and Wastewater Association
- Member of Canadian Water Network
- Technical Director – Atlantic Canada Water and Wastewater Association (2017-present)
- Technical Papers Chair – Atlantic Canada Water and Wastewater Association (2015 to 2017)
- Technical Papers Committee – Atlantic Canada Water and Wastewater Association (2014)
- Manuscript reviews for: Chemical Engineering Journal, Water Environment and Research, Journal of Hazardous Materials

UNIVERSITY TEACHING EXPERIENCE

Dalhousie University, Department of Civil and Resource Engineering

- ENGI 2203 – Engineering Design II (2014)
- CIVL 3451 – Water Quality and Treatment (2010)
- Teaching Assistant, (2004–2009)
  - Hydrology, Soil Mechanics, Geomatics, and Water Quality and Treatment

OUTREACH

ACWWA Lunch and Learn (2016)

- Provided a webinar on "Halifax Water's Continually Evolving Lead Program Guided by Research and Best Practice."

Senate Testimony (2014)

- Provided testimony to the Senate Standing Committee on Social Affairs, Science and Technology on Prescription Pharmaceuticals in Wastewater in Canada. Ottawa

Atlantic Canada First Nations Water and Wastewater Operators (2011-2014)

- Provided annual lectures for 50 First Nations Water and Wastewater Operators on the multi-barrier approach to water safety and risk assessment.

Halifax Water (2013)

- Developed course materials for short course on Advanced Coagulation Processes.

Nova Scotia Environment (2013)

- Developed course materials for short on Natural Organic Matter in Drinking Water.

SCIENTIFIC CONTRIBUTIONS

Journal Articles Published/Submitted

Dunnnington, D.W., Spooner, I.S., Krkosek, W.H., Gagnon, G.A., Cornett, R.J., Kurek, J., White, C.E., Misiuk, B., Tymstra, D. (2017) Separating anthropogenic watershed activity using bulk sediment geochemistry. *Submitted to Lake and Reservoir Management, November, 2017*.

Trueman, B.F., **Krkosek, W.H.,** Gagnon, G.A. (2018) Effects of ortho-and polyphosphates on lead speciation in drinking water. *Environmental Science: Water Research and Technology* 4:505-512.

Daley, K., Truelstrup-Hansen, L., Jamieson, R.C., Hayward, J., Piorkowski, G.S., **Krkosek, W.H.,** Gagnon, G.A., Castleden, H., MacNeil, K., Poltarawocz, J., Corriveau, E., Jackson, A., Lywood, J., Huang, Y., (2017) Chemical and Microbial Characteristics of Municipal Drinking Water Supply Systems in the Canadian Arctic. *Environmental Science and Pollution Research,* https://doi.org/10.1007/s11356-017-9423-5.

Anderson, L., **Krkosek, W.H.,** Stoddart, A.K., Gagnon, G.A., (2016) Lake Recovery Through Reduced Sulphate Deposition: A New Paradigm for Drinking Water Treatment *Environmental Science & Technology,* 51(3): 1414-1422.

Schmidt, J.J., Ragush, C.M., **Krkosek, W.H.,** Gagnon, G.A., Jamieson, R.C. (2016) Characterizing phosphorus removal in passive waste stabilization ponds in Arctic communities. *Arctic Science* 2(1): 1-14.

Gagnon, G.A., **Krkosek, W.H.,** Anderson, L., McBean, E., Mohseni, M., Bazri, M., Mauro, I., (2015) Impacts of Hydraulic Fracturing on Water Quality: A Review of Literature, Regulatory Frameworks and and Analysis of Information Gaps. *Environmental Reviews* 24(2):122-131.

Krumhansl, K., Jamieson, R.C., **Krkosek, W.H.** (2015) Using species traits to assess human impacts on near shore benthic ecosystems in the Canadian Arctic. *Ecological Indicators* 60:495-502.

Ragush, C.M., Schmidt, J.J., **Krkosek, W.H.,** Gagnon, G.A., Truelstrup-Hansen, L., Jamieson, R.C. (2015) Performance of Municipal Waste Stabilization Ponds in the Canadian Arctic. *Ecological Engineering* 83:413-421.

Krkosek, W.H., Reed, V., Gagnon, G.A. (2015) Assessing Protozoan Risks for Surface Drinking Water Supplies in Nova Scotia, Canada. *Journal of Water & Health,* 14(1):155-166.

Krumhansl, K., **Krkosek, W.H.,** Greenwood, M., Ragush, C., Schmidt, J., Grant, J., Barrell, J., Lu, L., Lam, B., Gagnon, G., and Jamieson, R. (2015) Assessment of arctic community wastewater impacts on marine benthic invertebrates. *Environmental Science and Technology*. 49(2): 760-766.

Krkosek, W.H., Payne, S.J., Gagnon, G.A.. (2014) Removal of acidic pharmaceuticals within a nitrifying recirculating biofilter. *Journal of Hazardous Materials* 273: 85-93.

Krkosek, W.K., Peldszus, S., Huck P.M., Gagnon G.A. (2014) Formation Kinetics of Gemfibrozil Chlorination Reaction Products: Analysis and Application. *Water Environment Research* 86(7): 654-662.

Krkosek, W.H., Koziar, S.A., White, R., Gagnon, G.A. (2011) Identification of Reaction Products from reactions of free chlorine with the lipid-regulator gemfibrozil, *Water Research* 45(3):1414-1422.

Conference Proceedings:

Campbell, R.C., **Krkosek, W.H**.,(2016) Challenges Building a NDWAC Inspired Lead Service Line Replacement Program. *AWWA Water Infrastructure Conference, Phoenix, AZ, USA. (Presentation)*

Krkosek, W.H., Campbell, R.C., Gagnon G.A., (2016) Monitoring Lead in Distribution Systems: An Evolution of Best Management Practices. *17th Annual National Drinking Water Conference. Ottawa, ON. (Presentation)*

Park, Y.R., Stoddart, A., Brophy, M., **Krkosek, W.H**., Gagnon, G.A. (2015) Assessment of Noval Natural Organic Matter Characterization Tools: Application to the Drinking Water Industry. *249th ACS National Meeting & Exposition, Denver CO, USA, March 22-26. (Presentation)*

Gagnon G.A., **Krkosek, W.H**., Trueman, B., Anderson, L. (2015) Perspectives on Hydraulic Fracturing in Atlantic Canada: Overview of Recent Regulatory Activities and Social License to Operate with an Environmental Context. *249th ACS National Meeting & Exposition, Denver CO, USA, March 22-26. (Presentation)*

Schmidt, J., Jamieson, R.C., Gagnon, G.A., Krumhansl, K., Lam, B., **Krkosek, W.H.** (2013) Integrated waste stabilization pond-wetland systems for municipal wastewater treatment in the Canadian Arctic: treatment preformance and environmental risk assessment. *10th IWA Specialis Group Conference on Ponds Technology: Advances and Innovations in Pond Treatment Technology. Cartagena, Columbia (Presentation).*

Hayward, J., Jamieson, R.C., Boutilier, L., Lam, B., Gagnon, G.A., **Krkosek, W.H.,** (2012) Natural Wetland Treatment Performance Modeling: Coral Harbour, Nunavut. *Northern Territories Water and Wastewater Association. Yellowknife, NT (Presentation).*

Schmidt, L., Krumhansl, K., **Krkosek, W.H.,** Lam, B., Ramieson, R.C., Gagnon, G.A. (2012) Wastewater Treatment System Performance and Environmental Impact Analysis in Kugaaruk and Grise Fiord, NU. *Northern Territories Water and Wastewater Association. Yellowknife, NT (Presentation).*

Krkosek, W.H., Ragush, C., Boutilier, L., Sinclair, A., Krumhansl, K., Gagnon, G.A., Jamieson, R.C. (2012) Treatment performance of Wastewater Stabilization Ponds in Canada's Far North. *15th International Conference on Cold Regions Engineering, Quebec City, QC. (Presentation)*

Hayward, J., Jamieson, R.,C., Boutilier, L., Lam, B., Gagnon, G.A., **Krkosek, W.H.,** (2012) Hyrdological characterization and treatment performance assessment of a natural tundra wetland receiving effluent from a wastewater stabilization pond. *15th International Conference on Cold Regions Engineering, Quebec City, QC. (Presentation)*

Jamieson, R.C., Lam, B., Hayward, J., **Krkosek, W.H.,** Daly, K., (2011) Nunavut Wastewater Research – A Study of Coral Harbour. *Northern Territories Water and Wastewater Association*, *Iqaluit, NU (Presentation).*

Gagnon, G.A., McIlwain, B., Filion, Y., Oldford, A., **Krkosek, W.H.,** (2011) Systems Traning and Education in Water Assets Research and Development. *Canadian Water Network Conference: Connecting Water Resources, Ottawa ON (Poster).*

Hayward, J.L., **Krkosek, W.H.,** Boutilier, L., Daly, K., Lam, B., Jamieson, R., Gagnon, G.A., (2011) Development of Northern Municipal Wastewater Effluent Discharge Quality Objectives in the Context of Canadian Regulatory Framework. *Canadian Water Network Conference: Connecting Water Resources, Ottawa ON (Poster).*

Krkosek, W.H., Koziar S.A., White, R.L., Peldszus, S., Huck, P.M., Gagnon, G.A. (2010) Transformation of the Lipid Regulator Gemfibrozil During Chlorine Disinfection. *IWA World Congress, Montreal, QC. (Poster).*

Krkosek, W.H., Patterson, A.L., Zevenhuizen, E.L., Yliruusi, H., Gagnon, G.A., (2009) Removal of Selected Pharmaceuticals within a Bench Scale Recirculting Biofilter. *IWA Biofilm Conference, Davis, CA. (Poster)*

Kot, M., **Krkosek, W.H**., Berube, P., Janhkay, S., Gagnon, G.A., (2009) Knowledge Translation Challenges in Small Communities. *Candian Rural Health Research Society 9th Conference,* New Brunswick. (Presentation)

Kot, M., **Krkosek, W.H**., Doubrough, J., Andrews, S.A., Berube, P., Gagnon, G.A., (2008) Knowledge Exchange Challenges for Small Water Treatment Systems. *National Conference, Canadian Water and Wastewater Association. (Presentation)*

Krkosek, W.H., Koziar, S.A., Peldszus, S, Huck, P.M., Gagnon, G.A. (2008) Formation and Fate of Chlorinated Pharmacuetically Active Compounds During Wastewater Disinfection. *ACE - American Water Works Association (Presentation), Atlanta, Georgia*

Krkosek, W.H., Van Dyke, M., Huck, P.M., Gagnon, G.A., (2007) Fate and Effects of Selected PhACs on a Model Biofilm System. *Aquatic Toxicity Workshop. Halifax, NS. (Presentation)*

Krkosek, W.H., Peldszus, S., Huck, P.M., Gagnon, G.A., (2007) Effects of Selected PhACs and Their Chlorinated Byproducts on Bacterial Communities in Receiving Water. *CAWQ Central Canadian Symposium on Water Quality Research. Burlington, ON. (Presentation)*

Payne, S.J., Murphy, H.M., **Krkosek, W.H.**, Gagnon, G.A., Truelstrup Hansen, L. (2006) E. coli detection in drinking water using conventional and molecular-based tools. *12th National Conference on Drinking Water, Canadian Water and Wastewater Association, St. John, NB. (Presentation)*

Krkosek, W.H., Koziar, S.A., Gagnon, G.A. (2006) Identification of Chlorinated Pharmaceuticals and their Effects on Bacterial Populations. 12th *National Conference, Canadian Water and Wastewater Association, St. John, NB. (Poster)*

Technical Reports/Articles:

Krkosek, W.H. (2016) Utility Adopts a Complete Lead Service Line Replacement Strategy. *AWWA Opflow* July edition

Jamieson, R.C., **Krkosek, W.H.** (2013) Breaking the Ice – The trouble with implementing national wastewater standards in our country's coldest climates. *Water Canada* http://watercanada.net/2013/breaking-the-ice/

W.H. Krkosek and Gagnon, G.A., (2012) Water and Wastewater Regulatory Benchmarks for First Nations Communities in Atlantic Canada. Submitted to *Atlantic Policy Congress of First Nations Chiefs.*

Gagnon, G.A., **Krkosek, W.H.,** Follett M., Woszcynski, M.**,** (2011) Characterization of water sources in Nova Scotia to establish drinking water treatment requirements. Submitted to: *Nova Scotia Department of Environment.*

Krkosek, W.H., Schmidt, J., Gagnon, G.A., (2011) Regulatory Review and Gap Analysis for First Nations Communities in Atlantic Canada. Submitted to: *Atlantic Policy Congress of First Nations Chiefs.*

Gagnon, G.A. and **Krkosek W.H.**, (2009) Analysis on the Impacts of a Proposed Federal Legislative Framework for Drinking Water and Wastewater in Atlantic First Nations Communities. Submitted to the *Atlantic Policy Congress for First Nations Chiefs*.

Gagnon, G.A., **Krkosek W.H**., Kot, M., Payne, S.J., (2009) Assessment of Leapfrog Technologies for Addressing the Management of Small Community Water Supplies. Submitted to *the World Health Organization. Geneva, Switzerland.*

Krkosek, W.H. (2006) "Creating the Winning Conditions for Technological Innovation in Municipal Water and Wastewater Infrastructure: A Policy Discussion" *Freshwater for the Future: Policies for Sustainable Water Management in Canada. Conference Proceedings.* pp. 135-146. Ottawa: Policy Research Initiative

Campbell, C., **Krkosek, W.H.** (2006) "Valuing and Allocating Water Resources IV: Watershed Management and Watershed Stewardship." *Freshwater for the Future: Policies for Sustainable Water Management in Canada. Conference Proceedings.* pp. 57-65. Ottawa: Policy Research Initiative

RICHARD MACEWEN, M.Sc., FEC, P.Eng.

EDUCATION

M. Sc.	Environmental Technology (Energy Policy), University of London, United Kingdom, 1998
D.I.C.	Diploma in Environmental Technology, Imperial College of Science, Technology and Medicine, United Kingdom, 1998
B. Sc. Eng.	Chemical Engineering, University of New Brunswick, Canada, 1997
Exchange Student	Ecole Supérieur de Chimie Industrielle de Lyon, France, 1993-4

Other Courses:

- Alternative Dispute Resolution and Conflict Management
- The Successful Negotiator
- Big Data for Smart Cities
- Energy Efficiency & RETScreen Version 4 Training Session
- GHGenius Users Workshop
- Solar Shelter Design Course
- Introduction to Computer Science and Programming Using Python
- An Introduction to Financial Accounting
- Introduction to Water Treatment
- Nutrient Management Planning Training Course, Nova Scotia Agricultural College
- 40-Hour Hazardous Waste Operations and Emergency Response Training Course
  8-Hour HAZWOPER Refresher, Annually
- Respiratory Protection, Hearing Conservation, Excavation Safety, Permit-Required Confined Space Entry, Fall Protection Training Courses
- Workplace Guidance to Health and Safety Programs and Accident Investigations, Workers Compensation Board of Prince Edward Island
- Leadership for Safety Excellence, Nova Scotia Construction Safety Association
- The Impact of Alcohol/Drug Use on Workplace Safety, and Reasonable Suspicion Training for Supervisors

EMPLOYMENT

2017-Present	Manager Charlottetown Water and Sewer Utility, Charlottetown, Prince Edward Island
2011- 2016	Assistant Manager Charlottetown Water and Sewer Utility, Charlottetown, Prince Edward Island
2006- 2011	Branch Manager Conestoga-Rovers & Associates, Charlottetown, Prince Edward Island
2004-06	Project Engineer, Conestoga-Rovers & Associates and MGI Limited, Charlottetown, Prince Edward Island
2002-04	Water Resources Adviser, Department of Geology, Mines and Water Resources, Port Vila, Vanuatu

2001-02	Environmental Economist, Southeast Environmental Association, Montague, Prince Edward Island
1999-01	Maintenance Department Manager, Achimota School, Accra, Ghana
1998	Energy Development Consultant, Intermediate Technology Development Group, Katmandu, Nepal
1996-97	Environmental Technology Development Consultant, University of New Brunswick, Fredericton, New Brunswick
1995-96	Material Scientist, Celestica Inc., North York, Ontario
1994	Fluid Curtain Researcher, Institut des Technologies Chimique, Lyon, France

AFFILIATIONS

Association of Professional Engineers of Prince Edward Island (Engineers PEI) – Past President
Member of American Water Works Association
Member of Atlantic Canada Water and Wastewater Association
Rotary Club of Charlottetown Member
Prince Edward Island Karate Association Member
Sir Andrew Macphail Homestead Foundation – Past Board Member
PEI Model Forest Network Partnership Association – Past Chair
Institute of Bioregional Studies Member
CUSO Board Member (2002-04)

PROFILE OF PROFESSIONAL ACTIVITIES

Water and Sewer

- Water and Sewer Utility management for the City of Charlottetown. Responsibilities include operations management and capital project planning. Project oversight of multimillion dollar capital projects resulting in the elimination of combined sewer overflows, water demand reductions of 15% and a water supply capacity increase of 25%.
- Completed a detailed wastewater audit for a fish processing facility. The work included wastewater flow estimates, wastewater stream dye tracing, facility operations audit and recommendations including an assessment of wastewater disposal to land application rates.
- Designed pesticide sprayer rinse collection and management systems for Agriculture and Agri-Food Canada facilities in Kentville and Sheffield, Nova Scotia.
- Completed groundwater protection strategies for the City of Charlottetown and Town of Souris.
- Provided groundwater development and protection analysis for the Charlottetown Area Water Supply Study for the Town of Stratford, City of Charlottetown and Town of Cornwall.
- Conducted groundwater well production efficiency testing for the Town of Amherst, Nova Scotia.
- Project Manager for saltwater intrusion protection monitoring of the Lennox Island wellfield. Work included the installation of monitoring equipment, data interpretation and recommendations.

Public Administration

- Member of the management team of the City of Charlottetown. Assistant Manager promoted to Manager of the Water Sewer Utility. Responsible for the oversight of services delivery as requested by City Council, employee motivation, and budgetary control. Implemented digital records management systems to improve service delivery.
- Federal Government Advisor on matters related to water resources for the Island nation of Vanuatu. Developed a National Water Resource Management Plan and in so doing transferred water resource management skills including hydrological and water quality data collection, analysis and dissemination. Designed, implemented and evaluated community based water management projects including a project that was designated as a UNESCO HELP (Hydrology for the Environment, Life and Policy) Basin. Advised on groundwater protection, municipal wastewater management, and micro-hydropower and other renewable energy developments.
- Maintenance Department Manager at a 1,500 student boarding school in Ghana, West Africa. Responsible for services delivery management, human resources and budgeting. Developed maintenance practices and schedules within the constraints of a developing nation. Improved solid waste, water, and wastewater management systems.
- Project manager for the development of an electrical energy efficiency strategy for Prince Edward Island. The work was completed for the PEI Office of Energy Efficiency and covered all sectors. The work included a review of electrical energy efficiency programs in other jurisdictions, historical programs on PEI and provided recommendations for future programming. The work included cost benefit analyses, estimated energy savings potential and anticipated environmental benefits.
- Project manager for a review of the Prince Edward Island Office of Energy Efficiency Residential Programs. The work included consolidating building energy audit and financial information in order to complete a cost benefit analysis of the various Home Energy Efficiency Programs.
- Facilitated a public forum on climate change mitigation options for Prince Edward Island using deliberative dialogue techniques.
- Environmental Economist. Developed environmental damage assessment and valuation methods for stream ecosystems to be used by Environment Canada officers.
- Organisational Change Facilitator. Co-ordinated business unit activities as Celestica moved toward a socio-technical system of management. Activities included participatory planning and teaching team skills such as consensus building and conflict resolution.

Public Works

- Maintenance Department Manager responsible for the infrastructure rehabilitation including roadways, buildings, and electrical systems.
- Project manager for the completion of an energy study for the Town of Montague, PEI. The work included a load survey, initial district heating network design, equipment evaluation, auxiliary renewable energy equipment options including wind power, active and passive solar, geothermal, economic feasibility analysis of the various technologies, environmental impact reviews and community consultation.
- Project manager for a review of grid interconnection requirements for a 1 MW wind turbine in Springhill, N.S.
- Project manager for a review of renewable energy technologies for the BioCommons Park in Charlottetown, PEI. Work included load estimates, initial district heating network design, equipment evaluation, economic feasibility analysis, environmental and local economic impact review.

- Completed jurisdictional scans of Prince Edward Island, Nova Scotia, Quebec and Manitoba in support of an economic assessment of commercially available and/or emerging green energy technologies in the agricultural, food processing, and rural sectors. The reviews included identification of opportunities for government intervention to stimulate green energy, as well as the identification of green energy technologies recommended for more in depth economic analysis based on their ability to contribute to the energy supply, their economic impact, non-energy benefit, and opportunity for government action.
- Project manager for the development of a conceptual plans for biomass energy systems for the Souris Food Park and Town of Kensington, PEI. The work included a load survey, initial network design, equipment evaluation, economic feasibility analysis, environmental impact review and the submission of an Application under Natural Resources Canada's Clean Energy Fund for Renewable Energy and Clean Energy Systems Demonstration Projects.
- Evaluation of various energy related technologies for application on Prince Edward Island including wood pellet production, solar hot water for dairy operations and residential applications, domestic scale wind turbines, ethanol and biodiesel production.
- Building demolition oversight including the completion of hazardous building materials surveys, demolition permitting assistance and demolition oversight.

Parks and Recreation

- Responsible for the oversight of grounds keeping and sports fields and recreation facilities maintenance at a large boarding school in West Africa.
- Board Member of the Sir Andrew MacPhail Homestead providing oversight of the maintenance of a historic building, nature reserve and organic garden.
- Chair of the PEI Model Forest Network Partnership providing a forum for the dissemination of information related to public and private woodlot management and opportunities for non-timber forest product development.
- Woodlot owner developing natural landscapes for the future and foraged today for apples, berries, nuts and mushrooms.
- Manage a hybrid poplar plantation assessing three varieties for biomass and timber production. Three acres planted on marginal farm land with intercropped clover.
- Completing tree, shrub and vine trials including heart nuts, chestnuts, hazel nuts, cherries, mulberries, apricots, goji berries, haskaps, saskatoon berries, hops and seven grape varieties.
- Urban agriculture experiments including a 3 m^2 hop yard, cherries, strawberries, raspberries, vegetables, herbs and tree seedlings.

AWARDS

Fellow of Engineers Canada
Commonwealth Scholarship, University of London, 1997-98
Celanese Canada Internationalist Fellowship, University of London, 1997-98
Canada Scholarship, University of New Brunswick, 1992-1996
Kenneth V. Cox Scholarship, 1991-1995
UNB Undergraduate Scholarships, 1991-1997
UNB Dean's List, 1991-1997

PRESENTATIONS

MacEwen, R., "PEI Wood Energy", presented at Managing Our Forests for Tomorrow Symposium, St. Teresa, PEI, March 2010.

MacEwen, R., "PEI Wood Energy", presented at PEI Model Forest Network Partnership Annual General Meeting, November 2009.

MacEwen, R. "Montague Energy Study" presented to Town of Montague and Southeast Environmental Association, September 2009.

McCallum, B., MacEwen, R. MacKay, B., O'Connor, J., "Biomass Energy on PEI", presented to PEI Legislative Standing Committee Standing Committee on Agriculture, Forestry and Environment, January 2008.

Engineering Career Options Various Grade Schools on behalf of Engineers PEI 2008-present.

Larwen, N., Ezgar, D., and MacEwen, R., "Charlottetown Area Water Supply Study", presented to Area Water Utilities, October 2007.

Sauveur, S. and MacEwen, R., "Souris Wellfield Protection Strategy", presented to Souris Town Council, 2006.

MacEwen, R. "Biofuel Options Efficiencies and Costs", PEI ADAPT Council AGM March 2008.

MacEwen, R. "Environmental Assessment of Prince Edward Island", IBS Social Forum Earth Day 2008.

R.MacEwen, T.Gidda, R. Mosher, F. Rovers, "Carbon Credit Trading: Canabrava Landfill Gas Flaring, Brazil", presented at Carbon Credit Forum, Nova Scotia 2007.

R.MacEwen, C.Henderickson, "Hybrid Willows and Poplars: Potential Biomass Sources with Environmental Benefits", presented at PEI Adapt Annual Conference 2007.

MacEwen, R., "An Investigation into the Applicability of Organisational Change Practices to Development Projects", M.Sc. Thesis, University of London, 1998.

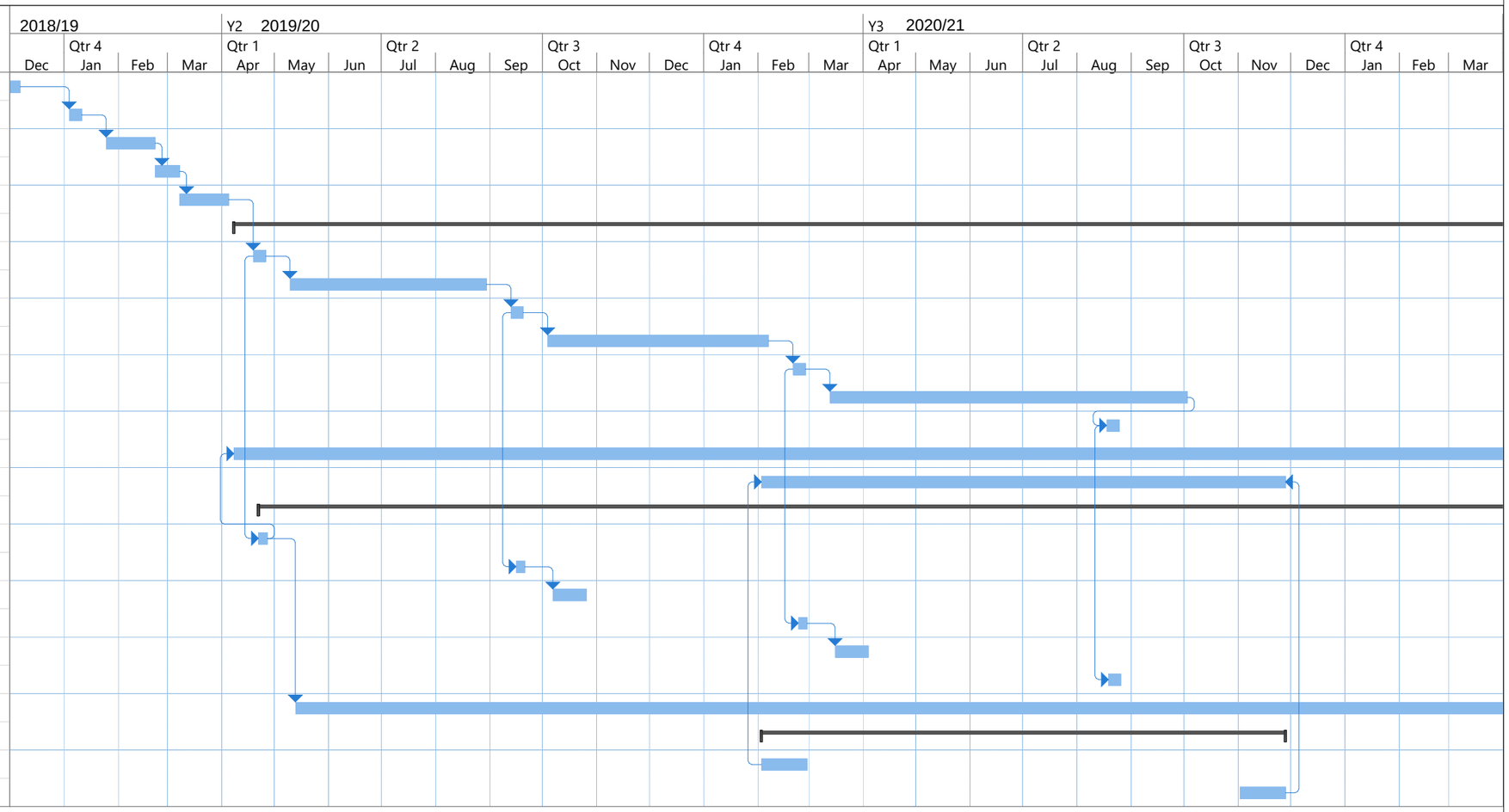
MacEwen, R., "Heat Transfer Characteristics of an Activated Carbon Adsorption Packed Bed", B.Sc.Eng. Project, University of New Brunswick, 1997.

MacEwen, R., Martin, G., "Analysis of a System of Five Aligned Nozzles for Fluid Curtain Applications", Institut des Technologies Chimique, Lyon, France, B.Sc.Eng. Thesis, University of New Brunswick, 1994.

Application to Brace
November 13, 2018
Atlantic Canada Water & Wastewater Association

Incorporating climate change resilience for municipal infrastructure into the updates of the existing Atlantic Canada Water and Wastewater Design Guidelines

Task Name
NRC funding finalized (assumed)
Provincial and municipal funding finalized
Terms of Reference issued for updating Guidelines
Guideline Consultants selected and notified
Guideline Consultants mobilize teams
Guideline Consultants work program (tentative)
Task 001 Startup Meeting (Meeting #1)
Task 002 Guidelines Updates, Draft #1
Task 003 Draft #1 Review (Meeting #2)
Task 004 Guidelines Updates, Draft #2
Task 005 Draft #2 Review (Meeting #3)
Task 006 Final Guidelines
Task 007 Final Guidelines Review (Meeting #4)
Task 008 Capacity Building Program
Task 009 Participation in National Knowledge-sharing Events
Workshops, webinars, courses
Workshop #1
Workshop #2
Webinars series 1
Workshop #3
Webinars series 2
Workshop #4
Courses, outreach, dessimination of presentation materials
Conferences
Adaptation Canada Conference
CWWA Annual Conference



Project: Schedule draft 2018111
Date: Sat 11/10/18

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

BRACE Proposal 22-Nov-18

Annual Budget

Year 1: Project Start - March 31, 2019

Item			Requested from NRCan	From Other Sources		Total Cost
				Cash	In-Kind	
1.0 Salaries and benefits	Hours	Rate				
1.1 Team leads	90	$ 100	$ -	$ -	$ 9,000.00	$ 9,000.00
1.2 Committee members	80	$ 100	$ -	$ -	$ 8,000.00	$ 8,000.00
1.3 Assistants	28	$ 75	$ -	$ -	$ 2,100.00	$ 2,100.00
2.0 Professional, scientific, contracted services	Hours	Rate				
2.1 Senior engineering	100	$ 150	$ 15,000.00	$ -	$ -	$ 15,000.00
2.2 Engineering support	90	$ 100	$ 9,000.00	$ -	$ -	$ 9,000.00
2.3 Technical support	-	$ 75	$ -	$ -	$ -	$ -
2.4 Guideline Consultants expenses			$ 1,449.00	$ -	$ -	$ 1,449.00
2.5 Webinar services			$ -	$ -	$ -	$ -
2.6 Presentation materials			$ -	$ -	$ -	$ -
2.7 Meeting rooms			$ -	$ -	$ -	$ -
2.8 ACWWA board members and personnel	29	$ 100	$ -	$ -	$ 2,865.00	$ 2,865.00
3.0 Conference fees						
.1 Conference fees			$ -	$ -	$ -	$ -
4.0 Travel including meals and accommodations						
4.1 Committee meetings and capacity building (meetings/workshops)						
.1 Airfares and related travel costs (provincial staff)			$ -	$ -	$ -	$ -
.2 Ground transportation (provincial staff)			$ -	$ -	$ -	$ -
.3 Accommodations and meals (provincial staff)			$ -	$ -	$ -	$ -
.4 Airfares and related travel costs (team leads)			$ -	$ -	$ -	$ -
.5 Ground transportation (team leads)			$ -	$ -	$ -	$ -
.6 Accommodations and meals (team leads)			$ -	$ -	$ -	$ -
5.0 Other expenses						
.1 Administration (15%)			$ -	$ -	$ 3,817.00	$ 3,817.00
Subtotal Year 1 (Project Start - March 31, 2019)			**$ 25,449.00**	**$ -**	**$ 25,782.00**	**$ 51,231.00**

SOURCES OF FUNDING	**Year 1 Funds**	
Year 1: Project Start - March 31, 2019		
Requested from Natural Resources Canada:	$ 25,449.00	49.7% of total project cost
Cash from other sources		
1. Cash donation from provincial regulatory agencies towards Guideline Consultants fees & expenses	$ -	
2. Cash donation from provincial regulatory agencies for travel costs	$ -	
In-kind contributions from other sources		
1. Provincial regulatory agency staff time	$ 10,100.00	
2. Utilities (committee chairs staff time)	$ 9,000.00	
3. ACWWA administration expenses	$ 6,682.00	

BRACE Proposal 22-Nov-18

Annual Budget

Year 2: April 1, 2019 - March 31, 2020

Item			Requested from NRCan	From Other Sources		Total Cost
				Cash	In-Kind	
1.0 Salaries and benefits	Hours	Rate				
1.1 Team leads	452	$ 100	$ -	$ -	$ 45,150.00	$ 45,150.00
1.2 Committee members	507	$ 100	$ -	$ -	$ 50,690.00	$ 50,690.00
1.3 Assistants	405	$ 75	$ -	$ -	$ 30,338.00	$ 30,338.00
2.0 Professional, scientific, contracted services	Hours	Rate				
2.1 Senior engineering	775	$ 150	$ 104,280.00	$12,000	$ -	$ 116,280.00
2.2 Engineering support	688	$ 100	$ 68,780.00	$ -	$ -	$ 68,780.00
2.3 Technical support	46	$ 75	$ 3,450.00	$ -	$ -	$ 3,450.00
2.4 Guideline Consultants expenses			$ 25,103.00	$ -	$ -	$ 25,103.00
2.5 Webinar services			$ -	$ -	$ 15,750.00	$ 15,750.00
2.6 Presentation materials			$ 1,670.00	$ -	$ 4,000.00	$ 5,670.00
2.7 Meeting rooms			$ 1,890.00	$ -	$ -	$ 1,890.00
2.8 ACWWA board members and personnel	251	$ 100	$ -	$ -	$ 25,075.00	$ 25,075.00
3.0 Conference fees						
.1 Conference fees			$ 2,100.00	$ -	$ -	$ 2,100.00
4.0 Travel including meals and accommodations						
4.1 Committee meetings and capacity building (meetings/workshops)						
.1 Airfares and related travel costs (provincial staff)			$ -	$ 3,287.00	$ -	$ 3,287.00
.2 Ground transportation (provincial staff)			$ -	$ 1,251.00	$ -	$ 1,251.00
.3 Accommodations and meals (provincial staff)			$ -	$ 4,704.00	$ -	$ 4,704.00
.4 Airfares and related travel costs (team leads)			$ 5,954.00	$ -	$ -	$ 5,954.00
.5 Ground transportation (team leads)			$ 610.00	$ -	$ -	$ 610.00
.6 Accommodations and meals (team leads)			$ 3,276.00	$ -	$ -	$ 3,276.00
5.0 Other expenses						
.1 Administration (15%)			$ -	$ -	$ 32,567.00	$ 32,567.00
Subtotal Year 2 (April 1, 2019 - March 31, 2020)			**$ 217,113.00**	**$ 21,242.00**	**$ 203,570.00**	**$ 441,925.00**

SOURCES OF FUNDING	**Year 2 Funds**	
Year 2: April 1, 2019 - March 31, 2020		
Requested from Natural Resources Canada:	$ 217,113.00	49.1% of total project cost
Cash from other sources		
1. Cash donation from provincial regulatory agencies towards Guideline Consultants fees & expenses	$ 12,000.00	
2. Cash donation from provincial regulatory agencies for travel costs	$ 9,242.00	
In-kind contributions from other sources		
1. Provincial regulatory agency staff time	$ 81,028.00	
2. Utilities (committee chairs staff time)	$ 45,150.00	
3. ACWWA administration expenses	$ 77,392.00	

BRACE Proposal 22-Nov-18

Annual Budget

Year 3: April 1, 2020 - March 31, 2021

Item			Requested from NRCan	From Other Sources		Total Cost
				Cash	In-Kind	
1.0 Salaries and benefits	Hours	Rate				
1.1 Team leads	120	$ 100	$ -	$ -	$ 12,000.00	$ 12,000.00
1.2 Committee members	104	$ 100	$ -	$ -	$ 10,400.00	$ 10,400.00
1.3 Assistants	40	$ 75	$ -	$ -	$ 3,000.00	$ 3,000.00
2.0 Professional, scientific, contracted services	Hours	Rate				
2.1 Senior engineering	200	$ 150	$ 6,000.00	$ 24,000.00	$ -	$ 30,000.00
2.2 Engineering support	184	$ 100	$ 18,400.00	$ -	$ -	$ 18,400.00
2.3 Technical support	80	$ 75	$ 6,000.00	$ -	$ -	$ 6,000.00
2.4 Guideline Consultants expenses			$ 12,740.00	$ -	$ -	$ 12,740.00
2.5 Webinar services			$ -	$ -	$ 5,250.00	$ 5,250.00
2.6 Presentation materials			$ 22,680.00	$ -	$ -	$ 22,680.00
2.7 Meeting rooms			$ 630.00	$ -	$ -	$ 630.00
2.8 ACWWA board members and personnel	86	$ 100	$ -	$ -	$ 8,558.00	$ 8,558.00
3.0 Conference fees						
.1 Conference fees			$ 2,100.00	$ -	$ -	$ 2,100.00
4.0 Travel including meals and accommodations						
4.1 Committee meetings and capacity building (meetings/workshops)						
.1 Airfares and related travel costs (provincial staff)			$ -	$ -	$ -	$ -
.2 Ground transportation (provincial staff)			$ -	$ 641.00	$ -	$ 641.00
.3 Accommodations and meals (provincial staff)			$ -	$ 1,764.00	$ -	$ 1,764.00
.4 Airfares and related travel costs (team leads)			$ 3,990.00	$ -	$ -	$ 3,990.00
.5 Ground transportation (team leads)			$ 641.00	$ -	$ -	$ 641.00
.6 Accommodations and meals (team leads)			$ 2,373.00	$ -	$ -	$ 2,373.00
5.0 Other expenses						
.1 Administration (15%)			$ -	$ -	$ 11,333.00	$ 11,333.00
Subtotal Year 3 (April 1, 2020 - March 31, 2021)			**$ 75,554.00**	**$ 26,405.00**	**$ 50,541.00**	**$ 152,500.00**

SOURCES OF FUNDING	**Year 3 Funds**	
Year 3: April 1, 2020 - March 31, 2021		
Requested from Natural Resources Canada:	$ 75,554.00	49.5% of total project cost
Cash from other sources		
1. Cash donation from provincial regulatory agencies towards Guideline Consultants fees & expenses	$ 24,000.00	
2. Cash donation from provincial regulatory agencies for travel costs	$ 2,405.00	
In-kind contributions from other sources		
1. Provincial regulatory agency staff time	$ 13,400.00	
2. Utilities (committee chairs staff time)	$ 12,000.00	
3. ACWWA administration expenses	$ 25,141.00	

BRACE Proposal

22-Nov-18

Summary of Funding

Item ID	Source	Year 1	Year 2	Year 3	Cumulative Total
1	Requested from Natural Resources Canada	$ 25,449.00	$ 217,113.00	$ 75,554.00	$ 318,116.00
2	Cash donation from provincial regulatory agencies towards Guideline Consultants fees & expenses	$ -	$ 12,000.00	$ 24,000.00	$ 36,000.00
3	Cash donation from provincial regulatory agencies for travel costs	$ -	$ 9,242.00	$ 2,405.00	$ 11,647.00
4	Provincial regulatory agency staff time	$ 10,100.00	$ 81,028.00	$ 13,400.00	$ 104,528.00
5	Utilities (team leads staff time)	$ 9,000.00	$ 45,150.00	$ 12,000.00	$ 66,150.00
6	ACWWA administration expenses	$ 6,682.00	$ 77,392.00	$ 25,141.00	$ 109,215.00
	Total Project Costs				**$ 645,656.00**

Source of Contributions	Percentage (%)	Cash ($)	In-Kind ($)	Total ($)
Canada	**49%**	$ 318,116	$ -	**$ 318,116**
The Proponent	**17%**	$ -	$ 109,215	**$ 109,215**
Government of New Brunswick	**7%**	$ 15,882	$ 26,132	**$ 42,014**
Government of Nova Scotia	**7%**	$ 15,882	$ 26,132	**$ 42,014**
Government of Prince Edward Island	**7%**	$ 15,882	$ 26,132	**$ 42,014**
Government of Newfoundland and Labrador	**4%**	$ -	$ 26,132	**$ 26,132**
Halifax Water	**5%**	$ -	$ 33,075	**$ 33,075**
City of Charlottetown	**5%**	$ -	$ 33,075	**$ 33,075**
TOTAL	**100%**	**$ 365,763**	**$ 279,893**	**$ 645,656**
(TOTAL FROM PROJECT BUDGET)		**($ 365,763.00)****	**($ 279,893.00)**	**($ 645,656)**

**** $47,647.00 are non-NRCan funds**

PLEASE PRINT THIS PAGE ON YOUR ORGANIZATION'S LETTERHEAD

CLIMATE CHANGE ADAPTATION PROGRAM
Quarterly Report

SUBMIT TO:
Natural Resources Canada
Attn: Elaine DeHamel
588 Booth Street, Room 423
Ottawa, Ontario K1A 0Y7
elaine.dehamel@canada.ca

AGREEMENT #: AP000

PROPONENT NAME: type in name of proponent

PROJECT: type in title of project

FISCAL YEAR: 2018-2019

PERIODS BY QUARTER:

- □ **Quarter 1 - April 1st to June 30th**
- □ **Quarter 2 - July 1st to September 30th**
- □ **Quarter 3 - October 1st to December 31st**
- □ **Quarter 4 - January 1st to March 31st**

PLEASE PRINT THIS PAGE ON YOUR ORGANIZATION'S LETTERHEAD

CLIMATE CHANGE ADAPTATION PROGRAM

Quarterly Report by Eligible Expenditures

AGREEMENT #: AP000 **FISCAL YEAR:** 2018-2019 □ **Quarter 1** □ **Quarter 2** □ **Quarter 3** □ **Quarter 4**

Budget Description by Eligible Expenditures	Budgeted Amount	Previously Claimed	This Claim	Document Reference	Total Claimed to Date
Salaries and benefits				Timesheet	$0.00
Professional, scientific and contracting services				provide invoices	$0.00
Travel, including meals and accommodation, up to the National Joint Council rates				Travel Report	$0.00
Conference fees approved on a case by case basis				provide invoices	$0.00
Materials, supplies and equipment (including laptop and desktop computers approved on a case by case basis)					$0.00
Licence fees					
Overhead expenditures approved by NRCan to a maximum of 15% of NRCan's contribution					$0.00
TOTAL	**$0.00**	**$0.00**	**$0.00**		**$0.00**

Signature **Date**

PLEASE PRINT THIS PAGE ON YOUR ORGANIZATION'S LETTERHEAD

CLIMATE CHANGE ADAPTATION PROGRAM

Time Sheet

AGREEMENT #: AP000 FISCAL YEAR: 2018-2019 □ Quarter 1 □ Quarter 2 □ Quarter 3 □ Quarter 4

Name	Company	Number of Hours

CLIMATE CHANGE ADAPTATION PROGRAM - Travel Report

AGREEMENT #: AP000 **FISCAL YEAR: 2017-2018** **□ Quarter 1 □ Quarter 2 □ Quarter 3 □ Quarter 4**

		Travel Details		Personal Vehicle			Car Rental		Transportation		Accommodations, meals and incidentals					
Traveller's Name	Reason for Travel	Travel Dates (one line per day)	From and To Locations	Number of Kilometers Driven	Kilometric Alllowance (km @ 57.5 cents for Province ON	Fuel Cost	Car Rental	Fuel Cost	Parking, Taxi and Other	Air, Rail Fare (total cost)	Hotel	Breakfast	Lunch	Dinner	Incidentals	Total
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
					$ -											$0.00
															Total Expenses	**$0.00**

Notes:

All claims must be supported by invoices or receipts.

Kilometric rates, meals and incidental allowances are reimbursed in accordance with the National Joint Council rates at: https://www.njc-cnm.gc.ca/en

Meals cannot be claimed if they were provided at meetings or events.

Hospitality is not an eligible expense.

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CLIMATE CHANGE ADAPTATION PROGRAM

Cash and In-Kind Contributions Report

AGREEMENT #: AP000 **FISCAL YEAR:** 2018-2019 □ Quarter 1 □ Quarter 2 □ Quarter 3 □ Quarter 4

Name of Organization and Individual	Cash Contribution	In-kind Contribution (Professional Hours)	In-Kind Contribution (Administrative Hours)	Student
Subtotal	$	hours	hours	hours
Rate of pay ($/hr or $/day)				
Subtotal x rate of pay				
Total All Contribution	$	$	$	$

The values are the ones agreed upon at the time of signing the contribution agreement.

NOTE: Cash and In-Kind Contributions must be achieved by the project completion date, they do not need to be submitted on a quarterly basis.