



Sunshine Coast Regional District

Request for Proposal

Number: 2361302

for

Water Management Programs for Recreation Facilities

Issue Date:

April 21, 2023

Closing Date of

May 24, 2023 at 3:00 PM local time

OPTIONAL SITE MEETING: An optional site meeting will be held on Thursday May 4, 2023 at 10:00 am local time. Proponents will need to travel to following facilities in order:

- a) Gibsons & Area Community Centre located at 700 Park Road, Gibsons, BC
- b) Gibsons and District Aquatic Facility located at 953 Gibsons Way, Gibsons BC
- c) Sunshine Coast Arena located at 5982 Shoal Way, Sechelt BC
- d) Sechelt Aquatic Center located at 5500 Shorncliffe Ave, Sechelt BC
- e) Pender Harbour Aquatic Fitness Center 13639 Sunshine Coast Hwy, Madeira Park BC

Proponents are required to RSVP by 12:00 noon on Wednesday May 3, 2023; if no RSVP's are received the site meeting will be cancelled.

CONTACT: All enquiries related to this Request for Proposals, including any requests for information and clarification, are to be submitted by May 10, 2023 and directed, in writing, to purchasing@scrd.ca, who will respond if time permits with a Q&A to prospective Proponents by May 24, 2023 Information obtained from any other source is not official and should not be relied upon. Enquiries and any responses providing new information will be recorded and distributed to prospective Proponents.

DELIVERY OF PROPOSALS: Proposals must be in English and must be submitted using one of the submission methods below, and must include a copy of this cover page that is signed by an authorized representative of the Proponent, in accordance with the requirements set out in the RFP.

Email Submission: Proponents may submit an electronic proposal by email. Proposals submitted by email should be submitted to submissions@scrd.ca in accordance with the instructions at Section 1.3 of the General Terms and Conditions of this RFP.

OR

Hard Copy Submission: Proponents must submit **ONE (1)** hard-copies and **ONE (1)** electronic copy on a USB Drive of the proposal. Proposals submitted by hard copy must be submitted by hand or courier to:

**Sunshine Coast Regional District
1975 Field Road
Sechelt, BC V7Z 0A8**

Regardless of submission method, proposals must be received before Closing Time to be considered.

A proposal is deemed to incorporate the Confirmation of Proponent's Intent to Be Bound below, without alteration.

CONFIRMATION OF PROPONENT'S INTENT TO BE BOUND:

The enclosed proposal is submitted in response to the referenced Request for Proposal, including any Addenda. By submitting a proposal, the Proponent agrees to all of the terms and conditions of the RFP including the following:

- a) The Proponent has carefully read and examined the entire Request for Proposal;
- b) The Proponent has conducted such other investigations as were prudent and reasonable in preparing the proposal; and
- c) The Proponent agrees to be bound by the statements and representations made in its proposal.

PROPONENT NAME (please print): _____

NAME OF AUTHORIZED REPRESENTATIVE (please print): _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____

DATE: _____

TABLE OF CONTENTS

	Page
1. GENERAL TERMS & CONDITIONS	3
2. INTRODUCTION.....	8
2.1 Purpose	8
3. SITUATION/OVERVIEW.....	8
3.1 Background.....	8
3.2 Project Objectives.....	9
3.3 Scope.....	9
3.4 Specifications.....	9
4. CONTRACT	9
4.1 General Contract Terms and Conditions.....	9
4.2 Service Requirements	9
4.3 Term of Contract.....	10
5. REQUIREMENTS	10
5.1 Capabilities	10
5.2 Approach	11
5.3 Sustainable Social Procurement	11
5.4 Price.....	12
6. PROPOSAL FORMAT	12
7. EVALUATION.....	12
7.1 Mandatory Criteria	12
7.2 Weighted Criteria.....	13
7.3 Price Evaluation.....	13
Appendix A Water Management Plan GACC.....	14
Appendix B Water Management Plan GDAF	32
Appendix C Water Management Plan SAC.....	44
Appendix D Water Management Plan SCA.....	56
Appendix E Water Management Plan PHAFC.....	75

1. GENERAL TERMS & CONDITIONS

1.1 DEFINITIONS

Throughout this Request for Proposal, the following definitions apply:

"Addenda" means all additional information regarding this RFP, including amendments to the RFP;

"BC Bid" means the BC Bid website located at www.bcbid.ca;

"Closing Location" includes the location or email address for submissions indicated on the cover page of this RFP, or BC Bid, as applicable;

"Closing Time" means the closing time and date for this RFP as set out on the cover page of this RFP;

"Contract" means the written agreement resulting from the RFP executed by the Regional District and the successful Proponent;

"Contractor" means the successful Proponent to the RFP who enters into a Contract with the Regional District;

"Must", or **"mandatory"** means a requirement that must be met in order for a proposal to receive consideration;

"Proponent" means a person or entity (excluding its parent, subsidiaries or other affiliates) with the legal capacity to contract, that submits a proposal in response to the RFP;

"Proposal" means a written response to the RFP that is submitted by a Proponent;

"Request for Proposals" or **"RFP"** means the solicitation described in this document, including any attached or referenced appendices, schedules or exhibits and as may be modified in writing from time to time by the Regional District by Addenda; and

"Should", **"may"** or **"weighted"** means a requirement having a significant degree of importance to the objectives of the Request for Proposals.

"SCRD", **"Regional District"**, **"Organization"**, **"we"**, **"us"**, and **"our"** mean Sunshine Coast Regional District.

1.2 FORM OF PROPOSAL

This Proposal must be completed in its entirety. Failure to properly complete this Proposal form may cause your Proposal to be rejected. The signing officer must initial all corrections. The Sunshine Coast Regional District (Regional District) reserves the right to permit a correction, clarification or amendment to the Proposal or to correct minor errors and irregularities.

1.3 SUBMISSION OF PROPOSAL

a) Proposals must be submitted before Closing Time to the Closing Location using one of the submission methods set out on the cover page of this RFP. Proposals must not be sent by fax. The Proponent is solely responsible for ensuring that, regardless of submission method selected, the Regional District receives a complete Proposal, including all attachments or enclosures, before the Closing Time.

b) For electronic submissions (BC Bid or email), the following applies:

(i) The Proponent is solely responsible for ensuring that the complete electronic

Proposal, including all attachments, is received before Closing Time;

(ii) The Regional District limits the maximum size of any single email message to 20MB or less.

(iii) Proponents should endeavour to submit emailed proposal submissions in a single message and avoid sending multiple email submissions for the same opportunity. If an electronic submission exceeds the applicable maximum single message size, the Proponent may make multiple submissions (BC Bid upload or multiple emails for the same opportunity). Proponents should identify the order and number of emails making up the email proposal submission (e.g. "email 1 of 3, email 2 of 3...");

(iv) For email proposal submissions sent through multiple emails, the Regional District reserves the right to seek clarification or reject the proposal if the Regional District is unable to determine what documents constitute the complete proposal;

(v) Attachments must not be compressed or encrypted, must not contain viruses or malware, must not be corrupted, and must be able to be opened using commonly available software (e.g. Adobe Acrobat). Proponents submitting by electronic submission are solely responsible for ensuring that any emails or attachments are not corrupted. The Regional District has no obligation to attempt to remedy any message or attachment that is received corrupted or cannot be viewed. The Regional District may reject proposals that are compressed encrypted, cannot be opened or that contain viruses or malware or corrupted attachments.

c) For BC Bid e-submissions only pre-authorized e-bidders registered on BC Bid can submit electronic bids on BC Bid. BC Bid is a subscription service (\$150 per year) and the registration process may take two business days to complete. If using this submission method, Proponents should refer to the BC Bid website or contact BC Bid Helpdesk at 250-387-7301 for more information. An electronic proposal submitted on BC Bid must be submitted using the e-bidding key of an authorized representative of the Proponent. Using the e-bidding key of a subcontractor is not acceptable.

d) For email proposal submissions, including any notices of amendment or withdrawal referred to in Section 1.6, the subject line of the email and any attachment should be clearly marked with the name of the Proponent, the RFP number and the project or program title.

e) The Regional District strongly encourages Proponents using electronic submissions to submit proposals with sufficient time to complete the upload and transmission of the complete proposal and any attachments before Closing Time.

- f) The Proponent bears all risk associated with delivering its Proposal by electronic submission, including but not limited to delays in transmission between the Proponent's computer and the Regional District Electronic Mail System or BC Bid.
- g) While the Regional District may allow for email proposal submissions, the Proponent acknowledges that email transmissions are inherently unreliable. The Proponent is solely responsible for ensuring that its complete email proposal submission and all attachments have been received before Closing Time. If the Regional District Electronic Mail System rejects an email proposal submission for any reason, and the Proponent does not successfully resubmit its proposal by the same or other permitted submission method before Closing Time, the Proponent will not be permitted to resubmit its proposal after Closing Time. The Proponent is strongly advised to contact the Regional District Contact immediately to arrange for an alternative submission method if:
 - (i) the Proponent's email proposal submission is rejected by the Regional District Electronic Mail System; or
 - (ii) the Proponent does not receive an automated response email from the Regional District confirming receipt of each and every message transmitted, within a half hour of transmission by the Proponent.

An alternate submission method may be made available, at the Regional District's discretion, immediately to arrange for an alternative submission method, and it is the Proponent's sole responsibility for ensuring that a complete proposal (and all attachments) submitted using an approved alternate submission method is received by the Regional District before the Closing Time. The Regional District makes no guarantee that an alternative submission method will be available or that the method available will ensure that a Proponent's proposal is received before Closing Time.

1.4 SIGNATURE REQUIRED

Proposals must be properly signed by an officer, employee or agent having authority to bind the Proponent by that signature.

1.5 CLARIFICATIONS, ADDENDA & MINOR IRREGULARITIES

If any Proponent finds any inconsistencies, errors or omissions in the proposal documents or requires information, clarification of any provision contained therein, they shall submit their query in writing or email, addressed as follows:

Purchasing Division
Sunshine Coast Regional District
1975 Field Road, Sechelt, BC V7Z 0A8

purchasing@scrd.ca

Any interpretation of, addition to, deletions from or any corrections to the proposal documents will be issued as written addendum by the Regional District.

All Addenda will be posted on BC Bid. It is the sole responsibility of the Proponent to check for Addenda on BC Bid. Proponents are strongly encouraged to subscribe to BC Bid's email notification service to receive notices of Addenda.

1.6 WITHDRAWAL OR REVISIONS

Proposals or revisions may be withdrawn by written notice provided such a notice of withdrawal is received prior to the closing date and time. Proposals withdrawn will be returned to the Proponent unopened. Revisions to the proposals already received shall be submitted only by electronic mail, or signed letter. The revision must state only the amount by which a figure is to be increased or decreased, or specific directions as to the exclusions or inclusion of particular words.

1.7 CONDUCT OF THE CONTRACT

Unless otherwise specified within this document, any queries regarding this Request for Proposal are to be directed to purchasing@scrd.ca. No other verbal or written instruction or information shall be relied upon by the Bidder, nor will they be binding upon the Regional District.

1.8 CONFLICT OF INTEREST/NO LOBBYING

- (a) A Proponent may be disqualified if the Proponent's current or past corporate or other interests, or those of a proposed subcontractor, may, in the Regional District's opinion, give rise to an actual or potential conflict of interest in connection with the services described in the RFP. This includes, but is not limited to, involvement by a Proponent in the preparation of the RFP or a relationship with any employee, contractor or representative of the Regional District involved in preparation of the RFP, participating on the evaluation committee or in the administration of the Contract. If a Proponent is in doubt as to whether there might be a conflict of interest, the Proponent should consult with the Regional District Contact prior to submitting a proposal. By submitting a proposal, the Proponent represents that it is not aware of any circumstances that would give rise to a conflict of interest that is actual or potential, in respect of the RFP.
- (b) A Proponent must not attempt to influence the outcome of the RFP process by engaging in lobbying activities. Any attempt by the Proponent to communicate, for this purpose directly or indirectly with any employee, contractor or representative of the Regional District, including members of the evaluation committee and any elected officials of the Regional District, or with the media, may result in disqualification of the Proponent.

1.9 CONTRACT

By submitting a proposal, the Proponent agrees that should its proposal be successful the Proponent will enter into a Contract with the Regional District on substantially the same terms and Conditions set out in <https://www.scrd.ca/go/terms> and such other terms and conditions to be finalized to the satisfaction of the Regional District, if applicable.

1.10 SUSTAINABLE PROCUREMENT

The Regional District adheres to its sustainable consideration factors. Proposals will be considered not only on the total cost of services, but Proposals that addresses the environment and social factors.

1.11 INVOICING AND PAYMENT

Unless otherwise agreed, the Regional District payment terms are Net 30 days following receipt of services or approved invoices, whichever is later. Original invoices are to be forwarded to the accounts payable department of the Regional District. The purchase order number assigned by the Regional District must be stated on the invoice otherwise payment may be delayed.

1.12 PRICING, CURRENCY AND TAXES

Offered prices are to be attached as a price schedule in Canadian dollars with taxes stated separately when applicable.

1.13 IRREVOCABLE OFFER

This Proposal must be irrevocable for 90 days from the Proposal closing date and time.

1.14 TIME IS OF THE ESSENCE

Time shall be of the essence in this contract.

1.15 ASSIGNMENT

The Proponent will not, without written consent of the Regional District, assign or transfer this contract or any part thereof.

1.16 OWNERSHIP OF DOCUMENTS & FREEDOM OF INFORMATION

All documents submitted in response to this Request for Proposal shall become the property of the Regional District and as such will be subject to the disclosure provisions of the *Freedom of Information and Protection of Privacy Act* and any requirement for disclosure of all or a part of a Proposal under that Act.

The requirement for confidentiality shall not apply to any Proposal that is incorporated into a Contract for the Work. Further, the Regional District may disclose the top scoring proponent's aggregate pricing to the Regional District Board at a public meeting, when making a recommendation for the award of the Contract.

For more information on the application of the Act, go to http://www.cio.gov.bc.ca/cio/priv_leg/index.page.

1.17 AWARD OF CONTRACT

The Purchasing Policy at the Regional District offers contracts to businesses through an open, fair and consistent competitive bidding process. This ensures that the Regional District will receive the best overall value for the goods and services it requires. The Regional District reserves the right to cancel, award all

or part of the scope of work described in this document to a single Proponent or may split the award with multiple Proponents.

All awards are subject to Board approval that meets the needs as determined by the Board. The Regional District, in receipt of a submission from a Proponent, may in its sole discretion consider the Proponent to have accepted the terms and conditions herein, except those expressly excluded or changed by the Proponent in writing.

The RFP shall not be construed as an agreement to purchase goods or services. The lowest priced or any proposal will not necessarily be accepted. The RFP does not commit the Regional District in any way to award a contract and that no legal relationship or obligation regarding the procurement of any good or service will be created between Regional District and the proponent unless and until Regional District and the proponent execute a written agreement for the Deliverables

1.18 COST OF PROPOSAL

The Proponent acknowledges and agrees that the Regional District will not be responsible for any costs, expenses, losses, damage or liability incurred by the Proponent as a result of or arising out submitting a Proposal for the proposed contract or the Regional District's acceptance or non-acceptance of their proposal. Further, except as expressly and specifically permitted herein, no Proponent shall have any claim for any compensation of any kind whatsoever, as a result of participating in this RFP, and by submitting a proposal each Proponent shall be deemed to have agreed that it has no claim.

1.19 PROPONENT'S RESPONSIBILITY

It is the Proponent's responsibility to ensure that the terms of reference contained herein are fully understood and to obtain any further information required for this proposal call on its own initiative. The Regional District reserves the right to share, with all proponents, all questions and answers related to this bid call.

1.20 EVALUATIONS

Proposals will be evaluated in private, including proposals that were opened and read in public, if applicable. Proposals will be assessed in accordance with the evaluation criteria.

If only one Proposal is received, the Regional District reserves the right to open the Proposal in private or if the total bid price exceeds the estimated budget for the Contract, the Regional District may cancel and re-tender, accept, not accept and cancel or re-scope the Work seeking a better response, with or without any substantive changes being made to the solicitation documents. If more than one Proposal is received from the same Proponent, the last Proposal received, as determined by the Regional District, will be the only Proposal considered.

1.21 ACCEPTANCE OF TERMS

The submission of the Proposal constitutes the agreement of the Proponent that all of the terms and conditions of the RFP are accepted by the Proponent and incorporated in its Proposal, except those

conditions and provisions which are expressly excluded and clearly stated as excluded by the Proponent's proposal.

1.22 MANDATORY REQUIREMENTS

Proposals not clearly demonstrating that they meet the mandatory requirements will receive no further consideration during the evaluation process.

1.23 INSURANCE & WCB

The Proponent shall obtain and continuously hold for the term of the contract, insurance coverage with the Regional District Listed as "Additional Insured" the minimum limits of not less than those stated below:

- (a) Commercial General Liability – not less than \$2,000,000 per occurrence
- (b) Motor Vehicle Insurance, including Bodily Injury and Property Damage in an amount no less than \$2,000,000 per accident from the Insurance Corporation of British Columbia on any licensed motor vehicles of any kind used to carry out the Work.
- (c) Error & Omissions Insurance – not less than \$2,000,000 per occurrence
- (d) A provision requiring the Insurer to give the Owners a minimum of 30 days' notice of cancellation or lapsing or any material change in the insurance policy;

The Proponent must comply with all applicable laws and bylaws within the jurisdiction of the work. The Proponent must further comply with all conditions and safety regulations of the Workers' Compensation Act of British Columbia and must be in good standing during the term of any contract entered into from this process.

1.24 COLLUSION

Except otherwise specified or as arising by reason of the provisions of these documents, no person, or corporation, other than the Proponent has or will have any interest or share in this proposal or in the proposal contract which may be completed in respect thereof. There is no collusion or arrangement between the Proponent and any other actual or prospective Proponent in connection with proposals submitted for this project and the Proponent has no knowledge of the context of other proposals and has no comparison of figures or agreement or arrangement, express or implied, with any other party in connection with the making of the proposal.

1.25 CONFLICT OF INTEREST

Proponents shall disclose in its Proposal any actual or potential conflict of interest and existing business relationship it may have with the Regional District, its elected or appointed officials or employees.

1.26 LIABILITY FOR ERRORS

While the Regional District has used considerable efforts to ensure an acute representation of information in these bid documents, the information contained is supplied solely as a guideline for Proponents. The information is not guaranteed or warranted to be accurate by the Regional District nor is it necessarily comprehensive or exhaustive.

1.27 TRADE AGREEMENTS

This RFP is covered by trade agreements between the Regional District and other jurisdictions, including the following:

- a) Canadian Free Trade Agreement; and
- b) New West Partnership Trade Agreement.

1.28 LAW

This contract and any resultant award shall be governed by and construed in accordance with the laws of the Province of British Columbia, which shall be deemed the proper law thereof.

1.29 REPRISAL CLAUSE

Tenders will not be accepted by the Regional District from any person, corporation, or other legal entity (the "Party") if the Party, or any officer or director of a corporate Party, is, or has been within a period of two years prior to the tender closing date, engaged either directly or indirectly through another corporation or legal entity in a legal proceeding initiated in any court against the Regional District in relation to any contract with, or works or services provided to, the Regional District; and any such Party is not eligible to submit a tender.

1.30 FORCE MAJEURE (ACT OF GOD)

Neither party shall be liable for any failure of or delay in the performance of this Agreement for the period that such failure or delay is due to causes beyond its reasonable control including but not limited to acts of God, war, strikes or labour disputes, embargoes, government orders or any other force majeure event. The Regional District may terminate the Contract by notice if the event lasts for longer than 30 days.

1.31 CONFIDENTIAL INFORMATION OF PROPONENT

A proponent should identify any information in its proposal or any accompanying documentation supplied in confidence for which confidentiality is to be maintained by Regional District. The confidentiality of such information will be maintained by Regional District, except the total proposed value, which must be publicly released for all proposals, or otherwise required by the Freedom of Information and Protection of Privacy Act ("FOIPPA"), law or by order of a court or tribunal. Proponents are advised that their proposals will, as necessary, be disclosed, on a confidential basis, to advisers retained by Regional District to advise or assist with the RFP process, including the evaluation of proposals. If a proponent has any questions about the collection and use of personal information pursuant to this RFP, questions are to be submitted to the RFP Contact.

1.32 DISPUTE RESOLUTION

All unresolved disputes arising out of or in connection with this Proposal or in respect of any contractual relationship associated therewith or derived therewith shall be referred to and finally resolved by arbitration as prescribed by Mediate BC services pursuant to its rules, unless otherwise mutually agreed between the parties.

1.33 DEBRIEFING

At the conclusion of the RFP process, all Proponents will be notified. Proponents may request a debriefing meeting with the Regional District.

2. INTRODUCTION

2.1 Purpose

The Regional District is seeking proposals from qualified Contractors to implement water management programs to mitigate risk of micro-organism growth at five of our recreation facilities, the Sunshine Coast Arena, the Sechelt Aquatic Centre, the Gibsons & Area Community Centre, Gibsons and District Aquatic Facility and the Pender Harbour Aquatic and Fitness Centre. The programs will be unique to each facility.

The Regional District desires an approach that will be cost effective and environmentally sound.

Annual project budget is \$17,000 with an additional \$9,500 in year one for installation of required equipment.

3. SITUATION/OVERVIEW

3.1 Background

The coronavirus pandemic highlighted the need for a program to monitor water quality in our buildings. During the pandemic buildings were shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have significant quantities of water flowing through the fixtures, piping and equipment daily were stagnant or operated at reduced flows for an extended period of time. To mitigate the possibility of water quality being compromised by building closures or periods of reduced usage, water management programs are being proposed for the following buildings.

The Sunshine Coast Arena (SCA), located at 5982 Shoal Way, was constructed in 1973 and holds a 200 X 85-foot NHL- sized ice surface that can also be operated as a dry floor. The building features a single ice plant, Zamboni room, workshop, back office, four dressing rooms, flex room, officials' room, lower lobby, operations office, skate shop, skate club office, staff bathroom, two lower lobby washrooms and sprinkler room. On the second floor there is a boiler room, storage room, two bathrooms, viewing lounge, community room, two offices and a kitchen.

The Sechelt Aquatic Centre (SAC) located at 5500 Shorncliffe Ave, was constructed in 2007, is approximately 22,500 square feet and features a 25m pool, leisure pool, swirl pool, water slide, steam room, sauna, gym, fitness studio, fitness studio storage with roof access via hatch, community use room, three change room areas, viewing lobby, three lobby washrooms, reception area, lifeguard room, staff offices, storage rooms and mechanical rooms.

The Gibsons & Area Community Centre (GACC), located at 700 Park rd. was constructed in 2007 and features one 200 X 85-foot NHL sized ice surface that can also be operated as a dry floor. The building features a single ice plant, Zamboni room with roof access via hatch, exterior electrical room, workshop, operations office, skate shop, four dressing rooms, flex room, coaches rooms, arena level washrooms, warm viewing area, managers office , bleachers, two lobby washrooms, two lobby change rooms, fitness centre, four multi use rental rooms with kitchens, squash courts, reception area, four administrative offices, staff room, electrical room , west wing washrooms and multiple janitorial storage rooms.

The Gibsons and District Aquatic Facility (GDAF) is located at 953 Gibson's Way, Gibson's, BC, was originally constructed in 1977, is approximately 7,600 square feet and features a main pool, two small wading pools, hot tub, three change rooms, a mechanical room, chemical room, staff room, janitor room and two offices.

The Pender Harbour Aquatic and Fitness Centre (PHAFC) located at 13639 Sunshine Coast Hwy, Madeira Park, BC. The aquatic center features a main pool, hot tub, sauna, office, fitness center, three change rooms, mechanical room and a storage room off of the main pool deck.

3.2 Project Objectives

Supply and install materials and implement the control measures outlined in the water management plans for the Regional District's five (5) recreation facilities to mitigate risk of micro-organism growth.

3.3 Scope

The Contractor will provide all labour, equipment, and materials necessary to perform the services as described in Appendices A through E, including but not limited to the following:

- Complete a review of water management plans for each of the five facilities to identify areas that require installed controls.
- Supply and install feed timers, chemical feed systems and CT controllers as outlined in Appendices A through E.
- Supply and install winterizing and shock chlorination equipment as required.
- Provide a maintenance schedule for installed equipment.

3.4 Specifications

Please refer to the following Appendices:

- Appendix A Water Management Plan GACC
- Appendix B Water Management Plan GDAF
- Appendix C Water Management Plan SAC
- Appendix D Water Management Plan SCA
- Appendix E Water Management Plan PHAFC

4. CONTRACT

4.1 General Contract Terms and Conditions

Proponents should review carefully the terms and conditions set out in the General Service Contract, including the Schedules. The General Contract terms can be found at: www.scrd.ca/bid

4.2 Service Requirements

The Contractor's responsibilities will include the following:

- a) The Contractor will be expected to work closely with the Regional District staff throughout the term of the contract; and
- b) The Contractor will provide all deliverables as outlined in Appendices A through E; and
- c) The Contractor will conform to all applicable codes, guidelines regulations and all laws as required by the authorities having jurisdiction; and
- d) The Contractor will employ skilled and qualified people to complete the work; and
- e) The Contractor will notify the Regional District when the installation of the required equipment has reached substantial performance and shall review all completed work with the Regional District for the purposes of final inspection and deficiencies. Any deficiencies identified the successful Proponent is required to provide the Regional District with a reasonable time period for the correction. The Regional District will provide acknowledgment of those corrections and time frame. The Regional District will conduct further inspections; and
- f) The Contractor will warrant that the work for the installation of the required equipment in year one. The Contractor will warrant that the equipment has been installed in a good and skilful manner and provide a minimum of 1 year or longer warranty on their work.

If within warranty period any part of the work is found by the Regional District to be defective or faulty due to imperfect or bad construction or material, the Contractor will replace such defective items without expense to the Regional District; and

- g) The Contractor will obtain all permits, licenses, approvals, and certificates which are generally required for the performance of the work; and
- h) The Contractor will provide 3 hard copies and one electronic copy in PDF format of operation and maintenance manuals; and
- i) The Contractor will provide operation and basic preventative maintenance training to Regional District staff.

4.3 Term of Contract

The term of the contract will be for a 3-year period, with the option to renew up to two additional years at the sole discretion of the Regional District.

5. REQUIREMENTS

In order for a proposal to be considered, a Proponent must clearly demonstrate that they meet the mandatory requirements set out in Section 7.1 (Mandatory Criteria) of the RFP.

This section includes “Response Guidelines” which are intended to assist Proponents in the development of their proposals in respect of the weighted criteria set out in Section 7.2 of the RFP. The Response Guidelines are not intended to be comprehensive. Proponents should use their own judgement in determining what information to provide to demonstrate that the Proponent meets or exceeds the Regional District’s expectations.

Please address each of the following items in your proposal in the order presented.

5.1 Capabilities

5.1.1 Relevant Experience

The Proponent and any subcontractors of the Proponent included in its proposal **should** have a minimum of **5** years with the past **7** years providing services of a similar scope and complexity.

Similar scope and complexity is defined as:

- a) Previous experience working in an arena and aquatic facilities.
- b) Previous experience in design and implementing water systems management programs.

5.1.2 Relevant Qualifications

The Proponent or any subcontractors of the Proponent included in its proposal **should** have the following qualifications:

- All personnel performing the work **need to** be appropriately certified to provide commercial water systems management program services and shall maintain a valid Province of British Columbia trade qualification or equivalent.
- Apprentices or helpers **need to** have a minimum of one-year commercial water management program services or equivalent experience. All work performed by apprentices or helpers needs to be checked and verified by the supervising authority.

5.1.3 Subcontractors

Proponents **need to** provide a list of all subcontractors that they will utilize to perform the services, the list **should** include the legal company name, subtrade and any qualifications.

5.1.4 References

Proponents **need to** provide a minimum of **3** references (i.e. names and contact information) of individuals who can verify the quality of work provided specific to the relevant experience of the Proponent and of any subcontractors named in the proposal. References from the Proponent's own organization or from named subcontractors are not acceptable.

The Regional District reserves the right to seek additional references independent of those supplied by the Proponent, including internal references in relation to the Proponent's and any subcontractor's performance under any past or current contracts with the Regional District or other verifications as are deemed necessary by it to verify the information contained in the proposal and to confirm the suitability of the Proponent.

5.1.5 Environmental Requirements

All removed system components and waste installation materials **need to** be disposed of in a manner that meets all regulatory and environmental requirements. Upcycling or recycling should be considered as the preferred method of disposal whenever possible. Water treatment chemicals **should** be environmentally friendly wherever possible and **need to** be disposed of in a manner that meets all regulatory and environmental requirements. Proponents **need to** provide a list of all proposed water treatment chemicals which indicates any potential environmental concerns as well as a disposal plan for unused or waste chemicals and or by-products of treatment routines.

5.2 Approach

Proponents need to provide details on how they will meet the requirements outline in Appendix A through E, test result lead times, additional re-testing procedures and lead times, schedule for when routine services will be completed, any efficiencies or incentives, and warranty information for the installed equipment.

5.3 Sustainable Social Procurement

A factor in the Regional District evaluation process is sustainable social procurement and the evaluation of proposals will take this into consideration.

As part of any submission the Proponent is encouraged to identify how they may contribute to the following key social, employment and economical goals, but not limited to the following:

- a) Contribute to a stronger economy by:
 - promoting a Living Wage
 - Using fair employment practices;
 - Increase training and apprenticeship opportunities;
- b) Environmental Cost of Ownership;
- c) Energy efficient products;
- d) Minimal or environmentally friendly use of packing materials; and
- e) Reducing hazardous materials (toxics and ozone depleting substances).

5.4 Price

Proponents **need to** submit a fee proposal in accordance with Schedule A Fees (in excel) that provides inspection and additional testing services. Pricing must include all time, travel, hourly billable rates and material costs. Proponents **need to** provide an estimated number of hours on site annually to perform their services.

Prices quoted will be deemed to be:

- in Canadian dollars;
- inclusive of duty, FOB destination, and delivery charges where applicable; and
- exclusive of any applicable taxes.

6. PROPOSAL FORMAT

Proponents should ensure that they fully respond to all requirements in the RFP in order to receive full consideration during evaluation.

The following format, sequence, and instructions should be followed in order to provide consistency in Proponent response and ensure each proposal receives full consideration. All pages should be consecutively numbered.

- a) Signed cover page (see section 7.1 Mandatory Criteria).
- b) Table of contents including page numbers.
- c) A short (one or two page) summary of the key features of the proposal.
- d) The body of the proposal, including pricing, i.e. the “Proponent Response”.
- e) Appendices, appropriately tabbed and referenced.
- f) Identification of Proponent (legal name)
- g) Identification of Proponent contact (if different from the authorized representative) and contact information.

7. EVALUATION

Evaluation of proposals will be by a committee formed by the Regional District and may include other employees and contractors.

The Regional District’s intent is to enter into a Contract with the Proponent who has met all mandatory criteria and minimum scores (if any) and who has the highest overall ranking.

Proposals will be assessed in accordance with the entire requirement of the RFP, including mandatory and weighted criteria.

The Regional District reserves the right to be the sole judge of a qualified proponent.

The Evaluation Committee may, at its discretion, request clarifications or additional information from a Proponent with respect to any Proposal, and the Evaluation Committee may make such requests to only selected Proponents. The Evaluation Committee may consider such clarification or additional information in evaluating a Proposal.

7.1 Mandatory Criteria

Proposals not clearly demonstrating that they meet the following mandatory criteria will be excluded from further consideration during the evaluation process.

Mandatory Criteria
The proposal must be received at the Closing Location before the Closing Time.
The proposal must be in English.
The proposal must be submitted using one of the submission methods set out on the cover

Mandatory Criteria

page of the RFP

The proposal must either (1) include a copy of the cover page that is signed by an authorized representative of the Proponent, this is also required for email submissions or (2) be submitted by using the e-bidding key on BC Bid (if applicable), in accordance with the requirements set out in the RFP

7.2 Weighted Criteria

Proposals meeting all of the mandatory criteria will be further assessed against the following weighted criteria.

Weighted Criteria	Weight (%)
Experience	20
Qualifications	20
Approach	15
Environmental Requirements	10
Sustainable Social Procurement	5
Price	30
TOTAL	100

7.3 Price Evaluation

The lowest priced Proposal will receive full points for pricing. All other prices will be scored using the following formula: lowest priced proposal/price of this proposal* total points available for price.

Appendix A Water Management Plan GACC



Legionella Minimization Water Management Plan



GIBSONS & AREA COMMUNITY CENTRE
700 Park Road, Gibsons, BC

Last Revision Date: January 24, 2022

Contents

1.0 Plan Overview

- 1.1 Objective
- 1.2 Development Approach
- 1.3 References

2.0 Site Program Administration

- 2.1 Site Description
- 2.2 Program Team
- 2.3 Program Confirmation
- 2.4 Program Documentation
- 2.5 Plan Management
- 2.6 Legionella Hazard Analysis

3.0 Water Systems

- 3.1 System Description
- 3.2 Control Locations
- 3.3 Cooling Tower Water Treatment Program
- 3.4 Cooling Tower Control Measures
- 3.5 Legionella Monitoring Guidelines
- 3.6 Monitoring Sample Locations
- 3.7 Cooling Tower Legionella Response Protocol
- 3.8 Domestic Water Legionella Response Protocol
- 3.9 Decorative Water Feature Legionella Response Protocol

4.0 Pandemic Planning for Stagnant Water

1.0 Plan Overview

1.1 Objective

This Legionella Risk Management Plan (Plan) was prepared to define a site-specific Water Management Program (Program) to reduce the health hazards and risks associated with the presence of Legionella bacteria in the cooling tower water. However, due to the universal nature of Legionella, and its ability to reappear and colonize building water systems, no water management plan, program, or maintenance measures can guarantee the absence of Legionella or eliminate the potential for associated disease.

1.2 Development Approach

The Plan was developed in accordance with the requirements outlined PWGSC MD15161 -2013, ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems (ASHRAE 188) and ASHRAE 12-2000 best practices.

1. Form Program Team – Building owner or management forms a Program Team to be responsible for developing, implementing, and maintaining the water management program.
2. Describe Water Systems with Flow Diagrams – Program Team develops a process flow diagram that describes the cooling towers and associated sub-systems.
3. Analysis of Building Water Systems – Program Team evaluates where hazardous conditions may occur in cooling towers and associated sub-systems, and determine the locations where measures should be applied to control risks.
4. Control Measures - For each control location, Program Team determines appropriate control measures based the hazard analysis and governmental and/or industry guidelines.
5. Monitoring and Corrective Actions - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions
6. Confirmation Procedures - Program Team establishes procedures to confirm that the Program is being implemented as designed and effectively controls Legionella hazards.
7. Documentation - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions

The building owner through the Program Team is responsible for developing and implementing a Water Management Program (Program) in accordance with the Plan, and for maintaining all documentation for compliance. Building owner through the Program Team is responsible reviewing and updating the Plan and Program as required.

1.3 References

The following regulations, standards, and guidelines are used as references to develop the Legionella Water Management Plan and Program:

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems. June 2015
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, February 2000
3. U.S. Occupational Safety and Health Administration (OSHA) Technical Manual, Section III, Chapter 7: Legionnaires 'disease, January 1999
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems, June 2013.
5. Cooling Technology Institute (CTI), Legionellosis Guideline WTB-148: Best Practices for Control of Legionella, July 2008
6. New York Department of Health, Part 4 – Protection against Legionella of the State Sanitary Code (SSC), found in 10 NYCRR Chapter 1. Effective Date July 6, 2016.
7. New York City Department of Health and Mental Hygiene (NYC DOHMH), Amendment to Title 24 of the Rules of the City of New York: Chapter 8 (Cooling Towers)
8. Public Works Government Services Canada MD – 15161 – 2013 including Addendum A, B&C

2.0 Over-all Site Plan

2.1 Site Description

GIBSONS & AREA COMMUNITY CENTRE ARENA
700 Park Road, Gibsons, BC

2.2 Program Team

The Program Team is responsible for all activities associated with the Water Management Plan and Program. The Program Team Leader must be a person representing the building owner.

Program Team				
Team Member	Name	Company	Title	Responsibility
Owner Representative – Program Lead	Allen Van Velzen	SCRD	Manager Facility Services	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 1	Peter Esser	SCRD	Facility Services Assistant Coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 2	Tim Street	SCRD	Facility Services Coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Contractor			Water Treatment Representative	Manage Program/Plan development. Inspect system and documentation. Audit compliance to generate annual certification report. Provide water treatment program and service components specified in Plan

Team Member	Name	Company	Email	Phone
Owner Representative	Allen Van Velzen	SCRD	Allen.vanVelzen@scrd.ca	604-741-1547
Site Responsible Person 1	Peter Esser	SCRD	peter.esser@scrd.ca	604-741-8510
Site Responsible 2	Tim Street	SCRD	tim.street@scrd.ca	604-989-4685
Contractor				

2.3 Program Confirmation

Program Team is responsible for confirming that the Plan and Program are implemented as designed and controls Legionella hazards in designated building water systems.

1. Program documentation will be used to verify the Plan and Program are implemented as designed. The Program Management Schedule defines the minimum review frequency.
2. Validation that the Plan and Program controls Legionella will be determined by the following:
 - a. Documented use of water treatment, maintenance, operation, and monitoring practices (control measures) supported by industry standards and/or scientific studies that show a reduced incidence of Legionella where similar practices are applied.
 - b. Where necessary, collection of water samples from designated systems for Legionella culture testing by a CDC Elite laboratory. Sample frequency and triggering events defined in Program Control Measures.

2.4 Program Documentation

Program documentation will be provided by the following:

- a. Written procedures for Program maintenance and monitoring activities.

Legionella Minimization Program and Plan

- b. Site Logs to document site performed Program maintenance and monitoring activities.
- c. Service Reports to document service visits by the water treatment service providers.
- d. Reports to document microbiological analyses including any Legionella test results.
- e. Reports to document cooling tower cleaning and/or disinfection procedures.
- f. Reports and/or Site Logs to document any remedial maintenance or monitoring activities.

A master document providing the location of all Plan and Program documents will be maintained by the Program Team.

2.5 Program Management

The Program Team is responsible for maintaining the Plan and Program by the following activities:

Task	Frequency
Review Program Documentation to verify Plan and Program has been implemented as designed.	Annually
Review Program Documentation to validate that the Plan and Program control hazards as defined in Program Confirmation procedures. Program Team to determine if control measures changes are warranted.	Annually
Update Plan and Program to reflect any changes in Team Members, risk factors, building water systems, or control measures.	As Needed

2.6 Legionella Hazard Analysis

Water System Description	Location	Hazard Analysis	Significant Risk	Control Location
Domestic Cold Water	See Site Plans	Public water mains supplying water for any potable outlets are low risk due to temperature and low chance of aerosols.	No	Yes
Domestic Hot Water	See Site Plans	Legionella growth in DHW can affect exposure at point of use. Aerosols are created at areas such as faucets, showers and tubs.	Yes	Yes
Fire Systems	See Site Plans	The potential for Legionella exposure is low for fire protection systems. Water only for systems that are non-domestic does not present a significant risk.	No	N/A
Irrigation Systems	See Site Plans	The potential for Legionella exposure from irrigation systems is relatively low and Legionnaires' disease associated with IRRs has not been reported in scientific literature, so IRRs are typically not Control Location.	No	N/A
Cooling Towers	See Site Plans	Significant potential for Legionella growth and exposure to aerosols	Yes	Yes
Hot Water Heating Loop	See Site Plans	The potential for Legionella growth and exposure is low for closed-loop systems	No	Yes

3.0 Site Specific Water Systems

3.1 System Description: Gibson Community Centre and Arena

Potable Water System	
Potable System Description	
Point of Entry (POE)	<p>About 75% of Gibsons water supply is provided by the Gibsons Aquifer that holds and provides groundwater to the wells and springs. The town of Gibsons is divided into three water zones with Zones 1 and 2 serviced by the Gibsons Aquifer and Zone 3 (Upper Gibsons) being serviced by water purchased from the Sunshine Coast Regional District.</p> <p>The aquifer is so pure that it has no need of chorine additions. The town maintains a network of seven monitoring wells and monitors its drinking water on a regular basis.</p>
Purpose	Provides potable cold and hot water as well as utility water for equipment including cooling towers, for cooling ammonia for ice surfaces.
Components	DCW for building including utilities. DHW with showers, Cooling tower and Hot water heating

Domestic Hot Water Recirculation Loops					
Configuration	Gas hot water heaters provide DHW to facility and is maintained at 120 F				
Purpose	Domestic Hot Water supply				
Components	See above				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

Utilities Water: 1 Cooling Tower System with remote sump					
Tower System Description					
Configuration	Cooling Tower system is located outside the building, remote sump is inside the mechanical room the tower is 200 Tons				
Purpose	Cooling ammonia for ice surface				
Components	Cooling Towers and remote sump				
Avg. Days/Week Online	varies	Avg. Weeks/Year Online	43	Operational Months	Seasonal
Cooling Capacity (Tons)	200 Tons	Number of Cells	1	Recirculation Rate (GPM)	800 USG

Hot Water Heating Closed Loop					
Configuration	Hot Water heating boiler loops				
Purpose	Comfort Heating				
Components	Water Boilers				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

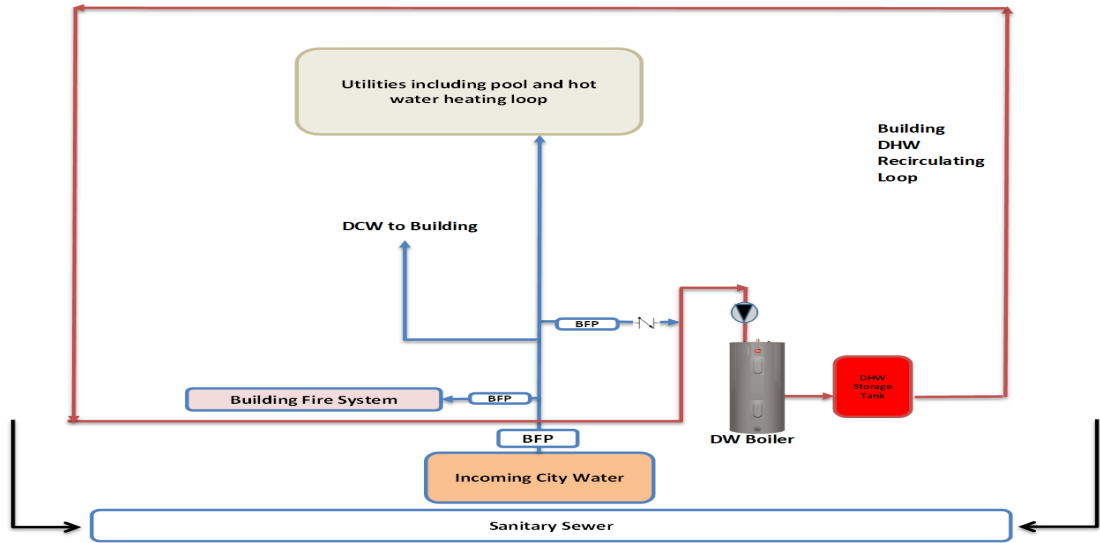
Cooling Tower:



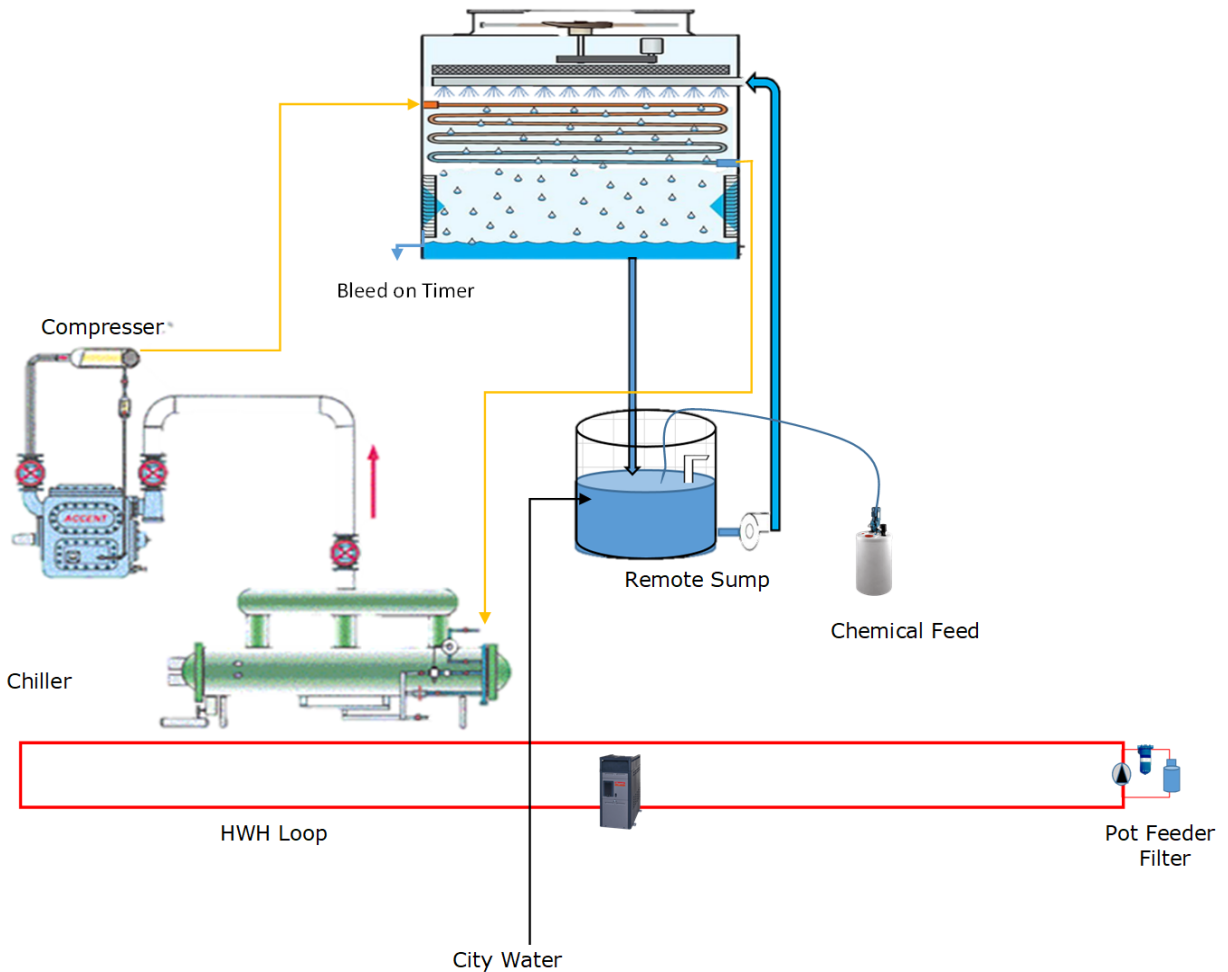
Treatment System Being Replaced



3.1.1 FLOW DIAGRAM: Potable Flow and Utilities (HVAC) Flow Water Flow Diagram



200 Ton Ammonia Fluid Cooler Tower



3.2 Site Control Locations

Control locations are components of water systems associated with the risk of Legionellosis where physical, mechanical, operational, and/or chemical control measures can be applied. The following control locations were identified in the risk assessment survey.

System Control Location		
Control Location	Location	Function and Maintenance
POE City Mains	Enters in mechanical room	The water enters from water main, and is used throughout the building.
DHW System	Various Locations Throughout Buildings	DHW is supplied to showers and faucets throughout the building. The DHW returns is supplied on demand. DHW is considered a CL as secondary disinfection treatment may be added at this point.
Cooling Towers	Tower is outside with remote sump in mechanical room	Rejects heat through evaporative cooling. Requires routine and remedial cleaning, disinfection, water treatment, and mechanical maintenance as outlined in the control measures.
Water Treatment Chemical Feed & Control System	No Water Treatment for towers	Automatically adds water treatment chemicals as programmed and initiates blowdown of cooling tower water to drain to maintain target concentrations. Requires routine monitoring and maintenance to verify proper operation.
Hot Water Heating Closed Loop	Mech. Room	Provides heating to building. Loops are treated with Moly based inhibitor to minimize corrosion. Pot feeders and filters on bypasses.

3.3 Control Measures:

The following control measures have been established to meet the requirements outlined in ASHRAE 188-2015 and PWGSC MD 15161 at the time of document preparation:

Control Measure	Who	Limits / Reference	Monitoring Procedures			Corrective Actions	
			Method	Frequency	Documentation	Procedures	Documentation
Water Treatment Service and Testing - Provider to monitor CT program	Contractor	Site Specific	Inhibitor/Biocide Program and Automated Bleed	Minimum Monthly	Service Report	See Water Treatment Program 3.5 (below)	Service Reports
On-Site Staff CT program monitoring	Site Personnel	Site Specific	Inspect Equipment & test Inhibitor and Conductivity	Minimum 3 times week	Monitoring Log	Visual Inspection and water tests	Monitoring Log
Monitor aerobic bacteria counts in CT	Site Personnel	< 10,000 CFU/mL	Aerobic Bacteria Count - Dip Slide	Weekly Each Tower	Monitoring Log	Cooling Tower Bacteria Testing: Response Protocol	Monitoring Log
Monitor Legionella count for CT program validation	Contractor	< 10 CFU/mL	Lab Culture Tests (ISO:17025:2017)	Monthly Each Tower	Lab Report	Legionella Testing: Response Protocol	Documentation Reports
Clean cooling tower with post-cleaning disinfection procedure	Contractor	Per ASHRAE 188- 2015	CAS chemical cleaning and disinfection	Spring	Cooling Tower Cleaning Report	Follow Cleaning and disinfection outlined by PWGSC 15161	Maintenance Log & Documentation Reports
Monitor Legionella Count in DHW Systems	Contractor	< 10 CFU/mL	Lab Culture Tests (ISO:17025:2017)	Annually	Lab Report	Flush/Heating/CuAg Disinfection	Documentation Report

3.4 Cooling Tower Water Treatment Program - Pending

The following control measures have been established to meet the best practices for Legionella minimization as per ASHRAE 2000-12, Cooling Technology Institute (CTI) and PWGSC MD-15161 and Manufacturers Operating Manuals.

Note: Legionella bacteria cannot be eradicated, however the following best practices are meant to minimize the occurrences and number of bacteria.

- Automatic continuous bleed, manual cleaning at regular intervals, application of scale and rust inhibitors on a continuous basis, and application of alternating oxidizing and non-oxidizing biocides, including shock chlorination, at timed intervals using automatic equipment.

Cooling Tower Start Up: (at start of season or in spring for year round towers)

- While operating the condensing water pump(s), Contractor will treat the system with patented bioXile or like to penetrate and put into suspension any biofilm that may be present. This solution will be circulated through entire system.
- The system will then be treated with sodium hypochlorite to a level of 5 mg/L (ppm) free chlorine residual and held for 2 hours.
- Once this biocidal treatment has been successfully completed, resume the standard water treatment program.

Cooling Tower Inhibitor Program:

- An inhibitor such as Chem-Aqua HP 31155 or like with a combination of PBTC phosphonate and azole, with a blend of synthetic phosphonate and sequestering agents to prevent deposition and minimize corrosion should be utilized. The product should have an excellent environmental profile and contain no heavy metals. The product should contain a tracer that can be tested for automatically with the AquaDart or like system and manually with a hand held tester.

Alternating Biocide Program:

Good microbiological control requires regular additions of both oxidizing and non-oxidizing biocides, routine cooling tower cleaning, and proper equipment operation.

Oxidizing Biocide (Halogen)

- TowerChlor - Oxidizing biocide or like product should be fed a minimum of 3 times per week to achieve a minimum 1.0 PPM free halogen residual for a minimum of one hour.
- FAC levels must be tested at start up, during the summer months and again in the fall. Adjustments to biocide feed time and/ frequency should be made based on results.
- In some locations, continuous feed halogen may be preferred. In these areas of continuous halogen feed, the control should be 0.2-0.5 PPM free halogen.

Non-Oxidizing Biocide Feed

- CPen-C – Dispersant with Non-oxidizing biocide DBNPA properties or similar Non-ionic product.

It is imperative that the oxidizing biocide touches every drop of water at least once per week. This involves the customer BMS turning on all recirculating pumps at a pre-determined time and adjusting the biocide feed to co-ordinate with the timing.

If Applicable: The Procedure for Winterizing based on ASHRAE Guideline 12-2000, Section 7.6.3

Proper layup of system that are seasonally shut down is extremely important to minimize corrosion and biological deposits.

- a) It is recommended that the entire system (cooling tower, system piping, heat exchangers, etc.) be drained to waste.
- b) When draining the system is not practical during shutdown, lower the bleed set point by 30% and increase the inhibitor to maximum levels 2-3 weeks before shutdown. Ensure any stagnant cooling water is pretreated with your maximum dose of non-oxidizing biocide just prior to shut down.

Cooling Tower Chemicals

Product	Purpose	Manufacturer	PCR Reg. #	Target Residual
Chem-Aqua HP 31155 or like	Solid Inhibitor/ Sludge Conditioner			100-200 ppb PTSA
TowerChlor or like	Solid Oxidizing Biocide			0.5-1.5 ppm FAC
CPen-C or like	Dispersant with DBNPA properties			10-20 ppm
Chem-Aqua 51999 or like	Closed Loop Inhibitor			800-1600 ppm NA2O

Safety Data Sheets (SDS) for all products located in binder

Equipment

System	Manufacturer	Featur
CT Controller	Advantage or equivalent	Monitors Conductivity, inhibitor feed multi- function dual biocide feed timers. On-line capabilities/ORP – not used at this point
Chemical Feed Systems	3 x Walchem Feed Pumps Solid Feeder Boards or like	Feeds chemical and biocide based on controller settings

Equipment Settings

Feed/Control Equipment Settings					
Product	Feed Method	Feed Frequency	Days Added	Time Added	Feed Location
Chem-Aqua HP 31155 or like	Based on metered make-up water	As Needed	As Needed	As Needed	Control Loop
TowerChlor or like	Feed Timer	3 x / Week	M/W/F	8 AM	Control Loop
CPen-C or like	Feed Timer	3 x / Week	T/T/S	7 AM	Control Loop

3.5 Monitoring Guidelines

Monitoring Control Measures			
Control Measure	Control Range	Control Objective	Controlled By
Conductivity	300-500 µmhos 8-10 Cycles	Keep tower water solids concentration in range desired for corrosion and scale control and water conservation.	Bleed Controller
Inhibitor Level	100-200 ppb PTSA	Maintain concentration of corrosion and scale inhibitor product in target range	Corrosion/Scale Inhibitor Feed Rate
Free Chlorine Residual	1.0-1.5 ppm	Achieve oxidizing biocide residual in target range for microbiological control.	Oxidizing Biocide Feed Rate and Frequency
Bacteria Count	< 10,000 CFU/mL	Keep bacteria count low as a general indicator of microbiological control	Corrosion/Scale Control, Biocide Additions, Routine Cleaning, System Disinfections, Good Operational Practices, Mechanical Maintenance
Cooling Tower Inspections	Clean. No Visible Microbial Growth. No Mechanical	Evaluate need for chemical program adjustments, cleaning and/or disinfection, or mechanical service	
Legionella Count CT	< 10 CFU/mL	Validate cooling tower maintenance program and plan for Legionella control.	
DHW Legionella Count	< 10 CFU/mL	Validate DHW maintenance program and plan for Legionella control.	Site Staff Flush all DHW showers and faucets weekly during low or no use periods

3.6 Monitoring Sample Locations

Cooling Tower Monitoring Sample Locations		
Sample Type	Sample Location	Sampling
Water Quality Testing	Control Loops	Take water sample at any time that gives an accurate representation of water treatment chemical levels. Sample should be taken during or as close to the end of a biocide feed as possible.
Tower Legionella Culture Sample	Control Loops	Water sample should be taken before a biocide feed but as close to the start of the biocide feed as possible. Taking a sample during a biocide feed may result in an invalid representation of the system and could be subject to rejection by the Legionella testing lab.
Dip Slide Sample	Control Loops	Water sample should be taken before a biocide feed but as close to the start of the biocide feed as possible.
Domestic Hot Water Monitoring Sample Locations		
Sample Type	Sample Location	Sampling
Domestic Hot Water Legionella Culture Sample	Remote Shower or faucet	Sample at most remote shower faucet. Allow water to get hot and then run for 1 minute to get a representative sample

3.7 Cooling Tower Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - **When the LPTOT count is less than 10 cfu/mL:**

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - **When the LPTOT count is between 10- 999 cfu/mL:**

- Perform a disinfection within 48 hours.
- Review and adjust the O&M procedures and the water treatment program as required to ensure acceptable bacterial levels in the system.
- Wait 2 to 7 days then perform a Legionella bacteria culture test.

Level 3 Limits - **When the LPTOT count exceeds 1,000 cfu/mL:**

- Immediately implement measures that will eliminate water dispersion by aerosol from the affected cooling tower system then clean with bioXile or like and disinfect the system before putting the system back into service.
- Review and adjust the O&M procedures and water treatment program to ensure acceptable bacterial levels in the system.
- Wait 2 to 7 days then perform a Legionella bacteria culture test

The disinfection procedure using shock chlorination for cooling towers shall be as follows:

- ✓ Turn OFF the cooling tower fan during shock chlorination. Turn off bleed controller.
- ✓ Shock chlorinate the whole system including the cooling-tower distribution basin and fill with the all circulating pump(s) in operation.
- ✓ During shock chlorination, be aware that pH higher than 7.0 may require more product.
- ✓ **Maintain free chlorine residual of at least 10 ppm for 4 hours or alternatively, a residual of 15 ppm for at least 2 hours.**
- ✓ This shall be followed by continuous, automatically controlled feed of suitable water treatment chemicals with scale and rust inhibitors.
- ✓ Lower conductivity set point to 250 mmh.
- ✓ Wait two days and retest. Increase controller back to normal cycles.

Disinfections for actionable Legionella counts are not included in your treatment program and will be performed by the Contractor at an agreed upon additional price.

3.8 Domestic Hot Water Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - When the LPTOT count is less than 10 cfu/mL:

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - When the LPTOT count is 10-100 cfu/mL:

- Immediately flush all hot water faucets for 10 minutes and consider performing a disinfection using copper silver ionization. Resample when disinfection is completed
- Resample between 2-7 days.

Level 3 Limits - When the LPTOT count is above 100 cfu/mL:

- Immediately shut off all aerosilization devices and flush all hot water faucets for 10 minutes.
- Perform disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample when disinfection is completed.

4.0 Pandemic Planning for Stagnant Water

In the rare case that a pandemic (such as coronavirus) occurs buildings can be shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have hundreds or thousands of gallons of water flowing through the fixtures, piping, and equipment daily may be stagnant for an unknown period of time, maybe several months.

Stagnation can lead to serious problems that cause long-term damage, reduce property values, and be very difficult to mitigate once the building is reoccupied.

Issues with stagnant water:

Low flow and stagnation in water systems depletes disinfectant levels and stabilizes temperatures to ambient. This provides ideal conditions for biofilms to form in hot and cold water storage tanks, hot water heaters, showerheads, faucets, ice machines, , decorative fountains, and cooling tower systems.

Biofilms are communities of surface-attached bacteria that are directly linked to serious corrosion problems, biofouling, and the growth of Legionella and other premise plumbing pathogens. Once established, biofilms are difficult to remove from water systems even with high disinfectant levels.

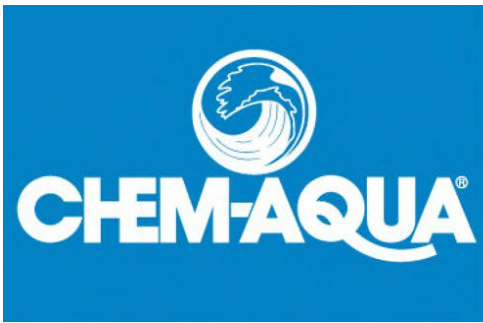
Although each situation is different, there are practical steps you can take when shutting down a building to help reduce the potential for water system damage and waterborne pathogen growth:

- Keep the building HVAC systems live to maintain temperature and humidity control.
- If not required for HVAC system operation, the cooling tower, chillers, heat exchangers, and associated piping should be completely drained. Leaving the system filled with stagnant water can result in severe corrosion, biofouling problems, and contribute to the transmission of Legionnaire's disease.

Legionella Minimization Program and Plan

- If the cooling tower is required for HVAC system operation, specific treatment protocols may be required to help address low load conditions. Inhibitor requirements may need to be adjusted, and microbiological control can be more challenging. Do not discontinue water treatment if the tower is being operated. Ensure there is full circulation at least 1-3 times per week so inhibitors and biocides can perform properly.
- Drain decorative fountains unless approved treatment and monitoring protocols are maintained.
- Disconnect the water supply to ice machines, coffee makers, water filters, and similar devices. Disinfect inlet lines and install new filters prior to start up.
- Keep water heaters set at their designated temperature (ideally at or above 120°F).
- **Flush all hot and cold water fixtures (showers, faucets, eyewash stations) at least weekly. Document the flushing schedule with log sheets. Routine flushing may mitigate the necessity of disinfecting the potable water system before the building is reoccupied.**
- Periodically monitor the chlorine level at the point of entry and locations throughout the building to ensure flushing provides adequate residuals. Simple test kits are available for chlorine testing.

Appendix B Water Management Plan GDAF



Legionella Minimization DHW Management Plan



GIBSONS and DISTRICT AQUATIC FACILITY
953 Gibsons Way, Gibsons, BC

Last Revision Date: January 24, 2022

Contents

1.0 Plan Overview

- 1.1 Objective
- 1.2 Development Approach
- 1.3 References

2.0 Site Program Administration

- 2.1 Site Description
- 2.2 Program Team
- 2.3 Program Confirmation
- 2.4 Program Documentation
- 2.5 Plan Management
- 2.6 Legionella Hazard Analysis

3.0 Water Systems

- 3.1 System Description
- 3.2 Flow Diagram
- 3.3 Control Locations
- 3.4 Control Measures
- 3.5 Water Treatment Program
- 3.6 Monitoring Guidelines
- 3.7 Response Protocol

4.0 Pandemic Plan for Water Stagnation

1.0 Plan Overview

1.1 Objective

This Legionella Risk Management Plan (Plan) was prepared to define a site-specific Water Management Program (Program) to reduce the health hazards and risks associated with the presence of Legionella bacteria in the **building domestic hot water**. However, due to the universal nature of Legionella, and its ability to reappear and colonize building water systems, no water management plan, program, or maintenance measures can guarantee the absence of Legionella or eliminate the potential for associated disease.

1.2 Development Approach

The Plan was developed in accordance with the requirements outlined PWGSC MD15161 -2013, ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems (ASHRAE 188) and ASHRAE 12-2000 best practices.

1. Form Program Team – Building owner or management forms a Program Team to be responsible for developing, implementing, and maintaining the water management program.
2. Describe Water Systems with Flow Diagrams – Program Team develops a potable water flow diagram that describes the associated sub-systems.
3. Analysis of Building Water Systems – Program Team evaluates where hazardous conditions may occur in domestic hot water and associated sub-systems, and determine the locations where measures should be applied to control risks.
4. Control Measures - For each control location, Program Team determines appropriate control measures based the hazard analysis and governmental and/or industry guidelines.
5. Monitoring and Corrective Actions - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions
6. Confirmation Procedures - Program Team establishes procedures to confirm that the Program is being implemented as designed and effectively controls Legionella hazards.
7. Documentation - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions

The building owner through the Program Team is responsible for developing and implementing a Water Management Program (Program) in accordance with the Plan, and for maintaining all documentation for compliance. Building owner through the Program Team is responsible reviewing and updating the Plan and Program as required.

1.3 References

The following regulations, standards, and guidelines are used as references to develop the Legionella Water Management Plan and Program:

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems. June 2015
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, February 2000
3. U.S. Occupational Safety and Health Administration (OSHA) Technical Manual, Section III, Chapter 7: Legionnaires' Disease, January 1999
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems, June 2013.
5. Cooling Technology Institute (CTI), Legionellosis Guideline WTB-148: Best Practices for Control of Legionella, July 2008
6. New York Department of Health, Part 4 – Protection Against Legionella of the State Sanitary Code (SSC), found in 10 NYCRR Chapter 1. Effective Date July 6, 2016.
7. New York City Department of Health and Mental Hygiene (NYC DOHMH), Amendment to Title 24 of the Rules of the City of New York: Chapter 8 (Cooling Towers)
8. Public Works Government Services Canada MD – 15161 – 2013 including Addendum A, B&C
9. CDC <https://www.cdc.gov/legionella/wmp/overview/wmp-fact-sheet.html>

2.0 Site Plan

2.1 Site Description

GIBSONS and DISTRICT AQUATIC FACILITY

953 Gibsons Way, Gibsons, BC. The plan includes only the domestic hot water systems at this site. Public pools, whirlpool spas shall comply with national, regional, and local codes.

2.2 Program Team

The Program Team is responsible for all activities associated with the Water Management Plan and Program. The Program Team Leader must be a person representing the building owner.

Program Team				
Team Member	Name	Company	Title	Responsibility
Owner Representative – Program Lead	Allen Van Velzen	SCRD	Manager Facility Services	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 1	Peter Esser	SCRD	Facility Services Supervisor	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 2	Tim Street	SCRD	Facility Services Coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Contractor			Water Treatment Representative	Manage Program/Plan development. Inspect system and documentation. Audit compliance to generate annual certification report. Provide water treatment program and service components specified in Plan

Team Member	Name	Company	Email	Phone
Owner Representative	Allen Van Velzen	SCRD	Allen.vanVelzen@scrd.ca	604-741-1547
Site Responsible	Peter Esser	SCRD	Peter.esser@scrd.ca	604-741-8510
Site Responsible Person 2	Tim Street	SCRD	Tim.street@scrd.ca	604-989-4685
Contractor				

2.3 Program Confirmation

Program Team is responsible for confirming that the Plan and Program are implemented as designed and controls Legionella hazards in designated building water systems.

1. Program documentation will be used to verify the Plan and Program were implemented as designed. The Program Management Schedule defines the minimum review frequency.
2. Validation that the Plan and Program controls Legionella will be determined by the following:
 - a. Documented use of water treatment, maintenance, operation, and monitoring practices (control measures) supported by industry standards and/or scientific studies that show a reduced incidence of Legionella where similar practices are applied.
 - b. Where necessary, collection of water samples from designated systems for Legionella culture testing by a CDC Elite laboratory. Sample frequency and triggering events defined in Program Control Measures.

2.4 Program Documentation

Program documentation will be provided by the following:

- a. Written procedures for Program maintenance and monitoring activities.

Legionella Minimization Program and Plan

- b. Site Logs to document site performed Program maintenance and monitoring activities.
- c. Service Reports to document service visits by the water treatment service providers.
- d. Reports to document microbiological analyses including any Legionella test results.
- e. Reports to document any cleaning and/or disinfection procedures.
- f. Reports and/or Site Logs to document any remedial maintenance or monitoring activities.

A master document providing the location of all Plan and Program documents will be maintained by the Program Team.

2.5 Program Management

The Program Team is responsible for maintaining the Plan and Program by the following activities:

Task	Frequency
Review Program Documentation to verify Plan and Program has been implemented as designed.	Annually
Review Program Documentation to validate that the Plan and Program control hazards as defined in Program Confirmation procedures. Program Team to determine if control measures changes are warranted.	Annually
Update Plan and Program to reflect any changes in Team Members, risk factors, building water systems, or control measures.	As Needed

2.6 Legionella Hazard Analysis

Water System Description	Location	Hazard Analysis	Significant Risk	Control Location
Domestic Cold Water	See Site Plans	Public water mains supplying water for any potable outlets are low risk due to temperature and low chance of aerosols.	No	Yes
Domestic Hot Water	See Site Plans	Legionella growth in DHW can affect exposure at point of use. Aerosols are created at areas such as faucets, showers and tubs. Proliferation and Amplification of Legionella can occur in DHW systems. During periods of water stagnation or low flow, hot water temperature decreases and a significant decay in residual disinfectant from the city water will occur. Both of these factors are favorable to the development of biofilm and can produce an environment in which Legionella thrives.	Yes	Yes
Fire Systems	See Site Plans	The potential for Legionella exposure is low for fire protection systems. Water only for systems that are non-domestic does not present a significant risk.	No	No
Hot Water Heating Loop	See Site Plans	The potential for Legionella growth and exposure is low for closed-loop systems	No	Yes

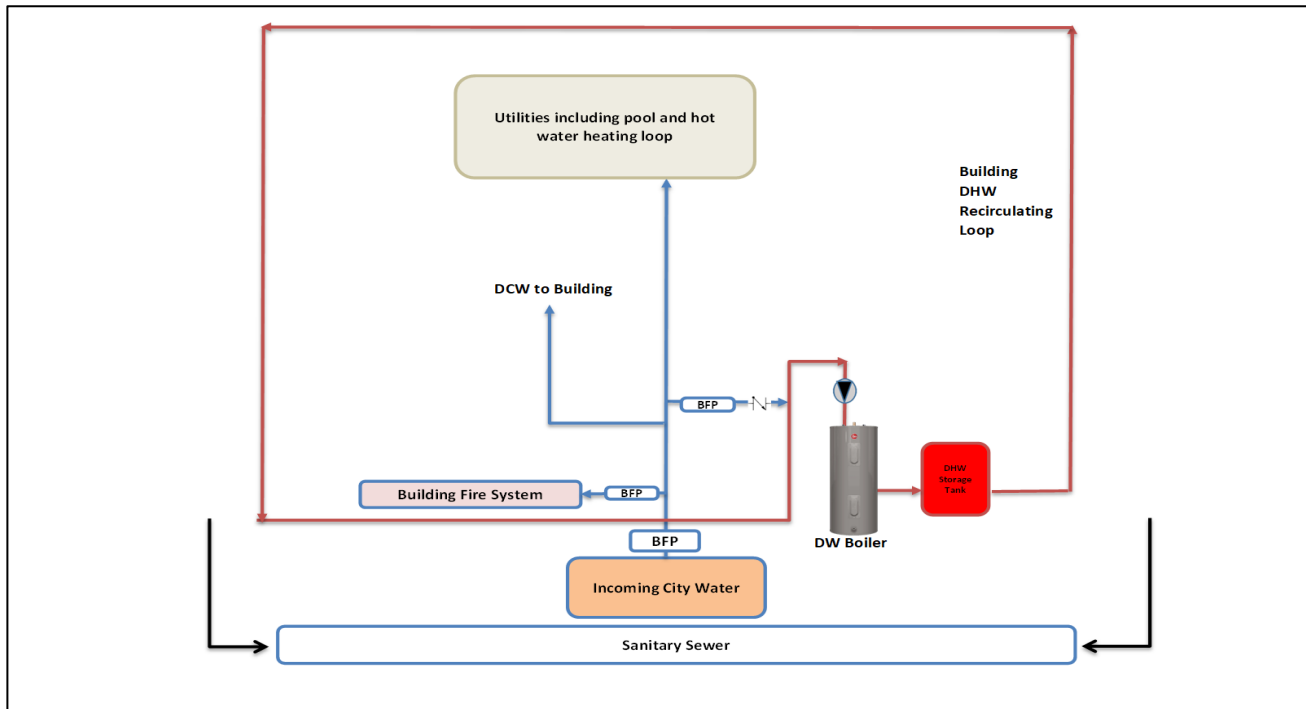
3.0 Water Systems

3.1 System Description: Gibsons and District Aquatic Facility

Potable Water System	
Potable System Description	
Point of Entry (POE)	<p>About 75% of Gibsons water supply is provided by the Gibsons Aquifer that holds and provides groundwater to the wells and springs. The town of Gibsons is divided into three water zones with Zones 1 and 2 serviced by the Gibsons Aquifer and Zone 3 (Upper Gibsons) being serviced by water purchased from the Sunshine Coast Regional District.</p> <p>The aquifer is so pure that it has no need of chorine additions. The town maintains a network of seven monitoring wells and monitors its drinking water on a regular basis.</p>
Purpose	Provides potable cold and hot water as well as utility water for equipment
Components	DCW for building including utilities. Domestic hot water with gas hot water heaters, with storage tanks. There are showers on the system.

Domestic Hot Water Recirculation Loops					
Configuration	Gas hot water heaters provide DHW to facility and is maintained at 120 F				
Purpose	Domestic Hot Water supply				
Components	See above				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

3.2 FLOW DIAGRAM –Potable Water



3.3 Control Locations

Control locations are components of water systems associated with the risk of Legionellosis where physical, mechanical, operational, and/or chemical control measures can be applied. The following control locations were identified in the risk assessment survey.

System Control Locations (CL)		
Control Location	Location	Function and Maintenance
Point of Entry (PE) City Main	Mechanical Room	Public water main (PWMTs) supplying water for any potable uses are CLs because conditions that promote Legionella growth at PWMTs will affect exposure to Legionella at points of domestic water use (POUs). However, control measures are limited to points in the system at which the building owner has authority and responsibility. The water enters the building through city main for distribution to building systems. Operate in accordance with prescribed federal and provincial/territorial requirements for drinking water quality
Fire Systems	Mechanical Rooms	Public water main for non-potable uses (e.g., fire protection) are not CLs.
DHW Recirculation Loop	Mechanical Rooms	DHW passes through heaters, is supplied to showers and faucets throughout the building. The DHW returns to the mechanical room and circulates in a continuous loop. The loop is considered a CL as secondary disinfection treatment may be added at this point.

3.4 Control Measures

The following control measures have been established to meet Best Practices and the requirements outlined in ASHRAE 188-2015 and PWGSC MD 15161, CSA 317.1 Healthcare Plumbing at the time of document preparation:

Control Measure	Method	Limits	Frequency	Documentation
Remove or routinely flush accessible piping that is no longer used.	Conduct survey for abandoned piping yearly and ensure all applicable piping is scheduled for removal or monthly flushing.	N/A	Yearly by Site Staff	Maintenance Log
Flushing Program Unoccupied Units	Run hot and cold outlets and flush toilets in any unoccupied units to ensure every outlet and appliance is used at least once weekly	Flush till water gets hot and then additional 30 seconds	Weekly By Site Staff	Maintenance Log
Yearly Operation and Maintenance Review	Maintain all DHW related equipment per manufacturers' recommendations including storage tanks, water heaters, hot water return pumps, shower heads and hoses, aerators, master thermostatic mixing valves, softeners, and backflow preventers.	Log procedure dates for each device. Follow all manufacture recommendations	Yearly by staff or designated contactor	Operating and maintenance manuals.
Legionella Culture Test at two Remote Showers on each DHW Recirculating Loop	Turn on hot water at shower and flush for 30 seconds after it warms up to allow for representative bulk water sample	Less than 10 cfu/mL Total Legionella Pneumophila as per PWGSC MD15161	Every six (6) Months Contractor will draw two distal samples from each DHW loop & send to lab for Legionella Culture Testing. Additional samples may be drawn depending on Bacteria Test Results.	Documentation and Service Reports

3.5 Water Treatment Program: Secondary Disinfection for DHW

- Not applicable

3.6 DHW Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - When the LPTOT count is less than 10 cfu/mL:

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - When the LPTOT count is 10-100 cfu/mL:

- Immediately flush all hot water faucets for 10 minutes and consider performing a disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

Level 3 Limits - When the LPTOT count is above 100 cfu/mL:

- Immediately shut off all aerosilization devices and flush all hot water faucets for 10 minutes.
- Perform disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

4.0 Pandemic Planning for Stagnant Water

In the rare case that a pandemic (such as coronavirus) occurs buildings can be shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have hundreds or thousands of gallons of water flowing through the fixtures, piping, and equipment daily may be stagnant for an unknown period of time, maybe several months.

Stagnation can lead to serious problems that cause long-term damage, reduce property values, and be very difficult to mitigate once the building is reoccupied.

Issues with stagnant water:

Low flow and stagnation in water systems depletes disinfectant levels and stabilizes temperatures to ambient. This provides ideal conditions for biofilms to form in hot and cold water storage tanks, hot water heaters, showerheads, faucets, ice machines, decorative fountains, and cooling tower systems.

Biofilms are communities of surface-attached bacteria that are directly linked to serious corrosion problems, biofouling, and the growth of Legionella and other premise plumbing pathogens. Once established, biofilms are difficult to remove from water systems even with high disinfectant levels.

Although each situation is different, there are practical steps you can take when shutting down a building to

help reduce the potential for water system damage and waterborne pathogen growth:

- Keep the building HVAC systems live to maintain temperature and humidity control.
- If not required for HVAC system operation, the cooling tower, chillers, heat exchangers, and associated piping should be completely drained. Leaving the system filled with stagnant water can result in severe corrosion, biofouling problems, and contribute to the transmission of Legionnaire's disease.
- If the cooling tower is required for HVAC system operation, specific treatment protocols may be required to help address low load conditions. Inhibitor requirements may need to be adjusted, and microbiological control can be more challenging. Do not discontinue water treatment if the tower is being operated. Ensure there is full circulation at least 1-3 times per week so inhibitors and biocides can perform properly.
- Drain decorative fountains unless approved treatment and monitoring protocols are maintained.
- Disconnect the water supply to ice machines, coffee makers, water filters, and similar devices. Disinfect inlet lines and install new filters prior to start up.
- Keep water heaters set at their designated temperature (ideally at or above 120°F).
- **Flush all hot and cold water fixtures (showers, faucets, eyewash stations) at least weekly. Document the flushing schedule with log sheets. Routine flushing may mitigate the necessity of disinfecting the potable water system before the building is reoccupied.**
- Periodically monitor the chlorine level at the point of entry and locations throughout the building to ensure flushing provides adequate residuals. Simple test kits are available for chlorine testing.

Contact your water treatment representative for more information and support addressing these issues, or any other water management concerns.

Appendix C Water Management Plan SAC



Legionella Minimization DHW Management Plan



Sechelt Aquatic Centre
5500 Shorncliffe Ave., Sechelt, BC

Updated: January 24, 2022

Contents

1.0 Plan Overview

- 1.1 Objective
- 1.2 Development Approach
- 1.3 References

2.0 Site Program Administration

- 2.1 Site Description
- 2.2 Program Team
- 2.3 Program Confirmation
- 2.4 Program Documentation
- 2.5 Plan Management
- 2.6 Legionella Hazard Analysis

3.0 Water Systems

- 3.1 System Description
- 3.2 Flow Diagram
- 3.3 Control Locations
- 3.4 Control Measures
- 3.5 Water Treatment Program
- 3.6 Monitoring Guidelines
- 3.7 Response Protocol

4.0 Pandemic Plan for Water Stagnation

1.0 Plan Overview

1.1 Objective

This Legionella Risk Management Plan (Plan) was prepared to define a site-specific Water Management Program (Program) to reduce the health hazards and risks associated with the presence of Legionella bacteria in the **building domestic hot water**. However, due to the universal nature of Legionella, and its ability to reappear and colonize building water systems, no water management plan, program, or maintenance measures can guarantee the absence of Legionella or eliminate the potential for associated disease.

1.2 Development Approach

The Plan was developed in accordance with the requirements outlined PWGSC MD15161 -2013, ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems (ASHRAE 188) and ASHRAE 12-2000 best practices.

1. Form Program Team – Building owner or management forms a Program Team to be responsible for developing, implementing, and maintaining the water management program.
2. Describe Water Systems with Flow Diagrams – Program Team develops a potable water flow diagram that describes the associated sub-systems.
3. Analysis of Building Water Systems – Program Team evaluates where hazardous conditions may occur in domestic hot water and associated sub-systems, and determine the locations where measures should be applied to control risks.
4. Control Measures - For each control location, Program Team determines appropriate control measures based the hazard analysis and governmental and/or industry guidelines.
5. Monitoring and Corrective Actions - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions
6. Confirmation Procedures - Program Team establishes procedures to confirm that the Program is being implemented as designed and effectively controls Legionella hazards.
7. Documentation - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions

The building owner through the Program Team is responsible for developing and implementing a Water Management Program (Program) in accordance with the Plan, and for maintaining all documentation for compliance. Building owner through the Program Team is responsible reviewing and updating the Plan and Program as required.

1.3 References

The following regulations, standards, and guidelines are used as references to develop the Legionella Water Management Plan and Program:

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems. June 2015
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, February 2000
3. U.S. Occupational Safety and Health Administration (OSHA) Technical Manual, Section III, Chapter 7: Legionnaires' Disease, January 1999
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems, June 2013.
5. Cooling Technology Institute (CTI), Legionellosis Guideline WTB-148: Best Practices for Control of Legionella, July 2008
6. New York Department of Health, Part 4 – Protection Against Legionella of the State Sanitary Code (SSC), found in 10 NYCRR Chapter 1. Effective Date July 6, 2016.
7. New York City Department of Health and Mental Hygiene (NYC DOHMH), Amendment to Title 24 of the Rules of the City of New York: Chapter 8 (Cooling Towers)
8. Public Works Government Services Canada MD – 15161 – 2013 including Addendum A, B&C
9. CDC <https://www.cdc.gov/legionella/wmp/overview/wmp-fact-sheet.html>

2.0 Site Plan

2.1 Site Description

SECHELT AQUATIC CENTER

5500 Shorncliffe Ave, Sechelt, BC V0N 3A0

The plan includes only the domestic hot water systems at this site. Public pools, whirlpool spas and splash pad operation shall comply with national, regional, and local codes.

2.2 Program Team

The Program Team is responsible for all activities associated with the Water Management Plan and Program. The Program Team Leader must be a person representing the building owner.

Program Team				
Team Member	Name	Company	Title	Responsibility
Owner Representative – Program Lead	Allen Van Velzen	SCRD	Manager Facility Services	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 1	Daryl Lowey	SCRD	Facility Services Supervisor	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 2	Tim Street	SCRD	Facility Services Coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Contractor			Water Treatment Representative	Manage Program/Plan development. Inspect system and documentation. Audit compliance to generate annual certification report. Provide water treatment program and service components specified in Plan

Team Member	Name	Company	Email	Phone
Owner Representative	Allen Van Velzen	SCRD	Allen.vanVelzen@scrd.ca	604-741-1547
Site Responsible	Daryl Lowey	SCRD	daryl.lowey@scrd.ca	604-741-3680
Site Responsible Person 2	Tim Street	SCRD	Tim.street@scrd.caa	604-989-4685
Contractor				

2.3 Program Confirmation

Program Team is responsible for confirming that the Plan and Program are implemented as designed and controls Legionella hazards in designated building water systems.

1. Program documentation will be used to verify the Plan and Program were implemented as designed. The Program Management Schedule defines the minimum review frequency.
2. Validation that the Plan and Program controls Legionella will be determined by the following:
 - a. Documented use of water treatment, maintenance, operation, and monitoring practices (control measures) supported by industry standards and/or scientific studies that show a reduced incidence of Legionella where similar practices are applied.
 - b. Where necessary, collection of water samples from designated systems for Legionella culture testing by a CDC Elite laboratory. Sample frequency and triggering events defined in Program Control Measures.

2.4 Program Documentation

Program documentation will be provided by the following:

- a. Written procedures for Program maintenance and monitoring activities.

- b. Site Logs to document site performed Program maintenance and monitoring activities.
- c. Service Reports to document service visits by the water treatment service providers.
- d. Reports to document microbiological analyses including any Legionella test results.
- e. Reports to document any cleaning and/or disinfection procedures.
- f. Reports and/or Site Logs to document any remedial maintenance or monitoring activities.

A master document providing the location of all Plan and Program documents will be maintained by the Program Team.

2.5 Program Management

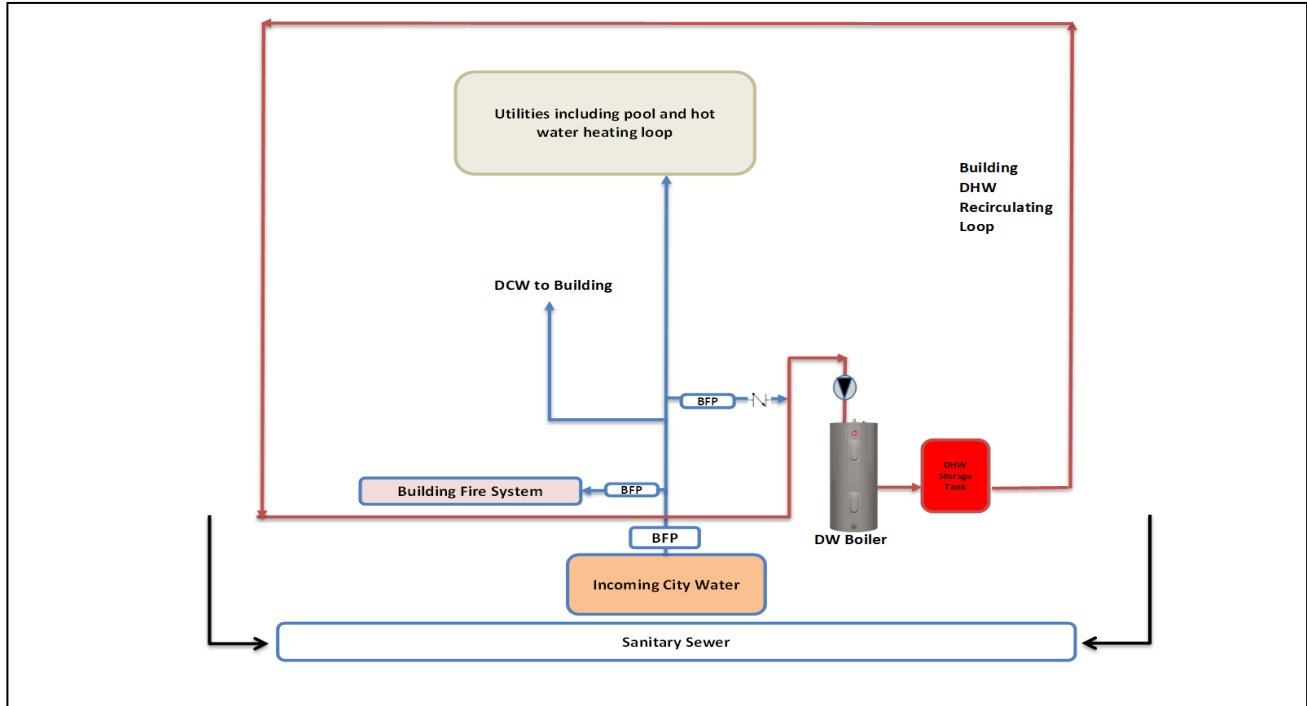
The Program Team is responsible for maintaining the Plan and Program by the following activities:

Task	Frequency
Review Program Documentation to verify Plan and Program has been implemented as designed.	Annually
Review Program Documentation to validate that the Plan and Program control hazards as defined in Program Confirmation procedures. Program Team to determine if control measures changes are warranted.	Annually
Update Plan and Program to reflect any changes in Team Members, risk factors, building water systems, or control measures.	As Needed

2.6 Legionella Hazard Analysis

Water System Description	Location	Hazard Analysis	Significant Risk	Control Location
Domestic Cold Water	See Site Plans	Public water mains supplying water for any potable outlets are low risk due to temperature and low chance of aerosols.	No	Yes
Domestic Hot Water	See Site Plans	Legionella growth in DHW can affect exposure at point of use. Aerosols are created at areas such as faucets, showers and tubs. Proliferation and Amplification of Legionella can occur in DHW systems. Conditions for amplification of the bacteria in DHW recirculation systems can include temperature ranges of less than 60°C, pH levels in water in the range of 6–8, stagnation of water supply (i.e. Showers not being used), the presence of amoebae, and the formation of sludge, sediments, and biofilms.	Yes	Yes
Fire Systems	See Site Plans	The potential for Legionella exposure is low for fire protection systems. Water only for systems that are non-domestic does not present a significant risk.	No	No
Hot Water Heating Loop	See Site Plans	The potential for Legionella growth and exposure is low for closed-loop systems	No	Yes

3.0 Water Systems



3.1 System Description: Sechelt Aquatic Centre

Potable Water System	
Potable System Description	
Point of Entry (POE)	The water supply system in the District of Sechelt is provided by the Sunshine Coast Regional District (SCRD). The SCR D water systems supply potable water to approximately 23,000 residents between Egmont and Langdale. Three different water systems provide water from sources that include lakes, streams and groundwater. In addition to water for drinking, these water systems supply potable water used for fire protection, recreation (pools and ice rinks), industry and irrigation.
Purpose	Provides potable cold and hot water as well as utility water for equipment including cooling towers, for cooling ammonia for ice surfaces.
Components	DCW for building including utilities. Domestic hot water with gas hot water heaters, with storage tanks. There are showers on the system.

Domestic Hot Water Recirculation Loops					
Configuration	Gas hot water heaters provide DHW to facility and is maintained at 120 F				
Purpose	Domestic Hot Water supply				
Components	See above				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

3.2 FLOW DIAGRAM –Potable Water

3.3 Control Locations

Control locations are components of water systems associated with the risk of Legionellosis where physical, mechanical, operational, and/or chemical control measures can be applied. The following control locations were identified in the risk assessment survey.

System Control Locations (CL)		
Control Location	Location	Function and Maintenance
Point of Entry (PE) City Main	Mechanical Room	Public water main (PWMTs) supplying water for any potable uses are CLs because conditions that promote Legionella growth at PWMTs will affect exposure to Legionella at points of domestic water use (POUs). However, control measures are limited to points in the system at which the building owner has authority and responsibility. The water enters the building through city main for distribution to building systems. Operate in accordance with prescribed federal and provincial/territorial requirements for drinking water quality
Fire Systems	Mechanical Rooms	Public water main for non-potable uses (e.g., fire protection) are not CLs.
DHW Recirculation Loop	Mechanical Rooms	DHW passes through heaters, is supplied to showers and faucets throughout the building. The DHW returns to the mechanical room and circulates in a continuous loop. The loop is considered a CL as secondary disinfection treatment may be added at this point.

3.4 Control Measures

The following control measures have been established to meet Best Practices and the requirements outlined in ASHRAE 188-2015 and PWGSC MD 15161, CSA 317.1 Healthcare Plumbing at the time of document preparation:

Control Measure	Method	Limits	Frequency	Documentation
Remove or routinely flush accessible piping that is no longer used.	Conduct survey for abandoned piping yearly and ensure all applicable piping is scheduled for removal or monthly flushing.	N/A	Yearly by Site Staff	Maintenance Log
Flushing Program Unoccupied Units	Run hot and cold outlets and flush toilets in any unoccupied units to ensure every outlet and appliance is used at least once weekly	Flush till water gets hot and then additional 30 seconds	Weekly By Site Staff	Maintenance Log
Yearly Operation and Maintenance Review	Maintain all DHW related equipment per manufacturers' recommendations including storage tanks, water heaters, hot water return pumps, shower heads and hoses, aerators, master thermostatic mixing valves, softeners, and backflow preventers.	Log procedure dates for each device. Follow all manufacture recommendations	Yearly by staff or designated contractor	Operating and maintenance manuals.
Legionella Culture Test at two Remote Showers on each DHW Recirculating Loop	Turn on hot water at shower and flush for 30 seconds after it warms up to allow for representative bulk water sample	Less than 10 cfu/mL Total Legionella Pneumophila as per PWGSC MD15161	Every six (6) Months Contractor will draw two distal samples from each DHW loop & send to lab for Legionella Culture Testing. Additional samples may be drawn depending on Bacteria Test Results.	Documentation and Service Reports

3.5 Water Treatment Program: Secondary Disinfection for DHW

- Not applicable.

3.6 DHW Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - When the LPTOT count is less than 10 cfu/mL:

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - When the LPTOT count is 10-100 cfu/mL:

- Immediately flush all hot water faucets for 10 minutes and consider performing a disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

Level 3 Limits - When the LPTOT count is above 100 cfu/mL:

- Immediately shut off all aerosolization devices and flush all hot water faucets for 10 minutes.
- Perform disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

4.0 Pandemic Planning for Stagnant Water

In the rare case that a pandemic (such as coronavirus) occurs buildings can be shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have hundreds or thousands of gallons of water flowing through the fixtures, piping, and equipment daily may be stagnant for an unknown period of time, maybe several months.

Stagnation can lead to serious problems that cause long-term damage, reduce property values, and be very difficult to mitigate once the building is reoccupied.

Issues with stagnant water:

Low flow and stagnation in water systems depletes disinfectant levels and stabilizes temperatures to ambient. This provides ideal conditions for biofilms to form in hot and cold water storage tanks, hot water heaters, showerheads, faucets, ice machines, decorative fountains, and cooling tower systems.

Biofilms are communities of surface-attached bacteria that are directly linked to serious corrosion problems, biofouling, and the growth of Legionella and other premise plumbing pathogens. Once established, biofilms are difficult to remove from water systems even with high disinfectant levels.

Legionella Minimization Program and Plan

Although each situation is different, there are practical steps you can take when shutting down a building to help reduce the potential for water system damage and waterborne pathogen growth:

- Keep the building HVAC systems live to maintain temperature and humidity control.
- If not required for HVAC system operation, the cooling tower, chillers, heat exchangers, and associated piping should be completely drained. Leaving the system filled with stagnant water can result in severe corrosion, biofouling problems, and contribute to the transmission of Legionnaire's disease.
- If the cooling tower is required for HVAC system operation, specific treatment protocols may be required to help address low load conditions. Inhibitor requirements may need to be adjusted, and microbiological control can be more challenging. Do not discontinue water treatment if the tower is being operated. Ensure there is full circulation at least 1-3 times per week so inhibitors and biocides can perform properly.
- Drain decorative fountains unless approved treatment and monitoring protocols are maintained.
- Disconnect the water supply to ice machines, coffee makers, water filters, and similar devices. Disinfect inlet lines and install new filters prior to start up.
- Keep water heaters set at their designated temperature (ideally at or above 120°F).
- **Flush all hot and cold water fixtures (showers, faucets, eyewash stations) at least weekly. Document the flushing schedule with log sheets. Routine flushing may mitigate the necessity of disinfecting the potable water system before the building is reoccupied.**
- Periodically monitor the chlorine level at the point of entry and locations throughout the building to ensure flushing provides adequate residuals. Simple test kits are available for chlorine testing.

Contact your water treatment representative for more information and support addressing these issues, or any other water management concerns.

Appendix D Water Management Plan SCA



Legionella Minimization Water Management Plan



Sunshine Coast Arena
5982 Shoal Way, Sechelt, BC V0N 3A0

Last Revision Date: January 24, 2022

Contents

1.0 Plan Overview

- 1.1 Objective
- 1.2 Development Approach
- 1.3 References

2.0 Site Program Administration

- 2.1 Site Description
- 2.2 Program Team
- 2.3 Program Confirmation
- 2.4 Program Documentation
- 2.5 Plan Management
- 2.6 Legionella Hazard Analysis

3.0 Water Systems

- 3.1 System Description
- 3.2 Control Locations
- 3.3 Cooling Tower Water Treatment Program
- 3.4 Cooling Tower Control Measures
- 3.5 Legionella Monitoring Guidelines
- 3.6 Monitoring Sample Locations
- 3.7 Cooling Tower Legionella Response Protocol
- 3.8 Domestic Water Legionella Response Protocol
- 3.9 Decorative Water Feature Legionella Response Protocol

4.0 Pandemic Planning for Stagnant Water

1.0 Plan Overview

1.1 Objective

This Legionella Risk Management Plan (Plan) was prepared to define a site-specific Water Management Program (Program) to reduce the health hazards and risks associated with the presence of Legionella bacteria in the cooling tower water. However, due to the universal nature of Legionella, and its ability to reappear and colonize building water systems, no water management plan, program, or maintenance measures can guarantee the absence of Legionella or eliminate the potential for associated disease.

1.2 Development Approach

The Plan was developed in accordance with the requirements outlined PWGSC MD15161 -2013, ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems (ASHRAE 188) and ASHRAE 12-2000 best practices.

1. Form Program Team – Building owner or management forms a Program Team to be responsible for developing, implementing, and maintaining the water management program.
2. Describe Water Systems with Flow Diagrams – Program Team develops a process flow diagram that describes the cooling towers and associated sub-systems.
3. Analysis of Building Water Systems – Program Team evaluates where hazardous conditions may occur in cooling towers and associated sub-systems, and determine the locations where measures should be applied to control risks.
4. Control Measures - For each control location, Program Team determines appropriate control measures based the hazard analysis and governmental and/or industry guidelines.
5. Monitoring and Corrective Actions - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions
6. Confirmation Procedures - Program Team establishes procedures to confirm that the Program is being implemented as designed and effectively controls Legionella hazards.
7. Documentation - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions

The building owner through the Program Team is responsible for developing and implementing a Water Management Program (Program) in accordance with the Plan, and for maintaining all documentation for compliance. Building owner through the Program Team is responsible reviewing and updating the Plan and Program as required.

1.3 References

The following regulations, standards, and guidelines are used as references to develop the Legionella Water Management Plan and Program:

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems. June 2015
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, February 2000
3. U.S. Occupational Safety and Health Administration (OSHA) Technical Manual, Section III, Chapter 7: Legionnaires 'disease, January 1999
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems, June 2013.
5. Cooling Technology Institute (CTI), Legionellosis Guideline WTB-148: Best Practices for Control of Legionella, July 2008
6. New York Department of Health, Part 4 – Protection against Legionella of the State Sanitary Code (SSC), found in 10 NYCRR Chapter 1. Effective Date July 6, 2016.
7. New York City Department of Health and Mental Hygiene (NYC DOHMH), Amendment to Title 24 of the Rules of the City of New York: Chapter 8 (Cooling Towers)
8. Public Works Government Services Canada MD – 15161 – 2013 including Addendum A, B&C

2.0 Over-all Site Plan

2.1 Site Description

This plan is for **Sunshine Coast Arena**

The Sunshine Coast Arena (Sechelt) has an NHL-Sized Arena.

5982 Shoal Way,, BC V0N 3A5, Sechelt, BC V0N 3A0

2.2 Program Team

The Program Team is responsible for all activities associated with the Water Management Plan and Program. The Program Team Leader must be a person representing the building owner.

Program Team				
Team Member	Name	Company	Title	Responsibility
Owner Representative – Program Lead	Allen van Velzen	SCRD	Manager Facility Services	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 1	Melanie Cloutier	SCRD	Facility Services Supervisor	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 2	Tim Street	SCRD	Facility Service coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Contractor			Water Treatment Representative	Manage Program/Plan development. Inspect system and documentation. Audit compliance to generate annual certification report. Provide water treatment program and service components specified in Plan

Team Member	Name	Company	Email	Phone
Owner Representative	Allen Van Velzen	SCRD	Allen.vanVelzen@scrd.ca	604-741-1547
Site Responsible Person 1	Melanie Cloutier	SCRD	melanie.cloutier@scrd.ca	604-989-8000
Site Responsible Person 2	Tim Street	SCRD	tim.street@scrd.ca	604-989-4685
Contractor				

2.3 Program Confirmation

Program Team is responsible for confirming that the Plan and Program are implemented as designed and controls Legionella hazards in designated building water systems.

1. Program documentation will be used to verify the Plan and Program are implemented as designed. The Program Management Schedule defines the minimum review frequency.
2. Validation that the Plan and Program controls Legionella will be determined by the following:
 - a. Documented use of water treatment, maintenance, operation, and monitoring practices (control measures) supported by industry standards and/or scientific studies that show a reduced incidence of Legionella where similar practices are applied.
 - b. Where necessary, collection of water samples from designated systems for Legionella culture testing by a CDC Elite laboratory. Sample frequency and triggering events defined in Program Control Measures.

2.4 Program Documentation

Program documentation will be provided by the following:

- a. Written procedures for Program maintenance and monitoring activities.
- b. Site Logs to document site performed Program maintenance and monitoring activities.
- c. Service Reports to document service visits by the water treatment service providers.
- d. Reports to document microbiological analyses including any Legionella test results.
- e. Reports to document cooling tower cleaning and/or disinfection procedures.
- f. Reports and/or Site Logs to document any remedial maintenance or monitoring activities.

A master document providing the location of all Plan and Program documents will be maintained by the Program Team.

2.5 Program Management

The Program Team is responsible for maintaining the Plan and Program by the following activities:

Task	Frequency
Review Program Documentation to verify Plan and Program has been implemented as designed.	Annually
Review Program Documentation to validate that the Plan and Program control hazards as defined in Program Confirmation procedures. Program Team to determine if control measures changes are warranted.	Annually
Update Plan and Program to reflect any changes in Team Members, risk factors, building water systems, or control measures.	As Needed

2.6 Legionella Hazard Analysis

Water System Description	Location	Hazard Analysis	Significant Risk	Control Location
Domestic Cold Water	See Site Plans	Public water mains supplying water for any potable outlets are low risk due to temperature and low chance of aerosols.	No	Yes
Domestic Hot Water	See Site Plans	Legionella growth in DHW can affect exposure at point of use. Aerosols are created at areas such as faucets, showers and tubs.	Yes	Yes
Fire Systems	See Site Plans	The potential for Legionella exposure is low for fire protection systems. Water only for systems that are non-domestic does not present a significant risk.	No	N/A
Irrigation Systems	See Site Plans	The potential for Legionella exposure from irrigation systems is relatively low and Legionnaires' disease associated with IRRs has not been reported in scientific literature, so IRRs are typically not Control Location.	No	N/A
Cooling Towers	See Site Plans	Significant potential for Legionella growth and exposure to aerosols	Yes	Yes
Hot Water Heating Loop	See Site Plans	The potential for Legionella growth and exposure is low for closed-loop systems	No	Yes

3.0 Site Specific Water Systems

3.1 System Description: Sechelt Arena Facility

Potable Water System	
Potable System Description	
Point of Entry (POE)	The water supply system in the District of Sechelt is provided by the Sunshine Coast Regional District (SCRD). The SCR D water systems supply potable water to approximately 23,000 residents between Egmont and Langdale. Three different water systems provide water from sources that include lakes, streams, and groundwater. In addition to water for drinking, these water systems supply potable water used for fire protection, recreation (pools and ice rinks), industry and irrigation.
Purpose	Provides potable cold and hot water as well as utility water for equipment including cooling towers, for cooling ammonia for ice surfaces.
Components	DCW for building including utilities. DHW with showers, Cooling tower and Hot water heating

Domestic Hot Water Recirculation Loops					
Configuration	Gas hot water heaters provide DHW to facility and is maintained at 120 F				
Purpose	Domestic Hot Water supply				
Components	See above				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

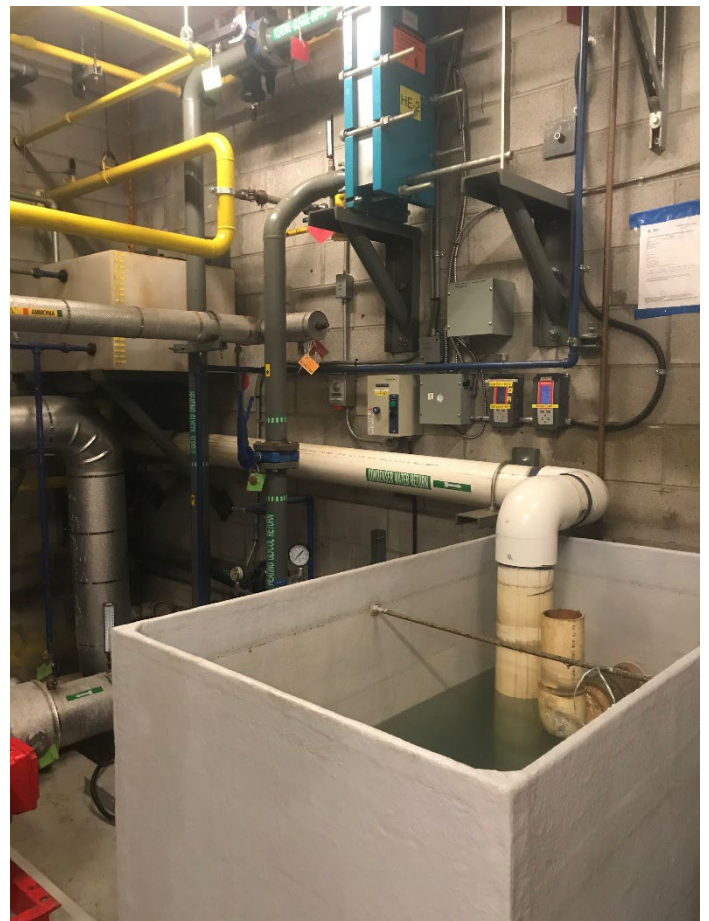
Utilities Water: 1 Cooling Tower System with remote sump					
Tower System Description					
Configuration	Cooling Tower system is located outside the building, remote sump is inside the mechanical room the tower is 165 Tons				
Purpose	Cooling ammonia for ice surface				
Components	Cooling Towers and remote sump				
Avg. Days/Week Online	varies	Avg. Weeks/Year Online	27	Operational Months	Seasonal
Cooling Capacity (Tons)	165 Tons	Number of Cells	1	Recirculation Rate (GPM)	480 USG

Hot Water Heating Closed Loop					
Configuration	2 separate Hot Water heating boiler loops				
Purpose	Comfort Heating				
Components	Water Boilers				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

Cooling Tower:

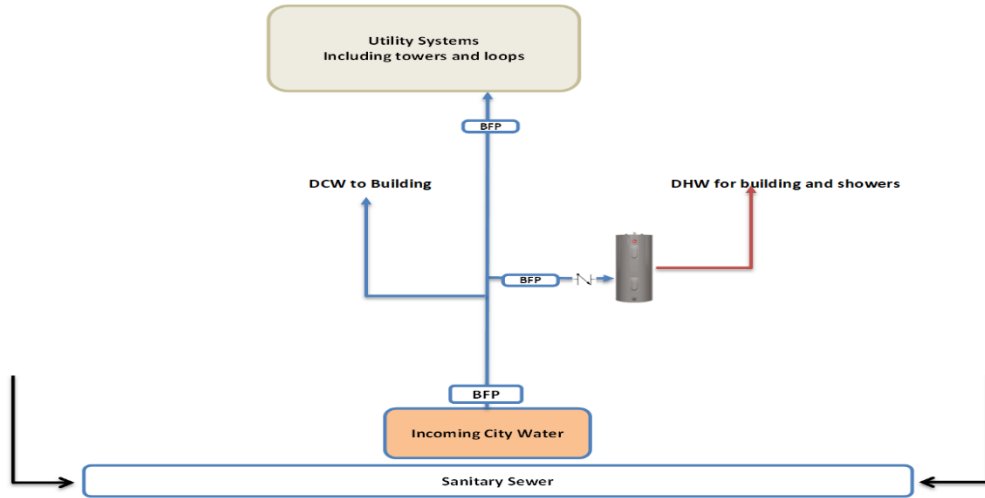


Remote Sump:

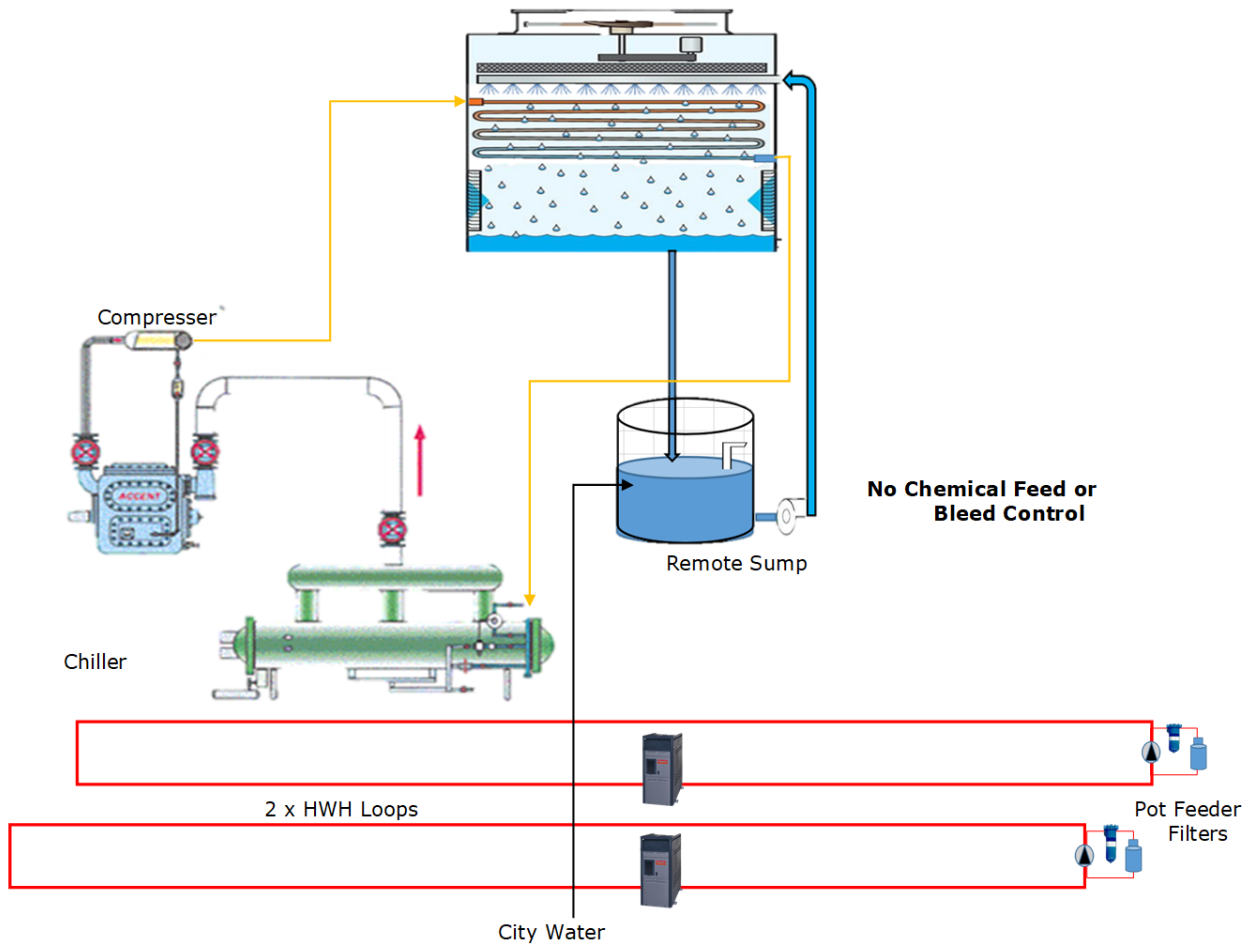


3.1.1 FLOW DIAGRAM: Potable Flow and Utilities (HVAC) Flow

Potable Flow Diagram



165 Ton Ammonia Fluid Cooler Tower



3.2 Site Control Locations

Control locations are components of water systems associated with the risk of Legionellosis where physical, mechanical, operational, and/or chemical control measures can be applied. The following control locations were identified in the risk assessment survey.

System Control Location		
Control Location	Location	Function and Maintenance
POE City Mains	Enters in mechanical room	The water enters from water main, and is used throughout the building.
DHW System	Various Locations Throughout Buildings	DHW is supplied to showers and faucets throughout the building. The DHW returns is supplied on demand. DHW is considered a CL as secondary disinfection treatment may be added at this point.
Cooling Towers	Tower is outside with remote sump in mechanical room	Rejects heat through evaporative cooling. Requires routine and remedial cleaning, disinfection, water treatment, and mechanical maintenance as outlined in the control measures.
Water Treatment Chemical Feed & Control System	No Water Treatment for towers	Automatically adds water treatment chemicals as programmed and initiates blowdown of cooling tower water to drain to maintain target concentrations. Requires routine monitoring and maintenance to verify proper operation.
Hot Water Heating Closed Loop	Mech. Room	Provides heating to building.

3.3 Control Measures:

The following control measures have been established to meet the requirements outlined in ASHRAE 188-2015 and PWGSC MD 15161 at the time of document preparation:

Control Measure	Who	Limits / Reference	Monitoring Procedures			Corrective Actions	
			Method	Frequency	Documentation	Procedures	Documentation
Water Treatment Service and Testing - Provider to monitor CT program	Contractor	Site Specific	Inhibitor/Biocide Program and Automated Bleed	Minimum Monthly	Service Report	See Water Treatment Program 3.5 (below)	Service Reports
On-Site Staff CT program monitoring	Site Personnel	Site Specific	Inspect Equipment & test Inhibitor and Conductivity	Minimum 3 times week	Monitoring Log	Visual Inspection and water tests	Monitoring Log
Monitor aerobic bacteria counts in CT	Site Personnel	< 10,000 CFU/mL	Aerobic Bacteria Count - Dip Slide	Weekly Each Tower	Monitoring Log	Cooling Tower Bacteria Testing: Response Protocol	Monitoring Log
Monitor Legionella count for CT program validation	Contractor	< 10 CFU/mL	Lab Culture Tests (ISO:17025:2017)	Monthly Each Tower	Lab Report	Legionella Testing: Response Protocol	Documentation Reports
Clean cooling tower with post-cleaning disinfection procedure	Contractor	Per ASHRAE 188- 2015	CAS chemical cleaning and disinfection	Spring	Cooling Tower Cleaning Report	Follow Cleaning and disinfection outlined by PWGSC 15161	Maintenance Log & Documentation Reports
Monitor Legionella Count in DHW Systems	Contractor	< 10 CFU/mL	Lab Culture Tests (ISO:17025:2017)	Annually	Lab Report	Flush/Heating/CuAg Disinfection	Documentation Report

3.4 Cooling Tower Water Treatment Program - Pending

The following control measures have been established to meet Best Practices for Legionella minimization as per ASHRAE 2000-12, Cooling Technology Institute (CTI) and PWGSC MD-15161 and Manufacturers Operating Manuals.

Note: Legionella bacteria cannot be eradicated, however the following best practices are meant to minimize the occurrences and number of bacteria.

- Automatic continuous bleed, manual cleaning at regular intervals, application of scale and rust inhibitors on a continuous basis, and application of alternating oxidizing and non-oxidizing biocides, including shock chlorination, at timed intervals using automatic equipment.

Cooling Tower Start Up: (at start of season or in spring for year round towers)

- While operating the condensing water pump(s), Contractor will treat the system with patented bioXile or like to penetrate and put into suspension any biofilm that may be present. This solution will be circulated through entire system.
- The system will then be treated with sodium hypochlorite to a level of 5 mg/L (ppm) free chlorine residual and held for 2 hours.
- Once this biocidal treatment has been successfully completed, resume the standard water treatment program.

Cooling Tower Inhibitor Program:

- An inhibitor such as Chem-Aqua HP 31155 or like with a combination of PBTC phosphonate and azole, with a blend of synthetic phosphonate and sequestering agents to prevent deposition and minimize corrosion should be utilized. The product should have an excellent environmental profile and contain no heavy metals. The product should contain a tracer that can be tested for automatically with the AquaDart or like system and manually with a hand held tester.

Alternating Biocide Program:

Good microbiological control requires regular additions of both oxidizing and non-oxidizing biocides, routine cooling tower cleaning, and proper equipment operation.

Oxidizing Biocide (Halogen)

- TowerChlor - Oxidizing biocide or like product should be fed a minimum of 3 times per week to achieve a minimum 1.0 PPM free halogen residual for a minimum of one hour.
- FAC levels must be tested at start up, during the summer months and again in the fall. Adjustments to biocide feed time and/ frequency should be made based on results.
- In some locations, continuous feed halogen may be preferred. In these areas of continuous halogen feed, the control should be 0.2-0.5 PPM free halogen.

Non-Oxidizing Biocide Feed

- CPen-C – Dispersant with Non-oxidizing biocide DBNPA properties or similar Non-ionic product.

It is imperative that the oxidizing biocide touches every drop of water at least once per week. This involves the customer BMS turning on all recirculating pumps at a pre-determined time and adjusting the biocide feed to co-ordinate with the timing.

If Applicable: The Procedure for Winterizing based on ASHRAE Guideline 12-2000, Section 7.6.3

Proper layup of system that are seasonally shut down is extremely important to minimize corrosion and biological deposits.

- a) It is recommended that the entire system (cooling tower, system piping, heat exchangers, etc.) be drained to waste.
- b) When draining the system is not practical during shutdown, lower the bleed set point by 30% and increase the inhibitor to maximum levels 2-3 weeks before shutdown. Ensure any stagnant cooling water is pretreated with your maximum dose of non-oxidizing biocide just prior to shut down.

Cooling Tower Chemicals

Product	Purpose	Manufacturer	PCR Reg. #	Target Residual
Chem-Aqua HP 31155 or like	Solid Inhibitor/ Sludge Conditioner	Chem-Aqua	N/a	100-200 ppb PTSA
TowerChlor or like	Solid Oxidizing Biocide	Chem-Aqua	#25822	0.5-1.5 ppm FAC
CPen-C or like	Dispersant with DBNPA properties	Chem-Aqua	N/a	10-20 ppm
Chem-Aqua 51999 or like	Closed Loop Inhibitor	Chem-Aqua	N/a	800-1600 ppm NA2O

Safety Data Sheets (SDS) for all products located in binder

Equipment

System	Manufacturer	Featur
CT Controller	Advantage or like	Monitors Conductivity, inhibitor feed multi- function dual biocide feed timers. On-line capabilities/ORP – not used at this point
Chemical Feed Systems	3 x Walchem Feed Pumps Solid Feeder Boards or like	Feeds chemical and biocide based on controller settings

Equipment Settings

Feed/Control Equipment Settings					
Product	Feed Method	Feed Frequency	Days Added	Time Added	Feed Location
Chem-Aqua HP 31155 or like	Based on metered make-up water	As Needed	As Needed	As Needed	Control Loop
TowerChlor or like	Feed Timer	3 x / Week	M/W/F	8 AM	Control Loop
CPen-C or like	Feed Timer	3 x / Week	T/T/S	7 AM	Control Loop

3.5 Monitoring Guidelines

Monitoring Control Measures			
Control Measure	Control Range	Control Objective	Controlled By
Conductivity	300-500 µmhos 8-10 Cycles	Keep tower water solids concentration in range desired for corrosion and scale control and water conservation.	Bleed Controller
Inhibitor Level	100-200 ppb PTSA	Maintain concentration of corrosion and scale inhibitor product in target range	Corrosion/Scale Inhibitor Feed Rate
Free Chlorine Residual	1.0-1.5 ppm	Achieve oxidizing biocide residual in target range for microbiological control.	Oxidizing Biocide Feed Rate and Frequency
Bacteria Count	< 10,000 CFU/mL	Keep bacteria count low as a general indicator of microbiological control	Corrosion/Scale Control, Biocide Additions, Routine Cleaning, System Disinfections, Good Operational Practices, Mechanical Maintenance
Cooling Tower Inspections	Clean. No Visible Microbial Growth. No Mechanical	Evaluate need for chemical program adjustments, cleaning and/or disinfection, or mechanical service	
Legionella Count CT	< 10 CFU/mL	Validate cooling tower maintenance program and plan for Legionella control.	
DHW Legionella Count	< 10 CFU/mL	Validate DHW maintenance program and plan for Legionella control.	Site Staff Flush all DHW showers and faucets weekly during low or no use periods

3.6 Monitoring Sample Locations

Cooling Tower Monitoring Sample Locations		
Sample Type	Sample Location	Sampling
Water Quality Testing	Control Loops	Take water sample at any time that gives an accurate representation of water treatment chemical levels. Sample should be taken during or as close to the end of a biocide feed as possible.
Tower Legionella Culture Sample	Control Loops	Water sample should be taken before a biocide feed but as close to the start of the biocide feed as possible. Taking a sample during a biocide feed may result in an invalid representation of the system and could be subject to rejection by the Legionella testing lab.
Dip Slide Sample	Control Loops	Water sample should be taken before a biocide feed but as close to the start of the biocide feed as possible.
Domestic Hot Water Monitoring Sample Locations		
Sample Type	Sample Location	Sampling
Domestic Hot Water Legionella Culture Sample	Remote Shower or faucet	Sample at most remote shower faucet. Allow water to get hot and then run for 1 minute to get a representative sample

3.7 Cooling Tower Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - **When the LPTOT count is less than 10 cfu/mL:**

- Continue with normal O&M check biocide program is working properly

Level 2 Limits - **When the LPTOT count is between 10- 999 cfu/mL:**

- Perform a disinfection within 48 hours.
- Review and adjust the O&M procedures and the water treatment program as required to ensure acceptable bacterial levels in the system.
- Wait 2 to 7 days then perform a Legionella bacteria culture test

Level 3 Limits - **When the LPTOT count exceeds 1,000 cfu/mL:**

- Immediately implement measures that will eliminate water dispersion by aerosol from the affected cooling tower system then clean with bioXile or like and disinfect the system before putting the system back into service.
- Review and adjust the O&M procedures and water treatment program to ensure acceptable bacterial levels in the system.
- Wait 2 to 7 days then perform a Legionella bacteria culture test

The disinfection procedure using shock chlorination for cooling towers shall be as follows:

- ✓ Turn OFF the cooling tower fan during shock chlorination. Turn off bleed controller.
- ✓ Shock chlorinate the whole system including the cooling-tower distribution basin and fill with the all circulating pump(s) in operation.
- ✓ During shock chlorination, be aware that pH higher than 7.0 may require more product.
- ✓ **Maintain free chlorine residual of at least 10 ppm for 4 hours or alternatively, a residual of 15 ppm for at least 2 hours.**
- ✓ This shall be followed by continuous, automatically controlled feed of suitable water treatment chemicals with scale and rust inhibitors.
- ✓ Lower conductivity set point to 250 mmh.
- ✓ Wait two days and retest. Increase controller back to normal cycles.

Disinfections for actionable Legionella counts are not included in your treatment program and will be performed by Chem-Aqua at an agreed upon additional price.

3.8 Domestic Hot Water Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - When the LPTOT count is less than 10 cfu/mL:

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - When the LPTOT count is 10-100 cfu/mL:

- Immediately flush all hot water faucets for 10 minutes and consider performing a disinfection using copper silver ionization. Resample when disinfection is completed.
- Resample between 2-7 days.

Level 3 Limits - When the LPTOT count is above 100 cfu/mL:

- Immediately shut off all aerosilization devices and flush all hot water faucets for 10 minutes.
- Perform disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample when disinfection is completed.

4.0 Pandemic Planning for Stagnant Water

In the rare case that a pandemic (such as coronavirus) occurs buildings can be shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have hundreds or thousands of gallons of water flowing through the fixtures, piping, and equipment daily may be stagnant for an unknown period of time, maybe several months.

Stagnation can lead to serious problems that cause long-term damage, reduce property values, and be very difficult to mitigate once the building is reoccupied.

Issues with stagnant water:

Low flow and stagnation in water systems depletes disinfectant levels and stabilizes temperatures to ambient. This provides ideal conditions for biofilms to form in hot and cold water storage tanks, hot water heaters, showerheads, faucets, ice machines, , decorative fountains, and cooling tower systems.

Biofilms are communities of surface-attached bacteria that are directly linked to serious corrosion problems, biofouling, and the growth of Legionella and other premise plumbing pathogens. Once established, biofilms are difficult to remove from water systems even with high disinfectant levels.

Although each situation is different, there are practical steps you can take when shutting down a building to help reduce the potential for water system damage and waterborne pathogen growth:

- Keep the building HVAC systems live to maintain temperature and humidity control.
- If not required for HVAC system operation, the cooling tower, chillers, heat exchangers, and associated

Legionella Minimization Program and Plan

pipings should be completely drained. Leaving the system filled with stagnant water can result in severe corrosion, biofouling problems, and contribute to the transmission of Legionnaire's disease.

- If the cooling tower is required for HVAC system operation, specific treatment protocols may be required to help address low load conditions. Inhibitor requirements may need to be adjusted, and microbiological control can be more challenging. Do not discontinue water treatment if the tower is being operated. Ensure there is full circulation at least 1-3 times per week so inhibitors and biocides can perform properly.
- Drain decorative fountains unless approved treatment and monitoring protocols are maintained.
- Disconnect the water supply to ice machines, coffee makers, water filters, and similar devices. Disinfect inlet lines and install new filters prior to start up.
- Keep water heaters set at their designated temperature (ideally at or above 120°F).
- **Flush all hot and cold water fixtures (showers, faucets, eyewash stations) at least weekly. Document the flushing schedule with log sheets. Routine flushing may mitigate the necessity of disinfecting the potable water system before the building is reoccupied.**
- Periodically monitor the chlorine level at the point of entry and locations throughout the building to ensure flushing provides adequate residuals. Simple test kits are available for chlorine testing.

Contact your water treatment representative for more information and support addressing these issues, or any other water management concerns.

Appendix E Water Management Plan PHAFC



Legionella Minimization DHW Management Plan



PENDER
HARBOUR AQUATIC AND FITNESS CENTRE
13639 Sunshine Coast Hwy, Madeira Park, BC

Last Revision Date: January 24, 2022

Contents

1.0 Plan Overview

- 1.1 Objective
- 1.2 Development Approach
- 1.3 References

2.0 Site Program Administration

- 2.1 Site Description
- 2.2 Program Team
- 2.3 Program Confirmation
- 2.4 Program Documentation
- 2.5 Plan Management
- 2.6 Legionella Hazard Analysis

3.0 Water Systems

- 3.1 System Description
- 3.2 Flow Diagram
- 3.3 Control Locations
- 3.4 Control Measures
- 3.5 Water Treatment Program
- 3.6 Monitoring Guidelines
- 3.7 Response Protocol

4.0 Pandemic Plan for Water Stagnation

1.0 Plan Overview

1.1 Objective

This Legionella Risk Management Plan (Plan) was prepared to define a site specific Water Management Program (Program) to reduce the health hazards and risks associated with the presence of Legionella bacteria in the **building domestic hot water**. However, due to the universal nature of Legionella, and its ability to reappear and colonize building water systems, no water management plan, program, or maintenance measures can guarantee the absence of Legionella or eliminate the potential for associated disease.

1.2 Development Approach

The Plan was developed in accordance with the requirements outlined PWGSC MD15161 -2013, ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems (ASHRAE 188) and ASHRAE 12-2000 best practices.

1. Form Program Team – Building owner or management forms a Program Team to be responsible for developing, implementing, and maintaining the water management program.
2. Describe Water Systems with Flow Diagrams – Program Team develops a potable water flow diagram that describes the associated sub-systems.
3. Analysis of Building Water Systems – Program Team evaluates where hazardous conditions may occur in domestic hot water and associated sub-systems, and determine the locations where measures should be applied to control risks.
4. Control Measures - For each control location, Program Team determines appropriate control measures based the hazard analysis and governmental and/or industry guidelines.
5. Monitoring and Corrective Actions - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions
6. Confirmation Procedures - Program Team establishes procedures to confirm that the Program is being implemented as designed and effectively controls Legionella hazards.
7. Documentation - Program Team establishes procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions

The building owner through the Program Team is responsible for developing and implementing a Water Management Program (Program) in accordance with the Plan, and for maintaining all documentation for compliance. Building owner through the Program Team is responsible reviewing and updating the Plan and Program as required.

1.3 References

The following regulations, standards, and guidelines are used as references to develop the Legionella Water Management Plan and Program:

1. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ANSI/ASHRAE Standard 188-2015: Legionellosis: Risk Management for Building Water Systems. June 2015
2. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), ASHRAE Guideline 12-2000: Minimizing the Risk of Legionellosis Associated with Building Water Systems, February 2000
3. U.S. Occupational Safety and Health Administration (OSHA) Technical Manual, Section III, Chapter 7: Legionnaires' Disease, January 1999
4. Public Works and Government Services Canada, Standard MD 15161 – 2013: Control of Legionella in Mechanical Systems, June 2013.
5. Cooling Technology Institute (CTI), Legionellosis Guideline WTB-148: Best Practices for Control of Legionella, July 2008
6. New York Department of Health, Part 4 – Protection Against Legionella of the State Sanitary Code (SSC), found in 10 NYCRR Chapter 1. Effective Date July 6, 2016.
7. New York City Department of Health and Mental Hygiene (NYC DOHMH), Amendment to Title 24 of the Rules of the City of New York: Chapter 8 (Cooling Towers)
8. Public Works Government Services Canada MD – 15161 – 2013 including Addendum A, B&C
9. CDC <https://www.cdc.gov/legionella/wmp/overview/wmp-fact-sheet.html>

2.0 Site Plan

2.1 Site Description

PENDER HARBOUR AQUATIC AND FITNESS CENTRE (PHAFC)
13639 Sunshine Coast Hwy, Madeira Park, BC

The plan includes only the domestic hot water systems at this site. Public pools, whirlpool spas and splash pad operation shall comply with national, regional, and local codes.

2.2 Program Team

The Program Team is responsible for all activities associated with the Water Management Plan and Program. The Program Team Leader must be a person representing the building owner.

Program Team				
Team Member	Name	Company	Title	Responsibility
Owner Representative – Program Lead	Graeme Donn	SCRD	Manager Rec Services	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 1	Melanie Cloutier	SCRD	Facility Services Ass't Coordinator	Responsible for Program/Plan implementation by site personnel and outside contractors.
Site Responsible Person 2	Tim Street	SCRD	Facility Services Supervisor	Responsible for Program/Plan implementation by site personnel and outside contractors.
Contractor			Water Treatment Representative	Manage Program/Plan development. Inspect system and documentation. Audit compliance to generate annual certification report. Provide water treatment program and service components specified in Plan

Team Member	Name	Company	Email	Phone
Owner Representative	Graeme Donn	SCRD	Graeme.donn@scrd.ca	604-885-6801
Site Responsible Person 1	Melanie Cloutier	SCRD	melanie.cloutier@scrd.ca	604-885-8000
Site Responsible Person 2	Tim Street	SCRD	tim.street@scrd.ca	604 989 4685
Contractor				

2.3 Program Confirmation

Program Team is responsible for confirming that the Plan and Program are implemented as designed and controls Legionella hazards in designated building water systems.

1. Program documentation will be used to verify the Plan and Program were implemented as designed. The Program Management Schedule defines the minimum review frequency.
2. Validation that the Plan and Program controls Legionella will be determined by the following:
 - a. Documented use of water treatment, maintenance, operation, and monitoring practices (control measures) supported by industry standards and/or scientific studies that show a reduced incidence of Legionella where similar practices are applied.
 - b. Where necessary, collection of water samples from designated systems for Legionella culture testing by a CDC Elite lab. Sample frequency and triggering events defined in Program Control Measures.

2.4 Program Documentation

Program documentation will be provided by the following:

- a. Written procedures for Program maintenance and monitoring activities.
- b. Site Logs to document site performed Program maintenance and monitoring activities.
- c. Service Reports to document service visits by the water treatment service providers.
- d. Reports to document microbiological analyses including any Legionella test results.

Legionella Minimization Program and Plan

- e. Reports to document any cleaning and/or disinfection procedures.
- f. Reports and/or Site Logs to document any remedial maintenance or monitoring activities.

A master document providing the location of all Plan and Program documents will be maintained by the Program Team.

2.5 Program Management

The Program Team is responsible for maintaining the Plan and Program by the following activities:

Task	Frequency
Review Program Documentation to verify Plan and Program has been implemented as designed.	Annually
Review Program Documentation to validate that the Plan and Program control hazards as defined in Program Confirmation procedures. Program Team to determine if control measures changes are warranted.	Annually
Update Plan and Program to reflect any changes in Team Members, risk factors, building water systems, or control measures.	As Needed

2.6 Legionella Hazard Analysis

Water System Description	Location	Hazard Analysis	Significant Risk	Control Location
Domestic Cold Water	See Site Plans	Public water mains supplying water for any potable outlets are low risk due to temperature and low chance of aerosols.	No	Yes
Domestic Hot Water	See Site Plans	Legionella growth in DHW can affect exposure at point of use. Aerosols are created at areas such as faucets, showers and tubs. Proliferation and Amplification of Legionella can occur in DHW systems. During periods of water stagnation or low flow, hot water temperature decreases and a significant decay in residual disinfectant from the city water will occur. Both of these factors are favorable to the development of biofilm and can produce an environment in which Legionella thrives.	Yes	Yes
Fire Systems	See Site Plans	The potential for Legionella exposure is low for fire protection systems. Water only for systems that are non-domestic does not present a significant risk.	No	No
Hot Water Heating Loop	See Site Plans	The potential for Legionella growth and exposure is low for closed-loop systems	No	Yes

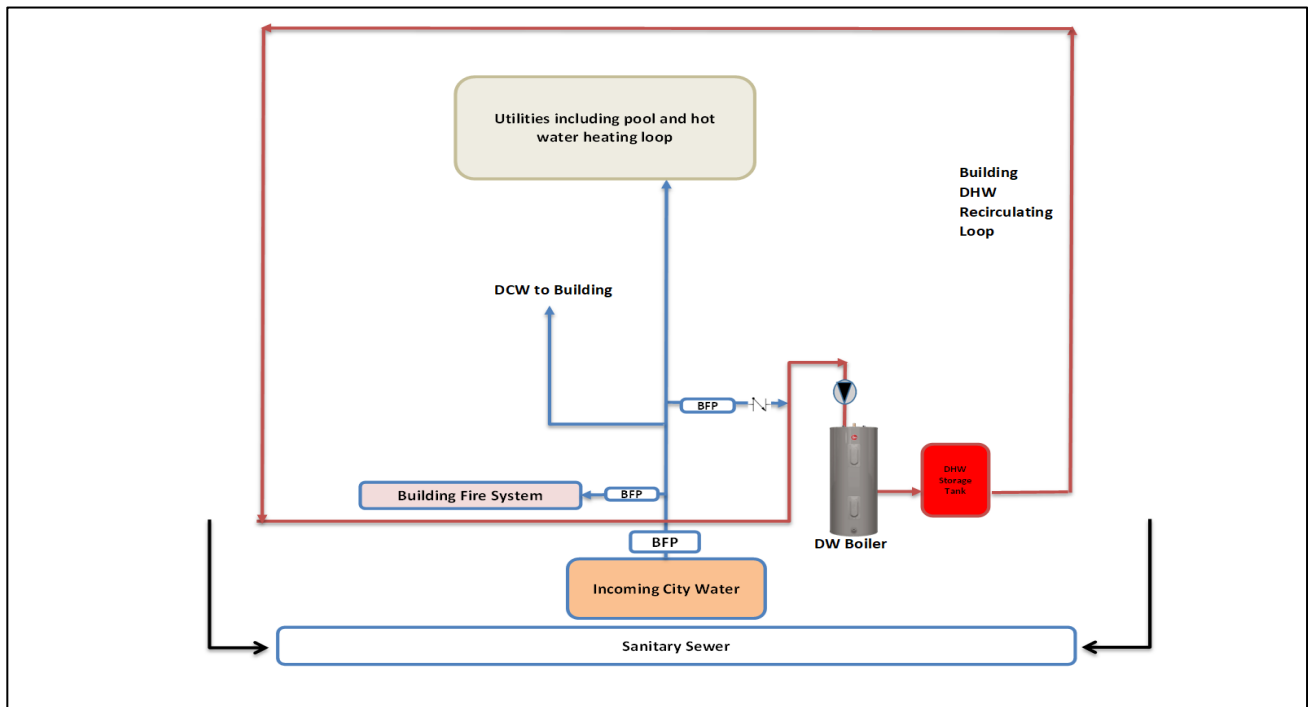
3.0 Water Systems

3.1 System Description: Pender Harbour Aquatic & Fitness Center

Potable Water System	
Potable System Description	
Point of Entry (POE)	PHAFC has an independent ground water well system.
Purpose	Provides potable cold and hot water as well as utility water for watering.
Components	DCW for building including utilities. Domestic hot water with gas hot water heaters, with storage tanks. There are showers on the system.

Domestic Hot Water Recirculation Loops					
Configuration	Gas hot water heaters provide DHW to facility and is maintained at 120 F				
Purpose	Domestic Hot Water supply				
Components	See above				
Avg. Days/Week Online	7	Avg. Weeks/Year Online	52	Operational Months	Year Round

3.2 FLOW DIAGRAM –Potable Water



3.3 Control Locations

Control locations are components of water systems associated with the risk of Legionellosis where physical, mechanical, operational, and/or chemical control measures can be applied. The following control locations were identified in the risk assessment survey.

System Control Locations (CL)		
Control Location	Location	Function and Maintenance
Point of Entry (PE) City Main	Mechanical Room	Public water main (PWMTs) supplying water for any potable uses are CLs because conditions that promote Legionella growth at PWMTs will affect exposure to Legionella at points of domestic water use (POUs). However, control measures are limited to points in the system at which the building owner has authority and responsibility. The water enters the building through city main for distribution to building systems. Operate in accordance with prescribed federal and provincial/territorial requirements for drinking water quality
Fire Systems	Mechanical Rooms	Public water main for non-potable uses (e.g., fire protection) are not CLs.
DHW Recirculation Loop	Mechanical Rooms	DHW passes through heaters, is supplied to showers and faucets throughout the building. The DHW returns to the mechanical room and circulates in a continuous loop. The loop is considered a CL as secondary disinfection treatment may be added at this point.

3.4 Control Measures

The following control measures have been established to meet Best Practices and the requirements outlined in ASHRAE 188-2015 and PWGSC MD 15161, CSA 317.1 Healthcare Plumbing at the time of document preparation:

Control Measure	Method	Limits	Frequency	Documentation
Remove or routinely flush accessible piping that is no longer used.	Conduct survey for abandoned piping yearly and ensure all applicable piping is scheduled for removal or monthly flushing.	N/A	Yearly by Site Staff	Maintenance Log
Flushing Program Unoccupied Units	Run hot and cold outlets and flush toilets in any unoccupied units to ensure every outlet and appliance is used at least once weekly	Flush till water gets hot and then additional 30 seconds	Weekly By Site Staff	Maintenance Log
Yearly Operation and Maintenance Review	Maintain all DHW related equipment per manufacturers' recommendations including storage tanks, water heaters, hot water return pumps, shower heads and hoses, aerators, master thermostatic mixing valves, softeners, and backflow preventers.	Log procedure dates for each device. Follow all manufacture recommendations	Yearly by staff or designated contractor	Operating and maintenance manuals.
Legionella Culture Test at two Remote Showers on each DHW Recirculating Loop	Turn on hot water at shower and flush for 30 seconds after it warms up to allow for representative bulk water sample	Less than 10 cfu/mL Total Legionella Pneumophila as per PWGSC MD15161	Every six (6) Months Contractor will draw two distal samples from each DHW loop & send to lab for Legionella Culture Testing. Additional samples may be drawn depending on Bacteria Test Results.	Documentation and Service Reports

3.5 Water Treatment Program: Secondary Disinfection for DHW

- Not applicable

3.6 DHW Legionella Culture Test Limits and Response Protocol:

Level 1 Limits - When the LPTOT count is less than 10 cfu/mL:

- Continue with normal O&M check biocide program is working properly.

Level 2 Limits - When the LPTOT count is 10-100 cfu/mL:

- Immediately flush all hot water faucets for 10 minutes and consider performing a disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

Level 3 Limits - When the LPTOT count is above 100 cfu/mL:

- Immediately shut off all aerosilization devices and flush all hot water faucets for 10 minutes.
- Perform disinfection utilizing heat and flush, hypo chlorination or copper silver ionization program.
- Resample between 2-7 days.

4.0 Pandemic Planning for Stagnant Water

In the rare case that a pandemic (such as coronavirus) occurs buildings can be shut down unexpectedly or operated with very low occupancy. As a result, building water systems that normally have hundreds or thousands of gallons of water flowing through the fixtures, piping, and equipment daily may be stagnant for an unknown period of time, maybe several months.

Stagnation can lead to serious problems that cause long-term damage, reduce property values, and be very difficult to mitigate once the building is reoccupied.

Issues with stagnant water:

Low flow and stagnation in water systems depletes disinfectant levels and stabilizes temperatures to ambient. This provides ideal conditions for biofilms to form in hot and cold water storage tanks, hot water heaters, showerheads, faucets, ice machines, decorative fountains, and cooling tower systems.

Biofilms are communities of surface-attached bacteria that are directly linked to serious corrosion problems, biofouling, and the growth of Legionella and other premise plumbing pathogens. Once established, biofilms are difficult to remove from water systems even with high disinfectant levels.

Although each situation is different, there are practical steps you can take when shutting down a building to help reduce the potential for water system damage and waterborne pathogen growth:

Legionella Minimization Program and Plan

- Keep the building HVAC systems live to maintain temperature and humidity control.
- If not required for HVAC system operation, the cooling tower, chillers, heat exchangers, and associated piping should be completely drained. Leaving the system filled with stagnant water can result in severe corrosion, biofouling problems, and contribute to the transmission of Legionnaire's disease.
- If the cooling tower is required for HVAC system operation, specific treatment protocols may be required to help address low load conditions. Inhibitor requirements may need to be adjusted, and microbiological control can be more challenging. Do not discontinue water treatment if the tower is being operated. Ensure there is full circulation at least 1-3 times per week so inhibitors and biocides can perform properly.
- Drain decorative fountains unless approved treatment and monitoring protocols are maintained.
- Disconnect the water supply to ice machines, coffee makers, water filters, and similar devices. Disinfect inlet lines and install new filters prior to start up.
- Keep water heaters set at their designated temperature (ideally at or above 120°F).
- **Flush all hot and cold water fixtures (showers, faucets, eyewash stations) at least weekly. Document the flushing schedule with log sheets. Routine flushing may mitigate the necessity of disinfecting the potable water system before the building is reoccupied.**
- Periodically monitor the chlorine level at the point of entry and locations throughout the building to ensure flushing provides adequate residuals. Simple test kits are available for chlorine testing.

Contact your water treatment representative for more information and support addressing these issues, or any other water management concerns.