



The Regular Meeting of Town Council for the Town of Mahone Bay was held on Tuesday, July 27, 2023 at 7:00 p.m. in Council Chambers and broadcast via YouTube live.

Present:

Mayor D. DeVenne
Deputy Mayor F. Kangata
Councillor P. Carver
Councillor R. Nowe
Councillor K. Wilson
Councillor J. Feeney
Councillor S. Lohnes-Croft
CAO, D. Heide
Deputy CAO, E. Levy

Regrets:

Town Clerk, K. Redden

Gallery: Online & 1 in-person gallery

Land Acknowledgement

Let us begin by acknowledging that we are gathered today in Mi'kma'ki. The ancestral, present and future territory of the Mi'kmaw people. Today, we gather with the intent followed by the living Peace and Friendship Treaties - with respect, cooperation and coexistence.

1. Agenda

A motion by Councillor Carver, seconded by Councillor Feeney, "THAT the agenda be approved as presented with an amendment to move discussion of 6.13 ahead of item 4." Motion carried.

2. Minutes

A motion by Councillor Feeney, seconded by Councillor Nowe, "THAT the minutes of the June 29, 2023 regular meeting of Council be approved as presented." Motion carried.

3. Public Input Session

No one was in attendance for the Public Input Session.

6.13 Report of the Clerk – Noise Bylaw

Council received a report of the Clerk concerning the draft Noise Bylaw.

A motion by Councillor Feeney, seconded by Councillor Carver, “THAT Council refer the item to the next Policy & Strategy Committee meeting.” Motion carried.

4. Presentations

4.1 Mahone Bay and District Fire Department

Adam Ekins, Fire Chief – Quarterly Report

Chief Adam Ekins answered questions concerning the Department’s monthly report.

Mahone Bay District Fire Department – Ladder Truck Proposal

Council received a presentation on a proposal to sell one of the Department’s pumper trucks and replace it with a used ladder truck.

4.2 Lisa Bozek & Lesley McFarlane, Municipal Joint Services Board – IT & Intermunicipal Contract

Council received a presentation from the Manager of the Municipal Joint Services Board (MJSB), Lesley McFarlane and the Manager of IT Services, Lisa Bozek on the MJSB Intermunicipal Service Agreement.

5. Correspondence

5.1 Tim Merry, President, Mahone Bay United Soccer Association – Thank-you Letter

Council received a letter from Mahone Bay United Soccer Association thanking them for the support provided to Mahone Bay United.

A motion by Councillor Wilson, seconded by Deputy Mayor Kangata, “THAT items 5.1 and 5.7 be Received and Filed.” motion carried.

5.2 Dan Hennessey, Chairman, November 11th Committee – Remembrance Day Flyby

Council received a request from the Chairman of the November 11th Committee, a Committee of the Royal Canadian Legion, requesting community participation in this year’s Remembrance Day flyby.

A motion by Deputy Mayor Kangata, seconded by Councillor Nowe, “THAT Council direct the staff to draft, for the Mayor’s signature, a response granting community participation in this year’s Remembrance Day flyby.” Motion carried.

5.3 Mahone Islands Conservation Association – Grant Request

Council received a grant request from MICA (Mahone Islands Conservation Association), in the amount of \$1,000.

A motion by Councillor Feeney, seconded by Deputy Mayor Kangata, “THAT item 5.3 be received and filed.” Motion carried.

5.4 Town of Lunenburg – Fisher’s Memorial Service

Council received information about the Town of Lunenburg’s September 10, 2023 Fishers’ Memorial Service.

A motion by Deputy Mayor Kangata, seconded by Councillor Wilson, “THAT staff respond to the organizers of the Fisher’s Memorial Service, informing them that Councillor Wilson will attend, on behalf of the Town of Mahone Bay.” Motion carried.

5.5 George Anderson, Chair, Mahone Bay Tourism & Chamber of Commerce – Logo Response

Council received a response from the Mahone Bay Tourism & Chamber of Commerce to the request that the MBTCC transfer the rights for use of their logo to the Town of Mahone Bay.

A motion by Councillor Carver, seconded by Deputy Mayor Kangata, “THAT the Town of Mahone Bay accept the offer from the Mahone Bay Tourism and Chamber of Commerce, with funds up to \$5,000 to cover associated costs.” Motion withdrawn.

A motion by Councillor Feeney, seconded by Councillor Carver, “THAT Item 5.5 be referred to the Community Logo Development Steering Team requesting feedback and a formal recommendation.” Motion carried.

5.6 George Anderson, Chair, Mahone Bay Tourism & Chamber of Commerce – VIC Funding Shortfall

Council received a request from the Mahone Bay Tourism & Chamber of Commerce to increase their grant allocation from the Town, to assist in hiring a summer student.

A motion by Councillor Feeney, seconded by Councillor Lohnes-Croft, “THAT the Town of Mahone Bay provide a grant to the Mahone Bay Tourism and Chamber of Commerce in the amount of \$1,600, to assist with hiring a summer student to staff the Visitor Information Centre,” Motion carried.

5.7 Deryk McGrath – Feedback on Speed Humps

Council received feedback from resident, Deryk McGrath, on the speed humps installed on Pleasant Street.

6. Staff Reports

6.1 Council Report

Staff Report was not complete in time for the Council meeting. Mr. Heide will provide the report to Council for their information.

6.2 Staff Report – Comfort Centre

Council received a staff report with information about the implementation of a Comfort Centre at the Mahone Bay and District Fire Department.

A motion by Councillor Feeney, seconded by Councillor Wilson, “THAT Council approve the Town of Mahone Bay Comfort Centre Standard Operating Procedures, with an amendment noting a janitorial contract is in place, and direct staff to begin the recruitment of volunteers to support the Comfort Centre.” Motion carried.

6.3 Staff Report – Fire Services Bylaw

Council received a staff report concerning a Fire Services Bylaw as well as an updated draft bylaw.

A motion by Councillor Carver, seconded by Councillor Feeney, “THAT Council provide first reading to the Fire Services Bylaw as presented.” Motion carried.

A motion by Councillor Carver, seconded by Deputy Mayor Kangata, “THAT staff develop a job description for the Fire Chief.” Motion withdrawn.

6.4 Staff Report – 2023-24 Business Plan

Council received the draft 2023-24 Business Plan.

A motion by Councillor Feeney, seconded by Councillor Wilson, “THAT Council approve the 2023-24 Business Plan as presented.” Motion carried.

6.5 Staff Report – Development Agreement MBC

Council received a development agreement request from the Mahone Bay Centre.

A motion by Councillor Wilson, seconded by Councillor Lohnes-Croft, “THAT Council give written consent to approve the minor change to Schedule B of the Development Agreement in relation to the development permit request received from Mahone Bay Centre Society to install a 12 x 30 shed.” Motion carried.

6.6 Staff Report – Orchard Street

Council received a staff report with a recommendation concerning traffic flow on Orchard Street, following up on previous direction.

A motion by Deputy Mayor Kangata, seconded by Councillor Carver, “THAT Council direct staff to restrict Orchard St. to ‘right turn only’ at the intersection with Main Street.”

Motion carried.

6.7 Staff Report – Non-Revenue Water Update

Council received an update concerning water loss (non-revenue water) in the water utility and staff efforts to reduce.

A motion by Councillor Carver, seconded by Deputy Mayor Kangata, “THAT Council accept this report for information.”

Motion carried.

6.8 Staff Report – Water Plant Repairs

Council received an update and associated recommendations concerning necessary repairs to the Town’s water treatment plant.

A motion by Councillor Feeney, seconded by Deputy Mayor Kangata, “THAT Council approve the plumbing repairs (\$10,750+HST) and replacement flocculation mixer (\$4,487+HST) as recommended, to be funded from the water utility depreciation reserve.”

Motion carried.

6.9 Staff Report – Housing Action Plan

Council received additional information about the Housing Accelerator Fund and an overview of the proposed housing action plan currently under development to support the Town’s anticipated Housing Accelerator Fund application. This will be discussed further at the special meeting of Council scheduled for August 11th.

6.10 Staff Report – Tree Planting Fund

Council received a recommendation to approve an application to the Nova Scotia Thriving Forests program.

A motion by Councillor Wilson, seconded by Councillor Carver, “THAT Council direct staff to submit an application to the Nova Scotia Thriving Forests program.”

Motion carried.

6.11 Staff Report – ACOA Project Funding

Council received a recommendation to apply for federal funding to support infrastructure improvement projects.

A motion by Councillor Carver, seconded by Councillor Lohnes-Croft, “THAT Council direct staff to apply for the ACOA Innovative Communities Fund for funding to support various infrastructure improvements in the downtown core included in the Council’s 10-year Capital Investment Plan.” Motion carried.

6.12 Staff Report – Temporary Borrowing Resolutions

Council received a staff report with temporary borrowing resolutions relating to a balloon payment renewal and to waterline upgrades on Main Street – serving the new Long Term Care Facility – which were recently completed.

A motion by Councillor Feeney, seconded by Councillor Lohnes-Croft, WHEREAS Section 66 of the Municipal Government Act provides that the Council of the Town of Mahone Bay, subject to the approval of the Minister of Municipal Affairs and Housing, may borrow to expend funds for a capital purpose as authorized by statute;

WHEREAS the Council of the Town of Mahone Bay has adopted a capital budget for this fiscal year as required by Section 65 of the Municipal Government Act and are so authorized to expend funds for a capital purpose as identified in their capital budget; and

WHEREAS the Council of the Town of Mahone Bay has determined to borrow for the purposes of Water/Wastewater Upgrades serving Long-Term Care Facility;

BE IT THEREFORE RESOLVED

THAT under the authority of Section 66 of the Municipal Government Act, the Council of the Town of Mahone Bay borrow a sum or sums not exceeding Five Hundred Forty-Nine thousand and Seven Hundred Seventy-Two Dollars (\$549,772) for the purpose set out above, subject to the approval of the Minister of Municipal Affairs and Housing;

THAT the sum be borrowed by the issue and sale of debentures of the Council of the Town of Mahone Bay to such an amount as the Council deems necessary;

THAT the issue of debentures be postponed pursuant to Section 92 of the Municipal Government Act and that the Council borrow from time to time a sum or sums not exceeding Five Hundred Forty-Nine thousand and Seven Hundred Seventy-Two Dollars (\$549,772) in total from any chartered bank or trust company doing business in Nova Scotia;

THAT the sum be borrowed for a period not exceeding Twelve (12) months from the date of the approval of the Minister of Municipal Affairs and Housing of this resolution;

THAT the interest payable on the borrowing be paid at a rate to be agreed upon; and

THAT the amount borrowed be repaid from the proceeds of the debentures when sold.

Motion carried.

A motion by Councillor Feeney, seconded by Councillor Lohnes-Croft,

WHEREAS Section 66 of the Municipal Government Act provides that the Council of the Town of Mahone Bay, subject to the approval of the Minister of Municipal Affairs and Housing, may borrow to expend funds for a capital purpose as authorized by statute;

WHEREAS clause 66 (4)(b) of the Municipal Government Act authorizes the Municipality to expend funds for the purpose of paying or retiring debentures;

BE IT THEREFORE RESOLVED

THAT under the authority of Section 66 of the Municipal Government Act, the Council of the Town of Mahone Bay borrow a sum or sums not exceeding One Hundred Thirty-Two Thousand and Five Hundred Dollars (\$132,500) for the purpose set out above, subject to the approval of the Minister of Municipal Affairs and Housing;

THAT the sum be borrowed by the issue and sale of debentures of the Council of the Town of Mahone Bay to such an amount as the Council deems necessary;

THAT the issue of debentures be postponed pursuant to Section 92 of the Municipal Government Act and that the Council borrow from time to time a sum or sums not exceeding One Hundred Thirty-Two Thousand and Five Hundred Dollars (\$132,500) in total from any chartered bank or trust company doing business in Nova Scotia;

THAT the sum be borrowed for a period not exceeding Twelve (12) months from the date of the approval of the Minister of Municipal Affairs and Housing of this resolution;

THAT the interest payable on the borrowing be paid at a rate to be agreed upon; and

THAT the amount borrowed be repaid from the proceeds of the debentures when sold.

Motion carried.

7 Council Items

7.1 Councillor Carver – South Shore Open Door Association

Councillor Carver asked if Council would like reports from the South Shore Open Door Association to be included on Council agendas.

A motion by Councillor Carver, seconded by Councillor Wilson, “THAT South Shore Open Door Association reports be regularly included on Council agendas.” Motion carried.

7.2 Councillor Feeney – Staff Appreciation Day

Councillor Feeney requested that Council continue with the tradition of having a Staff Appreciation Day.

A motion by Councillor Feeney, seconded by Councillor Lohnes-Croft, “THAT Council designate August 14, 2023 as Staff Appreciation Day and that staff be given that day off in appreciation of their efforts in advancing the Town’s strategic objectives.”

Motion carried.

8. Committee Reports

8.1 Lunenburg County Senior Safety Program

Council received the monthly report of the Senior Safety Program.

8.2 Accessibility Quarterly Update

Council received the quarterly update from Ellen Johnson, Accessibility Coordinator.

8.3 Climate and Environment Committee

Council received the draft minutes of the July 5, 2023 meeting of the Climate and Environment Committee.

A motion by Councillor Wilson, seconded by Deputy Mayor Kangata, “THAT council adopt the proposed 2023 update to the Town’s GHG Reduction Action Plan, amended as discussed.” Motion carried.

8.3 Cemetery Committee

Council received the draft minutes of the July 7, 2023 meeting of the Cemetery Committee.

A motion by Councillor Feeney, seconded by Councillor Nowe, “THAT Council direct staff to issue a request for proposals for creation of a future development plan for Park Cemetery.” Motion carried.

8.4 Heritage Advisory Committee

Council received the minutes of the July 12, 2023 meeting of the Heritage Advisory Committee.

A motion by Councillor Carver, seconded by Councillor Feeney, "THAT council direct staff to apply for conservation advice funding prior to any work being done on the exterior of Town Hall." Motion carried.

8.5 Asset Management Committee

Council received the draft minutes of the July 13, 2023 meeting of the Asset Management Committee.

9. New Business

Deputy Mayor Kangata made a notice of motion for staff to work with the Fire Department on the potential for the addition of a ladder truck to the Department's fleet.

10. Closed Session

A motion by Councillor Feeney, at 10:08pm, seconded by Councillor Nowe, "THAT Council go into Closed Session to discuss Acquisition, Sale, Lease and Security of Municipal Property and Contract Negotiations as permitted by the Municipal Government Act sections 22(2)(a) and 22(2)(e) respectively. Motion carried.

Council came out of closed session at 10:56 p.m.

Business Arising from Closed Session

A motion by Feeney, seconded by Wilson, "THAT council direct staff to write to the owners of 8 Edgewater Street informing them they will have until September 20th to fix the water leak on their property, at which time the water service will be suspended if the repair hasn't been made." Motion carried.

Council adjourned at 10:57 p.m. on conclusion of business.

TOWN OF MAHONE BAY

Mayor, David Devenne

TOWN OF MAHONE BAY

Town Clerk, Kelly Redden



A special meeting of Town Council for the Town of Mahone Bay was held on Friday, August 11, 2023 at 9:00 a.m. in Council Chambers.

Present:

Mayor D. DeVenne (virtual)
Deputy Mayor F. Kangata
Councillor S. Lohnes-Croft
Councillor R. Nowe
Councillor K. Wilson
Councillor Carver
D. Heide, CAO
E. Levy, Deputy CAO
K. Redden, Town Clerk

Absent: Councillor J. Feeney

Gallery: Online and 0 in-person gallery

Land Acknowledgement

Let us begin by acknowledging that we are gathered today in Mi'kma'ki. The ancestral, present and future territory of the Mi'kmaw people. Today, we gather with the intent followed by the living Peace and Friendship Treaties - with respect, cooperation and coexistence.

1. Agenda

A motion by Councillor Lohnes-Croft, seconded by Councillor Carver, "THAT the agenda be approved as presented." Motion carried.

2. Housing Accelerator Fund Application

Council received a staff report and a complete review of the proposed Housing Accelerator Fund application.

A motion by Councillor Carver, seconded by Deputy Mayor Kangata, "THAT Council direct staff to submit an application to the CMHC Housing Accelerator Fund on the basis of the draft Action Plan for the Town of Mahone Bay." Motion carried.

3. Meeting Minutes

Council received the draft minutes of the July 31, 2023 meeting of the Community Logo Development Steering Team.

A motion by Councillor Wilson, seconded by Councillor Nowe, “THAT the Town accept the offer from the Mahone Bay Tourism and Chamber of Commerce with respect to repatriating their current logo to the Town and agree to compensate up to \$2,500 in costs incurred by the Mahone Bay Tourism and Chamber of Commerce.”
Motion carried.

10. Closed Session

A motion by Councillor Nowe, at 11:51am, seconded by Councillor Carver, “THAT Council go into Closed Session to discuss Contract Negotiations as permitted by the Municipal Government Act section 22(2)(e).
Motion carried.

Council adjourned upon motion at 12:07 p.m.

TOWN OF MAHONE BAY

TOWN OF MAHONE BAY

Mayor, David Devenne

Town Clerk, Kelly Redden



Sustainability Summit

Growing Regional Cooperation and adapting
to a changing climate



Municipal Asset Management Program



This initiative is delivered through the Municipal Asset Management Program, which is delivered by the Federation of Canadian Municipalities and funded by the Government of Canada.

Who We Are

A not-for-profit organization that provides training, education and technical assistance to advance the practice of asset management in Atlantic Canada

Presenter

Matt Delorme, P.Eng

AIM Network Executive Director



Purpose of Project

- Infrastructure management is changing
 - National Adaptation Strategy
 - Aging infrastructure
 - Climate change
 - Natural assets
 - Funding constraints
 - Population growth and demographic changes
- Solution is long-term planning
 - Strategy
 - Community consultation and involvement
 - Balance costs with risks and service delivery

Day 1 - September 22

Staff and Council

- Discuss how natural assets contribute to services
 - Natural solutions are required – insufficient funding for built solutions
 - Communities of the future will look different
 - Land use, zoning, demographic changes and population increase
 - Level of service, risk and prioritizing alongside built infrastructure
- Build on existing work with regional cooperation
 - Current: MJSB, EMO, Building Inspection, Accessibility
 - Potential: WWTP & WTP Operators, Transit, Climate Preparedness, Communications, Forest management

Day 1 - September 22

Staff and Council

10:00 AM	Introduction and Welcome Matt Delorme
10:15 AM	Workshop: Natural Assets Levels of Service and Policy
10:30 AM	
10:45 AM	
11:00 AM	
11:15 AM	Natural Assets Peter Duinker, Dalhousie
11:30 AM	
11:45 AM	
12:00 PM	
12:15 PM	Networking Lunch
12:30 PM	
12:45 PM	

1:00 PM	David McIsaac - HRM Active Transportation Planning, Alignment with Capital Projects by Video Link
1:15 PM	
1:30 PM	Municipal Joint Service Board - Leslie McFarland Building and Fire Inspection - Graham Hopkins Accessibility - Ellen Johnson
1:45 PM	
2:00 PM	REMO - lessons from 2023 Angela Henhoeffler
2:15 PM	
2:30 PM	Workshop: Regional Cooperation in the South Shore - all local municipalities - Focus on trans-jurisdictional issues (WWTP & WTP Operators, transit, climate preparedness, communications, urban forest management)
2:45 PM	
3:00 PM	
3:15 PM	
3:30 PM	
3:45 PM	Debrief

Day 2 - September 23

Public Engagement

- Community feedback on difficult decisions
 - Land use and coastal protection questions
 - Infrastructure upgrades vs. emergency response
 - Prepare for projects under the new National Adaptation Strategy
- Commitment to addressing climate related risks
- Network with industry and NGOs
- Gain insight on responding to climate questions from residents
- Increase education and engagement around climate issues

Outcomes

- Defined levels of service and projected costs related to at least one critical natural asset
- Risk assessment for at least one critical natural asset
- Tools, templates and roadmap to complete remaining assessments, relying on in-house expertise
- Roadmap of actions to expand regional cooperation or share services in new areas
- Resident surveys from the Sustainability Summit to understand what climate issues are front of mind



QUESTIONS?

We look forward to
seeing you there!

Kelly Redden

From: Kelly.Redden@TownofMahoneBay.ca
Subject: FW: Noise By-law

From: Christopher Ouellette [REDACTED]
Sent: Tuesday, August 8, 2023 9:37 PM
To: Dylan Heide <dylan.heide@townofmahonebay.ca>; Eric Levy <eric.levy@townofmahonebay.ca>; Kelly Redden <Kelly.Redden@TownofMahoneBay.ca>; David Devenne <david.devenne@townofmahonebay.ca>; Francis Kangata <francis.kangata@townofmahonebay.ca>; Penny Carver <Penny.Carver@townofmahonebay.ca>; Joseph Feeney <joseph.feeney@townofmahonebay.ca>; Suzanne Lohnes-Croft <suzanne.lohnes-croft@townofmahonebay.ca>; Richard Nowe <richard.nowe@townofmahonebay.ca>; Kelly Wilson <kelly.wilson@townofmahonebay.ca>
Subject: Noise By-law

CAUTION: This email originated from an external sender.

Hello,

The recent proposal for a Noise by-law has certainly sparked a controversy within the town. It is a contentious issue but one that does need to be addressed.

I had the privilege of speaking at the Townhall meeting and wish to reiterate my support for a Noise by-law. In fact it is long overdue. I fully support the concerns brought up by some of the hospitality businesses here in town and believe that a reasonable and responsible by-law would help to protect the restaurants from unnecessary harassment. As we all know, the revenues generated by these business is very important to the health of the town. I also believe that a sensible by-law is needed for the residential parts of town. Lunenburg has a noise by-law, Bridgewater has one. Halifax has one. A quick Google search will bring up a multitude of towns, cities and communities that have a by-law.

The proposed by-law that was voted down at the second reading was an attempt at a "one-size fits all" affair. The problem is more complex than that. Without re-inventing the wheel, I would like to suggest that the noise by-law for the town would incorporate 3 distinct zones; A commercial zone, a residential zone and a sports field(s) zone.

To start with, the 65db sound threshold suggested is way too low. As was brought up at the town meeting, lawn-mowers, weed-trimmers, leaf blowers, snow blowers, circular saws, chain saws and wood splitters all exceed the proposed threshold in some cases by double the 65 db proposal. This would make mowing a person's lawn in violation of the by-law. Any repairs to a home/building would violate the by-law. 4 people speaking animatedly in one of the outdoor patios at any of the towns restaurants/pubs would exceed the by-law limit. So clearly 65db is much too low a threshold.

The time(s) when restrictions apply need to be reasonable to allow people to maintain their property and for the businesses to maintain reasonable hours. Of course this is all a compromise because what's reasonable to one person is completely unacceptable to another. I would like to suggest that for the commercial zone the restricted noise time begin at 10:00pm and last until 8:00am on Monday to Friday. On Saturday perhaps it could start at 11:00pm and last until 9:00 Sunday morning.

For the Residential zone, I would like to suggest the restricted (quiet) time begin each night at 7:00pm and last until 8:00am the following morning. Friday and Saturday night perhaps the time could start at 8:00pm and last until 9:00am.

Sports fields could have a restricted time from 9:00pm to 9:00am daily. As to what the noise level should be is a difficult question. Of the Noise by-laws that I looked at on-line from other communities, some avoided putting a number on the restricted noise level, others had levels in the 75db for the restricted times. In the non-restricted times it is pretty hard to restrict noise as this would be the time of the day that one would expect work of various natures to be carried out. Assuming that the noise generated by the work is not an on-going daily annoyance, one might expect that reasonable people would understand and tolerate the noise for a reasonable period.

However, as I mentioned at the town meeting, we have a neighbour who habitually runs either his chainsaw or his woodsplitter each evening through most of the summer beginning at around 5:30 until 9:00pm. Two nights ago he started his tractor (he has a small Kubota tractor) at 8:00pm to use it as a lift to trim trees with a chainsaw until 9:00pm. When we have asked him to stop or be more considerate of the neighbourhood his response was "F... off"! His habitual noise making makes it near impossible to sit on our deck and enjoy dinner, or have friends over or sometimes even just have a conversation. Lacking a town noise by-law we have absolutely no recourse with this inconsiderate boob of a neighbour. He used to burn garbage every 3rd day in a barrel in his back yard until the by-law officer was called and threatened a fine, only then were we able to get him to stop. So I think our dilemma is obvious. We have suffered through this every year now for about 20 years and our patience is wearing mighty thin. A noise by-law with a provision for nuisance or on-going noise would benefit many people.

I thank council and town staff for finally looking at a noise by-law. I hope my concerns will help to craft a noise by-law that is reasonable, responsible and enforceable. Thank you.

Chris Ouellette

133 Pine Grove Street

Mahone Bay

[REDACTED]

Phone: (902) 624-9118

August 11, 2023

Attention: Mahone Bay Town Council

Dear Councillors:

We would like to bring to your attention an issue that is of very high importance to us. To start, we are Dave and Shawn Highfield of 232 Hawthorn Rd., Mahone Bay. We have been residents of Mahone Bay since 2019 when we built a home and retired here from the HRM.

We love living in Mahone Bay for many reasons, the options to enjoy the outdoors in a suburban environment, the beauty of the area and proximity to a large urban center are but a few. However, we would like to express our frustration and concern that there is no enforced by law regarding the disposal of storm and surface water, specifically water escaping from one property onto another. Here I would like to reference the Mahone Bay Land Use By-Law Section 4.5.19 (viii) Page 17.

To provide you some background I offer the following:

For approximately the past 18 – 24 months, since a new home was constructed on an abutting lot, starting in April 2021, we have been subject to large amounts of water and silt escaping from the adjacent property and onto our property during rainstorm events.

I have brought this to the attention of the homeowners verbally and via written correspondence several times starting early in the construction and after occupancy. To date no meaningful measures have been taken by the homeowners to rectify the problem. In fact, they have denied, in writing, to my legal counsel that such things have ever occurred.

This week they have constructed a 55-foot-long shallow ditch filled with rock along the road frontage of their driveway / property. The purpose of this ditch is to take water runoff from the roadway and redirect it from their lot directly onto my property.

Obviously, this will only aggravate the situation and increase the potential for major damage to my property.

We have had discussions by phone and in person with Mayor Devenne and Mr. Dylan Hyde regarding this situation in 2021 and 2022. They both advised that the provisions in the above cited section of the Land Use By-Law are interpreted as to only pertain to developments as a whole and not to individual lots. We were further advised that this is a matter that must be resolved between neighbours and that the town has no interest in the matter.

It was obvious to us that the owners of the adjacent property were not prepared to take steps to rectify the problem, so we reluctantly engaged the services of legal counsel to investigate what our options were going forward. Our solicitor advised us that this issue is indeed illegal in common law for property owners to allow water to escape their property to an adjacent property. Our solicitor sent letters to the property owners requesting them to rectify the situation or face the possibility of litigation.

To date we have spent several thousand dollars in legal fees on this and to take the matter forward to litigation will cost in excess of ten thousand dollars more. As retirees on a fixed income this becomes a heavy burden.

It is apparent that the Town of Mahone Bays position of “a matter between neighbours” is something that may work in an ideal world, but that is not the case here. Further it appears that at present individual property owners / taxpayers have no protection from these situations. As the Hawthorn Rd. development is a “new” development, the fact that this is allowed to occur is very perplexing and with climate change, the intensity and frequency of abnormal heavy rainfall events, as we all have witnessed over the past 2 months, cannot be ignored.

Allowing this to become a case of those who live at elevations lower than others or those who do not have the financial means to bear the cost of litigation must pay the price of property damage is blatantly unfair and morally wrong. In our view it is incumbent upon Council and indeed Council’s responsibility and duty to ensure that this is not the case.

We implore you as Town Councillors to review the situation as it relates to the interpretation of the existing section of the by-law or draft and implement a new by-law that prohibits this from happening as soon as possible. It is not only legally wrong to let situations like this continue but it is morally wrong as well.

We realize that you are all very busy people, however, if any wish to reach out and discuss this matter further, visit the site or review any of the many photographs and videos I have that very vividly document the problems from 2021 to today, please do so.

Thank you for your time.

Dave & Shawn Highfield
232 Hawthorn Dr.
Mahone Bay, NS
902-624-8878
902-497-9072


cc: David Devenne
Francis Kangata
Penny Carver
Joseph Feeney
Suzanne Lohnes-Croft
Richard Nowe
Kelly Wilson



Municipality of the District of Lunenburg

10 Allée Champlain Drive Cookville Nova Scotia Canada B4V 9E4

Administration

Phone: 902.543.8181 Fax: 902.543.7123 Web Site: www.modl.ca

August 10, 2023

Mayor David Devenne & Council
Town of Mahone Bay
493 Main Street
Mahone Bay NS B0J 2E0

Dear Mayor Devenne:

RE: 2023/24 REMO Budget Allocation:

At the July 17, 2023, Regional Emergency Management Organization (REMO) Advisory Committee meeting, the Committee passed the following motion:

"that the REMO Advisory Committee recommend to the partner Councils that at the end of each fiscal year, any unspent REMO funds remain with REMO, to be placed in a reserve for emergency spending."

Please forward this motion to your Council for consideration and approval. Once approved, please forward a copy of Council's motion to Angela Henhoeffler, Lunenburg County Emergency Management Coordinator (angela.henhoeffler@modl.ca) for insertion on a future REMO agenda.

Sincerely,

Tom MacEwan
Chief Administrative Officer

/jgp

cc: Angela Henhoeffler, REMC

July 27, 2023

The Honourable Steven Guilbeault
Minister of the Environment and Climate Change
House of Commons
Ottawa, Ontario
Canada
K1A 0A6

By email: minister-minister@ec.gc.ca

**Re: Request for Exemption of Volunteer Emergency Service Providers
from New Fuel Charges**

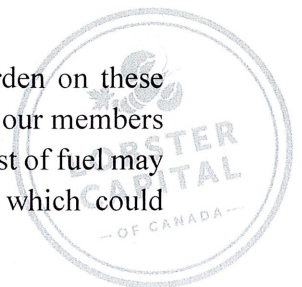
Minister Guilbeault,

On behalf of the Municipality of Barrington, I am writing to you to advocate for the dedicated volunteer emergency service providers within our Municipality and respectfully request that you consider granting an exemption to the volunteer emergency service providers from the new fuel charges.

As we both know, the invaluable contributions of volunteer emergency service providers, including firefighters, and search and rescue personnel, are immeasurable. They selflessly dedicate their time, skills, and efforts to safeguard the lives and properties of our fellow residents, often putting themselves at considerable risk. These volunteers perform their duties with utmost professionalism and dedication, serving as pillars of strength and hope in times of crisis.

While we understand the importance of reducing greenhouse gas emissions and promoting cleaner fuels, we believe it is essential to recognize the unique circumstances and challenges faced by volunteer emergency service providers.

The implementation of these new fuel charges will create an added financial burden on these organizations, who often operate on limited budgets and rely on the commitment of our members who generously devote their personal resources to serve the public. The increased cost of fuel may restrict their ability to maintain and deploy their emergency response vehicles, which could potentially jeopardize the safety and well-being of those in need.

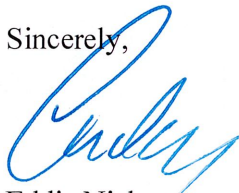


Therefore, I kindly request that you consider exempting volunteer emergency service providers from the new Fuel Charges (Carbon Tax) under the Greenhouse Gas Pollution Pricing Act and the Clean Fuel Regulations. Granting this exemption would not only recognize the significant contributions of these volunteers but also demonstrate your government's appreciation for their unwavering commitment to public safety and welfare.

I am confident that through collaborative efforts, we can strike a balance between environmental stewardship and acknowledging the essential role played by volunteer emergency service providers in our society. I would be more than willing to discuss this matter further and provide any additional information that may assist you in making a well-informed decision.

Thank you for your time and consideration of this vital request. I eagerly await your response and trust that you will give due attention to the concerns raised on behalf of our esteemed volunteer emergency service providers.

Sincerely,



Eddie Nickerson
Warden

CC: Federation of Canadian Municipalities
Nova Scotia Federation of Municipalities
Mr. Rick Perkins, M.P. for South Shore – St. Margaret's
Mr. Nolan Young, M.L.A. for Shelburne
Nova Scotia Municipalities



Kelly Redden

From: Kelly.Redden@townofmahonebay.ca
Subject: FW: Cross Walk

-----Original Message-----

From: Addie Burkam [REDACTED]
Sent: Wednesday, August 16, 2023 11:41 PM
To: Town of Mahone Bay Clerk <clerk@townofmahonebay.ca>
Subject: Cross Walk

[You don't often get email from arburkam@gmail.com. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

CAUTION: This email originated from an external sender.

Hi there,

As someone who grew up in Mahone Bay, I have noticed how much busier the town has been within the past few years. I see this increase in tourism as a great thing for local businesses and for the town as a whole. However, I've also noticed how the road infrastructure could be improved to keep both residents and visitors safe. I have seen many people attempt to cross the street just across from the Post Office, or near Sweet Ride Bike shop. This is dangerous for pedestrians as the corner of the street is too sharp to see around. I believe putting a crosswalk in this area would greatly benefit the town and help to keep everyone safe.

Please let me know if you have any questions or if I can provide any further information.

Thank you,
Addie Burkam.

Pleasant Street, Mahone Bay

July 25, 2023

Mayors/Wardens and Chief Administrative Officers/Town Clerks
Nova Scotia Municipalities

Dear Mayors/Wardens and Chief Administrative Officers/Town Clerks:

Re: Delivery of 2022-23 Annual Report

On behalf of Property Valuation Services Corporation (PVSC), I am pleased to inform you that the 2022-23 Annual Report (for the April 1, 2022 to March 31, 2023 fiscal year) is now available.

This year's Annual Report focuses on embracing agility – being ready to pivot, re-prioritize, and re-distribute resources – to ensure our commitments to Nova Scotia municipalities are met and PVSC is positioned for success now and in the future.

The Report is posted on our website here: [Agility in Action \(pvsc.ca\)](http://pvsc.ca).



Sincerely,



Joseph Feeney
Chair, PVSC Board of Directors



Goal	Objective	Assigned	Target	% Completion			
Council Assignments to Staff							
1	Staff to initiate discussion with MODL Planning staff and prepare a report for Council about the possibility of intermunicipal collaboration between the Town of Mahone Bay and MODL on the topic of housing in the preparation of their respective planning documents.	26-Nov-20	Sep., 2023	<div><div></div><div></div><div></div><div></div></div>			75%
		Notes: In progress. Discussion initiated with MODL Planning staff. Timeline coordinated with Plan Mahone Bay process.					
2	Staff to apply to the Canada Healthy Communities initiative and the Canada Cultural Spaces Fund to sponsor Phase 3 improvements to the Michael O'Connor Memorial Bandstand	08-Jun-21	Aug., 2023	<div><div></div><div></div><div></div><div></div></div>			
		Notes: Canada Healthy Communities Initiative application did not receive approval. Canada Cultural Spaces Program application was submitted, in August, for implementation in 2024 (if approved).					



3	Staff to initiate a Home Charger Pilot Program for electric vehicle owners under the Grow the Load Initiative.	29-Jul-21	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: In Progress. Town staff coordinating with AREA staff on development of pilot program. Associated residents survey to inform program development completed in 2022. Implementation planned for Q2 2023.
4	Staff to produce a report on the Town's Procurement Policy.	28-Jul-21	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: Assigned to Manager of Finance (Treasurer). Discussed at July 24th Policy & Strategy Committee meeting.
5	That minimum standards for housing be reflected in any housing strategy that the Town may develop.	14-Sep-21	Feb., 2024	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: Housing Strategy now reflected as an action in the Town's CMHC Housing Accelerator Fund application.
6	Direct staff to issue an RFP for legal services.	28-Oct-21	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: RFP to be issued in Fall of 2023/24 to take effect April 1, 2024.
7	Staff to convene a Special Council meeting in the new year to discuss the RCMP service that the Town contracts through the Province.	09-Nov-21	Jul., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>		Notes: Took place on July 21, 2023
8	Staff to develop draft protocols for the new community hall as an emergency shelter.	27-Jan-22	Jul., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>		Notes: Report presented to Council's July 27, 2023 meeting. Protocols approved by Council. Volunteer recruitment proceeding.
9	Staff to initiate discussions with the Nova Scotia Liquour Commission concerning potential cyclist and pedestrian safety improvements to their property on Main Street.	08-Mar-22	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: Staff in discussion with Nova Scotia Liquour Commission. Report anticipated to Council's September 28th meeting.




10	Council take no action for a further eighteen (18) months from the date of this resolution regarding the discharge of MB-DA2019-001.	12-Jul-22	Feb, 2024	<div> <div></div> <div></div> <div></div> <div></div> </div>	★	Notes: Development Agreement Amendment process completed.
11	Staff to reach out to MODL staff to discuss any interest in extending Town water/wastewater services into Mader's Cove / Blockhouse.	14-Jul-22	Nov., 2023	<div> <div></div> <div></div> <div></div> <div></div> </div>	75%	Notes: In Progress, report anticipated to in Q3 2023-24.
12	Defer the Ghaffari/Mahmoodi request until the resolution of the Plan Mahone Bay process.	11-Oct-22	Oct., 2023	<div> <div></div> <div></div> <div></div> <div></div> </div>	★	Notes: Property owners have been notified of the decision of Council. Item on agenda for Council's Sept. 12, 2023 meeting.
13	Direct staff to execute a twenty-five year power purchase agreement with AREA for wind energy incremental to AREA's existing 23.5W Ellershouse Wind Farm, delivered as the wind blows and when the Town can use it in a given hour, with the added option for the Town to increase its annual takings from AREA to achieve 100% renewable energy supply if the town elects to subscribe to energy balancing services from the market	11-Oct-22	Sep., 2023	<div> <div></div> <div></div> <div></div> <div></div> </div>	75%	Notes: In Progress.


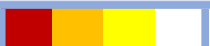



14	Direct staff to coordinate with the Fire Chief to present the draft by-law to the Fire department to obtain specific stakeholder feedback to be presented to council.	08-Nov-22	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	★	Notes: Feedback from Department received. First reading given to the bylaw on July 27th. Public Hearing scheduled for September 12, 2023.	
15	Inquire of the South Shore Regional Library Board about the rationale for an appointment to that Board and if there is a preference for a community member or a member of Council, and on receiving that answer that Council consider whether an appointment to that Board is necessary.	13-Dec-22	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: Correspondence has been sent and staff will share the response with Council when it becomes available.	
16	Provide Council with a report regarding the potential implementation of a marketing levy and interaction with the Provincial Short-Term Accommodation legislation.	26-Jan-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: Coordinating with other Lunenburg County municipalities in developing report, anticipated to Council's October 10th meeting.	
17	Proceed with recommended tee-up of the Pleasant Street and Main Street intersection.	07-Feb-23	Jun., 2024	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In progress with WSP (engineering).	
18	Provide Council with a report no later than November 14, 2023, on the potential formation of a Council Remuneration Review	09-Mar-23	Nov., 2023	Not yet begun			Notes:

19	Investigate potential locations for a new Mahone Bay Pool, as as part of that investigation, a survey be conducted with citizens.	30-Mar-23	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: Underway in coordination with Mahone Bay Pool Society. Public Survey launched in August. RFP for design work closing Sept. 12, 2023.
20	Provide a report on the feasibility of Council receiving periodic summaries of building and development permits issued by the Town's Planners.	30-Mar-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In Progress. Report anticipated to Council's October 10th meeting.
21	Prepare a report on the potential for the provision of access to Oakland Lake for fire services.	30-Mar-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In Progress.
22	Facilitate tours of the Community Solar Garden	11-Apr-23	Nov., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In progress with AREA staff for Q3 2023-24.
23	Develop service standards that can be used to benchmark and analyze performance.	11-Apr-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In Progress. Report anticipated to Council's Oct 10th meeting.
24	Provide a report on the possibility of shared use of former firehall between Public Works and other possible uses.	28-Apr-23	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: In Progress. Report anticipated to Council's September 28th meeting.
25	Request a meeting between Council members and representatives of the Wooden Boat Society concerning the Mahone Bay Marina and future capital expenditures on the wharf.	28-Apr-24	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: Wooden Boat Society has been contacted and responded positively to Council's request; discussing upcoming opportunities to meet.

26	Work with the Wooden Boat Society to explore options for a fishing pier at the marina wharf.	11-May-23	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%
		Notes: Staff have engaged in preliminary discussion with Wooden Boat Society; exploring options for extending marina area to the East or West to accommodate fishing pier / potential other facilities expansion.			
27	Prepare a report on the addition of a Town financed washer and dryer at the marina comfort station, including the feasibility of cost recovery.	11-May-23	Oct., 2023	Not yet begun	
		Notes:			
28	Staff to conduct a fire rate study.	11-May-23	Dec., 2023	Not yet begun	
		Notes:			
29	Invite MJSB to speak with Council about IT Service cost and level of service.	18-May-23	Jul., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	★
		Notes: Presentation from MJSB IT received on July 27th			
30	Prepare a report on the potential use of the perpetual care funds to be provided as a loan to the utility to finance any operational deficit in	18-May-23	Nov., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%
		Notes: Associated with proposed Reserves Policy anticipated to October Policy & Strategy Committee meeting for consideration.			
31	Prepare a report on employee pension and benefit plans, benchmarking against other NS municipalities.	18-May-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	25%
		Notes: In progress.			
32	Support welcome initiatives for the newcomers arriving from Kenya in coordination with MacLeod Group's Settlement Coordinator.	25-May-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%
		Notes: In progress.			

33	Register the property located at 496 Main Street as a Municipal Heritage Property.	25-May-23	Jun., 2023	<div><div></div><div></div><div></div><div></div></div>	75%	Notes: Schedule B picked up by Town solicitor to be registered at Access NS
34	Register the property located at 45 School Street as a Municipal Heritage Property.	25-May-23	Jun., 2023	<div><div></div><div></div><div></div><div></div></div>	75%	Notes: Schedule B picked up by Town solicitor to be registered at Access NS
35	Provide Council with a report on the items outlined in the letter from Mr. Haysom and Ms. Hearder concerning forest fire prevention.	13-Jun-23	Sep., 2023	Not yet begun		Notes:
36	Develop a draft Housing Action Plan to support application to the CMHC Housing Accelerator Fund, for Council's consideration.	13-Jun-23	Aug., 2023	<div><div></div><div></div><div></div><div></div></div>		Notes: Application to CMHC Housing Accelerator Fund submitted August 18, 2023.
37	Write to the Council of the Municipality of the District of Lunenburg indicating support for the Mahone Bay Tourism and Chamber of Commerce's efforts to eliminate the unsightly signage display at the Exit 10 junction with Route #3.	13-Jun-23	Jun., 2023	<div><div></div><div></div><div></div><div></div></div>		Notes: Letter sent.
38	Approach the Mahone Bay Tourism and Chamber of Commerce to request that they permanently discontinue the use of their logo, that it might be exclusively used by the Town.	13-Jun-23	Sep., 2023	<div><div></div><div></div><div></div><div></div></div>	75%	Notes: Response received in July, forwarded to Logo Steering Team. Steering Team recommendation received by Council Aug 11, correspondence in this regard sent to MBTCC in August, awaiting response from MBTCC following their Sept. board meeting.

39	Work with Upland to include appropriate language in the draft MPS/LUB concerning applications for Development Agreements received prior to the cut off for new applications associated with the approval process for the draft documents.	13-Jun-23	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: In progress.
40	Proceed with an environmental assessment and geotechnical assessment of the Town-owned property located at the corner of Kinburn Street and Hawthorn	29-Jun-23	Jul., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	75%	Notes: In progress.
41	Proceed with preparations for the demolition of the Public Works garage on Aberdeen Road.	29-Jun-23	Oct., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>	50%	Notes: In progress.
42	Draft, for the Mayor's signature, a response granting community participation in this year's Remembrance Day flyby.	27-Jul-23	Aug., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>		Notes: Completed.
43	Respond to organizers of the Fisher's Memorial Service, informing them that Councillor Wilson will attend, on behalf of the Town.	27-Jul-23	Aug., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>		Notes: Completed.
44	Restrict Orchard Street to "right turn only" at the intersection with Main Street.	27-Jul-23	Sep., 2023	<div><div></div><div></div><div></div><div></div><div></div></div>		Notes: Signs installed on September 1, 2023. Businesses and residents on Orchard St. notified in advance.

45	Submit an application to the Nova Scotia Thriving Forests program.	27-Jul-23	Sep., 2023		50%
		Notes: In progress.			
46	Apply for the ACOA Innovative Communities Fund for funding to support various infrastructure improvements in the downtown core included in the Council's 10-year Capital Invest Plan	27-Jul-23	Sep., 2023		75%
		Notes: In progress.			
47	Issue a request for proposals for creation of a future development plan for Park Cemetery	27-Jul-23	Sep., 2023		25%
		Notes: In progress			
48	Apply for conservation advice funding prior to any work being done on the exterior of Town Hall.	27-Jul-23	Sep., 2023		50%
		Notes: In progress			
49	Write to the owners of 8 Edgewater Street informing them they will have until September 20th to fix the water leak on their property, at which time the water service will be suspended if the repair hasn't been made.	27-Jul-23	Aug., 2023		★
		Notes: Completed.			

Chief Administrative Officer's Report - July 27, 2023 (Next update Sept. 28)

1	Atlantic Infrastructure Management (AIM) Network	Participated in annual conference in Charlottetown (Sept 13-14); 2023 conference Sept 18-20 in Moncton, New Brunswick. Council approved participation in Regional Climate Cohort (planning workshops begun Jan 2023); AIM-supported South Shore Sustainability Summit planned for September 23. Data collection on natural assets completed in October. Appointed Chair of AIM Network at October AGM.
2	Municipal Joint Services Board (MJSB)	Regular CAO/COO meetings ongoing. Topics include additional shared service opportunities among others. Participation in Board meetings.
3	Riverport Electric Shared Service Advisory Committee	Regular meetings continue. Committee discussions focus on opportunities for closer cooperation.
4	Regional Emergency Measures Organization (REMO)	Regular monthly meetings and bi-monthly table exercises between REMO Coordinator and CAOs continue (along with regular planning meetings). Planning Committee established and meeting regularly.
5	Alternative Energy Resource Authority (AREA)	Weekly AREA staff meetings continue by phone. Participation in AREA Board meetings. AREA continues to manage solar garden projects for Berwick, Mahone Bay and Antigonish with regular updates to Council. Joint HOME Program review application with other AREA units submitted to FCM.

6	Lunenburg County Accessibility Advisory Committee	CAO serving as staff policy resource to Lunenburg County Accessibility Advisory Committee (LCAAC). Funding for accessibility audits included in draft 2023-24 budget. Draft Operational Plan presented to Council by Lunenburg County Accessibility Coordinator on March 9; draft plan referred to LCAAC for review and recommendation back to Council.
7	Nova Scotia Federation of Municipalities (NSFM)	CAO continuing to serve on Nova Scotia Infrastructure Asset Management Working Group as AMA/NSFM representative (meeting quarterly). Participated in Working Group panel/presentation at 2022 NSFM Spring conference (May 5).
8	New Long Term Care Facility	Water/Wastewater upgrades project serving new long term care facility completed. Wrap-up with MacLeod Group now completed. Electrical system upgrades in progress (voltage regulator received in August).

Manager of Public Works & Transportation's Report - July 27, 2023 (Next update Sept. 28)

1

Streets & Sidewalks

1. Jubilee Park laneway culvert scheduled to be installed between June 1st - Sept 30th, 2023.
2. 2023 Line Painting is in progress.
3. Annual shoulder vegetation cut backs starting June 18th.
4. All additional, current and revised no parking curb painting starting next month.
5. Larger paving projects (Main St West, Fauxburg/Pleasant and Roy Broadbent) to be completed next month.
6. RPS to Town Catch basin underground pipe and driveway culvert to be completed early next month.
7. Upgrade wastewater plant cross culvert to harbour to be completed early next month

2	Other	<ol style="list-style-type: none"> 1. Swimming pool still up and running with hitches along the way. 2. New Articulating tractor and Thail mower ordered and will be received in September-October. 3. New 2 ton plow truck with plow awarded to Mosher Motors and Rick Bulsar Welding. Delivery in late October. 4. Town Hall Exterior Renovations tender awarded to Mid Valley Construction 5. New roof on playground gazebo roof to be installed later next month. 6. Installiton of park benches and picnic table ongoing. 7. New enclosed trailer received and being used for transporting equipment to and from Town greenspaces. 8. Geotechnical and Enviromental Assessments on Hawthorn and Kinburn Town Properties to be completed on the 26th of July and full report by
---	-------	---

Water/Wastewater System Manager's Report - July 27, 2023 (Next update Sept. 28)

1	Water Supply, Treatment & Distribution	<ul style="list-style-type: none">• CBCL assisting as need for compliance monitoring, data collection, plus on call rotation• Regular monitoring and maintenance activities continued. Routine or as required flushing of water mains conducted in various locations throughout the water distribution system• Watermain project wrapped up week of Sept 12th, some deficiencies still outstanding• Second dead-end flush unit location TBD (Edgewater St., Fairmont St.) Portable flush unit on order• Oakland Lake Watercourse Level Monitoring indicated below seasonal low levels on May 25th, back to normal levels by June 5th.• Draft Cross Connection Control Program due to NSE April 2023, draft by-law in the works and working on identifying and surveying locations• Plans to continue with NRW recommendations• Spring Leak Survey completed with 3 leaks located, potential of a 4th leak discovered after the leak survey. Since the Leak Survey 3 leaks were repaired with the 4th repair pending on the
---	---	---

property owner. A fall follow up leak survey will be booked once the repairs are completed.

- CBCL 10yr System Assessment Report completed and submitted to NSE for review and comments.
- New 3" water meter installed at new LTCF
- Vibration monitoring program started on WTP/WWTF Equipment
- Residential auto-flusher installed in problem area, minor adjustments made to maintain positive results

2	Sewage Collection & Treatment	<ul style="list-style-type: none"> • Regular daily compliance monitoring and maintenance activities continued • CBCL has submitted a job proposal including the repairs and upgrades of the Towns current pumping stations, to be reviewed • Door modifications of chemical room WWTP for PAA tote delivery pending on CBCL • Treatment cell #3 drain and cleaning planning started, quotations requested for sludge hauling and disposal (Approval for Summer 2023) • potential leak discovered near solar garden. • Select sewer main cleaning and inspections approved, scheduling to begin late summer/early fall • New connections on Hawthorn, Longhill, & Welcome St. Summer 2023 • CBCL to update PAA Pilot Project Final Report, 2022 thru current. Lab & Budget information provided • Investigations started to locate sources of Tidal infiltration affecting collection system • Pumps pulled and Rags removed from pumps in
---	--	---

Climate & Energy Program Manager's Report - July 27, 2023 (Next update Sept. 28)

1	EV CarShare - Study	MODL Council is in support of partnering with ToMB on this project but has decided to postpone the project until 2025-2027 (aligning with the ToMB Council's decision not to proceed with this project in 2023-24) and has directed their staff to reach out to neighbouring municipalities as well.
2	Climate and Environment Advisory Committee	The last meeting of the C&E committee took place on July 5th. Amendments to the GHG Reduction Action Plan have been finalized.
3	HOME program reboot	Greenfoot Energy Solutions are the new contractors for the HOME program. Marketing, including updates to the website, a brochure and a press release to announce the relaunch of the
4	HOME Program Review	The full application to FCM has been submitted. The review of this application is nearly completed. A decision in regards to funding is expected mid-
5	Solar Garden	Continues to attend bi-weekly meetings to get updates on the progress of the ToMB solar garden and provide general support to AREA staff.
6	Clean Foundation Internships	The Natural Assets Intern continues to do great work to map trees, promote the interactive tree map to residents and collect natural asset data.
7	Home EV Charger Pilot	Options are being explored in terms of the logistics for controlling the chargers.
8	Urban Forest Management Pla	A public engagement session took place on May 31st and was well attended with around 30 participants. A second public engagement session is being planned for sometime in mid to late

Finance Manager's Report - July 27, 2023 (Next update Sept. 28)

1	Electric Utility Bills	Power & Demand and Main Street Bills mailed out on 7.14.23 along with a letter explaining the approved rate increase
2	Tax Bills	Will be sent out on July 31.
3	Rate Study	Rate approved as of April 28, 2023.
4	Annual Audit Preparation/Support	Audit for 22/23 Fiscal Year is currently outstanding. Deloitte has scheduled more time the last two weeks of August.
5	New Hire	Pam Wilkie join the Finance Team on July 10, 2023.
6	Financial Information Return (FIR)	2021-22 FIR has been filed. Waiting to hear back from the province.

Deputy CAO's Report - July 27, 2023 (Next update Sept. 28)

I started in early June. Since then, I have been focused on getting familiar with the organization and learning how things work here.

I have been working on the submission for the Housing Accelerator Fund application through CMHC. The proposed application is on the July 27th Council agenda for consideration.

I have also begun to research and work with staff on the development of a Human Resource Employee Handbook. This handbook will be a set of HR policies for the organization. During this process, I have also been doing light research into the current HR practices of the Town to see if there are areas for changes that could improve the Town from a HR perspective.

I have been working closely with the REMO Coordinator, Angela Henhoeffler, to learn the regional approach to emergency management. I have also completed the Standard Operating Procedures for a comfort centre at the Fire Department.

I have worked with managers to update the Business Plan.

By-law and Policy Review - July 27, 2023 (Next update Sept. 28)

1	Trees	Target	Staff to research tree policy/by-laws and recommendations received regarding Mahone Bay specifically. In context of Plan Review.
		13-Feb-24	
2	Park By-law	Target	Staff to review Park By-law in context of Plan Review.
		13-Feb-24	
3	Stormwater Management By-law	Target	Staff to draft Stormwater Management By-law in context of
		13-Feb-24	
4	Subdivision By-law	Target	Staff to Subdivision By-law in context of Plan Review.
		26-Oct-23	
5	Fire Services	Target	Public hearing / second reading of draft by-law scheduled for Sept. 12th.
		12-Sep-23	
6	Fees Policy	Target	Not yet begun
		TBD	
7	Penalties By-law	Target	Not yet begun
		TBD	
8	Land-Use By-law and Municipal Planning Strategy	Plan Review Underway. Draft documents now publicly available. Consultations took place May 10th and June 26th (MBTCC stakeholder consultation took place June 14th); engagement period ended July 4th. Steering Team considering possible amendments to draft documents now with revised documents to be posted publicly on Council approval. Public Hearing anticipated not later than November 2023.	

9	Noise By-law	Target	Public hearing took place July 27th. Council has referred back to Policy & Strategy Committee meeting Sept. 25th for additional consideration.
		25-Jan-24	
10	Reserve Management Policy	Target	Discussed at July Policy & Strategy Committee, drafting underway now.
		14-Nov-23	
11	Procurement Policy	Target	Discussed at July Policy & Strategy Committee, revision underway now.
		14-Nov-23	

Service Statistics - July 27, 2023 (Next update Sept. 28)				
1	By-law Enforcement	May, 2023	Parking Tickets: 7	
		Notes: Regular patrols and parking enforcement continues. Coordinating LUB enforcement with Development Officer. Followed up on illegal dumping concerns with Town waste bins. Enforcement and education activities in relation to woodlands closure (good compliance from the public). Spoke at the Atlantic By-law Officers Convention at Oak Island.		
2	Police Services (founded & SUI occurrences)	Q1 2023	65	CalendarYTD: 65
		Notes:		
3	Mahone Bay & District Fire Department	Apr-Jun	29	YTD: 29
		Fire Calls: 6; Fire Alarms: 4; Mutual Aid: 12; Medical Calls: 1; Motor Vehicle: 2; Other: 4		
		Notes:		

4	Traffic (Speed Signage)	July, 2023	<u>MAIN STREET (50 km/h)</u> Median Speed ~55 km/h			
			<u>EDGEWATER STREET (50 km/h)</u> Median Speed ~59 km/h			
			<u>300 FAUXBURG ROAD (40 km/h)</u> Average Speed 43 km/h			
		Notes: Tube Counters = 129 Pleasant St. (Weekday ADT: 441, Weekend ADT: 306).				
5	Solid Waste (Tonnage)	2023-24 VTD	307.06	2022-23:	303.22	
		Notes: Recyclables = 30.24; Organics = 61.07; Garbage/Other = 208.15; Septic/Treatment Plant = 0.92; Cardboard = 6.68.				
6	HOME Program	Leads: 50	Installations: 5			
		Notes: Ambassador engagement (previously Oct-Nov 2020) and installations to resume in Spring/Summer 2023.				
7	Water Utility	Pumped	Q4 2023 (flow meter total)			
			58,638,000 Litres Q3: 61,669,000 Litres			
		Treated	Q4 2023 (4th Quarter total)			
			47,996,000 Litres Q3: 49,262,000 Litres			
		Sold	Q4 2023 (4th Quarter total)			
			22,073,153 Litres Q3: 24,114,552 Litres			
		Accounted NRW (flushing,	Q4 2023 (approximate quarterly			
			1,756,080 Litres Q3: 2,876,000 Litres			
Losses NRW	Q4 2023 (4th Quarter total)					
	24,166,767 Litres Q3: 22,271,448 Litres					

8	Electrical Utility (Q3)	Purchased (AREA)		\$132,608	
		Purchased (NBP)		\$254,524	
		TOTAL Purchased		\$387,132	
		Sold (Commercial)		\$28,130	
		Sold (Residential)		\$367,048	
		Sold (Power & Demand)		\$193,191	
		TOTAL Sold		\$588,370	
9	EV Chargers	YTD	898 Charging Sessions	1742 Hrs / \$2,514	10,005 kWh
		June 2023	77 Charging Sessions	154 Hrs / \$217	896 kWh
10	Development Services	Approved Subdivisions		Q3 2022-23	2
		Development Permits		Q3 2022-23	10
11	Comfort Stations (July 2023)	Edgewater Street	2,882 (7,443 YTD)	Main St.	524 in May (Counter Down)

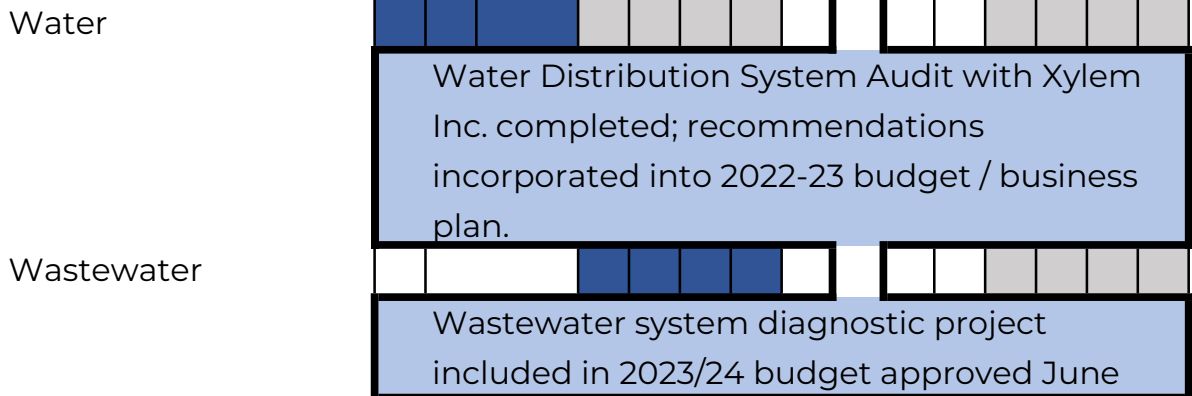
12	CodeRED Registrations	31/4/2023	Residential: 424; Business: 19; Email: 218; Text: 309
		31/3/2023	Residential: 417; Business: 19; Email: 216; Text: 305
		31/1/2023	Residential: 412; Business: 19; Email: 208; Text: 286
		31/12/2022	Residential: 412; Business: 19; Email:
		30/09/2022	Residential: 400; Business: 12;
		31/08/2022	Residential: 393; Business: 12; Email:
		30/07/2022	Residential: 390; Business: 11; Email:
		30/06/2022	Residential: 371; Business: 11; Email:
		31/5/2022	Residential: 369; Business: 11; Email:
		30/4/2022	Residential: 357; Business: 11; Email:
		31/3/2022	Residential: 356; Business: 11; Email:
		28/2/2022	Residential: 356; Business: 11; Email:
		31/1/2022	Residential: 336; Business: 10; Email:
		31/12/2021	Residential: 326; Business: 10; Email:
		2021-11-30	Residential: 319; Business: 10; Email:
		31/10/2021	Residential: 310; Business: 10; Email:
		30/9/2021	Residential: 308; Business: 10;
		31/08/2021	Residential: 297; Business: 10;
		31/07/2021	Residential: 298; Business: 10;
		30/06/2021	Residential: 297; Business: 10;
		31/05/2021	Residential: 294; Business: 10;
		30/04/2021	Residential: 293; Business: 10; Email:
		31/03/2021	Residential: 294; Business: 10;
		28/02/2021	Residential: 290; Business: 10;
		31/01/2021	Residential: 285; Business: 10;
		31/12/2020	Residential: 285; Business: 10;
		31/03/2020	Residential: 243; Business: 12; Email:

2021-25 Strategic Plan - July 27, 2023

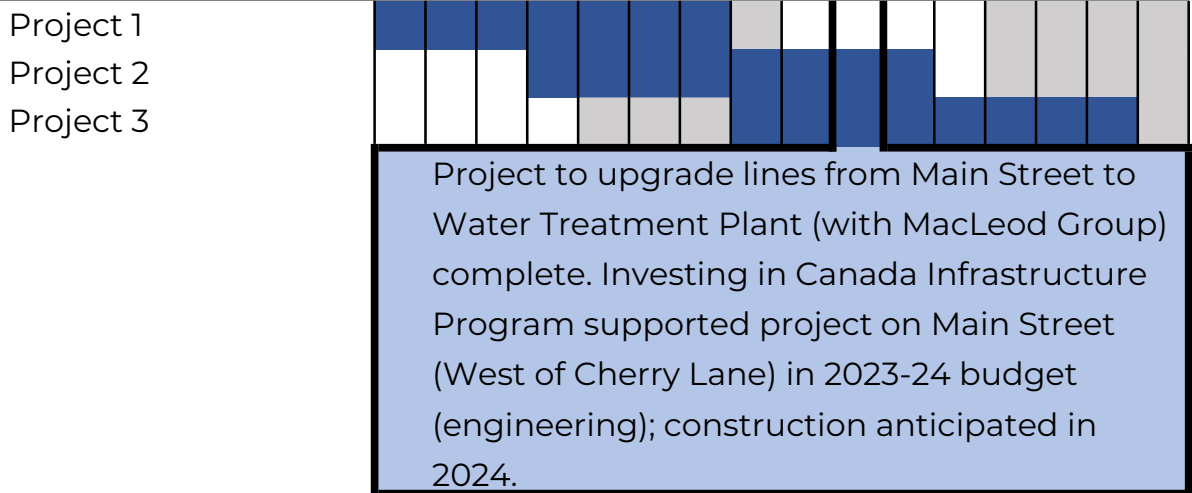
Sustainable Municipal Services

	2021				2022				2023				2024							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
1.1.1	Undertake water, wastewater & electrical rate studies																Operating Initiatives			
Water																				
Wastewater																				
Electrical																				
Electrical rate study by BDR (contracted by AREA), presented to Council's October 20th meeting. Application submitted to NSUARB; hearing took place February 14th. Decision Issued April 28th, required compliance filling made May 12th, new rates will be reflected in next billing cycle. Water utility rate study will get underway in Q2 2023-24 supporting NSUARB rates decision effective April 1, 2024.																				
1.1.2	Implement initiatives to increase utility demand																Operating Initiatives			
EV Home Charger Pilot under development. Joint application - Mahone Bay, Berwick and Antigonish - submitted to FCM for funding support for HOME Program review/expansion.																				

1.1.3 Complete water and wastewater system diagnostics Operating Initiatives

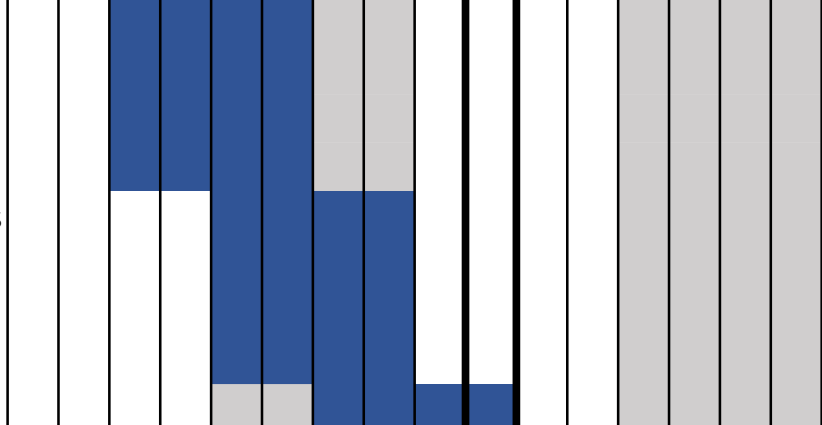


1.1.4 Strategically replace/upgrade utility infrastructure Capital Projects



1.2.1 Develop 10-year asset management plans for each asset class

Electrical
Water
Wastewater
Stormwater
Buildings and facilities
Transportation
Recreational facilities
Equipment & Vehicles
Natural infrastructure



AIM Cohort 2.0 completed. Development of draft Water, Wastewater, Stormwater and Transportation asset management plans currently underway with AM Committee. GIS for AM transitioned from ESRI to Civitas/QGIS. Natural Assets / Cemetery data collection project completed in October 2022. 2023 summer intern expected to complete Natural Assets inventory.

1.2.2 Integrate asset management plans into 10-year capital budget



1.3.1 Accessibility Operational Plan Operating Initiative / Capital Projects



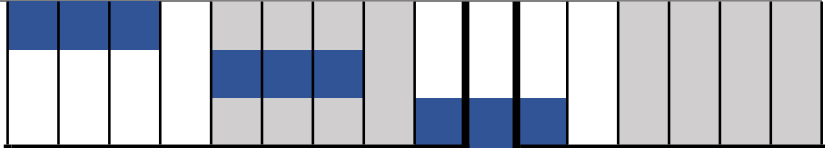
Draft operational plan presented to Council March 9, 2023. Referred to Lunenburg County Accessibility Advisory Committee for recommendation back to Council.

1.3.2 Improve transportation infrastructure to support healthy living Capital Projects

Project 1

Project 2

Project 3



Crossings at Anglican Church, Lutheran Church (pride crossing), Medical Clinic, Kedy's Landing, and Main/Long Hill completed. Trail crossing signage improved. Speed humps on Clairmont/Kinburn and Pleasant/Fauxburg completed. Tee-up of Pleasant/Main in engineering stage. WSP engineers presented concepts report for Edgewater/Main intersection Apr 21, 2023. Edgewater multi-use trail (with anticipated external funding) included in 2023-24 budget approved June 13th.

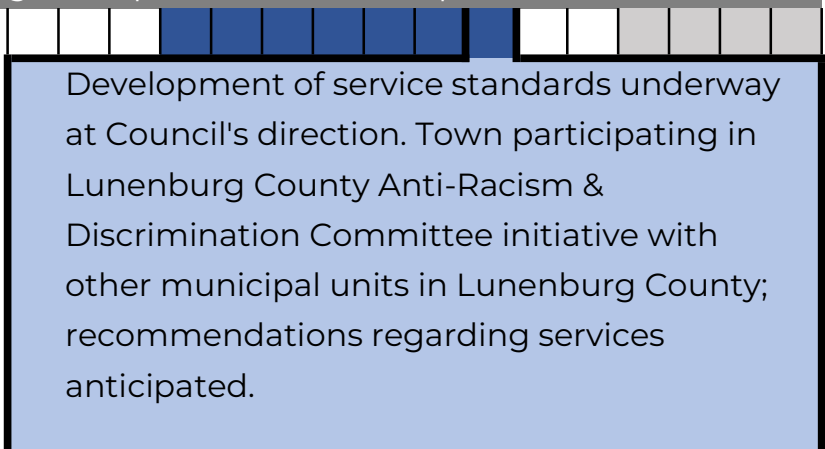
Equitable & Inclusive Growth

		2021				2022				2023				2024			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2.1.1	Complete Plan Mahone Bay MPS/LUB Process	Operating Initiative															
		■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	■
	Draft MPS/LUB documents under development now. Phase 2 engagement process underway now (first public session took place May 10th, next planned for June). Adoption of new documents by Council anticipated in Fall of 2023.																
2.1.2	Develop and implement Housing Strategy	Operating Initiatives															
		□	□	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Discussions initiated with other Lunenburg County units on the possibility of regional approach to housing (staff-level regional meetings ongoing). Next steps report included on Council's Oct 27th meeting agenda. Update report provided to Council's June 13th meeting; staff currently working on Housing Action Plan for CMHC (on the basis of Provincial Needs Assessment report).																
2.2.1	Review service levels and align with residents' ability to pay																
		□	□	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Low Income Tax Exemption process enhanced in 2022-23 annual budget. Service standards report requested by Council now under development.																

2.2.2 Explore shared services and partnerships for efficient service delivery



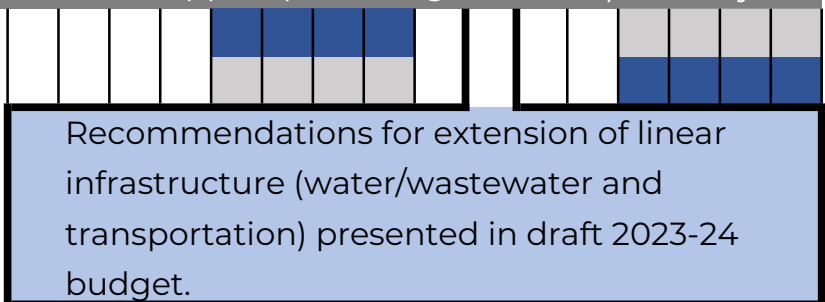
2.2.3 Establish inclusive strategies for provision of municipal services







2.2.4 Expand existing infrastructure to support planned growth Capital Projects

Project 1

Project 2

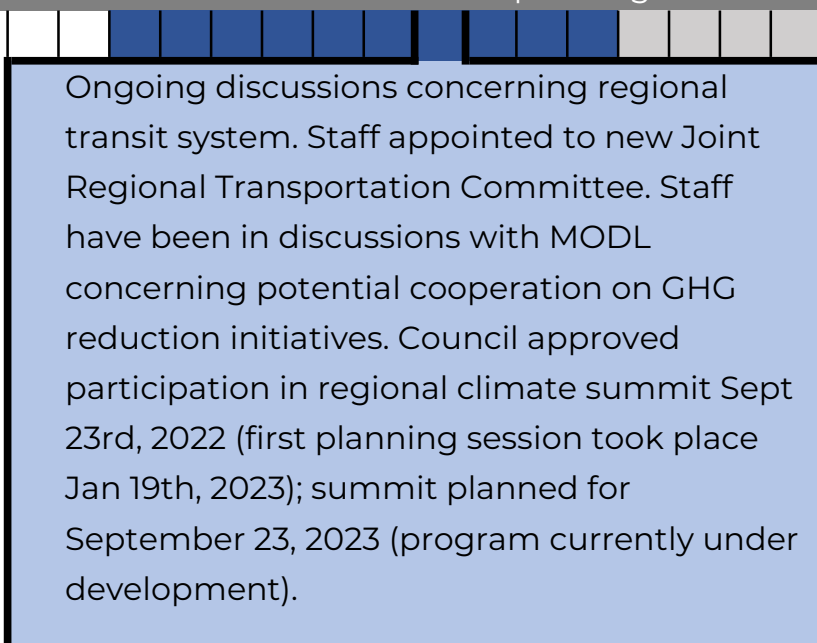


2.3.1	Align staff capacity, capital and operating plans with strategic plan	 <p>2022-23 annual budget included investments in staff capacity in Public Works and Finance, 2023-24 budget includes separation of Town Clerk and Deputy CAO positions to improve strategic focus.</p>
2.3.2	Update policies and by-laws for effective governance / Plan implementation	 <p>Numerous policies and by-laws developed / amended.</p>
2.3.3	Prioritize public engagement processes supporting Plan implementation	 <p>Council adopted Public Engagement Policy and has subsequently approved numerous Public Engagement Plans in relation to Council's strategic priorities.</p>
2.3.4	Regularly review progress and continually improve strategic plan	 <p>Most recent annual strategic plan review completed April 11, 2023 with amendment of strategic plan.</p>

Environmental Leadership

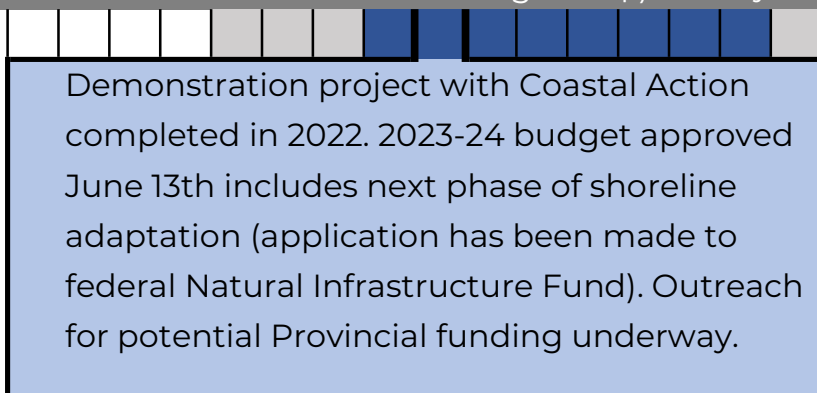
		2021				2022				2023				2024			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
3.1.1	Community Greenhouse Gas (GHG) Reduction Action Plan	Operating Initiatives															
		Implementation of Community Greenhouse Gas (GHG) Reduction Action Plan proceeding apace. Climate & Environment Committee established with a mandate to review the GHG Reduction Action Plan and recommend updates to Council. Committee recommendations for updates to GHG Reduction Action Plan anticipated in July 2023.															
3.1.2	Expand home heating program	Operating Initiative															
		Joint proposal - Berwick, Antigonish and Mahone Bay - submitted to FCM for review and expansion of HOME Program.															
3.1.3	Expand electric vehicle charging infrastructure	Capital Projects															
		Equipment received, installations completed at all locations (town hall, marina, clairmont street, MBC, main street, fire station). Chargers now online. Promotion of EV chargers will															
3.1.4	Invest in renewables (e.g., community solar garden)	Capital Project															
		The construction phase continues, with completion anticipated in the late Summer / early Fall of 2023. The second open house on the project took place October 19th 2022 and was well attended with ~90 participants. Distribution line upgrades currently underway.															

3.1.5 Support regional initiatives that contribute GHG reduction Operating Initiatives

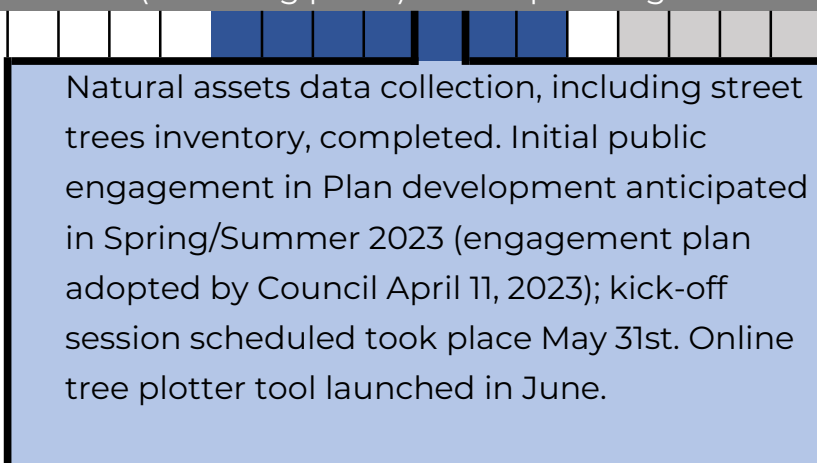


3.2.1 Develop and implement policies / by-laws supporting adaptation measures

3.2.2 Invest in infrastructure (shoreline and stormwater management) Capital Project



3.3.1 Urban Forest Management Plan (including parks) Operating Initiative



3.3.2 Invest in infrastructure (straight pipes) and land acquisition Capital Projects



Project 1																	
Project 2																	

3.3.3 Encourage recognition of the value of natural assets Operating Initiatives

Promotion of natural assets planned to coincide with Urban Forest engagement, program manager supported by summer interns, in coordination with Climate & Environment Committee.

2023-24 Budget - Operating Initiatives - July 27, 2023

		23-24 Budget	YTD						
1	MPS / LUB Update	\$31,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	75%
		Notes:							
2	Accessibility Audits	\$20,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	75%
		Notes:							
3	New Logo Development	\$25,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	50%
		Notes:							
4	Urban Forest Management Plan	\$30,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	25%
		Notes:							
5	Housing Strategy Development	\$30,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	25%
		Notes:							
6	Audit Controls	\$27,300		Not Yet Begun					
		Notes:							
7	Stormwater Inflow / Infiltration Study	\$10,000		Not Yet Begun					
		Notes:							
8	Human Resources Manual Update	\$15,000		<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	25%
		Notes:							

9 Traffic Engineering Services	\$18,000	<div><div></div><div></div><div></div><div></div><div></div></div>	75%
	Notes:		
10 Water Rate Study	\$10,000	<div><div></div><div></div><div></div><div></div><div></div></div>	25%
	Notes:		
11 Water System Assessment Report	\$10,000	<div><div></div><div></div><div></div><div></div><div></div></div>	
	Notes:		
12 Electrical Rate Study and GRA	\$63,615	<div><div></div><div></div><div></div><div></div><div></div></div>	
	Notes:		
13 Resourcing Study	\$30,000		Not Yet Begun
	Notes:		

2023-24 Budget - Capital Projects - July 27, 2023									
Town General									
		23-24 Budget		YTD					
1	Public Works Garage / Office	\$100,000		<div><div></div></div>					25%
		Notes:							
2	Public Works Articulating Tractor	\$160,000		<div><div></div></div>					★
		Notes:							
3	Equipment Trailer	\$9,000		<div><div></div></div>					★
		Notes:							
4	Flail Mower Attachment	\$42,000		Not Yet Begun					
		Notes:							
5	Arrow Board	\$2,000		Not Yet Begun					
		Notes:							
6	Replace 2011 Dodge Truck 5500	\$95,000		<div><div></div></div>					★
		Notes:							
7	Culvert Replacement	\$16,000		<div><div></div></div>					50%
		Notes:							
8	Asphalt Repairs	\$35,000		Not Yet Begun					
		Notes:							
9	Sidewalk - Fairmont St.	\$40,000		Not Yet Begun					
		Notes:							

10	Fairmont Street (Pleasant to top of Fairmont)	\$86,000		Not Yet Begun				
		Notes:						
11	Replace Main St. Brook Railing (394 Main)	\$3,000		Not Yet Begun				
		Notes:						
12	Install turning area at Town limits on Fauxburg Road	\$4,500		Not Yet Begun				
		Notes:						
13	Pleasant-Main Intersection	\$5,000		<div></div>	<div></div>	<div></div>	<div></div>	50%
		Notes:						
14	Edgewater Trail	\$148,920		Not Yet Begun				
		Notes:						
15	Town Hall Exterior	\$230,000		Not Yet Begun				
		Notes:						
16	Town Hall Electrification	\$30,000		Not Yet Begun				
		Notes:						
17	Town Hall Parking and Crossing Improvement	\$30,000		Not Yet Begun				
		Notes:						
18	Pump out Station	\$12,000		Not Yet Begun				
		Notes:						
19	Edgewater Shoreline (Coastal Action) - Phase 1	\$100,000		Not Yet Begun				
		Notes:						

20	Edgewater Shoreline - Phase 2	\$200,000		Not Yet Begun			
		Notes:					
21	Community Solar Garden	\$2,909,561		<div><div></div><div></div><div></div><div></div><div></div></div>			75%
		Notes:					
22	Edgewater Beautification	\$6,000		Not Yet Begun			
		Notes:					
23	Waste Receptacles	\$12,000		<div><div></div><div></div><div></div><div></div><div></div></div>			50%
		Notes:					
24	Michael O'Connor Memorial Bandstand - Phase 3	\$20,000		Not Yet Begun			
		Notes:					
25	Aquatic Gardens Entrance(s)	\$10,000		<div><div></div><div></div><div></div><div></div><div></div></div>			25%
		Notes:					
26	Sports Field Barrier	\$12,000		<div><div></div><div></div><div></div><div></div><div></div></div>			50%
		Notes:					
27	Grub B Gone for Bayview Cemetery and Ballfield	\$11,500		<div><div></div><div></div><div></div><div></div><div></div></div>		<div><div></div></div>	
		Notes:					
28	Ballfield and Bayview Cemetery Spring Lawn Repairs	\$16,500		<div><div></div><div></div><div></div><div></div><div></div></div>		<div><div></div></div>	
		Notes:					
29	Grub B Gone for Edgewater	\$2,500		<div><div></div><div></div><div></div><div></div><div></div></div>		<div><div></div></div>	
		Notes:					

30	Marina boardwalk repair / improvement	\$2,500		Not Yet Begun		
		Notes:				
31	Edgewater Comfort Station	\$82,500		Not Yet Begun		
		Notes:				
32	Main Comfort Station	\$77,500		Not Yet Begun		
		Notes:				
33	New washer and dryer at Marina Comfort Station	\$5,000		Not Yet Begun		
		Notes:				
34	Support for bench installation	\$20,000		<div><div></div><div></div><div></div><div></div><div></div></div>		50%
		Notes:				
35	Jubilee Park new gazebo roof	\$3,000		<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div></div>	
		Notes:				
36	VIC: New thermal pane window inserts and mini split	\$10,000		<div><div></div><div></div><div></div><div></div><div></div></div>	<div><div></div></div>	
		Notes:				
37	Pool - new build or major renovation	\$55,000		<div><div></div><div></div><div></div><div></div><div></div></div>		25%
		Notes:				
38	Tree Donation Recognition	\$5,000		Not Yet Begun		
		Notes:				

Fire Services						
1	Radios & Pagers	\$3,000		Not Yet Begun		
		Notes:				
2	New PPE	\$10,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>	★	
		Notes:				
3	Fire Vehicle - Pumper	\$400,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>		50%
		Notes:				
4	Additional Helmets	\$20,000		Not Yet Begun		
		Notes:				
Water Utility						
1	New Water Services	\$5,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>		50%
		Notes:				
2	Hydrant Replacement	\$5,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>		50%
		Notes:				
3	Water Meters	\$3,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>		50%
		Notes:				
4	Transmission Line Access	\$15,000		Not Yet Begun		
		Notes:				
5	Chemical Room Floor - WTP	\$10,000		Not Yet Begun		
		Notes:				
6	Automatic Flushers	\$13,000		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>		75%
		Notes:				
7	Security Cameras	\$14,000		Not Yet Begun		
		Notes:				

8	ICIP Priority #2 - Water Rehabilitation and Improvement	\$223,400		Not Yet Begun		
		Notes:				
9	Service Extensions	\$41,000		<div></div>		25%
		Notes:				
10	Reserve Pump Replacement	\$11,500		Not Yet Begun		
		Notes:				
11	Flow Meter at Water Treatment Plant	\$3,000		Not Yet Begun		
		Notes:				
12	Gate Valves	\$6,000		Not Yet Begun		
		Notes:				
13	Thermal Imager	\$5,000		Not Yet Begun		
		Notes:				
14	Underground Locator	\$2,500		Not Yet Begun		
		Notes:				
15	Level Control Valve - Smart Positioner	\$2,500		Not Yet Begun		
		Notes:				
Wastewater						
1	New Sewer Services	\$10,000		<div></div>		50%
		Notes:				
2	Security Cameras	\$6,000		Not Yet Begun		
		Notes:				
3	Fairmont/Pinegrove Drainage Improvement	\$120,000		Not Yet Begun		
		Notes:				

4	Main at RPS Stormwater	\$20,000	<div><div></div><div></div><div></div><div></div><div></div></div>	25%
		Notes:		
5	ICIP Priority #2 - Water Rehabilitation and Improvement	\$223,400	<div></div>	Not Yet Begun
		Notes:		
6	Service Extensions	\$41,000	<div><div></div><div></div><div></div><div></div><div></div></div>	25%
		Notes:		
7	PAA Pilot Project	\$37,000	<div><div></div><div></div><div></div><div></div><div></div></div>	75%
		Notes:		
8	Lift Station Repairs	\$40,000	<div></div>	Not Yet Begun
		Notes:		
9	Sewer Lift Station	\$2,400	<div></div>	Not Yet Begun
		Notes:		
10	WWTP Lab / Equipment	\$3,150	<div></div>	Not Yet Begun
		Notes:		
11	Stormwater Management	\$20,000	<div></div>	Not Yet Begun
		Notes:		
12	Thermal Imager	\$5,000	<div></div>	Not Yet Begun
		Notes:		
13	Underground Locator	\$2,500	<div></div>	Not Yet Begun
		Notes:		
14	Sewer Lift Station	\$12,000	<div></div>	Not Yet Begun
		Notes:		

15	WWTP SCADA	\$15,000		Not Yet Begun		
		Notes:				
Electric Utility						
1	Electric Line Replacements	\$25,000		<div><div></div></div>		50%
		Notes:				
2	New Digital Electric Meters	\$4,000		<div><div></div></div>		50%
		Notes:				
3	Transformers	\$20,000		<div><div></div></div>		50%
		Notes:				
4	PCB Transformers Replacement Project	\$400,000		<div><div></div></div>		75%
		Notes:				
5	Thermal Imager	\$10,000		Not Yet Begun		
		Notes:				
6	Underground Locator	\$5,000		Not Yet Begun		
		Notes:				
7	New Street Lights	\$5,000		<div><div></div></div>		50%
		Notes:				
8	Voltage Regulators	\$100,000		<div><div></div></div>		75%
		Notes:				
9	Utility Truck	\$80,000		Not Yet Begun		
		Notes:				

Date: September 12, 2023

RE: Inter-Municipal Anti-Racism and Anti-Discrimination Initiative

General Overview:

The purpose of this staff report is to provide Council with a Terms of Reference for The Lunenburg County Anti-Racism & Anti-Discrimination Committee (ARADAC) and An Inter-Municipal Regional Anti- Racism and Diversity Agreement amongst the municipal units in Lunenburg Council for shared delivery of anti-racism and diversity initiatives.

Background:

In recent years, the need for municipal anti-racism and anti-discrimination work has been highlighted in numerous ways, including changing demographics and migration trends and a rise in discriminatory sentiment. Along the south shore, the changing population is easily seen and there have been reports of racist verbal attacks, vandalism, and hate motivated physical assaults. Several municipalities in Nova Scotia have active committees to advise strategies to address these issues.

The *Dismantling Racism and Hate Act. 2022, c.3* was enacted by the Province of Nova Scotia in 2022. In section 9 of the Act, public bodies will be prescribed to create plans to ..."address systemic hate, inequity and racism with the form and content by the date prescribed." In Nova Scotia, several municipalities have begun working on their plans and strategies to address equity, diversity, and inclusion needs in their organizations and communities.

At the January 2023 meeting of mayors and wardens, CAOs were given direction to provide a Terms of Reference for a regional Anti-Racism and Anti-Discrimination Committee and a model budget for hiring a regional coordinator to lead this work.

Attached in this staff report are three documents.

- The Lunenburg County Anti-Racism & Anti-Discrimination Committee (ARADAC) Term of Reference – This committee will be a regional committee composed of representatives from all five municipal units in the county.
- Position Description – Diversity, Equity, and Inclusion (DEI) Coordinator – This is a term position that will support the work of the municipalities and the ARADAC.



- An Inter-Municipal Regional Anti-Racism and Diversity Agreement – The proposed agreement for the municipal units in Lunenburg County to undertake this work.

These documents were created with input from staff at all five municipal units.

Analysis:

The role of the ARADAC would be to advise administration and elected officials of the five municipalities in Lunenburg County on ways to implement anti-racism and anti-discrimination initiatives. The ARADAC would also work with partners and communities to help lead, support, and promote equity, diversity, and inclusion efforts. At the institutional level, the ARADAC would work to identify and provide recommendations to address racism and inequity in government policy, legislation, programs and services. The ARADAC would be supported by the Diversity, Equity, and Inclusion Coordinator a shared position amongst the five (5) municipal units.

It is proposed that the Municipality of the District of Chester would host the shared position.

Financial Analysis:

The funding for the Equity, Diversity, and Inclusion Coordinator position would be based on uniform assessment. Initially, the position would be for a two (2) year period.

It is to be noted that in the attached documents, the term for the position is two (2) years, but the Shared Service Agreement notes a term ending in March 2026. This is this discrepancy in timelines to allow time for the approval and recruitment of the position.

The anticipated budget and funding model are as follows:

Annual Budget

Staff Member	
Salary	\$85,000
Benefits (CPP, WCB, EI, vacation)	\$15,300
Mileage	\$2,500
Training/PD certification	\$2,000
Admin & Overhead	\$10,480
Total	\$115,280
Regional Support	

Meeting pay • 6 members, \$55 per meeting, 8 meetings	\$2,640
Room Rental etc	\$500
Mileage • 6 members, Estimated \$20 per meeting/event, 10 meetings	\$1,200
Committee Training & facilitation	\$5,000
Training for Staff & Council	\$10,000
Total	\$19,340

Total **\$134,620**

	23-24 Uniform Assessment	%	23-24 Total Contribution
Town of Mahone Bay	\$145,777,562	2.52%	\$3,390
Town of Lunenburg	\$298,368,092	5.15%	\$6,939
Town of Bridgewater	\$715,142,664	12.35%	\$16,632
Municipality of the District of Chester	\$1,741,116,861	30.08%	\$40,493
Municipality of the District of Lunenburg	\$2,887,963,821	49.89%	\$67,165
TOTAL	\$5,788,369,000	100.00%	\$134,620

Climate Analysis:

There are no anticipated climate impacts.

Links to Strategic Plan:

The 2021-2025 Town of Mahone Bay Strategic Plan Priority 2 is Equitable and Inclusive Growth with the goal to create and support and enabling environment for equitable and inclusive growth in the community including investment in core infrastructure and services.

The creation of the ARADAC and addition of a regional Diversity, Equity, and Inclusion Coordinator would directly contribute to this strategic priority.



Recommendation:

It is recommended,

THAT Council approve the attached Terms of Reference for The Lunenburg County Anti-Racism & Anti-Discrimination Committee.

THAT Council approve the position description and recruitment for the Diversity, Equity, and Inclusion (DEI) Coordinator.

THAT Council enter into the Inter-Municipal Regional Anti-Racism and Diversity Agreement with the Municipality of the District of Lunenburg, the Municipality of the District of Chester, the Town of Bridgewater, and the Town of Lunenburg.

Respectfully submitted,

Eric J. Levy, Deputy CAO

INCL:

- Terms of Reference - The Lunenburg County Anti-Racism & Anti-Discrimination Committee
- Position Description - Diversity, Equity, and Inclusion (DEI) Coordinator
- An Inter-Municipal Regional Anti-Racism and Diversity Agreement

Terms of Reference

The Lunenburg County Anti-Racism & Anti-Discrimination Committee

Municipality of Chester

Municipality of the District of Lunenburg

Town of Lunenburg

Town of Bridgewater

Town of Mahone Bay



Section 1 - Purpose

The Lunenburg County Anti-Racism & Anti-Discrimination Advisory Committee (ARADAC) is established to advise the respective administrations and elected bodies of the Town of Lunenburg, Municipality of the District of Lunenburg, Municipality of Chester, Town of Bridgewater and Town of Mahone Bay to advance, strengthen, support, and unify the five municipal units in adopting and implementing Anti-Racism and Anti-Discrimination initiatives throughout the Region.

The ARADAC works with partners and communities to help lead and support anti-racism and anti-discrimination initiatives and promote equity, diversity and inclusion initiatives. They would work to identify and address systemic racism and inequity in government policy, legislation, programs and services.

Section 2 - Authority

The ARADAC shall be appointed by each Council upon recommendation of Mayors and Wardens by application process via the Regional Coordinator and advise the Councils, the Coordinator and Chief Administrative Officers (CAOs) for each respective organization.

The ARADAC is an advisory body and is an opportunity to provide valuable perspectives and recommendations for consideration of each respective Council. The ARADRC is supported by a Regional Coordinator who will directly report to the CAO of the host unit and will also be responsible to the CAOs of each of the five (5) Councils when working for each municipal unit.

ARADAC may submit proposed amendments or updates to the Terms of Reference to the Regional Coordinator for consideration by the five (5) Councils.

The ARADAC may be dissolved by way of resolution of majority of participating Councils.

Section 3 - Responsibilities

The ARADAC is responsible to:

- Provide ongoing advice, education, information and recommendations to the five Municipal Councils and staff on internal and external projects, initiatives, or policy via the Regional Coordinator.
- Develop and recommend to municipalities a regional action plan which will provide regional-level guidance and coordinated approaches and



strategies on actions to be taken by the municipalities.

- Support the Regional Coordinator for Anti-Racism and Anti-Discrimination initiatives.
- Develop and propose an annual budget to the Regional Coordinator, to be reviewed and proposed to the five (5) Municipal Councils for consideration.
- Provide advice, when requested, on projects and policies undertaken by municipalities including municipal plans, development, human resource policies and other projects.
- Remain apprised and connected to new municipal, provincial and federal directives, regulations and initiatives that impact or intersect with Anti-Racism and Anti-Discrimination or funding opportunities.
- Collaborate with the Lunenburg County Accessibility Advisory Committee and Regional Accessibility Coordinator.
- Liaise with community members through regular engagement, maintain transparency, and provide a framework and platform for reporting back to the community.
- Collaborate and build relationships with community members and organizations that address Anti- Racism and Anti-Discrimination through events, programming, training and other forms of support.
- The Regional Coordinator may speak on behalf of the ARADAC and provide updates to respective councils. During the first year of the initiative, the Committee shall report to Councils once per quarter and thereafter, at least twice per year.

Municipalities are responsible to:

- Recruit and retain a Regional Coordinator.
- Adopt a cost-sharing model to assign budgetary commitments to each participating organization based on proposed budget from the Regional Coordinator.
- Identify and prioritize requests and recommendations and provide timelines for implementation, where applicable.
- Support and invest in the work of the ARADAC through staff and political participation.
- Consider and potentially implement recommendations from the ARADAC.



- Contribute ongoing budget and resources to the work of the ARADRC, as described in this Terms of Reference.
- Upon annual budget approval via municipalities, each CAO will work with the Regional Coordinator to identify projects that will need to be reviewed or require input from the ARADRC.

Section 4 - Membership

The ARADAC should reflect the diversity of the region, where possible, having first voice and diverse representation from youth, elders, Indigenous Mi'kmaq, African Nova Scotian, members of 2SLGBTQ+ community as well as Immigrants and Newcomers and others on the ARADRC.

With an emphasis on accessibility, it must include authentic strategic engagement – through public channels and known networks physically and digitally, via media, emails, engagements and social media and displayed on municipal websites.

The appointment process will consist of an intake document/questionnaire, to assess for alignment with the work.

The ARADAC will consist of up to thirteen (13) voting members.

- Five (5) Political Representation through appointment of one councillor from each municipality or community. Council/Commission appointments shall be for two-(2) year terms.
- Councils shall appoint each of six (6) community representatives' members, with a priority on members who live, work or are connected to the region. The appointments shall be made as follows:
 - Two (2) members to a three- (3) year term;
 - Two (2) members to a two-(2) year term; and
 - Two members to a one- (1) year term.
- Once a member has completed their term, all new terms will be for three (3) years. If a community member vacates the Committee for any reason at any time before that member's term would normally expire, the Councils shall promptly appoint a new member to the Committee to hold office for the unexpired term.
- If a Council/Commission member vacates the Committee for any reason at any time before that Council/Commission member's term would normally expire, the Council/Commission that the member represents shall promptly appoint a new member for the remainder of the term.



- The Committee will be supported by the Regional Equity, Diversity, and Inclusion Coordinator and the Regional Staff Accessibility Coordinator (Non-Voting)
- Two positions (voting) will also be designated for representation from Acadia and Sipekne'katik First Nation, and an invitation shall be extended to each Nation to appoint a member.

Applications will be received by the Regional Coordinator. The Regional Coordinator may request and hold interviews, after which they submit recommendations for committee members to Mayors and Wardens, or their designate, for Council consideration and appointment.

Membership to conduct annual check-in and review of status, capacity and intent to continue into the following year. This is to ensure there is enough lead time to recruit and promote for the seat to be filled.

ARADAC Chair

The Committee will be chaired by one municipal councillor from one of the municipalities. Vice Chairs will be appointed through vote of the ARADAC at the inaugural meeting. The Chair will facilitate the meetings with support from the Regional Coordinator, who will organize logistics, take minutes and support agenda development.

Membership Changes

- Members may resign at any time by giving written notice to the ARADRC Chair and the Regional Coordinator.
- Missing three consecutive meetings a year without prior discussion and approval from the ARADRC Chair is deemed equivalent to a resignation.
- Membership may be terminated by the ARADAC Chair for violating the terms of reference, if recommended by the Committee.
- Meetings will be held at a frequency that is necessary to conduct the business of the ARADAC (approximately once per month) until such time as the ARADAC is dissolved. A meeting schedule will be discussed by the Committee at the first meeting and subsequent meetings will be confirmed at each meeting. Advance notice will be provided as soon as possible. In addition to regular meetings, additional means of communication, such as email or phone calls will be necessary to conduct the business of the Committee.



Section 5 Committee Procedures

- Committee meetings will be called by the Chair, as required, to fulfill the duties outlined.
- Subject to Section 22 of the Municipal Government Act, meetings of the committee are open to the public and advertised no less than one week in advance.
- A majority of the appointed voting members of the Committee constitutes a quorum.
- Subject to the principles set out in the Municipal Conflict of Interest Act, all committee members present including the person presiding shall vote on a question.
- The Committee may receive presentations from the public upon the approval of the Chair.
- The Committee may establish Working Groups to explore specific issues related to their workplan and/or other responsibilities. Members of a Working Group may consist of additional members of the community. A member of the ARADAC shall chair Working Groups. The Committee will be supported by municipal staff and consulting resources as required.

Membership Remuneration

Recognizing that this is a first voice, lived experience committee membership, Members will be compensated, in accordance with the approved budgeted amount.

Policy Review

- These Terms of Reference will be reviewed by each of the five (5) Councils and the Commissions at least every four years from the effective/amended date.





Municipality of the District of Chester

Position Description

Position Title:	Diversity, Equity and Inclusion (DEI) Coordinator
Salary:	TBD
Reports to:	Deputy CAO (or the CAO or their Designate of the partner units)
Status:	24-month contract, Full Time
Location:	Various locations, flexible
Hours:	Normally 8:30 a.m. to 4:30 p.m., evening meetings and overtime may be required
Updated:	February 2023

SCOPE

The DEI Coordinator will lead the development and implementation of proactive diversity, equity, inclusion, and belonging initiatives in support of 5 municipal units. The coordinator will work with the Lunenburg County Anti-Racism & Anti-Discrimination Committee (LCARADC) to develop and implement a strategic plan, to address racism and discrimination within our communities. By ensuring alignment across the five jurisdictions, addressing racism, discrimination, and the prevention, identification, and removal of barriers to access in opportunity, the Coordinator will create clear accountabilities, strengthening the ability to serve diverse communities. The position will work within teams to develop, support, implement and champion diversity and inclusion initiatives with the Region. The position will provide public outreach, support community events, workshops, and community conversations on anti-racism, anti-discrimination and diversity issues. The position will support efforts to promote volunteerism and civic engagement, facilitate community collaboration and partnerships, and support efforts to provide culturally competent community programs, observances, and services.

OBLIGATIONS AND RESPONSIBILITIES UNDER LEGISLATION

- 1) The Municipality of the District of Chester is committed to workplace safety and all employees are expected to actively participate in the Municipality's Occupational Health and Safety Policy and Program and

Occupational Health and Safety Legislation as well as Regulations of the Province of Nova Scotia.

- 2) The Municipality of the District of Chester complies with the Employment Legislation of Nova Scotia and all employees are also expected to act in accordance with the appropriate Legislation as well.

QUALIFICATIONS

Education & Experience

- 1) An undergraduate degree specializing in Diversity Management, Public Administration, Communications, Business, Human Resources, or a related field of study plus 1 - 3 years' related experience with preference given to candidates with diverse lived experience and those experienced in working collaboratively with Indigenous and/or Black/African Nova Scotian communities, or other unrepresented communities.
- 2) Experience & knowledge in more than one of the following: communications, adult education principles / practices, principles of diversity in the workplace, diversity training, research and analysis, and use of technology to increase participatory culture.
- 3) Demonstrated success implementing diversity initiatives in a workplace or community.

Skills/Knowledge/Competencies

- 1) Strong communication skills (oral and written);
- 2) Ability to assess needs and develop and present educational programs and/or workshops;
- 3) Strong facilitation skills (small and large groups);
- 4) Good listening skills and the ability to relate to and connect with a wide range of people;
- 5) Open mindedness and patience;
- 6) A thorough understanding of the any relevant legislation.
- 7) A proactive, positive attitude and flexibility working in a fast-paced environment.
- 8) An ability to work with a team, as well as independently.
- 9) Excellent organizational skills and a high degree of efficiency.
- 10) Experience with Microsoft office suite.
- 11) An ability to find creative solutions to problems.
- 12) Professionalism, tact, and sensitivity.

Other Requirements

- 1) Must be able to work after normal business hours occasionally to attend LCARADC meetings and public engagement events.
- 2) This position involves a combination of office and field work.
- 3) WHMIS, Emergency First Aid, Basic Fall Protection training and other

safety related training as required by Provincial Regulation or Municipal Policy.

SUMMARY OF FUNCTION

Regional Committee Support

- 1) Coordinate and support the work of the Lunenburg County Anti Racism and Anti- Discrimination Committee (LCARADC) in the development and implementation of an Equity, Diversity, and Inclusion Action Plan.
- 2) Provide best practice research and advice on the interpretation and implementation of the Nova Scotia Act to Dismantle Racism and Hate and other relevant legislation and regulations.
- 3) Act as a liaison between the LCARADC and municipal units.
- 4) Liaise with the Lunenburg County Accessibility Advisory Committee, as necessary.
- 5) Review legislation, standards and best practices in equity diversity and inclusion, and determine their applicability to the LCARADC Action plan.
- 6) Evaluate and report to the LCARADC on the achievement of anti-racism and anti-discrimination goals.
- 7) Book meetings, prepare and distribute agendas and minutes, assist Chair in leading the meetings, manage recruitment for Committee when necessary.

Program/Policy Development & Support

- 1) Develop, recommend, implement, monitor, and evaluate Anti-Racism & Discrimination as well as equity, diversity and inclusion (EDI) policies, procedures, and programs (i.e. EDI Action Plan).
- 2) Engage with citizens who face barriers voicing their opinions or who wish to participate in local government.
- 3) Develop and maintain relationships with organizations/service providers to diverse populations.
- 4) Provide leadership and coordination for training, development, and education initiatives; Support for Council and Staff
- 5) Promote diversity, equity, inclusion, anti-racism, and anti-discrimination in the workplace through skill building opportunities inclusive of various learning styles.
- 6) Serve as a support/resource to Council, management and staff on applying an EDI lens on the work of the Municipalities.

ACCOUNTABILITIES

- 1) **Remain current with Provincial legislation, guidelines, standards and funding programs regarding EDI, Anti-racism and anti-discrimination.**
- 2) **Use personal protective clothing and equipment as required by Safe Work Practices.**
- 3) **Daily use of a computer to input inspection data and to communicate with other staff and external clients, develop correspondence and reports.**
- 4) **Maintains clear and accurate digital and paper records.**

CONTACTS

- 1) **Members of Council and Staff**
- 2) **LCARADC members**
- 3) **General Public**
- 4) **Provincial Officials**
- 5) **Designers, Architects, Engineers, etc.**



AN INTER-MUNICIPAL REGIONAL ANTI-RASISM AND DIVERSITY AGREEMENT

THIS AGREEMENT is made in five copies this on (DATE)_____.

AMONG:

The **Municipality of the District of Lunenburg**, a municipal body corporate pursuant to the *Municipal Government Act*;

-and-

The **Municipality of the District of Chester**, a municipal body corporate pursuant to the *Municipal Government Act*;

- and -

The **Town of Bridgewater**, a municipal body corporate pursuant to the *Municipal Government Act*;

-and-

The **Town of Mahone Bay**, a municipal body corporate pursuant to the *Municipal Government Act*.

-and-

The **Town of Lunenburg**, a municipal body corporate pursuant to the *Municipal Government Act*.

WHEREAS the parties wish to jointly support and advance anti-racism and anti-discrimination initiatives and promote equity, diversity and inclusion initiatives to identify and address systemic racism and inequity in government policy, legislation, programs and services in Lunenburg County.

NOW THEREFORE witness in consider of the mutual promises and covenants contained herein the parties hereto agree as follows:

General

1. The Purpose of this inter-municipal services agreement, hereafter called (Agreement) is to provide for coordinated Anti-Racism and Diversity services referred to in this Agreement as the (region).

Host Municipality

2. The Municipality of the District of Chester is hereafter called the Host Municipality, and as such, will provide office space and support.
3. The Host Municipality will be responsible for all administrative functions including financial, record keeping, minute taking and reporting on behalf of the Lunenburg County Anti-Racism & Anti-Discrimination Advisory Committee.
4. The Host Municipality will include the Anti-Racism and Diversity Coordinator, assets, and activities on their

Municipality's liability insurance policy.

Anti-Racism & Anti-Discrimination Committee

5. A Lunenburg County Anti-Racism & Anti-Discrimination Advisory Committee (ARADAC) has been established and Terms of Reference agreed upon by all parties.
6. As per the TOR:
 - a. The Lunenburg County Anti-Racism & Anti-Discrimination Advisory Committee (ARADAC) is established to advise the respective administrations and elected bodies of the Town of Lunenburg, Municipality of the District of Lunenburg, Municipality of Chester, Town of Bridgewater and Town of Mahone Bay to advance, strengthen, support, and unify the five municipal units in adopting and implementing Anti-Racism and Anti-Discrimination initiatives throughout the Region.
 - b. The ARADAC works with partners and communities to help lead and support anti-racism and anti-discrimination initiatives and promote equity, diversity and inclusion initiatives. They would work to identify and address systemic racism and inequity in government policy, legislation, programs and services.
 - c. The Committee has the following responsibilities:
 - i. Provide ongoing advice, education, information and recommendations to the five Municipal Councils and staff on internal and external projects, initiatives, or policy via the Anti-Racism and Diversity Coordinator.
 - ii. Develop and recommend to municipalities a regional action plan which will provide regional-level guidance and coordinated approaches and strategies on actions to be taken by the municipalities.
 - iii. Support the Regional Coordinator for Anti-Racism and Anti-Discrimination initiatives.
 - iv. Develop and propose an annual budget to the Anti-Racism and Diversity Coordinator, to be reviewed and proposed to the five (5) Municipal Councils for consideration.
 - v. Provide advice, when requested, on projects and policies undertaken by municipalities including municipal plans, development, human resource policies and other projects.
 - vi. Remain apprised and connected to new municipal, provincial and federal directives, regulations and initiatives that impact or intersect with Anti-Racism and Anti-Discrimination or funding opportunities.
 - vii. Collaborate with the Lunenburg County Accessibility Advisory Committee and Regional Accessibility Coordinator.
 - viii. Liaise with community members through regular engagement, maintain transparency, and provide a framework and platform for reporting back to the community.
 - ix. Collaborate and build relationships with community members and organizations that address Anti-Racism and Anti-Discrimination through events, programming, training and other forms of support.

Anti-Racism and Diversity Coordinator

1. All parties agree that an Anti-Racism and Diversity Coordinator shall be hired for a term ending March 31, 2026.
2. All parties agree that the Anti-Racism and Diversity Coordinator shall be a contractor of the Municipality of the District of Chester and shall serve as the coordinator and administrative support for the Lunenburg County Anti-Racism & Anti-Discrimination Advisory Committee (ARADAC) and shall provide

support for the development of local anti-racism and diversity plans to each Municipal Unit based on additional hours purchased by each unit.

3. The Anti-Racism and Diversity Coordinator will provide anti-racism and diversity expertise and inform municipal administrators of their professional responsibilities to ensure inclusive practices at each municipal unit.
4. The Anti-Racism and Diversity Coordinator may speak on behalf of the ARADAC and provide updates to respective councils. During the first year of the initiative, the Committee shall report to Councils once per quarter and thereafter, at least twice per year.
5. Not less than quarterly, the Anti-Racism and Diversity Coordinator shall meet with the CAO, or designate, of each municipal unit to assess overall service delivery in the preceding quarter and to plan for the anticipated needs of the upcoming quarter.
6. The Host Municipality is empowered to acquire or contract for the use of equipment, facilities, and personnel necessary or advisable to carry out the responsibilities assigned to the Anti-Racism and Diversity Coordinator by this Agreement.
7. Should the position of the Anti-Racism and Diversity Coordinator become vacant, it will be the responsibility of the CAO of the Municipality of the District of Chester to fill the vacancy in accordance with the hiring policies of the Municipality of the District of Chester. The selection committee shall be determined by the CAOs of the participating municipalities.
8. The parties shall share the cost of operations of the Anti-Racism and Diversity Coordinator based on an annual budget.
 - a. The cost sharing formula will be based on the Uniform Assessment of the previous year and will be adjusted annually. For 2023-24 budget year the following formula applies:

	22-23 Uniform Assessment	%
Town of Mahone Bay	\$145,777,562	2.52%
Town of Lunenburg	\$298,368,092	5.15%
Town of Bridgewater	\$715,142,664	12.35%
Municipality of the District of Chester	\$1,741,116,861	30.08%
Municipality of the District of Lunenburg	\$2,887,963,821	49.89%
TOTAL	\$5,788,369,000	100.00%

- b. The CAOs of the participating units shall recommend to the parties of this Agreement an Operating and Capital Budget by February 1 of the fiscal year prior to the fiscal year of the recommended budget. The approving parties must represent more than half of the approved budget.
 - c. Actual dollar contribution of the Municipalities shall be based on the annual budget of the Anti-

Racism and Diversity Coordinator and Lunenburg County Anti-Racism and Anti-Discrimination Committee.

- d. The Host Municipality will invoice the other contributing Municipality(s) for their portion of the actual costs that are additional to their annual contribution. Actual expenditures will be reviewed yearly and surplus funds, if any, will be credited against the participating units' following year's contribution, based on the cost sharing formula referenced to in this section herein.
 - e. In the event Anti-Racism and Diversity Coordinator requires additional money for capital or operating purposes, any such increase shall require the approval of all parties to the agreement.
9. The fiscal year of the Anti-Racism and Diversity Coordinator shall be from April 1 to March 31 of the following year.

Termination of Agreement

10. This Agreement has effect commencing August 1, 2023, and ending April 1, 2026.
11. By motion of each Council, the term of the agreement may be extended by mutual agreement.

Indemnification

12. Each party shall indemnify its representatives from any liability that may arise as a result of that member.

Dispute Resolution

13. If any disagreement arises among the parties as to the proper interpretation of this agreement that cannot be resolved, the parties shall submit the area of disagreement to an arbitrator as provided by the *Arbitration Act*.
14. The parties acknowledge and agree that all headings are inserted for convenience only and do not form part of the agreement.
15. This Agreement is governed by the laws of Nova Scotia.



IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by the hands of their duly authorized officers and the affixing of their respective seals the day and year first above written (15)

Dated this ____ day of _____, _____ A.D.

Signed, sealed and delivered in the presence of;

Per: _____

Municipality of the District of Lunenburg

Per _____

Witness

Carolyn Bolivar-Getson, Mayor

Per: _____

, Deputy Mayor

Per: _____

Municipality of the District of Chester

Per _____

Witness

Allen Webber, Warden

Per: _____

Floyd Shatford, Deputy Warden

Per: _____

The Town of Bridgewater

Per _____

Witness

David Mitchell, Mayor

Per: _____

, Deputy Mayor

Per: _____

The Town of Mahone Bay

Per _____

Witness

David Devenne, Mayor

Per: _____

Francis Kangata, Deputy Mayor

Per: _____

The Town of Lunenburg

Witness

Per _____

, Mayor

Per: _____

, Deputy Mayor





Town of Mahone Bay

Staff Report

RE: Light the Town Project

September 12th, 2023

General Overview:

This staff report is intended to present Council with an update on the Light the Town Project with MBTCC and associated recommendations.

Background:

In June of 2023 the Town Council approved a financial contribution the Light the Town Project proposed by Mahone Bay Tourism & Chamber of Commerce (MBTCC) and directed staff to apply to the Province for additional funding to support this project (on request of MBTCC).

Analysis:

In preparing for confirmation of Provincial funding MBTCC considered the scope of work for the project with Town staff and have proposed a change from what was discussed with Council in June.

The proposed scope change would see the plan to purchase seasonal lights replaced with a plan to replace the existing streetlights in the downtown – on Main St. from Edgewater to the Marina – with a more decorative style of fixtures (which would remain in place year-round). This would have significant advantage for the Town in that there would be no increase in annual labour or electrical costs (as would be the case with the seasonal lighting previously anticipated).



Mock-up of proposed decorative lighting fixtures in place on Main St.

The existing light fixtures being replaced would be retained by the electrical utility and used as replacements in other areas as needed. In the longer term the Town could consider converting remaining lights in the downtown (Main St. from Edgewater to Long Hill) when these lights require scheduled replacement; there is very little additional cost in so doing (we'd be purchasing new fixtures anyway and the decorative fixtures are not significantly different in cost).

Time is of the essence if we are going to complete this project prior to the November 24th date set by MBTCC for the beginning of the holiday season (which is their goal for the project and aligns with the Province's requirement that any granted funds to be spent this fiscal year).

Financial Analysis:

The revision of the project budget which would be associated with the proposed scope change is as follows:

When MBTCC initially approached the Town the proposal was for the Town to apply for Provincial funding for this project on the basis of the Town contributing \$10,000, MBTCC and businesses contributing \$15,000 and \$25,000 being requested from the Province.

Based on the scope change detailed above and the latest quotation obtained we're now anticipating a project budget of ~\$57,500 including net HST, plus an estimated ~\$3,500 for installation by our utility staff (in-kind).

MBTCC is requesting Council agree to cover the difference between the \$50,000 confirmed funding and the estimated total project cost (increasing the Town's cash contribution to \$17,500 relative to the \$15,000 committed by the Chamber).

It should be further noted that the Electrical Utility would own the assets (light fixtures) following installation. With the Town funding approximately 30% of the project costs and the Utility owning 100% the resulting assets – and retaining the removed fixtures to be used as replacements elsewhere in town – the infrastructure value of the project is considerable.

Climate Analysis:

N/A

Strategic Plan:

1.1. Improve Performance of Town-Owned Utilities

- Strategically replace/upgrade utility infrastructure to support growth and enhance reliability

Recommendation:

It is recommended,

THAT Council approve the proposed scope change and associated increased contribution to the Light the Town Project with MBTCC (from \$10,000 to \$17,500) and direct staff to proceed with acquisition and installation of the new light fixtures.

Attached for Council Review:

None

Respectfully Submitted,A handwritten signature in blue ink, appearing to read 'Dylan Heide', with a long horizontal flourish extending to the right.

Dylan Heide,
Town of Mahone Bay CAO



Town of Mahone Bay

Staff Report

RE: Updated Municipal Specifications

September 12th, 2023

General Overview:

This staff report is intended to present Council with a recommendation to update the Town's Municipal Specifications.

Background:

Municipal Specifications are the general specifications which inform Town infrastructure design including the design of infrastructure by property owners and developers where said infrastructure will become the property of the Town (such as roads and utility services in subdivisions, etc.).

The Town's current Municipal Specifications were adopted in 2002 and are attached as an appendix to this report.

Town policies, by-laws and regulations variously reference the Town's municipal specifications or Provincial equivalents (which can be referenced [HERE](#)).

Analysis:

Staff believe there is value in updating the Town's municipal specifications where it has been over twenty years since the last update.

Additionally, there are some areas where the Town deviates - or could benefit from deviating – from Provincial specifications, for example in stormwater or roadway standards (given the town's denser and more urban character), where additions to the Town's current specifications would be required to support future infrastructure development.

Undertaking such an update now aligns with policy, by-laws and regulation updates currently underway, in particular the Municipal Planning Strategy (MPS) and Land Use By-law (LUB) and the Subdivision By-law. The proposed new MPS/LUB establishes new requirements for road frontage which will significantly interact with the Subdivision By-law; updated specifications for roadways and utility services can support development in line with these new requirements by clarifying options for property owners and developers.

Financial Analysis:

A range of costs is possible. Staff recommend proceeding to a Request for Proposals (RFP) with an emphasis on proposals reflecting an efficient approach considering current Provincial specifications and the Town's specific needs. Staff will report to Council on proposals received.

Climate Analysis:

N/A

Strategic Plan:

N/A

Recommendation:

It is recommended,

THAT Council direct staff to issue a Request for Proposals for update of the Town's Municipal Specifications.

Attached for Council Review:

- Current Municipal Specifications

Respectfully Submitted,



Dylan Heide,
Town of Mahone Bay CAO

TOWN OF MAHONE BAY

MUNICIPAL SPECIFICATIONS

Adopted by Council 14 May 2002

TABLE OF CONTENTS

Section	Title	Page
1.0	Definitions.....	1 of 2
2.0	Submission Requirements	
	2.1 Tentative Approval.....	1 of 3
	2.2 Final Approval.....	2 of 3
	2.3 Listing Procedures for Subdivision Roads.....	3 of 3
3.0	Central Sewer System Specifications	
	3.1 Scope.....	1 of 11
	3.2 Design Criteria.....	1 of 11
	3.3 Gravity Systems.....	1 of 11
	3.4 Pumped Systems.....	4 of 11
	3.5 Installation.....	10 of 11
	3.6 Inspections and Testing.....	11 of 11
4.0	Central Water System Specifications	
	4.1 Scope.....	1 of 7
	4.2 Design Criteria.....	1 of 7
	4.3 Water Main.....	2 of 7
	4.4 Service Laterals.....	3 of 7
	4.5 Valves.....	4 of 7
	4.6 Back Flow Prevention Devices.....	5 of 7
	4.7 Fire Hydrants.....	5 of 7
	4.8 Insulation.....	5 of 7
	4.9 Pumping and Storage.	6 of 7
	4.10 Installation.....	6 of 7
	4.11 Inspections and Testing.....	6 of 7
5.0	Storm Drainage System Specifications	
	5.1 General.....	1 of 8
	5.2 Design Approach.....	1 of 8
	5.3 Meteorologic Data.....	2 of 8
	5.4 Runoff Methodology.....	3 of 8
	5.5 Storm Drainage Report.....	3 of 8
	5.6 Location.....	4 of 8
	5.7 System Components.....	5 of 8
	5.8 Erosion and Sediment Control.....	7 of 8

6.0 Municipal Public Highways

6.1 Scope.....	1 of 5
6.2 Street Classification and Characteristics.....	1 of 5
6.3 Design Criteria.....	1 of 5
6.4 Inspection and Testing.....	4 of 5
6.5 Street Construction.....	5 of 5

Appendices.....

Standard Drawings.....

Whenever, in any part of these Specifications, the following terms are used, the intent and meaning will be interpreted as follows:

Act. Means the Municipal Government Act

Approval. The approval of the Engineer. The Engineer's decision will be final and binding in matters of design and construction.

Board. Means the Nova Scotia Utility and Review Board

Development Officer. The Development Officer for the Town of Mahone Bay acting directly, or through an assistant or representatives duly authorized by the Development Officer, and acting only within the scope of the particular duties assigned or within the tested scope of the authority.

Engineer. The engineer of the Town of Mahone Bay and includes a person acting under the supervision and direction of the Engineer.

Forcemain. A section of sanitary sewer through which sewage is either pumped or flows by gravity under a low pressure head.

Public Highway. Any street or road owned and maintained by the Town, a Municipality or the Province excluding designated controlled access highways pursuant to Section 20 of the Public Highways Act.

Inspection. Field inspection by the Engineer at various stages of construction.

Lateral. A service pipe for either sanitary sewage, storm water or potable water that extends from the main to the property line.

Main Line. A main line refers to the primary pipeline in a water or sewer system. In the case of a sewer line a main line includes both collection and trunk lines, and in the case of a water main includes both distribution and transmission lines.

Maintenance Period. One year from the date of final approval of a subdivision as issued by the Engineer. For final asphaltic paving or chip seal courses, the maintenance period shall extend one year from the date of approval by the Engineer.

Natural Watercourse. The bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, whether it contains water or not.

Professional Engineer. A Professional Engineer who is a member of the Association of Professional Engineers of Nova Scotia.

Roadway/Street. It includes the whole right-of-way which is reserved for use in constructing the roadway and its appurtenances.

Run-off. Overland flow that occurs when the rainfall rate exceeds the soil's capacity to absorb water.

Sanitary Sewage. Wastewater from residential, industrial, institutional, and commercial buildings, excluding storm water runoff and ground water.

Set Back. As defined by the Land Use Bylaw or the Subdivision By-law of the Town.

Services. All of the sanitary sewer, storm sewer, and water systems.

Storm Sewer. A buried drain for conveyance of storm water that includes the storm sewer main, manholes, laterals, catchbasins, and catchbasin leads.

Sub-Base Course. The crushed rock or aggregate which is placed immediately upon the subgrade.

Subdivision. The division of any area of land into two or more parcels, and includes a re-subdivision or a consolidation of two or more parcels.

Subgrade. That portion of the roadbed upon which the sub-base course is to be placed.

Town. The Town of Mahone Bay.

Tributary Area. The area that contributes runoff flow to an inlet or given point immediately downstream of the contributing area.

- 2.0** This Section is intended to assist the applicant for subdivision approval prepare a submission for the approval of municipal services. This section must be read in conjunction with the Subdivision By-Law.

2.1 TENTATIVE APPROVAL

2.1.1 General

A copy of the Permit to Construct from Nova Scotia Department of Environment will be required prior to approval of Tentative Plan.

The following information is required with an application for tentative approval of subdivisions:

2.1.2 General Service Plan

Plan indicating proposed road layout, tributary service areas, and existing and proposed services; including pipe sizes, valves, hydrants, manholes, lift stations, directions of flow, and points of connection to existing systems.

2.1.3 Drainage Plan

Plan indicating contributing area, the area tributary to each inlet, natural watercourse, and existing and proposed storm drainage systems; including run-off rates at each inlet and outlet, pipe/culvert size, and other relevant features. Lot grading plans and minimum basement elevations may be required for areas prone to flooding.

2.1.4 Survey Plan

Tentative plan of survey in accordance with the Subdivision Bylaw, showing proposed lot layout and all proposed public highways, road reserves, and easements to be transferred to the Town.

Proposed roads shall be identified alphabetically with preferred street names provided in the covering letter.

2.1.5 Detailed Design Drawings

Plan and profile drawings (1:500 horizontal, 1:5 vertical), drawing size D (600 mm x 915 mm overall dimensions) indicating lot layout, manhole locations, lateral locations, valves, hydrants, pipe size, material, and slope, horizontal and vertical road alignment data, existing and proposed road center line profiles, and proposed ditch profiles.

Cross section elements if different than standard.

Details for lift stations indicating pump data, invert elevations for gravity inlet, overflow, and forcemain, float elevations, base elevation, top elevation, wet well size, bypass piping arrangement, and other relevant details.

Details for environmental control measures, and other relevant details as required or as requested by the Engineer.

Provide three copies of all submissions.

2.1.5 Design Submission

Depending on the size of the proposed subdivision development, the following information may be required by the Engineer:

Design summary for the sewer system in tabular form giving population density peak flow, design flow, pipe size, slope, minimum and maximum velocity, and

depth of flow.

Design summary for the water system in tabular form giving population density, domestic demand, fire flow requirements, maximum and minimum static pressures under normal operating conditions, and residual pressures under fire flow conditions.

Design information for the storm drainage system in tabular form giving runoff rates at each inlet and outlet, design flow, pipe, culvert, or channel size, and depth of flow.

Design information in tabular form for lift stations and forcemains giving minimum, maximum, and peak flow rates, pipe size, velocity in forcemain, and pump cycle time, system and pump curves for lift stations and forcemains.

Erosion and sedimentation control plan.

2.2 FINAL APPROVAL

The following information is required for final approval of municipal roads and services:

2.2.1 Record Drawings

Reproducible record drawings stamped by a Professional Engineer. Plan and profile and detail drawings in accordance with those submitted for tentative approval are required. A drainage plan is also required.

Record drawings prepared on a CAD system must be submitted in both hard and electronic format. Hard copies must be on a high quality bond paper(1 set) and mylar (1 set). Electronic copies are to be submitted on floppy disc or compact disc and be saved in AutoCAD "dwg" or "dxf" format. Record drawings prepared manually must be submitted on both high quality bond paper (1 set) and mylar (1 set).

2.2.2 Deeds and Easement Documentation

Warranty Deed for all road right of ways and road reserves.

Easement agreements for water, sanitary sewer, and storm drainage easements.

Title certificate by developer's solicitor for land and easements being transferred. A copy shall be provided to the Town Solicitor.

Legal Plan of Subdivision submitted for final approval.

2.2.3 Maintenance Deposit

Statement of construction costs.

Statutory declaration from developer indicating that all accounts for labor and material used in the construction of the subdivision and statutory liens have been paid in full.

Maintenance deposit in the form of cash or certified cheque for 10% of construction costs, to be held for the duration of the warranty period. (OR in accordance with Subdivision Bylaw)

2.2.4 Road Completion Agreement and Bond for Street Completion

In accordance with the Subdivision Bylaw.

2.2.5 Operation and Maintenance Manuals

O & M Manuals are required for pumps and other similar equipment.

2.2.6 Certificate of Compliance

A Certificate of Compliance is required from a Professional Engineer stating that the roads and services have been constructed in accordance with the approved plans and these specifications.

2.2.7 Inspection and Testing Reports

The following inspection and testing results as applicable, must be provided as a matter of course:

- Video inspection tape and report for sanitary sewer.
- Test results for air and deflection testing of the sanitary sewer, stamped by a Professional Engineer.
- Test results for hydrostatic leakage tests for water lines, stamped by a Professional Engineer.
- Bacteriological test results for water lines.
- Sieve Analysis for base and sub-base gravel.
- Compaction test results on trench compaction, subgrade, sub-base, and base courses.
- Test results for asphaltic concrete paving or chip seal will be required after completion, and prior to release of standby letter of credit.

2.3 LISTING PROCEDURE FOR SUBDIVISION ROADS

Before the constructed roads are accepted for listing, the Town must receive confirmation from the Nova Scotia Department of the Environment that all their requirements have been met.

When the preceding information has been submitted and approved, the developer may then officially request the Town take over the road system in the subdivision. The request should be accompanied by 4 copies of a final plan showing the entire subdivision, its boundaries and road layout. The Engineer may then recommend that the Town officially list the roads in the subdivision.

3.1 SCOPE

This section specifies the requirements for a central sanitary sewer collection system. A sanitary sewer consists of main lines, laterals, forcemains and appurtenances (including manholes and lift stations).

In addition to these design criteria, all sanitary sewage systems shall conform to the *Nova Scotia Department of the Environment Standard and Guidelines for the Collection, Treatment and Disposal of Sanitary Sewage*. No systems shall be constructed until the design has been approved by the Engineer and by the Nova Scotia Department of the Environment.

3.2 DESIGN CRITERIA

General The sanitary sewage system shall be designed for flows generated from all lands within the Serviceable Area which are naturally tributary to the drainage area as determined from topographic plans. In addition, lands within the Serviceable Area which are tributary by pumping or regrading which are at present or anticipated to flow through the design area are to be included.

Design shall be based on an appropriate population density according to land use.

Design Flows Sewer Collection Mains shall be sized to conduct the domestic peak hourly water demand. Unless data is supplied by flow metering, the design sewage flow shall be calculated as follows:

Average Dry Weather Flow (Q_A) Shall be calculated on the basis of an allowance of 75 Imperial Gallons per person per day (340 liters per person per day).

Design Peak Flow (Q_p) shall be based on the peak wet weather flow according to the following:

$$Q_p = MQ_A + IA$$

Where M = Peaking Factor, determined using the Harman formula:

$$M = 1 + \frac{14}{4 + P^{0.5}}, \text{ where } P = \text{design population in thousands}$$

And IA = Infiltration Allowance, determined as follows:

I = a minimum of 1080 Imperial Gallons per acre per day (12096 liters per hectare per day);

A = tributary area in Acres (Hectares) as defined in the Definitions section.

The Engineer reserves the right to request flow and other engineering calculations prior to approval to install a sewer system.

3.3 GRAVITY SYSTEMS

Main Line

Pipe Material Polyvinyl Chloride (PVC), SDR 35 shall be used for sanitary sewer main installations within the Town, unless otherwise approved by the Engineer.

Hydraulic Design Sanitary sewer mains shall be designed to convey the calculated Design Peak Flows. The Designer shall ensure that surcharging of the system does not occur during such peak flow conditions by taking into consideration such factors as energy loss at manholes. The capacity of the sanitary sewer mains is to be

calculated using the "Manning Formula" or an appropriate nomograph. A Manning roughness coefficient (n) equal to 0.011 shall be used for PVC pipe.

Sewers shall be designed to maintain a minimum velocity of 2 feet per second (0.6 meters per second) and a maximum velocity of 15 feet per second (4.6 meters per second) when operating under Design Peak Flow conditions from the tributary area when fully developed.

Pipe Size No sanitary sewer main shall be less than 8 inches (200 mm) in diameter.

Minimum Sanitary sewer mains shall generally have a minimum slope of 1 percent. Under special conditions

Slope slopes less than 1 percent may be permitted. Slopes less than 1 percent will only be considered where the depth of flow will be at least 30 percent of the diameter of the pipe for Design Peak Flow. In no case shall the slope be reduced to less than 0.75 percent.

Calculations shall be presented, in a tabular form to indicate depths and velocities at minimum, average and maximum daily wastewater flow for the different sizes of sewer proposed.

High Velocity Protection

Where velocities greater than 15 feet per second (4.5 meters per second) are attained, special provision shall be made to protect against displacement of pipe and structures by erosion and shock.

Depth

In general, the sanitary sewer shall be installed at a sufficient depth to provide service by gravity flow from all proposed lots within the proposed subdivision and to provide service to adjoining lands.

The minimum depth of sanitary sewer mains shall not be less than 4 feet (1.2 meters).

The depth of sanitary sewer mains shall not normally exceed a maximum of 14 feet (4.5 meters). However, under special conditions, if full and justifiable reasons are given (such as elimination of a pumping station), the maximum depth of sanitary sewer mains may be increased to 18 feet (5.5 meters).

Location

Where possible, all sanitary sewer pipe and appurtenances shall be located within a street owned by the Town or the Nova Scotia Department of Transportation and Public Works. If approved by the Engineer, sanitary sewer mains may be installed within an easement granted in favour of the Municipality. The actual width of the easement shall depend upon the depth of any pipe lines contained within the easement. The minimum width of any such easement shall be 20 feet (6 meters).

Depending upon the length and location of the easement, the Engineer may require a travel way to be provided within the easement for access and maintenance purposes.

Where a need is identified by the Engineer to accommodate future upstream lands naturally tributary to the drainage area, an easement shall be provided from the edge of the street right-of-way to the upstream limit of the subdivision.

Joints

All joints on gravity lines shall be bell and spigot as recommended by the manufacturer.

Alignment

All sanitary sewer mains shall be laid with a straight alignment between manholes.

Manholes

General A manhole shall be provided on a sanitary sewer at the end of each line, at any change in pipe size, slope or horizontal alignment and/or at all pipe intersections.

Hydraulic Losses The following criteria shall be used for pipe elevation and alignment in sanitary sewer manholes to account for hydraulic losses through the manhole:

- a. Minimum drop across manholes of similar diameters shall be:
 - Straight run - 0.10 feet (30 mm)
 - Deflections up to 45 Degrees - 0.10 feet (30 mm)
 - Deflections 45 to 90 Degrees - 0.20 feet (60 mm)
- b. The Crown of a downstream pipe shall not be higher than the crown of an upstream pipe.

Minimum Diameter The minimum internal diameter of a manhole shall be 42 inches (1065 mm).

Maximum Spacing The distance between manholes shall not exceed 400 feet (120 m) for sewer main diameter of

15 in. (375 mm) or less. For sewer mains greater than 15 in (375 mm) in diameter, the maximum spacing shall be 500 ft. (150 mm).

Location All sanitary sewer manholes shall be positioned so as to minimize the inflow of surface water or ground water. Manholes shall not be located at or near drainage ditches or roadway low points.

In some situations where manholes cannot be easily located to minimize inflow, the use of berms and/or water-tight frames and covers may be permitted by the Engineer.

Drop Manholes Where the difference between invert elevations of any two pipes entering and leaving a manhole is greater than 3 feet, either an internal or external drop chamber shall be provided.

Frames & Covers The following manhole frames and covers are approved for use:
(a) IMP Type R10 for manholes within a public road allowance.
(b) IMP R12 bolt down frame and cover for manholes in all easements or park areas.

Lateral If services are designed to enter manholes the maximum number entering any manhole shall be limited to 3. All entrances shall be cast into the manhole by the manufacturer and be complete with watertight gasketed joints.

Service Laterals

General In any subdivision for which tentative or final approval is being sought, a single sanitary sewer lateral shall be provided by the developer to each lot at the time of installation of services. The lateral shall extend from the main to the property line.

In the case of duplexes, semi-detached, row houses, or other similar development where each dwelling unit has road frontage, one lateral shall be installed to each unit.

Pipe Material Polyvinyl Chloride (PVC), SDR 28 shall be used for sanitary sewer service laterals. Pipe for sanitary sewer laterals shall be white in color.

<i>Pipe Size</i>	Minimum size lateral piping shall be 4 inches (100 mm) in diameter.
<i>Clean-out</i>	Service laterals with a total length greater than 85 feet (25 metres) shall be installed complete with a wye type clean-out or approved manhole in locations approved by the Engineer.
<i>Minimum Slope</i>	Sewer laterals shall have a minimum slope of 2 percent.
<i>Depth</i>	The depth of sanitary sewer laterals shall not be less than 4 feet (1.2 metres) below a traveled way (such as a driveway or street) or less than 3 feet (1 meter) below the bottom of a ditch.

To minimize future maintenance costs, all service laterals shall be eliminated from the deep section of the sewer main either by installation of a rider sewer for lateral connections or by the installation of all laterals at manholes.

Connection to Mains

Service connections to an existing main in service shall be made using the approved saddles listed below:

- (i) PVC Main - PVC gasketed strap on, in line or wye tee.
- (ii) Concrete/A.C. Main - Daigle D-50

All saddles shall be fitted with a gasket and a double stainless steel strap and shall not protrude into the main.

Service connections to any newly constructed main shall be made using the approved service tee/wyes with gaskets.

For laterals greater than 6 inches (150 mm), connection to the sewer main shall be made by installing a manhole on the sanitary sewer main.

Any service connection requiring a major change in horizontal or vertical alignment shall be constructed using a maximum of one horizontal and one vertical bend per service lateral unless an approved manhole structure or "wye" type clean-out is provided. All bends shall be long radius type with a maximum deflection of forty-five degrees.

The center line of any service connection shall be located at an angle of 45 degrees above the horizontal at the main.

<i>Joints</i>	Sewer joints shall be designed to prevent infiltration and to prevent the entrance of roots, and shall be made in accordance with the manufacturer's recommendations.
---------------	---

<i>Repairs</i>	Repairs to pipe damaged after installation will be accepted only if carried out in accordance with the manufacturer's recommendations and after the damaged section has been retested.
----------------	--

Groundwater Movement

The designer shall assess the possible change in groundwater movement caused by the use of pervious bedding material and shall be responsible for the design of corrective measures to prevent flooding as a result of this groundwater movement. Clay plugs at service lateral trenches may be required for low lying lots and impervious soils.

3.4 PUMPED SYSTEMS

General Pumping stations shall be provided when, in the opinion of the Engineer, a gravity system is not possible or is not economically feasible.

Sewage pumping station structures and electrical and mechanical equipment shall be protected from physical damage from the 1 in 100 year flood. Sewage pumping stations should remain fully operational and accessible during the 1 in 50 year flood.

During preliminary location planning, consideration shall be given to the potential of emergency overflow provisions and as much as practically possible, the avoidance of health hazards, nuisances and adverse environmental effects.

Unless otherwise approved by the Engineer, all pumping stations, pumps, and forcemains shall be designed for the ultimate sanitary sewer peak flows from the tributary drainage area. In the selection of pumps, both present and future conditions shall be considered, and pump overloading situations shall be avoided.

Design parameters such as the roughness coefficient of pipe and flow volumes can vary over time, and such variances shall be considered in the selection of the pumps.

Pumping Stations

Type Pumping stations with an ultimate capacity of 75 l/s or less may be submersible type.

Pump Capacity

All pumping stations shall have a minimum of two pumping assemblies. If only two pumps are provided, each shall be capable of handling the expected Design Peak Flow. Where three or more units are provided, they shall be designed to fit actual flow conditions and must be of such capacity that, with the largest unit out of service, the remaining units will have capacity to handle maximum sewage flows, taking into account head losses with parallel operation. The pump control circuitry shall be designed to automatically alternate pumps for each pump cycle. Run time meters shall be provided to record run time for two pumps operating simultaneously.

Wet Well Size The wet well shall be designed to allow for a minimum cycle time for each pump of fifteen minutes. For a duplex station, the volume in cubic feet, between pump start and pump stop shall be 0.5 times the pumping rate of one pump, expressed in US gallons per minute. The wet well size and control settings shall be appropriate to avoid heat build-up in the pump motor due to frequent starting and to avoid septic conditions due to excessive detention time.

The wet well shall be designed for a maximum retention time of 30 minutes to avoid septic conditions.

Phased Development

In situations of phased development, the effects of minimum flow conditions shall be investigated to ensure that the retention time in the wet well will not create an odor or septic problem.

Structural Design

The wet well structure shall be designed for all external loads, including bearing capacity with the wet well full, and lateral earth pressure and hydraulic uplift with the wet well empty.

Pump Manufacturers

The following pumps and pump manufacturers are approved for use in sewage pumping stations in the Municipality:

- (a) Submersible pumps manufactured by "ITT Flygt" or "Gorman Rupp."
- (b) Self priming pumps manufactured by "Gorman Rupp".

All pumps shall be solids handling type complete with electric motors.

Emergency Overflows

Each pumping station shall be provided with an emergency overflow arrangement acceptable to both the Engineer and DOE. The invert of the overflow pipe at the pumping station shall be lower than the invert of any sanitary sewer laterals at the property line. As well, the invert of the overflow pipe shall be at an elevation high enough to prevent backflow from surface runoff or during extreme high tides.

All pumping stations shall be provided with an emergency bypass valve chamber. The piping arrangement of all pumping stations shall be designed to facilitate use of an emergency pumping facility.

To prevent or minimize overflows, each pumping station shall be designed with a retention capacity calculated on the basis of Peak Design Flow for a duration related to frequency and length of power outages for the area.

In the absence of reliable data regarding the frequency and length of power outages, minimum retention capacity of 4.5 hours at Design Peak Flow shall be provided. An auxiliary power supply which meets the requirements of the Engineer may be used as a substitute for retention capacity at the pumping station.

Safety Precautions

The pumping station and appurtenances shall be designed in such a manner to ensure the safety of operations, in accordance with all applicable Municipal, Provincial and Federal regulations including the Occupational Health and Safety Act. All moving equipment shall be covered with suitable guards to prevent accidental contact.

Equipment that starts automatically shall be suitably and visibly posted with warning signs to ensure that the operators are aware of this condition. Lock-outs on all equipment shall be supplied to ensure that the equipment is completely out of service when maintenance or servicing is being carried out.

Pump Selection

Pumping equipment shall be selected to perform at maximum efficiencies under normal operating conditions. Pumping stations, wet wells and dry wells shall be designed such that all pumps will operate under a continuous positive prime condition during the entire pump cycle. (This criteria will not apply to pumping stations designed to use Gorman Rupp self priming pumps). System head calculations and curves shall be provided for the following operating conditions:

- (a) C=100 and low water level in the wet well.
- (b) C=120 and medium water level over the normal operating range in the wet well.
- (c) C=130 and overflow water level in the wet well.

Curve (b) shall be used to select the pump and motor since this most closely represents normal operating conditions. The extreme operating ranges will be

given by the intersections of curves (a) and (c) with the selected pump curve. The pump and motor shall be capable of operating satisfactorily over the full range of operating conditions.

Surcharge Pumping stations shall be designed such that the incoming sewers will not surcharge under the peak flow conditions.

Flow Velocity Suction and header piping shall be sized to carry the anticipated flows. Flow velocities shall be:

(a) Minimum cleansing velocity of 2.6 feet per second (0.8 meters per second).

(b) Maximum velocity of 6.6 feet per second (2.0 meters per second).

Regardless of the above conditions, piping less than 4 inches (100 mm) in diameter is not acceptable, unless otherwise approved by the Engineer.

Piping Pumping station internal piping shall be either ductile iron Class 54 with coal tar epoxy lining or stainless steel, Type 316 or 316L, 11 Gauge. Regular steel pipe spool pieces will not be permitted.

Threaded flanges shall be used for all ductile iron pipe joints, fittings and connections within the station. Pressed or rolled vanstone neck flanges shall be used for all stainless steel pipe joints, fittings and connections. All piping within the pumping station shall be properly supported and shall be designed with appropriate fittings to allow for expansion and contraction, thrust restraint, etc.

Wet Well Inlet Only one inlet will be permitted into the wet well. If more than one sewer main flows to a pumping station site, a manhole shall be provided outside of the pumping station to collect the flow from the contributing mains.

Hydraulic Analysis

A hydraulic transient analysis shall be undertaken to ensure that transients (water hammer) resulting from pumps starting, stopping, full load rejection during power failure, etc. do not adversely affect the pipe or valves in the system.

Valves Hand operated gate or plug valves shall be provided on discharge piping to allow for proper maintenance. Ball check or swing check valves shall be provided on the discharge lines between the isolation gate valve and the pump. Check valves shall be accessible for maintenance.

Ventilation Forced ventilation shall be provided for pumping station wet wells and dry wells. Ventilation may be continuous at a rate of 12 air changes per hour or intermittent at a rate of 30 air changes per hour.

Access & Removal

Access hatchways and doorways shall be provided to allow adequate maintenance and servicing. All pumping stations shall be provided with an acceptable device for the removal of pumps and motors for repair and maintenance. Submersible pumps shall be readily removable and replaceable without dewatering the wet well or disconnecting any piping in the wet well. All locks shall be keyed to the Town's standard key system.

Electrical Electric motors less than 10 horsepower shall be 208 volt, 3 phase; electric motors 10 horsepower and larger shall be 600 volt, 3 phase. Single phase pumps will only be permitted if in the opinion of the Engineer three phase power is not feasible. All pumping station control equipment shall be mounted in a CSA Type 3 enclosure that is weather tight, heated and rated NEMA4. Alternatively, control equipment may be mounted in an Aboveground, Prepackaged Valve Enclosure as

manufactured by Gorman Rupp.

Control Package

Controller, Floats and appurtenances to be suitable for 4 float, duplex operation with alternating pump cycles. Flygt Model Alpha 2, CEMA 3 controller with DLT-22 monitoring. Float levels to include pumps off, pump on, 2nd pump on, high water alarm. Control shall include:

- Alarm light
- Elapsed time meter for each pump
- Seal failure indicators for each pump
- Phase failure protection
- Automatic Lead/Lag pump alternator
- Time delay for lag pump
- Panel heater complete with thermostat.

All components shall be CSA approved and the complete assembly shall meet CSA requirements for the type of equipment.

Liquid Level Regulators

Flygt float switches, ENM-10
One each for pump off, lead pump on, lag pump on, and high level alarm.
CSA approved type.
Each regulator complete with sufficient, continuous cable to permit positioning at any level in the wet well with at least three feet to spare.
Maximum voltage 250 V AC.
Maximum operating temperature 50° C.
Minimum operating temperature 0° C.

Conduit

Service entrance shall be rigid steel, CSA approved, hot dip galvanized above grade; rigid PVC below grade, conforming to CSA C22.2 No. 136.
Branch feeders shall be rigid steel, hot dip galvanized, sized in accordance to CSA standards.

Wiring

CSA approved, sized according to equipment manufacturer's stated full load current or as shown on the drawings.

Alarm Light

Red Globe alarm light complete with wire cage protection mounted generally as shown on top of control panel assembly.

Include alarm resets.
Alarm shall be activated for the following conditions:

- High liquid level
- Pump failure
- Pump leakage failure

Control Panel Support

Reinforced concrete control panel support.

Control Panel Enclosure

Control panel to be complete with weatherproof insulated CEMA 3 enclosure.
No side or top entry permitted.
Minimum 14 gauge stainless steel.
Insulated with minimum 3/4 inch double aluminum faced insulating foam.
Finish exposed edges with aluminum tape.
Ensure solid bond to enclosure throughout.
Gasket seal doors.
Enclosure to have padlock hasp and full length stainless steel piano hinges.
Provide heater of 50-75 watts output for control panel enclosure.
Thermostat with 5°C minimum setting.
Non burning exposed surface.
Install a duplex outlet in the control panel enclosure c/w:
Separate protected 120 volt circuit.
Ground fault protection.

Electrical Service Enclosure

Electrical service meter socket to be mounted on Utility Pole and come complete with CEMA 3 weatherproof enclosure and disconnect switch suitable for service provided.

Service connection to meet requirements of NSPI.

Electrical service from the NSP supply to the control panel and between the control panel and the pumping station shall be through buried conduit. Each pump cable shall be installed in a separate conduit and a spare conduit shall be provided for future use. All conduits entering or leaving shall be adequately sealed to protect against corrosion from water intrusion or harmful gases.

Indication & Control Devices

A hinged sub panel shall contain the following control devices:
Hand-off-Auto selector switch, neon running lights, running hour meter, start counter and ammeter for each pump.
Overload and alarm reset buttons for the controller

Site Considerations

Whenever possible, all pumping stations and control panels shall be within the street right-of-way in an appropriate area specifically designated for that purpose. The ownership of this property shall be deeded to the Town. All pumping station land shall be graded such that ponding of water does not occur. The elevation of the top of the wet well shall be no less than 4 inches (100 mm) and no more than 6 inches (150 mm) above the finished grade of the pumping station lot. Adequate areas for vehicular access and parking shall be paved; all other exposed areas shall be sodded.

O & M Manual

Three copies of the pumping station operation and maintenance manual shall be prepared in a form acceptable to the Engineer, and provided to the Engineer prior to acceptance of the pumping station. This manual shall contain the following as a minimum:

- (a) System description
- (b) Design parameters, system hydraulics and design calculations (including curves)

- (c) As constructed civil, mechanical and electrical drawings
- (d) Pump literature, pump curves and operating instructions
- (e) Manufacturer's operation and maintenance instructions of all equipment
- (f) Name, address, and telephone number of all equipment suppliers and installers
- (g) Information on guarantees/warranties for all equipment

All special tools and standard spare parts for all pumping station equipment shall be provided by the contractor prior to acceptance of the system by the Engineer.

Forcemain

Pipe PVC DR18 and Ductile Iron Class 350 pipe are approved for use for all sanitary sewer forcemains in the Town.

The hydraulic losses in the forcemain shall be calculated using the Hazen-Williams Formula or an appropriate nomograph using roughness coefficients (C) of 100, 120 and 130 as set out above under "Pump Selection".

Limiting Velocities

The forcemain shall be designed such that a minimum cleansing velocity of 2 feet per second (0.6 meters per second) is maintained. The maximum velocity in any forcemain shall not exceed 8 feet per second (2.4 meter per second). Regardless of the above conditions, piping less than 4 inches (100 mm) in diameter is not acceptable, unless otherwise approved by the Engineer.

Minimum/Maximum Depth

Forcemains shall have a minimum cover of 5 feet (1.5 meters) and a maximum cover of 8 feet (2.4 meters). The depth of cover shall be measured from the design grade at finished surface to the crown of the pipe line.

Slope Forcemains shall be installed at uniform slopes to minimize accumulation of air and wastewater gases. Under no circumstance, shall any forcemain be installed at zero slope.

Location Forcemains shall not be located in a common trench with a water main and the soil between them shall be undisturbed. Forcemains crossing water mains shall be laid to provide a minimum vertical distance of 1.5 feet (450 mm) between the outside of the forcemain and the outside of the water main. The water main shall be above the forcemain. At crossings, one full length of water pipe shall be located so both joints will be as far from the forcemain as possible. Special structural support for the water main and forcemain may be required.

Termination Forcemains shall terminate at a manhole on the gravity sewer system, and at a point not more than 2 feet (0.6 meters) above the flow line of the receiving manhole. A 45 degree bend may be utilized to direct the flow downward.

Valves Where high points in the forcemain profile can not be avoided, automatic air relief and vacuum valves shall be installed in a manhole to prevent air locks in the pipe. Air relief valves may be required at other locations along the profile if, in the opinion of the Engineer, there is a potential for accumulation of air and gases at such other points. Blow-offs (drains), housed in manholes, shall be provided at all low points in the forcemain system as directed by the Engineer.

Air Relief & Vacuum Valves

Heavy duty type cast iron body valves with bronze trim and combination of small orifice and large orifices shall be used. Small orifice size shall be 3.2 mm. Valves shall be suitable for operation at 150 psi (1 MPa) working pressure and shall have flanged ends.

Operation shall be through independent floating stainless steel buoy balls located in both orifices.

Orifices shall be capable of expelling air at a high rate during filling and at a low rate during operation and shall admit air while draining the pipeline. Seats shall be replaceable.

Valves shall have no moving parts except for stainless steel balls which shall remain in the throat area discharging air without blowing shut or collapsing the balls.

Valves shall not leak in the closed position when pipe is being filled.

Changes in Direction

Any change in direction which is in excess of the pipe joint deflection tolerance will require a suitable fitting as approved by the Engineer. Thrust blocks shall be provided at any change of direction and shall be designed considering the operating pressure, surge pressure, peak flow velocity and in-situ material which the thrust block bears against. Thrust blocks shall be constructed of "ready mix" concrete and shall have a minimum 28 day compressive strength of 3000 psi (20 MPa). In the case of vertical bends, the thrust block shall be located below the fitting and shall be connected to the forcemain through the use of stainless steel tie rods securely embedded in concrete. The use of restrained joints is not permitted unless used in conjunction with a thrust block and of a design acceptable to the Engineer.

Pipe Installation

Repairs to pipe after installation will only be accepted if carried out in accordance with the manufacturer's recommendations and shall be re-tested in accordance with this section.

3.5 INSTALLATION

General Installation shall be in accordance with the NSRBA/ NSCEA Standard Specification for Municipal Services.

3.6 INSPECTIONS & TESTING

General Sewers and forcemains shall be tested in accordance with the requirements of the Nova Scotia Department of the Environment. The Engineer shall be notified at least 24 hours in advance of all proposed tests, and tests shall be performed in the presence of the Engineer, or his representative, and a representative of the Town.

Manholes Manholes, catch basins, and valve chambers will be inspected by the Town at the completion of construction and again prior to the end of the maintenance period.

All manholes shall be tested for leakage using either a hydrostatic or air vacuum method.

Any part of the system failing the above tests or found deficient shall be repaired, retested and inspected to the satisfaction of the Engineer.

Deflection Testing Sewers shall be tested for deflection after trenches are backfilled and compacted.

*Leakage
Testing*

In accordance with the NSCEA/NSRBA Municipal Services Specification.

*Video
Inspection*

Closed Circuit Television Inspections shall be carried out at the following times:

- (a) At completion of construction and prior to subdivision endorsement of acceptance of the work by the Town.
- (b) Two months prior to the end of the twelve maintenance period.

A colour camera shall be used for Television Inspections and full colour VHS format video tape records shall be provided.

4.1 SCOPE

This section specifies the requirements for a central water distribution system. A water distribution system consists of water mains, laterals and appurtenances, including pumping stations, pressure control facilities and reservoirs, which is designed to convey and distribute an adequate supply of potable water for domestic consumption and fire protection.

References The following reference standards and organizations are supplementary to these specifications:

- "Water Supply For Public Fire Protection" prepared by the Fire Underwriters Survey-Insurer's Advisory Organization (IAO)
- National Fire Protection Association (NFPA)
- American Water Works Association (AWWA)
- Canadian Standards Association (CSA)
- National Building Code (NBC)
- Canadian Plumbing Code (CPC)
- Underwriters Laboratories of Canada (ULC)

NSDOE Water distribution systems shall conform also to any requirements established by the Nova Scotia Department of the Environment. No system shall be constructed until the design has been approved by the Engineer and by the Nova Scotia Department of the Environment.

Quality Assurance

Water quality is monitored and maintained by the Town, and the system shall be designed such that the quality is maintained and water is distributed to the customers at an adequate pressure to supply their needs.

4.2 DESIGN CRITERIA

Demand The following domestic demand rates shall be used for water distribution systems design:

- (a) Average daily demand: 80 Imperial Gallons per capita per day (364 liters per capita per day).
- (b) Maximum daily demand: 200 Imperial Gallons per capita per day (909 liters per capita per day).
- (c) Maximum hourly demand: 320 Imperial Gallons per capita per day (1456 liters per capita per day).

Fire flow demand shall be established in accordance with the latest edition of Fire Underwriter's Survey publication, "Water Supply for Public Fire Protection: A Guide to Recommended Practice".

Water distribution systems shall be designed to supply fire flow demand plus maximum daily demand, or the maximum hourly demand, whichever is greater, unless otherwise approved by the Engineer.

Design Population

Water distribution systems shall be designed based upon appropriate population projections. The design population and assumed domestic demand shall be clearly stated in the calculations submitted for review and approval.

Hydraulic Analysis

Hydraulic analysis of the distribution system shall be carried out by the design engineer; the Engineer will provide the design engineer with the hydraulic grade line at the point of supply to be used for the design analysis.

The hydraulic analysis of the distribution system shall be based upon the Hazen-Williams Formula or an appropriate nomograph, using a pipe friction factor of $C=120$ for PVC pipe and $C=100$ for ductile iron pipe.

Water distribution systems shall be designed and sized such that a minimum residual pressure of 20 psi (150 kPa) is maintained at all points in the water distribution system during a fire flow condition. The system shall be designed to maintain a minimum residual pressure of 40 psi (275 kPa) during maximum hourly demand conditions.

The Engineer reserves the right to request flow and other engineering calculations prior to granting approval to install a water system.

Limiting Velocities

The water main shall be sized such that the maximum velocity in the pipe shall not exceed 5 feet per second (1.5 meters per second) during maximum hourly domestic flow conditions or 8 feet per second (2.4 meters per second) during fire flow conditions.

Minimum Pipe Size

The water distribution system shall be sized as outlined in the above clauses. However, in no instance shall the main be smaller than 8 inches (200 mm) in diameter for dead-end lines in excess of 300 feet (90 meters) in length.

Oversizing Oversizing of water mains to accommodate the water supply requirements of future off-site development may be required as instructed by the Engineer.

4.3 WATER MAIN

Looping Water distribution systems shall be designed to provide looping of water mains where permitted by road or easement layout.

Type of Pipe Pipe shall be: Ductile Iron pipe Class 350 conforming to AWWA C151, cement mortar lined to AWWA C104; or Polyvinyl Chloride (PVC) conforming to AWWA C900, DR18.

Fittings shall be gray iron or ductile iron conforming to AWWA C110, cement mortar lined to AWWA C104, with a minimum working pressure rating of 1035 kPa (150 psi).

Ductile iron pipe joints shall be mechanical or push-on conforming to AWWA C111; or flanged where indicated conforming to AWWA C110 with Class 125 flanged ends conforming to ANSI B16.1.

Mechanical joint restraints for ductile iron pipe up to 16 in. (400 mm) shall consist of ductile iron follower gland conforming to AWWA C153 and AWWA C111, with multiple wedge restraining mechanism, minimum working pressure rating of 350 psi (2410 kPa), and twist off lugs with a minimum factor of safety of 2:1. Joint restraints for pipe larger than 16 in shall be as approved by the Town.

Minimum/Maximum Cover

All water mains shall be designed with a minimum cover of 5 feet (1.5 meters).

In no situation shall the depth of cover over the water main exceed 8 feet (2.4 meters). The depth of cover shall be measured from the design grade at finished surface to the crown of the pipe line.

Location

Waterlines installed in the same trench as sewer lines shall be installed to one side on a shelf of undisturbed earth, and a horizontal and vertical separation of at least 12 in. (300 mm) shall be maintained between the crown of the sewer line and the bottom of the water line. If the vertical separation cannot be maintained, the two lines shall be installed in separate trenches with a minimum horizontal separation 10 feet (3 m).

Under no circumstances shall a water main be installed in the same trench as a sewer forcemain. Water mains and sewer forcemains shall be installed with a minimum horizontal separation of 10 feet (3 m), maintaining undisturbed soil between the trenches.

All water main and appurtenances shall be located within a street owned either by the Town or the Nova Scotia Department of Transportation and Public Works or within an easement, of minimum 20 foot (6 meter) width, granted in favor of the Town. Depending on the length and location of the easement, the Engineer may require a travel way to be provided within the easement for access and maintenance purposes. Water mains shall be installed as close as possible to the centerline of the easement.

Where a need for water mains to accommodate future development on adjacent lands is identified, easements shall be provided from the edge of the street right-of-way to the property boundary of the subdivision.

Changes in Direction

Any change in direction which is in excess of the pipe joint deflection tolerance shall require a suitable fitting as approved by the Engineer. Thrust blocks shall be provided at any change in direction and shall be designed considering the operating pressure, surge pressure, peak flow velocity and in-situ material which the thrust block bears against. Thrust blocks shall be constructed of "ready mix" concrete and shall have a minimum 28 day compressive strength of 3000 psi (20 Mpa).

In the case of vertical bends, the thrust block shall be located below the fitting and shall be connected to the water main through the use of stainless steel tie rods securely embedded in the concrete. The use of restrained joints is not permitted unless used in conjunction with a thrust block and of a design acceptable to the Engineer.

Polyethylene Encasement

Encasement, when required by the Engineer, shall be 200 micron polyethylene tube or sheet conforming AWWA C105.

Trench Drainage Relief System

The designer shall assess the possible change in groundwater movement caused by the use of pervious bedding material and shall be responsible for the design of corrective measures to prevent flooding as a result of this groundwater movement. Water mains installed in a single trench or in areas where sanitary sewer and/or storm sewer mains are not installed shall require a "Trench Drainage Relief System" to lower the hydraulic grade line of the groundwater in

the trench below the invert of the water main.

4.4 SERVICE LATERALS

Number All water distribution system laterals from the main line to the property line shall be provided by the developer or the property owner. A single service lateral shall be installed to each existing lot or potential future lot which could be created under the zoning in effect at the time of installation of services except that duplex or semi-detached units lots may be serviced by a common service lateral from the main to the street line with individual curb stops for the two units at the street line.

Location Where possible, service laterals shall not be installed in private driveways, parking areas, or other traveled areas.

Pipe Material and Size Service lateral pipe shall be either of the following materials:

- Copper tubing conforming to ASTM B88, Type K annealed, minimum working pressure of 150 psi (1035 kPa).
- Polyethylene tubing conforming to CSA B137.10-M, type PE, Series 160.

All water service pipe between the corporation stop and curb stop shall be a minimum of 3/4 inch (19 mm) in diameter.

A single pipe designed to service duplex or semi-detached units shall be 1 inch (25 mm) diameter minimum; the individual service pipes from the curb stop to the buildings shall have a minimum inside diameter of 0.75 in. (19 mm).

Where service laterals from the curb stop to the serviced building may exceed 200 feet (55 meters) in length, 1 inch (25 mm) diameter minimum service pipe shall be installed.

Service Fittings

Corporation and curb stops shall be brass conforming to ASTM B 62 with compression type joints. Threads on corporation stops shall conform to AWWA C800. All service connections on PVC mains shall include a service clamp (saddle) with bronze body, confined "o"-ring seal cemented in place, stainless steel straps suited for the main size, and outlet threads conforming to AWWA C800.

Service connection joints shall be compression type, with a minimum pressure rating of 150 psi (1035 kPa). For polyethylene tubing, joints shall conform to CSA B137.1-M with stainless steel liners.

For services which are longer than 66 feet (20 meters), the number of compression couplings used shall be kept to a minimum. Compression couplings shall not be used within 5 feet (1.5 meters) of the foundation of any serviced building.

Service boxes shall be adjustable with cast iron bottom section, cast iron lid with recessed nut, and internal stem to suit the depth of bury.

Minimum Cover All service laterals shall be installed with a minimum cover of 1.5 meters (5 feet).

4.5 VALVES

<i>General</i>	All connections to an existing water system shall be valved so that the system can be isolated by the valve at the start of the extension. The connection to the existing water system shall be coordinated through the Engineer.
<i>Type</i>	<p>Valves on water mains 12 in (300 mm) and smaller shall be mechanical joint gate valves conforming to AWWA C509, minimum working pressure rating of 200 psi (1380 kPa), with cast iron body and resilient rubber seat. Cast iron adjustable height valve boxes shall be provided on all valves 12 in. (300 mm) and smaller.</p> <p>Valves larger than 12 in (300 mm) shall be: gate valves conforming to AWWA C500, minimum working pressure rating of 150 psi (1035) kPa, with cast iron body and bronze mounted mechanism; or butterfly valves conforming to AWWA C504, Class 150B, minimum pressure rating of 150 psi (1035 kPa), with cast iron body and mechanical joint ends. Valves larger than 12 in (300 mm) shall be installed in precast or cast-in-place valve chambers.</p> <p>All meter chambers, air release chambers, and other special works shall be as approved by the Engineer.</p>
<i>Connections to Existing Mains</i>	Tapping sleeves and valves shall be provided for connections to existing water mains where required by the Engineer.
<i>Valve Locations</i>	<p>Valves shall be provided on the water mains at the following locations:</p> <ul style="list-style-type: none">(a) where required to adequately isolate sections of the water system as determined by the Engineer.(b) On each leg of cross or tee junctions(c) At intervals of 1320 feet (400 meters) on water main sections where there are no junctions.(d) At the edge of right-of-way for all domestic and sprinkler services

4.6 BACKFLOW PREVENTION DEVICES

Where Required

Backflow prevention devices shall be provided on new services if there is a risk of contamination of the potable water supply. Premises which require backflow prevention devices include, but are not limited to, the following:

- Industrial, commercial and institutional buildings;
- Apartment buildings larger than four units;
- Sprinkler service lines.

Location

Backflow prevention devices shall be installed downstream of water meters. A water distribution connection will not be permitted between a water meter and a backflow prevention device.

Where a meter by-pass is required, a backflow prevention device shall be installed on the main service line and on the by-pass line.

Products

Backflow prevention devices shall conform to CSA B64-M88.

4.7 FIRE HYDRANTS*Spacing/Location*

Fire hydrants shall be spaced in accordance with the publication "Water Supply for Public Protection". In no case shall the spacing exceed 500 feet (150 meters). The following are desirable hydrant locations:

- a. At high points on the water main profile unless an automatic air release valve is required at that location.
- b. At low points on the water main profile.
- c. At road intersections
- d. Near the middle of long blocks.
- e. At the end of dead-end streets or cul-de-sacs greater than 90 meters (300 feet) in length.

Fire hydrant laterals shall have a minimum diameter of 6 inches (150 mm) and shall be provided with a gate valve between the hydrant and the tee from the main. The depth of bury of hydrant laterals shall be 5 feet (1.5 meters).

Hydrants shall be provided with adequate drains to prevent freezing.

Fire hydrants shall be dry barrel type, conforming to AWWA C502 and shall be two piece with safety break-away flange and stem. The safety flange shall be installed above the ground but it shall be no higher than 6 inches (150 mm) above finished grade.

Hydrants shall have two one-half (2.5) inch hose nozzles and one standard pumper nozzle with an outside diameter of four and fifteen sixteenths (4-15/16) inches.

4.8 INSULATION

Insulation shall be placed where, due to special circumstances, the depth of bury is less than 5 feet. Insulation shall conform to CAN/CGSB 51.20M, type 4, expanded polystyrene.

Insulation of a main shall consist of insulation over the top of the pipe, with clean dry sand filling the annular space between the pipe and insulation.

4.9 PUMPING AND STORAGE FACILITIES

Differences in ground elevations or distance from the source of supply, may require that the water system pressure be boosted in certain areas to provide adequate pressure and flows to meet domestic and/or fire flow requirements.

To accomplish this, a pumping station may be required to service a specific and defined area of a water distribution system which is generally isolated from the remainder of the system. All pumps and pump houses shall meet the requirements set by the Engineer.

Water pumping and storage facilities shall be designed in consultation with the Engineer.

4.10 INSTALLATION

General Installation shall be in accordance with the NSRBA/ NSCEA Standard Specification for Municipal Services.

4.11 INSPECTIONS AND TESTING

Valve Operation Existing valves, not part of new construction, shall be operated only by the Town.

Notice The Town shall be notified 24 hours in advance of all filling, flushing, or chlorination operations for new construction.

Requirements Testing shall be carried out with the following additional requirements:

- (a) All services, hydrants, mains, and other appurtenances shall be included in the system test.
- (b) Testing shall be performed in presence of the Engineer, or his representative, and a representative of the Town. Test results shall be sealed and submitted by a Professional Engineer registered or licensed to practice in Nova Scotia.
- (c) All water used for pipe testing shall be the responsibility of the contractor and shall be chlorinated potable water.

Hydrostatic Pressure Test

Mains and services shall be flushed before testing. The duration of each hydrostatic pressure test shall be at least (2) hours, and the pressure shall be maintained at a minimum of 200 psi (1380)kPa throughout the test period.

Pressure gauges shall be liquid filled type, minimum 100 mm (4 inch) face diameter, graduated in psi, accuracy 3% at maximum reading.

There shall be no leakage or drop in pressure for the duration of the test.

The test must be conducted with all proposed service laterals installed to the property line.

Should any section of the pipe exhibit leakage, the contractor shall, at his own expense, locate and repair the defects, and re-test the section.

Disinfection All water mains shall be chlorinated in accordance with AWWA C651.

Chlorination of any water system may proceed only after the system has been successfully pressure tested, with the test witnessed by a Town representative.

All water mains shall be flushed before and after chlorination. Dechlorination of the water mains shall be the responsibility of the contractor. Dechlorination procedures shall satisfy the requirements of the Nova Scotia Department of Environment and the Town.

After chlorination and dechlorination are complete, water samples shall be delivered to the Nova Scotia Department of the Environment for bacteriological testing. Chlorination shall be repeated if necessary.

Bacteriological test results shall be forwarded to the Engineer.

5.1 GENERAL

A drainage system receiving, carrying and controlling discharges on response to rain and snow which includes overland flow, sub-surface flow, groundwater flow and snow melt. A storm drainage system may consist of ditches, culverts, swales, subsurface interceptor drains, roadways, curb and gutters, catch basins, manholes, pipes or conduits, retention ponds, lateral lines to the lots from pipes or conduits to street lines, watercourses, floodplains, canals, ravines, gullies, springs and creeks.

The design criteria contained in this section are included to illustrate the more common aspects encountered in the design of storm drainage systems. Any storm drainage system within the Town shall be designed to achieve the following objectives:

- to prevent loss of life and to protect structures and property from damage due to a major storm event;
- to provide safe and convenient use of streets, lot areas and other land during and following rain and snow events;
- to adequately convey stormwater flow from upstream sources;
- to mitigate the adverse effects of stormwater flow, such as flooding and erosion, on downstream properties;
- to preserve natural water courses;
- to minimize the long term effect of development on receiving watercourses and on groundwater.

In the Town such storm drainage systems are typically owned, operated and/or maintained by either the Town, TPW, DOE, private landowners, or a combination of any of these groups.

All storm drainage systems shall conform to any requirements established by DOE. No system shall be constructed until the design has been approved by the Engineer and by DOE.

5.2 DESIGN APPROACH**5.2.1 MINOR DRAINAGE SYSTEM**

The minor drainage system is the system which is used for initial stormwater flows, or for flows generated in high-frequency rainfalls. The minor drainage system shall be designed to provide safe and convenient use of streets and properties, to minimize street maintenance costs and to provide convenience to the public. Where a piped system is required, all pipes within the system shall be designed to carry the runoff from the minor storm without surcharge.

5.2.2 MAJOR DRAINAGE SYSTEM

The major drainage system is the path which stormwater will follow during a major storm, when the capacity of the minor drainage system is exceeded. The minor and major drainage systems together shall be capable of carrying the runoff from the major storm. Systems shall be designed to control the flow of stormwater in a major storm so as to prevent basement flooding and damage to property, streets and structures. Easements may be required for the identification and protection of certain elements of the major drainage system.

5.2.3 DOWNSTREAM EFFECTS OF STORM WATER CONTROL FACILITIES

The downstream storm system shall have the capacity to convey discharge from its fully developed watershed. Mitigative measures may be required to the downstream system to reduce adverse impacts.

If an investigation determines that a storage facility is required, it shall be appropriately designed. The design shall address factors such as watercourse protection, erosion and sediment control, impact on adjacent property, maintenance requirements, public safety, access, liability and nuisance. Storage facilities shall be planned and designed to encompass larger facilities rather than facilities serving larger properties.

Storage facilities shall be designed to control the peak runoff conditions for storm events with different return frequencies including the major storm.

5.2.4 DESIGN PARAMETERS**5.2.4.1 Basis of Design**

The storm system shall be designed for flows from all lands within the watershed in which the system is situated, and lands anticipated being tributary to the watershed, either by future development or regrading.

5.2.4.2 Design Flow

The design is to be based on the larger of winter or annual flow. Submit calculations and size storm sewers as follows:

- I) ordinary residential, commercial, or industrial land use: annual (year-round) rainfall data.
- II) where the duration is greater than six hours: winter precipitation and ice/snow melt data.
- III) where the design area includes a significant proportion of undeveloped land: annual and winter data.

5.2.4.3 Downstream Effects

The downstream storm system shall have the capacity to convey discharge from the fully developed watershed.

5.2.5 DESIGN STORM FREQUENCIES

The following frequencies shall be used for design of storm drainage systems in the Municipality:

- I) Piped systems and road driveway culverts: minor storm.
- II) The combined capacity of the major drainage system and the minor drainage system: major storm
- III) The design capacity of watercourses (including the floodplain), culverts for watercourse, drainage systems where a minor drainage system is not provided, and roadside ditches: major storm
- IV) Driveway and road culverts; 1:10 year storm.

5.3 METEOROLOGIC DATA

Acceptable rainfall data to be used to calculate runoff flows are as follows:

- intensity-duration-frequency curves - most current information from the Atmospheric Environment Service for area closest to project.
- synthetic design storms - hyetograph of the Chicago type distribution with: $r=0.5$, 2 and 24 hour storm duration; intervals of 5 minutes and 1 hour for the 2 hour and 24 hour storm durations.
- historical design storms - historical flood records or from runoff simulations for historical storms (required to verify the performance of storage facilities and major structures.)

5.4 RUNOFF METHODOLOGY

The designer must determine the best runoff calculation method to be used. The designer must also calibrate and verify for local conditions. The designer shall provide for future reference the reason why a certain method is selected. The Engineer may request that a second method be used as verification or checking of the results.

The Rational Method may be used for drainage areas less than 20 hectares and for the preliminary design of Storm Drainage Systems servicing larger areas.

Generally, the Rational Method shall not be used for the design of storage facilities, except that the modified Rational Method may be used for the design of storage facilities for highly impervious areas, and shall use the graphical hydrograph method.

5.5 STORM DRAINAGE REPORT

A storm drainage report shall be prepared and included as part of the submission for any land development to deal with storm water and drainage issues related to the development. The report shall include site engineering analysis to a level consistent with the size of the development, its location within the drainage basin, and the sensitivity of the area's drainage system. The report shall include details of the safety implications of the proposed system, and an examination of the potential for erosion in the downstream receiving streams due to increased peak and total flows and flow velocities as a result of the development.

The storm drainage report shall also include drainage plans and detailed runoff calculations. The calculations shall include input information showing sub-watersheds, rainfall abstraction, antecedent moisture conditions and schematization of the system for pre and post development and all stormwater management alternatives; and output information which shows the main step of the calculations and the peak discharge at key points in the system.

The drainage plans shall show the location of the proposed development within the topographic drainage area, the drainage area tributary to the proposed and existing storm drainage system(s), boundaries of all drainage sub-areas, contours at intervals not exceeding 2 m, site layout including proposed streets and lots, locations of proposed storm drainage system(s) and stormwater management facilities, location of outfalls or connections into existing services, hydrologic and hydraulic data table and any other information required by the Engineer.

TABLE 1
RECOMMENDED COEFFICIENT OF RUNOFF VALUES FOR VARIOUS
SELECTED LAND USES

<u>Description of Area</u>	<u>Runoff Coefficients</u>
Business	
Downtown	0.75 to 0.95
Neighborhood	0.50 to 0.70
Residential	
Single-family	0.30 to 0.50
Multi-units, detached	0.40 to 0.60
Multi-units, attached	0.60 to 0.75
Suburban	0.25 to 0.40
Residential (1/2 acre lots or more)	0.25 to 0.40
Apartment dwelling areas	0.50 to 0.70
Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Parks, Cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.40
Railroad yard	0.20 to 0.40
Unimproved	0.10 to 0.30

It is often desirable to develop a composite runoff coefficient based on the percentage of different types of surfaces in the drainage area. This procedure is often applied to typical "sample" blocks as a guide to selection of reasonable values of the coefficient for an entire area. Coefficients with respect to surface type, currently in use are:

<u>Character of Surface</u>	<u>Runoff Coefficients</u>
Street	
Asphalt	0.70 to 0.95
Concrete	0.80 to 0.95
Drives and walks	0.75 to 0.85
Roofs	0.75 to 0.95
Lawns, sandy soil	
Flat, 2%	0.05 to 0.10
Average, 2 to 7%	0.10 to 0.15
Steep, 7%	0.15 to 0.20
Lawns, heavy soil	
Flat, 2%	0.13 to 0.17
Average, 2 to 7%	0.18 to 0.22
Steep, 7%	0.25 to 0.35

The coefficients in these two tabulations are applicable for storms of 5 to 10 year frequencies. Less frequent, higher intensity storms will require the use of higher coefficients because infiltration and other losses have proportionally smaller effect on runoff.

Winter Runoff Coefficient 0.80
 (All areas and surfaces with summer coefficients less than or equal to 0.80)

Source: Hydrology, Federal Highway Administration, HEC No. 19, 1984.

5.6 LOCATION

No storm drainage shall be carried on, through, or over an approved residential lot within a subdivision. All storm drainage shall be carried by either an unconfined natural watercourse, excavated ditch, or storm sewer.

All excavated ditches and storm sewers within a subdivision shall be located either within a right of way or on an easement in favor of the Town. The minimum width of an easement is 20 ft (6.1 m).

Where subdivision storm drainage flows onto abutting land other than through a natural watercourse, a right of way or easement in favor of the Town shall be provided.

Where a need is identified by the Engineer to accommodate future upstream development, and where no future road reserve is available, a drainage right of way or an easement in favor of the Town shall be provided.

Natural watercourses shall not be carried in roadside ditches or piped roadside storm drainage systems.

Discharge to Adjacent Properties:

All storm drainage shall be self contained within the subdivision boundaries, except natural run-off from undeveloped areas.

All run-off from the developed limits of a subdivision must be directed to either a natural watercourse or storm drainage system owned by the Town or the Nova Scotia Department of Transportation and Public Works.

Discharge of run-off to adjacent properties other than in a natural watercourse is prohibited unless the developer obtains consent in writing from the adjacent property owner(s), and drainage easements over such natural property are provided in favor of the Town.

5.7 SYSTEM COMPONENTS

Buried Storm Drainage Systems

Velocity

The minimum design velocity for storm sewers shall be 2 fps (0.6 m/s). Consideration shall be given to initial minimum cleansing velocity for phased development.

The maximum design velocity for storm sewers shall be 15 fps (4.5 m/s) for pipes up to and including 30" (750 mm) in diameter. The maximum design velocity for storm sewer pipes greater than 30" (750 mm) in diameter shall be 20 fps (6 m/s).

Pipe Size

The minimum diameter for a storm sewer main shall be 12" (300 mm).

The minimum diameter for a catch basin lead shall be 10" (250 mm).

Pipe sizes shall not decrease in the downstream direction unless approved by the Engineer.

Depth

The minimum depth for a storm sewer main located within the road right of way is 4 ft (1.2 m).

The minimum depth for storm laterals at the property line is 4 ft (1.2 m).

Manholes

Manholes shall be installed at all changes in grade or alignment, at all intersections and at intervals not exceeding 400 feet (120 meters).

The minimum internal diameter of a manhole shall be 42 inches (1050 mm).

Service Laterals

All laterals from the storm sewer main to the property line shall be provided by the developer or owner and shall have a minimum grade of 2 percent.

Catch Basins

Catch basins shall be installed at the curb of the street and shall be adequately spaced to prevent ponding on the street and to prevent water from entering on or flowing in the travel lanes during storm events corresponding to the design of the Minor Drainage System. In no case shall the spacing of the catch basins exceed 330 feet (100 meters).

Catch basin leads shall be connected to a storm drainage main at a manhole.

Inlets

Vertical grates shall be installed at inlets.

Outfalls

The design of outfalls shall take into consideration such factors as public safety, erosion control, appearance, etc. Horizontal grates shall be installed at outfalls.

Ditches/Open Channel Drainage System

Roadway ditches shall conform to the standard cross section for local subdivision roads and shall have adequate capacity for the 1 in 100 years storm.

Velocity

To prevent erosion, the maximum velocity during a 1 in 100 year storm event in ditches or open channels shall not exceed the values given in Table 2.

Culverts

The size of culverts (including driveway culverts) shall generally be as shown on the approved engineering drawings. The minimum size for any other culvert shall be 18".

The minimum depth of bury for any driveway culvert is 12" (300 mm). The minimum depth of bury for any other culvert is 20" (500 mm).

Culverts other than driveway culverts shall be designed for the 1 in 100 year peak flow with a headwater depth not greater than the diameter of the pipe.

Driveway culverts generally do not require grating. Storm sewer outfalls, and culverts greater than 50 feet (15 m) require inlet and outlet grating.

All culverts shall be reinforced concrete pipe to ASTM C76-M or CAN/CSA A257.2.

Minor Drainage System Connections

Roof Drains

Roof drains shall discharge on the ground surface and shall not be connected to a storm drainage system.

Foundation Drains

Where a buried storm drainage system exists, foundation drains will normally be connected to the main by laterals. The invert of the lateral at the property line must be at least 2 feet (610 mm) above the top of the main at the point of connection.

Where a buried storm drainage system does not exist, Section 9.14 of the National Building Code of Canada, latest revision, shall apply.

Under no circumstance shall foundation drains direct stormwater to the street surface, sidewalk or adjacent property.

TABLE 2
SUGGESTED MAXIMUM PERMISSIBLE MEAN
CHANNEL VELOCITIES
IN STRAIGHT, UNIFORM CHANNELS

<u>Channel</u>	<u>Mean Channel Velocity</u> <u>fps (metres per second)</u>
Fine sand	1.5 (0.46)
Coarse sand	2.5 (0.76)
Fine gravel	6.0 (1.83)
Earth	
Sandy silt	2.0 (0.61)
Silt clay	3.5 (1.07)
Clay	4.0 (1.22)
Grass-lined earth	
Bermuda grass	-sandy silt
	6.0 (1.83)
	-silt clay
	8.0 (2.44)
Kentucky Blue grass	-sandy silt
	5.0 (1.52)
	-silt clay
	7.0 (2.13)
Poor rock (usually sedimentary)	10.0 (3.05)
Soft sandstone	8.0 (2.44)
Soft shale	3.5 (1.07)
Good rock (usually igneous or hard metamorphic)	20.0 (6.10)

5.8 EROSION AND SEDIMENT CONTROL

An Erosion and Sediment control plan shall be provided in compliance with Provincial regulations, and a copy submitted to the Engineer. The plan shall address measures during construction of roads, services, and houses, as well as long term measures after the completion of development.

The Erosion and Sediment Control Plan, as well as control measures taken, shall comply with the Erosion and Sedimentation Control Handbook for Construction Sites, as prepared by the Nova Scotia Department of the Environment.

During construction, surface water flows across the construction site must be minimized. Exposed soils within ditches and on cut and fill slopes shall be permanently stabilized by hydroseeding or equivalent within two weeks after final grades are reached. Temporary stabilization measures such as application of straw or wood chips shall be used to prevent erosion of exposed soils during construction and prior to reaching finished grades. These measures are required to prevent downstream sedimentation of watercourses and within culverts.

Long term environmental protection measures to be addressed in the subdivision design may include but are not limited to:

- minimization of erosion and sediment transport
- protection of outfall areas
- utilization of wetland areas for filtration of stormwater run-off
- minimization of disruption to natural watercourses

6.1 SCOPE

This section specifies the requirements for all Municipal Public Highways within the Town of Mahone Bay.

A Municipal Public Highway consists of the wearing surface, road bed and all slopes, ditches, channels, waterways and structures necessary for proper drainage and protection, owned by the Town of Mahone Bay.

The design and location of all sewers, water mains, electrical, telephone and such utilities located within the right-of-way of the Public Highway shall be in accordance with the appropriate specification section(s) and must be approved by the Town Engineer prior to their construction.

With the exception of street cross section, the Engineer may consider variances to these specifications.

6.2 STREET CLASSIFICATION AND CHARACTERISTICS

Table 6.1 provides three classes of Public Highways applicable to development within the Town of Mahone Bay.

The subdivision bylaw(s) regulates the minimum lot sizes and development character. The lot size and the development character may dictate the appropriate road classification and characteristics. The following criteria shall be considered in determining which design and construction standard will apply to a particular development.

- In areas serviced with central sewers and with lot sizes less than 930 to 1110 Sq. M. (10,000 to 12,000 sq. ft), Public Highways shall be constructed to the urban standard.
- Public Highways for rural lots with on-site sewage disposal shall be constructed to the rural standard.
- A design brief prepared by the Developer's consultant shall be submitted addressing the design intent including rationalization of the selected road type and length. The design brief shall address issues such as capacity, parking and maintenance.
- The final decision on the street category and parking allowances rests with the Engineer.

6.3 DESIGN CRITERIA

General

This section covers the more common aspects for design and construction of Public Highways within the Town of Mahone Bay. In cases where this section needs to be expanded or additional specifications are required, the "Geometric Design Guide for Canadian Roads and Streets", the "Manual of Uniform Traffic Control Devices for Canada" in the latest edition as published by Transportation Association of Canada (TAC), and the Nova Scotia Motor Vehicle Act and Regulations shall be used.

Specific design criteria are listed in Table 6.1, the standard details and in the following clauses.

Design Speed

In accordance with Table 6.1

Typically a design speed of 30 to 50 km/hr, will be used for all Municipal Public Highways unless the intended use of the road requires a higher design speed as determined by the Municipal Engineer.

Right-of-Way

Typically the minimum right-of-way width is 66 feet (20 m) except in the case of a fully serviced subdivision with curb & gutters, where a width of not less than 50 feet (16 metres) may be accepted by the Engineer.

Any property susceptible to damage as a result of construction must be within the right-of-way. All slopes (in either cuts or fills), must be included within the right-of-way.

An exception to benching backslopes may be considered by the Municipal Engineer where a geotechnical report is provided supporting the proposal.

In all subdivision designs, an acceptable right-of-way access to adjacent property must be provided and deeded to the Town. The access roads must not be more than 1310 ft (400 m) apart. In addition, access roads will be located along the boundary of the subdivision for which approval is being sought in such a manner as too not prejudice development of adjacent land.

Where a roadway can be extended to service adjacent or future development, sufficient right-of-way shall be provided for the "Local" road standard.

Road Layout

Roads must be laid out where reasonably possible in prolongations of other roads, either in the same subdivision or in adjacent subdivisions. Road designs should recognize and incorporate natural features such as watercourses, wet areas, unique wildlife habitats, and rock outcrops.

Unless there are unique circumstances, the minimum length of a road considered for acceptance as a public highway is 500 ft (150 m).

Cul-de-sacs are not to be used when the land can be effectively serviced by other road layouts. All cul-de-sacs must end in a permanent or temporary turn around area as approved by the Engineer. The grade of the turning area shall not exceed 4%.

Boulevards will not be permitted in residential subdivisions.

Guard Rails are required on fills 10 ft (3 m) or greater (unless a slope of 6:1 can be provided) and in other hazardous areas. Refer to Standard Drawings for details of guardrail construction and location.

Signage installation including stop signs, street signs and all other required signs shall be the responsibility of the developer and shall be installed in accordance with the approved road design prior to conveyance of the road to the Town.

Intersections

Reference Table 6.1

Where Municipal Public Highways meet existing classes of provincial highways, the intersection must be approved by the Provincial Department of Transportation and Public Works.

All intersecting roads must intersect at an angle of 70 to 90 degrees for a minimum distance of 100 ft (30 m) from the intersection measured from the respective center lines.

Offset intersections will not be permitted.

The maximum of four streets will be permitted at an intersection.

Horizontal Alignment

Reference Table 6.1

Tangent distances between horizontal reverse curves shall not be less than 20 m.

Tangent distances between horizontal curves turning the same way shall not be less than 40 m.

Vertical Alignment

Reference Table 6.1

Grades at intersections shall not exceed 4% for at least 50 ft (15 m) measured from the shoulder of the intersecting road.

Local streets generally shall not be superelevated unless there are safety or drainage concerns.

Design Limits

Where streets are required to service future or adjacent property the design shall include sufficient detail to illustrate that the extension is compatible with adjacent topography and can be constructed in accordance with this specification.

Construction Limits

All road accesses to adjacent property must be constructed to the property lines.

Access

A maximum of 50 lots may receive final approval prior to a second access being provided.

Stopping Sight Distance

Reference Table 6.1

Minimum stopping and turning sight distances shall be as defined by the TAC Geometric Design Guide.

Bridges

Bridges are designed and constructed to Canadian Standards Association (CSA) specification "S6 Design of Highway Bridges";

Extension of Existing Public Highways

Where a proposed extension to an existing road increases traffic volumes, the Developer shall upgrade the existing road to a suitable standard.

6.4 INSPECTION AND TESTING

Notification

A preconstruction meeting is required before construction work begins on any Municipal Public Highway.

Inspections may be carried out at any time, however, inspection reports by the developer's engineer are required at the following stages:

- (1) After clearing and grubbing (pre-culvert and drains);
- (2) After completion of subgrade and installation of drainage structures and other buried services;
- (3) Prior to paving;
- (4) Prior to Town takeover of roads

Reporting

All results of laboratory and field density tests shall be submitted to the Engineer.

Subgrade

Subgrade material shall be placed and compacted to the specified minimum density attained using the "Control Strip" method. Additional guidance on the Control Strip method may be found in the DOT Standard Specification for Highway Construction and Maintenance (April 1996), Division 2, Earthworks.

At least one field density test shall be taken for every 500 ft (150 m) of roadway subgrade.

Soft Spots

All "soft spots" in the subgrade shall be removed to full depth and replaced with approved backfill.

Trenches

Pipe bedding, cover and backfill in trenches shall be to the depth and width indicated in the details. Field density tests shall be taken within a section of trench to determine level of effort required to achieve the specified compaction for each of the following.

1. Pipe bedding
2. Pipe cover material
3. Trench backfill excluding final 12 inches (300 mm) to subgrade; and
4. Final 12 inches (300 mm)

Compaction within trenches may proceed using the compactive effort determined for each of the above provided there is no change in materials, equipment or site conditions. Such a change will require re-determination of the compactive effort. Quality control testing of compaction within trenches shall be as required for site soil conditions or as directed by the Engineer.

Moisture content of subgrade and trench backfill materials must be controlled to obtain the specified compaction.

Gravels

At least one field density test shall be taken for every 100 ft (30 m) of roadway gravels for each gravel lift.

Asphalt Concrete

Prior to paving, the developer shall provide the Town with a letter signed by a Professional Engineer which states that the aggregates(s) and asphalt cement has been sampled and tested, and that the asphalt

concrete mix design meets the specification.

A minimum of one series of tests per day or for each 500 tonnes of asphalt concrete shall be performed. The series of tests shall include all of the following:

1. Marshall Stability, kN
2. Marshall Flow, x 0.25 mm
3. Voids in Mineral Aggregate (VMA), %
4. Air Voids, %
5. Asphalt Cement Content, %
6. Gradation of Extracted Aggregate

There shall be at least one field density test per day for each 500 tonnes (metric) of asphalt concrete placed. Each lift for every individual road shall have at least one field density test taken.

Curbing

At least one set (3) of concrete test cylinders (6 inch x 12 inch) shall be taken for every 328 ft (100 m) (linear) of curbing and tested for compressive strength at 7 days (1) and 28 days (2).

6.5 STREET CONSTRUCTION

Contract specifications shall be developed in conjunction with "Standard Specifications for Municipal Services" as published by the Nova Scotia Road Builders Association & Consulting Engineers of Nova Scotia Joint Committee on Contract Documents. The following specification shall take precedence where there is a conflict with the Standard Specification for Municipal Services.

Clearing and Grubbing

All grubbing materials under the road bed shall be removed. In no case shall grubbing material be buried in roadway fills.

The right-of-way shall be cleared to the outside edges of the ditch backslopes and as required for overhead utilities. All brush, trees and cuttings shall be disposed of in such a manner as to give a neat appearance to the cleared area, but in no circumstances are the cuttings to be disposed of in the roadway fills.

Roadway

Roadbeds shall be constructed including pavements in accordance with the Typical Cross Section.

Roadway culverts, underdrains, driveway culverts, and storm drainage systems where required, shall be provided and placed by the developer. The ends of all pipes shall be rip-rapped with 12 to 18-inch (300 - 450 mm) diameter flat stones. The right-of-way shall be left properly drained and should the work, as performed, create pockets of isolated water holes, this drainage condition shall be rectified.

Roadside ditches shall be constructed by the developer unless storm sewers are provided.

Culvert sizes shall be provided by the developer based on ditch flows. The minimum allowable culvert size shall be 16 inch (400 mm) diameter.

Topsoil, peat and other unsuitable materials under the roadbed must be removed prior to placing embankment material. Rock cuts will be excavated too at least 1 ft (300 mm) below the subgrade and backfilled with material satisfactory to the Engineer. Water pockets will not be left in the bottom of rock cuts. All backfill in cuts or embankment must be with graded material approved by the Engineer. The top 12 inches (300 mm) of subgrade must be free of rocks larger than 6 inches (150 mm) maximum dimension.

The Subgrade must be well-drained and compacted using the Control Strip method described in Section 6.7. Any unsuitable material including soft or yielding material shall be removed, replaced with suitable material, and compacted.

Characteristic	Minor Collector	Local - 50 km/hr	Low Volume - 30 km/h *
Traffic service & function	Traffic movement of equal importance with land access.	Land access first consideration, traffic movement second consideration.	Aesthetics first, land access second, traffic third
Maximum number of lots or dwelling units	N/A	N/A	30
Maximum street length	N/A	N/A	Permanent Cul-de-sac - 400 m Crescent - 800 m
Parking	Permitted	Permitted - one side	Not permitted
Average daily volume	Up to 3,000	Less than 1000	Less than 300
Average running speed	30 - 50 km/h	30-50 km/h	15-30 km/h
Vehicle types	All types with truck limits	Passenger and service vehicles, with limits on large vehicles,	Passenger and service vehicles
Design speed	50	50	30
Right-of-way widths - minimum	20 to 25	16 to 20	16 to 20
Min. Grade	1	1	1
Max. Grade	8	8 to 10	10
Min Centerline Radius	See TAC	100m	30
Min. Sight Distance	85	65	45
Typical Road cross section	As Per Municipal Engineer	See Detail nos. 3 & 5	See Detail nos. 2 & 4
Min. Centerline distance between intersections Same Sides Opposite Sides	150	75	75
	60	45	45
Min. K Factors	20	7	2
Sag	20	12	4
	10	7.5	7.5
Max. Cul-De-Sac Length	N/A	400	N/A

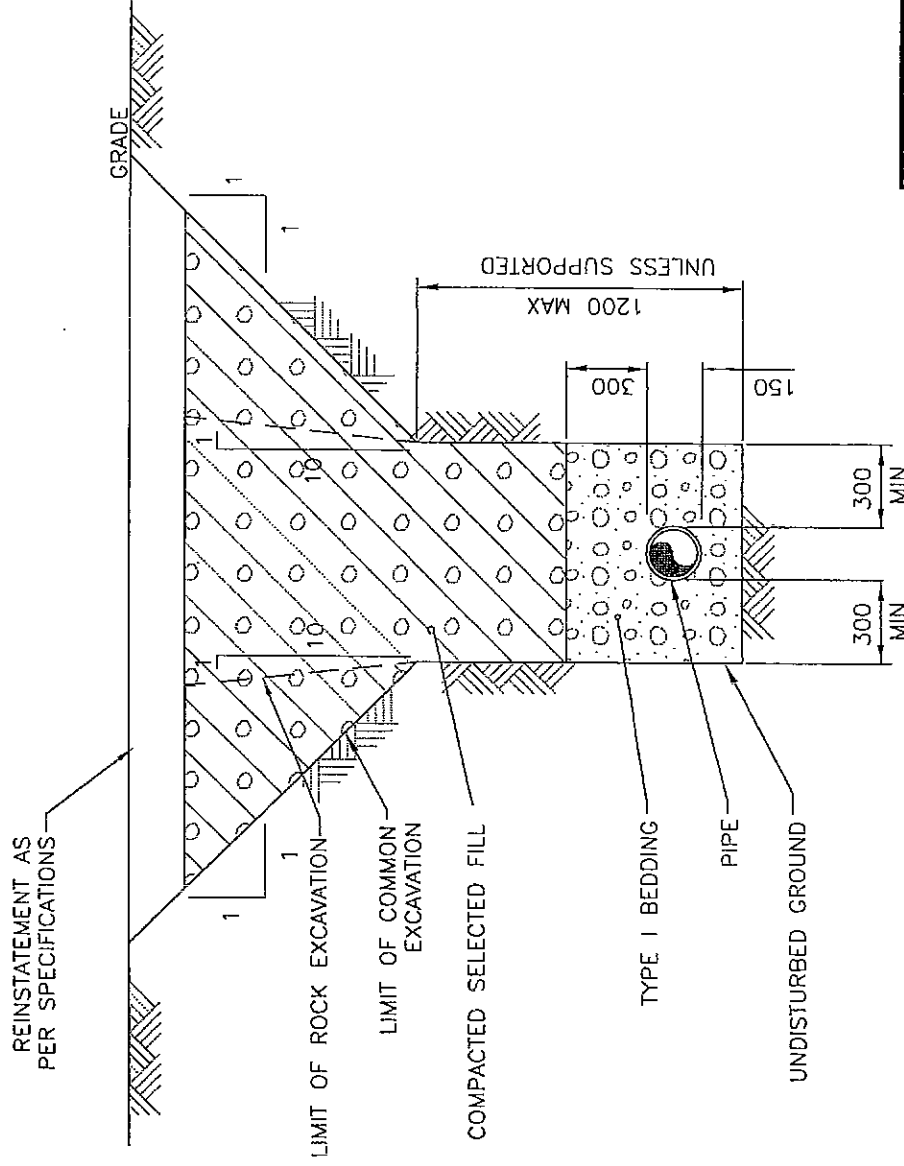
(*) Public Highways which connect to "Local" Public Highways, typically permanent cul-de-sacs and crescents with no opportunity for extension.

APPENDICES

- (A.1) Blasting shall be conducted in a manner which conforms to Municipal Bylaws and Provincial Regulations.
- (A.2) The contractor must provide evidence that a pre-blast survey, addressing all affected properties have been conducted by the contractor's insurers. The contractor shall also provide evidence of insurance in accordance with GC-20 of the Standard Specifications for Municipal Services. The policy shall be in the joint names of the Contractor and the Municipality and include a blasting endorsement.
- (A.3) The contractor shall employ a qualified blasting consultant to monitor blasting operations throughout the duration of the blasting.
- (A.4) Appropriate seismographic equipment shall be used for blast monitoring.
- (A.5) Permissible blasting tolerances:
 - a) peak particle velocity of less than 0.5 inches per second and;
 - b) air shock waves of less than 120 decibels.

These tolerance are the maximum permissible. Should blasting operations result in damage or disturbance to private property, the Contractor shall adjust operations to mitigate these effects. In addition the Town shall be notified of such damage or disturbance no later than 24 hours after the occurrence.
- (A.6) Drilling or blasting operations shall not be conducted between the hours of 8:00 o'clock in the forenoon and 6:00 o'clock in the afternoon (Monday-Friday inclusive).
- (A.7) A copy of all blasting data obtained from the site seismographic monitoring shall be submitted to the Town on a weekly basis.

STANDARD DETAIL DRAWINGS



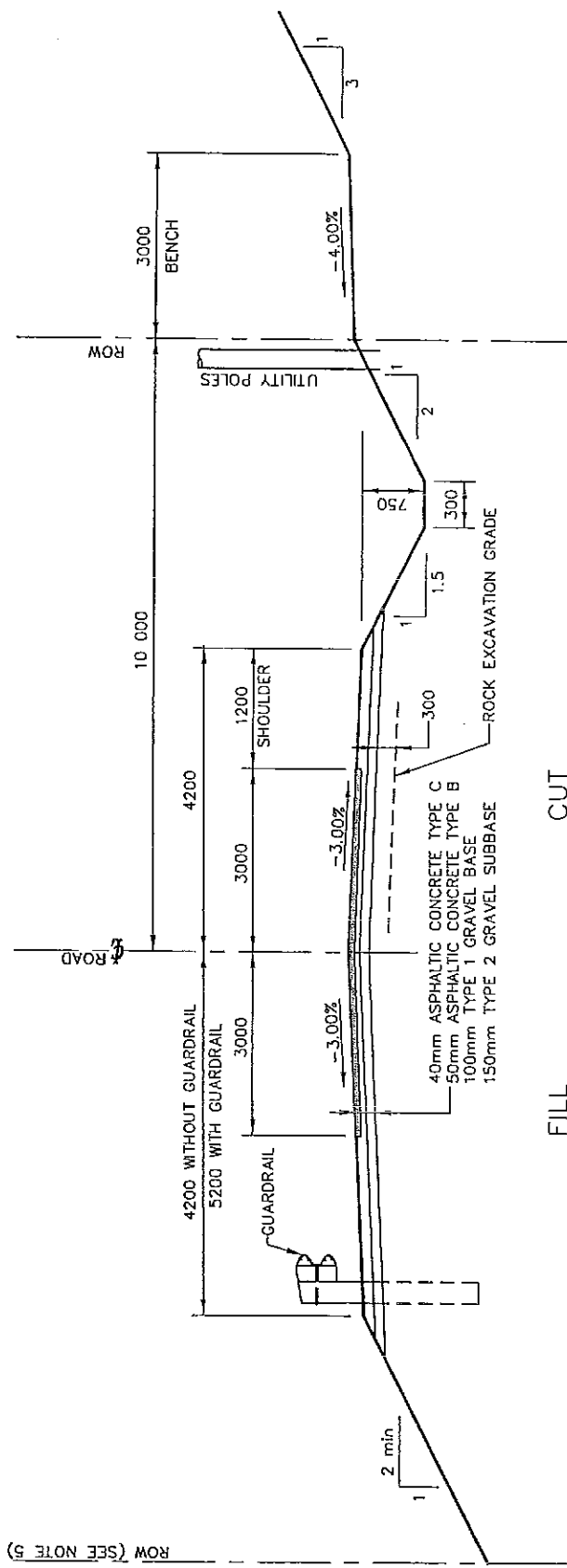
NOTE:

ALL DIMENSIONS ARE IN MILLIMETERS.

*Town of
Mahone Bay*

Typical Trench Detail

Approved: _____	Approved: _____
Municipal Engineer _____	Operations Manager _____
Dwg. No. 1	Not to Scale
	Drawn By: CTP



CUT

FILL

Notes:

- All dimensions are in millimeters.
- Provide 30m taper between 4200mm and 5200mm shoulders.
- Areas within ROW not asphalt or gravel to be hydroseeded.
- Provide rip-rap lining at all ditches susceptible to erosion. As a minimum, where ditch slopes exceed 5%, line with 150mm rip-rap.
- Right of way to include fill slopes and any drainage works.
- Side embankment slopes illustrated are minimums. More gentle slopes shall be required for less stable materials.
- Provide additional road bed and slope stabilization as required by Geotechnical Report.
- On sections where sidewalk may be required in the future, the shoulder width shall be increased by a minimum of 1000mm, or as otherwise required by the Engineer.
- Gravel and asphalt thicknesses are minimums measured after compaction to specified densities.

Town of
Mahone Bay

Typical Cross-section
Rural - Low Volume

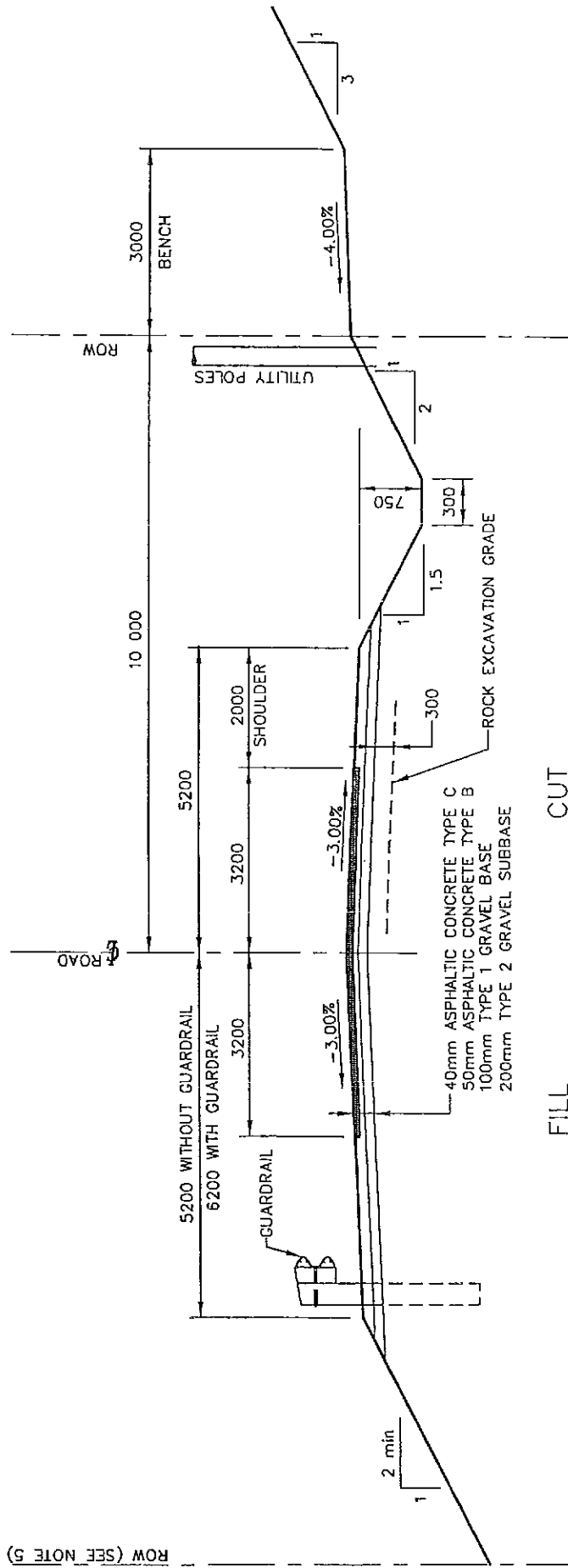
Approved: _____

Municipal Engineer _____ Operations Manager _____

Dwg. No. 2 Not to Scale

Drawn By: CTP

ROW (SEE NOTE 5)



FILL CUT

Notes:

1. All dimensions are in millimeters.
2. Provide 30m taper between 5200mm and 6200mm shoulders.
3. Areas within ROW not asphalt or gravel to be hydroseeded.
4. Provide rip-rap lining at all ditches susceptible to erosion. As a minimum, where ditch slopes exceed 5% line with 150mm rip-rap.
5. Right of way to include fill slopes and any drainage works.
6. Side embankment slopes illustrated are minimums. More gentle slopes shall be required for less stable materials.
7. Provide additional road bed and slope stabilization as required by Geotechnical Report.
8. On sections where sidewalk may be required in the future, the shoulder width shall be increased by a minimum of 1000mm, or as otherwise required by the Engineer.
9. Gravel and asphalt thicknesses are minimums measured after compaction to specified densities.

*Town of
Mahone Bay*

Typical Cross-section
Rural - Local 50 km/h

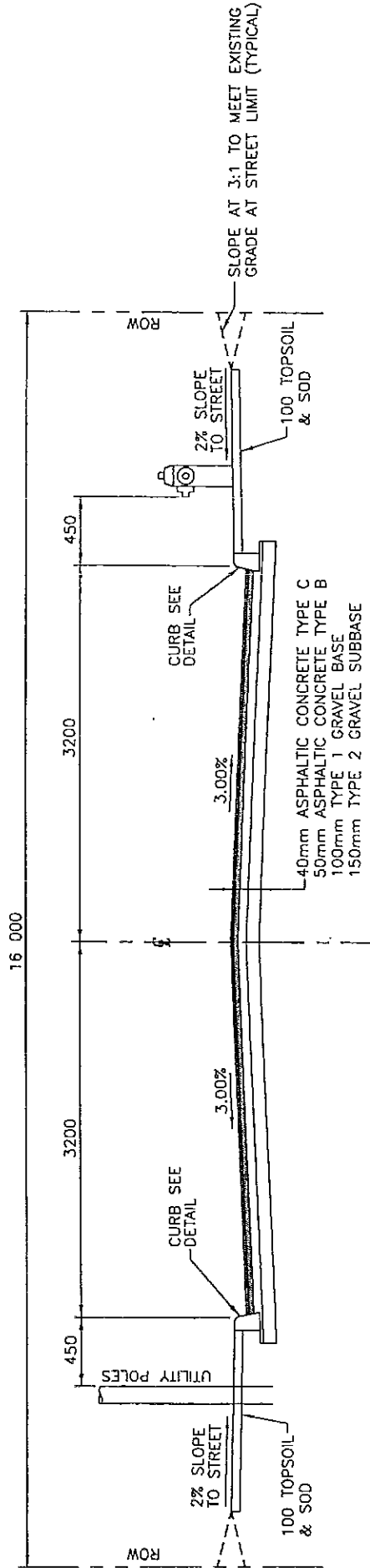
Approved: _____

Municipal Engineer

Operations Manager

Dwg. No. 3 Not to Scale

Drawn By: CTP



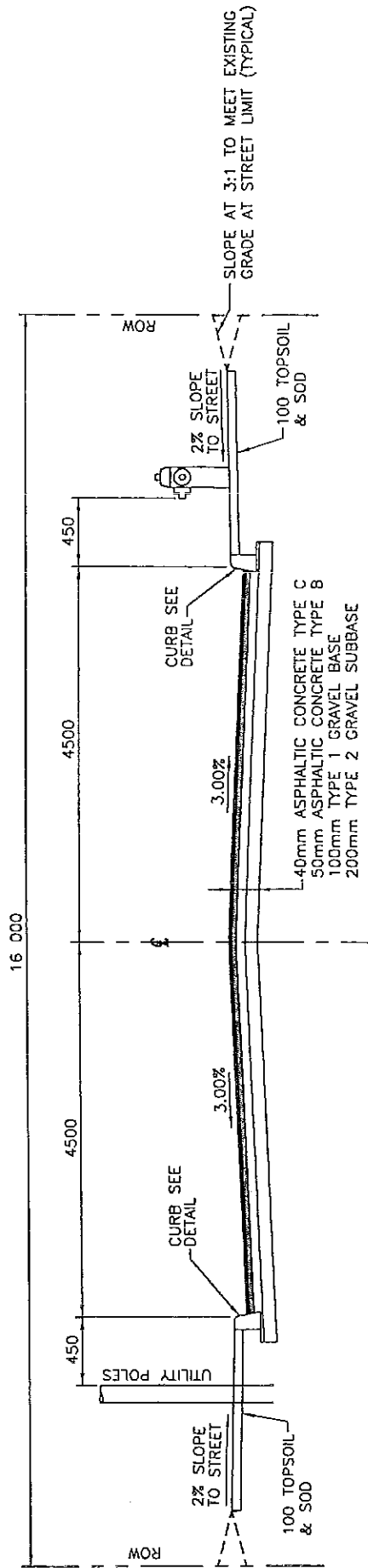
Notes:

1. All dimensions are in millimeters.
2. Provide additional road bed and slope stabilization as required by Geotechnical Report.
3. Provide 1500mm wide sidewalk where directed.
4. Curb to NSRBA/NSCEA specification No. 02630-02
5. Concrete: 35MPa, 0.4 water to cement ratio, 5% to 8% entrained air.
6. Gravel and asphalt thicknesses are minimums measured after compaction to specified densities.

*Town of
Mahone Bay*

Typical Cross-section
Urban - Low Volume

Approved: _____	Approved: _____
Municipal Engineer _____	Operations Manager _____
Dwg. No. 4	Not to Scale
	Drawn By: CTP



Notes:

1. All dimensions are in millimeters.
2. Provide additional road bed and slope stabilization as required by Geotechnical Report.
3. Provide 1500mm wide sidewalk where directed.
4. Curb to NSRBA/NSCEA specification No. 02830-02
5. Concrete: 35MPa, 0.4 water to cement ratio, 5% to 8% entrained air.
6. Gravel and asphalt thicknesses are minimums measured after compaction to specified densities.

Town of Mahone Bay

Typical Cross-section Urban - Local 50 km/h

Approved: _____

Approved: _____

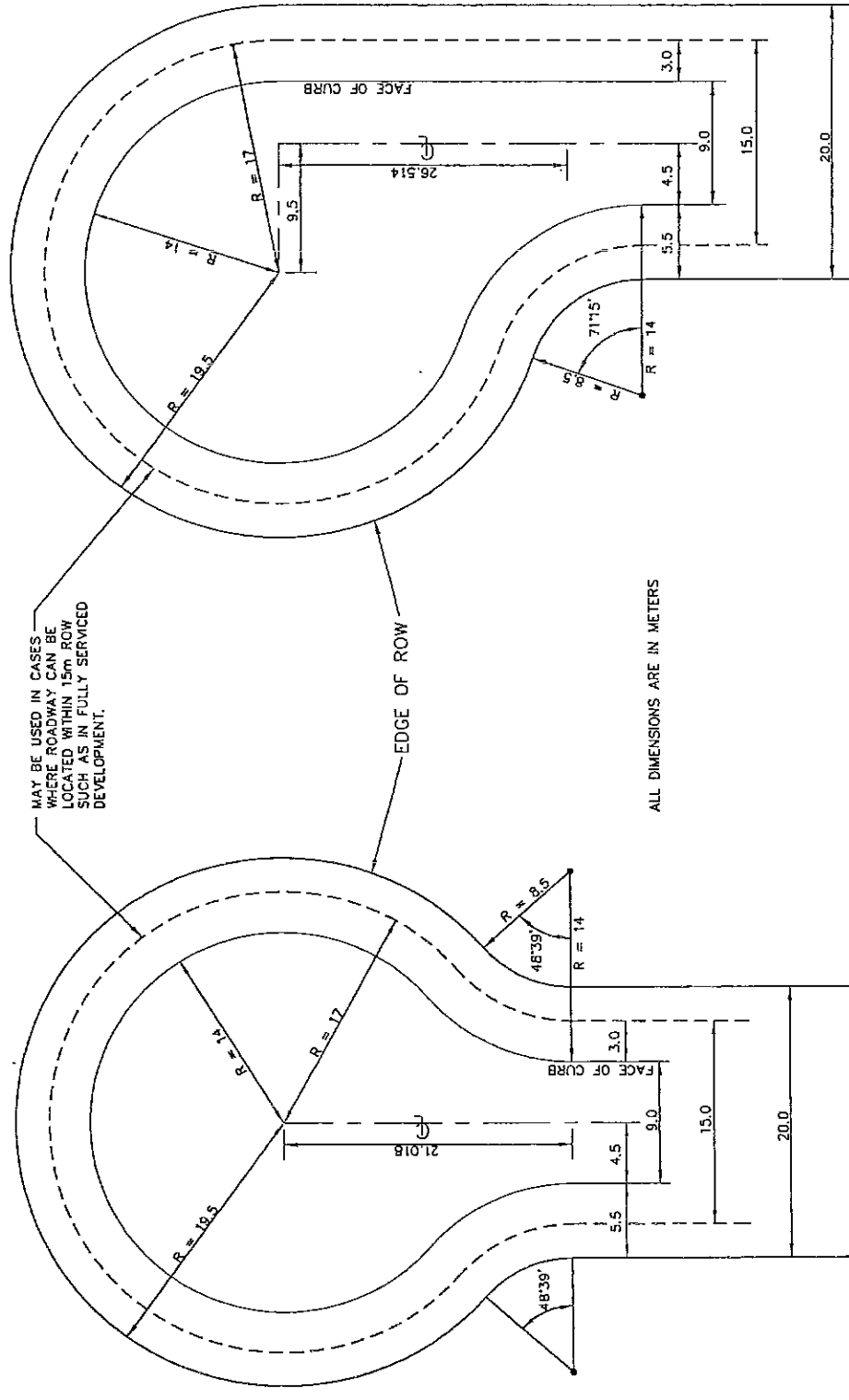
Municipal Engineer _____

Operations Manager _____

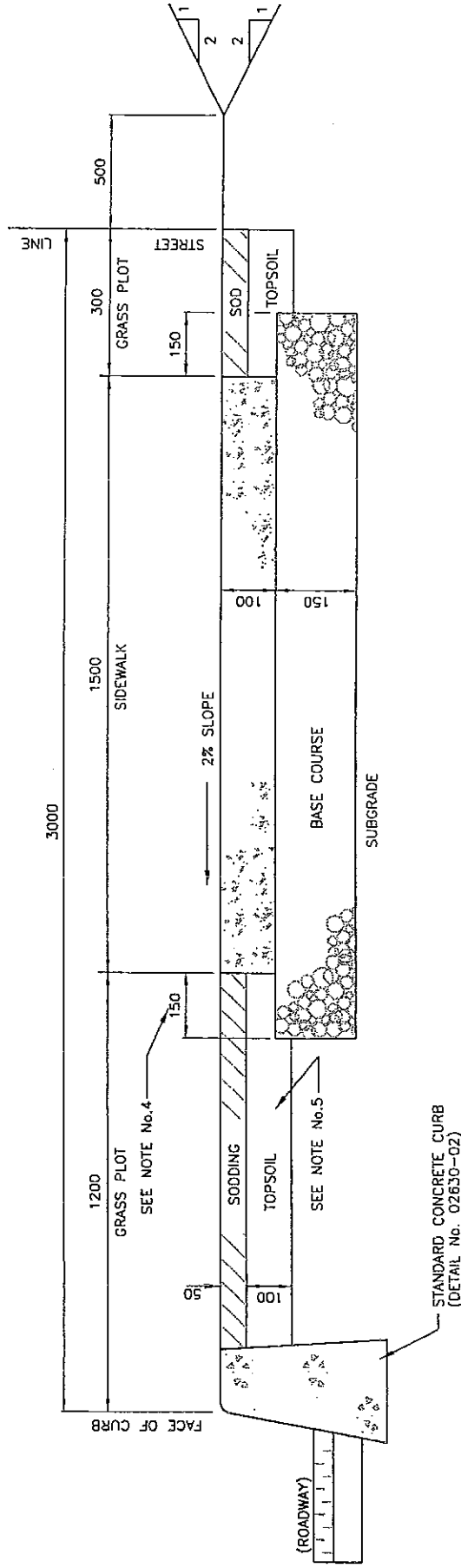
Dwg. No. 5

Not to Scale

Drawn By: CTP



<i>Town of Mahone Bay</i>	
Standard Cul-de-sacs	
Approved: _____	Approved: _____
Municipal Engineer _____	Operations Manager _____
Dwg. No. 7	Not to Scale
Drawn By: CTP	



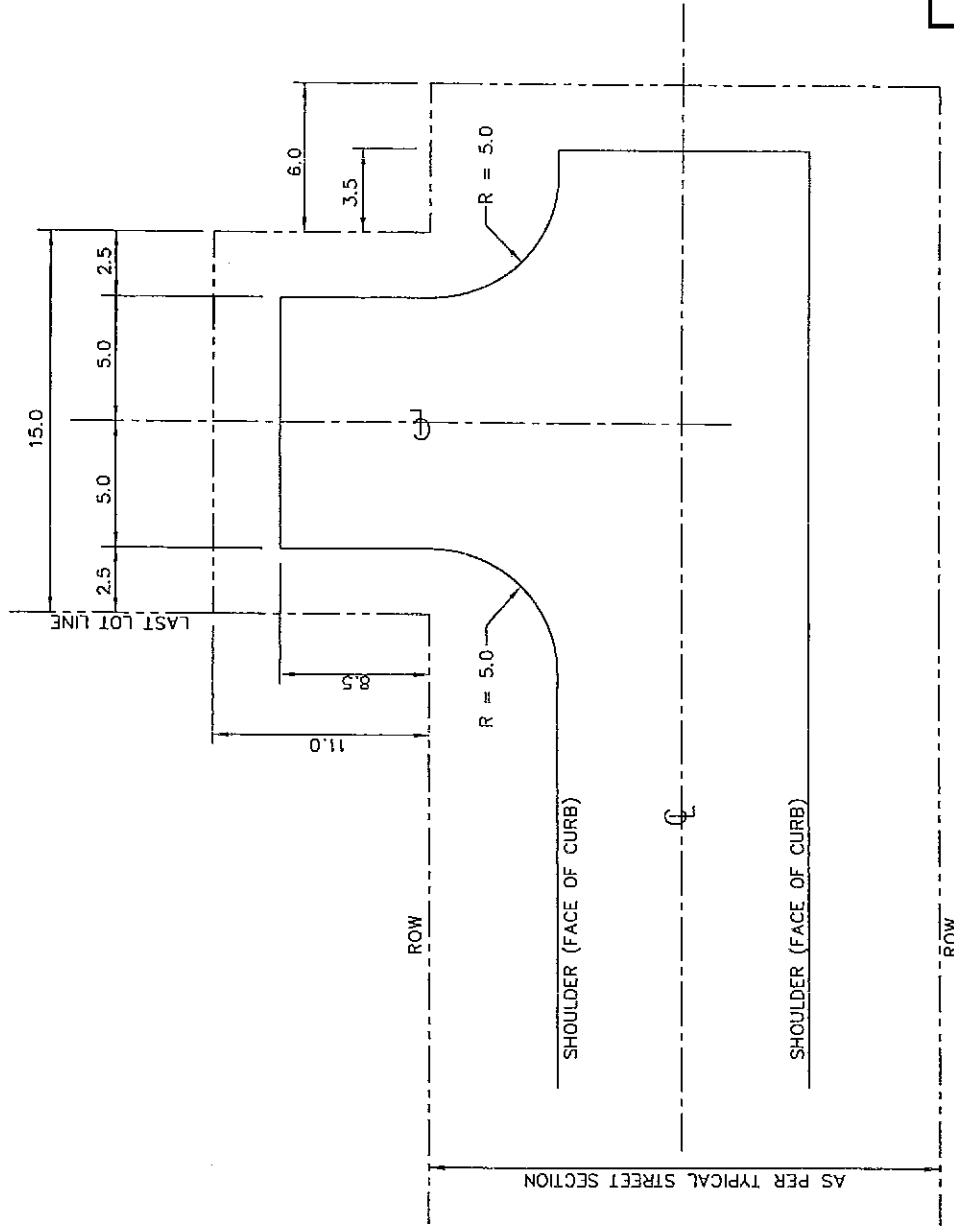
NOTES

1. NORMAL THICKNESS OF CONCRETE SIDEWALK TO BE 100.
2. THICKNESS OF CONCRETE SIDEWALK THROUGH DRIVEWAY AREA TO BE 150.
3. 152 x 152 M.W. 18.7 x M.W. 18.7 (WELEDE WIRE FABRIC) TO BE USED IN ALL COMMERCIAL TYPE DRIVEWAYS.
4. THE BASE COURSE SHALL EXTEND 150 MINIMUM ON EACH EDGE OF THE SIDEWALK STRUCTURE.
5. TOPSOIL TO BE TREATED WITH FERTILIZER AND LIME AS DETAILED IN SPECS.
6. SIDEWALK ABUTTING HIGH DENSITY AREA SHALL HAVE FULL WIDTH (3.000) SIDEWALK.
7. SIDEWALK ABUTTING COMMERCIAL AREAS SHALL HAVE FULL WIDTH (3.000) AND 150 DEPTH.
8. ALL DIMENSIONS ARE MILLIMETERS.
9. CONCRETE: 35MPa, 0.4 WATER TO CEMENT RATIO, 5% TO 8% ENTRAINED AIR.

*Town of
Mahone Bay*

Typical Sidewalk Section

Approved: _____	Approved: _____	Not to Scale	Drawn By: CTP
Municipal Engineer _____	Operations Manager _____		
Dwg. No. 6			



NOTES:

1. TEE TO BE ON LEFT SIDE WHERE POSSIBLE.
2. ALL DIMENSIONS ARE METERS.

*Town of
Mahone Bay*

Temporary Turning Tee

Approved: _____ Approved: _____

Municipal Engineer _____ Operations Manager _____

Dwg. No. 8

Not to Scale

Drawn By: CTP



Town of Mahone Bay

Staff Report

RE: Water System Assessment Report

September 12th, 2023

General Overview:

This staff report is intended to present Council with the required 10-year System Assessment Report on the Town's water system and associated recommendations.

Background:

Every municipal water utility is required to file a System Assessment Report (SAR) with Nova Scotia Environment and Climate Change (NSECC) every 10 years. Previous SARs were completed in October 2003 and April 2013. The SAR is to be completed by an external contractor. CBCL Limited (CBCL) was retained to complete the 2023 SAR for the Town.

The objective of the System Assessment Report (SAR) is to verify that the operation, supply, and distribution provided by the Town's water system complies with the environmental standards for safe drinking water as outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems (June 2022). The report follows the Terms of Reference provided by Nova Scotia Environment and Climate Change (NSECC). In addition to verifying the required performance, the report also identifies any sources of concern and provides appropriate recommendations. The overall study area included all water utility infrastructure and Oakland Lake, found within the municipal boundaries of the Town of Mahone Bay (the Town) and the Municipality of the District of Lunenburg (MODL).

Infrastructure in the Town's drinking water system includes:

- Oakland Lake Pump Station.
- Mahone Bay Water Treatment Plant (WTP).
- Raw water transmission mains from Oakland Lake Pump Station to the WTP.
- Treated Water Reservoir.
- Treated Water Distribution System.

The report verifies that the WTP can:

- Meet current environmental standards, which are frequently updated and enhanced for public health protection.
- Meet the minimum requirements set out in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.
- Demonstrate performance with disinfection criteria.

- Demonstrate performance with turbidity criteria.
- Demonstrate that online equipment is in place and appropriately alarmed to continuously monitor chlorine residual, turbidity, and all parameters related to other primary disinfectants.
- Confirm that waste streams generated by treatment facilities are adequately managed.

The 2023 SAR prepared by CBCL is attached as an appendix to this report.

Analysis:

The 2023 SAR provided a positive assessment of the Town's water system. The only recommendations for improvement offered by CBCL were in the area of staffing. CBCL's conclusion (stated on page 35 of the SAR) was as follows:

"4.4.1 Operation & Maintenance

The WTP has a comprehensive Operations and Maintenance Manual.

4.4.2 Monitoring & Reporting

The 2023 Annual Sampling Plan and 2022 Annual Report were reviewed and have addressed all requirements. The plan was adequate in meeting sampling requirements prescribed in the Approval to Operate, GCDWQ, and GMPDWS. Lab samples are analyzed by accredited laboratories.

4.4.3 Management

The ODRC is Scott Hoyt. All operators are not adequately certified and there is not a sufficient number of operators as well as back-up personnel available. The procedure for when the ODRC is absent is outlined in Appendix A."

The SAR offered two associated recommendations as follows:

- **"The Town should train current staff to meet the classification of the existing treatment and distribution system (WT II and WD I)."**
- **"The Town should hire an additional WTP operator to provide more operational support and staffing redundancy."**

As noted in the Report, the Town has relied on contractor AIWUC for operational support to address the identified shortcomings in the immediate term.

With respect to the first recommendation, existing staff are making good progress on training. In 2023-24 System Manager Scott Hoyt will attain his WT II and Operator Blake Tibert will attain WT I.

With respect to the second – hiring an additional operator – management strongly recommends additional consideration be given to this recommendation in the upcoming Rate Study process.

Financial Analysis:

Turning to contracted services for operational support has been costly. Estimated costs for contracted operational support are as follows:

2022-23	~\$58,000*
2023-24	~\$32,000
2024-25	~\$24,000**

*In 2022-23 the utility was dealing with vacancies, so costs were higher but there were some associated savings on salaries and benefits

**costs will reduce as existing staff attain required qualifications but will likely level out around \$24,000/year for standby / vacation coverage

Additionally, overtime costs for existing staff are estimated at ~\$12,000/year (split between water and wastewater), which would be able to be taken as time in lieu with an additional staff person (as there would be sufficient staff for operational coverage during absences).

The Rate Study process – just getting underway now – is used to set rates for future years and would need to factor in the additional costs for another full-time operator (~\$80,000). If the operator were split 50/50 water/wastewater the costs to the utility (~\$40,000) would not be too much greater than the operational support and overtime costs (~\$30,000). The larger financial impact would be on the wastewater side, which would need to be covered by general revenues.

Climate Analysis:

N/A

Strategic Plan:

1.1. Improve Performance of Town-Owned Utilities

- Undertake strategic water, wastewater & electrical rate studies and adjust rates as appropriate

Recommendation:

It is recommended,

THAT Council direct staff to include an additional operator (shared 50/50 between water and wastewater) in the Water Rate Study.

Attached for Council Review:

- 2023 System Assessment Report

Respectfully Submitted,

A handwritten signature in blue ink, appearing to read 'Dylan Heide', with a long horizontal flourish extending to the right.

Dylan Heide,
Town of Mahone Bay CAO




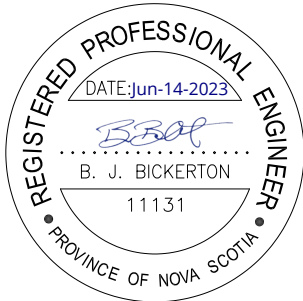
2023 Water System Assessment Report

Town of Mahone Bay

Final Report



230800.00 • June 2023

0	FINAL	BB	2023-06-14	Z.L.
A	DRAFT	BB	2023-05-24	ZL
Issue or Revision		Reviewed By:	Date	Issued By:
 <p>This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.</p>				



June 14, 2023

Scott Hoyt
Water/Wastewater Systems Manager
Town of Mahone Bay
493 Main Street, BOX
Mahone Bay, NS, B0J 2E0

Dear Scott:

RE: Mahone Bay 2023 Water System Assessment Report (FINAL)

Please find enclosed the 2023 System Assessment Report (SAR) completed by CBCL Limited (CBCL) on behalf of the Town of Mahone Bay (the Town). This report includes the specific SAR requirements as outlined in the Nova Scotia Environment and Climate Change (NSECC) *Approval to Operate*.

Yours very truly,

CBCL Limited



Ben Bickerton, M.A.Sc., P.Eng.
Process Engineer
Direct: 902-492-7979, Ext. 2271
E-Mail: bbickerton@cbcl.ca

Project No: 230800.00

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

Contents

1 Project.....	1
1.1 Introduction	1
1.2 Purpose	1
2 Characterization of the Water Source	3
2.1 Source Description & Schematic	3
2.1.1 Back-up Water Supplies	3
2.2 Microbial Risks.....	3
2.2.1 Surface Water Sources	4
2.2.2 Groundwater Sources.....	5
2.3 Chemical & Physical Risks	5
2.3.1 Disinfection By-Products.....	5
2.3.2 Lead & Corrosion Control	6
2.3.3 Guidelines for Canadian Drinking Water Quality.....	8
2.3.4 Guidelines for Monitoring Public Drinking Water Supplies.....	8
2.3.5 Source Water Protection Plan for Monitoring.....	9
2.3.6 Cyanobacteria.....	9
2.4 Filter Backwash Water	9
2.5 Source Quantity.....	10
2.5.1 Demand Growth.....	11
2.6 Source Water Protection Plan.....	11
2.7 Conclusion & Recommendations	12
2.7.1 Treatment Requirements to Protect Against Pathogenic Organisms.....	12
2.7.2 Disinfection By-Products.....	12
2.7.3 Lead & Corrosion Control	13
2.7.4 Guidelines for Canadian Drinking Water Quality.....	13
2.7.5 Guidelines for Monitoring Public Drinking Water Supplies.....	13
2.7.6 Source Water Protection Plan Monitoring.....	13
2.7.7 Filter Backwash Water Discharge.....	14
2.7.8 Source Quantity.....	14

2.7.9	Source Water Protection Plan	14
3	Treatment Processes, Facilities, & Equipment.....	15
3.1	Treatment Process	15
3.1.1	Treatment Process Schematic.....	15
3.1.2	Turbidity Levels & Associated Criteria.....	17
3.1.3	Membrane Filtration.....	21
3.1.4	Primary Disinfection	23
3.1.5	Secondary Disinfection.....	26
3.1.6	Other Critical Processes	26
3.1.7	Waste Streams.....	26
3.2	Distribution Water Quality	27
3.2.1	Chlorine Residual Levels	27
3.2.2	Microbial Water Quality.....	28
3.2.3	Turbidity	28
3.2.4	Cross Connection Control Program.....	28
3.2.5	Other Distribution System Monitoring Programs	28
3.3	On-Site Inspection.....	29
3.4	Conclusion & Recommendations	29
3.4.1	Turbidity Levels	29
3.4.2	Membranes.....	29
3.4.3	Primary Disinfection	29
3.4.4	Secondary Disinfection.....	30
3.4.5	Other Critical Processes	30
3.4.6	Waste Streams.....	30
3.4.7	Distribution Water Quality	30
3.4.8	On-site Inspection	31
4	Operations, Monitoring, & Management	32
4.1	Operations & Maintenance	32
4.2	Monitoring & Reporting.....	32
4.2.1	Review of Recent Submitted Annual Report	35
4.3	Management.....	35
4.4	Conclusion & Recommendations	35
4.4.1	Operation & Maintenance	35

4.4.2	Monitoring & Reporting.....	36
4.4.3	Management.....	36
5	Ability to Comply	37
5.1	Summary	37
5.1.1	Treatment Processes, Facilities, & Equipment	37
5.1.2	Distribution System Water Quality	38
5.1.3	Operations, Monitoring, & Management.....	39
5.2	Report Preparation	41

Appendices

A	Tables Required by the Terms of References
B	Watershed Boundary Plan
C	Distribution Map
D	Corrosion Control Program Results
E	Last Round of Sampling Data for <i>GCDWQ</i>
F	Last Round of Sampling Data for <i>GMPDWS</i>
G	Approval to Operate
H	Approval to Withdrawal
I	Source Water Protection Plan Meeting Minutes
J	Standard Operating Procedures for Disinfection
K	Schematic of the Treatment & Disinfection Process
L	Historical Effluent Graphs SCADA
M	Water Protection Zone Mapping in GIS Format for NSECC
N	Terms of Reference Checklist

1 Project

1.1 Introduction

The objective of this System Assessment Report (SAR) is to verify that the operation, supply, and distribution provided by this system complies with the environmental standards for safe drinking water as outlined in the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems* (June 2022). This report follows the Terms of Reference provided by Nova Scotia Environment and Climate Change (NSECC). In addition to verifying the required performance, this report will identify any sources of concern and provide appropriate recommendations. The overall study area includes all water utility infrastructure and Oakland Lake, found within the municipal boundaries of the Town of Mahone Bay (the Town) and the Municipality of the District of Lunenburg (MODL).

Infrastructure in the Town's drinking water system includes:

- ▶ Oakland Lake Pump Station.
- ▶ Mahone Bay Water Treatment Plant (WTP).
- ▶ Raw water transmission mains from Oakland Lake Pump Station to the WTP.
- ▶ Treated Water Reservoir.
- ▶ Treated Water Distribution System.

1.2 Purpose

CBCL Limited (CBCL) has been retained to complete the 2023 SAR for the Town to verify that the system meets the requirements to comply with the current standards outlined by NSECC. Previous SARs for the Town were completed in October 2003 and April 2013.

This report, prepared by CBCL, verifies that the WTP can:

- ▶ Meet current environmental standards, which are frequently updated and enhanced for public health protection.
- ▶ Meet the minimum requirements set out in the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems*.
- ▶ Demonstrate performance with disinfection criteria.
- ▶ Demonstrate performance with turbidity criteria.
- ▶ Demonstrate that online equipment is in place and appropriately alarmed to continuously monitor chlorine residual, turbidity, and all parameters related to other primary disinfectants.
- ▶ Confirm that waste streams generated by treatment facilities are adequately managed.

This report is organised into the following four sections:

- 1 Characterization of the Water Source.
- 2 Treatment Processes, Facilities and Equipment.
- 3 Operations, Monitoring and Management.
- 4 Ability to Comply.

2 Characterization of the Water Source

This section of the SAR characterizes the source water for the Town by reporting on the following:

- 1 Microbial risks.
- 2 Chemical and physical risks.
- 3 Filter backwash waste.
- 4 Source quantity.
- 5 Source Water Protection Plan (SWPP).

2.1 Source Description & Schematic

Oakland Lake is the drinking water source for Mahone Bay. Oakland Lake is located approximately 1 km northeast of the Town and covers an area of approximately 0.65 km². The Oakland Lake watershed is a designated protected watershed under section 106(6) of the Province of Nova Scotia's *Environment Act*. Raw water is pumped from Oakland Lake to the Mahone Bay WTP using the Oakland Lake Pumping Station. Raw water is drawn from a screened intake and 200 mm diameter intake pipe which extends 30 ft into the lake and empties into the raw water wet well below the pump station. Following this, water is pumped using two 20 horsepower (HP) variable speed pumps through a 3 km long 200 mm diameter raw water transmission main to the Mahone Bay WTP. The source water schematic is provided in Appendix B.

2.1.1 Back-up Water Supplies

The Mahone Bay WTP does not have a designated back-up water supply.

2.2 Microbial Risks

The treatment requirements for all Nova Scotia municipal drinking water systems, includes the following:

- ▶ 3.0-log reduction in protozoa (e.g., *Cryptosporidium* oocysts and *Giardia* cysts).
- ▶ 4.0-log reduction in viruses.

Log reductions of pathogenic microorganisms from a surface water source must be achieved by a combination of engineered filtration and disinfection. Disinfection must provide a minimum of 0.5-log inactivation of *Giardia*.

2.2.1 Surface Water Sources

The raw water supply for the Mahone Bay WTP originates from a surface water source and is required to meet a minimum 3.0-log reduction for protozoa (e.g., *Cryptosporidium* oocysts and *Giardia* cysts) and a minimum 4.0-log reduction of viruses according to the requirements outlined in the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems*.

The Mahone Bay WTP utilizes a coagulation-assisted membrane filtration and disinfection process consisting of coagulation, flocculation, clarification, membrane microfiltration, ultraviolet (UV) disinfection and chlorine disinfection to achieve the required log reductions. The *Nova Scotia Treatment Standards for Municipal Drinking Water Systems* allows for microfiltration membranes to achieve log-reduction credits according to a number of stipulations, including regular direct integrity testing, and the establishment of log-reduction performance by third-party validation testing. The microfiltration units at the Mahone Bay WTP achieve a minimum of 3.0-log removal credit for protozoa (e.g., *Cryptosporidium* oocysts and *Giardia* cysts). Remaining log-reductions for *Giardia* and viruses are met using UV and chlorine disinfection. The UV disinfection system must provide a minimum 0.5-log reduction of *Giardia*, whilst chlorine disinfection must provide a 4.0-log reduction of viruses. Table 2.1 outlines the minimum pathogen reduction credits achieved at the Mahone Bay WTP by unit process.

Table 2.1: Minimum Pathogen Reduction Credits Achieved at the Mahone Bay WTP

Treatment Technology	Protozoa		Virus
	<i>Cryptosporidium</i>	<i>Giardia</i>	
Filtration	3.0-log	3.0-log	-
Chlorination	-	-	4.0-log
UV Disinfection	-	3.0 log	-
Minimum Total Reduction	3.0-log	3.0-log	4.0-log

2.2.1.1 Bacterial Water Quality

The *Approval to Operate* (Schedule A) does not require raw water bacteriological testing for total coliforms and *E. coli* at the Mahone Bay WTP. The Town conducts quarterly sampling for bacteria in the raw water.

2.2.1.2 Protozoa Water Quality

Schedule A within the *Approval to Operate* lists that the minimum sampling frequency requirements to test for the presence of protozoa in the raw water, is at the request of NSECC. To date, no raw water protozoa quality testing has been requested.

2.2.1.3 Viral Water Quality

Schedule A within the *Approval to Operate* lists that the minimum sampling frequency requirements to test for the presence of viruses in the raw water, is at the request of NSECC. To date, no raw water virus quality testing has been requested.

2.2.2 Groundwater Sources

There are no groundwater sources utilized by the Town.

2.3 Chemical & Physical Risks

2.3.1 Disinfection By-Products

Trihalomethanes (THMs) and Haloacetic Acids (HAAs) levels are currently monitored on a quarterly basis at two different locations within the distribution system. The sample locations are as follows:

- ▶ Site B: Town Hall, 493 Main Street.
- ▶ Site C: 740 Main Street.

The Town Hall was selected to represent the central part of the distribution system. 740 Main Street was chosen due to its long retention time. The mapped locations of the Disinfection By-Product (DBP) sampling points are found in Appendix C.

The Town should conduct a DBP study to determine the location with the highest concentration of THM's and HAAs in the distribution system. Samples should be collected at Bayview School, 740 Main Street, Town Hall and WWTP to determine the location with the highest concentration.

2.3.1.1 Trihalomethanes

THM sampling results for 2021 are provided in Table A.2 (Appendix A). THM levels observed in the distribution system were less than the Locational Running Annual Average (LRAA) maximum of 100 µg/L in 2021.

2.3.1.2 Haloacetic Acids

HAA5 concentration results for 2021 are provided in Table A.3 (Appendix A). HAA5 levels observed in the distribution system were less than the LRAA maximum of 80 µg/L during 2021.

2.3.1.3 Other Disinfectant By-Products

Other DBPs listed in the NSECC Terms of Reference include Bromate, Chlorate, Chlorite and N-Nitroso dimethylamine (NDMA). The system utilizes UV disinfection and sodium hypochlorite (with storage volumes less than 3 months) for primary and secondary disinfection, therefore, monitoring for these other DBPs is not required. The Town

monitors for NDMA and should end sampling as concentrations have not been found in the past.

2.3.2 Lead & Corrosion Control

2.3.2.1 Lead & Copper

The Town has established a limited Lead Sampling Plan for use in the distribution system. The purpose of this program is to implement consistent sampling of lead in the distribution system to assess the public exposure, as well as to evaluate the Town's Corrosion Control Program.

The *Guidelines for Canadian Drinking Water Quality (GCDWQ)* has set a Maximum Acceptable Concentration (MAC) of 0.005 mg/L for total lead in drinking water. The minimum number of residential sample locations is determined based on the current serviced population size. Table 2.2 displays the ranges for the minimum number of sample locations based on the serviced population size.

Table 2.2: Minimum Number of Sample Locations

Number of People Served	Number of Sample Locations (Annual)
≤500	5
501-3,300	10
3,301-10,000	20
10,001-100,000	30
>100,000	50

As of 2022, the Mahone Bay WTP serves approximately 1,000 people, therefore, 10 residential sampling locations are required to comply with the Lead Sampling Program. Samples for lead and copper were collected from distribution sample points during the warmest part of the year (August). A summary of lead and copper sampling results is presented below in Table 2.3.

Table 2.3: Lead & Copper Secondary Sampling Locations & Results (2022)

Sample Location	Lead Result (µg/L)	Copper Result (µg/L)
Raw Water	3.2	21
	1.7	12
Entering Distribution	<0.5	<2
	<0.5	<2
Town Hall	<0.5	<2
	<0.5	3
740 Main Street	<0.5	<2
	<0.5	<2
Bayview	<0.5	<2
	1.3	9

The 2022 Lead Sampling Program results indicated that lead concentrations were below the MAC limit of 5 µg/L at all sample sites. Samples were not collected from residential sample locations and as such, lead exposure from Lead Service Lines (LSL) and lead plumbing cannot be evaluated.

The Town has developed a lead and copper exceedance contingency plan. In the event of an exceedance, the Town shall notify NSECC immediately and notify the homeowner within 14 days of receiving the sample result. Subsequently, the Town shall recommend a variety of measures to reduce lead exposure and conduct profile sampling. Profile sampling will allow the Town to interpret the location of lead sources within the residence.

The Town should commence sampling from residential locations as part of the Lead Sampling Program, in accordance with the *Requirements for Lead and Copper Management – Municipal Public Drinking Water Supplies*.

2.3.2.2 Corrosion Control

The Town's *Approval to Operate* (Schedule A) includes requirements for a Corrosion Monitoring Program, including sampling for various parameters on a quarterly basis in the distribution system. Sampling parameters include the following:

- ▶ pH.
- ▶ Alkalinity.
- ▶ Conductivity.
- ▶ Temperature
- ▶ Dissolved oxygen.
- ▶ Chlorine residual.
- ▶ Corrosion inhibitor.

The sampling location and frequency outlined in the *Approval to Operate* indicates that sampling must occur at the point of entry and representative locations within the distribution system. The Town's Annual Sampling Plan outlines that these parameters are being monitored at four locations (WTP, Town Hall, 740 Main Street, and Bayview School) on a minimum of a quarterly basis. The results are summarized in Appendix D.

The results from 2022 indicate that corrosion control parameters were not collected according to the correct schedule at the four sample points (Point of Entry (POE) and three distribution locations). The following parameters were not collected at the respective sites on a quarterly basis:

- ▶ Alkalinity: not collected from POE, Site C, and Site D.
- ▶ Conductivity: not collected from POE, Site C, and Site D.
- ▶ Temperature: not measured at distribution sample points (Sites B, C, and D).
- ▶ Dissolved Oxygen: not collected from POE, Site C, and Site D.

The Town has implemented action limits for pH, chlorine residual, and corrosion inhibitor (orthophosphate). As such, the Town has implemented an adequate Corrosion Control Program.

The Town should sample for all corrosion control parameters at the four sample sites on a quarterly basis. Alternatively, the parameters required for corrosion control monitoring should be updated (reduced) based on acceptable practices and targets following the two consecutive years of sampling described in the Approval to Operate.

2.3.3 Guidelines for Canadian Drinking Water Quality

All parameters with associated MACs listed in the *GCDWQ* are required to be analyzed from a raw and treated water sample every five years. The most recent rounds of *GCDWQ* compliance sampling were completed on the following dates:

- ▶ Sample Date #1: October 18th, 2017.
- ▶ Sample Date #2: August 29th, 2022.
- ▶ Sample Date #3: Scheduled 2027.

The last round of sampling results, as required by NSECC, are provided in Appendix E. The next round of sampling will be completed in 2027 to meet the minimum requirements of one sampling event every five years. Raw water samples are drawn from water obtained at the plant inlet. The treated samples are collected at the outlet of the WTP before water enters the distribution system. All raw and treated samples were in compliance with the MACs for health-related parameters of the *GCDWQ* during the 2022 sampling event.

2.3.4 Guidelines for Monitoring Public Drinking Water Supplies

The *Nova Scotia Treatment Standards for Municipal Drinking Water Systems* requires that municipal water utilities monitor water quality for the parameters listed in the *GMPDWS*. As per the *Approval to Operate*, the *Guidelines for Municipal Public Drinking Water Supplies (GMPDWS)* samples are collected and tested annually at the AGAT Laboratories in Dartmouth, NS. The sampling results from the last 10 years are provided in Table A.5 (Appendix A) and the last round of sampling results for September 12th, 2021 are provided in Appendix F.

As per the last round of sampling completed, all treated samples are in compliance with the NSECC sampling requirements of the *GMPDWS*. The raw water exceeded Aesthetic Objectives (AO) for colour and manganese in the raw water in 2021. Exceedances were within the treatment capacity of the WTP and removed prior to entering the distribution system. A summary of these exceedances is presented below in Table 2.4. The next round of compliance testing is scheduled to occur in summer 2023.

Table 2.4: Parameters Exceeding *GMPDWS* Guidelines

Parameter	<i>GMPDWS</i> Result	Guideline
Colour	21.1	AO: 15
Manganese (Raw Water)	0.046 mg/L	AO: 0.02 mg/L

2.3.5 Source Water Protection Plan for Monitoring

The only parameter monitored as per the SWPP for the Oakland Lake watershed is ecological flow monitoring. As per the *Water Withdrawal Approval*, the Town is required to maintain the following ecological flows at the outlet of Oakland Lake:

- ▶ 0.01 m³/s (July to September).
- ▶ 0.06 m³/s (Remainder of the year).

The Town is required to maintain a permanent staff gauge in the stream immediately downstream of the outlet of the lake. Measurements are collected and tabulated on a twice weekly basis. The level of the stream has been correlated to a stage-discharge curve to determine the rate of flow leaving Oakland Lake. All other raw water parameters are measured as per the requirement of the *GMPDWS* and the *GCDWQ*.

2.3.6 Cyanobacteria

The Town conducts visual monitoring of the raw water intake 5 times per week for signs of algal blooms. Response triggers for cyanotoxin (microcystin-LR) testing in the raw and treated water will occur if a bloom is detected or suspected. In the event of a suspected bloom, NSECC will be notified.

In the event of a bloom, the water treatment process can remove the majority of cyanobacterial biomass through the coagulation, flocculation, and microfiltration processes. Any intracellular toxins (contained within the biomass) will be removed, however, dissolved cyanotoxins (extracellular) are not readily reduced in the existing WTP filtration process. UV irradiation at typical levels for primary disinfection will not result in significant reduction, but free chlorine is moderately effective for the oxidation of microcystin and is in use at the facility. As a result, the WTP does have the capability to reduce total microcystin to some extent should a cyanotoxin-producing bloom occur.

2.4 Filter Backwash Water

All process wastewater from the WTP is directed to a municipal sewer and is directed to the Mahone Bay Wastewater Treatment Plant (WWTP). Consequently, the filter backwash water has no impact on the source water quality.

2.5 Source Quantity

Water withdrawal permits are issued by NSECC in order to document the allowable withdrawals from a water source. The *Water Withdrawal Approval* Number is 2008-061974-02 with an expiry date of August 19, 2029. A copy of the approval is provided in Appendix H.

The *Water Withdrawal Approval* authorizes the following withdrawal rates:

- ▶ Average rate of withdrawal: 710,000 litres per day (averaged over 30 days).
- ▶ Maximum rate of withdrawal: 960,000 L/day (averaged over 3 days).

The average daily rate of withdrawal of the WTP in the year 2022 was 617,460 L/day with a maximum rate of withdrawal of 851,000 L/day occurring in September. In 2021, the WTP used 87.0% of its allotted average yearly withdrawal rate, and 88.6% of the maximum rate of withdrawal. Raw water flow data for 2022 is provided in Table A.6 in Appendix A and summarized in Figure 2.1.

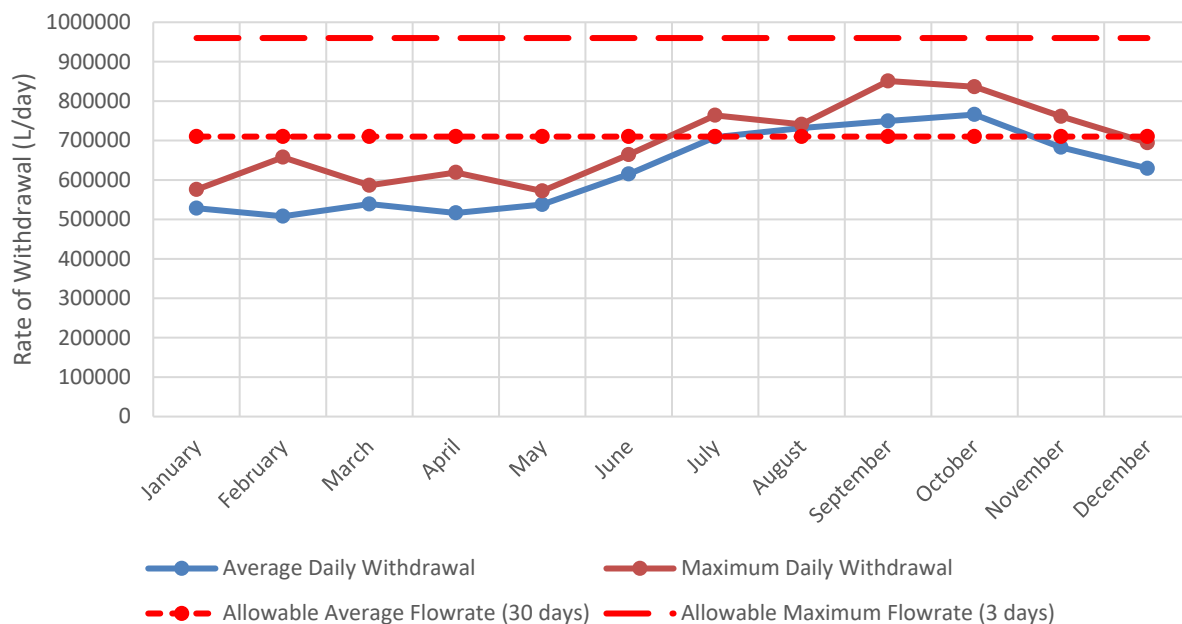


Figure 2.1: 2022 Raw Water Withdrawal Data, Mahone Bay WTP

Withdrawal data for 2022 indicates that the Town was in exceedance of authorized withdrawal rates as per their water withdrawal permit. During the months of August, September, and October, the average rate of withdrawal (30 days) exceeded the prescribed limit of 710,000 L/day. The Mahone Bay WTP is designed to produce at a net production rate of 981,956 L/day with one membrane train out of service, and has the capacity to supply water at a rate greater than the approved limit. As such, the current average rate of withdrawal (30 days) is the limiting factor and should be raised to meet the demand of the system.

The Town should seek to increase the allowable average rate of withdrawal for the water supply, or seek to reduce water usage/demand during peak usage seasons.

2.5.1 Demand Growth

In 2021, the Canadian Census listed the population of the Town of Mahone Bay as 1,064, a 2.7% increase from the Town's population in 2016. Given the current population trends and production rate of the WTP, demand growth may eventually exceed the capacity of the current drinking water system, with the first limiting factor being the maximum water withdrawal amounts. As per the conclusion of Section 2.5, the Town should first seek to increase the allowable raw water withdrawal rates.

2.6 Source Water Protection Plan

The source water area included within the SWPP includes all lands within the watershed of Oakland Lake. The Oakland Lake watershed has been designated a protected water area under section 106(6) of the Province of Nova Scotia's *Environment Act*. The watershed is located 1 km northeast of the Town and encompasses a total area of 1000 acres. A map of the watershed, attached in Appendix B, identifies the boundaries of the Oakland Lake Watershed, from which the WTP draws its raw water. Moreover, the Water Protection Area Mapping in GIS format is attached in Appendix M.

The stated objective of the SWPP is to protect the Oakland Lake Watershed as a drinking water supply for the indefinite future. The original SWPP was adopted in 1985 and has been most recently updated in 2007.

The main risks that have been established within the watershed are:

- 1 Chemical contamination.
- 2 Microbial contamination.
- 3 Pesticides and contaminants.
- 4 Forestry activities.
- 5 Agricultural activities.
- 6 Sediment.

The primary management strategies adopted in the SWPP are purchasing land within the watershed, public education, best management practices, and contingency/emergency planning. The purchase of land within the watershed maximizes the Town's control of the surrounding watershed and minimizes the risk of harmful activities and developments. Public education is used to inform landowners of the importance of the watershed and various steps that can be taken to minimize contamination. Best management practices are manuals developed to encourage behaviours/practices which minimize the negative effects of various activities on the quality and quantity of the water in the watershed. Lastly, contingency/emergency plans provide the necessary information to coordinate proper communication and response procedures during contamination events.

The last two meetings of the Source Water Protection Advisory Council (SWPAC) were held on April 4, 2022, and March 6, 2023. Copies of the meeting minutes are provided in Appendix I. The next meeting is scheduled to occur in spring 2024. Respective summaries of the past two SWPAC meetings are as follows:

- ▶ On April 4, 2022: the primary action item was the committee recommending the council direct staff to write to the MODL, concerning land-use provisions for the Oakland Lake Watershed. The proposed correspondence with the MODL was to provide clarity on regulations for properties that are partially within the protected watershed, and to ensure the Town is notified when property is sold or when a development permit application for a property within the watershed is received. The motion carried.
- ▶ On March 6, 2023: Ella Gindi, the MODL planner, updated the committee on the MODL Bylaw and Municipal Planning Strategy, as it pertains to the Town's watershed. Following this, Scott Hoyt, Water/Wastewater System Manager, presented a request from the Martin's River Fire Department to access the raw water pumphouse at Oakland Lake in the event of a nearby fire. A motion to prepare a report for a provision of access to Oakland Lake for fire services was presented and carried by the committee.

2.7 Conclusion & Recommendations

The objective of this section was to provide a detailed characterization of the source water through a review of available information. Specifically, the focus was on assessing the Town's approach and ability to protect against pathogenic organisms, effectiveness of DBP monitoring, lead and corrosion control/monitoring, assessment of *GCDWQ* and *GMPDWS* parameters, source quantity, and SWPP.

2.7.1 Treatment Requirements to Protect Against Pathogenic Organisms

The Mahone Bay WTP draws water from Oakland Lake. As per the *Nova Scotia Treatment Standards for Municipal Drinking Systems*, surface water sources require a 3.0-log reduction for protozoa and 4.0-log reduction for viruses. Using coagulation, flocculation, membrane filtration, chlorination, and UV disinfection, the Mahone Bay WTP meets the treatment requirements to protect against protozoa and viruses.

2.7.2 Disinfection By-Products

The Town monitors THMs and HAA5 quarterly at two different locations throughout the distribution system, which are the centre of the community (Site B), and at a point with long retention time (Site C). THM and HAA5 levels observed in the distribution system comply with the respective LRAA maximums of 100 µg/L and 80 µg/L.

The Town should conduct a DBP study to determine the location with the highest concentration of THM's and HAAs in the distribution system. Samples should be collected at Bayview School, 740 Main Street, Town Hall and WWTP to determine the location with the highest concentration.

2.7.3 Lead & Corrosion Control

The Town partially monitors for lead within the distribution system. Distribution samples were collected from five sites during the warmest month of the year (August) and all results were below the MAC of 5 µg/L. The Town has implemented an exceedance contingency plan.

The Town has implemented a Corrosion Control Program. Distribution samples are monitored on a minimum of a quarterly basis, however, samples are not collected at all sample sites. The Town has implemented action limits for pH, chlorine residual, and corrosion inhibitor (orthophosphate).

The Town should commence residential lead sampling for the Lead Sampling Program in accordance with the *Requirements for Lead and Copper Management – Municipal Public Drinking Water Supplies*.

The Town should sample for all corrosion control parameters at the four sample sites on a quarterly basis. Alternatively, the parameters required for corrosion control monitoring should be updated (reduced) based on acceptable practices and targets following the two consecutive years of sampling described in the Approval to Operate.

2.7.4 Guidelines for Canadian Drinking Water Quality

The Town samples for *GCDWQ* parameters every five years. The last round of sampling results indicates that both raw and treated water samples are in compliance with the NSECC and *GCDWQ* sampling requirements. The next round of sampling is scheduled to occur in 2027 to meet the minimum requirements of once every five years.

2.7.5 Guidelines for Monitoring Public Drinking Water Supplies

As per the *Approval to Operate*, the *GMPDWS* samples are collected and tested annually at the AGAT Laboratories. The last round of sampling results reviewed was conducted on September 12, 2021, and was in compliance with the NSECC sampling requirements of the *GMPDWS*.

2.7.6 Source Water Protection Plan Monitoring

The only parameter sampled as per the SWPP for the Oakland Lake watershed is twice weekly ecological flow monitoring at the outlet of the lake. All other raw water parameters are measured as per the requirements of the *GMPDWS* and the *GCDWQ*.

2.7.7 Filter Backwash Water Discharge

Process wastewater from the WTP is directed to a municipal sewer and is subsequently fed to the Mahone Bay WWTP. As a result, the FBWW has no impact on the source water quality.

2.7.8 Source Quantity

The WTP used 87.0% of its allotted average yearly withdrawal rate in 2022, and 88.6% of the maximum rate of withdrawal. The Town exceeded the average monthly withdrawal rate during the months of August, September, and October. As a result, the WTP was not in compliance with its withdrawal limits in 2021.

The Town should seek to increase the allowable average rate of withdrawal from Oakland Lake, or reduce water usage/loss in the community during periods of elevated demand.

2.7.9 Source Water Protection Plan

Appendix B identifies the boundaries of the Oakland Lake Watershed. The Water Protection Zone Mapping in GIS Format is attached to Appendix M. The last two SWPP meetings were held on April 4, 2022, and March 6, 2023. Copies of the meeting minutes are attached in Appendix I.

3 Treatment Processes, Facilities, & Equipment

3.1 Treatment Process

The Town of Mahone Bay owns and operates the Mahone Bay WTP and associated works at 68 Zwicker Lane, Mahone Bay, Nova Scotia. The *Approval to Operate* classifies the system as a Class II Water Treatment Facility and a Class I Water Distribution Facility. The *Approval to Operate* is attached in Appendix G, and the details are as follows:

- ▶ Approval Holder: Town of Mahone Bay.
- ▶ Approval No: 2008-061157-03.
- ▶ Expiry Date: May 1st, 2029.

3.1.1 Treatment Process Schematic

The Mahone Bay WTP is a coagulation assisted membrane filtration plant, and it consists of the following units:

- ▶ Coagulation.
- ▶ Flocculation.
- ▶ Membrane filtration – microfiltration.
- ▶ UV disinfection.
- ▶ Chlorine disinfection.

A schematic of the treatment process is presented below in Figure 3.1 and in Appendix K.

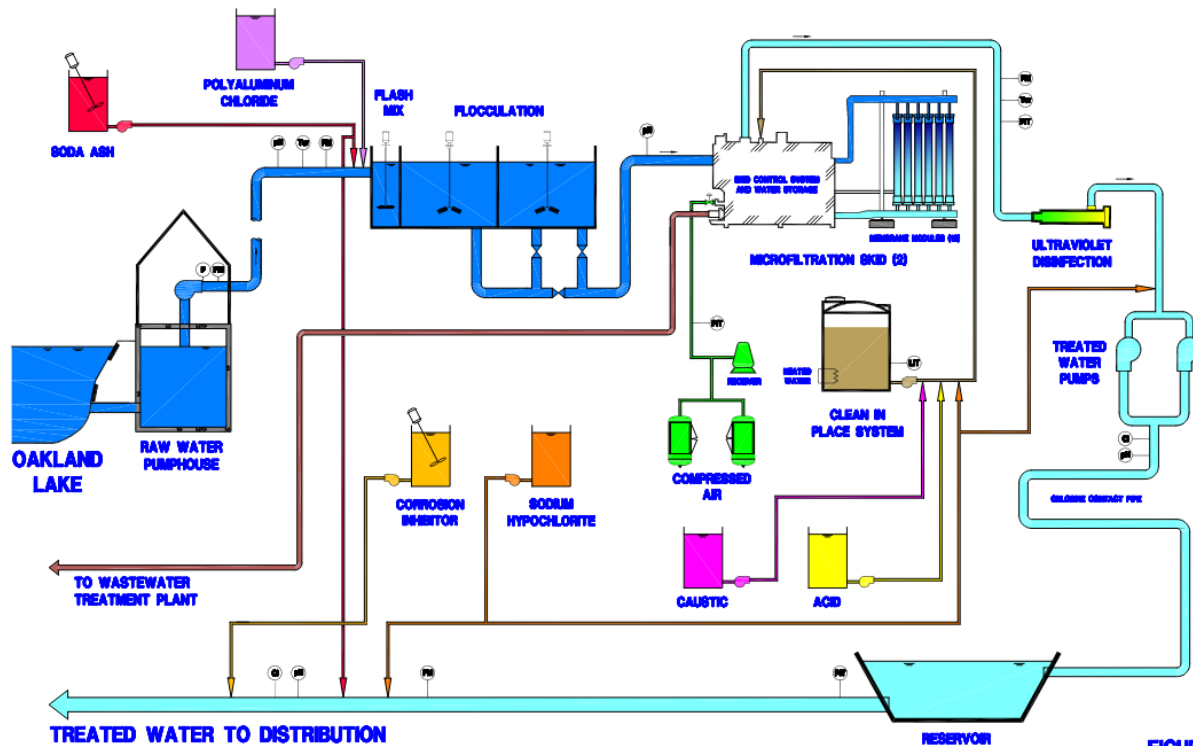


FIGURE 3.1

Figure 3.1: Schematic of Treatment & Disinfection Process at the Mahone Bay WTP

3.1.1.1 Coagulation/Flocculation

The coagulation and flocculation system at the Mahone Bay WTP consists of a rapid mixing tank and two 3,000 USgal coagulation chambers. Raw water enters the WTP via a 200 mm transmission main from the pump station at Oakland Lake. The raw water is dosed with polyaluminium chloride (PACl) coagulant and soda ash prior to entering the rapid mix chamber, whereby it undergoes a rapid mix for 10-30 seconds. The coagulation tanks contain vertical paddle wheel mixers with Variable Frequency Drives (VFD) which impart a desired mixing intensity. Water flows into the first chamber and subsequently into the second chamber or into a bypass line. At the design flow, the retention time for both chambers is 17 minutes. Following coagulation and flocculation, water enters directly into the membrane filter system.

3.1.1.2 Membrane Filtration

Membrane filtration is achieved by two PALL AP-4 microfiltration (MF) skids and prefiltration strainers. Flocculated water passes through 400-micron prefiltration strainers before entering a feed water storage tank. Subsequently, water is pumped from the storage tanks and is distributed amongst the membrane modules of the filtration unit. The Microza membrane modules operate in an “outside-in” configuration, whereby feed water passes from the outside to the inside of membrane fibres by an applied pressure. Filtrate flows within the hollow fibres, and is collected at a filter header. Filter cleaning occurs every 10-40 minutes by stopping production and reversing the direction of flow from inside the

hollow fibre to the outside. An air scour system within the modules is simultaneously run to remove collected filter material. Water used in the reverse filtration is stored in a separate tank and filled with filtrate during regular operation. The Pall MF system is able to operate with a minimum overall recovery of 92.5%.

3.1.1.3 UV Disinfection

UV disinfection is achieved using a single low pressure high output UV reactor. The UV reactors impart a minimum dose of 40 mJ/cm² upon the water to achieve a 0.5-log reduction of *Giardia* in the water.

3.1.1.4 Chlorine Disinfection

Chemical disinfection is achieved using sodium hypochlorite, dosed following the membrane filtration units. The dosing point is located after the UV system and is flow-paced to ensure a consistent chlorine dose is achieved. Disinfection is achieved in a 400 mm diameter contact pipe between the WTP and the reservoir.

3.1.2 Turbidity Levels & Associated Criteria

3.1.2.1 Surface Water

Table 3 of the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems* outlines the prescribed filter turbidity levels. The individual filter turbidity limits for membrane filtration systems, such as the Mahone Bay WTP, are as follows:

- ▶ Turbidity shall be less than or equal to 0.1 NTU in at least 99% of the measurements made or at least 99% of the time each calendar month.
- ▶ If turbidity exceeds 0.1 NTU for more than 15 minutes, direct integrity testing shall be immediately conducted on the membrane treatment unit.
- ▶ Shall not exceed 0.3 NTU at any time.
- ▶ Filter-to-waste shall be provided for operational flexibility.
- ▶ The membrane system used for pathogen reduction shall have continuous indirect integrity testing.
- ▶ Continuous indirect integrity testing shall be conducted at a minimum frequency of once every 5 minutes. Indirect integrity testing shall follow that outlined in the *EPA Membrane Filtration Guidance Manual*, as amended from time to time.
- ▶ The actual removal efficiency of a membrane shall be verified by third party challenge testing. Acceptable challenge testing shall follow that provided in the *EPA Membrane Filtration Guidance Manual*, as amended from time to time.
- ▶ Direct integrity testing shall be able to verify a log removal value equal to or greater than the removal credit awarded to the membrane filtration process.
- ▶ Direct integrity testing shall be conducted on each membrane filtration unit at least once per day and as soon as the Approval Holder becomes aware when the turbidity exceeds 0.1 NTU for more than 15 minutes.

Verification of the ability of the microfiltration membranes to continuously achieve the minimum 3.0-log removal credits for protozoa was evaluated using Option 1 as outlined in the NSECC *Terms of Reference for Municipal Drinking Water Systems*. The Mahone Bay WTP utilizes SCADA to provide individual membrane filter effluent turbidity data. The historical filter effluent graphs obtained from SCADA are presented in Appendix L for 2022. Table 3.1 and Table 3.2 illustrate the 2022 turbidity level breakdown for membrane filters A and B, respectively.

Table 3.1: Percentile of Turbidity Readings below 0.1 NTU in 2022 (Filter A)

2022	Filter A			
Month	Total Readings	Readings Above 0.1 NTU	Readings Below 0.1 NTU	Percentile
January	8,928	0	8,928	100.00%
February	8,064	13	8,051	99.84%
March	8,928	13	8,915	99.85%
April	8,640	1	8,639	99.99%
May	8,928	30	8,898	99.66%
June	8,640	0	8,640	100.00%
July	8,928	6	8,922	99.93%
August	8,928	7	8,921	99.92%
September	8,640	8	8,632	99.91%
October	8,928	2	8,926	99.98%
November	8,640	5	8,635	99.94%
December	8,928	0	8,928	100.00%

Table 3.2: Percentile of Turbidity Readings below 0.1 NTU in 2022 (Filter B)

2022	Filter B			
Month	Total Readings	Readings Above 0.1 NTU	Readings Below 0.1 NTU	Percentile
January	8,928	25	8,903	99.72%
February	8,064	57	8,007	99.29%
March	8,912	22	8,890	99.75%
April	8,640	6	8,634	99.93%
May	8,928	5	8,923	99.94%
June	8,640	0	8,640	100.00%
July	8,928	5	8,923	99.94%
August	8,928	11	8,917	99.88%
September	8,640	1	8,639	99.99%
October	8,928	1	8,927	99.99%
November	8,640	2	8,638	99.98%
December	8,928	1	8,927	99.99%

The data presented in Table 3.1 and Table 3.2 demonstrates the ability for the A and B membrane filter units to produce filtered water with turbidity less than or equal to 0.1 NTU in at least 99% of the measurements made. Another turbidity limit requirement of the microfiltration skids is to never exceed a turbidity of 0.3 NTU. The count of exceedances of 0.3 NTU during 2022 is presented below in Table 3.3.

Table 3.3: Permeate Water Turbidity Exceedances of 0.3 NTU in 2022

Month	Count Turbidity Exceedances of 0.3 NTU	
	Filter A	Filter B
January	0	32
February	7	36
March	11	26
April	2	7
May	10	5
June	0	1
July	6	8
August	7	13
September	9	1
October	5	1
November	3	4
December	0	3

The data presented above illustrates that both microfiltration skids exceeded a turbidity value of 0.3 NTU on multiple occasions throughout 2022. In total, Skid A exceeded the limit 60 times, whilst Skid B exceeded the limit 137 times. Turbidity exceedances were a result of a variety of issues, including the following.

- ▶ Broken drain valve on Filter B (improper seal).
- ▶ Staff turnover.
- ▶ Improper maintenance schedule.
- ▶ Air bubbles following MIT and EMF sequences.

The Town should investigate options for mitigating turbidity exceedances resulting from air bubbles. Upgrade of the turbidimeter instruments, or addition of an upstream sample conditioning (i.e., air release) step, should be added to reduce “nuisance” turbidimeter exceedances resulting from air bubbles. Following this, if turbidity exceedances are persistent, further investigation into the source of turbidity exceedances should be done.

3.1.2.2 GUDI Wells

This section is not applicable for this system.

3.1.2.3 Non-GUDI Wells

This section is not applicable for this system.

3.1.2.4 Review of the Standard Operating Procedure for Filtration Process

The operations manual for the Mahone Bay WTP contains an entire section of Standard Operating Procedures (SOPs) for the operation of the membrane filtration system. The SOP's address the background of the units, filtration requirements, operation requirements, monitoring requirements, setpoints, and filter cleaning processes.

Through the SCADA system, the plant operators can establish filter set point alarms and critical shut down parameters. Currently the system will automatically shut down a filter to begin Membrane Integrity Testing (MIT) if the filter effluent turbidity exceeds 0.1 NTU for a duration of 15 minutes. A critical alarm is set for 0.3 NTU and results in an immediate automatic filter shutdown. The filter will remain shutdown until filter effluent is once again below 0.1 NTU.

The document resides at the WTP and forms part of the Operations and Maintenance Manual. The SOP is presented in Appendix J along with other SOPs. The SOP for the filtration process at the WTP contains the necessary information to ensure the proper operation of the membrane filtration system.

3.1.2.5 Inspection of Turbidity Meters

Continuous monitoring of filter effluent turbidity is conducted using HACH TU5300SC turbidimeters. The HACH TU5300SC is a high performance optical turbidimeter used to measure turbidity for drinking water compliance. The analysis is an optical method based upon the comparison of light scattering of a laser through a sample, compared with the intensity of light scattered by a standard reference suspension. These units are capable of measuring turbidity levels with an accuracy of $\pm 2\%$ of the reading or ± 0.01 NTU (whichever is greater) from 0 to 40 NTU. The initial response time is 45 seconds with a signal average time default of 30 seconds.

The WTP's Operations and Maintenance Manual includes a SOP addressing turbidimeter maintenance. The Town conducts monthly cleaning and maintenance on all turbidimeters as per the recommendations of the manufacturer. The SOP includes detailed procedures to properly bring turbidimeters offline, conduct cleaning, perform a calibration and maintenance, and to bring the turbidimeter back into service. Turbidimeters are inspected daily as part of normal Quality Assurance/Quality Control (QA/QC) procedures and are calibrated monthly. The turbidimeter is in good working order.

3.1.2.6 Filter Redundancy & Compliance

The maximum design capacity of the WTP is 682 L/min (0.98 MLD). The filtration system consists of two equally sized membrane filtration skids. Each skid is rated at a maximum capacity of 682 L/min (0.98 MLD) and can meet the maximum design capacity of the plant with one train out of service (N-1 scenario). As such, the WTP can meet maximum daily flow with the largest filter out of service and satisfies the condition outlined in the *Approval to Operate*.

3.1.3 Membrane Filtration

MIT is performed daily for each skid to ensure that adequate log-removal credits are being met. Pressurized air is used in the MIT to establish the decay of pressure over a given time interval.

The results from MIT testing are calculated automatically and compared against an established criteria to determine if the train is suitable for production. As per the design of the system, the membrane skids must maintain a pressure decay of less than 0.551 kPa/min (0.08 psi/min) to obtain a Log Removal Value (LRV) of 4.0 for *Cryptosporidium* and *Giardia*. A LRV of 4.0 is established as the Upper Control Limit (UCL), however, the membrane skids are only required to impart a 3.0 log reduction for protozoa as per the *Approval to Operate*. To obtain a LRV of 3.0, the membrane skids must maintain a pressure decay of less than 5.51 kPa/min (0.8 psi/min). Figure 3.2 below illustrates the relationship between pressure decay and LRV for the PALL membrane system at the Mahone Bay WTP.

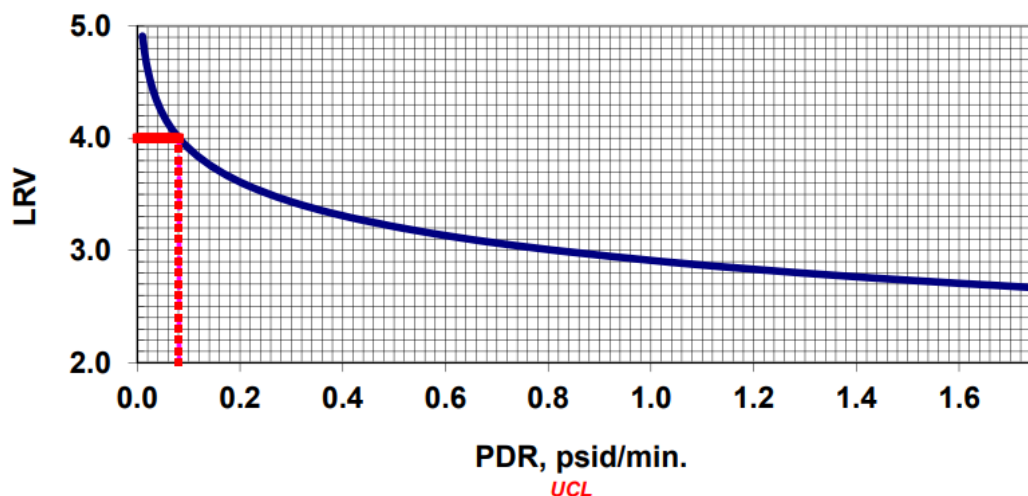


Figure 3.2: Relationship between LRV and Pressure Decay (Mahone Bay WTP)

The daily log-reduction results for each train are presented in Appendix A. The table has been simplified as log reduction credits are automatically calculated at the WTP. Table 3.4 and Table 3.5 present the number of days per month in which 4.0 and 3.0 LRV's are obtained for Skid A and Skid B in 2021.

Table 3.4: Daily MIT Testing Results 2021 (Skid A)

MIT Results (Skid A)			
Month	Number of Days where LRV > 4.0	Number of Days where LRV > 3.0	Number of Days where LRV < 3.0
January	30	1	0
February	27	1	0
March	29	2	0
April	29	1	0
May	28	3	0
June	27	3	0
July	30	1	0
August	31	0	0
September	30	0	0
October	31	0	0
November	23	6	1
December	28	3	0

Table 3.5: Daily MIT Testing Results 2021 (Skid B)

Skid B			
Month	Log-4.0 Removal	Log-3.0 Removal	< Log-3.0 Removal
January	30	1	0
February	28	0	0
March	30	1	0
April	28	2	0
May	31	0	0
June	29	1	0
July	28	3	0
August	26	5	0
September	30	0	0
October	29	2	0
November	29	1	0
December	30	1	0

During 2021 there were 21 instances where the MIT result for Skid A were less than a 4.0-log reduction but still remained greater than a 3.0-log reduction. There was one instance (November 15th), where the LRV result was less than a 3.0-log reduction. The membrane filter marginally did not achieve at 3.0-log reduction on this instance, and as such, the UV unit was able to provide the necessary log removal to achieve a total 3.0-log reduction of protozoa. On all other days in 2021, the LRV result from MIT was greater than a 4.0-log reduction for protozoa.

During 2021 there were 17 instances where the MIT result for Skid B were less than a 4.0-log reduction but still remained greater than a 3.0-log reduction. On all other days in

2021, the LRV result from MIT was greater than a 4.0-log reduction for protozoa. All results for Skid A and Skid B, therefore, verified the ability to achieve a 3.0-log reduction of protozoa.

3.1.4 Primary Disinfection

Under the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems*, treatment processes using surface water as their source water are required to have the ability to achieve.

- ▶ 3.0-log reduction for *Giardia* and *Cryptosporidium*.
- ▶ 4.0-log reduction for viruses.
- ▶ A minimum of 0.5-log inactivation for *Giardia* with primary disinfection (chlorine) when used in conjunction with filtration.

3.1.4.1 Chemical Disinfection (CT Concept)

CT calculations are based on various operational, treatment, and system design parameters. Operational parameters including maximum flowrate, chlorine dosing rate, and contact volume will affect the time that primary disinfection occurs and efficiency of disinfection. Furthermore, environmental conditions such as pH and temperature affect the efficiency of disinfection and are included in CT calculations. Calculations reflect the worst-case scenario to ensure that adequate disinfection will always occur in the water disinfection system.

All design parameters used to calculate the CT ratio for the WTP are listed below in Table 3.6, Table 3.7, and Table 3.8.

Table 3.6: CT Design Parameters

CT Design Parameters	Values
Maximum Flow (L/min)	682 L/min
Maximum pH	8.0
Minimum Temperature (°C)	0.5
Minimum Free Chlorine Residual (mg/L)	0.75

Table 3.7: Contact Pipe #1 Design Parameters for CT Calculations

CT Design Parameters	Values
Diameter (m)	0.2 m
Length (m)	150 m
Volume (m ³)	4.71 m ³
Baffling Factor	1.0

Table 3.8: Contact Pipe #2 Design Parameters for CT Calculations

CT Design Parameters	Values
Diameter (m)	0.4 m
Length (m)	50 m
Volume (m ³)	6.28 m ³
Baffling Factor	1.0

$$\text{Contact time (min)} = \frac{\text{Volume (m}^3\text{)}}{\text{Max Flow (}\frac{\text{m}^3}{\text{min}}\text{)}} = \frac{(6.93 \text{ m}^3 + 5.91 \text{ m}^3)}{0.682 \frac{\text{m}^3}{\text{min}}} = 18.83 \text{ min}$$

$$CT_{\text{actual}} (\text{mg} * \text{min}/\text{L}) = \text{Chlorine Residual} \left(\frac{\text{mg}}{\text{L}}\right) * \text{Contact Time (min)} * \text{Baffling Factor}$$

$$CT_{\text{actual}} (\text{mg} * \text{min}/\text{L}) = 0.75 \frac{\text{mg}}{\text{L}} * 18.83 \text{ min} * 1.0 = 14.12 \text{ mg} * \text{min}/\text{L}$$

$$CT_{\text{req (viruses)}} = 12 \text{ mg} * \text{min}/\text{L}$$

$$\frac{CT_{\text{actual}}}{CT_{\text{req (viruses)}}} = \frac{14.12 \text{ mg} * \text{min}/\text{L}}{12 \text{ mg} * \text{min}/\text{L}} = 1.17 > 1.0 \text{ (CT Achieved)}$$

The CT calculation above for the log inactivation of viruses confirm that the Mahone Bay WTP meets the minimum CT_{required} for the 4.0-log inactivation of viruses in drinking water. This is the case as the ratio of $CT_{\text{actual}}/CT_{\text{required}}$ is greater than one and confirms proper disinfection. During 2022, there were two instances where operational conditions for adequate chlorine residuals were not recorded.

3.1.4.2 UV Disinfection (IT Concept)

The required 0.5 log reduction of *Giardia* is achieved by the Low Pressure High Output (LPHO) UV reactor. This type of UV unit emits UV light at a single wavelength of 254 nm. The UV unit is sized to provide a dose of 40 mJ/cm², at a transmittance of 90% at a maximum flow rate of 690 Lpm. At this design point the UV system will provide 3.0-log reduction of *Giardia*. During 2021, the Integrity Test (IT) parameters remained within the acceptable range, providing adequate primary disinfection. These parameters are summarized below in Table 3.9. The UV sleeve is cleaned manually. A schematic of the primary disinfection system is provided in Appendix K.

Table 3.9: Summary of 2021 IT Parameters (Worst Case Scenario)

IT Design Parameters	Values
Minimum IT Intensity (mJ/cm ²)	40 mJ/cm ²
Maximum flow rate (L/min)	682 L/min
Minimum Transmittance (%)	93.7%

3.1.4.3 Redundancy, Monitoring, & Alerting

The existing chlorination system consists of 240 kg drums of 12% sodium hypochlorite, equipped with three Grundfos DDA-FCM diaphragm dosing pumps. The existing set-up operates with one pump online and the second pump in standby. The metering pumps provide the necessary redundancy to ensure the continuous operation of the disinfection system. At the current design flow rate and disinfection doses, the existing system is well within the acceptable operating ranges and can satisfy chlorine demands with one unit offline.

Online monitoring of chlorine residual is accomplished using a Rosemount Analytical 499ACL-01 free chlorine analyzer. The chlorine analyzer takes continuous measurements of the primary disinfection residual and transmits this data to the SCADA system for monitoring and process adjustments as required. The device is inspected daily and calibrated monthly by plant staff to ensure accuracy and functionality. The chlorine analyzers appear to be in good working order.

A single UV unit is installed at the WTP and, as such, does not provide adequate redundancy for UV disinfection. That said, the chlorination primary disinfection system can provide the minimum required 0.5-log reduction of *Giardia* in the event that the UV system is out of service.

The dosage rate of sodium hypochlorite can be raised to meet a 0.5-log reduction of *Giardia*. As such, the chlorination system acts to provide adequate redundancy to the UV disinfection system.

The Town should add an equation in SCADA to calculate the actual CT_{required} based on the operational conditions. This will be used to ensure CT is met if the UV unit goes offline.

3.1.4.4 Standard Operating Procedures

SOPs for the UV and chemical disinfection systems are provided in Chapter 6 of the Mahone Bay WTP Operations and Maintenance Manual and are attached in Appendix J. The SOP outlines the requirements for disinfection to meet chlorine residual limits throughout the WTP's distribution system. Procedures for chlorine dosage outlined in the SOP are as follows:

- ▶ Dose sodium hypochlorite to maintain a free chlorine residual between 0.75-2.0 mg/L.
- ▶ Maintain a free chlorine residual of 0.5 mg/L leaving the reservoir.

The design parameters for CT calculations are outlined within the 2007 Mahone Bay WTP upgrade report. These design parameters represent the worst-case scenario required to provide adequate disinfection.

- ▶ Maximum Flow: 682 Lpm.
- ▶ Maximum pH: 8°C.

- ▶ Minimum Temperature: 0.5 °C.
- ▶ Minimum Free Cl₂ (reservoir inlet): 0.75 mg/L.

The design parameters for UV disinfection are outlined within the 2007 Mahone Bay WTP upgrade report. These design parameters represent the worst-case scenario required to provide adequate UV disinfection.

- ▶ Maximum Flow: 682 Lpm.
- ▶ Minimum Water Transmittance: 90%.
- ▶ Applied Dosage: 40 mJ/cm².

The Town should add all design parameters required to provide adequate disinfection within the SOPs for disinfection.

3.1.5 Secondary Disinfection

Secondary disinfection is achieved by maintaining a minimum free chlorine residual of 0.2 mg/L at all points within the distribution system. Grab samples are collected weekly at designated distribution sample locations with a HACH DR2800 spectrophotometer.

A chlorinator at the exit of the reservoir doses water with a 12% sodium hypochlorite solution to maintain secondary disinfection within the distribution system. Residuals leaving the reservoir are typically maintained between 1.5-2.0 mg/L. Weekly grab samples collected in 2021 confirm that chlorine residuals did not fall below 0.2 mg/L in the distribution system.

3.1.6 Other Critical Processes

A corrosion inhibitor is added at the Mahone Bay WTP to reduce the overall corrosivity of drinking water in the distribution system. Ortho-polyphosphate is added to water exiting the reservoir prior to entering the distribution system. Corrosion inhibitor is dosed with a flow-paced metering pump.

There are no other critical processes at the WTP outside those described above. Generally, the treatment process at the WTP appears to be within acceptable operating parameters including optimization of chemical feed and process control for coagulation, flocculation, filtration, and disinfection.

3.1.7 Waste Streams

3.1.7.1 Filter-to-Waste

The membrane filtration units undergo regular backwash cycles to remove accumulated matter. The membranes are simultaneously aerated and back pulsed to remove solids. Once the backwash is completed, the process wastewater is drained to the municipal wastewater sewer which feed into the Mahone Bay WWTP.

The backwash water is ultimately treated at the Mahone Bay WWTP and, therefore, it has no impact on the source water quality. As a result, water quality measurements (Total Suspended Solids (TSS), total aluminium [Al], total chlorine [Cl], pH, and fish toxicity) are not measured. The filter-to-waste sequence meets the requirements of the *Nova Scotia Treatment Standards for Municipal Drinking Water Systems*.

3.1.7.2 Filter Backwash Water - Discharging into a Freshwater Watercourse

This section is not applicable for this system.

3.1.7.3 Filter Backwash Water - Discharge to Land or Soil

This section is not applicable for this system.

3.1.7.4 Filter Backwash Water – Discharge to a Marine or Brackish Environment

This section is not applicable for this system.

3.1.7.5 Other Waste Streams

Sanitary wastewater from the washroom at the Mahone Bay WTP is directed to a municipal sewer. The WTP does not have any other waste streams.

3.2 Distribution Water Quality

Distribution system water quality samples are collected from the locations listed below. The Distribution Map is presented in Appendix C.

- ▶ Site A: Mahone Bay WTP.
- ▶ Site B: Town Hall, 493 Main Street.
- ▶ Site C: 740 Main Street.
- ▶ Site D: Bayview School, 110 Clearway Street.

3.2.1 Chlorine Residual Levels

Samples from the distribution system for residual chlorine levels are collected weekly using grab samples as per the *Approval to Operate* conditions. In 2021, the chlorine residuals did not fall below 0.2 mg/L in the distribution system.

To satisfy the continuous online monitoring clause of the *Approval to Operate*, operators utilize a HACH DR2800 and HACH Pocket Pro spectrophotometers to conduct free chlorine analysis on grab samples from all four locations.

Residual chlorine monitoring for water entering the distribution system is measured leaving the WTP. A Rosemount Analytical 499ACL-01 free chlorine analyzer continuously monitors the chlorine residual levels entering the distribution system. Values are reported

continuously to a SCADA software package which sets alarms if the levels drop below 1.0 mg/L. The existing system is in good condition.

3.2.2 Microbial Water Quality

Schedule A in the existing Mahone Bay WTP *Approval to Operate* requires the Town to collect grab samples on a weekly basis to monitor for total coliforms and *E. coli*. Samples are collected from four distribution locations on a weekly basis. All test results in 2021 showed absent for the presence of *E. coli* and total coliforms. As a result, the Mahone Bay WTP complies with the required distribution system bacteriological sampling.

3.2.3 Turbidity

The distribution system was monitored for turbidity at four distribution sampling locations. The four sites and sampling schedules are as follows and are marked on the distribution map in Appendix C:

- ▶ Site A: WTP, prior to the first customer - (five grab samples weekly).
- ▶ Site B: Town Hall, 493 Main Street - (five grab samples weekly).
- ▶ Site C: 740 Main Street - (one grab sample weekly).
- ▶ Site D: Bayview School, 110 Clearway Street - (one grab sample weekly).

Schedule A in the *Approval to Operate* requires the Mahone Bay WTP to grab turbidity samples on a weekly basis to monitor for distribution turbidity to ensure values are maintained below 5.0 NTU. The 2021 turbidity samples collected from these four locations were all within compliance.

3.2.4 Cross Connection Control Program

The Town has indicated that it is in the process of developing a Cross Connection Program to comply with NSECC requirements. The program has not been submitted to NSECC for approval. The program does not have a set start date and does not meet the minimum requirements outlined in *A Guide to Assist Nova Scotia Municipal Water Works Develop A Cross Connection Control Program*.

The Town should finalize the Cross-Connection Control Program in accordance with *A Guide to Assist Nova Scotia Municipal Water Works Develop A Cross Connection Control Program* and submit it to NSECC for approval.

3.2.5 Other Distribution System Monitoring Programs

Other distribution system monitoring programs in place for the system include:

- ▶ QA/QC Program.
- ▶ Quarterly distribution manganese grab samples.
- ▶ Monthly distribution aluminium grab samples.
- ▶ Monthly distribution iron grab samples.
- ▶ Twice weekly maintenance flow monitoring, Oakland Lake outlet.

3.3 On-Site Inspection

An on-site inspection was conducted on April 19th, 2023, by Ben Bickerton, M.A.Sc., P.Eng. and Zack Levisky, B.Eng. There were no concerns identified at this time.

3.4 Conclusion & Recommendations

3.4.1 Turbidity Levels

All membrane filter units performed to an acceptable standard, producing filtered water with turbidity less than or equal to 0.1 NTU in at least 99% of the measurements made in 2022. There were 197 instances of filtrate turbidity exceeding 0.3 NTU in 2022. These exceedances were a result of air bubbles, operator turnover, and a faulty drain valve. MIT following exceedances confirmed that adequate log reductions were met in all filters and as such the filters met the requirement of the *Approval to Operate*.

The current operation is such that membrane filters are backwashed regularly, with the backwash water being sent to waste until filter turbidity values drop below 0.1 NTU. Each filter skid is capable of meeting half of the maximum design flow of the WTP, providing the necessary redundancy.

The Town should investigate the exceedances resulting from air bubbles and make modifications to the sample lines/turbidimeters themselves to eliminate nuisance air bubble-associated turbidity exceedances.

3.4.2 Membranes

The membrane filtration at the WTP is provided by two PALL AP-4 microfiltration skids. MIT was performed daily for each train and verified that adequate log-removal credits were met.

3.4.3 Primary Disinfection

The Mahone Bay WTP utilizes a combination of chemical and UV disinfection systems to provide adequate primary disinfection. A 12% sodium hypochlorite solution is dosed to achieve a 4.0-log reduction of viruses. CT calculations confirm that primary disinfection was adequate to always provide primary disinfection during 2021. Sodium hypochlorite is dosed from three diaphragm metering pumps, providing the necessary redundancy.

The required 0.5 log reduction of *Giardia* is achieved by the Low Pressure High Output (LPHO) UV reactor. The UV reactor is rated to provide a dose of 40 mJ/cm² at a transmittance of 90% at a maximum flow rate of 682 Lpm. During 2021, the IT parameters remained within the acceptable range, providing adequate primary disinfection. The WTP has a single UV reactor and uses the chlorination system to provide adequate redundancy.

SOPs developed for disinfection provide guidance on free chlorine concentrations in the contact chamber and distribution system. The SOPs contain critical information with regards to CT calculation setpoints, and the necessary response and notification procedures in the case that chlorine residual falls below the required minimum.

The Town should add an equation in SCADA to calculate the actual CT_{required} based on the operational conditions. This will be used to ensure CT is met if the UV unit goes offline.

3.4.4 Secondary Disinfection

Secondary disinfection is achieved by maintaining a minimum free chlorine residual of 0.2 mg/L at all points within the distribution system. Grab samples are collected weekly at designated distribution sample locations with a HACH DR2800 spectrophotometer. Sodium hypochlorite is dosed at the exit of the reservoir to maintain secondary disinfection within the distribution system. Secondary disinfection never fell below 0.2 mg/L in 2021, meeting the requirements outlined in the *Approval to Operate*.

3.4.5 Other Critical Processes

An ortho-polyphosphate corrosion control system has been implemented to reduce corrosion within the distribution system. The treatment process at the WTP appears to be within acceptable operating parameters including optimization of chemical feed and process control for coagulation, flocculation, filtration, and disinfection.

3.4.6 Waste Streams

3.4.6.1 Filter-to-Waste

Process wastewater is directed to a municipal sewer, which feeds into the Mahone Bay WWTP.

3.4.6.2 Filter Backwash Water

Process wastewater is discharged to a municipal sewer and eventually undergoes treatment at the Mahone Bay WWTP.

3.4.7 Distribution Water Quality

3.4.7.1 Chlorine Residual Levels

To satisfy the continuous online monitoring clause of the *Approval to Operate*, operators utilize HACH DR2800 and HACH Pocket Pro spectrophotometers to collect weekly free chlorine samples from distribution sample points. A Rosemount Analytical 1056 FCL chlorine analyzer continuously monitors the chlorine residual levels entering the

distribution system. Data for 2021 from all locations showed residual levels greater than 0.2 mg/L.

3.4.7.2 Microbial Water Quality

All *E. coli* and total coliform test results in 2021 showed absent for the presence of total coliforms and *E. coli*. As a result, the distribution system microbial water quality for the Town is within compliance.

3.4.7.3 Turbidity

The distribution system was monitored for turbidity on a weekly or a five time per week basis at four distribution sample locations. All turbidity samples collected in 2021 from these four locations are within compliance and below 5.0 NTU.

3.4.7.4 Cross Connection Control Program

The Town has begun the development of a new Cross-Connection Control Program. The program has not been submitted to NSECC.

The Town should continue to develop the Cross-Connection Control Program and submit to NSECC.

3.4.7.5 Other Distribution System Monitoring Programs

The Town conducts a variety of additional distribution monitoring programs including quarterly manganese grab samples and monthly aluminium and iron grab samples. The Town also conducts a QA/QC program and twice weekly maintenance flow monitoring.

3.4.8 On-site Inspection

An on-site inspection was conducted on April 19, 2023, and no concerns were identified at that time.

4 Operations, Monitoring, & Management

4.1 Operations & Maintenance

As required by the *Approval to Operate*, the WTP has an Operations and Maintenance Manual which outlines the characteristics of the WTP and includes emergency action plans. The Operations and Maintenance Manual also contains SOPs for normal plant operations, including coagulation, filtration, and disinfection. The Operations and Maintenance Manual is located at the WTP (68 Zwicker Lane).

Sections of the Operations and Maintenance Manual are as follows:

- ▶ Chapter 1: Introduction & General Information.
- ▶ Chapter 2: Facility Overview & Operational Details.
- ▶ Chapter 3: Oakland Lake Pumping Station.
- ▶ Chapter 4: Coagulation/Flocculation.
- ▶ Chapter 5: Filtration.
- ▶ Chapter 6: Disinfection.
- ▶ Chapter 7: Treated Water Storage.
- ▶ Chapter 8: Water Quality Monitoring.
- ▶ Chapter 9: Emergency Notification Procedures.

All certified operators make process adjustments such as chemical dosing changes, initiating backwashing, and performing equipment and instrument maintenance, as required based on experience and continuous evaluation of plant performance. The Operator in Direct Responsible Charge (ODRC) is ultimately responsible for changes, and significant changes beyond routine adjustments are discussed with the ODRC prior to implementing the change. The Operations and Maintenance Manual outlines various SOPs for the operations staff to follow.

4.2 Monitoring & Reporting

A 2022-2023 monitoring program of the WTP was submitted to NSECC. The plan includes quality assurance programs, water quality compliance limits, data evaluation, sampling sites, and monitoring plans. Compliance monitoring is required to ensure the water distributed after leaving the plant adheres by the quality standards of the *GCDWQ*.

A summary of the raw and treated water sampling programs analyzed at accredited third-party labs are provided in Table 4.1 and Table 4.2.

Table 4.1: Mahone Bay WTP Raw Water Sampling Program

Summary of Raw Water Requirements			
Parameter	Approval to Operate Sampling Requirements		Mahone Bay WTP Sampling Program
	Location	Frequency	Frequency
Turbidity	Raw Water	Continuous	Continuous
	Raw Water	-	Weekly Grab
Water Volume	Raw Water	Continuous	Continuous
Temperature	Raw Water	-	Continuous
All <i>GMPDWS</i>	Raw Water	Annually	Annually
All <i>GCDWQ</i>	Raw Water	Every 5 Years	Every 5 Years
Iron	Raw Water	-	Weekly Grab
Lead	Raw Water	-	Annually
Manganese	Raw Water	-	Quarterly Grab
Viruses	Raw Water	As Requested	As Requested
<i>Giardia</i> and <i>Cryptosporidium</i>	Raw Water	As Requested	As Requested
Cyanobacteria	Raw Water	Weekly Visual	Five times per Week
Cyanobacterial Toxins– Total Microcystins	Raw Water	During a Bloom	During a Bloom
	Raw Water	Every 5 Years for <i>GCDWQ</i> – Warmest Months	Every 5 Years for <i>GCDWQ</i> – Warmest Months

Table 4.2: Mahone Bay WTP Treated and Distribution Water Sampling Program

Summary of Treated Water and Distribution Monitoring Requirements			
Parameter	Approval to Operate Sampling Requirements		Mahone Bay WTP Sampling Program
	Location	Frequency	Frequency
Turbidity	Individual Filter Effluent	Continuous	Continuous
	Filter-to-Waste	Continuous	-
	Distribution Samples	Weekly Grab	Weekly & Weekday Grab
Temperature	CT Control Point	Continuous	Continuous
	Filter Effluent	-	Continuous
pH	CT Control Point	Continuous	Continuous
	Entering Distribution	-	5 Times per Week
Free Chlorine	CT Control Point	Continuous	Continuous
	Storage Structure Outlet	Continuous	Continuous
	Distribution Samples	Weekly Grab	Weekly Grab
	Distribution Samples	-	5 Grab samples per Week
UV Dose	UV Chamber	Continuous	Continuous
Total Coliform and <i>E. coli</i> (P/A)	Entering Distribution	Weekly Grab	Weekly Grab
	Distribution Samples	Weekly Grab	Weekly Grab
All <i>GMPDWS</i>	Entering Distribution	Annually	Annually
All <i>GCDWQ</i>	Entering Distribution	Every 5 Years	Every 5 Years
Corrosion Monitoring Program	Entering Distribution	Quarterly Grab	Quarterly Grab
	Representative Distribution Samples	Quarterly Grab	Quarterly Grab
Lead (Flushed Samples)	Representative Distribution Samples	Annually – Warmest Months	Annually – Warmest Months
Lead	Tier-1: Stagnated Residential Samples	Annually – Between May & October	-
	Tier 2: Stagnated Residential Samples	If >10% of Tier 1 samples exceed MAC	-
Aluminium	Entering Distribution	-	Monthly
	Town Hall	-	Monthly & Quarterly
Copper	Entering Distribution	-	Quarterly Grab
	Representative Distribution Samples	-	Quarterly Grab
Iron	Entering Distribution	-	Weekly Grab
	Representative Distribution Samples	-	Weekly Grab
Manganese	Entering Distribution	-	Quarterly Grab
	Representative Distribution Samples	-	Quarterly Grab
HAA's	Representative Distribution Samples	Quarterly Grab	Quarterly Grab
THM's	Representative Distribution Samples	Quarterly Grab	Quarterly Grab
NDMA	Representative Distribution Samples	-	Quarterly Grab
Viruses	Distribution Samples	As Requested	As Requested
<i>Giardia</i> and <i>Cryptosporidium</i>	Distribution Samples	As Requested	As Requested
Cyanobacterial Toxins – Total Microcystins	Treated Water	During a Bloom	During a Bloom
	Treated Water	Every 5 Years for <i>GCDWQ</i> –Warmest Months	Every 5 Years for <i>GCDWQ</i> – Warmest Months

All samples, apart from *E. coli* and total coliforms, collected for the various monitoring programs are sent to AGAT Laboratories in Dartmouth, NS for analysis. *E. coli* and total coliforms samples are sent to the Southshore Regional Hospital in Bridgewater, NS. AGAT Laboratories and the Southshore Regional Hospital are both accredited third-party laboratories.

4.2.1 Review of Recent Submitted Annual Report

The 2022 Annual Report was reviewed and appears to have addressed all report requirements.

4.3 Management

The system has been classified as a Class II Water Treatment (WT) Facility and a Class I Water Distribution (WD) Facility. Scott Hoyt, the Water/Wastewater Manager is the ODRC of the WTP. Plant staffing information is provided as:

- ▶ Scott Hoyt – Level I WT.
- ▶ Blake Tibert – OIT.
- ▶ Ben Underhill (AIWUC) – Level II WT.
- ▶ Chahin Ali (AIWUC) – Level I WT.

There is not an adequate number of trained staff to operate the WTP and WD system. There are currently only two full time staff working at the WTP, which doesn't provide the necessary redundancy. Independent operators from AIWUC have been hired to provide additional operations support.

Furthermore, staff are not trained to an acceptable level to operate the drinking water system. Full time WTP employees are certified below the Class II WT rating for the WTP. The only fully trained staff has been hired as a consultant and does not conduct daily operational duties of the WTP. The ODRC protocol information is provided in Table C.1 in Appendix A.

The Town should train current staff to meet the classification of the existing treatment and distribution system (WT II and WD I). The Town should hire an additional WTP operator to provide more operational support and staffing redundancy.

4.4 Conclusion & Recommendations

4.4.1 Operation & Maintenance

The WTP has a comprehensive Operations and Maintenance Manual.

4.4.2 Monitoring & Reporting

The 2023 Annual Sampling Plan and 2022 Annual Report were reviewed and have addressed all requirements. The plan was adequate in meeting sampling requirements prescribed in the *Approval to Operate*, *GCDWQ*, and *GMPDWS*. Lab samples are analyzed by accredited laboratories.

4.4.3 Management

The ODRC is Scott Hoyt. All operators are not adequately certified and there is not a sufficient number of operators as well as back-up personnel available. The procedure for when the ODRC is absent is outlined in Appendix A.

The Town should train current staff to meet the classification of the existing treatment and distribution system (WT II and WD I). The Town should hire an additional WTP operator to provide more operational support and staffing redundancy.

5 Ability to Comply

This section will provide a summary of conclusions as referenced from the NSECC Terms of Reference.

5.1 Summary

5.1.1 Treatment Processes, Facilities, & Equipment

5.1.1.1 Treatment Process

Water is supplied from surface water from Oakland Lake, within the municipal boundaries of the MODL. The treatment process consists of coagulation, flocculation, clarification, membrane filtration, UV disinfection and chlorine disinfection. The *Approval to Operate* is valid until May 1, 2029.

5.1.1.2 Turbidity Levels & Associated Criteria

The turbidity of filtered water leaving the membrane filtration units must be less than or equal to 0.1 NTU in at least 99% of the measurements made in each calendar month. Membrane filters ZW1, ZW2, and ZW3 were all able to meet this criterion. Filter turbidity is also not to exceed 0.3 NTU at any time. During 2021, there were six occurrences with measurements above 0.3 NTU and these exceedance events occurred while filters were not in operation. The three membrane filters were compliant with the turbidity level criteria outline in the *Approval to Operate*.

5.1.1.3 Primary Disinfection

All municipal drinking water systems in Nova Scotia are required to meet treatment standards to achieve:

- ▶ 3.0-log removal for *Giardia* and *Cryptosporidium*.
- ▶ 4.0-log removal credits for viruses.

The membrane filtration skids at the WTP have been assigned a 3.0-log removal credit for *Giardia* and *Cryptosporidium*. The remaining 0.5-log removal of *Giardia* is completed with UV disinfection and the 4.0-log removal of viruses is completed using chlorine disinfection. During 2022, UV disinfection was sufficient to always maintain an adequate IT to achieve a 0.5 log reduction of *Giardia*. CT calculations for the “worst case scenario” confirm that chlorine disinfection is adequate to always achieve a 4.0-log reduction of viruses. As such,

the combination of membrane filtration, UV disinfection, and chemical disinfection is able to remove and inactivate protozoa (*Giardia* and *Cryptosporidium*) and viruses to NSECC's treatment standards.

5.1.1.4 Secondary Disinfection

Secondary disinfection is achieved by maintaining a minimum free chlorine residual of 0.2 mg/L at all points within the distribution system. Chlorine is dosed at the exit of the reservoir with a 12% sodium hypochlorite solution to maintain secondary disinfection within the distribution system. Residuals leaving the reservoir are typically maintained between 1.5-2.0 mg/L. Weekly grab samples collected in 2021 confirm that chlorine residuals did not fall below 0.2 mg/L in the distribution system.

5.1.1.5 Other Critical Processes

An ortho-polyphosphate corrosion control system has been implemented to reduce corrosion within the distribution system.

5.1.1.6 Process Waste Streams

Process wastewater is directed to a 9,000 L precast concrete wastewater equalization tank. Process wastewater is subsequently pumped from the EQ tank into a municipal sewer, which feeds into the Mahone Bay WWTP.

5.1.2 Distribution System Water Quality

5.1.2.1 Chlorine Residuals

A chlorine analyzer continuously monitors the chlorine residual levels entering the distribution system. Chlorine residual grab samples are taken on a weekly basis from distribution sample points. Data for 2021 from all locations showed residual levels greater than 0.2 mg/L.

5.1.2.2 Microbial Water Quality

All *E. coli* and total coliform test results in 2021 showed absent for the presence of total coliforms and *E. coli*.

5.1.2.3 Turbidity

The distribution system was monitored for turbidity on either a weekly or five times per week basis at four distribution sample locations. All turbidity samples collected in 2021 were within compliance and below 5.0 NTU.

5.1.2.4 Cross-Connection Control Programs

The Town has begun the development of a new Cross Connection Control Program. The program has not been submitted to NSECC.

5.1.2.5 Other Distribution System Monitoring Programs

Additional distribution sampling includes quarterly manganese grab samples, monthly aluminium, and monthly iron grab samples. The Town also conducts a QA/QC program and twice weekly maintenance flow monitoring at the outlet of the source water supply.

5.1.3 Operations, Monitoring, & Management

5.1.3.1 Operations & Maintenance

The Town has an Operations and Maintenance Manual that outlines the characteristics of the WTP and includes emergency actions and SOPs for normal facility operation.

5.1.3.2 Monitoring & Reporting

The 2023 Annual Sampling Plan and 2021 Annual Report were reviewed and have addressed all requirements. Lab samples are analyzed by accredited laboratories.

5.1.3.3 Management

The WTP has been classified as a Class II Water Treatment Facility and a Class I Water Distribution Facility. Scott Hoyt, Water and Wastewater Manager, Level I Water Treatment is the ODRC of the WTP.

Table 5.1 summarizes the recommendations to problems identified throughout this report.

Table 5.1: Recommendations for the Mahone Bay Water Utility

Category	Problem/Challenge	Recommended Action	Time Frame to Complete	Opinion of Cost
Water Quality	DBP's	Conduct 1 year of additional THM/HAA sampling to ensure appropriate sampling locations.	2023	\$5,000
Water Quality	Lead Sampling	Commence residential lead & copper sampling.	2023	\$1,000/yr
Water Quality	Corrosion Control Sampling	Collect all corrosion control parameters on a quarterly basis.	Q3 2023	\$2,000/yr
Source Quantity	Withdrawal Exceedances	Seek to increase allowable rate of withdrawal from source water.	2024	No cost if done in-house. External studies may be required.
Monitoring	Cross Connection Control Program	Continue to develop cross-connection control program and submit to NSECC	2023	No cost if done in-house.
Operations	Primary Disinfection	Add equation to calculate CT_{required} in SCADA for primary disinfection.	2023/24	\$5,000
Operations	Management	Train current staff to meet classification of treatment and distribution system.	2023/24	No cost if done in-house.
Operations	Management	Hire an additional WTP operator to provide additional support	As soon as possible	1 Full-Time Operator

5.2 Report Preparation

I, the undersigned, hereby declare that to the best of my knowledge, the information contained herein and the information in support of this submission, as completed by me, is complete and accurate in accordance with my obligations under the Engineering Profession Act and its regulations. I further declare that this submission has been prepared in accordance with the published standard for this submission.

A handwritten signature in blue ink, appearing to read 'BBB', with a long horizontal flourish extending to the right.

Ben Bickerton, M.A.Sc., P.Eng.
Process Engineer

APPENDIX A

Tables Required by the Terms of References

Table A.1: Groundwater Under the Direct Influence of Surface Water: (MP) Test Results
Table not applicable to system

Table A.2: Annual Trihalomethanes Concentrations (THMs) by Sample Location

Sampling Period/Month		Site C: 740 Main Street
		THM total (ug/L)
Q1	January	-
	February	-
	March	53
Q2	April	-
	May	-
	June	97
Q3	July	-
	August	-
	September	87
Q4	October	-
	November	-
	December	69
LRAA (µg/L)		77
Meets MAC of 0.1 mg/L (100 µg/L)		Yes

Table A.3: Annual Haloacetic Acid Concentrations (HAA5) by Sample Location

Sampling Period/Month		Site B: Town Hall	Site C: 740 Main Street
		HAA (5) ug/L	HAA (5) ug/L
Q1	January	-	-
	February	-	-
	March	27	29
Q2	April	-	-
	May	-	-
	June	41	47
Q3	July	-	-
	August	-	-
	September	47	48
Q4	October	-	-
	November	-	-
	December	33	37
LRAA (µg/L)		37	40
Meets MAC of 0.08 mg/L (80 µg/L)		Yes	Yes

Table A.4: Health-Related Parameters in the Guidelines for Canadian Drinking Water Quality

Parameter	MAC (mg/L)	Raw Water			Treated Water		
		Sampling Period			Sampling Period		
		10/18/2017	08/29/2022	2027	10/18/2017	08/29/2022	2027
Bacteria							
Total Coliforms	None per 100 mL	-	-	-	-	-	-
<i>E. coli</i>	None per 100 mL	-	-	-	-	-	-
Aluminum	2.9	0.052	0.061	-	0.037	ND	-
Antimony	0.006	ND	ND	-	ND	ND	-
Arsenic	0.01	ND	ND	-	ND	ND	-
Atrazine	0.005	ND	ND	-	ND	ND	-
Barium	2	ND	ND	-	ND	ND	-
Benzene	0.005	ND	ND	-	ND	ND	-
Benzo[<i>a</i>]pyrene	0.00004	ND	ND	-	ND	ND	-
Boron	5	0.013	0.006	-	0.009	0.0066	-
Bromate	0.01	ND	ND	-	ND	ND	-
Bromoxynil	0.03	ND	ND	-	ND	ND	-
Cadmium	0.007	ND	ND	-	ND	ND	-
Carbon tetrachloride	0.002	ND	ND	-	ND	ND	-
Chlorate	1	ND	ND	-	0.68	0.39	-
Chlorite	1	ND	ND	-	ND	ND	-
Chlorpyrifos	0.09	ND	ND	-	ND	ND	-
Chromium	0.05	ND	ND	-	ND	ND	-
Copper	2	0.003	0.012	-	ND	ND	-
Cyanide	0.2	0.003	ND	-	ND	ND	-
Cyanobacterial toxins	0.0015	ND	ND	-	ND	ND	-
Dicamba	0.11	ND	ND	-	ND	ND	-
1,4-Dichlorobenzene	0.005	ND	ND	-	ND	ND	-
1,2-Dichloroethane	0.005	ND	ND	-	ND	ND	-
1,1-Dichloroethylene	0.014	ND	ND	-	ND	ND	-
Dichloromethane	0.05	ND	ND	-	ND	ND	-
2,4-Dichlorophenoxy acetic acid (2,4-D)	0.1	ND	ND	-	ND	ND	-
Dimethoate	0.02	ND	ND	-	ND	ND	-
1,4-Dioxane	0.05	-	-	-	-	-	-
Diquat	0.05	ND	ND	-	ND	ND	-
Ethylbenzene	0.14	ND	ND	-	ND	ND	-
Fluoride	1.5	ND	ND	-	ND	ND	-
Glyphosate	0.28	ND	ND	-	ND	ND	-
Haloacetic acids - Total (HAAs)	0.08	ND	ND	-	0.0682	0.037	-
Lead	0.005	ND	0.0026	-	ND	ND	-
Malathion	0.19	ND	ND	-	ND	ND	-
Manganese	0.12	0.041	0.046	-	0.002	0.004	-
Mercury	0.001	ND	ND	-	ND	ND	-
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	0.35	ND	ND	-	ND	ND	-

Parameter	MAC (mg/L)	Raw Water			Treated Water		
		Sampling Period			Sampling Period		
		10/18/2017	08/29/2022	2027	10/18/2017	08/29/2022	2027
Metribuzin	0.08	ND	ND	-	ND	ND	-
Nitrate-Nitrogen	10	0.07	ND	-	ND	ND	-
Nitrilotriacetic acid (NTA)	0.4	ND	ND	-	ND	ND	-
Nitrite-Nitrogen	1	-	ND	-	-	ND	-
N-Nitroso dimethylamine (NDMA)	0.00004	ND	ND	-	ND	ND	-
Pentachlorophenol	0.06	ND	ND	-	ND	ND	-
Perfluorooctane Sulfonate (PFOS)	0.0006	-	ND	-	-	ND	-
Perfluorooactanoic Acid (PFOA)	0.0002	-	ND	-	-	ND	-
Selenium	0.05	ND	ND	-	ND	ND	-
Strontium	7	-	0.01	-	-	0.01	-
Tetrachloroethylene	0.01	ND	ND	-	ND	ND	-
Toluene	0.06	ND	ND	-	ND	ND	-
Trichloroethylene	0.005	ND	ND	-	ND	ND	-
2,4,6-Trichlorophenol	0.005	ND	ND	-	ND	ND	-
Trihalomethanes (THM)	0.1	ND	-	-	0.024	-	-
Turbidity		1.2	4.4	-	0.5	1.0	-
Uranium	0.02	ND	ND	-	ND	ND	-
Vinyl chloride	0.002	ND	ND	-	ND	ND	-
Xylenes (total)	0.09	ND	ND	-	ND	ND	-

Table A.5: Guidelines for Monitoring Public Drinking Water Supplies

Parameter	MAC	AO	2013		2014		2015 (10/07)		2016		2017 (10/12)		2018 (08/15)		2019 (08/13)		2020 (08/28)		2021 (08/17)		2022 (08/30)	
	(mg/L)	(mg/L)	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.	Raw	Treat.
Alkalinity			-	-	-	-	13	ND	-	-	ND	17	ND	12	ND	16	ND	16	ND	16	5	16
Aluminium	0.1/0.2		-	-	-	-	0.073	0.018	-	-	0.054	0.037	0.063	0.012	0.055	0.011	0.055	0.010	0.065	0.009	0.060	0.011
Ammonia			-	-	-	-	ND	ND	-	-	0.07	0.05	0.03	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	0.006		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	0.01		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium	1		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron	5		-	-	-	-	0.005	0.006	-	-	ND	ND	0.008	0.007	ND	ND	0.005	ND	ND	ND	0.006	0.005
Cadmium	0.005		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium			-	-	-	-	2.1	2.0	-	-	2.0	2.3	2.3	1.9	1.7	1.4	1.7	1.6	1.8	1.8	1.7	1.6
Chloride		≤250	-	-	-	-	20	31	-	-	20	33	21	35	20	31	20	33	14	23	15	24
Chromium	0.05		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Colour		≤ 15 TCU	-	-	-	-	23	<5	-	-	28	6	32	14	<5	9	22	7	55	48.6	21.1	<5
Conductivity			-	-	-	-	88	144	-	-	89	151	96	150	88	153	87	155	91	158	83	151
Copper		≤1.0	-	-	-	-	0.013	ND	-	-	0.004	ND	0.005	ND	0.003	ND	0.003	ND	0.002	ND	0.010	ND
Fluoride	1.5		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness			-	-	-	-	8.9	8.7	-	-	8.7	9.0	9.9	8.5	7.5	6.0	7.5	6.9	7.4	7.8	8.0	7.3
Iron		≤0.3	-	-	-	-	0.324	ND	-	-	0.266	0.052	0.370	ND	0.132	ND	0.291	0.054	0.294	ND	0.2	ND
Lead	0.01		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND
Magnesium			-	-	-	-	0.9	0.9	-	-	0.9	0.8	1.0	0.9	0.8	0.6	0.8	0.7	0.7	0.8	0.9	0.8
Manganese		≤0.05	-	-	-	-	0.044	0.004	-	-	0.046	0.002	0.327	0.004	0.023	0.003	0.089	0.003	0.101	0.003	0.046	0.002
Nitrate-nitrogen	10		-	-	-	-	ND	0.09	-	-	ND	ND	0.06	ND	ND	ND	ND	ND	ND	ND	ND	0.06
pH		6.5-8.5	-	-	-	-	6.55	7.65	-	-	6.31	7.50	6.27	7.19	6.15	7.76	6.25	7.65	5.85	6.71	7.08	7.17
Potassium			-	-	-	-	0.5	0.4	-	-	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.4	0.4	0.3	0.3
Selenium	0.01		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium		≤200	-	-	-	-	14.6	30.0	-	-	13.5	28.9	14.9	30.1	13.3	22.6	13.3	27.4	12.2	24.5	13	27
Sulphate		≤500	-	-	-	-	2	4	-	-	3	4	3	4	3	5	4	11	6	5	5	3
Total Dissolved Solids		≤500	-	-	-	-	41	77	-	-	40	80	43	80	39	71	40	84	36	65	39	67
Total Organic Carbon			-	-	-	-	4.7	1.8	-	-	4.3	1.4	4.0	1.8	5.3	1.6	4.2	1.4	4.6	ND	4.9	1.9
Turbidity			-	-	-	-	0.7	0.6	-	-	1.3	0.5	0.9	0.4	2.8	1.7	1.0	<0.5	0.7	0.6	0.9	0.5
Uranium	0.02		-	-	-	-	ND	ND	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc		≤5	-	-	-	-	26	ND	-	-	0.006	0.005	0.009	ND	ND	ND	ND	ND	ND	ND	0.006	ND

Table A.6.a: Water Withdrawal Data

Month	Source 1 - Oakland Lake			
	Monthly Maximum Daily Rate (L/d)	Monthly Average Daily Rate (L/d)	Monthly Withdrawal Volume (L)	Annual Withdrawal Volume (L)
January	575,667	528,400	15,852,000	
February	657,667	507,933	15,238,000	
March	586,333	538,967	16,169,000	
April	619,000	516,467	15,494,000	
May	572,000	537,733	16,132,000	
June	664,333	615,067	18,452,000	
July	764,000	708,633	21,259,000	
August	741,000	731,633	21,949,000	
September	851,000	749,533	22,486,000	
October	836,333	765,867	22,976,000	
November	761,333	682,733	20,482,000	
December	694,333	629,467	18,884,000	
Total Annual Withdrawal				225,373,000

Table A.6.b: Water Withdrawal Data Comparison to Approved Limits

Source 1- Oakland		
Specify Approved Withdrawal Limits		Exceeds (Yes/No)
Maximum Daily Rate (litres/day)	960,000	No
Average Daily Rate (litres/day)	710,000	Yes
Volume (30 days) (litres)	-	No
Volume (Annual) (litres)	-	No

Table B.1: Membrane Filtration Direct Integrity Testing Using Pressure Decay

Date	Skid A (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid A (ΔkPa/min)
1-Jan-21	1.1	300	5	0.22
2-Jan-21	2.7	300	5	0.54
3-Jan-21	1.3	300	5	0.26
4-Jan-21	1.3	300	5	0.26
5-Jan-21	0.9	300	5	0.18
6-Jan-21	1.1	300	5	0.22
7-Jan-21	1.1	300	5	0.22
8-Jan-21	1.5	300	5	0.3
9-Jan-21	1.8	300	5	0.36
10-Jan-21	2.7	300	5	0.54
11-Jan-21	1.8	300	5	0.36
12-Jan-21	2.6	300	5	0.52
13-Jan-21	0.9	300	5	0.18
14-Jan-21	1.6	300	5	0.32
15-Jan-21	3.1	300	5	0.62
16-Jan-21	1.3	300	5	0.26
17-Jan-21	1.1	300	5	0.22
18-Jan-21	0.3	300	5	0.06
19-Jan-21	1.8	300	5	0.36
20-Jan-21	1.5	300	5	0.3
21-Jan-21	2.5	300	5	0.5
22-Jan-21	1.6	300	5	0.32
23-Jan-21	2.0	300	5	0.4
24-Jan-21	0.5	300	5	0.1
25-Jan-21	2.4	300	5	0.48
26-Jan-21	1.4	300	5	0.28
27-Jan-21	1.6	300	5	0.32
28-Jan-21	0.4	300	5	0.08
29-Jan-21	0.9	300	5	0.18
30-Jan-21	1.6	300	5	0.32
31-Jan-21	1.4	300	5	0.28
1-Feb-21	0.5	300	5	0.1
2-Feb-21	2.9	300	5	0.58
3-Feb-21	1.6	300	5	0.32
4-Feb-21	1.6	300	5	0.32
5-Feb-21	1.6	300	5	0.32
6-Feb-21	2.1	300	5	0.42
7-Feb-21	2.2	300	5	0.44
8-Feb-21	1.5	300	5	0.3
9-Feb-21	0.9	300	5	0.18
10-Feb-21	1.1	300	5	0.22
11-Feb-21	2.2	300	5	0.44
12-Feb-21	2.0	300	5	0.4
13-Feb-21	1.6	300	5	0.32
14-Feb-21	1.8	300	5	0.36
15-Feb-21	1.3	300	5	0.26
16-Feb-21	0.9	300	5	0.18
17-Feb-21	1.5	300	5	0.3
18-Feb-21	2.0	300	5	0.4
19-Feb-21	0.9	300	5	0.18
20-Feb-21	2.7	300	5	0.54
21-Feb-21	1.8	300	5	0.36
22-Feb-21	2.5	300	5	0.5
23-Feb-21	1.1	300	5	0.22
24-Feb-21	1.3	300	5	0.26
25-Feb-21	2.0	300	5	0.4
26-Feb-21	1.8	300	5	0.36
27-Feb-21	1.3	300	5	0.26
28-Feb-21	1.1	300	5	0.22
1-Mar-21	1.5	300	5	0.3
2-Mar-21	1.6	300	5	0.32
3-Mar-21	2.1	300	5	0.42
4-Mar-21	0.7	300	5	0.14
5-Mar-21	1.3	300	5	0.26
6-Mar-21	3.4	300	5	0.68
7-Mar-21	2.0	300	5	0.4
8-Mar-21	2.5	300	5	0.5
9-Mar-21	1.6	300	5	0.32
10-Mar-21	1.6	300	5	0.32
11-Mar-21	1.6	300	5	0.32
12-Mar-21	2.7	300	5	0.54
13-Mar-21	3.1	300	5	0.62
14-Mar-21	0.2	300	5	0.04
15-Mar-21	1.6	300	5	0.32
16-Mar-21	1.1	300	5	0.22
17-Mar-21	0.9	300	5	0.18
18-Mar-21	1.6	300	5	0.32

Date	Skid A (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid A (ΔkPa/min)
19-Mar-21	2.7	300	5	0.54
20-Mar-21	1.8	300	5	0.36
21-Mar-21	0.6	300	5	0.12
22-Mar-21	1.1	300	5	0.22
23-Mar-21	2.2	300	5	0.44
24-Mar-21	1.1	300	5	0.22
25-Mar-21	2.2	300	5	0.44
26-Mar-21	1.8	300	5	0.36
27-Mar-21	2.7	300	5	0.54
28-Mar-21	0.9	300	5	0.18
29-Mar-21	1.3	300	5	0.26
30-Mar-21	1.1	300	5	0.22
31-Mar-21	2.7	300	5	0.54
1-Apr-21	2.5	300	5	0.5
2-Apr-21	0.9	300	5	0.18
3-Apr-21	0.9	300	5	0.18
4-Apr-21	2.5	300	5	0.5
5-Apr-21	1.8	300	5	0.36
6-Apr-21	1.6	300	5	0.32
7-Apr-21	1.1	300	5	0.22
8-Apr-21	2.3	300	5	0.46
9-Apr-21	2.7	300	5	0.54
10-Apr-21	1.8	300	5	0.36
11-Apr-21	2.2	300	5	0.44
12-Apr-21	1.8	300	5	0.36
13-Apr-21	1.6	300	5	0.32
14-Apr-21	0.7	300	5	0.14
15-Apr-21	0.5	300	5	0.1
16-Apr-21	1.4	300	5	0.28
17-Apr-21	1.6	300	5	0.32
18-Apr-21	2.7	300	5	0.54
19-Apr-21	2.7	300	5	0.54
20-Apr-21	1.8	300	5	0.36
21-Apr-21	0.9	300	5	0.18
22-Apr-21	0.9	300	5	0.18
23-Apr-21	1.4	300	5	0.28
24-Apr-21	0.9	300	5	0.18
25-Apr-21	2.1	300	5	0.42
26-Apr-21	1.3	300	5	0.26
27-Apr-21	1.8	300	5	0.36
28-Apr-21	2.2	300	5	0.44
29-Apr-21	1.4	300	5	0.28
30-Apr-21	3.1	300	5	0.62
1-May-21	1.1	300	5	0.22
2-May-21	2.7	300	5	0.54
3-May-21	1.5	300	5	0.3
4-May-21	1.3	300	5	0.26
5-May-21	1.6	300	5	0.32
6-May-21	1.3	300	5	0.26
7-May-21	2.7	300	5	0.54
8-May-21	2.7	300	5	0.54
9-May-21	1.1	300	5	0.22
10-May-21	1.8	300	5	0.36
11-May-21	3.0	300	5	0.6
12-May-21	1.6	300	5	0.32
13-May-21	1.3	300	5	0.26
14-May-21	1.1	300	5	0.22
15-May-21	1.6	300	5	0.32
16-May-21	0.2	300	5	0.04
17-May-21	1.1	300	5	0.22
18-May-21	2.2	300	5	0.44
19-May-21	2.9	300	5	0.58
20-May-21	1.7	300	5	0.34
21-May-21	1.1	300	5	0.22
22-May-21	2.2	300	5	0.44
23-May-21	2.7	300	5	0.54
24-May-21	0.2	300	5	0.04
25-May-21	1.1	300	5	0.22
26-May-21	0.6	300	5	0.12
27-May-21	1.3	300	5	0.26
28-May-21	3.8	300	5	0.76
29-May-21	2.0	300	5	0.4
30-May-21	2.0	300	5	0.4
31-May-21	1.8	300	5	0.36
1-Jun-21	3.4	300	5	0.68
2-Jun-21	1.3	300	5	0.26
3-Jun-21	1.8	300	5	0.36
4-Jun-21	2.5	300	5	0.5

Date	Skid A (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid A (ΔkPa/min)
5-Jun-21	1.7	300	5	0.34
6-Jun-21	2.4	300	5	0.48
7-Jun-21	2.0	300	5	0.4
8-Jun-21	1.1	300	5	0.22
9-Jun-21	2.2	300	5	0.44
10-Jun-21	1.1	300	5	0.22
11-Jun-21	3.4	300	5	0.68
12-Jun-21	2.0	300	5	0.4
13-Jun-21	2.0	300	5	0.4
14-Jun-21	1.1	300	5	0.22
15-Jun-21	2.0	300	5	0.4
16-Jun-21	1.8	300	5	0.36
17-Jun-21	2.3	300	5	0.46
18-Jun-21	2.7	300	5	0.54
19-Jun-21	0.6	300	5	0.12
20-Jun-21	1.5	300	5	0.3
21-Jun-21	2.2	300	5	0.44
22-Jun-21	2.0	300	5	0.4
23-Jun-21	2.5	300	5	0.5
24-Jun-21	1.8	300	5	0.36
25-Jun-21	2.2	300	5	0.44
26-Jun-21	1.6	300	5	0.32
27-Jun-21	3.1	300	5	0.62
28-Jun-21	2.2	300	5	0.44
29-Jun-21	1.1	300	5	0.22
30-Jun-21	1.8	300	5	0.36
1-Jul-21	2.2	300	5	0.44
2-Jul-21	2.2	300	5	0.44
3-Jul-21	3.1	300	5	0.62
4-Jul-21	1.1	300	5	0.22
5-Jul-21	1.1	300	5	0.22
6-Jul-21	0.5	300	5	0.1
7-Jul-21	0.9	300	5	0.18
8-Jul-21	0.5	300	5	0.1
9-Jul-21	0.7	300	5	0.14
10-Jul-21	0.0	300	5	0
11-Jul-21	-0.2	300	5	-0.04
12-Jul-21	0.2	300	5	0.04
13-Jul-21	0.7	300	5	0.14
14-Jul-21	0.7	300	5	0.14
15-Jul-21	0.5	300	5	0.1
16-Jul-21	0.7	300	5	0.14
17-Jul-21	1.1	300	5	0.22
18-Jul-21	0.5	300	5	0.1
19-Jul-21	0.0	300	5	0
20-Jul-21	1.1	300	5	0.22
21-Jul-21	1.1	300	5	0.22
22-Jul-21	0.0	300	5	0
23-Jul-21	1.5	300	5	0.3
24-Jul-21	0.7	300	5	0.14
25-Jul-21	0.4	300	5	0.08
26-Jul-21	1.1	300	5	0.22
27-Jul-21	1.1	300	5	0.22
28-Jul-21	0.4	300	5	0.08
29-Jul-21	0.9	300	5	0.18
30-Jul-21	1.1	300	5	0.22
31-Jul-21	0.4	300	5	0.08
1-Aug-21	0.9	300	5	0.18
2-Aug-21	0.2	300	5	0.04
3-Aug-21	0.4	300	5	0.08
4-Aug-21	1.1	300	5	0.22
5-Aug-21	0.2	300	5	0.04
6-Aug-21	0.0	300	5	0
7-Aug-21	0.9	300	5	0.18
8-Aug-21	0.7	300	5	0.14
9-Aug-21	0.7	300	5	0.14
10-Aug-21	0.6	300	5	0.12
11-Aug-21	0.5	300	5	0.1
12-Aug-21	1.1	300	5	0.22
13-Aug-21	0.2	300	5	0.04
14-Aug-21	0.0	300	5	0
15-Aug-21	0.9	300	5	0.18
16-Aug-21	1.1	300	5	0.22
17-Aug-21	0.9	300	5	0.18
18-Aug-21	0.2	300	5	0.04
19-Aug-21	1.3	300	5	0.26
20-Aug-21	0.9	300	5	0.18
21-Aug-21	1.6	300	5	0.32

Date	Skid A (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid A (ΔkPa/min)
22-Aug-21	0.7	300	5	0.14
23-Aug-21	1.3	300	5	0.26
24-Aug-21	0.7	300	5	0.14
25-Aug-21	0.7	300	5	0.14
26-Aug-21	0.4	300	5	0.08
27-Aug-21	0.7	300	5	0.14
28-Aug-21	0.4	300	5	0.08
29-Aug-21	0.9	300	5	0.18
30-Aug-21	0.0	300	5	0
31-Aug-21	1.1	300	5	0.22
1-Sep-21	0.7	300	5	0.14
2-Sep-21	0.7	300	5	0.14
3-Sep-21	0.9	300	5	0.18
4-Sep-21	1.1	300	5	0.22
5-Sep-21	1.3	300	5	0.26
6-Sep-21	0.4	300	5	0.08
7-Sep-21	0.2	300	5	0.04
8-Sep-21	1.1	300	5	0.22
9-Sep-21	1.1	300	5	0.22
10-Sep-21	0.4	300	5	0.08
11-Sep-21	0.2	300	5	0.04
12-Sep-21	1.1	300	5	0.22
13-Sep-21	1.6	300	5	0.32
14-Sep-21	0.3	300	5	0.06
15-Sep-21	0.2	300	5	0.04
16-Sep-21	0.9	300	5	0.18
17-Sep-21	0.5	300	5	0.1
18-Sep-21	1.5	300	5	0.3
19-Sep-21	0.7	300	5	0.14
20-Sep-21	1.1	300	5	0.22
21-Sep-21	0.9	300	5	0.18
22-Sep-21	1.1	300	5	0.22
23-Sep-21	0.9	300	5	0.18
24-Sep-21	0.6	300	5	0.12
25-Sep-21	0.0	300	5	0
26-Sep-21	1.1	300	5	0.22
27-Sep-21	1.1	300	5	0.22
28-Sep-21	1.3	300	5	0.26
29-Sep-21	1.4	300	5	0.28
30-Sep-21	1.5	300	5	0.3
1-Oct-21	0.2	300	5	0.04
2-Oct-21	0.8	300	5	0.16
3-Oct-21	1.1	300	5	0.22
4-Oct-21	0.7	300	5	0.14
5-Oct-21	1.5	300	5	0.3
6-Oct-21	1.1	300	5	0.22
7-Oct-21	0.2	300	5	0.04
8-Oct-21	0.2	300	5	0.04
9-Oct-21	0.7	300	5	0.14
10-Oct-21	0.9	300	5	0.18
11-Oct-21	0.7	300	5	0.14
12-Oct-21	1.2	300	5	0.24
13-Oct-21	0.7	300	5	0.14
14-Oct-21	0.9	300	5	0.18
15-Oct-21	1.3	300	5	0.26
16-Oct-21	1.1	300	5	0.22
17-Oct-21	0.7	300	5	0.14
18-Oct-21	1.1	300	5	0.22
19-Oct-21	0.4	300	5	0.08
20-Oct-21	1.3	300	5	0.26
21-Oct-21	0.3	300	5	0.06
22-Oct-21	0.6	300	5	0.12
23-Oct-21	0.9	300	5	0.18
24-Oct-21	0.4	300	5	0.08
25-Oct-21	1.1	300	5	0.22
26-Oct-21	0.9	300	5	0.18
27-Oct-21	0.7	300	5	0.14
28-Oct-21	1.8	300	5	0.36
29-Oct-21	1.8	300	5	0.36
30-Oct-21	1.1	300	5	0.22
31-Oct-21	0.0	300	5	0
1-Nov-21	0.9	300	5	0.18
2-Nov-21	0.9	300	5	0.18
3-Nov-21	1.1	300	5	0.22
4-Nov-21	1.4	300	5	0.28
5-Nov-21	0.6	300	5	0.12
6-Nov-21	0.7	300	5	0.14
7-Nov-21	0.9	300	5	0.18

Date	Skid A (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid A (ΔkPa/min)
8-Nov-21	1.6	300	5	0.32
9-Nov-21	3.1	300	5	0.62
10-Nov-21	4.9	300	5	0.98
11-Nov-21	3.6	300	5	0.72
12-Nov-21	2.9	300	5	0.58
13-Nov-21	3.1	300	5	0.62
14-Nov-21	4.0	300	5	0.8
15-Nov-21	37.5	300	5	7.5
16-Nov-21	1.3	300	5	0.26
17-Nov-21	1.6	300	5	0.32
18-Nov-21	2.5	300	5	0.5
19-Nov-21	1.1	300	5	0.22
20-Nov-21	1.3	300	5	0.26
21-Nov-21	1.3	300	5	0.26
22-Nov-21	1.3	300	5	0.26
23-Nov-21	1.8	300	5	0.36
24-Nov-21	1.1	300	5	0.22
25-Nov-21	1.6	300	5	0.32
26-Nov-21	2.2	300	5	0.44
27-Nov-21	1.3	300	5	0.26
28-Nov-21	0.4	300	5	0.08
29-Nov-21	0.9	300	5	0.18
30-Nov-21	1.1	300	5	0.2246
1-Dec-21	0.7	300	5	0.1348
2-Dec-21	0.4	300	5	0.08
3-Dec-21	2.0	300	5	0.4
4-Dec-21	1.3	300	5	0.26
5-Dec-21	0.9	300	5	0.18
6-Dec-21	2.2	300	5	0.44
7-Dec-21	1.6	300	5	0.32
8-Dec-21	1.8	300	5	0.36
9-Dec-21	0.9	300	5	0.18
10-Dec-21	1.1	300	5	0.22
11-Dec-21	3.4	300	5	0.68
12-Dec-21	1.6	300	5	0.32
13-Dec-21	1.6	300	5	0.32
14-Dec-21	1.1	300	5	0.22
15-Dec-21	1.6	300	5	0.32
16-Dec-21	1.3	300	5	0.26
17-Dec-21	2.9	300	5	0.58
18-Dec-21	1.6	300	5	0.32
19-Dec-21	0.7	300	5	0.14
20-Dec-21	1.6	300	5	0.32
21-Dec-21	1.1	300	5	0.22
22-Dec-21	0.7	300	5	0.14
23-Dec-21	1.1	300	5	0.22
24-Dec-21	0.9	300	5	0.18
25-Dec-21	1.3	300	5	0.26
26-Dec-21	3.6	300	5	0.72
27-Dec-21	1.1	300	5	0.22
28-Dec-21	0.4	300	5	0.08
29-Dec-21	2.5	300	5	0.5
30-Dec-21	1.1	300	5	0.22
31-Dec-21	0.9	300	5	0.18

Date	Skid B (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid B (ΔkPa/min)
1-Jan-21	0.0	300	5	0
2-Jan-21	-0.2	300	5	-0.04
3-Jan-21	0.2	300	5	0.04
4-Jan-21	0.6	300	5	0.12
5-Jan-21	0.3	300	5	0.06
6-Jan-21	0.4	300	5	0.08
7-Jan-21	1.3	300	5	0.26
8-Jan-21	1.8	300	5	0.36
9-Jan-21	1.8	300	5	0.36
10-Jan-21	1.1	300	5	0.22
11-Jan-21	1.6	300	5	0.32
12-Jan-21	0.9	300	5	0.18
13-Jan-21	1.2	300	5	0.24
14-Jan-21	2.0	300	5	0.4
15-Jan-21	1.6	300	5	0.32
16-Jan-21	1.1	300	5	0.22
17-Jan-21	1.4	300	5	0.28
18-Jan-21	1.1	300	5	0.22
19-Jan-21	0.9	300	5	0.18
20-Jan-21	2.3	300	5	0.46
21-Jan-21	1.6	300	5	0.32
22-Jan-21	2.0	300	5	0.4
23-Jan-21	0.9	300	5	0.18
24-Jan-21	1.3	300	5	0.26
25-Jan-21	2.3	300	5	0.46
26-Jan-21	2.1	300	5	0.42
27-Jan-21	2.4	300	5	0.48
28-Jan-21	3.4	300	5	0.68
29-Jan-21	2.7	300	5	0.54
30-Jan-21	2.3	300	5	0.46
31-Jan-21	2.5	300	5	0.5
1-Feb-21	1.8	300	5	0.36
2-Feb-21	1.6	300	5	0.32
3-Feb-21	1.1	300	5	0.22
4-Feb-21	1.1	300	5	0.22
5-Feb-21	0.7	300	5	0.14
6-Feb-21	0.9	300	5	0.18
7-Feb-21	0.9	300	5	0.18
8-Feb-21	0.9	300	5	0.18
9-Feb-21	0.9	300	5	0.18
10-Feb-21	1.1	300	5	0.22
11-Feb-21	1.1	300	5	0.22
12-Feb-21	0.7	300	5	0.14
13-Feb-21	1.8	300	5	0.36
14-Feb-21	2.0	300	5	0.4
15-Feb-21	1.3	300	5	0.26
16-Feb-21	2.1	300	5	0.42
17-Feb-21	0.7	300	5	0.14
18-Feb-21	0.7	300	5	0.14
19-Feb-21	1.8	300	5	0.36
20-Feb-21	1.8	300	5	0.36
21-Feb-21	2.1	300	5	0.42
22-Feb-21	0.9	300	5	0.18
23-Feb-21	0.7	300	5	0.14
24-Feb-21	1.3	300	5	0.26
25-Feb-21	2.2	300	5	0.44
26-Feb-21	1.6	300	5	0.32
27-Feb-21	0.2	300	5	0.04
28-Feb-21	0.9	300	5	0.18
1-Mar-21	0.9	300	5	0.18
2-Mar-21	2.8	300	5	0.56
3-Mar-21	1.8	300	5	0.36
4-Mar-21	1.1	300	5	0.22
5-Mar-21	2.2	300	5	0.44
6-Mar-21	1.1	300	5	0.22
7-Mar-21	0.4	300	5	0.08
8-Mar-21	2.0	300	5	0.4
9-Mar-21	2.0	300	5	0.4
10-Mar-21	0.9	300	5	0.18
11-Mar-21	1.1	300	5	0.22
12-Mar-21	1.1	300	5	0.22
13-Mar-21	1.1	300	5	0.22
14-Mar-21	0.7	300	5	0.14
15-Mar-21	0.7	300	5	0.14
16-Mar-21	1.6	300	5	0.32
17-Mar-21	1.6	300	5	0.32
18-Mar-21	2.5	300	5	0.5
19-Mar-21	1.2	300	5	0.24

Date	Skid B (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid B (ΔkPa/min)
20-Mar-21	1.1	300	5	0.22
21-Mar-21	0.0	300	5	0
22-Mar-21	0.9	300	5	0.18
23-Mar-21	1.3	300	5	0.26
24-Mar-21	1.3	300	5	0.26
25-Mar-21	1.3	300	5	0.26
26-Mar-21	0.9	300	5	0.18
27-Mar-21	0.7	300	5	0.14
28-Mar-21	1.6	300	5	0.32
29-Mar-21	1.4	300	5	0.28
30-Mar-21	0.7	300	5	0.14
31-Mar-21	2.0	300	5	0.4
1-Apr-21	0.9	300	5	0.18
2-Apr-21	0.4	300	5	0.08
3-Apr-21	0.9	300	5	0.18
4-Apr-21	2.0	300	5	0.4
5-Apr-21	0.9	300	5	0.18
6-Apr-21	0.2	300	5	0.04
7-Apr-21	0.4	300	5	0.08
8-Apr-21	1.1	300	5	0.22
9-Apr-21	1.6	300	5	0.32
10-Apr-21	0.4	300	5	0.08
11-Apr-21	0.9	300	5	0.18
12-Apr-21	1.3	300	5	0.26
13-Apr-21	0.7	300	5	0.14
14-Apr-21	0.2	300	5	0.04
15-Apr-21	1.1	300	5	0.22
16-Apr-21	1.6	300	5	0.32
17-Apr-21	1.5	300	5	0.3
18-Apr-21	1.4	300	5	0.28
19-Apr-21	0.9	300	5	0.18
20-Apr-21	1.8	300	5	0.36
21-Apr-21	1.4	300	5	0.28
22-Apr-21	2.9	300	5	0.58
23-Apr-21	1.1	300	5	0.22
24-Apr-21	1.5	300	5	0.3
25-Apr-21	3.1	300	5	0.62
26-Apr-21	0.7	300	5	0.14
27-Apr-21	1.4	300	5	0.28
28-Apr-21	0.9	300	5	0.18
29-Apr-21	1.1	300	5	0.22
30-Apr-21	0.7	300	5	0.14
1-May-21	1.5	300	5	0.3
2-May-21	1.4	300	5	0.28
3-May-21	2.0	300	5	0.4
4-May-21	0.7	300	5	0.14
5-May-21	0.9	300	5	0.18
6-May-21	1.1	300	5	0.22
7-May-21	2.0	300	5	0.4
8-May-21	0.6	300	5	0.12
9-May-21	1.1	300	5	0.22
10-May-21	1.3	300	5	0.26
11-May-21	1.1	300	5	0.22
12-May-21	1.8	300	5	0.36
13-May-21	1.1	300	5	0.22
14-May-21	0.0	300	5	0
15-May-21	0.5	300	5	0.1
16-May-21	1.6	300	5	0.32
17-May-21	0.5	300	5	0.1
18-May-21	1.1	300	5	0.22
19-May-21	-0.2	300	5	-0.04
20-May-21	0.4	300	5	0.08
21-May-21	1.1	300	5	0.22
22-May-21	0.2	300	5	0.04
23-May-21	1.1	300	5	0.22
24-May-21	0.9	300	5	0.18
25-May-21	0.2	300	5	0.04
26-May-21	0.6	300	5	0.12
27-May-21	2.0	300	5	0.4
28-May-21	1.3	300	5	0.26
29-May-21	0.9	300	5	0.18
30-May-21	0.4	300	5	0.08
31-May-21	0.2	300	5	0.04
1-Jun-21	0.3	300	5	0.06
2-Jun-21	0.9	300	5	0.18
3-Jun-21	1.1	300	5	0.22
4-Jun-21	1.2	300	5	0.24
5-Jun-21	1.3	300	5	0.26

Date	Skid B (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid B (ΔkPa/min)
6-Jun-21	1.8	300	5	0.36
7-Jun-21	0.9	300	5	0.18
8-Jun-21	0.9	300	5	0.18
9-Jun-21	1.1	300	5	0.22
10-Jun-21	0.4	300	5	0.08
11-Jun-21	1.1	300	5	0.22
12-Jun-21	0.2	300	5	0.04
13-Jun-21	1.4	300	5	0.28
14-Jun-21	2.3	300	5	0.46
15-Jun-21	2.9	300	5	0.58
16-Jun-21	1.6	300	5	0.32
17-Jun-21	1.8	300	5	0.36
18-Jun-21	1.4	300	5	0.28
19-Jun-21	1.8	300	5	0.36
20-Jun-21	0.7	300	5	0.14
21-Jun-21	0.9	300	5	0.18
22-Jun-21	-0.2	300	5	-0.04
23-Jun-21	-0.2	300	5	-0.04
24-Jun-21	1.4	300	5	0.28
25-Jun-21	0.9	300	5	0.18
26-Jun-21	0.9	300	5	0.18
27-Jun-21	0.3	300	5	0.06
28-Jun-21	1.1	300	5	0.22
29-Jun-21	1.3	300	5	0.26
30-Jun-21	1.1	300	5	0.22
1-Jul-21	1.3	300	5	0.26
2-Jul-21	0.7	300	5	0.14
3-Jul-21	1.6	300	5	0.32
4-Jul-21	0.4	300	5	0.08
5-Jul-21	1.3	300	5	0.26
6-Jul-21	0.0	300	5	0
7-Jul-21	0.0	300	5	0
8-Jul-21	1.4	300	5	0.28
9-Jul-21	0.7	300	5	0.14
10-Jul-21	2.3	300	5	0.46
11-Jul-21	4.9	300	5	0.98
12-Jul-21	-0.7	300	5	-0.14
13-Jul-21	0.3	300	5	0.06
14-Jul-21	0.4	300	5	0.08
15-Jul-21	0.7	300	5	0.14
16-Jul-21	0.9	300	5	0.18
17-Jul-21	0.9	300	5	0.18
18-Jul-21	2.3	300	5	0.46
19-Jul-21	0.0	300	5	0
20-Jul-21	0.3	300	5	0.06
21-Jul-21	3.1	300	5	0.62
22-Jul-21	0.0	300	5	0
23-Jul-21	0.4	300	5	0.08
24-Jul-21	0.7	300	5	0.14
25-Jul-21	1.1	300	5	0.22
26-Jul-21	2.9	300	5	0.58
27-Jul-21	1.1	300	5	0.22
28-Jul-21	1.3	300	5	0.26
29-Jul-21	0.0	300	5	0
30-Jul-21	0.2	300	5	0.04
31-Jul-21	0.7	300	5	0.14
1-Aug-21	-0.2	300	5	-0.04
2-Aug-21	0.4	300	5	0.08
3-Aug-21	1.1	300	5	0.22
4-Aug-21	1.1	300	5	0.22
5-Aug-21	0.0	300	5	0
6-Aug-21	2.0	300	5	0.4
7-Aug-21	-0.2	300	5	-0.04
8-Aug-21	0.0	300	5	0
9-Aug-21	2.9	300	5	0.58
10-Aug-21	3.6	300	5	0.72
11-Aug-21	0.5	300	5	0.1
12-Aug-21	1.3	300	5	0.26
13-Aug-21	0.9	300	5	0.18
14-Aug-21	1.7	300	5	0.34
15-Aug-21	0.9	300	5	0.18
16-Aug-21	1.1	300	5	0.22
17-Aug-21	0.9	300	5	0.18
18-Aug-21	1.8	300	5	0.36
19-Aug-21	2.5	300	5	0.5
20-Aug-21	1.4	300	5	0.28
21-Aug-21	3.3	300	5	0.66
22-Aug-21	2.9	300	5	0.58

Date	Skid B (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid B (ΔkPa/min)
23-Aug-21	1.8	300	5	0.36
24-Aug-21	1.3	300	5	0.26
25-Aug-21	0.4	300	5	0.08
26-Aug-21	1.4	300	5	0.28
27-Aug-21	1.1	300	5	0.22
28-Aug-21	1.3	300	5	0.26
29-Aug-21	0.7	300	5	0.14
30-Aug-21	2.5	300	5	0.5
31-Aug-21	3.4	300	5	0.68
1-Sep-21	0.4	300	5	0.08
2-Sep-21	1.2	300	5	0.24
3-Sep-21	1.1	300	5	0.22
4-Sep-21	1.3	300	5	0.26
5-Sep-21	1.4	300	5	0.28
6-Sep-21	0.6	300	5	0.12
7-Sep-21	0.5	300	5	0.1
8-Sep-21	1.1	300	5	0.22
9-Sep-21	1.8	300	5	0.36
10-Sep-21	0.2	300	5	0.04
11-Sep-21	0.9	300	5	0.18
12-Sep-21	0.5	300	5	0.1
13-Sep-21	0.9	300	5	0.18
14-Sep-21	1.3	300	5	0.26
15-Sep-21	1.2	300	5	0.24
16-Sep-21	0.2	300	5	0.04
17-Sep-21	0.9	300	5	0.18
18-Sep-21	0.5	300	5	0.1
19-Sep-21	0.0	300	5	0
20-Sep-21	0.0	300	5	0
21-Sep-21	0.9	300	5	0.18
22-Sep-21	1.2	300	5	0.24
23-Sep-21	1.8	300	5	0.36
24-Sep-21	2.2	300	5	0.44
25-Sep-21	1.3	300	5	0.26
26-Sep-21	0.9	300	5	0.18
27-Sep-21	1.8	300	5	0.36
28-Sep-21	0.3	300	5	0.06
29-Sep-21	1.5	300	5	0.3
30-Sep-21	1.1	300	5	0.22
1-Oct-21	1.4	300	5	0.28
2-Oct-21	0.6	300	5	0.12
3-Oct-21	1.1	300	5	0.22
4-Oct-21	0.9	300	5	0.18
5-Oct-21	0.5	300	5	0.1
6-Oct-21	1.6	300	5	0.32
7-Oct-21	1.1	300	5	0.22
8-Oct-21	0.4	300	5	0.08
9-Oct-21	0.2	300	5	0.04
10-Oct-21	1.3	300	5	0.26
11-Oct-21	0.7	300	5	0.14
12-Oct-21	0.6	300	5	0.12
13-Oct-21	0.4	300	5	0.08
14-Oct-21	1.2	300	5	0.24
15-Oct-21	0.4	300	5	0.08
16-Oct-21	0.2	300	5	0.04
17-Oct-21	3.1	300	5	0.62
18-Oct-21	1.6	300	5	0.32
19-Oct-21	2.7	300	5	0.54
20-Oct-21	3.2	300	5	0.64
21-Oct-21	0.7	300	5	0.14
22-Oct-21	0.9	300	5	0.18
23-Oct-21	0.4	300	5	0.08
24-Oct-21	2.7	300	5	0.54
25-Oct-21	1.1	300	5	0.22
26-Oct-21	1.2	300	5	0.24
27-Oct-21	1.3	300	5	0.26
28-Oct-21	1.6	300	5	0.32
29-Oct-21	0.9	300	5	0.18
30-Oct-21	0.4	300	5	0.08
31-Oct-21	0.9	300	5	0.18
1-Nov-21	1.8	300	5	0.36
2-Nov-21	0.9	300	5	0.18
3-Nov-21	1.3	300	5	0.26
4-Nov-21	0.4	300	5	0.08
5-Nov-21	1.6	300	5	0.32
6-Nov-21	0.0	300	5	0
7-Nov-21	1.6	300	5	0.32
8-Nov-21	1.6	300	5	0.32

Date	Skid B (ΔkPa)	Test Duration (Sec)	Test Duration (Min)	Skid B (ΔkPa/min)
9-Nov-21	2.2	300	5	0.44
10-Nov-21	2.5	300	5	0.5
11-Nov-21	0.5	300	5	0.1
12-Nov-21	1.1	300	5	0.22
13-Nov-21	1.1	300	5	0.22
14-Nov-21	1.4	300	5	0.28
15-Nov-21	1.3	300	5	0.26
16-Nov-21	1.3	300	5	0.26
17-Nov-21	2.0	300	5	0.4
18-Nov-21	1.6	300	5	0.32
19-Nov-21	2.5	300	5	0.5
20-Nov-21	0.7	300	5	0.14
21-Nov-21	1.6	300	5	0.32
22-Nov-21	1.8	300	5	0.36
23-Nov-21	1.1	300	5	0.22
24-Nov-21	0.9	300	5	0.18
25-Nov-21	0.2	300	5	0.04
26-Nov-21	2.0	300	5	0.4
27-Nov-21	1.8	300	5	0.36
28-Nov-21	2.0	300	5	0.4
29-Nov-21	2.9	300	5	0.58
30-Nov-21	0.7	300	5	0.1348
1-Dec-21	2.0	300	5	0.4042
2-Dec-21	1.1	300	5	0.22
3-Dec-21	1.8	300	5	0.36
4-Dec-21	1.8	300	5	0.36
5-Dec-21	0.9	300	5	0.18
6-Dec-21	2.2	300	5	0.44
7-Dec-21	1.3	300	5	0.26
8-Dec-21	1.3	300	5	0.26
9-Dec-21	0.7	300	5	0.14
10-Dec-21	1.8	300	5	0.36
11-Dec-21	1.1	300	5	0.22
12-Dec-21	1.6	300	5	0.32
13-Dec-21	2.7	300	5	0.54
14-Dec-21	2.7	300	5	0.54
15-Dec-21	1.1	300	5	0.22
16-Dec-21	0.9	300	5	0.18
17-Dec-21	1.6	300	5	0.32
18-Dec-21	1.6	300	5	0.32
19-Dec-21	1.8	300	5	0.36
20-Dec-21	1.6	300	5	0.32
21-Dec-21	0.7	300	5	0.14
22-Dec-21	2.2	300	5	0.44
23-Dec-21	0.9	300	5	0.18
24-Dec-21	2.5	300	5	0.5
25-Dec-21	2.7	300	5	0.54
26-Dec-21	2.0	300	5	0.4
27-Dec-21	2.5	300	5	0.5
28-Dec-21	1.3	300	5	0.26
29-Dec-21	1.6	300	5	0.32
30-Dec-21	0.4	300	5	0.08
31-Dec-21	3.6	300	5	0.72

**Resolution and LRV Calculations for Direct Integrity Testing Using the
MFGM Method for Water Treatment Plant at
Mahone Bay, NS (2 AP4 units with 12 modules each)**

Objectives

The objective is to determine (1) the testing pressure required to meet the resolution criterion of 3 µm or less as specified in the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), (2) the pressure decay value (PDR) corresponding to required Log Reduction Value (LRV) for particles with the size of 3 µm at plant design conditions.

Calculation for Resolution and Sensitivity of the Membrane System

1. Determining Testing Pressure for Required Resolution ($\leq 3 \mu\text{m}$)

The testing pressure can be calculated per Equation (4.1)

$$P_{test} = (0.193 * \kappa * \sigma * \cos\theta) + BP_{max} \quad \text{Equation (4.1)}$$

Table 1. Calculation Variables (P_{test})

Item	Description	Unit	Value
P_{test}	Test pressure for required resolution	psi	17.47
k	Shape correction factor	dimensionless	1
σ	Surface tension of water @ 5 °C	dynes/cm	74.97
θ	Water contact angle of membrane medium	degree	0.00
BP_{max}	Sum of backpressure and static head	psid	3

Since the testing pressure to be used is 25 psi or above and the pressure decay is anticipated lower than 1 psi during the duration of the test for Pall MF system, the resolution criterion is satisfied.

2. Calculating Sensitivity (LRV_{DIT})

The LRV calculation is performed by using Equation (4.9) in USEPA's Membrane Filtration Guidance Manual (USEPA, 2005):

$$LRV_{DIT} = \log\left(\frac{Q_p * ALCR * P_{atm}}{\Delta P_{test} * V_{sys} * VCF}\right) \quad \text{Equation (4.9)}$$

The air-liquid conversion ration (ALCR) is calculated using Darcy Equation by assuming that the hollow fiber breaks completely at the interface of potting layer, which results in a shortest flow path for bypass flow. The calculation also uses the highest trans-membrane pressure (TMP) during a filtration cycle. This results in a conservative result that has a low LRV.

Air-to-liquid-conversion ratio (ALCR):

$$ALCR = 170 * Y * \sqrt{\frac{(P_{test} - BP)(P_{test} + P_{atm})}{(460 + T) * TMP}} \quad \text{Equation (C.4)}$$

$$Y \propto \left[\frac{1}{\frac{(P_{test} - BP)}{(P_{test} + P_{atm})}}, K \right] \quad \text{Equation (C.5)}$$

K : resistant coefficient

$$K = f * \frac{L}{d_{fiber}} \quad \text{Equation (C.6)}$$

The parameters used in the LRV calculation are presented in Table 2.

Table 2. Parameters Used for LRV Calculation

Item	Description	Unit	Value
Q_p	design (instantaneous) flow per rack	gpm	224
VCF^a	volumetric concentration factor	dimensionless	1.08
ΔP_{test}	The smallest pressure decay rate associated w/ a breach	psi/min.	0.06
V_{sys}^b	system hold-up volume	ft ³	12.29
P_{atm}	Atmospheric pressure	psi	14.7
$BP^{b,c}$	back-pressure during pressure decay test	psi	0
T^b	Temperature	°F	75
TMP^b	terminal trans-membrane pressure during filtration	psi	35
f	friction factor	dimensionless	0.025
L^c	the length of flow path for breach	M	0.06
D	diameter of hollow fiber lumen	M	0.00064
P_{test}^b	testing pressure for pressure decay test	psi	25.0

Note: a - Calculated based on the data from AwwaRF Report No. 91032 by Sethi et al., 2004

b - Based on the design data

c - Assume worst-case fiber breakage (at the top potting layer)

Find K :

$$K = f * \frac{L}{d_{fiber}} \quad \text{Equation (C.6)}$$

f : friction factor

L : the length of flow path of the breach (equal to the potting thickness)

d_{fiber} : lumen diameter of the fiber.

$$K = 0.025 * \frac{0.06}{0.00064}$$

Find Y value using the chart on page A-22 from Crane:

$$Y \propto \left[\frac{1}{\frac{(P_{test} - BP)}{(P_{test} + P_{atm})}}, K \right]$$

Substitute Y into Equation (C.4):

Substitute ALCR into Equation (4.9):

Table 3. Additional Parameters Used for LRV Calculation

Item	Description	Unit	Value
K	Resistant coefficient	dimensionless	2.34
Y	Net expansion factor	dimensionless	0.63
ALCR	Air to liquid conversion ratio	dimensionless	24.55
LRV _{dit}	Sensitivity of direct integrity test	log	4.13

Therefore, the sensitivity of direct integrity testing is = LRV_{dit} in Table 3.

1. Calculate Upper Control Limit (UCL) and Alert Level (AL) for Direct Integrity Testing. The UCL for direct integrity testing, the pressure decay rate corresponding to the required LRV, is determined by rearranging Equation (4.9):

$$UCL = \frac{Q_p \bullet ALCR \bullet P_{atm}}{10^{LRC^*} \bullet V_{sys} \bullet VCF} \quad \text{Equation (4.17)}$$

Where: UCL - upper control limit for pressure decay rate, psi/min.

LRC* - required LRV for the membrane system

If the required LRV for the membrane system is 4-logs, substitute LRC* = 4 and

the same parameters in Table 2:

The plot of LRV as a function of pressure decay rate is presented in Figure 1 in which the UCL is marked with red dotted line.

Table 4. Results of UCL Calculation

Item	Description	Unit	Value
<i>UCL</i>	Upper control limit	dimensionless	0.08

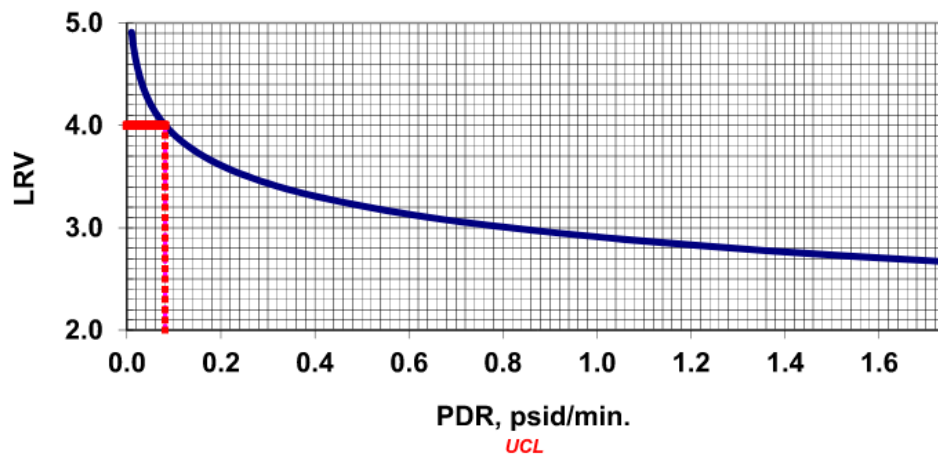


Figure 1: LRV as a function of pressure-decay rate (PDR)

UCL is indicated on the graph corresponding to LRV of 4-logs.

References

Sethi, S., G. Crozes, D. Hugaboom, B., Mi, J. M. Curl, and B. J. Mariñas (2004): *Assessment and Development of Low-Pressure Membrane Integrity Monitoring Tools*, AwwaRF Report No. 91032, Denver, CO.

USEPA: *National Primary Drinking Water regulations: Long Term 2 Enhanced Surface Water Treatment Rule; Final Rule* , Federal Register, January 5, 2006

USEPA: *Membrane Filtration Guidance Manual* , EPA-815-R-06-009, November, 2005

3/19/2013

Table B.2: Filter Backwash Water – Discharges to A Freshwater Watercourse
Section not applicable.

Table B.3: Filter Backwash Water – Discharge to Land or Soil
Section not applicable.

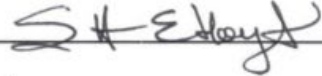
Table B.4: Filter Backwash Water – Discharge to A Marine Or Brackish Environment
Section not applicable.

Table C.1 - Operator in Overall Direct Responsible Charge

The operator in overall direct responsible charge (ODRC) is: *(Specify name - add additional lines if more than one ODRC operator)*

Scott E Hoyt

Signature of operator:



Date: February 22, 2023

Protocols in place during the absence of the operator in ODRC include (specify):

When on vacation:

Water/Wastewater Operator Blake Tibert will fill in with assistance from AIWUC operators Ben Underhill and Chahin Ali

When ill:

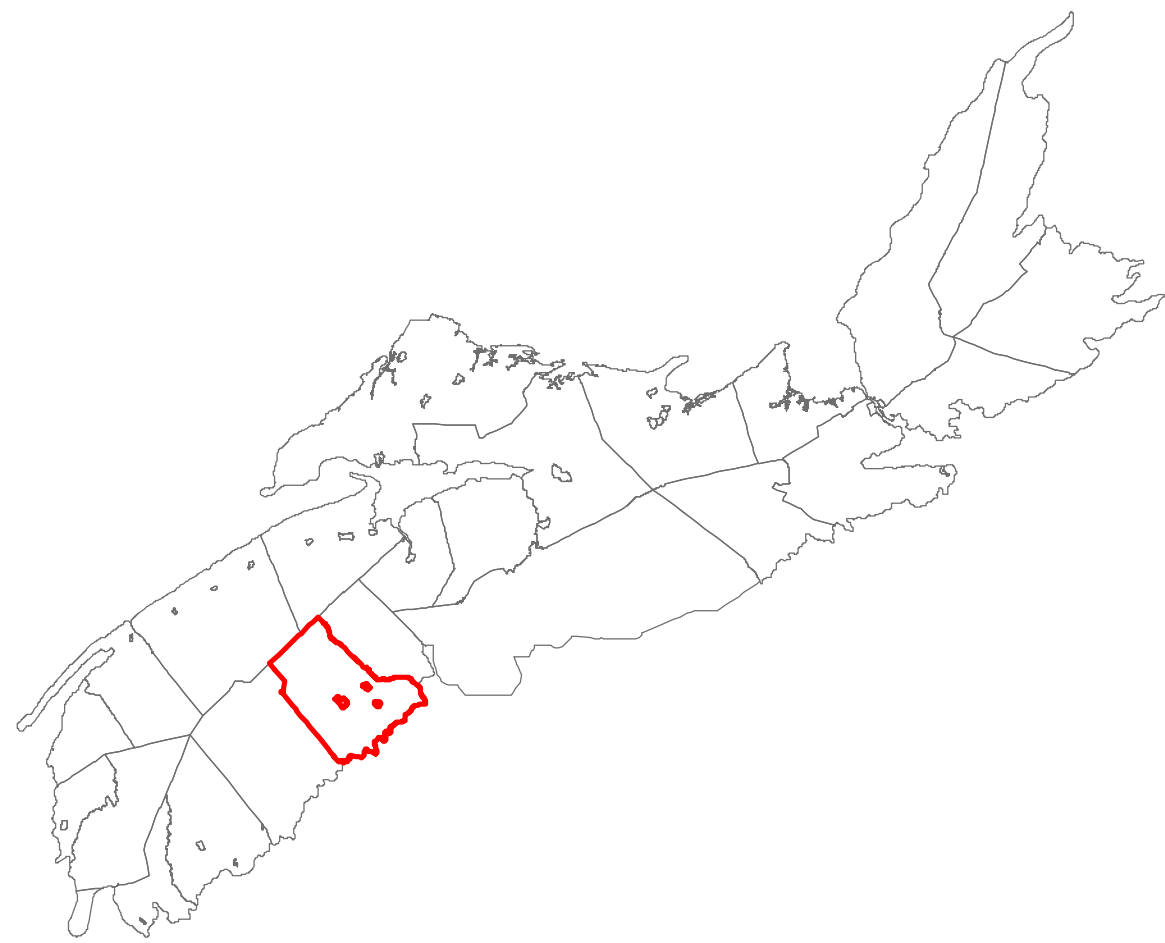
Water/Wastewater Operator Blake Tibert will fill in with assistance from AIWUC operators Ben Underhill and Chahin Ali

Other (specify)

AIWUC operators can assume ODRC in the event both Town operators are not available

APPENDIX B

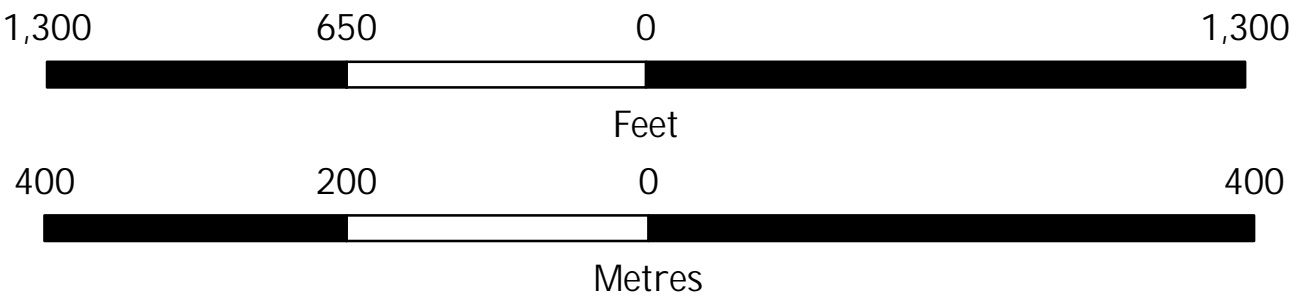
Watershed Boundary Plan



Representation of the Municipality of Lunenburg in Nova Scotia
Scale: 1:3,500,000



Scale: 1:5,000



- Oakland Lake Watershed Boundary
- Town of Mahone Bay
- Properties
- Roads
- Civics
- Water
- Water Courses

Rev.:	Description:	Date:
1	Property owners and PIDs for properties within and around the Oakland Lake Watershed	15/01/19
0	Property owners and PIDs for properties within and around the Oakland Lake Watershed	05/06

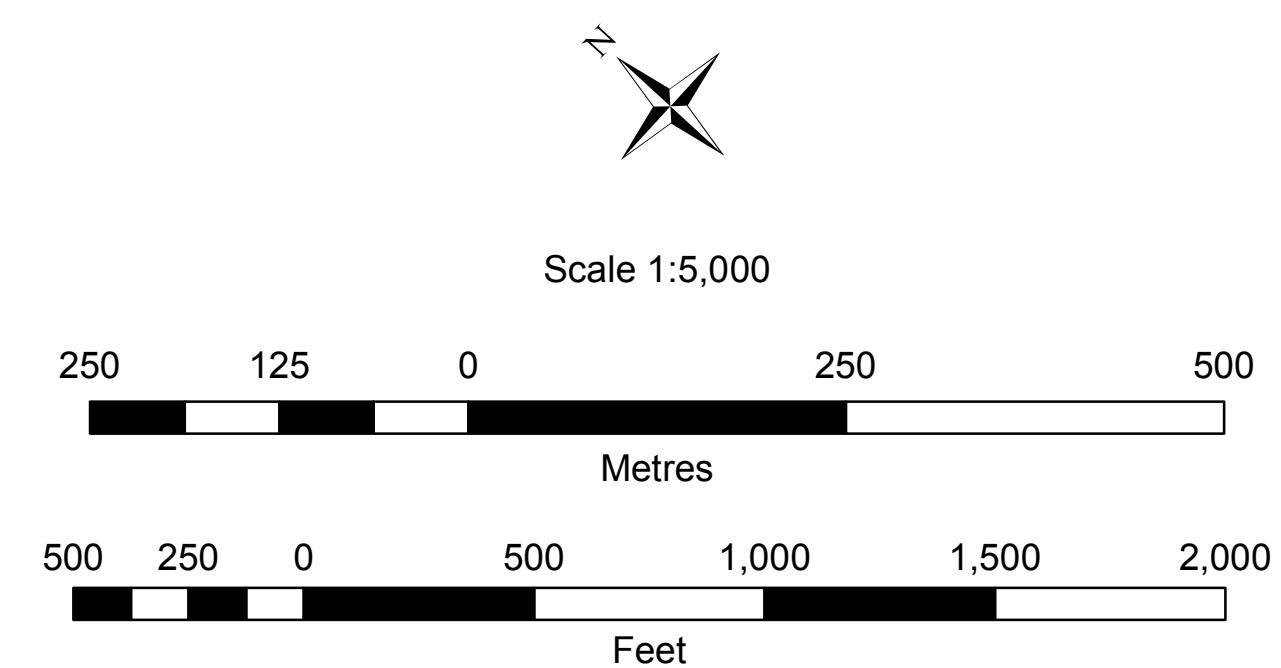
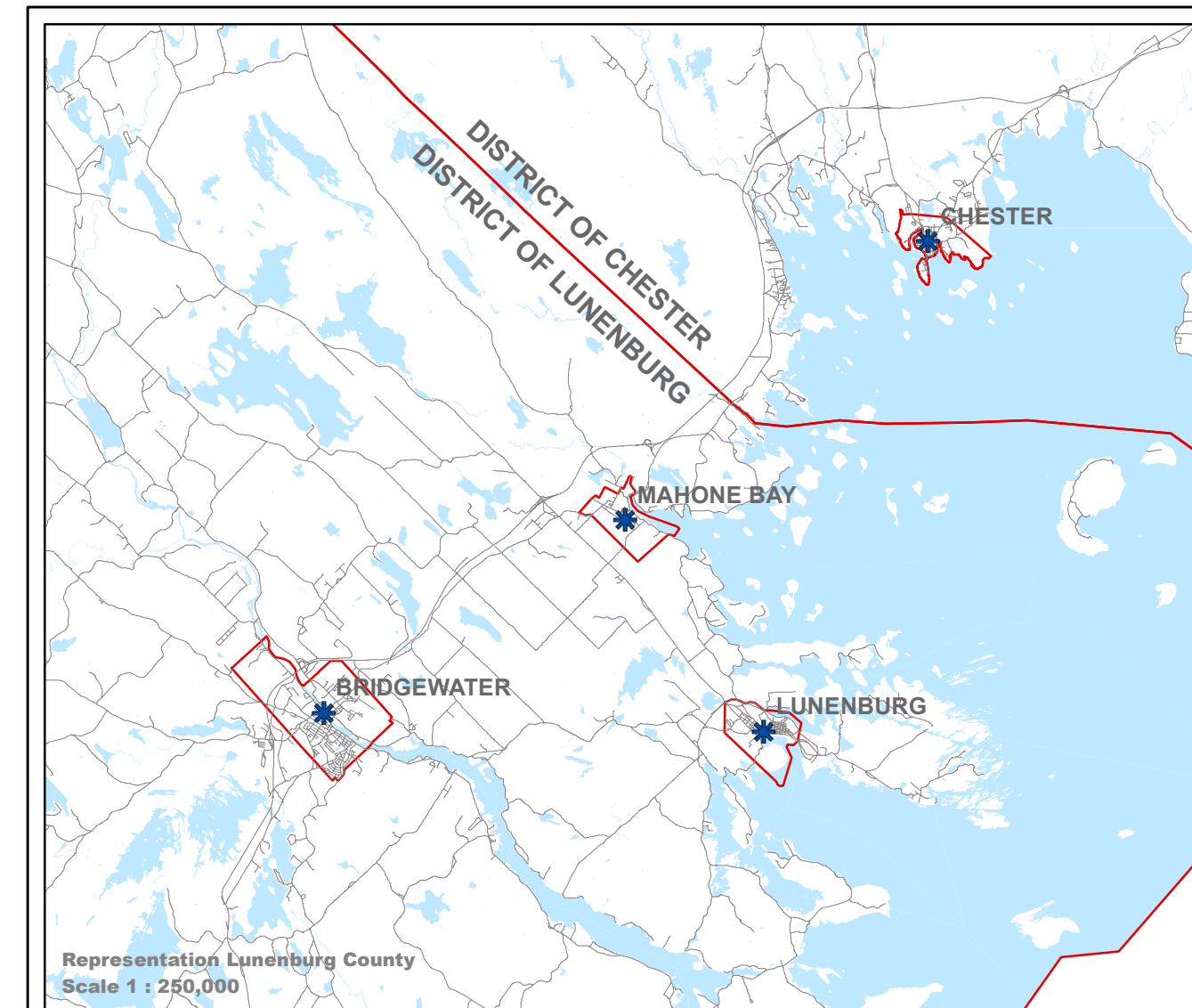
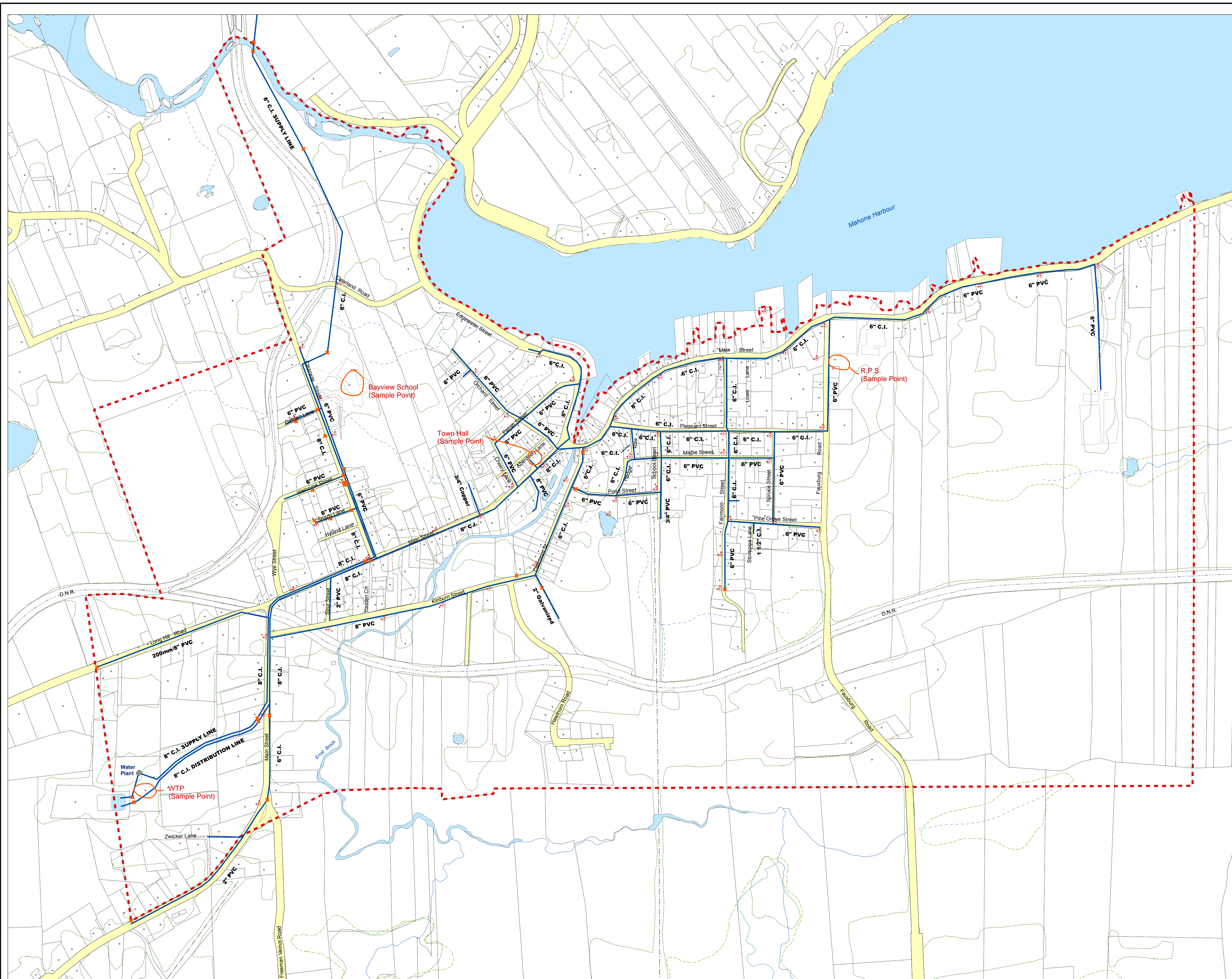
TOWN OF MAHONE BAY
















Properties within the
Oakland Lake Watershed

From Date: 14/12/01 To Date: n/a Date Printed: 15/01/21	Sources: Digital Base Map Data from Service Nova Scotia and Municipal Relations Prepared by the Municipality of the District of Chester
Status: Exists Project ID: TOMB_00002 Classification #: 05400-55	Map Disclaimer: Information shown on these drawings is compiled from numerous sources and may not be complete or accurate. The Municipality of the District of Chester is not responsible for any errors, omissions or deficiencies in these drawings.
Digital Folders and File Name: Map Library\Mahone Bay Town\Planning and Development\OaklandLakeWatershed_Municipal_TOMB "OaklandLakeWatershedProperties,TOMB"	Coordinate System/Datum: UTM NAD83 CSRS ZONE 20N Actual Map Size: w 42" x h 34"

APPENDIX C

Distribution Map



LEGEND	
	VALVE
	FIRE HYDRANT
	WATER LINE
	WATER
C	CONCRETE
C.I.	CAST IRON
PVC	POLYVINYL CHLORIDE
	BUILDING
	CUT LINE
	LAKE
	RIVER/STREAM
	ROAD
	SWAMP
	TRAIL
	TREE AREA
	Properties
	TOWN BOUNDARY
	MAINTAINED PUBLIC STREETS

Rev.:	Description:	Date:
1	Long Hill Road - new 200mm/8" PVC pipe * abandoned 1.5" PVC water pipe (still buried)	Feb. 16, 20
0	Effective	10/06/0

TOWN OF MAHONE BAY

MUNICIPAL PLANNING STRATEGY
MAP 2
WATER

Date Created: January 3, 2008	Sources: Digital BaseMap Data from Service Nova Scotia and Municipal Relations Prepared by Chester Municipality Planning Department
Digital File Name: Water_Map	

APPENDIX D

Corrosion Control Program Results

Table D.1: Distribution System Corrosion Control Program Results

Month		Site A: WTP						
		pH	Alkalinity (mg/L)	Conductivity (umho/cm)	Temp. (°C)	DO (mg/L)	Cl Residual (mg/L)	Orthophosphate (mg/L)
Q1	January	8.70	-	-	-	-	1.75	-
	February	8.57	-	-	-	-	1.59	-
	March	7.98	-	-	-	-	1.48	-
Q2	April	8.78	-	-	-	-	1.55	-
	May	8.62	-	-	-	-	1.64	-
	June	8.48	-	-	-	-	1.74	-
Q3	July	8.42	-	-	-	-	1.99	-
	August	8.68	-	-	-	-	1.75	-
	September	8.55	-	-	-	-	1.87	-
Q4	October	8.53	-	-	-	-	1.82	-
	November	8.50	-	-	-	-	1.78	-
	December	8.79	-	-	-	-	1.67	-

Month		Site B: Town Hall						
		pH	Alkalinity (mg/L)	Conductivity (umho/cm)	Temp. (°C)	DO (mg/L)	Cl Residual (mg/L)	Orthophosphate (mg/L)
Q1	January	8.21	17.9	-	-	-	1.29	0.34
	February	7.96	19.8	-	-	-	1.21	0.47
	March	7.81	17.8	149	-	10.1	1.14	0.53
Q2	April	8.68	19.2	-	-	-	1.18	0.51
	May	8.35	17.9	-	-	-	1.15	0.51
	June	8.34	18.7	158	-	10.0	1.19	0.37
Q3	July	8.14	20.4	-	-	-	1.25	0.46
	August	8.53	20.9	-	-	-	1.18	0.48
	September	8.54	16.9	132	-	11.5	1.31	0.44
Q4	October	8.21	18.4	-	-	-	1.35	0.36
	November	8.11	15.6	-	-	-	1.21	0.48
	December	8.33	14.7	146	-	10.9	1.11	0.49

Month		Site C: 740 Main Street						
		pH	Alkalinity (mg/L)	Conductivity (umho/cm)	Temp. (°C)	DO (mg/L)	Cl Residual (mg/L)	Orthophosphate (mg/L)
Q1	January	8.48	-	-	-	-	1.12	0.40
	February	8.06	-	-	-	-	1.08	0.52
	March	8.03	-	-	-	-	1.10	0.55
Q2	April	8.80	-	-	-	-	1.14	0.58
	May	8.49	-	-	-	-	1.04	0.56
	June	8.35	-	-	-	-	0.94	0.46
Q3	July	8.11	-	-	-	-	1.21	0.54
	August	8.65	-	-	-	-	0.97	0.61
	September	8.60	-	-	-	-	1.09	0.54
Q4	October	8.04	-	-	-	-	1.22	0.49
	November	7.99	-	-	-	-	1.18	0.60
	December	8.30	-	-	-	-	0.78	0.52

Month		Site D: Bayview School						
		pH	Alkalinity (mg/L)	Conductivity (umho/cm)	Temp. (°C)	DO (mg/L)	Cl Residual (mg/L)	Orthophosphate (mg/L)
Q1	January	8.54	-	-	-	-	1.23	0.36
	February	8.27	-	-	-	-	1.05	0.50
	March	7.93	-	-	-	-	1.05	0.51
Q2	April	8.91	-	-	-	-	1.18	0.57
	May	8.41	-	-	-	-	0.91	0.56
	June	8.52	-	-	-	-	0.93	0.47
Q3	July	8.29	-	-	-	-	0.63	0.56
	August	8.60	-	-	-	-	0.60	0.65
	September	8.90	-	-	-	-	0.92	0.57
Q4	October	8.62	-	-	-	-	1.29	0.46
	November	8.22	-	-	-	-	1.15	0.56
	December	8.48	-	-	-	-	0.92	0.49

APPENDIX E

Last Round of Sampling Data for *GCDWQ*

CLIENT NAME: TOWN OF MAHONE BAY
PO BOX 530
MAHONE BAY, NS B0J2E0
(902) 624-8327

ATTENTION TO: Scott Hoyt

PROJECT: Mac/iMac 2022 2008-061157-03

AGAT WORK ORDER: 22X938799

FOOD CHEMISTRY REVIEWED BY: Fabien Aulagnier, Chimiste, AGAT Montréal

MISCELLANEOUS ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

TRACE ORGANICS REVIEWED BY: Dylan McCarthy, Trace Organics Lab Technician

ULTRA TRACE REVIEWED BY: Roza Makhtari, Chimiste, AGAT Montréal

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Oct 26, 2022

PAGES (INCLUDING COVER): 28

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

SAMPLING SITE:

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Glyphosate (Montreal) (ug/L)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Glyphosate	ug/L		15	<15	<15

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Radiochemistry)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Radionuclides - Gross Alpha*	Bq/L	0.5	0.1	Y	Y
Radionuclides - Gross Beta*	Bq/L	1.0	0.1	Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632-4254678 *Analysis performed at subcontracted laboratory.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Subcontracted)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Nitriloacetic Acid (NTA)	mg/L	0.4	0.03	Y	Y
Microcystin - LR	ug/L	1.5	0.05	Y	Y
N-Nitrosodimethylamine (NDMA)	ug/L	0.04	1	Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632-4254678 *Analysis performed at subcontracted laboratory.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

SAMPLING SITE:

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Canadian Drinking Water MAC Package (Diquat)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

		SAMPLE DESCRIPTION:		Raw	Treated
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Diquat	µg/L	70	5	<5	<5
Paraquat	µg/L		1	<1	<1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632-4254678 Analysis performed at AGAT Toronto.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (HAAs, PAH, VOCs)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

Parameter	Unit	SAMPLE DESCRIPTION:		Raw	Treated
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-08-29	2022-08-29
				08:45	09:00
		G / S	RDL	4254632	4254678
Chloroacetic Acid	ug/L		0.5	<0.5	<0.5
Bromoacetic Acid	ug/L		0.5	<0.5	<0.5
Dichloroacetic Acid	ug/L		0.5	<0.5	15.4
Trichloroacetic Acid	ug/L		0.5	<0.5	18.5
Bromochloroacetic Acid	ug/L		0.5	<0.5	3.1
Dibromoacetic Acid	ug/L		0.5	<0.5	<0.5
Haloacetic Acids	ug/L	80	4.0	<4.0	37.0
Benzo(a)pyrene	mg/L	0.00004	0.00001	<0.00001	<0.00001
Vinyl Chloride	ug/L	2	0.6	<0.6	<0.6
Chloroethane	ug/L		5	<5	<5
1,1-Dichloroethylene	ug/L	14	2	<2	<2
Methylene Chloride (Dichloromethane)	ug/L	50	2	<2	<2
Methyl-t-Butyl-Ether (MTBE)	ug/L	15 AO	2	<2	<2
Chloroform	ug/L		1	<1	42
1,2-Dichloroethane	ug/L	5	2	<2	<2
Carbon Tetrachloride	ug/L	2	0.56	<0.56	<0.56
Benzene	ug/L	5	1	<1	<1
Trichloroethylene	ug/L	5	1	<1	<1
Bromodichloromethane	ug/L		1	<1	8
Toluene	ug/L	60, 24 AO	2	<2	<2
Dibromochloromethane	ug/L		1	<1	1
Tetrachloroethylene	ug/L		1	<1	<1
Ethylbenzene	ug/L	140.1.6 AO	2	<2	<2
Bromoform	ug/L		1	<1	<1
Xylenes (Total)	ug/L	300 AO	4	<4	<4
1,4-Dichlorobenzene	ug/L	5, 1 AO	1	<1	<1
Total Trihalomethanes	ug/L	100	1	<1	51

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (HAAs, PAH, VOCs)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:			Raw	Treated
SAMPLE TYPE:			Water	Water
DATE SAMPLED:			2022-08-29 08:45	2022-08-29 09:00
Surrogate	Unit	Acceptable Limits	4254632	4254678
2-Bromobutanoic acid	%	50-130	104	98
Toluene-d8	%	60-130	80	77
4-Bromofluorobenzene	%	60-130	92	90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.
Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Herbicides)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

		SAMPLE DESCRIPTION:		Raw	Treated
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Bromoxynil	µg/L		0.5	<0.5	<0.5
Dicamba	µg/L		0.05	<0.05	<0.05
2,4-D	µg/L		0.05	<0.05	<0.05
MCPA	µg/L		5	<5	<5
Pentachlorophenol	µg/L		0.1	<0.1	<0.1
2,4,6-Trichlorophenol	µg/L		0.5	<0.5	<0.5
Surrogate	Unit	Acceptable Limits			
DCAA	%	50-130		96	74

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4254632-4254678 Analysis performed at AGAT Toronto laboratory.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (OP Pest)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Dimethoate	µg/L	20	1.5	<1.5	<1.5
Malathion	µg/L	190	1	<1	<1
Chlorpyrifos	µg/L	90	1	<1	<1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632-4254678 Results relate only to the items tested.
Analysis performed at AGAT Toronto.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Triaz. Pest)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Trifluralin	µg/L		1.0	<1.0	<1.0
Atrazine	µg/L	5	0.5	<0.5	<0.5
Atrazine + N-dealkylated metabolites	µg/L	5	1.0	<1.0	<1.0
Metribuzin	µg/L	80	0.25	<0.25	<0.25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632-4254678 Results relate only to the items tested.
Analysis performed at AGAT Toronto.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

		SAMPLE DESCRIPTION:		Raw	Treated
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Perfluorobutanoic Acid PFBA	ng/L		1.0	4.3	10.3
Perfluoropentanoic Acid PFPeA	ng/L		1.0	<1.0	<1.0
Perfluorohexanoic Acid PFHxA	ng/L		1.0	<1.0	<1.0
Perfluoroheptanoic Acid PFHpA	ng/L		1.0	<1.0	<1.0
Perfluorooctanoic Acid PFOA	ng/L	200	1.0	<1.0	<1.0
Perfluorononanoic Acid PFNA	ng/L		1.0	<1.0	<1.0
Perfluorodecanoic Acid PFDA	ng/L		1.0	<1.0	<1.0
Perfluoroundecanoic Acid PFUnA	ng/L		1.0	<1.0	<1.0
Perfluorododecanoic Acid PFDoA	ng/L		1.0	<1.0	<1.0
Perfluorotridecanoic Acid PFTrDA	ng/L		1.0	<1.0	<1.0
Perfluorotetradecanoic Acid PFTeDA	ng/L		1.0	<1.0	<1.0
Perfluorobutanesulfonic Acid PFBS	ng/L		1.0	<1.0	<1.0
Perfluorohexasulfonic Acid PFHxS	ng/L		1.0	<1.0	<1.0
Perfluoroheptanesulfonate PFHpS	ng/L		1.0	<1.0	<1.0
Perfluorooctasulfonic Acid PFOS	ng/L	600	1.0	<1.0	<1.0
Perfluorooctanesulfonamide Acid PFOSA	ng/L		1.0	<1.0	<1.0
Perfluorodecanesulfonic Acid PFDS	ng/L		1.0	<1.0	<1.0
N-Methylperfluorosulfonamideacetic N-MeFOSAA	ng/L		1.0	<1.0	<1.0
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	ng/L		1.0	<1.0	<1.0

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Perfluorinated Compounds (water)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:			Raw	Treated
SAMPLE TYPE:			Water	Water
DATE SAMPLED:			2022-08-29 08:45	2022-08-29 09:00
Surrogate	Unit	Acceptable Limits	4254632	4254678
Perfluorobutanoic Acid-13C4	%	30-140	119	111
Perfluoropentanoic Acid-13C5	%	30-140	60	56
Perfluorohexanoic Acid-13C5	%	30-140	106	106
Perfluoroheptanoic Acid-13C4	%	30-140	131	150
Perfluorooctanoic Acid-13C8	%	30-140	110	109
Perfluorononanoic Acid-13C9	%	30-140	106	114
Perfluorodecanoic Acid-13C6	%	30-140	100	100
Perfluoroundecanoic Acid-13C7	%	30-140	78	82
Perfluorododecanoic Acid-13C2	%	30-140	49	54
Perfluorotetradecanoic Acid-13C2	%	30-140	33	42
Perfluorobutanesulfonic Acid-13C3	%	30-140	104	91
Perfluorohexasulfonic Acid-13C3	%	30-140	146	200
Perfluorooctasulfonic Acid-13C8	%	30-140	112	111
Perfluorooctane sulfonamide -13C8	%	30-140	71	90
N-Ethylperfluorosulfonamideacetic-D5	%	30-140	63	68

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4254632 Results are corrected with surrogate recoveries.

4254678 Results are corrected with surrogate recoveries. Some of the surrogate recoveries are not within acceptance limits due to matrix interference.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:





AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Total Aluminum	ug/L	2900, 100	10	61	<10
Total Antimony	ug/L	6	2	<2	<2
Total Arsenic	ug/L	10	2	<2	<2
Total Barium	ug/L	2000	5	<5	<5
Total Boron	ug/L	5000	5	6	6
Total Cadmium	ug/L	7	0.3	<0.3	<0.3
Total Chromium	ug/L	50	2	<2	<2
Total Copper	ug/L	2000, 1000	2	12	<2
Total Iron	ug/L	300 AO	50	209	<50
Total Lead	ug/L	5	0.5	2.6	<0.5
Total Manganese	ug/L	120, 20 AO	2	46	4
Total Selenium	ug/L	50	2	<2	<2
Total Strontium	ug/L	7000	5	10	10
Total Uranium	ug/L	20	0.2	<0.2	<0.2
Total Zinc	ug/L	5000 AO	5	11	<5
Total Sodium	mg/L	200 AO	1	12	31
Mercury	ug/L	1	0.05	<0.05	<0.05
pH		7.0-10.5		6.21	7.28
Turbidity	NTU	1.0	0.5	4.4	1.0
True Color	TCU	15 AO	5.00	43.9	<5.00
Chloride	mg/L	250 AO	1	39	25
Fluoride	mg/L	1.5	0.12	<0.12	<0.12
Nitrate as N	mg/L	10	0.05	<0.05	<0.05
Nitrite as N	mg/L	1.0	0.05	<0.05	<0.05
Sulphate	mg/L	500 AO	2	4	3
Total Dissolved Solids	mg/L	500 AO	5	28	48
Bromate	mg/L	0.01	0.01	<0.01	<0.01
Chlorate	mg/L	1	0.02	<0.02	0.39
Chlorite	mg/L	1	0.02	<0.02	<0.02

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Chloramines - Total	mg/L		0.1	<0.1	0.4

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.
4254632-4254678 Chloramines is a calculated parameter. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.
Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

SAMPLING SITE:

ATTENTION TO: Scott Hoyt

SAMPLED BY:

TCN

DATE RECEIVED: 2022-08-29

DATE REPORTED: 2022-10-26

SAMPLE DESCRIPTION:				Raw	Treated
SAMPLE TYPE:				Water	Water
DATE SAMPLED:				2022-08-29 08:45	2022-08-29 09:00
Parameter	Unit	G / S	RDL	4254632	4254678
Cyanide, SAD	mg/L		0.002	<0.002	<0.002

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Exceedance Summary

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
4254632	Raw	NS-CDWQ incl [AO]	Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)	True Color	TCU	15 AO	43.9
4254632	Raw	NS-CDWQ incl [AO]	Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)	Turbidity	NTU	1.0	4.4
4254632	Raw	NS-CDWQ incl [AO]	Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)	pH		7.0-10.5 OG	6.21

Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Food Chemistry Analysis

RPT Date: Oct 26, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Glyphosate (Montreal) (ug/L)																
Glyphosate	831	NA	< 15	< 15	NA	< 15	89%	70%	130%	87%	70%	130%	81%	70%	130%	

Certified By:



Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 26, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Canadian Drinking Water MAC Package (HAAs, PAH, VOCs)															
Chloroacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	106%	70%	130%	68%	60%	130%	60%	60%	130%
Bromoacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	94%	70%	130%	77%	60%	130%	64%	60%	130%
Dichloroacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	102%	70%	130%	95%	60%	130%	115%	60%	130%
Trichloroacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	83%	70%	130%	86%	60%	130%	94%	60%	130%
Bromochloroacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	81%	70%	130%	85%	60%	130%	88%	60%	130%
Dibromoacetic Acid	1	4242846	< 0.5	< 0.5	NA	< 0.5	79%	70%	130%	98%	60%	130%	101%	60%	130%
Benzo(a)pyrene	1	4255291	< 0.00001	< 0.00001	NA	< 0.00001	70%	50%	140%	72%	50%	140%	76%	50%	140%
Vinyl Chloride	1	4254632	< 0.6	< 0.6	NA	< 0.6	114%	50%	140%	104%	60%	130%	93%	50%	140%
Chloroethane	1	4254632	< 5	< 5	NA	< 5	124%	50%	140%	128%	60%	130%	114%	50%	140%
1,1-Dichloroethylene	1	4254632	< 2	< 2	NA	< 2	97%	50%	140%	108%	60%	130%	84%	50%	140%
Methylene Chloride (Dichloromethane)	1	4254632	< 2	< 2	NA	< 2	107%	50%	140%	100%	60%	130%	90%	50%	140%
Methyl-t-Butyl-Ether (MTBE)	1	4254632	< 2	< 2	NA	< 2	104%	60%	140%	99%	60%	140%	91%	60%	140%
Chloroform	1	4254632	< 1	< 1	NA	< 1	117%	50%	140%	112%	60%	130%	102%	50%	140%
1,2-Dichloroethane	1	4254632	< 2	< 2	NA	< 2	102%	50%	140%	97%	60%	130%	90%	50%	140%
Carbon Tetrachloride	1	4254632	< 0.56	< 0.56	NA	< 0.56	109%	50%	140%	100%	60%	130%	98%	50%	140%
Benzene	1	4254632	< 1	< 1	NA	< 1	99%	70%	130%	95%	70%	130%	86%	70%	130%
Trichloroethylene	1	4254632	< 1	< 1	NA	< 1	110%	50%	140%	104%	60%	130%	118%	50%	140%
Bromodichloromethane	1	4254632	< 1	< 1	NA	< 1	105%	50%	140%	98%	60%	130%	97%	50%	140%
Toluene	1	4254632	< 2	< 2	NA	< 2	98%	70%	130%	76%	60%	140%	71%	60%	140%
Dibromochloromethane	1	4254632	< 1	< 1	NA	< 1	101%	50%	140%	94%	60%	130%	85%	50%	140%
Tetrachloroethylene	1	4254632	< 1	< 1	NA	< 1	102%	70%	130%	87%	60%	140%	75%	60%	140%
Ethylbenzene	1	4254632	< 2	< 2	NA	< 2	89%	70%	130%	86%	60%	140%	70%	60%	140%
Bromoform	1	4254632	< 1	< 1	NA	< 1	85%	50%	140%	82%	60%	130%	78%	50%	140%
1,4-Dichlorobenzene	1	4254632	< 1	< 1	NA	< 1	84%	50%	140%	76%	60%	130%	70%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Canadian Drinking Water MAC Package (Herbicides)

Bromoxynil			< 0.5	< 0.5	NA	< 0.5	92%	50%	140%	80%	50%	140%	NA	50%	140%
Dicamba			< 0.05	< 0.05	NA	< 0.05	85%	50%	140%	82%	50%	140%	79%	50%	140%
2,4-D			< 0.05	< 0.05	NA	< 0.05	99%	60%	130%	96%	60%	130%	82%	60%	130%
MCPA			< 5	< 5	NA	< 5	92%	50%	140%	82%	50%	140%	80%	50%	140%
Pentachlorophenol			< 0.1	< 0.1	NA	< 0.1	100%	50%	140%	98%	50%	140%	90%	50%	140%
2,4,6-Trichlorophenol			< 0.5	< 0.5	NA	< 0.5	90%	50%	140%	86%	50%	140%	75%	50%	140%

Canadian Drinking Water MAC Package (Diquat)

Diquat	1	TWDUP	< 5	< 5	NA	< 5	101%	60%	140%	86%	60%	140%	95%	60%	140%
Paraquat	1	TWDUP	< 1	< 1	NA	< 1	97%	50%	140%	88%	50%	140%	102%	50%	140%

Canadian Drinking Water MAC Package (Triaz. Pest)

AGAT QUALITY ASSURANCE REPORT (V1)

Page 18 of 28

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 26, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Trifluralin	4259709		< 1.0	< 1.0	NA	< 1.0	85%	50%	140%	84%	50%	140%	79%	50%	140%
Atrazine	4259709		< 0.5	< 0.5	NA	< 0.5	79%	50%	140%	79%	50%	140%	84%	50%	140%
Metribuzin	4259709		< 0.25	< 0.25	NA	< 0.25	85%	50%	140%	78%	50%	140%	79%	50%	140%

Canadian Drinking Water MAC Package (OP Pest)

Dimethoate	4242846		< 1.5	< 1.5	NA	< 1.5	69%	50%	140%	99%	50%	140%	97%	50%	140%
Malathion	4242846		< 1	< 1	NA	< 1	77%	50%	140%	101%	50%	140%	99%	50%	140%
Chlorpyrifos	4242846		< 1	< 1	NA	< 1	79%	50%	140%	123%	50%	140%	116%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:





Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Ultra Trace Analysis

RPT Date: Oct 26, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits	Recovery	Acceptable Limits	Recovery	Acceptable Limits
								Lower		Upper		Lower	Upper	Lower	Upper

Perfluorinated Compounds (water)

Perfluorobutanoic Acid PFBA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	109%	60%	140%	NA	60%	140%
Perfluoropentanoic Acid PFPeA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	109%	60%	140%	NA	60%	140%
Perfluorohexanoic Acid PFHxA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	113%	60%	140%	NA	60%	140%
Perfluoroheptanoic Acid PFHpA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	114%	60%	140%	NA	60%	140%
Perfluorooctanoic Acid PFOA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	105%	60%	140%	NA	60%	140%
Perfluorononanoic Acid PFNA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	106%	60%	140%	NA	60%	140%
Perfluorodecanoic Acid PFDA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	107%	60%	140%	NA	60%	140%
Perfluoroundecanoic Acid PFUnA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	105%	60%	140%	NA	60%	140%
Perfluorododecanoic Acid PFDoA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	104%	60%	140%	NA	60%	140%
Perfluorotridecanoic Acid PFTrDA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	102%	60%	140%	NA	60%	140%
Perfluorotetradecanoic Acid PFTEdA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	112%	60%	140%	NA	60%	140%
Perfluorobutanesulfonic Acid PFBS	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	109%	60%	140%	NA	60%	140%
Perfluorohexasulfonic Acid PFHxS	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	107%	60%	140%	NA	60%	140%
Perfluoroheptanesulfonate PFHpS	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	110%	60%	140%	NA	60%	140%
Perfluorooctasulfonic Acid PFOS	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	100%	60%	140%	NA	60%	140%
Perfluorooctanesulfonamide Acid PFOSA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	101%	60%	140%	NA	60%	140%
Perfluorodecanesulfonic Acid PFDS	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	56%	60%	140%	NA	60%	140%
N-Methylperfluorosulfonamideacetic N-MeFOSAA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	105%	60%	140%	NA	60%	140%
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	1	NA	NA	NA	0.0%	< 1.0	NA	60%	140%	98%	60%	140%	NA	60%	140%
Perfluorobutanoic Acid-13C4	1	NA	NA	NA	0.0%	103	NA	40%	140%	111%	40%	140%	NA	40%	140%
Perfluoropentanoic Acid-13C5	1	NA	NA	NA	0.0%	94	NA	40%	140%	104%	40%	140%	NA	40%	140%
Perfluorohexanoic Acid-13C5	1	NA	NA	NA	0.0%	94	NA	40%	140%	103%	40%	140%	NA	40%	140%
Perfluoroheptanoic Acid-13C4	1	NA	NA	NA	0.0%	91	NA	40%	140%	99%	40%	140%	NA	40%	140%
Perfluorooctanoic Acid-13C8	1	NA	NA	NA	0.0%	95	NA	40%	140%	104%	40%	140%	NA	40%	140%
Perfluorononanoic Acid-13C9	1	NA	NA	NA	0.0%	90	NA	40%	140%	100%	40%	140%	NA	40%	140%
Perfluorodecanoic Acid-13C6	1	NA	NA	NA	0.0%	90	NA	40%	140%	100%	40%	140%	NA	40%	140%
Perfluoroundecanoic Acid-13C7	1	NA	NA	NA	0.0%	75	NA	40%	140%	82%	40%	140%	NA	40%	140%
Perfluorododecanoic Acid-13C2	1	NA	NA	NA	0.0%	43	NA	40%	140%	54%	40%	140%	NA	40%	140%
Perfluorotetradecanoic Acid-13C2	1	NA	NA	NA	0.0%	34	NA	40%	140%	48%	40%	140%	NA	40%	140%
Perfluorobutanesulfonic Acid-13C3	1	NA	NA	NA	0.0%	107	NA	40%	140%	116%	40%	140%	NA	40%	140%
Perfluorohexasulfonic Acid-13C3	1	NA	NA	NA	0.0%	95	NA	40%	140%	104%	40%	140%	NA	40%	140%
Perfluorooctasulfonic Acid-13C8	1	NA	NA	NA	0.0%	99	NA	40%	140%	111%	40%	140%	NA	40%	140%
Perfluorooctane sulfonamide -13C8	1	NA	NA	NA	0.0%	85	NA	60%	140%	98%	60%	140%	NA	60%	140%
N-Ethylperfluorosulfonamideacetic-D5	1	NA	NA	NA	0.0%	73	NA	40%	140%	81%	40%	140%	NA	40%	140%

Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Ultra Trace Analysis (Continued)

RPT Date: Oct 26, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Certified By:



Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Water Analysis															
RPT Date: Oct 26, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Canadian Drinking Water MAC Package (Metals, Hg & Inorganics)

Total Aluminum	4254690		182	169	7.3%	< 10	103%	80%	120%	112%	80%	120%	NA	70%	130%
Total Antimony	4254690		<2	<2	NA	< 2	81%	80%	120%	NA	80%	120%	NA	70%	130%
Total Arsenic	4254690		<2	<2	NA	< 2	101%	80%	120%	101%	80%	120%	102%	70%	130%
Total Barium	4254690		8	8	NA	< 5	107%	80%	120%	113%	80%	120%	104%	70%	130%
Total Boron	4254690		276	266	3.8%	< 5	104%	80%	120%	106%	80%	120%	NA	70%	130%
Total Cadmium	4254690		<0.3	<0.3	NA	< 0.3	103%	80%	120%	103%	80%	120%	90%	70%	130%
Total Chromium	4254690		9	9	NA	< 2	98%	80%	120%	102%	80%	120%	NA	70%	130%
Total Copper	4254690		6	7	NA	< 2	100%	80%	120%	102%	80%	120%	102%	70%	130%
Total Iron	4254690		3460	3490	NA	< 50	100%	80%	120%	99%	80%	120%	NA	70%	130%
Total Lead	4254690		<0.5	<0.5	NA	< 0.5	106%	80%	120%	112%	80%	120%	93%	70%	130%
Total Manganese	4254690		569	579	1.8%	< 2	99%	80%	120%	98%	80%	120%	NA	70%	130%
Total Selenium	4254690		<2	<2	NA	< 2	100%	80%	120%	104%	80%	120%	78%	70%	130%
Total Strontium	4254690		4240	4360	2.8%	< 5	92%	80%	120%	93%	80%	120%	NA	70%	130%
Total Uranium	4254690		11.6	12.3	5.5%	< 0.2	105%	80%	120%	110%	80%	120%	NA	70%	130%
Total Zinc	4254690		8	7	NA	< 5	99%	80%	120%	100%	80%	120%	81%	70%	130%
Total Sodium	4254690		99	101	1.4%	< 0.1	105%	80%	120%	103%	80%	120%	NA	70%	130%
Mercury	4277305	4277305	<0.05	<0.05	NA	< 0.05	110%	80%	120%	116%	80%	120%	122%	70%	130%
pH	4238170		6.88	6.88	0.0%	<	100%	80%	120%		80%	120%		80%	120%
Turbidity	4254632		NA	NA	NA	< 0.5	98%	80%	120%	NA			NA		
True Color	4255209		<5.00	<5.00	NA	< 5	107%	80%	120%	93%	80%	120%	NA		
Chloride	4264616		8	8	4.9%	< 1	83%	80%	120%	NA	80%	120%	88%	70%	130%
Fluoride	4264616		<0.12	<0.12	NA	< 0.12	102%	80%	120%	NA	80%	120%	109%	70%	130%
Nitrate as N	4255346		0.06	0.05	NA	< 0.05	99%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	4255346		<0.05	<0.05	NA	< 0.05	94%	80%	120%	NA	80%	120%	NA	70%	130%
Sulphate	4261990		14	14	0.0%	< 2	101%	80%	120%	NA	80%	120%	NA	70%	130%
Total Dissolved Solids	4259727		1500	1500	0.1%	< 5	84%	80%	120%	NA			NA		
Bromate	4254632	4254632	<0.01	<0.01	NA	< 0.01	78%	70%	130%	NA	70%	130%	NA	70%	130%
Chlorate	4254632	4254632	<0.02	<0.02	NA	< 0.02	98%	70%	130%	NA	70%	130%	NA	70%	130%
Chlorite	4254632	4254632	<0.02	<0.02	NA	< 0.02	91%	70%	130%	NA	70%	130%	NA	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

TCN

Cyanide, SAD	4255218		<0.002	<0.002	NA	< 0.002	108%	70%	130%	94%	80%	120%	106%	70%	130%
--------------	---------	--	--------	--------	----	---------	------	-----	------	-----	-----	------	------	-----	------

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

Certified By:



QC Exceedance

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

RPT Date: Oct 26, 2022										
PARAMETER		Sample Id	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE		
			Measured Value	Acceptable Limits	Recovery	Acceptable Limits		Recovery	Acceptable Limits	
				Lower Upper		Lower	Upper		Lower	Upper

Perfluorinated Compounds (water)

Perfluorodecanesulfonic Acid PFDS	NA	NA	60%	140%	56%	60%	140%	NA	60%	140%
-----------------------------------	----	----	-----	------	-----	-----	------	----	-----	------

Comments: Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Food Chemistry Analysis			
Glyphosate	ORG-100-5115F	MA.403-GLYAMP 1.0 Modifiée	HPLC
Miscellaneous Analysis			
Radionuclides - Gross Alpha*			
Radionuclides - Gross Beta*			
Nitriloacetic Acid (NTA)			
Microcystin - LR			
N-Nitrosodimethylamine (NDMA)		EPA SW846-8270	GC/MS

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:
AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Diquat	ORG-91-5102	modified from EPA 549.2	HPLC
Paraquat	ORG-91-5102	EPA 549.1	HPLC
Chloroacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Bromoacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Dichloroacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Trichloroacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Bromochloroacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Dibromoacetic Acid	ORG-120-5110	EPA 552.3	GC/ECD
Haloacetic Acids	ORG-120-5110	EPA 552.3	GC/ECD
2-Bromobutanoic acid	ORG-120-5110	EPA 552.3	GC/ECD
Benzo(a)pyrene	ORG-120-5119	EPA 3510C/8270E	GC/MS
Vinyl Chloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,1-Dichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Methylene Chloride (Dichloromethane)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Methyl-t-Butyl-Ether (MTBE)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Chloroform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,2-Dichloroethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Carbon Tetrachloride	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Benzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Trichloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromodichloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Dibromochloromethane	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Tetrachloroethylene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Ethylbenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Bromoform	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Xylenes (Total)	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
1,4-Dichlorobenzene	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Total Trihalomethanes	VOL-120-5001	EPA SW-846 5030B/8260B	GC/MS
Toluene-d8	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
4-Bromofluorobenzene	VOL-120-5001	EPA SW846 5030B/8260B	GC/MS
Bromoxynil	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Dicamba	ORG-91-5110	EPA SW-846 8151A	GC/ECD
2,4-D	ORG-91-5110	EPA SW-846 8151A	GC/ECD
MCPA	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Pentachlorophenol	ORG-91-5110	EPA SW-846 8151A	GC/ECD
2,4,6-Trichlorophenol	ORG-91-5110	EPA SW-846 8151A	GC/ECD
DCAA	ORG-91-5110	EPA SW-846 8151	GC/ECD
Dimethoate	ORG-91-5103	modified from EPA SW-846 3510C, 8141B & 8270E	GC/MS
Malathion	ORG-91-5103	modified from EPA SW-846 3510C, 8141B & 8270E	GC/MS
Chlorpyrifos	ORG-91-5103	modified from EPA SW-846 3510C, 8141B & 8270E	GC/MS
Trifluralin	ORG-91-5104	EPA SW-846 3510 & 8270 & MOE E3121	GC/MS
Atrazine	ORG-91-5104	EPA SW-846 3510 & 8270 & MOE E3121	GC/MS

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X938799

PROJECT: Mac/iMac 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Atrazine + N-dealkylated metabolites	ORG-91-5104	EPA SW-846 3510c & 8270 & MOE E3121	GC/MS
Metribuzin	ORG-91-5104	EPA SW-846 3510 & 8270 & MOE E3121	GC/MS
Ultra Trace Analysis			
Perfluorobutanoic Acid PFBA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid PFPeA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid PFHxA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid PFHpA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid PFOA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid PFNA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid PFDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid PFUnA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid PFDoA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotridecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid PFTeDA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid PFBS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid PFHxS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanesulfonate PFHpS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanesulfonic Acid PFOS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanesulfonamide Acid PFOSA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanesulfonic Acid PFDS	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Methylperfluorosulfonamideacetic N-MeFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic N-EtFOSAA	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoropentanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexanoic Acid-13C5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroheptanoic Acid-13C4	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanoic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorononanoic Acid-13C9	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorodecanoic Acid-13C6	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluoroundecanoic Acid-13C7	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorododecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorotetradecanoic Acid-13C2	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorobutanesulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorohexasulfonic Acid-13C3	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctanesulfonic Acid-13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
Perfluorooctane sulfonamide -13C8	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS
N-Ethylperfluorosulfonamideacetic-D5	TOX-151-19012F	EPA 537, ISO25101	LC/MS/MS

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Mac/iMac 2022 2008-061157-03

SAMPLING SITE:
AGAT WORK ORDER: 22X938799

ATTENTION TO: Scott Hoyt

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Mercury	INOR-121-6100 & INOR-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Total Dissolved Solids	INOR-121-6024, 6025	SM 2540C, D	GRAVIMETRIC
Bromate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Chlorate	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Chlorite	INOR-121-6005	SM 4110 B	ION CHROMATOGRAPH
Chloramines - Total			CALCULATION
Cyanide, SAD	INOR-93-6051	modified from ON MOECC E3015, SM 4500-CN- A,B,C	TECHNICON AUTO ANALYZER



Laboratories

webearth.agatlabs.com • www.agatlabs.com

Chain of Custody Record

P: 902.468.8718 • F: 902.468.8924

Report Information

Company: Town of Mahone Bay

Contact: Scott Hoyt

Address: Box 530
Mahone Bay, NS, B0J 2E0

Phone: 902-624-0613 Fax: 902-624-8069

Client Project #: Mac/iMac 2022

AGAT Quotation: 607098

Please Note: If quotation number is not provided client will be billed full price for analysis.

Invoice To

Same Yes ☒ / No ☐

Company: _____
Contact: _____
Address: _____

Phone: _____ Fax: _____
PO/Credit Card#: 678242

Report Information (Please print):

1. Name: Scott Hoyt
Email: Scott.Hoyt@TownofMahoneBay.ca

2. Name: _____
Email: @townofmahonebay.com

Regulatory Requirements (Check):

☒ List Guidelines on Report ☐ Do not list Guidelines on Report

☐ PIRI

☐ Tier 1 ☐ Res ☒ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☒ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME

☒ CDWQ
☐ NSEQS-Cont Sites
☐ HRM 101
 ☐ Storm Water
 ☐ Waste Water
☐ Other

☐ Industrial
☐ Commercial
☐ Res/Park
☐ Agricultural
☐ FWAL
☐ Sediment

Report Format

☐ Single Sample
per page

☒ Multiple Samples
per page

☒ Excel Format
Included

☐ Export

Drinking Water Sample: ☒ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.: 2008-061157-03

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: _____
Hold Time: _____
AGAT Job Number: 22X938799

Notes:

No bottle for TCEC

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT ☐ Same day ☐ 1 day
☐ 2 days ☐ 3 days

Date Required: _____

[illegible]

Samples Relinquished By (Print Name)

BEN Underhill
Samples Relinquished By (Sign): *B. Underhill*

Date/Time

Aug29/22@8:45

Samples Received By (Print Name)	
----------------------------------	--

Samples Received By (Sign) _____

Date/Time:

Date/Time	Location	Activity	Remarks
10/10/2023 10:00	Room 101	Meeting with Mr. Smith	Discussed project progress
10/10/2023 14:30	Office	Writing report	Completed section 2
10/10/2023 18:00	Gym	Cardio workout	30 minutes
10/11/2023 09:00	Room 102	Meeting with Ms. Jones	Discussed budget
10/11/2023 11:00	Office	Reviewing documents	Checked email
10/11/2023 15:00	Room 103	Meeting with Mr. Brown	Discussed new client
10/11/2023 17:00	Office	Preparing presentation	Added slides
10/12/2023 08:00	Room 104	Meeting with Mr. Green	Discussed contract
10/12/2023 10:00	Office	Writing report	Completed section 3
10/12/2023 13:00	Room 105	Meeting with Ms. White	Discussed marketing
10/12/2023 16:00	Office	Reviewing documents	Checked email
10/13/2023 09:00	Room 106	Meeting with Mr. Black	Discussed project
10/13/2023 11:00	Office	Writing report	Completed section 4
10/13/2023 14:00	Room 107	Meeting with Ms. Grey	Discussed budget
10/13/2023 17:00	Office	Preparing presentation	Added slides
10/14/2023 08:00	Room 108	Meeting with Mr. Blue	Discussed contract
10/14/2023 10:00	Office	Writing report	Completed section 5
10/14/2023 13:00	Room 109	Meeting with Ms. Yellow	Discussed marketing
10/14/2023 16:00	Office	Reviewing documents	Checked email
10/15/2023 09:00	Room 110	Meeting with Mr. Purple	Discussed project
10/15/2023 11:00	Office	Writing report	Completed section 6
10/15/2023 14:00	Room 111	Meeting with Ms. Pink	Discussed budget
10/15/2023 17:00	Office	Preparing presentation	Added slides
10/16/2023 08:00	Room 112	Meeting with Mr. Brown	Discussed contract
10/16/2023 10:00	Office	Writing report	Completed section 7
10/16/2023 13:00	Room 113	Meeting with Ms. Green	Discussed marketing
10/16/2023 16:00	Office	Reviewing documents	Checked email
10/17/2023 09:00	Room 114	Meeting with Mr. Blue	Discussed project
10/17/2023 11:00	Office	Writing report	Completed section 8
10/17/2023 14:00	Room 115	Meeting with Ms. Yellow	Discussed budget
10/17/2023 17:00	Office	Preparing presentation	Added slides
10/18/2023 08:00	Room 116	Meeting with Mr. Purple	Discussed contract
10/18/2023 10:00	Office	Writing report	Completed section 9
10/18/2023 13:00	Room 117	Meeting with Ms. Pink	Discussed marketing
10/18/2023 16:00	Office	Reviewing documents	Checked email
10/19/2023 09:00	Room 118	Meeting with Mr. Brown	Discussed project
10/19/2023 11:00	Office	Writing report	Completed section 10
10/19/2023 14:00	Room 119	Meeting with Ms. Green	Discussed budget
10/19/2023 17:00	Office	Preparing presentation	Added slides
10/20/2023 08:00	Room 120	Meeting with Mr. Blue	Discussed contract
10/20/2023 10:00	Office	Writing report	Completed section 11
10/20/2023 13:00	Room 121	Meeting with Ms. Yellow	Discussed marketing
10/20/2023 16:00	Office	Reviewing documents	Checked email
10/21/2023 09:00	Room 122	Meeting with Mr. Purple	Discussed project
10/21/2023 11:00	Office	Writing report	Completed section 12
10/21/2023 14:00	Room 123	Meeting with Ms. Pink	Discussed budget
10/21/2023 17:00	Office	Preparing presentation	Added slides
10/22/2023 08:00	Room 124	Meeting with Mr. Brown	Discussed contract
10/22/2023 10:00	Office	Writing report	Completed section 13
10/22/2023 13:00	Room 125	Meeting with Ms. Green	Discussed marketing
10/22/2023 16:00	Office	Reviewing documents	Checked email
10/23/2023 09:00	Room 126	Meeting with Mr. Blue	Discussed project
10/23/2023 11:00	Office	Writing report	Completed section 14
10/23/2023 14:00	Room 127	Meeting with Ms. Yellow	Discussed budget
10/23/2023 17:00	Office	Preparing presentation	Added slides
10/24/2023 08:00	Room 128	Meeting with Mr. Purple	Discussed contract
10/24/2023 10:00	Office	Writing report	Completed section 15
10/24/2023 13:00	Room 129	Meeting with Ms. Pink	Discussed marketing
10/24/2023 16:00	Office	Reviewing documents	Checked email
10/25/2023 09:00	Room 130	Meeting with Mr. Brown	Discussed project
10/25/2023 11:00	Office	Writing report	Completed section 16
10/25/2023 14:00	Room 131	Meeting with Ms. Green	Discussed budget
10/25/2023 17:00	Office	Preparing presentation	Added slides
10/26/2023 08:00	Room 132	Meeting with Mr. Blue	Discussed contract
10/26/2023 10:00	Office	Writing report	Completed section 17
10/26/2023 13:00	Room 133	Meeting with Ms. Yellow	Discussed marketing
10/26/2023 16:00	Office	Reviewing documents	Checked email
10/27/2023 09:00	Room 134	Meeting with Mr. Purple	Discussed project
10/27/2023 11:00	Office	Writing report	Completed section 18
10/27/2023 14:00	Room 135	Meeting with Ms. Pink	Discussed budget
10/27/2023 17:00	Office	Preparing presentation	Added slides
10/28/2023			

Pink Copy - Client

Yellow Copy - AGAT

White Copy- AGAT

Page of

No.

APPENDIX F

Last Round of Sampling Data for *GMPDWS*

CLIENT NAME: TOWN OF MAHONE BAY
PO BOX 530
MAHONE BAY, NS B0J2E0
(902) 624-8327

ATTENTION TO: Scott Hoyt

PROJECT: Annual - 2022 2008-061157-03

AGAT WORK ORDER: 22X939149

MICROBIOLOGY ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

WATER ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Sep 12, 2022

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

SAMPLING SITE:

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-08-30

DATE REPORTED: 2022-09-12

SAMPLE DESCRIPTION: Raw
SAMPLE TYPE: Water
DATE SAMPLED: 2022-08-30
08:41
4258108

Parameter	Unit	G / S	RDL	
Total Coliforms (MF)	CFU/100 mL	1	100	1300
E. Coli (MF)	CFU/100 mL	1	1	<1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.
Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Health Canada Lead & Copper Sampling - Drinking Water

DATE RECEIVED: 2022-08-30

DATE REPORTED: 2022-09-12

		SAMPLE DESCRIPTION:		Raw	Distribution	Town Hall	RPS	Bayview	Raw	Distribution	Town Hall
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2022-08-30 08:41	2022-08-30 08:50	2022-08-30 08:45	2022-08-30 09:05	2022-08-30 08:20	2022-08-30 08:41	2022-08-30 08:50	2022-08-30 08:45
Parameter	Unit	G / S	RDL	4258108	4258349	4258423	4258425	4258426	4268211	4268212	4268213
Total Lead - Health Canada	ug/L	5	0.5	3.2	<0.5	<0.5	<0.5	<0.5	1.7	<0.5	<0.5
Total Copper	ug/L	2000, 1000	2	21	<2	<2	<2	<2	12	<2	3
		SAMPLE DESCRIPTION:		RPS	Bayview						
		SAMPLE TYPE:		Water	Water						
		DATE SAMPLED:		2022-08-30 09:05	2022-08-30 08:20						
Parameter	Unit	G / S	RDL	4268214	4268215						
Total Lead - Health Canada	ug/L	5	0.5	<0.5	1.3						
Total Copper	ug/L	2000, 1000	2	<2	9						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07

Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-08-30

DATE REPORTED: 2022-09-12

		SAMPLE DESCRIPTION:		Raw		Distribution	
		SAMPLE TYPE:		Water		Water	
		DATE SAMPLED:		2022-08-30 08:41		2022-08-30 08:50	
Parameter	Unit	G / S	RDL	4258108	RDL	4258349	
pH		7.0-10.5		7.08		7.17	
Reactive Silica as SiO2	mg/L		0.5	1.5	0.5	1.5	
Chloride	mg/L	250 AO	1	15	1	24	
Fluoride	mg/L	1.5	0.12	<0.12	0.12	<0.12	
Sulphate	mg/L	500 AO	2	5	2	3	
Alkalinity	mg/L		5	5	5	16	
True Color	TCU	15 AO	5.00	21.1	5.00	<5.00	
Turbidity	NTU	1.0	0.5	0.9	0.5	0.5	
Electrical Conductivity	umho/cm		1	83	1	151	
Nitrate + Nitrite as N	mg/L		0.05	<0.05	0.05	0.06	
Nitrate as N	mg/L	10	0.05	<0.05	0.05	0.06	
Nitrite as N	mg/L	1.0	0.05	<0.05	0.05	<0.05	
Ammonia as N	mg/L		0.03	<0.03	0.03	<0.03	
Total Organic Carbon	mg/L		0.5	4.9	0.5	1.9	
Ortho-Phosphate as P	mg/L		0.01	<0.01	0.01	<0.01	
Total Sodium	mg/L	200 AO	1	13	1	27	
Total Potassium	mg/L		0.1	0.3	0.1	0.3	
Total Calcium	mg/L		0.1	1.7	0.1	1.6	
Total Magnesium	mg/L		0.1	0.9	0.1	0.8	
Bicarb. Alkalinity (as CaCO3)	mg/L		5	5	5	16	
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	10	<10	
Hydroxide	mg/L		5	<5	5	<5	
Calculated TDS	mg/L	500 AO	1	39	1	67	
Hardness	mg/L			8.0		7.3	
Langelier Index (@20C)	NA			-3.54		-2.99	
Langelier Index (@ 4C)	NA			-3.86		-3.31	
Saturation pH (@ 20C)	NA			10.6		10.2	
Saturation pH (@ 4C)	NA			10.9		10.5	
Anion Sum	me/L			0.63		1.06	

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-08-30

DATE REPORTED: 2022-09-12

		SAMPLE DESCRIPTION:		Raw		Distribution	
		SAMPLE TYPE:		Water		Water	
		DATE SAMPLED:		2022-08-30 08:41		2022-08-30 08:50	
Parameter	Unit	G / S	RDL	4258108	RDL	4258349	
Cation sum	me/L			0.75		1.33	
% Difference/ Ion Balance	%			8.8		11.1	
Total Aluminum	ug/L	2900, 100	5	60	5	11	
Total Antimony	ug/L	6	2	<2	2	<2	
Total Arsenic	ug/L	10	2	<2	2	<2	
Total Barium	ug/L	2000	5	<5	5	<5	
Total Beryllium	ug/L		2	<2	2	<2	
Total Bismuth	ug/L		2	<2	2	<2	
Total Boron	ug/L	5000	5	6	5	5	
Total Cadmium	ug/L	7	0.09	<0.09	0.09	<0.09	
Total Chromium	ug/L	50	1	<1	1	<1	
Total Cobalt	ug/L		1	<1	1	<1	
Total Copper	ug/L	2000, 1000	1	10	1	<1	
Total Iron	ug/L	300 AO	50	200	50	<50	
Total Lead	ug/L	5	0.5	1.5	0.5	<0.5	
Total Manganese	ug/L	120, 20 AO	2	46	2	2	
Total Molybdenum	ug/L		2	<2	2	<2	
Total Nickel	ug/L		2	<2	2	<2	
Total Phosphorous	mg/L		0.02	0.04	0.02	0.03	
Total Selenium	ug/L	50	1	<1	1	<1	
Total Silver	ug/L		0.1	<0.1	0.1	<0.1	
Total Strontium	ug/L	7000	5	10	5	10	
Total Thallium	ug/L		0.1	<0.1	0.1	<0.1	
Total Tin	ug/L		2	<2	2	<2	
Total Titanium	ug/L		2	<2	2	<2	
Total Uranium	ug/L	20	0.2	<0.2	6	<6	
Total Vanadium	ug/L		2	<2	2	<2	
Total Zinc	ug/L	5000 AO	5	6	5	<5	

Certified By:

Jason Coaghtay



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: TOWN OF MAHONE BAY

SAMPLING SITE:

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-08-30

DATE REPORTED: 2022-09-12

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2022-07
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.
4258108-4258349 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Sep 12, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Standard Water Analysis + Total Metals

pH	4238170		6.88	6.88	0.0%	<	100%	80%	120%						
Reactive Silica as SiO ₂	4258349	4258349	1.5	1.5	NA	< 0.5	103%	80%	120%	107%	80%	120%	116%	80%	120%
Chloride	4256924		34	35	2.1%	< 1	85%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	4256924		<0.12	<0.12	NA	< 0.12	112%	80%	120%	NA	80%	120%	90%	70%	130%
Sulphate	4256924		15	15	1.5%	< 2	102%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	4238170		80	81	1.2%	< 5	82%	80%	120%						
True Color	4258349	4258349	<5.00	<5.00	NA	< 5	107%	80%	120%	93%	80%	120%	NA		
Turbidity	4259381		39.9	40.3	1.0%	< 0.5	98%	80%	120%	NA			NA		
Electrical Conductivity	4238170		947	954	0.7%	< 1	104%	90%	110%						
Nitrate as N	4256924		<0.05	<0.05	NA	< 0.05	97%	80%	120%	NA	80%	120%	90%	70%	130%
Nitrite as N	4256924		<0.05	<0.05	NA	< 0.05	95%	80%	120%	NA	80%	120%	91%	70%	130%
Ammonia as N	4258349	4258349	<0.03	<0.03	NA	< 0.03	110%	80%	120%	100%	80%	120%	105%	70%	130%
Total Organic Carbon	4261809		4.1	4.1	0.7%	< 0.5	97%	80%	120%	NA	80%	120%	103%	80%	120%
Total Sodium	4258349	4258349	27	28	2.7%	< 0.1	105%	80%	120%	107%	80%	120%	NA	70%	130%
Total Potassium	4258349	4258349	0.3	0.3	NA	< 0.1	106%	80%	120%	106%	80%	120%	111%	70%	130%
Total Calcium	4258349	4258349	1.6	1.7	3.2%	< 0.1	101%	80%	120%	100%	80%	120%	NA	70%	130%
Total Magnesium	4258349	4258349	0.8	0.8	2.6%	< 0.1	109%	80%	120%	107%	80%	120%	109%	70%	130%
Bicarb. Alkalinity (as CaCO ₃)	4238170		80	81	1.2%	< 5	NA	80%	120%						
Carb. Alkalinity (as CaCO ₃)	4238170		< 10	< 10	0.0%	< 10	NA	80%	120%						
Hydroxide	4238170		< 5	< 5	0.0%	< 5	NA	80%	120%						
Total Aluminum	4258349	4258349	11	<5	NA	< 5	105%	80%	120%	113%	80%	120%	102%	70%	130%
Total Antimony	4258349	4258349	<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	NA	70%	130%
Total Arsenic	4258349	4258349	<2	<2	NA	< 2	102%	80%	120%	101%	80%	120%	94%	70%	130%
Total Barium	4258349	4258349	<5	<5	NA	< 5	96%	80%	120%	101%	80%	120%	90%	70%	130%
Total Beryllium	4258349	4258349	<2	<2	NA	< 2	103%	80%	120%	102%	80%	120%	99%	70%	130%
Total Bismuth	4258349	4258349	<2	<2	NA	< 2	93%	80%	120%	98%	80%	120%	104%	70%	130%
Total Boron	4258349	4258349	5	6	NA	< 5	101%	80%	120%	105%	80%	120%	104%	70%	130%
Total Cadmium	4258349	4258349	<0.09	<0.09	NA	< 0.09	99%	80%	120%	101%	80%	120%	94%	70%	130%
Total Chromium	4258349	4258349	<1	<1	NA	< 1	96%	80%	120%	99%	80%	120%	99%	70%	130%
Total Cobalt	4258349	4258349	<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	98%	70%	130%
Total Copper	4258349	4258349	<1	<1	NA	< 1	99%	80%	120%	99%	80%	120%	99%	70%	130%
Total Iron	4258349	4258349	<50	<50	NA	< 50	98%	80%	120%	98%	80%	120%	97%	70%	130%
Total Lead	4258349	4258349	<0.5	<0.5	NA	< 0.5	101%	80%	120%	106%	80%	120%	93%	70%	130%
Total Manganese	4258349	4258349	2	3	NA	< 2	96%	80%	120%	94%	80%	120%	98%	70%	130%
Total Molybdenum	4258349	4258349	<2	<2	NA	< 2	95%	80%	120%	96%	80%	120%	102%	70%	130%
Total Nickel	4258349	4258349	<2	<2	NA	< 2	102%	80%	120%	102%	80%	120%	101%	70%	130%
Total Phosphorous	4258349	4258349	0.03	0.03	NA	< 0.02	101%	80%	120%	100%	80%	120%	112%	70%	130%
Total Selenium	4258349	4258349	<1	<1	NA	< 1	102%	80%	120%	101%	80%	120%	88%	70%	130%
Total Silver	4258349	4258349	<0.1	<0.1	NA	< 0.1	100%	80%	120%	99%	80%	120%	92%	70%	130%



Quality Assurance

CLIENT NAME: TOWN OF MAHONE BAY

PROJECT: Annual - 2022 2008-061157-03

SAMPLING SITE:

AGAT WORK ORDER: 22X939149

ATTENTION TO: Scott Hoyt

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Sep 12, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Strontium	4258349	4258349	10	10	NA	< 5	91%	80%	120%	91%	80%	120%	113%	70%	130%
Total Thallium	4258349	4258349	<0.1	<0.1	NA	< 0.1	104%	80%	120%	108%	80%	120%	97%	70%	130%
Total Tin	4258349	4258349	<2	<2	NA	< 2	95%	80%	120%	95%	80%	120%	97%	70%	130%
Total Titanium	4258349	4258349	<2	<2	NA	< 2	105%	80%	120%	105%	80%	120%	110%	70%	130%
Total Uranium	4258349	4258349	<6	<6	NA	< 0.2	105%	80%	120%	109%	80%	120%	93%	70%	130%
Total Vanadium	4258349	4258349	<2	<2	NA	< 2	92%	80%	120%	92%	80%	120%	98%	70%	130%
Total Zinc	4258349	4258349	<5	<5	NA	< 5	97%	80%	120%	98%	80%	120%	84%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Health Canada Lead & Copper Sampling - Drinking Water

Total Lead - Health Canada	4260820	<0.5	<0.5	NA	< 0.5	101%	80%	120%	106%	80%	120%	95%	70%	130%
Total Copper	4260820	2	2	NA	< 2	99%	80%	120%	99%	80%	120%	95%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR



Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Lead - Health Canada	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO ₂	INOR-121-6027	SM 4500-SiO ₂ F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH ₃ H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO ₃)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Method Summary

CLIENT NAME: TOWN OF MAHONE BAY

AGAT WORK ORDER: 22X939149

PROJECT: Annual - 2022 2008-061157-03

ATTENTION TO: Scott Hoyt

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Chain of Custody Record

P: 902.468.8718 • F: 902.468.8924

Report Information

Company: Town of Mahone Bay

Contact: Scott Hoyt

Address: Box 530
Mahone Bay, NS, B0J2E0

Phone: 902-624-8327 Fax: 902-624-8069

Client Project #: Annual - 2022

AGAT Quotation: 607098

Please Note: If quotation number is not provided client will be billed full price for analysis.

Invoice To

Same Yes ☒ / No ☐

Company: _____
Contact: _____
Address: _____

Phone: _____ Fax: _____
P0/Credit Card#: 678243

Report Information (Please print):

1. Name: Scott Hoyt
Email: Scott.Hoyt@townofmahonebay.ca

2. Name: _____
Email: @townofmahonebay.ca

Regulatory Requirements (Check):

☒ List Guidelines on Report ☐ Do not list Guidelines on Report

☐ PIRI

☐ Tier 1 ☐ Res ☒ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☒ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME ☐ CDWQ

☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial
☐ Res/Park ☐ HRM 101
☐ Agricultural ☐ Storm Water
☐ FWAL ☐ Waste Water
☐ Sediment ☐ Other

Report Format

- ☐ Single Sample per page
- ☐ Multiple Samples per page
- ☐ Excel Format Included
- ☐ Export

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: _____
Hold Time: _____
AGAT Job Number: 22x939149

Notes:

2253

Turnaround Time Required (TAT)

Regular TAT  5 to 7 working days

Rush TAT ☐ Same day ☐ 1 day
☐ 2 days ☐ 3 days

Date Required: _____

Drinking Water Sample: ☒ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.: (Approval No.) 2008-061157-03

[illegible]

Samples Relinquished By (Print Name)

Scott Hoyt

Samples Relinquished By (Sign):

St. Mary's

Date/Time	Location	Activity	Remarks
10/10/2019

Aug30,22@9:20

Date/Time

Aug30.22@ 9:20

Samples Received By (Print Name)	
----------------------------------	--

Samples Received By (Signature)	
---------------------------------	--

Date/Time	Location	Activity	Remarks
11/11/2019
11/12/2019
11/13/2019
11/14/2019
11/15/2019
11/16/2019
11/17/2019
11/18/2019
11/19/2019
11/20/2019
11/21/2019
11/22/2019
11/23/2019
11/24/2019
11/25/2019
11/26/2019
11/27/2019
11/28/2019
11/29/2019
11/30/2019

Date/Time

Pink Copy - Client

Yellow Copy - AGAT

White Copy- AGAT

Page of

Nº:

APPENDIX G

Approval to Operate



81 Logan Road
Bridgewater, NS
Canada B4V 3T3

902-543-4685 T
902-527-5480 F
www.novascotia.ca

Our File Number: 94600-30-BRI-2008-061157

May 4, 2022

TOWN OF MAHONE BAY
493 MAIN STREET, BOX 530
MAHONE BAY, NS B0J2E0

Dear Sir or Madam

**RE: Approval for Operation - Water Treatment Facility. Approval No. 2008-061157-03
PID # 60374881**

Enclosed please find Approval 2008-061157-03 for Operation of the Water Treatment Facility at 68 Zwicker Lane Mahone Bay, Lunenburg County Nova Scotia.

Strict adherence to the attached terms and conditions is imperative in order to validate this approval.

Despite the issuance of this Approval, the Approval Holder is still responsible for obtaining any other authorization which may be required to carry out the activity, including those which may be necessary under provincial, federal or municipal law.

Should you have any questions, please contact Barry Gillis, Western Region, Bridgewater Office at 902-543-4685.

Yours truly,

A handwritten signature in black ink, appearing to read 'David Clarke'.

David Clarke
District Manager

APPROVAL

**Province of Nova Scotia
Environment Act, S.N.S. 1994-95, c.1 s.1**

APPROVAL HOLDER: TOWN OF MAHONE BAY

SITE PID: 60374881

APPROVAL NO: 2008-061157-03

EXPIRY DATE: May 1, 2029

Pursuant to Part V of the Environment Act, S.N.S. 1994-95, c.1 s.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Municipal - Water Works - Water Treatment Facility



Administrator: David Clarke

Effective Date: May 4, 2022

The Minister's powers and responsibilities under the Act with respect to this Approval have been delegated to the Administrator named above. Therefore, any information or notifications required to be provided to the Minister under this Approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Department of Environment and Climate Change

Approval Holder: TOWN OF MAHONE BAY

Project: Mahone Bay WTP at Oakland Lake

Site:

PID	Civic #	Street Name	Street Type	Community	County
60374881	68	ZWICKER	LANE	MAHONE BAY	LUNENBURG COUNTY

Approval No: 2008-061157-03

File No: 94600-30-BRI-2008-061157

Reference Documents

- Application submitted April 26, 2022 and attachments.

1. Definitions

- a. Act means Environment Act, 1994-95, c.1, s.1, and includes, unless the context otherwise requires, the regulations made pursuant to the Act, as amended from time to time.
- b. CT means disinfectant residual in mg/l multiplied by the contact time in minutes.
- c. Contact Time denoted as T10 is an effective contact time for disinfection in minutes and represents the time when 10% of the water passes the contact unit; that is 90% of the water remains in the unit and will be exposed to longer disinfection within the unit. T10 can be established by tracer studies or calculated using theoretical hydraulic detention times multiplied by an appropriate baffling factor listed in the "Nova Scotia Treatment Standards for Municipal Drinking Water Systems" as amended from time to time.
- d. Continuous monitoring is sampling of flow through analysis equipment that creates an output signal a minimum of once every five minutes.
- e. Department means the Nova Scotia Department of Environment and Climate Change, and the contact for the Department for this approval is:
Nova Scotia Department of Environment and Climate Change
Western Region, Bridgewater Office
81 Logan Road
Bridgewater, Nova Scotia B4V 3T3

Phone: (902) 543-4685
Fax: 902-527-5480

- f. Grab sample means an individual sample collected in less than 30 minutes and which is representative of the substance sampled.
- g. Inadequate Primary Disinfection means water that does not meet the required CT/IT.
- h. Inadequate Secondary Disinfection means water that does not meet the required disinfectant residual in the distribution system.
- i. Log reduction means a negative of the base 10 logarithm of the fraction of pathogens remaining after the treatment process.

log reduction = log removal by physical treatment + log inactivation by disinfection

where log removal by physical treatment is equal to the credit assigned to the filtration technology indicated in the Department's "Nova Scotia Treatment Standards for Municipal Drinking Water Systems", as amended from time to time; and

log inactivation by disinfection is equal to the inactivation which shall be calculated as defined by the Department's "Nova Scotia Treatment Standards for Municipal Drinking Water Systems", as amended from time to time.

- j. Minister means the Minister of Environment and Climate Change and includes any person delegated the authority of the Minister.
- k. QA/QC means quality assurance and quality control.
- l. Quarterly sampling means samples taken once per quarter with no less than a 45 day interval between sampling events.
- m. Site means a place where a designated activity and/or undertaking is occurring or may occur.
- n. UV dose (IT) means the UV intensity (I) in Watts/cm² multiplied by the exposure time (T) in seconds.

2. Scope

- a. This Approval (the "Approval") relates to the Approval Holder(s) and their application and all documentation submitted to the Department prior to the issuance of this approval for the Water Treatment Facility situated at or near Mahone Bay WTP at Oakland Lake.
- b. The Approval Holder(s) shall ensure the designated activity is carried out in accordance with this Approval and reference documents, including the application and supporting documentation.

- c. This Approval supersedes previous Approval number 2008-061157-02 which is now null and void.

3. General

- a. The Approval Holder(s) shall conduct the Designated Activity in accordance with the following provisions:
 - i. The Act, as amended from time to time;
 - ii. Any standard adopted by the Department, as amended from time to time, which includes but is not limited to the following:
 - iii. The Atlantic Canada Guidelines for the Supply, Treatment, Storage, Distribution and Operation of Drinking Water Supply Systems (2004), as amended from time to time;
 - iv. The Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time;
 - v. The Guidelines for Monitoring Public Drinking Water Supplies, as amended from time to time;
 - vi. Health Canada's Guidelines for Canadian Drinking Water Quality, as amended from time to time; and
 - vii. Facility Classification Standards (2009), as amended from time to time.
- b. Nothing in this Approval relieves the Approval Holder(s) of the responsibility for obtaining and paying for all licenses, permits, approvals or authorizations necessary for carrying out the work authorized to be performed by this Approval which may be required by municipal by-laws, provincial or federal legislation, or other organizations. The Minister does not warrant that such licenses, permits, approvals or other authorizations will be issued.
- c. If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.
- d. Any request for renewal or amendment of this Approval is to be made in writing, to the Department, at least ninety (90) days prior to the Approval expiry.
- e. The Approval Holder(s) shall not transfer, sell, lease, assign or otherwise dispose of this Approval without the written consent of the Minister. The sale of a controlling interest of a business or a transfer of the approval from a parent company to a subsidiary or an affiliate is deemed to be a transfer requiring consent.
- f. If the Minister cancels or suspends this Approval, the Approval Holder(s) remains subject to the penalty provisions of the Act.
- g. The Approval Holder(s) shall advise the Department in writing prior to any proposed extensions or modifications to the Activity and/or the Site. An

amendment to this Approval may be required before implementing any extension or modification.

- h. The Approval Holder(s) shall immediately notify the Department of any incidents of non-compliance with this Approval.
- i. The Approval Holder(s) shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.
- j. All sampling and analysis must be performed in accordance with the following as amended from time to time: Standard Methods for the Examination of Water and Wastewater, or the analytical methods section of Health Canada's guideline technical document for the parameter of concern. All samples shall be collected by persons trained in appropriate sample collection procedures.
- k. Unless written authorization is received otherwise from the Minister, all samples required by this Approval shall be analyzed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.
- l. Notwithstanding the above item, the following parameters may be analyzed at the Site or a laboratory that is not certified.

Alkalinity*, Aluminium Residual*, Chloramines, Chlorine Dioxide Residual, Chlorine Residual, Colour, Conductivity*, Fluoride Residual*, Hardness*, Iron*, Manganese*, Methane*, Free Ammonia (as N)*, Ozone Residual, pH, Temperature, Total Organic Carbon, Turbidity and UV Absorbance.

* These parameters must have a Quality Assurance/Quality Control component that includes quarterly confirmation by an accredited laboratory.

- m. The Approval Holder(s) shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the designated activity are made fully aware of the terms and conditions which pertain to this Approval.
- n. Upon any changes to the Registry of Joint Stock Companies information, the Approval Holder(s) shall provide a copy to the Department within five business days.

4. Releases

- a. Releases shall be reported in accordance with the Act.
- b. Spills or releases shall be cleaned up in accordance with the Act.

5. Residuals Management

- a. All residuals generated at the Site shall be managed in accordance with a Residuals Management Plan deemed acceptable by the Department.

- b. Written authorization is required from the Department to modify the residuals management plan.
- c. The residuals management plan shall contain, at a minimum, the following information for each waste stream:
 - i. type of residual;
 - ii. processing method; and
 - iii. expected annual volume of residuals to be generated by the activity.
- d. The Approval Holder(s) shall record the following information each time residuals are removed from the facility and make the records available to the Department immediately upon request:
 - i. the type of residual;
 - ii. the volume of each residual transported, expressed as cubic metres or kilograms;
 - iii. hauler, if applicable;
 - iv. date of transport; and
 - v. final destination of residuals.

6. Operation

- a. The Municipal Public Drinking Water Supply has been classified as a Class II water treatment facility and a Class I water distribution facility.
- b. When it is necessary to use a by-pass to divert water around one or more unit processes, the Approval Holder(s) shall immediately notify the Department and identify the anticipated period of time that the by-pass will be in service.
- c. When it is necessary to use a by-pass to divert water around one or more unit processes, the Approval Holder(s) shall immediately initiate a Boil Water Advisory. The Approval Holder(s) shall maintain the boil advisory until otherwise advised by the Department.
- d. The Approval Holder(s) shall ensure the development and implementation of a cross-connection control program to protect the Municipal Public Drinking Water Supply from contamination due to cross-connections from commercial, institutional, industrial, multi-unit residential, and agricultural facilities, at a minimum, and avoid any cross-connections within the drinking water treatment facility. The program shall be submitted to the Department for review on or before April 30, 2023. Upon review, the Department may require changes to the cross-connection control program.
- e. The Approval Holder(s) shall demonstrate that any municipal public drinking water supply component in contact with treated water has been disinfected after construction, repair or maintenance in accordance with ANSI(American National

Standards Institute)/AWWA (American Water Works Association) C651 - Disinfection of Water Mains, ANSI/AWWA-C653 - Disinfection of Water Treatment Plant, and ANSI/AWWA C652 - Disinfection of Water Storage Facilities or the latest revisions.

- f. The Approval Holder(s) shall ensure that all chemicals used in the treatment process and all materials contacting the water are of "food grade" quality and meet both the AWWA quality criteria as set out in AWWA standards and the ANSI safety criteria as set out in ANSI standard NSF/60 (for chemical additives) or NSF/61 (for materials). A copy of the appropriate NSF certification is to be kept on Site and is to be available for review immediately upon request by the Department.
- g. The Approval Holder(s) shall discontinue use of any chemical found to have adverse effects on finished water quality limits as prescribed in this Approval.
- h. Emergency Notification Procedures:
 - i. The Approval Holder(s) shall ensure that the emergency notification procedures are reviewed and updated on a yearly basis. The Approval Holder(s) shall document in the annual report what modifications were made to the emergency notification procedures and how the procedures were communicated to their staff.
 - ii. A copy of the emergency notification procedures are to be maintained on Site at all times and are to be available for review immediately upon request by the Department.
 - iii. The Approval Holder(s) shall ensure that all employees are trained in accordance with the emergency notification procedures and shall keep a record of training at the facility for a minimum period of five (5) years.
- i. Operations Manual:
 - i. The Approval Holder(s) shall prepare an operations manual in accordance with "A Guide to Assist Nova Scotia Municipal Water Works Develop a Comprehensive Operations Manual" and keep it up-to-date.
 - ii. A copy of the operations manual is to be kept on Site at all times and is to be available for review immediately upon request by the Department.
 - iii. The Approval Holder(s) shall ensure that all employees are trained in accordance with the operations manual and shall keep a record of training at the facility for a minimum period of five (5) years.
- j. A set of drawings, incorporating any amendments made from time to time, shall be retained on Site by the Approval Holder(s) for as long as the Municipal Public Drinking Water Supply is kept in operation and are to be available for inspection or review by departmental staff immediately upon request.
- k. The Approval Holder(s) shall establish procedures for receiving and responding to complaints including a reporting system that records and documents what

steps were taken to determine the cause of complaint and the corrective measures taken to alleviate the cause and prevent its recurrence.

- l. The Approval Holder(s) shall establish security measures to assure the safety of the Municipal Public Drinking Water Supply.
- m. The Approval Holder(s) shall maintain a written list of the name of each laboratory utilized, and the parameters analyzed by each laboratory, and shall submit this list to the Department immediately upon request.

7. System Assessment Report

- a. The Approval Holder(s) shall submit a "System Assessment Report" to the Department by April 1, 2023, to verify that the Municipal Public Drinking Water Supply complies with the Act and standards.
- b. The System Assessment Report shall be in accordance with the Department's "Terms of Reference for System Assessment Reports for Water Works" as amended from time to time.
- c. The Approval Holder(s) shall provide the Department with their corrective action plan to address deficiencies identified by the "System Assessment Report" by October 1, 2023. Any changes to the corrective action plan shall be submitted to and deemed acceptable by the Department.

8. Source Water Protection

- a. The Approval Holder(s) shall implement the accepted Source Water Protection Plan in accordance with the accepted schedule.
- b. The Approval Holder(s) shall ensure that the Source Water Protection Plan is reviewed and updated on a yearly basis. The Approval Holder(s) shall ensure that any changes are documented in the annual report.
- c. The Approval Holder(s) shall modify the Source Water Protection Plan including updates, if so directed by the Department.

9. Water Quality Requirements - Performance and Limits

General Requirements

- a. Utilizing both the engineered filtration and disinfection processes, the treatment facility shall meet the following treatment efficiencies:
 - i. Treatment shall be sufficient to ensure 3-log reduction (99.9%) of Giardia and Cryptosporidium, and
 - ii. Treatment shall be sufficient to ensure 4-log reduction (99.99%) of viruses.
- b. Primary disinfection through the use of UV, chlorine, and/or Department approved alternate disinfectant shall address a minimum of 0.5-log inactivation for Giardia when used in conjunction with filtration. The disinfection log inactivation shall be based on CT/IT values as described in "Nova Scotia Treatment Standards for

Municipal Drinking Water Systems". CT values shall be calculated as defined by the Department's "Nova Scotia Treatment Standards for Municipal Drinking Water Systems". A minimum UV dose (IT) of 40mJ/cm² is required.

- c. The treated water shall minimize corrosion of the water distribution and/or plumbing systems.

Primary Disinfection Requirements

- d. The facility shall have a minimum of two primary disinfection units to ensure that inadequately disinfected water is not distributed. Each disinfection unit shall be capable of meeting the maximum day demand flow. Where more than two disinfection units are provided, the maximum day demand flow shall be met when the largest unit is out of service.
- e. Continuous on-line monitoring of the primary disinfection process is required at each treatment facility with measurements taken at a minimum of once every five minutes to ensure that inadequately disinfected water does not enter the distribution system. Water systems shall be equipped with alarm capabilities to notify operations staff if the disinfection process fails to operate properly to prevent inadequately disinfected water from being distributed.
- f. In the event of an emergency situation where water enters the water distribution system that does not meet the water quality limits as prescribed in this Approval, the Approval Holder(s) shall issue a boil water advisory, do-not-consume, or do-not-use advisory as described in the Guidelines for Monitoring Public Drinking Water Supplies and immediately notify the Department.
- g. Standard operational procedures (SOPs) for the disinfection process shall be developed, implemented and communicated to all operations staff and documented in the operations manual required herein. The procedures and a log indicating the date and method of communication to staff shall be made available to the Department immediately upon request.
 - i. The standard operational procedures shall indicate the design ranges for achieving CT (e.g. minimum temperature and chlorine residual; maximum flow and pH) and/or IT (e.g. min UV intensity, min UV transmittance, and max water flow).
 - ii. When operational conditions are outside the design ranges for achieving CT/IT, the Approval Holder shall notify the Department as soon as the Approval Holder becomes aware, investigate the cause and take necessary corrective action. CT/IT shall be calculated during every such event.

UV Light Requirements

- h. UV systems shall provide a minimum dosage of 40 mJ/cm² at all points within the reactor at all times when water is passing through the treatment process provided that the water quality characteristics indicate that this is a sufficient dosage.

- i. UV intensity and flow through the reactors shall be monitored a minimum of once every five minutes to ensure UV dose is greater than or equal to 40mJ/cm². UV transmittance shall be calculated at a minimum of daily.
- j. Contingencies shall be in place to prevent the distribution of water if UV dose drops below 40mJ/cm², including during lamp warm-up time. Water flow shall be stopped, directed to waste, or another method of disinfection shall be used.
- k. In case of UV bulb breakage during operation, contingencies shall be in place to prevent the distribution of inadequately disinfected water.
- l. UV disinfection unit shall be equipped with UV sensors reading calibrated UV intensity.
- m. UV sensors shall be calibrated on a monthly basis. Off-line reference sensors used for calibration shall be of equal quality to the on-line sensors and shall be calibrated annually.
- n. The system shall be equipped with an alarm notification and shutdown procedures in the event of:
 - i. high temperature in the reactor, lamp, ballast or transformer;
 - ii. high flow rate that causes dose to fall below design specifications;
 - iii. low UV dose;
 - iv. low UV intensity;
 - v. UV has shutdown;
 - vi. or any other emergency situation.
- o. UV transmittance analysers shall be calibrated weekly.
- p. UV lamp operation shall be monitored in a manner that ensures bulb replacement can be accomplished prior to the maximum lamp life expectancy.
- q. The Approval Holder(s) shall receive written verification from an independent third party that the manufacturer's system will continually meet the 40 mJ/cm² requirement and provide this information to the Department immediately upon request.

Filtration Requirements

General Requirements:

- r. A minimum of two filters (redundancy) is required. Where two filters or membrane units are provided, each shall be capable of supplying maximum daily demands with the largest membrane out of service. Where more than two filters or membrane units are provided, the maximum day demand shall be met with the largest membrane out of service.

- s. The membrane system used for pathogen reduction shall have continuous indirect integrity testing.
 - i. Continuous indirect integrity testing shall be conducted at a minimum frequency of once every 5 minutes. Indirect integrity testing shall follow that outlined in the EPA "Membrane Filtration Guidance Manual".
- t. The actual removal efficiency of a membrane shall be verified by third party challenge testing. Acceptable challenge testing shall follow that provided in the EPA "Membrane Filtration Guidance Manual".
- u. The integrity of the membrane system used for pathogen reduction and the actual removal efficiency of the membrane shall be demonstrated by direct integrity testing of the membrane under normal operating conditions. Direct integrity testing shall follow that outlined in the EPA "Membrane Filtration Guidance Manual".
 - i. Direct integrity testing shall be responsive to an integrity breach on the order of 3 micro-metres or less.
 - ii. Direct integrity testing shall be able to verify a log removal value equal to or greater than the removal credit awarded to the membrane filtration process.
 - iii. Direct integrity testing shall be conducted on each membrane filtration unit at least once per day and as soon as the Approval Holder(s) becomes aware when the turbidity exceeds 0.1 NTU for more than 15 minutes.

Individual Filter Turbidity Values:

- v. For membrane filtration, turbidity levels from individual membrane units:
 - i. shall be less than or equal to 0.1 NTU in at least 99% of measurements made, or at least 99% of the time each calendar month;
 - ii. shall not exceed 0.3 NTU at any time.
- w. The filtration process shall be operated in such a manner as to remove an individual membrane unit from service if the turbidity exceeds the values specified herein.
- x. Filtration processes for pathogen reduction are required to be continuously monitored, with measurements taken at a minimum frequency of once every five minutes. Filtration processes shall have a shut off feature and alarm when turbidity criteria are not achieved. The Approval Holder(s) shall notify the Department as soon as they become aware of turbidity values that do not meet the requirements of this Approval.
- y. Standard operational procedures for the filtration process shall be developed, implemented and communicated to all operations staff and documented in the operations manual required herein. The procedures shall be made available to the Department immediately upon request.

Turbidity Requirements:

- z. A turbidity value of 5.0 NTU or less shall be achieved on water distribution system sampling.
- aa. Where turbidity values of greater than 5.0 NTU are observed in the water distribution system, the Approval Holder(s) shall investigate the cause and take corrective action as necessary and notify the Department immediately.

Turbidity Monitoring Requirements:

- ab. Continuous monitoring, with measurements taken at no more than five minute intervals, is required for individual filter effluent.
- ac. Continuous or grab sample monitoring at least once a day is required for raw water prior to pre-treatment.
- ad. Continuous or grab sample monitoring of the water distribution system is required. Unless specified otherwise in this approval, sampling and testing frequency is the same as for bacteriological sampling requirements as stated in the "Guidelines for Monitoring Public Drinking Water Supplies".
- ae. Continuous or grab sample monitoring of the filter-to-waste product is required. Unless specified otherwise in this Approval, sampling and testing shall be completed prior to returning the filter to operation.

Secondary Disinfection and Residual Monitoring Requirements

- af. Secondary disinfection through the use of chlorination shall be used to maintain a chlorine residual in the water distribution system.
- ag. The disinfection process shall be operated in such a manner as to ensure that the following minimum chlorine residual value is achieved throughout the water distribution system at all times:
 - i. 0.20 mg/L free chlorine residual
- ah. The disinfection process shall be operated in such a manner as to ensure that the maximum chlorine residual delivered to consumers does not exceed the following value:
 - i. 4.0 mg/L free chlorine residual
- ai. Continuous monitoring of the chlorine residual is required for finished water leaving the facility, with measurements taken at no more than five minute intervals.
- aj. Continuous monitoring of the chlorine residual is required for the water leaving any water storage structure within the water distribution system, with measurements taken at no more than five minute intervals.

- ak. Monitoring of the water distribution system for chlorine residual is required. Unless specified otherwise in this Approval, sampling and testing frequency is the same as for bacteriological sampling requirements as stated in the "Guidelines for Monitoring Public Drinking Water Supplies".

10. Treatment Backwash - Performance and Limits

- a. Backwash water from the treatment process shall be discharged to a location deemed acceptable by the Department.
- b. Backwash water discharged from the treatment process shall go to a municipal wastewater collection system.

11. Backup Water Systems

- a. Prior to the use of a backup water system, the Approval Holder(s) shall immediately notify the Department and identify the anticipated period of time that the backup system will be in service.
- b. For backup systems that do not meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, the Approval Holder(s) shall immediately initiate a Boil Water Advisory as stated in the "Guidelines for Monitoring Public Drinking Water Supplies" prior to the use of the backup system. The Approval Holder(s) shall maintain the boil advisory until otherwise advised by the Department.
- c. For backup systems that meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, the backup water system may continue to operate until the main water system is put back into service or as otherwise directed by the Department.

12. Laboratory Reports and Water Quality Results

- a. The Approval Holder(s) shall submit copies of the laboratory certificate of analysis to the Department immediately upon request.
- b. The Approval Holder(s) will authorize and work with laboratories to electronically report water quality results to the Department upon implementation of an on-line drinking water quality surveillance program.
- c. Electronic reporting shall not replace the Approval Holder(s)'s responsibility to notify the Department immediately, by telephone, of the presence of bacteria or an exceedance of a maximum acceptable concentration for a health-related parameter listed in the "Guidelines for Canadian Drinking Water Quality".

13. Contingency Plan

- a. The contingency plan is to meet the minimum requirements of the Department's "A Guide to Assist Nova Scotia Municipal Water Works Develop a Comprehensive Operations Manual" and "Contingency Planning Guidelines" as amended from time to time.

- b. The Approval Holder(s) shall ensure that the contingency plan for the Municipal Public Drinking Water Supply is reviewed and updated on a yearly basis. The Approval Holder(s) shall document in the annual report what modifications were made to the plan and how the plan was communicated to their staff.
- c. The Approval Holder(s) shall ensure that all employees are trained in accordance with the contingency plan and shall keep a record of training at the facility for a minimum period of five (5) years.
- d. A copy of the Contingency Plan is to be maintained on Site at all times and is to be available for review immediately upon request by the Department.

14. Monitoring and Recording

- a. The Approval Holder(s) shall monitor and sample the municipal public drinking water supply system in accordance with a monitoring program deemed acceptable by the Department and which meets the minimum requirements of Schedule A, attached. In the case of a discrepancy between Schedule A and the accepted monitoring program, the accepted monitoring program shall apply.
- b. All required monitoring data must be collected and submitted in the units of measure indicated in the standard(s).
- c. Sampling shall be representative of the water distribution system.
- d. On or before October 1 of each year, the Approval Holder(s) shall recommend to the Department the monitoring program for the municipal public drinking water supply for the following calendar year, highlighting any proposed changes and the reason for the changes. Any existing monitoring program shall remain in place until the recommended monitoring program is deemed acceptable by the Department.
- e. The monitoring program shall meet the minimum requirements of the Department's "A Guide to Assist Nova Scotia Municipal Water Works Prepare Annual Sampling Plans" and "Requirements for Lead and Copper Management - Municipal Public Drinking Water Supplies", as amended from time to time.
- f. The monitoring program shall be acceptable to the Department.
- g. The Approval Holder(s) is responsible for implementing, on an annual basis, the monitoring program and subsequent revisions as deemed acceptable by the Department.
- h. The Approval Holder(s) shall not move, relocate or otherwise alter the location of the sampling locations indicated in the approved monitoring program without written permission from the Department.
- i. Following a review of any of the analytical results required by this Approval, the Department may alter the frequencies, location, and parameters for analyses required for this Approval or require other remedial action.

- j. Any flow measuring devices and continuous water quality analysers and indicators with alarm systems shall be installed, maintained and calibrated as specified by the instrument manufacturer's instructions. Calibration logs for each instrument shall be maintained at the site and be available for inspection immediately upon request by the Department.
- k. The Approval Holder(s) shall establish a QA/QC program to validate the measurements obtained from continuous monitoring equipment and for all analysis conducted at the Site or a non-certified laboratory.
- l. The Approval Holder(s) shall establish and conduct process control testing and sampling and record the results. Results are to be made available for inspection or review by departmental staff immediately upon request.
- m. The Approval Holder(s) shall establish and conduct source water protection testing and sampling and record the results. Results are to be made available for inspection or review by departmental staff immediately upon request.

15. Reporting

Reporting Upon Request

- a. The Approval Holder(s) shall keep records continually updated in such a way, that weekly and/or monthly reporting of monitoring and sampling results can be immediately sent to the Department upon request.

Annual Reporting

- b. The Approval Holder(s) shall prepare and submit to the Department, an annual report for the municipal public drinking water supply.
- c. The annual report shall be submitted on or before April 1 following the completion of the calendar year being reported upon.
- d. The annual report shall contain, but not be limited to, the following information:
 - i. a summary and discussion of the quantity of water supplied during the reporting period on a per month basis showing design values, maximum daily flow and average daily flow for each month and any other parameters or conditions specified in the Water Withdrawal Approval.
 - ii. a summary and interpretation of analytical results obtained in accordance with the monitoring and recording section of this Approval, including an explanation for any exceedance of the maximum acceptable concentration (MAC) of health-related parameters listed in the "Guidelines for Canadian Drinking Water Quality", latest edition and the actions taken to address the exceedance;
 - iii. minimum annual reporting requirements as outlined in the "Requirements for Lead and Copper Management – Municipal Public Drinking Water Supplies";

- iv. annual trend graphs for parameters that are continuously monitored;
- v. date and description of any emergency or upset conditions which occurred during the period being reported upon and action taken to correct them;
- vi. any modifications to the contingency plan or emergency notification procedures including a description of how the information was communicated to staff;
- vii. a list of the names of each laboratory utilized by the Approval Holder(s) and the parameters analyzed by each laboratory;
- viii. an update on the status of the source water protection plan, including any modifications to the plan or implementation schedule, and a summary of activities taken to achieve the goals and objectives of the plan;
- ix. all incidents of free chlorine residual below 0.20 mg/L in the water distribution system shall be detailed with a description of any actions taken;
- x. verification that the operational conditions remained within the design range for achieving CT/IT; if operational conditions went outside the design ranges, provide CT/IT calculations and a summary of corrective actions taken;
- xi. incidents of non-compliance with this Approval, the date it was reported to the Department, and corrective actions taken by the Approval Holder(s);
- xii. any complaints received and the steps taken to determine the cause of the complaint and the corrective measures taken to alleviate the cause and prevent its recurrence;
- xiii. a review of the QA/QC program to validate the measurements obtained from continuous monitoring equipment and for all analysis conducted at the facility or a non-certified laboratory;
- xiv. a list of each certified operator and their level of certification.
- xv. Mathematical verification that the turbidity of the water from an individual membrane unit is less than or equal to 0.1 NTU in at least 99% of the measurements made, or at least 99% of the time each calendar month.

Emergency Reporting on Operation

- e. The Approval Holder(s) shall notify the Department immediately of an incident that may adversely affect the quality of the water within the municipal public drinking water supply. Notification shall be made to a live person by phone or in person and followed by fax or email. These incidents shall include but not be limited to: the presence of bacteria; inadequately disinfected water being directed to the water distribution system; sewage or other releases in the source municipal public drinking water supply area; line breakage that may result in

cross contamination; exceedance of turbidity values required by this approval; if using membrane filtration, failure of direct integrity test, etc.

- f. The Approval Holder(s) shall notify the Department immediately of any analytical results that exceed the maximum acceptable concentration (MAC) of health-related parameters listed in the "Guidelines for Canadian Drinking Water Quality", latest edition. Notification shall be made to a live person by phone or in person and followed by fax or email.
- g. When bacteria are detected at the municipal public drinking water supply, the Approval Holder(s) shall notify the Department immediately of the presence of bacteria and take corrective action as outlined in the latest edition of the "Guidelines for Monitoring Public Drinking Water Supplies" as amended from time to time. Notification shall be made to a live person by phone or in person and followed by fax or email.
- h. If the chlorine residual in the water distribution system is less than 0.20 mg/L free chlorine, the Approval Holder(s) shall notify the Department immediately of the low chlorine residual and take corrective action to obtain the required residual. Notification shall be made to a live person by phone or in person and followed by fax or email.

16. Records

- a. The Approval Holder(s) shall keep the following records and water quality analyses:
 - i. all incidents of suspected and/or confirmed disease outbreaks attributed to the water system shall be documented and kept for a minimum of ten (10) years
 - ii. bacteriological, chlorine residual and turbidity analyses shall be kept for two (2) years
 - iii. chemical analysis shall be kept for ten (10) years
- b. The Approval Holder(s) shall retain the following information for a period of five (5) years:
 - i. calibration and maintenance records;
 - ii. continuous monitoring data
- c. A copy of project reports, construction documents and drawings, inspection reports, shall be kept for the life of the municipal public drinking water supply

Schedule A		
Surface Water		
Water Quality Parameters	Sample Location	Minimum Frequency
Turbidity		
Turbidity	Raw water	Continuous at no more than 5 minute intervals or daily grab
	Individual filter effluent	Continuous at no more than 5 minute intervals
	Filtered water directed to waste	Continuous at no more than 5 minute intervals or grab sample during filter-to-waste
	Distribution system sample points	Weekly grab sample
Primary Disinfection (Parameters to be monitored depend on the disinfection method used)		
Free Chlorine		
Free Chlorine Residual	CT control point (water entering distribution system)	Continuous at no more than 5 minute intervals - must meet CT design criteria
Temperature	CT control point	Continuous at no more than 5 minute intervals or daily grab - must meet CT design criteria
pH	CT control point	Continuous at no more than 5 minute intervals - must meet CT design criteria
UV		
UV Dose (IT)	UV chamber	Continuous at no more than 5 minute intervals - minimum UV dose of 40 mJ/cm ²
Chlorine Dioxide		
Chlorine Dioxide	CT control point	Continuous at no more than 5 minute intervals - must meet CT design criteria
Temperature	CT control point	Continuous at no more than 5 minute intervals or daily grab - must meet CT design criteria

Schedule A		
Surface Water		
Water Quality Parameters	Sample Location	Minimum Frequency
pH	CT control point	Continuous at no more than 5 minute intervals - must meet CT design criteria
Ozone		
Ozone	CT control point	Continuous at no more than 5 minute intervals - must meet CT design criteria
	Air Quality (off-gas destruct unit)	Continuous at no more than 5 minute intervals* *Should be interlocked with the ozone generator controls to shut down system if excess ozone is detected
Temperature	CT control point	Continuous at no more than 5 minute intervals or daily grab - must meet CT design criteria
pH	CT control point	Continuous at no more than 5 minute intervals - must meet CT design criteria
Secondary Disinfection (Parameters to be monitored depend on the disinfection method used)		
Free Chlorine		
Free Chlorine Residual	Storage structure outlet	Continuous at no more than 5 minute intervals
	Distribution system sample points	Weekly grab sample
Chloramines		
Combined Chlorine Residual	Storage structure outlet	Continuous at no more than 5 minute intervals
	Distribution system sample points	Weekly grab sample
Microbial Quality		
Total Coliforms and <i>E. coli</i> (present/absent)	Water entering the distribution system	Weekly grab sample
	Distribution system sample points	Weekly grab sample
Viruses	Raw water	As requested by the Department

Schedule A																
Surface Water																
Water Quality Parameters	Sample Location	Minimum Frequency														
	Water distribution system	As requested by the Department														
Giardia and Cryptosporidium	Raw water	As requested by the Department														
	Water distribution system	As requested by the Department														
Cyanobacteria	Raw water	Visual monitoring at least weekly for evidence of bloom formation from May to October.														
Cyanobacterial toxins - Total Microcystins	Raw water	During a bloom Minimum of every 5 years as part of full health-related parameter suite (during warmest month)														
	Treated water	During a bloom Minimum of every 5 years as part of full health-related parameter suite (during warmest month)														
Corrosion Monitoring Program																
<ul style="list-style-type: none">■ pH■ Alkalinity■ Conductivity■ Temperature■ Chlorine or chloramine residual■ Corrosion inhibitor residual (if used)	Point of entry and representative locations within the distribution system based on population served: <table><tr><th>Population</th><th># of distribution samples</th></tr><tr><td><100</td><td>1</td></tr><tr><td>101-500</td><td>2</td></tr><tr><td>501-3,300</td><td>3</td></tr><tr><td>3,301-10,000</td><td>4</td></tr><tr><td>10,001-100,000</td><td>6</td></tr><tr><td>>100, 000</td><td>10</td></tr></table>	Population	# of distribution samples	<100	1	101-500	2	501-3,300	3	3,301-10,000	4	10,001-100,000	6	>100, 000	10	Quarterly grab sample
Population	# of distribution samples															
<100	1															
101-500	2															
501-3,300	3															
3,301-10,000	4															
10,001-100,000	6															
>100, 000	10															

Schedule A		
Surface Water		
Water Quality Parameters	Sample Location	Minimum Frequency
Lead and Copper	As per the "Requirements for Lead and Copper Management Municipal Public Drinking Water Supplies"	
Process Control		
Water Volume	Raw water entering facility	Continuous at no more than 5 minute intervals - must meet CT design criteria
Free ammonia (as N) - for facilities using chloramination	Select distribution system sample point(s)* *Sampling points should include distribution system storage and dead ends	Weekly
Nitrate/nitrite (as N) - for facilities using chloramination	Select distribution system sample point(s)* *Sampling points should include distribution system storage and dead ends	Weekly
Fluoride - for facilities that add fluoride	Water entering the distribution system	Daily
Disinfection By-products		
Total Trihalomethanes (THMs)	Select distribution system sample point(s) - representative of highest level. Areas in the distribution system with the longest disinfectant retention time.	Quarterly - locational running annual average (Iraa) based on a minimum of 4 quarterly samples.
Haloacetic Acids (HAAs)	Select distribution system sample point(s) - where historical data show the highest concentration. Where historical data is not available concentrations shall be monitored in the middle and extremities of the distribution system.	Quarterly - locational running annual average (Iraa) based on a minimum of 4 quarterly samples.
Chlorate and chlorite - if using chlorine dioxide	Select distribution system sample point(s) - mid-system and end locations	Quarterly

Schedule A		
Surface Water		
Water Quality Parameters	Sample Location	Minimum Frequency
Chlorate – if storing sodium hypochlorite more than 3 months	Water entering distribution system	Quarterly
Bromate – if using ozone	Select distribution system sample point(s) – water entering distribution system	Monthly
Bromate – if storing sodium hypochlorite more than 3 months	Water entering distribution system	Quarterly
Treatment Process -Backwash Wastewater		
Treatment process backwash wastewater- parameter(s), location(s), and frequency in accordance with this approval and the accepted annual monitoring program.		
General Chemical and Physical Quality		
General chemical and physical parameters listed in the Guidelines for Monitoring Public Drinking Water Supplies Part I	Raw and treated water	Minimum annually
Manganese	<ul style="list-style-type: none"> ☒ Raw water (prior to treatment) ☒ Entering the distribution system ☒ Distribution system 	Quarterly * The Approval Holder may request a reduction in sample frequency if it is determined that manganese is not a parameter of concern for the water supply.
Guidelines for Canadian Drinking Water Quality		
All health-related parameters in the Guidelines for Canadian Drinking Water Quality	Raw and treated water	Every 5 years unless system assessment report or source water protection plan requires more frequent monitoring.
Source Water Protection		
Parameters as per the source water protection monitoring program	Locations and frequencies in accordance with the source water protection monitoring program.	

APPENDIX H

Approval to Withdrawal

APPROVAL

Province of Nova Scotia
Environment Act, S.N.S. 1994-95, c.1 s.1

APPROVAL HOLDER: TOWN OF MAHONE BAY

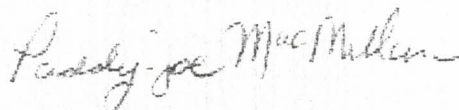
SITE PID: 60439882

APPROVAL NO: 2008-061974-02

EXPIRY DATE: August 19, 2029

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 s.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Water Approval - Water Withdrawal



Administrator: Paddy-joe MacMillan

Effective Date: August 19, 2019

The Minister's powers and responsibilities under the Act with respect to this Approval have been delegated to the Administrator named above. Therefore, any information or notifications required to be provided to the Minister under this Approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: TOWN OF MAHONE BAY

Project: Oakland Lake, Mahone Bay

Site:

PID	Civic #	Street Name	Street Type	Community	County
60439882				OAKLAND	LUNENBURG COUNTY

Approval No: 2008-061974-02

File No: 95100-30-BRI-2008-061974

Grid Reference: Easting - 390991, Northing - 4924155

Reference Documents

- Application submitted May 23, 2019 and attachments.

1. Definitions

- a. Act means Environment Act, Chapter 1 of the Acts of 1994-95, and includes, unless the context otherwise requires, all regulations made pursuant to the Act.
- b. Administrator means a person appointed by the Minister for the purpose of this Act, and includes an acting administrator.
- c. Approval means an Approval issued pursuant to this Act with respect to an activity.
- d. Department means the Department of Environment, and the contact for the Department for this approval is:
Nova Scotia Environment
Western Region, Bridgewater Office
81 Logan Road
Bridgewater, Nova Scotia B4V 3T3

Phone: (902) 543-4685

Fax: 902-527-5480

- e. Extension means an increase in size, volume or other physical dimensions of an activity such that the increase may cause an adverse effect if not properly mitigated.
- f. Minister means the Minister of Environment and includes any person appointed as a designate of the Minister.
- g. Modification means a change to an activity that may cause an adverse effect if not properly mitigated and includes, but is not limited to, the expansion of the same process, addition of product lines and replacement of equipment with different technology other than that presently in use.
- h. Standard means a standard, policy, code, guideline, protocol or other rule in relation to a designated activity that, by reason of its establishment or adoption by regulation or as a condition of an approval or certificate of qualification, becomes a mandatory requirement for participation in that designated activity.

2. Scope

- a. This Approval (the Approval) relates to the Approval Holder(s) and their application and all documentation submitted to the Department prior to the issuance of this approval to withdraw water from Oakland Lake at or near Oakland, Lunenburg County, Nova Scotia.

3. General

- a. The Approval Holder(s) shall construct, operate and reclaim the Facility in accordance with the following provisions:
 - i. Environment Act S.N.S. 1994-1995, c.1, s.1 as amended from time to time. Any Regulations or Standard adopted by the Department, as amended from time to time.
- b. No authority is granted by this Approval to enable the Approval Holder(s) to construct or operate the Facility on lands which are not in the control or ownership of the Approval Holder(s). It is the responsibility of the Approval Holder(s) to ensure that such a contravention does not occur.
- c. If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.
- d. Any request for renewal or extension of this Approval is to be made in writing, to the Department, at least ninety (90) days prior to the Approval expiry.
 - i. If the Minister cancels or suspends this Approval, the Approval Holder(s) remains subject to the penalty provisions of the Act and regulations

- e. The Approval Holder(s) shall notify the Department prior to any proposed extensions or modifications to the Facility, including, but not limited to, the active area, operating area, processing changes, production wells, return wells, monitoring wells or test wells, withdrawal rates, and withdrawal locations, which are not granted under this Approval. An amendment to this Approval may be required before implementing any change.
- f. The Approval Holder(s) shall immediately notify the Department of any incidents of non-compliance with this Approval.
- g. The Approval Holder(s) shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.
- h. Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.
- i. Unless written authorization is received otherwise from the Minister, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's Policy on Acceptable Certification of Laboratories as amended from time to time.
- j. The Approval Holder(s) shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.
- k. Upon any changes to the Registry of Joint Stock Companies information, the Approval Holder(s) shall provide a copy to the Department.

4. Covenant Conditions

- a. The Approval does not authorize any activity that would:
 - i. Prejudice any riparian rights of any owner or of any person lawfully in possession of or holding any lands abutting the watercourse;
 - ii. Cause any damage or nuisance to adjacent or abutting lands; or
 - iii. Discharge surface water onto adjoining lands without the authorization of the affected landowner(s).
- b. The Approval Holder is responsible to construct and maintain any culvert, bridge, dam, sluice, flume, conduit, well, or other approved structure in or on the water resource so that the structure(s) operate as originally designed and intended, and so that risks related to potential failure of the structure(s) are effectively mitigated.
- c. The Approval Holder shall rehabilitate the site to the satisfaction of the Minister and pay all expenses and costs of such rehabilitation in any of the following

circumstances:

- i. Upon the expiry or termination of this Approval; or
 - ii. If the culvert, bridge, dam, sluice, flume, conduit, well, or other approved structure in or on the water resource is not appropriately maintained to mitigate risks related to potential failure of the structure(s).
- d. The Approval Holder shall, upon receipt of an invoice from the Department stating the amount owing in accordance with the Fees Regulations, as amended from time to time, pay to the Minister of Finance the amount stipulated.
- e. The Department shall not be held responsible for any water quality or quantity problems that may be encountered by the Approval Holder(s).

5. Operation

Water Withdrawal Location

- a. The water intake and pumping facilities are located at the westerly tip of Oakland Lake (PID NUMBER 60439882) with GPS coordinates 390991E/4924155N.

Water Withdrawal Limits

- b. The average water withdrawal rate shall not exceed 710,000 litres per day (averaged over 30 days);
- c. The maximum withdrawal rate shall not exceed 960,000 litres per day (averaged over 3 days).

Ecological Maintenance Flow

- d. The Approval Holder shall ensure that an ecological maintenance flow of 0.01 cubic meters per second is maintained from July to September and 0.06 cubic meters per second during the remainder of the year in the watercourse immediately downstream of the Oakland Lake outlet.

Intake Screen

- e. The Approval Holder shall ensure that the intake pipes are screened, maintained and cleaned regularly in accordance with Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO) to prevent impingement and entrainment of fish.

Water Conservation Plan

- f. The Approval Holder shall implement, maintain, and update the Water Conservation Plan on an annual basis. The latest Water Conservation Plan shall be made available to the Department upon request.

6. Monitoring and Recording

Withdrawal Flow Rate Monitoring

- a. The Approval Holder shall install and maintain a flow meter which is capable of recording the total volume of water withdrawn.
- b. The flow meter is to be placed in a location and manner to accurately measure the water being withdrawn.
- c. The Approval Holder shall relocate the meter if directed to do so by the Department.
- d. The flow meter shall be installed and maintained as per the manufacturer's specifications.
- e. The Approval Holder shall record flow meter readings corresponding to withdrawal volumes for each day, and also record the monthly average withdrawal rate once per month.
- f. Flow data shall be tabulated within a spreadsheet and compared to the approved water withdrawals listed above (5.b and 5.c).

Lake Water Level Monitoring

- g. The Approval Holder shall install and maintain a permanent staff gauge to monitor water level in the Oakland Lake.
- h. A fixed point on the staff gauge shall be surveyed relative to a fixed point of known elevation on the shoreline by a licensed surveyor. The staff gauge shall be marked with units in centimetres.
- i. The water levels at staff gauge shall be measured twice a week. The monitoring frequency shall be increased during the period of the flow in the watercourse immediately downstream of the Oakland Lake outlet approaching the specified ecological maintenance flow. Monitoring data obtained at staff gauge shall be tabulated within a spreadsheet.

Ecological Maintenance Flow Monitoring

- j. The Approval Holder shall install and maintain a permanent staff gauge to monitor the stream flow in the watercourse immediately downstream of the Oakland Lake outlet to ensure the specified ecological maintenance flow being met.
- k. The flow rates at the staff gauge shall be measured twice a week. The monitoring frequency shall be increased as the measured stream flow rate approaches the specified ecological maintenance flow.
- l. Monitoring data obtained at staff gauge shall be tabulated within a spreadsheet

and compared to the maintenance flow requirements in this Approval.

- m. The Approval Holder shall notify the Department and DFO immediately if the flows fall below the specified ecological maintenance flow.

Stage-discharge Curve

- n. The Approval Holder shall develop a stage-discharge curve to establish the relationship between the water level on the staff gauge and the rate of flow immediately downstream of the Oakland Lake outlet, and determine the watercourse levels that correspond to the specified ecological maintenance flows.
 - i. Site selection for placement of the staff gauge and development of a stage-discharge curve shall be completed by or under the direct supervision of a qualified person or a qualified professional as defined in the Department's Guide to Surface Water Withdrawal Approvals, with training and experience in stream gauging.
 - ii. Sufficient measurements of stage versus flow immediately downstream of the Oakland Lake outlet shall be made especially during low flow stages to ensure accurate calibration of the staff gauge for measurement of low flows.
 - iii. The identified two water level benchmarks at the staff gauge, one for summer low flow and one for the remainder of the year shall accurately reflect the ecological maintenance flows. The established stage-discharge curve/benchmarks shall be recalibrated if site conditions change.
- o. The Approval Holder shall ensure all staff responsible for reading the staff gauge are trained to understand the water level corresponding to Ecological Maintenance Flow requirements of this Approval.

Records

- p. The Approval Holder shall collect and maintain the following monitoring records for the duration of the authorized water withdrawal:
 - i. Daily flow meter reading
 - ii. Daily water withdrawal volume
 - iii. A record of available water levels (current and historical) in the Oakland Lake
 - iv. A record of the water level on the staff gauge for ecological maintenance flow monitoring; defined benchmarks (water level at staff gauge) for the required ecological maintenance flows

- v. A record of the most recent calibration of the stage-discharge curve
- vi. A description of any complaints received regarding the water withdrawal activities and the follow up actions taken
- vii. Observed/reported effects of the activity on other water users and/or the environment
- q. The monitoring records shall be submitted to the Department upon request in a format and timeframe acceptable to the Department.
- r. The Approval Holder shall ensure that all records required by this Approval are maintained during the approval period and are to be made available to the Department upon request.

7. Reporting

- a. The Approval Holder shall prepare an annual report in a format acceptable to the Department, and submit the annual report to the Department by April 1 following the completion of the calendar year.
- b. The annual report shall summarize the following information, as required by the terms and conditions of this Approval, but not be limited to, for each calendar year, including:
 - ✓ i. A comparison of monitoring results to Approval limits and an evaluation of whether all results demonstrate compliance with Approval conditions. The evaluation of compliance shall also be presented in a statement at the beginning of the report;
 - ✓ ii. A summary of daily withdrawal volumes;
 - ✓ iii. A summary of daily withdrawal volumes averaged over each month and for the calendar year;
 - iv. A summary of ecological maintenance flow monitoring; an in-depth analysis on whether the ecological maintenance flows be maintained; observation of downstream flow system whether to sustain fisheries throughout the water withdrawal period.
 - ✓ v. A summary of results from available water level monitoring along with an analysis of the results. Results shall be provided in graphical format along with historical trends;
 - ✓ vi. A summary of complaints received and effects of the site activities on other water users and the environment.

APPENDIX I

Source Water Protection Plan Meeting Minutes



The special meeting of the Oakland Lake Watershed Advisory Committee for the Town of Mahone Bay was held on Monday, April 4, 2022 at 2:00 p.m. using video conferencing.

Present:

Councillor Richard Nowe (Chair)
Councillor Penny Carver
Michael Allen
Kacy DeLong, MODL Councillor
Tom Ernst
Mayor David Devenne
Dylan Heide, CAO
Scott Hoyt, Water/Wastewater System Manager
Kelly Redden, Deputy Clerk

Absent:

Approval of Agenda

A motion by Councillor Carver, seconded by Tom Ernst, "THAT the agenda be approved as presented." Motion carried.

Minutes

A motion by Councillor Carver, seconded by Councillor DeLong, "THAT the minutes of the March 14, 2022 meeting of the Oakland Lake Watershed Advisory Committee be approved as presented." Motion carried.

MODL Consultation, Policies Concerning Drinking Water Protection and Zoning

The committee discussed the presentation given by MODL (Municipality of the District of Lunenburg) planning staff at their last meeting.

A motion by Councillor Carver, seconded by Councillor DeLong, "THAT the Committee recommend that Council direct staff to write to Municipality of the District of Lunenburg planning staff, as a submission to their consultative process concerning Drinking Water Protection and Zoning, that Land-Use provisions for the Oakland Lake Watershed should:

- provide clarity as to whether regulations governing property partially within the Watershed would only apply to the portion of the property that is within the Watershed zone; and,

- ensure the Town is notified when a property sells within the Oakland Lake Watershed or when a Development Permit application for a property within the Watershed is received.

Staff will further request of MODL planning staff that they use clear and legible maps in their upcoming public engagement activities concerning Drinking Water Protection and Zoning.

Motion carried.

The meeting adjourned by motion at 2:48pm.

TOWN OF MAHONE BAY

TOWN OF MAHONE BAY

Councillor Richard Nowe

Kelly Redden, Deputy Clerk



The special meeting of the Oakland Lake Watershed Advisory Committee for the Town of Mahone Bay was held on Monday, March 6, 2023 at 3:00 p.m. using video conferencing.

Present:

Councillor Richard Nowe (Chair)
Councillor Suzanne Lohnes-Croft
Ella Gindi, MODL Planner
David Corkum
Dylan Heide, CAO
Scott Hoyt, Water/Wastewater System Manager
Kelly Redden, Acting Town Clerk & Deputy CAO

Absent:

Kacy DeLong, MODL Councillor (regrets)
Michael Allen, Watershed Planner (regrets)

1. Approval of Agenda

A motion by Councillor Lohnes-Croft, seconded by Mr. Corkum, "THAT the agenda be approved as amended to move Risk Assessment to the end of the agenda."
Motion carried.

2. Minutes

A motion by Councillor Suzanne Lohnes-Croft, seconded by Mr. Corkum, "THAT the minutes of the April 4, 2022 meeting of the Oakland Lake Watershed Advisory Committee be approved as presented."
Motion carried.

3. Discussion – Increase in Questions concerning Development in Watershed

Mr. Heide updated the committee on the Town's concerns about proposed development and planned development within the Oakland Lake Watershed.

4. MODL 2040 Update

Ella Gindi, MODL Planner, updated the committee on MODL 2040, a review of the Municipality of the District of Lunenburg's Land Use Bylaw and Municipal Planning Strategy, as it pertains to the Town's watershed.

5. Martins River Fire Department Request

Scott Hoyt, Water/Wastewater System Manager, told the committee about a request from the Martins River Fire Department to access the Pump House property to draw water from Oakland Lake in the case of a nearby fire.

A motion by Councillor Lohnes-Croft, seconded by Mr. Corkum, "THAT the committee recommend that council direct staff to prepare a report on the potential for the provision of access to Oakland Lake for fire services." Motion carried.

6. Risk Assessment

Scott Hoyt, Water/Wastewater System Manager, commented on the Risk Assessment. Members discussed and agreed to some additions to the draft document. This item will be added to the agenda for the next meeting of the committee.

The meeting adjourned by motion at 4:03pm.

TOWN OF MAHONE BAY

TOWN OF MAHONE BAY

Councillor Richard Nowe

Kelly Redden, Acting Town Clerk

APPENDIX J

Standard Operating Procedures for Disinfection

W23- Daily Operation Checks (Disinfection)

Purpose

The disinfection system located at the water treatment plant is checked and monitored on a daily basis.

Safe Work Procedure

The following procedure is to be used when checking and monitoring the disinfection system:

- Check and record on the water treatment plant daily check sheet the chlorine residual and pH readings from the filtrate and distribution in line analyzers. Check and record the UV intensity from the UV control panel. Check and record the chlorine setpoint readings from the SCADA system or HMI panel.
- Based on the in-house chlorine lab results adjust, if necessary, the chlorine setpoints on the SCADA system or HMI panel.
- Check chlorine metering pumps for excess heat noise and leaks.
- Ensure adequate chlorine available in sodium hypochlorite barrel.
- Check chlorine feed lines and connections for leaks and repair or tighten if necessary.
- Check chlorine, pH and temperature probes for leaks and ensure adequate water flow to the probes.
- Should there be a discrepancy between the analyzer readout and the in-house chlorine and pH lab results calibrate the probes. Refer to Chlorine and pH Analyzer Cleaning and Calibration SOP # 24 (W25) for calibration.
- Check UV reactor for excess heat and leaks.
- Should the UV intensity be low (below 40 W/m²) the system may need cleaning or lamps may need to be placed. Refer to SOP # 27: UV System – Cleaning (W27) or SOP # 26: UV system – Lamp Replacement (W26).
- All readings are to be recorded on the “Water Treatment Plant Daily Checks” sheet.

If any of the checks reveal problems that cannot be immediately rectified contact plant supervisor and report problem. This will ensure that maintenance can be determined, and the problem remedied as soon as possible

W24- Chemical Handling (Changing Sodium Hypochlorite Barrel)

Purpose

Sodium hypochlorite (liquid bleach) is used in the pretreatment system at the Water Treatment Plant as a source of chlorination. It is fed into the multiple water lines from 205-liter barrels by a metering pump also located in the chemical storage room.

Safe Work Procedure

The following procedure is to be used when changing sodium hypochlorite barrel.

- Before changing barrel ensure pump is off and to avoid low level alarm, stop water production.
- Remove suction line, level alarm and foot valve from barrel and place in a secure spot.
- Replace and secure bungs on barrel and remove barrel from feed area using barrel cart.
- Place full barrel in feed area, remove bungs and insert suction line, level alarm and foot valve into full barrel.
- Restart water production and pump ensuring the pump is in Analog mode.
- If pump becomes air locked, bleed off air by opening aeration valve on pump head while pump is running. Run pump until all air has been purged, close aeration valve.
- The small transfer pump attached to the wall can be used to transfer the remaining chemical from one barrel to the other.
- The transfer pump must be flushed after use by pumping clean water through it.
- The empty barrels should be sealed, wiped down, and stored.

If any unforeseen problems occur or assistance is required contact plant supervisor.

Hazard Specific PPE

- Always wear eye protection, gloves, and protective clothing when handling chemicals.

Hazard Specific Training

- Read and be familiar with the MSDS for this chemical before handling.

Manuals/External Reference Material

- MSDS's for all chemicals are located at the Water Treatment Plant.
- See Chemical pump manual for control selection, priming and bleeding air .

W25 - Chlorine Measuring System Cleaning and Calibration

Purpose

The WTP disinfection system uses two free chlorine measuring systems to continuously monitor the free chlorine residual in the filtrate flow (reservoir influent) and the distribution flow (reservoir effluent). Both systems should be cleaned once a month and calibrated anytime the analyzer readings vary from the WTP lab analyzed daily grab sample.

Safe Work Procedure

The following procedure is to be used when cleaning and calibrating the free chlorine measuring system:

- To avoid alarms during this procedure, disable the chlorine output alarms on to the SCADA system. This procedure can be performed without stopping water production as the chlorine feed is flow-paced.
- Shut off sample flow to the measuring system.
- To clean the chlorine sensor, remove it from the flow cell and clean the membrane with distilled water sprayed from a wash bottle. Do not use tissues to clean the membrane.
- To clean the pH/temperature sensor, remove it from the flow cell and rinse it with a stream of distilled water from a wash bottle. If the sensor becomes coated with rust, dissolve the rust by soaking in the sensor in dilute hydrochloric acid (5 mL of concentrated hydrochloric acid with 100 mL of water) for no longer than 5 minutes at room temperature. Rinse the sensor thoroughly with distilled water and soak in pH 4 buffer for several hours. recalibrate the sensor before returning to service.
- Once the sensors have been cleaned, return them to the fill cells and turn on sample flow.
- To calibrate the system, first calibrate for temperature then pH and finally for free chlorine.
- To calibrate for temperature, measure the sample flow temperature using the calibrated thermometer, then change the analyzer display using the procedure below.
 - Press "MENU". The main menu screen appears. Choose "calibrate"
 - Choose "Sensor2"
 - Choose "Temp"
 - To calibrate the temperature, change the number in the second line to match the temperature measured with the thermometer. Press "ENTER"
 - To return to the main display, press "MENU" followed by "EXIT"
- To calibrate their pH, stop the sample flow and obtain two stable buffer solutions, preferably 4.0 and 10.0. Remove the pH sensor from the flow cell and calibrate the sensor by using the following procedure:
 - On the analyzer press MENU. The main menu screen appears. Choose "calibrate"
 - Choose "Sensor2"
 - Choose "Measurement"
 - Choose "BufferCal"
 - Choose "Auto"

- Choose "Buffer1"
- Rinse the sensor with distilled water, place it in buffer1, and swirl the sensor.
- Wait until the reading is stable and press "ENTER".
- Remove the sensor from buffer1, rinse with distilled water, place it in buffer2, and swirl the sensor. Choose "Buffer2"
- Wait until reading is stable and press "ENTER".
- If calibration was successful, the analyzer will display the offset and slope.
- If the slope is out of range (less than 45 mV/pH or greater than 60 mV/pH) an error screen appears. Repeat the calibration. If the slope continues to be at a range, the sensor may need replacement.
- To return to the main display, press "MENU" followed by "EXIT".
- Return the sensor to the flow cell and restart the sample flow.
- Allow the reading to stabilize before calibrating the chlorine sensor.
- To calibrate for chlorine, use the following procedure:
 - On the analyzer press "MENU". the main menu screen appears. Choose "Calibrate"
 - Choose "Sensor1"
 - Choose "Measurement"
 - Choose "InProgress"
 - Wait until readings are stable and press "ENTER".
 - Sample the process flow using the lab analyzer and then press "ENTER".
 - Change the reading to match the results of the grab sample test. Press "ENTER"
 - To return to the main display, press "MENU" followed by "EXIT".
 - If calibration error screen appears the sensitivity is higher or lower than expected, repeat the calibration.

If unable to calibrate the chlorine sensor, the sensor membrane may need replacement.

Manuals/External Reference Material

Chlorine sensor zero calibration procedure, as well as troubleshooting assistance, can be found in the Model ECL Free Chlorine Measuring System Instruction Manual located at the WTP.

W26- UV System Lamp Replacement

Purpose

The UV lamps, which are mounted inside the UV reactor, will occasionally require replacement. There are eight high intensity low pressure amalgam UV lamps housed within protective quartz sleeves, which protect the lamps from water flow. If the UV control panel indicates a lamp failure, or/if upon cleaning the UV sensor and or the UV quartz sleeves, the UV intensity is still below 25 W/m^2 , some or all of the UV lamps will need replacement. Also, the UV output of the lamps decrease with time, therefore of the lamps must be replaced every 12,000 hours of operation even if lamp failure has not occurred.

Safe Work Procedure

The following procedure is to be used when replacing UV lamps:

- Stop water production and shut off power to the UV reactor at the UV control panel.
- Be sure to depressurize the UV Reactor before removing any of the lamps.
- Remove the reactor end cap by removing the two Phillips head screws and loosening the outer nut of the sanitary clamp. Pull the end cap straight out from the end plate.
- Disconnect the ground wire and the temperature switch.
- Gently pull the lamp holder and the UV lamp from the sleeve bolt. An internal spring at the far end of the UV lamp will push the lamp out approximately 12mm (0.5in).
- Wearing clean cotton gloves, carefully disconnect the lamps from the lamp holders and pull the lamp out. Carefully place the lamp in a safe area.
- Insert the replacement lamp into the sleeve, leaving the lamp end sticking out of the sleeve bolt in order to connect the lamp holder to the lamp.
- Slide the lamp gently into the sleeve bolt, pushing the lamp holder into the sleeve bolt until you feel a slight pop. The lamp must be inserted with the **amalgam spot down and the lamp wires at the top**.
- Confirm the lamp holder is secure by tugging on it slightly.
- Reconnect the temperature switch and the ground wire connections.
- Replace the end cap on the reactor chamber.
- Turn on the power to the reactor and confirmed that the operator display on the control panel does not show an alarm.
- Resume water production.
- If replacing all lamps, reset the elapsed runtime hours on the UV control panel by referring to the reset lamp hours procedure in chapter 7 of the Trojan UV Swift Operations and Maintenance Manual located at the WTP.
- Record the date changed, lamp hours, and which lamps were replaced in the lamp replacement log located at the WTP.

Be careful not to strike, bend, or apply pressure to the lamps or they will break. Broken lamps can cause serious cuts.

Lamps must be carefully stored until they can be discarded.

Exposure to UV light can cause serious burns to unprotected eyes and skin. Always turn system off before servicing. Ensure all lamps are properly secured within the chamber before turning system on.

Hazard Specific PPE

Wear safety glasses and use clean cotton gloves when handling lamps. Touching the lamp with bare hands will contaminate the quartz. If contaminated, wipe the lamp with alcohol and a non-abrasive cloth.

Manuals/External Reference Material

The Trojan UV Swift Operations and Maintenance Manual, located at the WTP, can provide a more detailed description of the UV system.

W27- UV Quartz Sleeve Cleaning

Purpose

The quartz sleeves contained in the UV system are subject to fouling and will occasionally need to be removed and cleaned in order to maintain UV intensity above 25 W/m^2 , thereby ensuring the required disinfection. The quartz sleeves will need cleaning if after cleaning the sensor, and checking the lamps, the UV intensity is still below 25 W/m^2 . Each of the UV lamps which are mounted inside the UV reactor, is housed within its own protective quartz sleeve that protects the lamp from water flow. One end of the quartz sleeve has a closed Dome shape, the other end is sealed against the reactor chamber and a plate by means of an O-ring compressed by the sleeve bolt. The quartz sleeves are supported by the sleeve holder assembly, which can be removed for cleaning and service.

Safe Work Procedure

The following procedure is to be used when removing, cleaning, and replacing the UV system quartz sleeves:

- Stop water production and shut off power to the UV reactor at the UV control panel.
- Turn off water flow through the reactor chamber by closing the inlet and outlet hand valves.
- Remove the drain plug from the underside of the reactor in order to drain and depressurize the reactor.
- Remove reactor end cap by removing the two Phillips head screws and loosening the outer nut of the sanitary clamp. Pull the end cap straight out from the end plate.
- Disconnect the ground wire and the temperature switch.
- Gently pull the lamp holder and the UV lamp from the sleeve bolt. An internal spring at the far end of the UV lamp will push the UV lamp out approximately 12mm (0.5in).
- Wearing clean cotton gloves carefully disconnect the lamp from the lamp holders and pull lamps out. Carefully place lamps in a safe secure area.
- Remove the two sanitary clamp bolts and extract the entire sleeve holder assembly from the reactor chamber. Pull the lamp holder in a direction parallel to the reactor chamber to prevent the quartz sleeve from striking the sides of the chamber.
- Prepare to clean the quartz sleeves by placing the entire assembly on a sheet of plastic.
- Clean the quartz sleeves by spraying with Lime-A-Way solution and wiping along the length of the sleeve with a clean non-abrasive rag. After cleaning, rinse the Lime-A-Way thoroughly from the sleeves with distilled water.
- Inspect the interior of the sleeves and clean with alcohol if necessary. Insert the sleeve holder assembly into the reactor chamber ensuring that hole #1 is aligned with the UV sensor port.
- Install the sanitary clamp.
- Insert each lamp into the sleeve leaving the lamp end sticking out of the sleeve bolt in order to connect the lamp holder to the lamp.

- Slide the lamp gently into the sleeve bolt pushing the lamp holder into the sleeve bolt until you feel a slight pop. The lamp must be inserted with the amalgam spot down and the lamp wires at the top.
- Reconnect the temperature switch and ground wire connections.
- Replace the end cap on the reactor chamber.
- Once assembled, replace reactor drain plug and open the reactor inlet and outlet valves.
- Turn on the power to the reactor and confirm that the operator display on the control panel does not show an alarm.
- Resume water production.

Be careful not to strike, bend, or apply pressure to the lamps or sleeves or they will break.

Broken lamps and sleeves can cause serious cuts.

Exposure to UV lights can cause serious burns to unprotected eyes and skin. Always turn system off before servicing. Ensure all lamps are properly secured within the chamber before turning system on.

Hazard Specific PPE

- Wear protective clothing and eyewear when cleaning the sleeves.
- Use clean cotton gloves when handling lamps and quartz sleeves. Touching the lamp or sleeves with bare hands will contaminate the quartz. If contaminated, wipe the lamp or sleeve with alcohol and a non-abrasive cloth.

Manuals/External Reference Material

The Trojan UV swift operations and maintenance manual, located at the WTP, can provide a more detailed description of the UV system.

W28- Daily Operation Checks (Water Storage)

Purpose

The water storage reservoir located at the water treatment plant is checked and monitored on a daily basis.

Safe Work Procedure

The following procedure is to be used when checking and monitoring the reservoir:

- The reservoir level is continuously monitored by the SCADA system. Check and record the level from the SCADA system on the “water treatment plant daily checks” sheet daily.
- Check the reservoir level trends on the SCADA daily for any spikes or irregularities.
- Visually inspect the reservoir floating cover once daily by walking the perimeter. Under normal conditions the floating cover should be taut without the appearance of wrinkles or trapped pockets of air. In general, the floating cover should be relatively dry and clean.
- Check for damage to perimeter fencing, gates, cover, troughs, or hatch.
- Check for and remove any large pieces of debris from the cover by hand immediately.
- If, after a recent rainfall, there is an excess of standing water on the cover, check that the submersible pump is operating properly, if not, the pump must be checked for clogging debris and/or for proper pump flotation operation.
- If, after rainwater removal, there is standing water isolated from the rainwater removal system, repositioned the drainage enhancement weights to between the ponded water and the nearest collection trough and investigate cover for damage.
- The floating cover is subject to damage by ice in the winter months period to minimize damage to the cover, the reservoir should be operated with as little change in water surface elevation as possible.

Repairs to the cover or the rainwater removal pump should only be carried out with a second person watching from off the cover.

Hazard Specific PPE

A lifejacket (PFD) must be worn anytime it is necessary to walk on the reservoir cover.

Manuals/External Reference Material

The Layfield Operation and Maintenance Manual for the reservoir floating cover is located at the water treatment plant and can provide a detailed description of the floating cover as well as a detailed maintenance procedure.

W29- Reservoir Floating Cover Maintenance

Purpose

As well as the daily checks, the reservoir floating cover also requires regular inspection and maintenance.

Safe Work Procedure

The following procedures are to be used when inspecting and performing maintenance on the reservoir floating cover:

- Once a month the floating cover should be visually inspected by walking the entire floating cover surface at 3-meter intervals. the operator should be looking to determine if any of the following conditions are present:
 - Pin holes, tears, abrasions, seam failures, etc.
 - Trash, debris, or accumulations of dirt
 - Rain removal pump clogging
 - Inoperable rain removal pump
 - Excessive air under cover
 - Unsecured hatch
 - Standing water
- Maintenance of the rainwater removal pump should be performed semi-annually. The rainwater removal pump should be removed from the rainwater collection sump and inspected for damage or wear. The sump should be thoroughly cleaned out. The pump often on float should be inspected and tested.
- The entire floating cover including the troughs should be thoroughly cleaned once a year or more if necessary. The cover and troughs can be hosed down using the town's fire truck. Before beginning washdown sweep or remove any dirt or debris from the troughs and cover. Soft bristled push brooms and soft rubber squeegees can be used alongside the flushing water to wash the water into the troughs and to the rain removal pump.
- Should repairs to the cover be deemed necessary involving patching, Bear River Plastic Welding (Dave Wilson @ 902-245-8319) is able to do the repairs using the cover patch material stored at the water treatment plant.

Repairing and cleaning the cover should only be carried out with at least one other person watching from off the cover.

Hazard Specific PPE

- Wear chest waders and waterproof gloves when hosing down cover.
- A lifejacket (PFD) must be worn anytime it is necessary to walk on the reservoir cover.

Manuals/External Reference Material

The Layfield operation and maintenance manual for their reservoir floating cover is located at the water treatment plant and can provide a more detailed description of the maintenance procedures as well as a detailed troubleshooting guide

APPENDIX K

Schematic of the Treatment & Disinfection Process

TOWN OF MAHONE BAY WATER TREATMENT PLANT

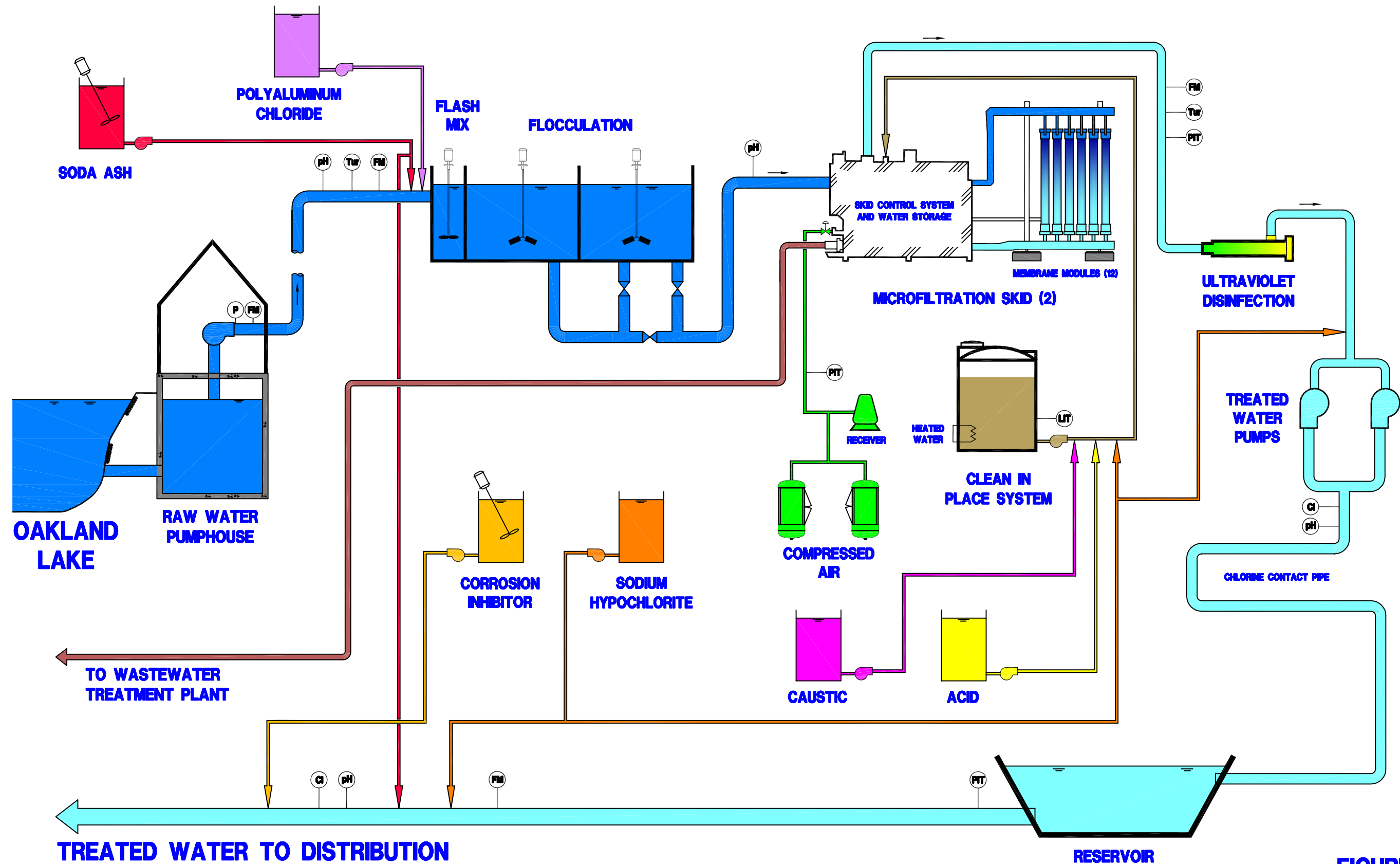
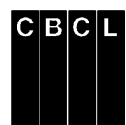
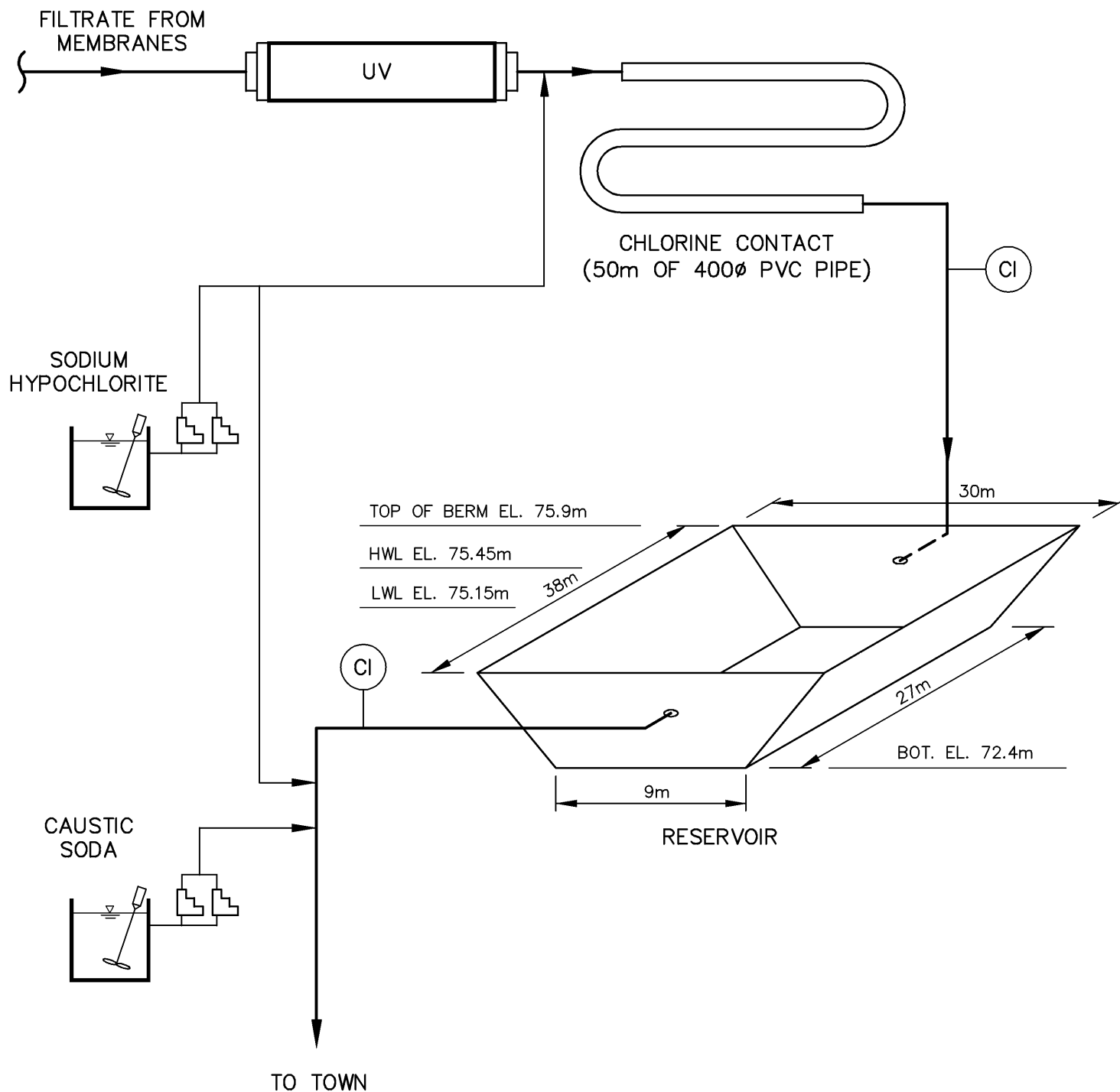


FIGURE 3.1



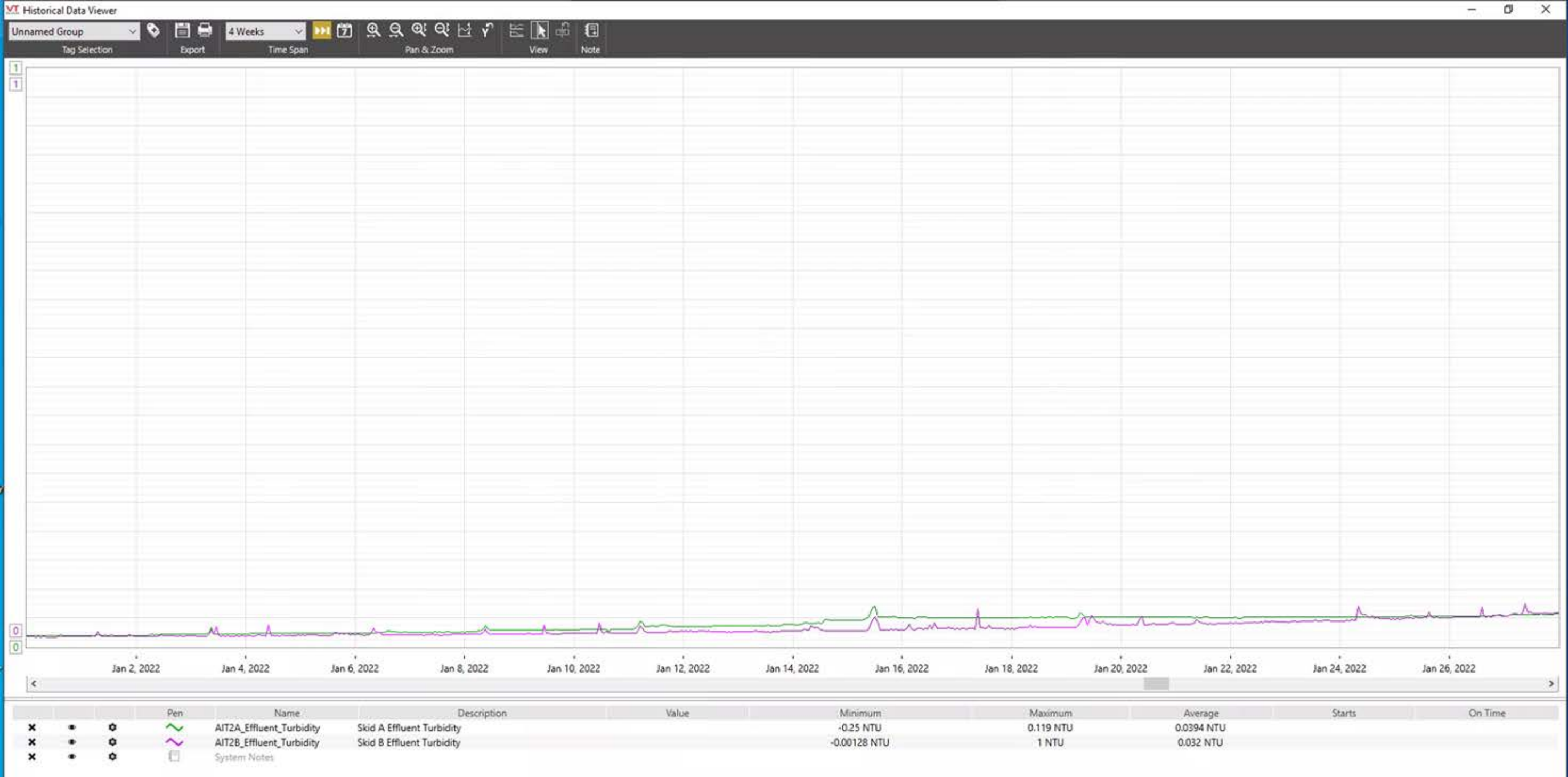
CBCL LIMITED
Consulting Engineers
ISO 9001 CERTIFIED

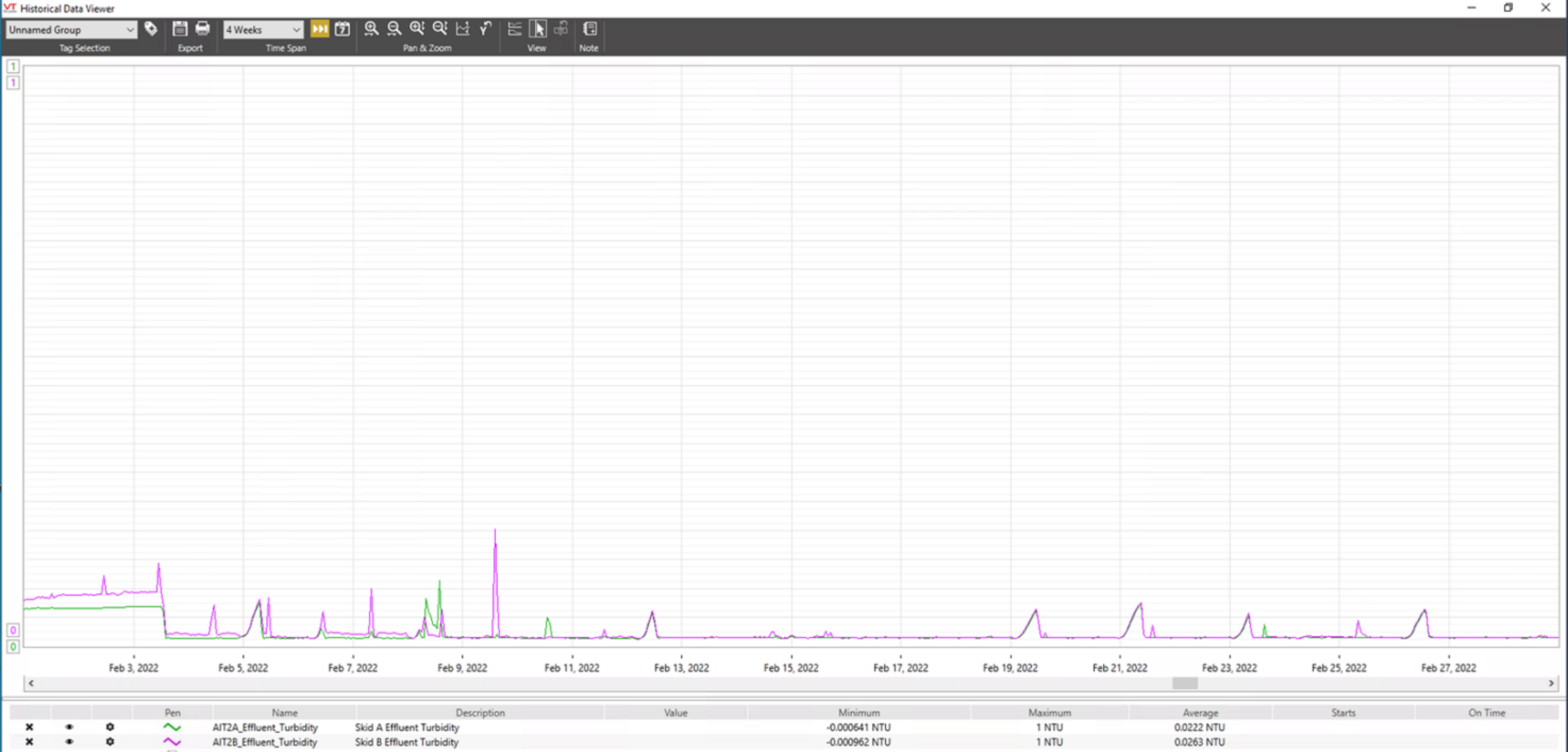
TOWN OF MAHONE BAY
PRIMARY DISINFECTION
SYSTEM SCHEMATIC

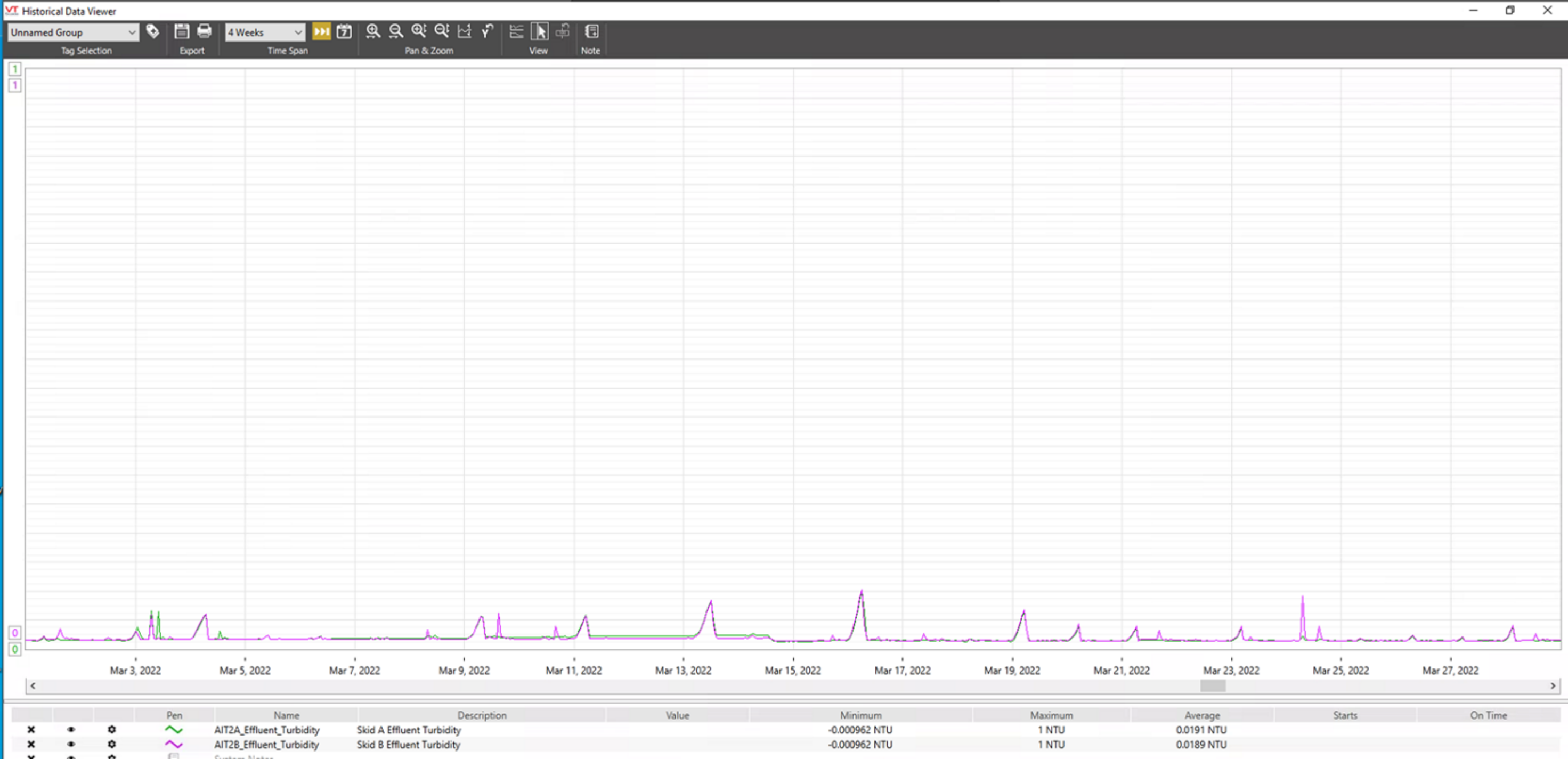
Contract No	Scale	Date
120819	NTS	APR. 2013
Reviewed	Drawn	FIGURE
JAB	DC	3.2

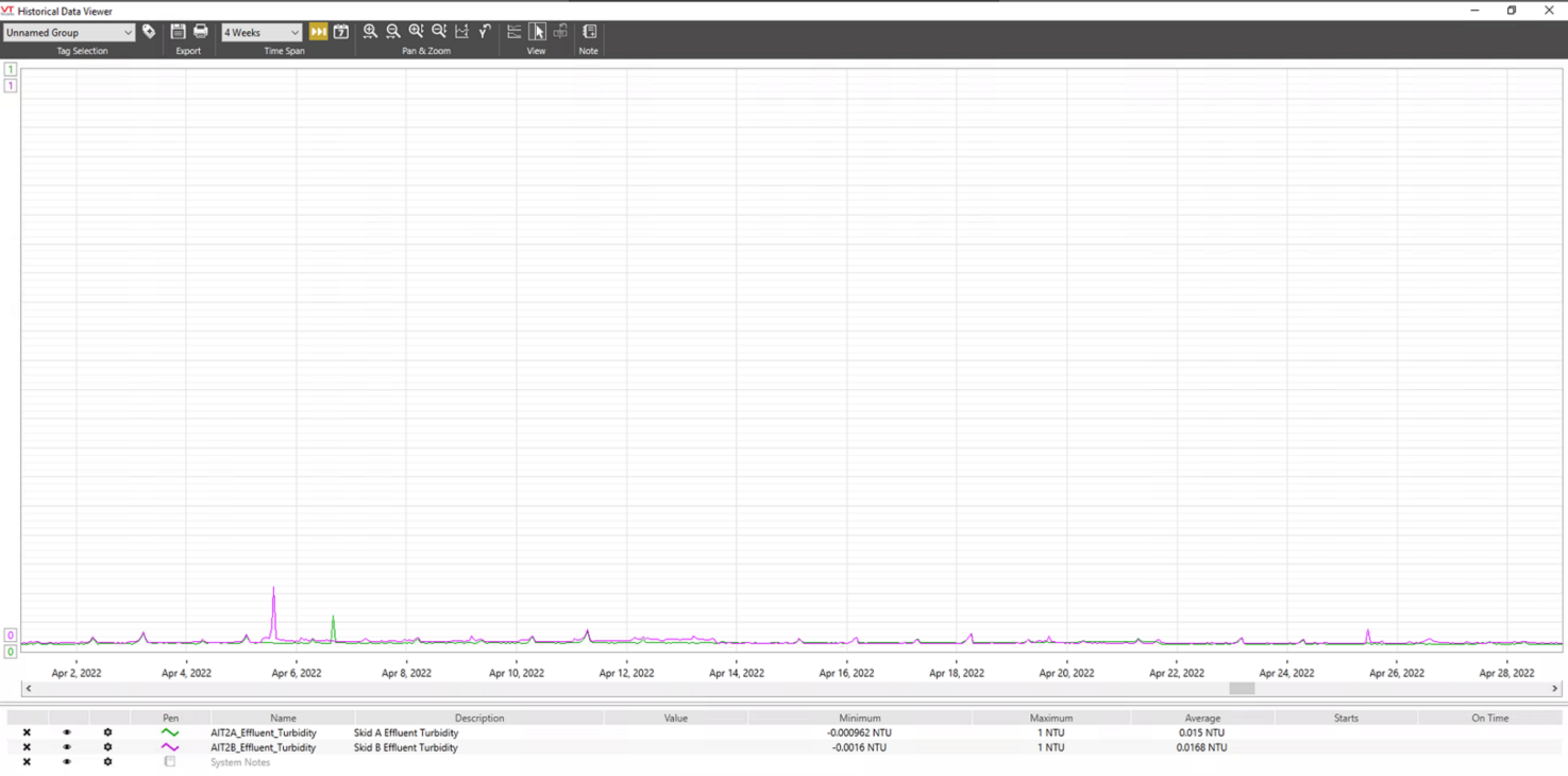
APPENDIX L

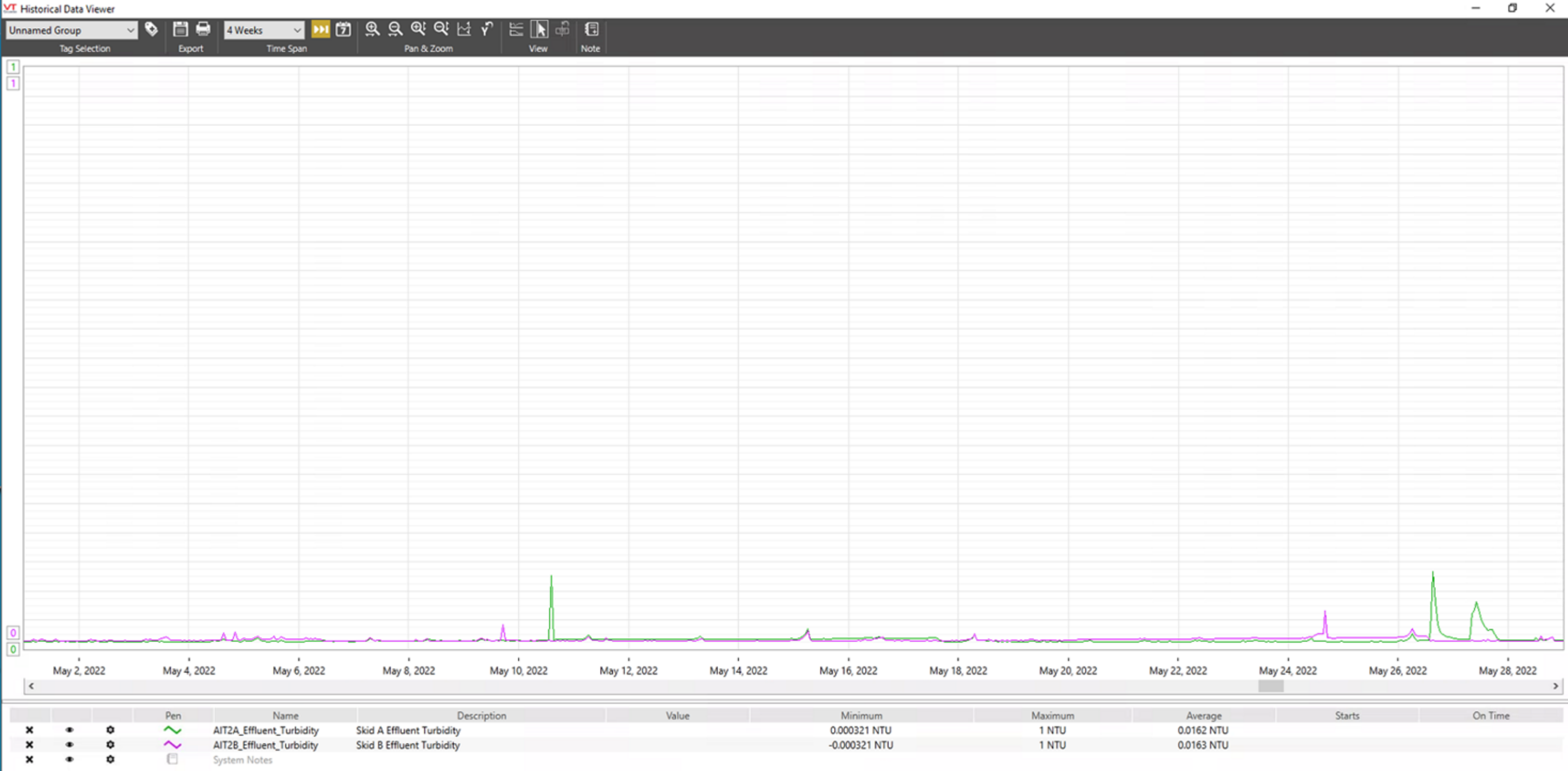
Historical Effluent Graphs SCADA

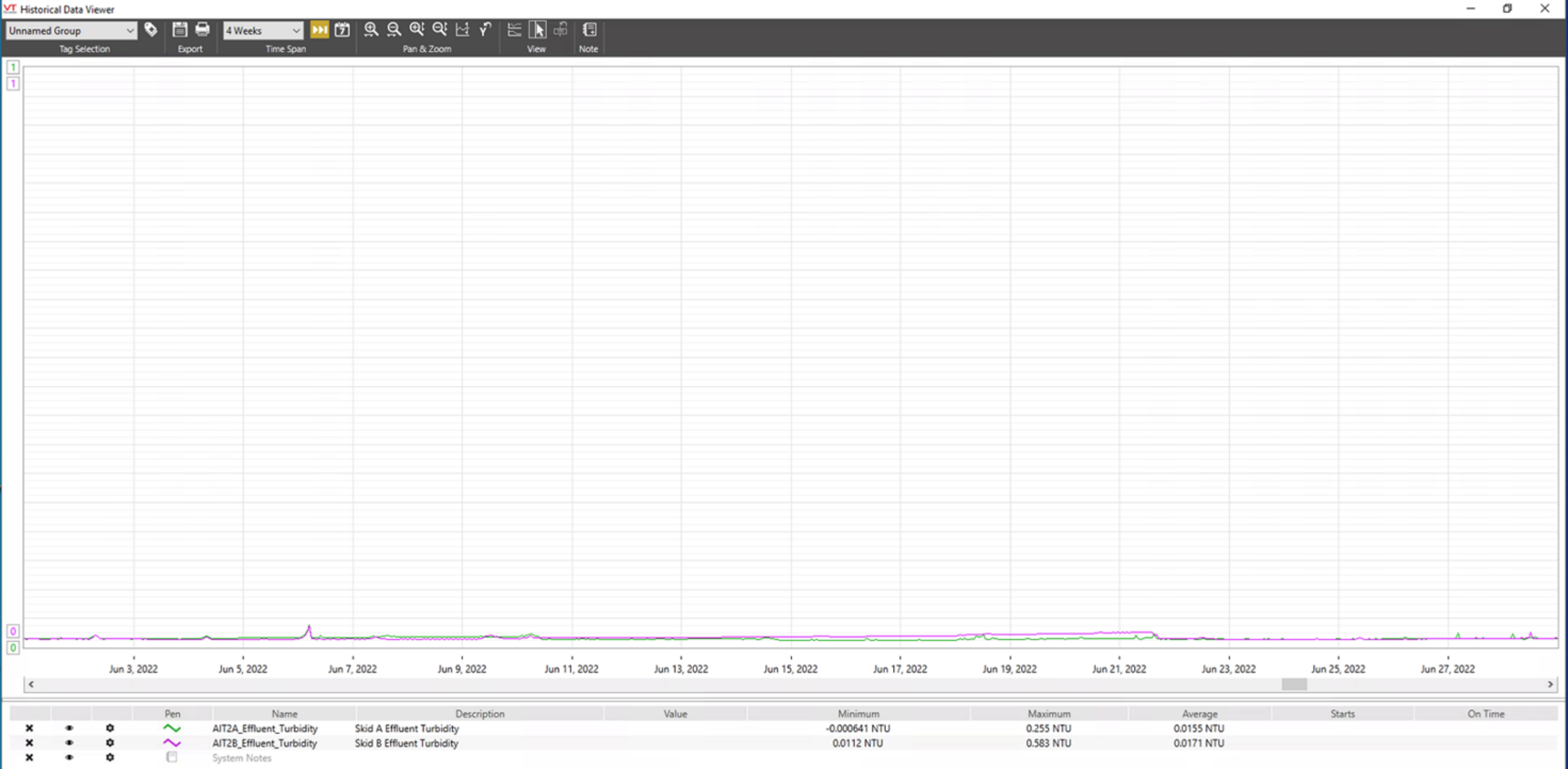


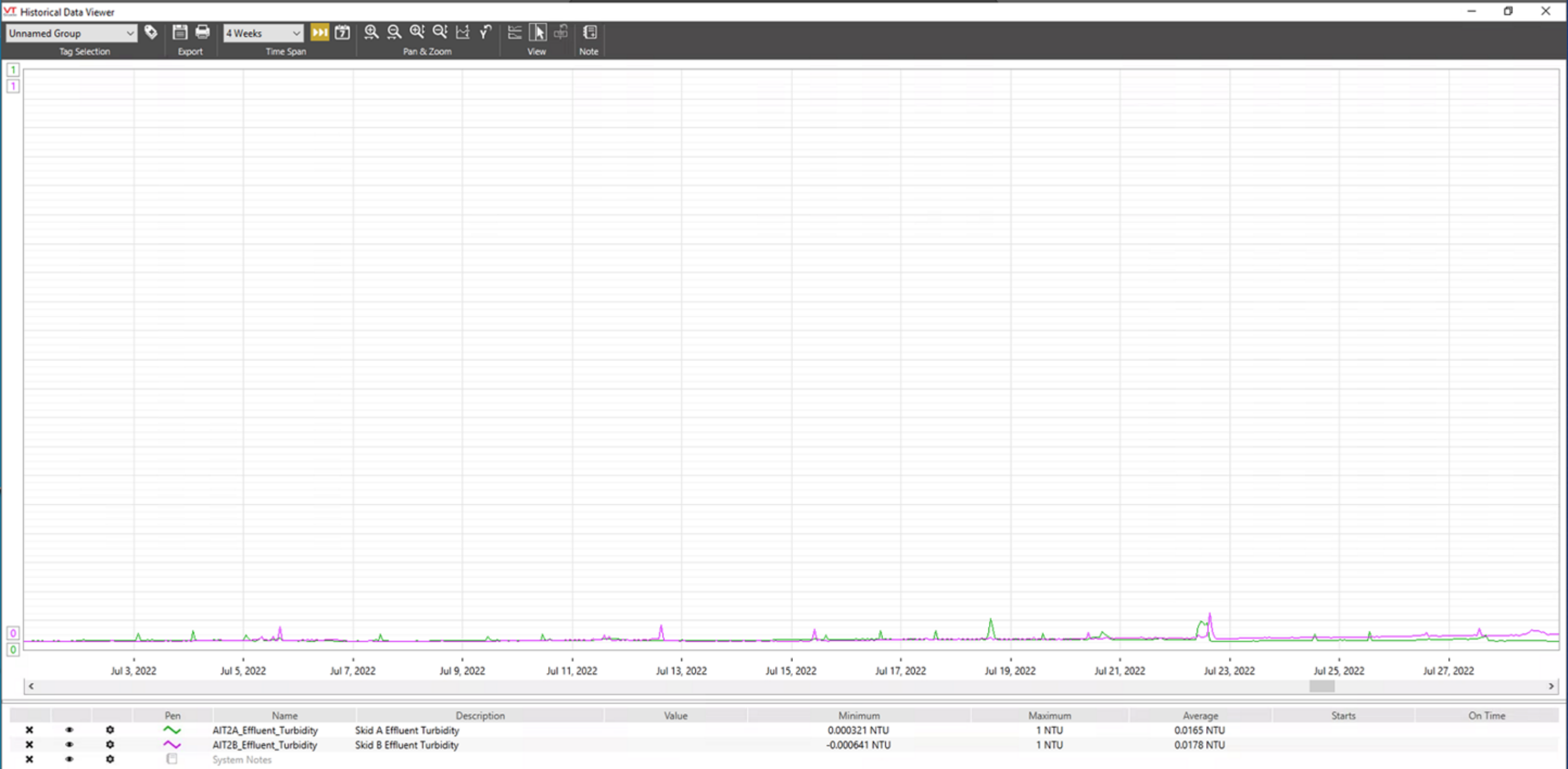


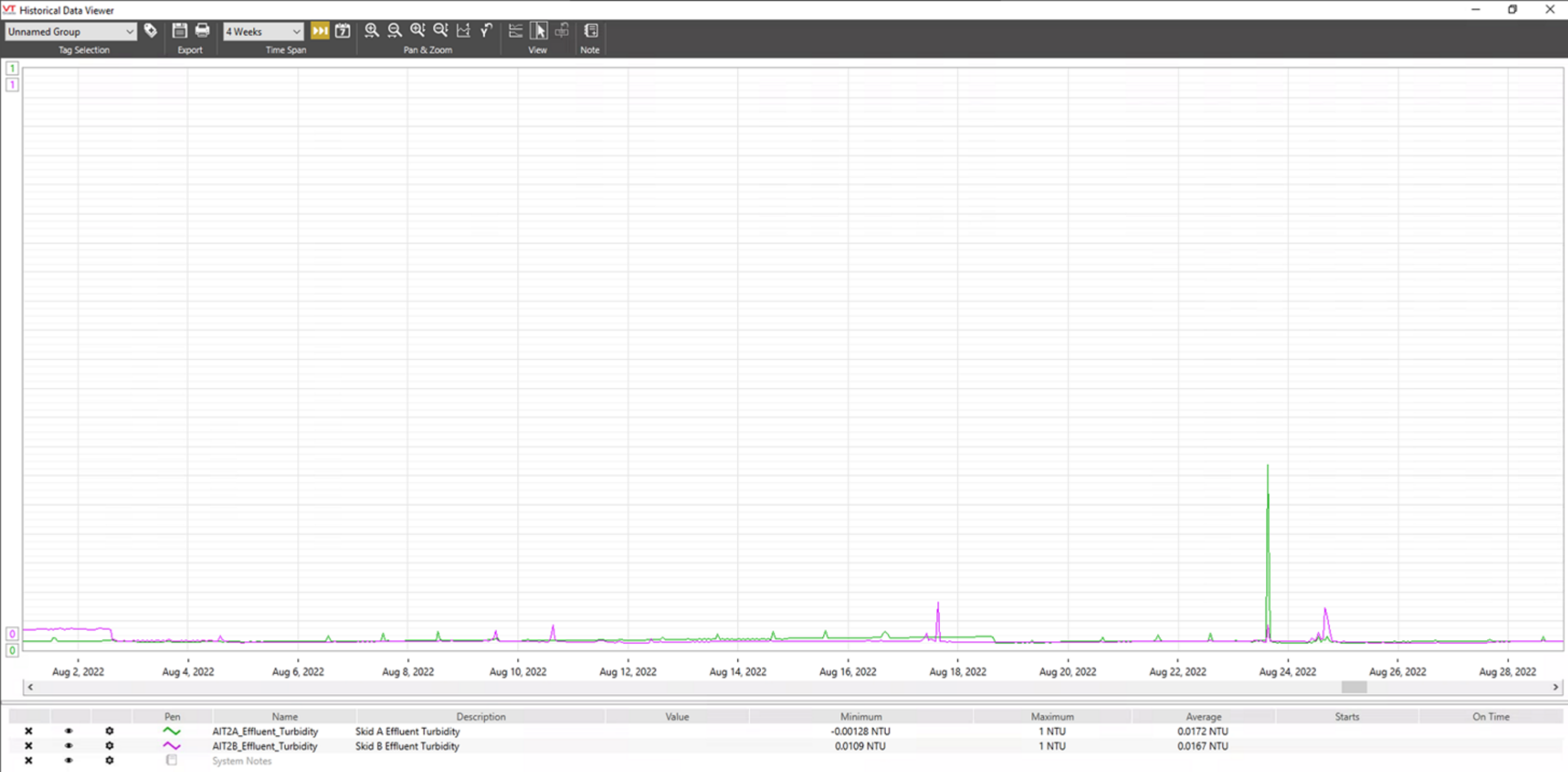


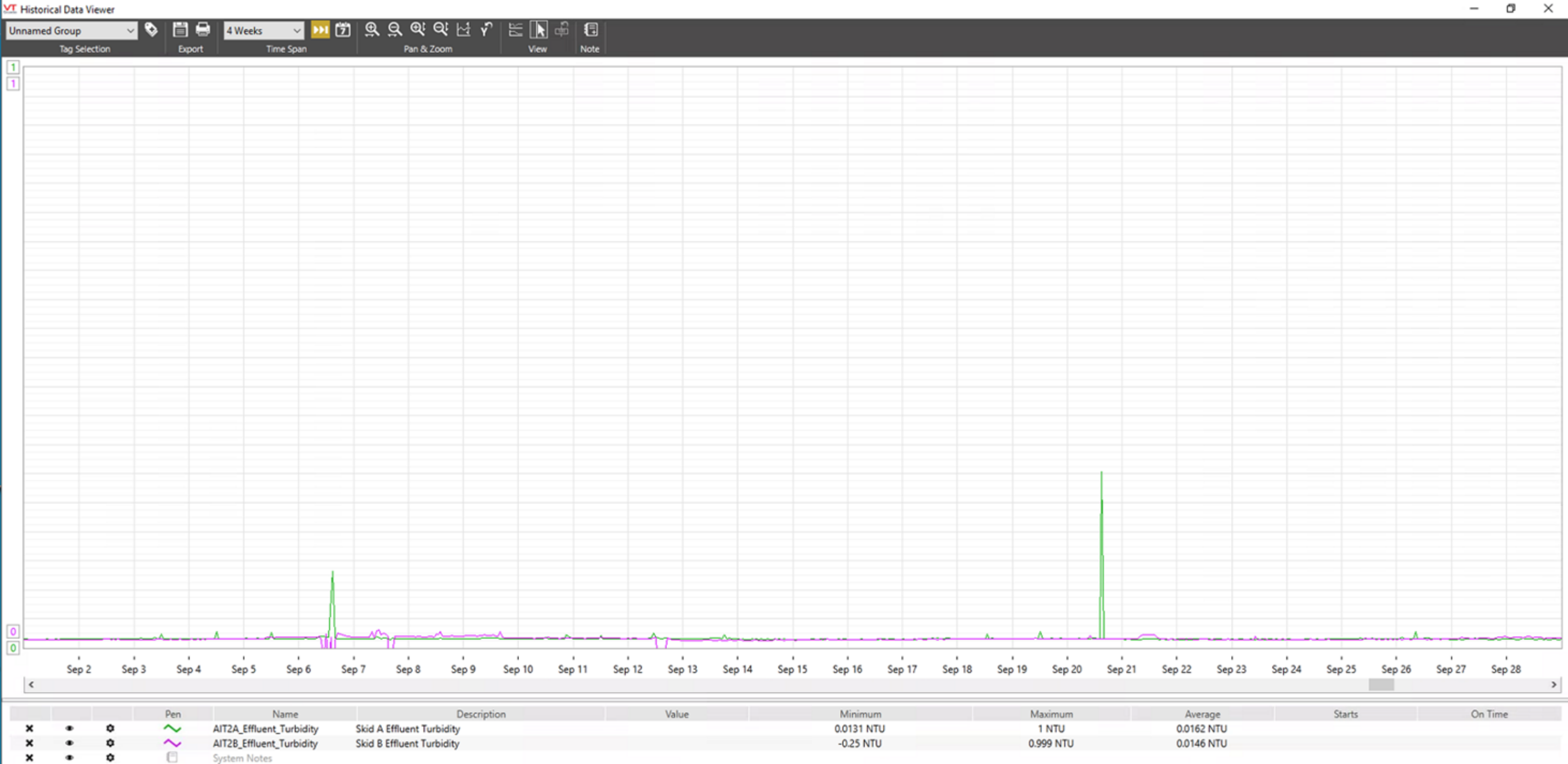


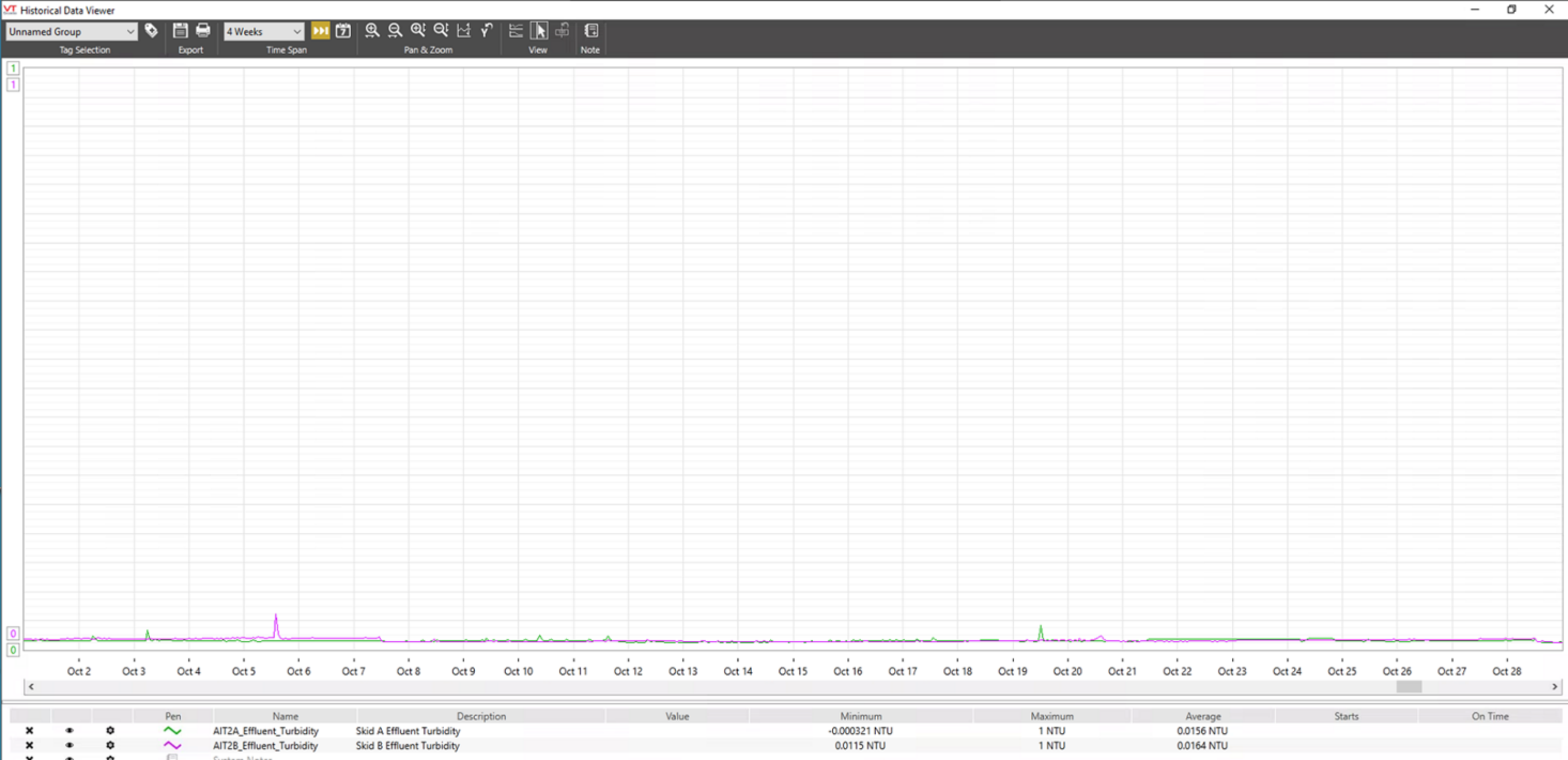


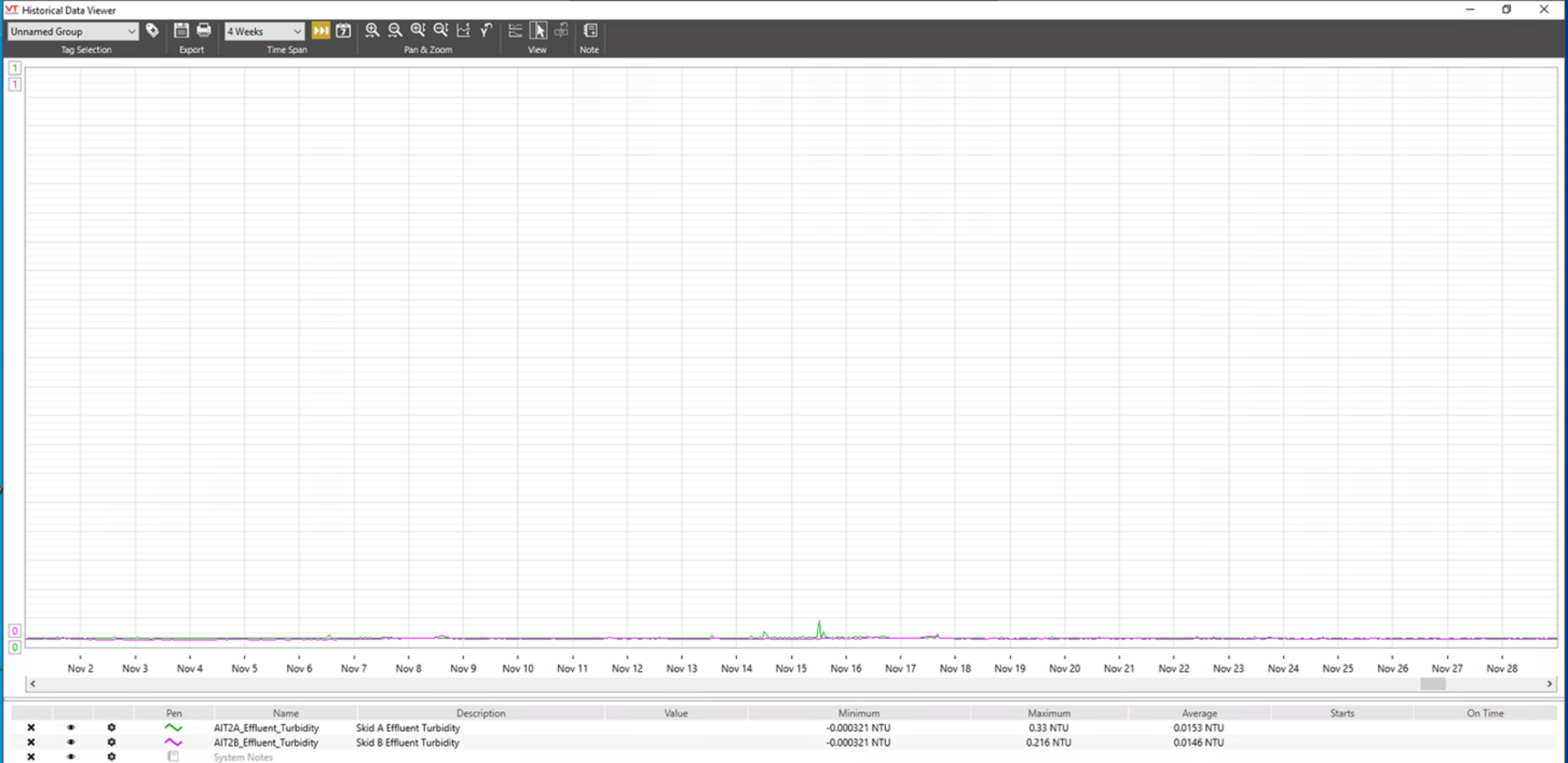


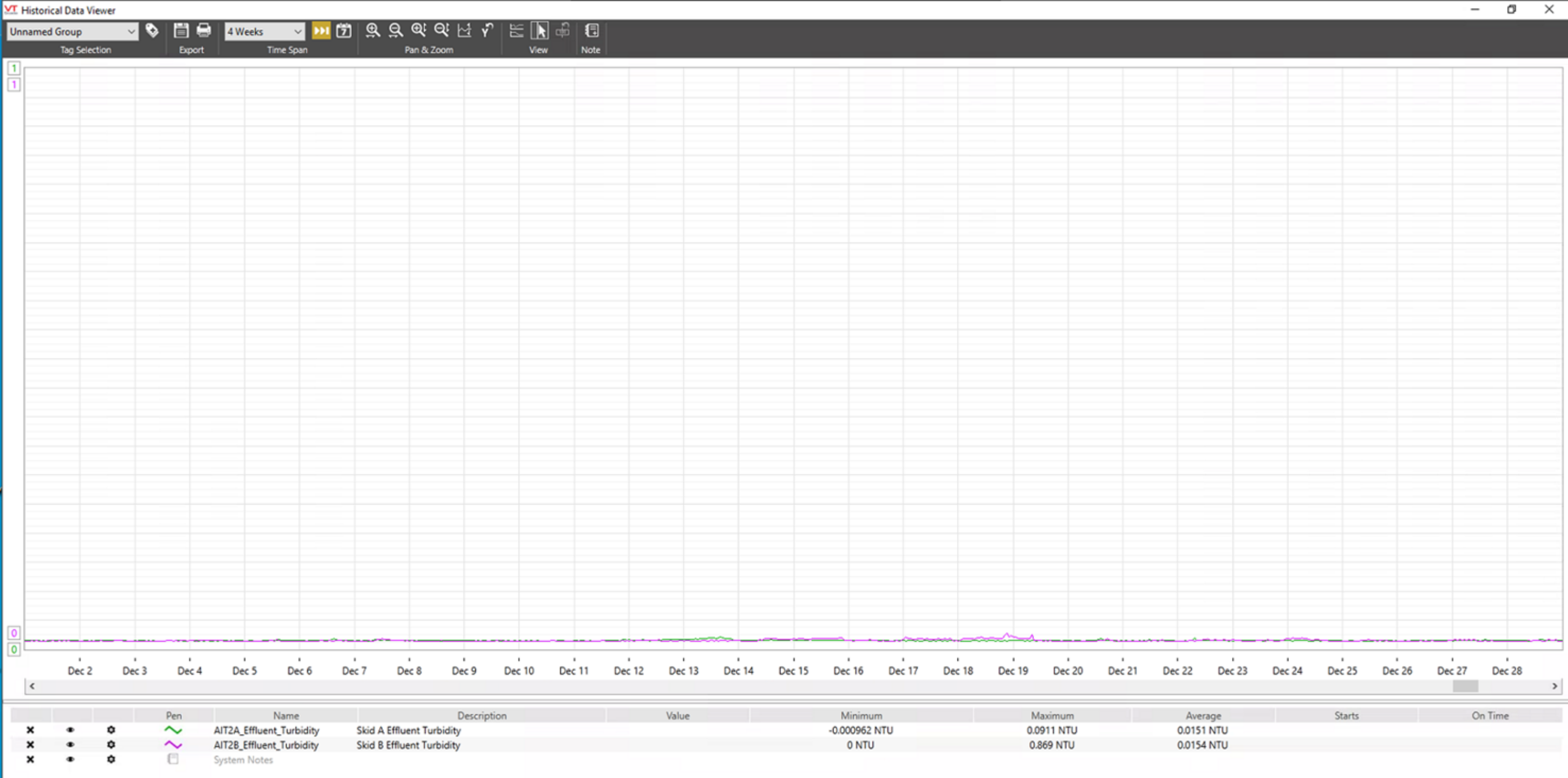












APPENDIX M

Water Protection Zone Mapping in GIS Format for NSECC

To be provided separately.

APPENDIX N

Terms of Reference Checklist

Nova Scotia Environment & Climate Change System Assessment Report Terms of Reference Checklist

PART I

Introduction

This checklist was prepared as a companion document to the Terms of Reference for System Assessment Reports for Municipal Drinking Water Systems, 2022. For detailed information on each of the submission requirements below, please consult the source document. For ease of reference, reports should follow the format and sequence of the checklist below. Where possible, section references should follow section and subsection numbering conventions used in the checklist.

Where data is required to be submitted for “the most recent calendar year”, Approval Holders may submit 12 consecutive months of data within a 2-year period from the date the system assessment report is due.

PART II

Characterization of the Water Source

2.0 Source Water Characterization

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.1 Source Description and Schematic*					
i.	Describe the water source(s) used to meet water consumption demand.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.1	3
ii.	Describe any sources that are used as back-up supplies.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.1.1	3
iii.	Identify sources on a map.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.B	App.B
iv.	Document what precautions are required for back-up supplies.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.1.1	-
v.	If a back-up supply is intended to be used without precautions, verify that it meets the Nova Scotia Treatment Standards for Municipal Drinking Water Systems or if the back-up supply is connected to an adjoining municipality, document the name of the Municipal Public Drinking Water Supply to which it is connected.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.1	-
vi.	For Municipal Public Drinking Water Supplies that purchase water from an adjoining system, identify system connections on a map.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.1	-
vii.	Document the name of the municipal public drinking water supply(s) that water is purchased from and proceed to section 2.3.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.1	-

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.2 Microbial Risks					
2.2.1 Surface Water Sources					
i.	Summarize microbial risks and water quality variability of the surface water source(s).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.2.1	4
ii.	Submit raw water quality data for total coliforms and E. coli, as well as Cryptosporidium and Giardia if available, for the most recent calendar year as an Appendix.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.1	4
2.2.2 Groundwater Sources					
i.	Verify that all individual wells have been classified in accordance with the Protocol for Determining Groundwater Under the Direct Influence of Surface Water.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
ii.	Summarize the GUDI status by individual well and identify at which step in the GUDI Protocol the well was categorized as GUDI or non-GUDI.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
iii.	For wells that are no longer in use, identify if the well has been properly decommissioned or is being maintained as a back-up well or monitoring well.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
iv.	For GUDI wells, complete Table A.1 and verify that the GUDI classification has not changed based on the results of microscopic particulate analysis (MPA) testing required every two years.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
v.	Verify that MPA samples were taken following a rainfall event in accordance with Step 3 of the GUDI Protocol (e.g., if there is a 15-day time-of-travel, then the well shall be sampled 15 days after a surface water event).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
vi.	Inspect the site(s) to verify that there are no changes to the surrounding area to warrant re-classification of the well(s).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
vii.	Recommend corrective action for wells: <ul style="list-style-type: none"> For which MPA test results indicate a change in GUDI classification. Where changes to the surrounding area have occurred to warrant re-classification of the well per the GUDI Protocol. Where any other concerns are identified. 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
viii.	Submit raw water quality data for total coliforms and E. coli bacteria for the most recent calendar year as an Appendix.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5
ix.	For GUDI wells, submit any raw water quality data for Cryptosporidium or Giardia (if available) for the most recent calendar year as an Appendix.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.2.2	5

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.3 Chemical Risks					
2.3.1 Disinfection By-Products					
a) Trihalomethanes (THMs)					
i.	Complete Table A.2 to summarize quarterly THM concentrations by sampling location.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
ii.	For non-GUDI systems that have had quarterly sampling reduced to annual sampling: <ul style="list-style-type: none"> Note the acceptance date for this reduction in sampling frequency. Modify Table A.2 to summarize annual results, including sampling date. 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.1	-
iii.	If the locational running annual average for any sampling location exceeds the maximum acceptable concentration, recommend corrective actions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.1	-
iv.	Verify that sampling locations are appropriate as follows: <ul style="list-style-type: none"> Are samples collected at the point(s) in the distribution system with the highest potential THM concentrations? Are an adequate number of sites sampled to represent exposure levels system-wide? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.1.1	5
v.	Identify THM sampling locations on a map of the distribution system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.C	App.C
vi.	Recommend sampling location/ frequency changes if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.1	5
b) Haloacetic Acids (HAA5)					

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
i.	Complete Table A.3 to summarize HAA5 concentrations by sampling location.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
ii.	For non-GUDI systems that have had quarterly sampling reduced to annual sampling: <ul style="list-style-type: none"> Note the acceptance date for this reduction in sampling frequency. Modify Table A.3 to summarize annual results, including sampling date. 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.2	-
iii.	If the locational running annual average for any sampling location exceeds the maximum acceptable concentration, recommend corrective actions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.2	-
iv.	Verify that sampling locations are appropriate as follows: <ul style="list-style-type: none"> Are samples collected at the location(s) where historical data show the highest HAA5 concentrations? If historical data are not available, are HAA5 concentrations monitored in the middle and extremities of the distribution system to determine the highest concentrations? Are samples collected in areas where disinfectant residuals are significantly lower than the system average because of long residence time? In systems with booster chlorination stations and water tanks/reservoirs, are HAA5 concentrations monitored downstream of these components? Are an adequate number of sites sampled to represent system-wide exposure levels? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.1.2	5
v.	Identify HAA5 sampling locations on a map of the distribution system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.C	App.C
vi.	Recommend sampling location/ frequency changes if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.1	5

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
c) Other Disinfection By-Products (DBPs)					
i.	Identify which other DBPs are required to be monitored and compare this to existing monitoring (see Table 1 in the Terms of Reference).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
ii.	Verify that sampling locations are appropriate.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
iii.	Identify sampling locations on a map of the distribution system.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
iv.	Recommend sampling location/frequency changes if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
v.	Summarize concentrations for the most recent calendar year as an Appendix.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
vi.	Recommend corrective actions if any maximum acceptable concentration is exceeded.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.1.3	5
2.3.2 Lead and Corrosion Control					
a) Lead and Copper					

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
i.	Verify that sampling locations and frequencies for lead are appropriate as follows: <ul style="list-style-type: none"> Does the residential sampling program meet the minimum requirements as outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies or as otherwise accepted by the Department? Are residences suspected to be at the highest risk for lead targeted in the residential sampling program? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.1	6
ii.	Recommend sampling location/frequency changes if necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.1	7
iii.	Summarize and append lead and copper concentrations by sampling location and sample protocol used for the most recent calendar year.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.1	6
iv.	Summarize corrective actions taken when residential sample results exceeded the maximum acceptable concentration, as outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies. <ul style="list-style-type: none"> Are the corrective actions taken in line with the minimum requirements outlined in the Lead and Copper Management Requirements – Municipal Public Drinking Water Supplies or as otherwise accepted by the Department? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.1	7
v.	Recommend program improvements, where applicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.1	7
b) Corrosion Control					
i.	Review the corrosion control program: <ul style="list-style-type: none"> Does one exist? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.2	7
	<ul style="list-style-type: none"> Does it include the minimum monitoring requirements as outlined in the Guidelines for Monitoring Public Drinking Water Supplies – Part 1? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.2	7

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
<ul style="list-style-type: none"> Does it include action limits for the corrosion monitoring parameters that trigger follow-up? 		<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.2.2	8
ii. Summarize the water quality results of the corrosion control program for the most recent calendar year as an Appendix.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.D	App.D
iii. Recommend corrective actions if concerns are identified from the review of the corrosion control program.		<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.2.2	8
iv. If a corrosion control program does not exist, document why, including water quality results that demonstrate non-corrosivity of the water, or recommend the need for a more comprehensive corrosion control program. Note: The Langelier Index is no longer considered an adequate measure of corrosivity. The submission of water quality results based solely on a positive Langelier Index will not be accepted as justification for not having a corrosion control program. Note: The Engineer is not required to develop a corrosion control program as part of the System Assessment Report.		<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.2.2	-
2.3.3 Guidelines for Canadian Drinking Water Quality* *Municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply may obtain water quality results from the Approval Holder of the Municipal Public Drinking Water Supply that treats the water.					
i. Verify that the full suite of health-related parameters (see Table A.4 in the Terms of Reference) has been analyzed a minimum of once every five years for all raw water sources and treated water and document sampling dates.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
ii. Review the data to: <ul style="list-style-type: none"> Verify that sampling locations and frequencies are appropriate for cyanobacterial toxins and pesticides. Identify if any maximum acceptable concentrations (MACs) have been exceeded. Identify parameters with detectable concentrations. 		<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.3	8

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
iii.	Discuss any trends for parameters with detectable concentrations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.3	8
iv.	Include laboratory results from the last round of sampling as an Appendix.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.E	App.E
v.	Identify when the next round of sampling is scheduled to occur.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.3	8
vi.	Recommend corrective actions if any MACs are exceeded.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.3	-
vii.	Recommend any changes to the monitoring program (frequency/location) if sampling is inappropriate for cyanobacterial toxins, pesticides or other parameters with enhanced monitoring that was recommended for parameters with detectable concentrations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.3	-
2.3.4 Guidelines for Monitoring Public Drinking Water Supplies					
i.	Verify that the parameters in the Guidelines for Monitoring Public Drinking Water Supplies (see Table A.5) have been analyzed as required in all raw water sources and treated water and document the sampling dates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
ii.	Review the data to: <ul style="list-style-type: none"> • Verify that sampling locations and frequencies are appropriate. • Identify if any maximum acceptable concentrations (MACs) have been exceeded. • Identify any aesthetic parameters that may compromise disinfection or other critical processes. 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.4	8
iii.	Discuss any water quality trends.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.4	8

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
iv.	Include laboratory results from the last round of sampling as an Appendix.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.F	App.F
v.	Identify when the next round of sampling is scheduled to occur.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.4	8
vi.	If any MACs are exceeded, recommend corrective actions.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.4	-
vii.	Recommend any changes to the monitoring program, sampling location/ frequencies if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.4	-
2.3.5 Source Water Protection Plan Monitoring* *This section is not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply.					
i.	For Approval Holders monitoring any other chemical parameters for source water protection purposes, summarize the parameters, their sampling frequency, and their measured concentrations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.5	9
ii.	Recommend corrective actions if concentrations are detectable or increasing.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.5	9
iii.	Review the source water protection plan monitoring program: <ul style="list-style-type: none"> Does one exist? Does it include monitoring of parameters that provide the information that is needed to evaluate the effectiveness of the source water protection plan? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.5	9

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.3.6 Cyanobacteria* *This section is only applicable to surface water sources.					
i.	Identify whether the source of supply has been impacted by cyanobacterial blooms.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.6	9
ii.	Summarize and append any results for cyanobacterial blooms through visual observation and/or confirmation from laboratory results including dates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.6	9
iii.	Discuss any corrective actions taken when cyanobacteria have been detected in the source water.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.6	9
iv.	Discuss the treatment capability of the facility to remove microcystin toxins and identify any vulnerabilities.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.3.6	9
v.	Provide recommendations if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.3.6	9

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.4 Filter Backwash Water*					
*Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply					
i.	Document the impact on the raw water source if water from the filter backwash treatment system is discharged upstream of the raw water intake.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.4	9
ii.	Provide recommendations if this discharge impacts the source.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.4	9
2.5 Source Quantity*					
*Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply					
i.	Compile existing Water Withdrawal Approvals and include copies of these as an Appendix.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.5	10
ii.	Complete Table A.6.a and A.6.b to compare water withdrawals to approved limits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
iii.	Recommend corrective actions, including water conservation measures, if water withdrawals are greater than approved limits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.5	11
iv.	Recommend corrective actions if water withdrawals are approaching approved limits and growth is forecast to increase withdrawals beyond approved limits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.5	11

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
2.6 Source Water Protection Plan*					
*Not applicable for municipalities that only distribute water purchased from another Municipal Public Drinking Water Supply.					
i.	Identify the source water protection zone(s) on a map.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.B	App.B
ii.	Submit the source water protection zone(s) in GIS format to the Department. If zones are not available in GIS format, contact the Watershed Planner for your supply.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.M	App.M
iii.	Summarize the status of the source water protection plan and implementation schedule.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.6	11
iv.	Document the dates of the last two SWPP meetings.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.6	12
v.	Note the status of meeting actions and/or SWPP deliverables.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.6	12
vi.	Make recommendations to address any concerns identified by the advisory committee or the source water protection planning process.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.6	12
2.7 Conclusions and Recommendations					
i.	Refer to the Terms of Reference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2.7	12

PART III

Treatment Processes, Facilities and Equipment

3.0 Evaluation of Treatment Processes, Facilities and Equipment

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
3.1 Treatment Processes					
i.	Compile existing Approval(s) to Operate and include copies of these as an Appendix. For Approval Holders that only distribute water purchased from another Municipal Public Drinking Water Supply, document the name of the treatment facility, and proceed to section 3.2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1	15
3.1.1 Treatment Process Schematic					
i.	Provide a schematic of the treatment process from the source to treated water entering the distribution system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.1	16
3.1.2 Turbidity Levels and Associated Criteria					
a) Surface Water					
i.	Verify that filtration technologies are meeting specified turbidity limits to receive the assigned log removal credits outlined in Table C2 of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems by either Option 1 or Option 2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.1	18
ii.	Submit individual filter effluent turbidity values for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.1	18
iii.	Recommend corrective actions if the supply does not meet stipulated turbidity limits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.1	19

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
iv.	For Municipal Public Drinking Water Supplies with cartridge filters assigned log reduction credits for protozoa, provide the highest recorded individual filter differential pressure reading for each month of the most recent calendar year.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.1	-
v.	Review the standard operating procedures (SOPs) for the filtration process: <ul style="list-style-type: none"> • Have control limits been set to alarm and notify operators of issues related to the filtration process? • Have procedures been developed to remove a filter or membrane unit from service before turbidity or differential pressure (i.e., for cartridge filters assigned log reduction credits) exceeds stipulated values? • Have procedures been implemented and communicated to all operations staff? • Have procedures been documented in the operations manual? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.4	20
vi.	Inspect the filtration process to verify that continuous on-line turbidity measurements are taken and recorded for each individual filter at a minimum of once every five minutes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.5	20

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
vii.	Inspect the on-line turbidimeters: <ul style="list-style-type: none"> Do they have the required range and accuracy to measure turbidity levels? Are they in good working order? Do they have a maintenance and quality assurance/calibration program? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.5	20
viii.	Inspect the filtration process to verify that there are a minimum of two filters.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.6	20
ix.	Document if the maximum day flow can be met with the largest filter out of service. Note: If the facility is unable to meet maximum day flows with the largest filter out of service, improvements to meet the Treatment Standards may be deferred to a future expansion provided SOPs are in place to minimize filter rate changes and spikes in turbidity which can result in filter breakthrough.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2.6	20
x.	Make recommendations to address any concerns identified by the review of the filtration SOPs, inspection of on-line turbidimeters, and filter redundancy.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.2	19

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
b) GUDI Wells					
i.	Verify that natural filtration is achieving specified turbidity limits to receive the assigned log removal credits outlined in Table C2 of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems by either Option 1 or Option 2.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19
ii.	Submit individual GUDI well turbidity values for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19
iii.	For GUDI wells that do not meet stipulated turbidity limits, contact the Department to determine what requirements shall apply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19
iv.	Inspect the site(s) to verify that continuous on-line turbidity measurements are taken for each individual GUDI wellhead at a minimum of once every five minutes.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19
v.	Inspect the on-line turbidimeters: <ul style="list-style-type: none"> Do they have the required range and accuracy to measure turbidity levels? Are they in good working order? Do they have a maintenance and quality assurance/calibration program? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19
vi.	Make recommendations to address any concerns identified by the inspection of the on-line turbidimeters.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.2	19

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
c) Non-GUDI Wells					
i.	Summarize turbidity levels in non-GUDI wells by either Option 1 or Option 2.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
ii.	Note if measurements are by daily grab samples or continuous on-line turbidimeters.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
iii.	Submit non-GUDI system turbidity for individual wells or combined flow for the most recent calendar year by month (Option 1) or by the time interval graphed (Option 2).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
iv.	For non-GUDI wells that do not meet stipulated turbidity limits, contact the Department to determine what requirements shall apply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
v.	Where continuous measurements are taken, inspect the on-line turbidimeters: <ul style="list-style-type: none"> Do they have the required range and accuracy to measure turbidity levels? Are they in good working order? Do they have a maintenance and quality assurance/calibration program? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
vi.	Where grab samples are taken, inspect the monitoring equipment, SOPs, maintenance, and quality assurance/calibration program to ensure equipment is in good working order and measurements are appropriate.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19
vii.	Make recommendations to address any concerns identified by the inspection of on-line turbidimeters or grab sample protocols.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.2.3	19

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
3.1.3 Membrane Filtration – Additional Requirements					
i.	Complete Table B.1 to verify that each individual membrane treatment unit that is used for pathogen reduction credits is free of any integrity breaches and determine its log removal value using pressure-based testing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.A	App.A
ii.	Make recommendations to address any concerns identified.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.3	22
iii.	For Municipal Public Drinking Water Supplies with integrated membrane systems, summarize the process used to verify the rejection rate remains adequate for organics removal.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.3	22
iv.	Make recommendations to address any concerns identified.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.3	22
3.1.4 Primary Disinfection					
i.	Document how many inactivation log credits are required by the disinfection process for each target microorganism (e.g., protozoa and/or viruses).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4	23
ii.	Discuss how disinfection is achieved (e.g., chemical disinfectants, UV or both).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	23

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
a) Chemical Disinfection (CT Concept)					
i.	Where chemical disinfectants are used, provide a schematic of the primary disinfection process including, but not limited to: <ul style="list-style-type: none"> Tank(s) dimensions. Baffling configuration and assumed baffling factor. Water level operating range, highlighting the low level. Disinfection type (e.g., free chlorine, chlorine dioxide, ozone). Minimum disinfectant concentration at the CT control point. Minimum water temperature. Maximum pH of the water for free chlorine or optimum pH for chlorine dioxide or ozone. Maximum flow and minimum retention time - if the tank used to achieve CT is subject to water level fluctuations, verify if the inflow/outflow represents the maximum flow condition. 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	23
ii.	Calculate the design CT.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	24
iii.	Verify that operational conditions remained within the design range for achieving CT at all times during the most recent calendar year.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	24
iv.	Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that CT was calculated during every such event.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.4.1	24
v.	Make recommendations to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.4.1	24
b) UV Disinfection (IT Concept)					

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
i.	Where UV disinfection is used, provide a schematic of the primary disinfection process including, but not limited to: <ul style="list-style-type: none"> • Unit manufacturer and model. • Validation standard. • Maximum flow. • Minimum intensity at the end of lamp life. • Minimum transmittance at the end of lamp life. • Correction for water temperature. • Maximum concentrations for water quality parameters that promote fouling (e.g., iron, manganese, hardness). • Sleeve cleaning method. 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.2	24
ii.	Verify that the unit has been designed to deliver a UV dose of 40 mJ/cm ² or Department accepted alternate dose. Specify the alternate dose, if applicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.2	24

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
iii.	Verify that the following conditions were met at all times during the most recent calendar year: <ul style="list-style-type: none"> Was the intensity above the minimum required? Was the flow below the maximum allowed? Was the transmittance above the minimum required? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.2	24
iv.	Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that IT was calculated during every such event.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.4.2	24
v.	Provide recommendations to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.4.2	24
c) Redundancy, Continuous Monitoring and Alerting					
i.	Inspect the primary disinfection process to verify the following: <ul style="list-style-type: none"> Are there a minimum of two primary disinfection units? Are the primary disinfection units sized to meet maximum day demand with one unit out of service? Is on-line monitoring of the primary disinfection process in place with measurements taken and recorded at least once every five minutes? Have control limits been set to alarm and notify operators that the primary disinfection process is not working properly? Are protocols in place to prevent inadequately disinfected water from entering the distribution system? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.3	25
ii.	Inspect the on-line instrumentation: <ul style="list-style-type: none"> Do they have the required range and accuracy to measure chlorine concentrations? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.3	25

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
<ul style="list-style-type: none"> Are they in good working order? Do they have a maintenance and quality assurance/calibration program? 				
iii. Provide recommendations to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.4.3	25
d) Standard Operating Procedures				
i. Review the standard operating procedures for the disinfection process: <ul style="list-style-type: none"> Do they specify the design ranges for achieving CT (e.g., temperature, disinfectant residual, flow, pH) or IT (e.g., intensity, flow, transmittance)? Do they include notification and response procedures when operational conditions are outside CT or IT design ranges? Do they include procedures to ensure the disinfection process is working properly? Do they include response procedures when the disinfection process is not working properly? Have they been implemented and communicated to all operations staff? Have they been documented in the operations manual? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.4	25
ii. Provide recommendations to address any concerns identified.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.4	25
3.1.5 Secondary Disinfection				
i. Describe the secondary disinfection process.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.5	26
ii. Inspect the secondary disinfection process to verify the following:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.5	26

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
<ul style="list-style-type: none"> Are on-line continuous chlorine residual monitors in place to measure chlorine residual entering the distribution system at least once every five minutes? Are the on-line chlorine residual monitors in good working order? Is there a maintenance and quality assurance/calibration program in place? 					
iii.	Where free chlorine is used for both primary and secondary disinfection, refer to Section 3.1.4 and note if the chlorine dose is controlled by CT (primary disinfection) or distribution system residual maintenance (secondary disinfection).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.5	26
iv.	Where UV light is used for primary disinfection to receive protozoa inactivation credits, calculate the design CT for virus inactivation credits.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	26
v.	Where UV light is used for primary disinfection to receive protozoa inactivation credits, verify that operational conditions remained within the design range for achieving CT for virus inactivation at all times during the most recent calendar year.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.4.1	26

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
vi.	Where operational conditions went outside the design range, identify the cause, document the corrective actions taken and verify that CT was calculated during every such event.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.5	26
vii.	Provide recommendations to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.5	26
3.1.6 Other Critical Processes					
i.	Evaluate and inspect other critical processes against established standards and guidelines.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.6	26
ii.	Recommend corrective actions where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.6	26
3.1.7 Waste Streams					
a) Filter-to-Waste					
i.	Describe the filter-to-waste process.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.7.1	26
ii.	For chemically assisted filtration, verify that turbidity is less than or equal to 0.2 NTU before returning a filter to service.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.1	26
iii.	Identify recommendations, if necessary, to meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.7.1	26
b) Filter Backwash Water – Discharge Into A Freshwater Watercourse					
i.	Summarize treatment of the filter backwash water, if applicable, and identify the watercourse it is discharging into.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.2	-
ii.	Identify any discharge criteria specified in the Approval to Operate.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.2	-

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
iii.	Complete Table B.2. <ul style="list-style-type: none"> Does sampling meet the minimum requirements as outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems? Does effluent quality meet the discharge criteria stipulated in the Approval to Operate? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.2	-
iv.	If the water quality does not meet the discharge criteria stipulated in the Approval to Operate or if there are no discharge criteria stipulated in the Approval to Operate, identify recommendations to meet the requirements specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.2	-
v.	Recommend corrective actions where necessary to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.2	-

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
c) Filter Backwash Water – Discharge To Land Or Soil					
i.	Summarize treatment of the filter backwash water, if applicable, and identify the location of discharge.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
ii.	Identify whether the municipal public drinking water supply has a Discharge Management Plan in accordance with Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
iii.	Identify the effluent discharge criteria specified in the Approval to Operate, or the Department accepted Discharge Management Plan.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
iv.	Complete Table B.3. <ul style="list-style-type: none"> Does effluent quality meet the discharge criteria stipulated in the Approval to Operate, or the Department accepted Discharge Management Plan? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
v.	If the water quality does not meet the discharge criteria stipulated in the Approval to Operate, or the Department accepted Discharge Management Plan, identify recommendations to meet the minimum requirements for a plan specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
vi.	Identify operational, maintenance, and monitoring procedures in the Discharge Management Plan that do not meet the minimum requirements for a plan as specified in Part V – Management of Waste Streams of the Nova Scotia Treatment Standards for Municipal Drinking Water Systems, as amended from time to time.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-
vii.	Recommend corrective actions where necessary to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.3	-

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
d) Filter Backwash Water – Discharge To A Marine Or Brackish Environment					
i.	Summarize treatment of the filter backwash water, if applicable, and identify the watercourse it is discharging into.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.4	-
ii.	Identify any discharge criteria specified in the Approval to Operate.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.4	-
iii.	Complete Table B.4. <ul style="list-style-type: none"> Does effluent quality meet the discharge criteria stipulated in the Approval to Operate? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.4	-
iv.	Recommend corrective actions where necessary to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.4	-
e) Other Waste Streams					
i.	Review other waste streams and verify that they are being managed appropriately.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.1.7.5	27
ii.	Provide recommendations to address any concerns identified.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.1.7.5	27

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
3.2 Distribution Water Quality					
3.2.1 Chlorine Residual Levels					
i.	Review distribution system chlorine residuals for the most recent calendar year available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.1	27
ii.	Recommend corrective actions where residuals are routinely less than 0.20 mg/L or 0.40 mg/L (depending on the concentration specified in the Municipal Public Drinking Water Supply's Approval to Operate) where free chlorine is used (or less than 1.0 mg/L combined chlorine for chloraminated systems).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.1	27
iii.	Inspect all distribution water storage tanks to verify that on-line continuous chlorine residual monitors are in place to measure chlorine residual at the storage tank outlet at least once every five minutes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.1	27
iv.	Inspect the on-line chlorine residual monitors to ensure that they are in good working order and that a maintenance and quality assurance/calibration program is in place.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.1	27
v.	Recommend corrective actions where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.1	27

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
3.2.2 Microbiological Water Quality					
i.	Review total coliforms and E. coli results for the most recent calendar year available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.2	27
ii.	Discuss any presence of bacteria in the distribution system and identify recommendations where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.2	27
iii.	Verify that sampling locations and frequencies meet the requirements of the Guidelines for Monitoring Public Drinking Water Supplies Part I, including any re-sampling required after the presence of bacteria is detected.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.2	27
iv.	Identify sampling locations on a map of the distribution system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	App.C	App.C
v.	Recommend sampling location/frequency changes if necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.2	27

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
3.2.3 Turbidity					
i.	Review distribution system turbidity results for the most recent calendar year available.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.3	28
ii.	Verify that a protocol exists for investigating the cause of turbidity values above 5 NTU.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.3	28
iii.	Discuss any values above 5 NTU and identify recommendations identified where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.3	28

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.2.4 Cross Connection Control Program				
i. Review the cross connection control program. <ul style="list-style-type: none"> Does it meet the minimum requirements as outlined in A Guide to Assist Nova Scotia Municipal Water Works Develop a Cross Connection Control Program, as amended from time to time. Are implementation timelines being met in accordance with the accepted plan? Provide an update on the status of the Cross Connection Control Program, including any modifications to the plan or implementation schedule, and a summary of the activities taken to achieve the goals and objectives of the program. 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.2.4	28
ii. Provide recommend where necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.4	28
3.2.5 Other Distribution System Monitoring/Programs				
i. Review any other distribution system monitoring or programs that are in place to deal with threats to distribution system integrity, including but not limited to infrastructure age, watermain breaks, leak detection, pressure transients, etc.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.5	
ii. Provide recommendations where necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2.5	

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
3.3 Site Inspection				
i. Conduct a site inspection to evaluate treatment processes, as well as other facilities and equipment as per the requirements outlined in section 3.3 of the Terms of Reference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.3	28
3.4 Conclusions and Recommendations				
i. Refer to section 3.4 of the Terms of Reference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		29

PART IV

Operations, Monitoring and Management

4.0 Review of Operations, Maintenance, Monitoring and Management

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
4.1 Operations and Maintenance				
i. Review the comprehensive operations manual: <ul style="list-style-type: none"> Does one exist? Is it current and up to date? Does it include SOPs, emergency notification procedures and contingency plans? Is it available on site or an alternate location accepted by the Department? Are operations staff aware of its contents? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.1	32
ii. Evaluate the procedures an operator follows to identify any problem(s) with the water treatment and distribution process, determine the changes needed to correct the problem(s) and how adjustments to the processes are approved and performed as needed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.1	32
iii. Verify that a maintenance program exists and is adequate to ensure the long-term viability of the Municipal Public Drinking Water Supply, including distribution system components.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.1	32
iv. Identify recommendations where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.1	32
4.2 Monitoring and Reporting				

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
i.	Review the annual monitoring program to: <ul style="list-style-type: none"> Does one exist? Is it current and up to date? Does it meet the minimum requirements as outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems and A Guide to Assist Nova Scotia Municipal Water Works Prepare Annual Sampling Plans? Are operations staff aware of its contents? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.2	32
ii.	Identify the laboratories being used for water quality analyses.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.2	35
iii.	Verify that the Municipal Public Drinking Water Supply is operating in accordance with the Policy on Acceptable Certification of Laboratories.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.2	35
iv.	Review reporting requirements and verify that the Approval Holder has complied with the immediate, annual and ad hoc reporting requirements outlined in the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.2	35
v.	Review the most recent annual report and identify any concerns in the System Assessment Report.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.2.1	35
vi.	Identify recommendations where necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/>		35

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
4.3 Management					
i.	Review the number of certified operators and back-up personnel to verify that the municipal public drinking water supply is operating in accordance with Part I of the Water and Wastewater Facilities and Public Drinking Water Supplies Regulations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.3	35
ii.	Complete Table C.1 to identify the operator(s) in overall direct responsible charge (ODRC) and summarize what protocols are in place during the absence of the operator(s) in ODRC. Note: The ODRC operator(s) must sign Table C.1.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.3	35
iii.	Review the water quality goals that the Municipal Public Drinking Water Supply has and evaluate their plan(s) to accomplish or maintain these goals.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.3	35
iv.	Identify recommendations where necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.3	35
4.4 Conclusions and Recommendations					
i.	Refer to section 4.4. of the Terms of Reference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.4	36

PART V

REPORT SUBMISSION

5.0 Ability to Comply

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.		Yes	N/A	Section	Page #
5.1 Summary					
i.	Summarize conclusions and identify all recommendations necessary to meet the Nova Scotia Treatment Standards for Municipal Drinking Water Systems.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.1	37
ii.	Include preliminary cost estimates and an implementation schedule to address the above requirements. Costs shall be presented and prioritized with respect to public health risks. Note: If the corrective action plan submitted to the Department varies from the risk-based approach documented in the System Assessment Report, written justification shall be included in the corrective action plan for varying the priority.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.1	39
iii.	Highlight any obvious problems associated with the Municipal Public Drinking Water Supply that jeopardize treated water quality to the point that it no longer meets the health protection standards adopted by the Department.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.1	37

Confirm all applicable information has been submitted to the Department. Indicate the section and page number where the information is documented.	Yes	N/A	Section	Page #
5.2 Report Preparation				
i. Submit three (3) copies of the System Assessment Report to the Department and include a copy of this completed checklist.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.2	39
ii. Engineer's Declaration (refer to section 1.4 of the Terms of Reference)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5.2	39



Solutions today | Tomorrow  mind

   
www.CBCL.ca

Municipal Joint Services Board

131 North St, PO Box 209, Bridgewater, NS B4V 2W8

Phone: (902) 543-2991 Fax: (902) 530-5189

A Joint Services Board



To: Municipal Joint Services Board

From: Lesley McFarlane, COO

Date: 28 June 2023

Subject: Review of MJSB Agreement

Decision []

Direction []

Information [X]

Background

Originally signed in 2013, the MJSB agreement was reviewed, amended and renewed by the three partner municipalities in October 2018. Under the terms of the agreement, Section 25.a, the agreement is subject to a formal review every four years. The annual MJSB business plan approved by the Board on March 2, 2023, included a review of the MJSB agreement. The business plan included a commitment to deliver a workplan for the agreement review by end of Q1, in consultation with partner CAO's.

Discussion

In consultation between MJSB and the partner CAO's, a workplan has been developed to complete the agreement review by June 2024. The review will be conducted in house by MJSB staff, in collaboration with the three CAO's and their delegates. The scope of the review will include the main body of the agreement as well as the three Schedules that define each of the Waste Management, Human Resources, and Information Technology Shared Services.

CAO's will consult with respective Councils to confirm changes requested to the agreement.

In November 2023, Board approval-in-principle will be requested for a summary of the proposed changes. Subject to legal review and any other changes, a final revised version of the agreement will be presented to the Board for approval by May 2024. Councils' approvals will be requested by June 2024.

Financial Implications

There are no immediate financial implications expected based upon the review of the MJSB agreement; this will be confirmed through the review process.

Municipal Joint Services Board

131 North St, PO Box 209, Bridgewater, NS B4V 2W8

Phone: (902) 543-2991 Fax: (902) 530-5189

A Joint Services Board



To: Municipal Joint Services Board Chair & Members

From: Lesley McFarlane – COO, MJSB

Date: September 28, 2022

Subject: MJSB Agreement Review

Decision [X]

Direction []

Information []

Recommendation

Direct the CAO's and COO to propose to the Board a process for a formal review of the MJSB agreement, that the Board would present to their respective Councils for approval. The process would be informed by that used to complete the 2018 review.

Background

Originally signed in 2013, the MJSB agreement was reviewed, amended and renewed by signature of the Mayors of each of the three partner municipalities in October 2018. Under the terms of the agreement, Section 25.a, the agreement is subject to a formal review every four years.

Discussion

The formal review provides an opportunity to reflect on how the agreement has served the partners, and identify whether any changes are required. Under the terms of the agreement, the purpose of the review is not to evaluate the operation of the MJSB, nor to review the schedules or services delivery of existing services.

Revisions made in the prior review included:

- Clarifying that the purpose of the MJSB is not to achieve the amalgamation of partnering municipalities into a single municipal unit
- Clarifying that there is a separate schedule for each service provided
- Providing greater flexibility for appointment of Board members
- Clarifying the importance of balancing the desire to expand shared services, with the complex relationship between the partners and the Board to create and manage successful shared services
- Removed reference to attracting economic development as an objective of the Board
- Clarified that the COO fulfills the role of the CAO for the organization, as outlined in the MGA
- Clarified process for exploration and development of new shared services
- Clarified that quarterly billing adjustment reports by service would be provided to the partners, reflecting the extent of use of each service and variance from budget
- Added a review of each service once every four years to assess the extent to which the shared service is meeting its objective(s)
- Implemented a dispute resolution mechanism

The review took place over a period of nearly two years. Given this was the first review of the agreement, the process was not defined in advance and evolved throughout the review. The process followed these general steps:

- Each council met individually to identify any issues
- Issues were summarized by CAO's
- A joint session was held by Councils to identify common items and differences
- CAO's prepared an issue report for partner Councils
 - o This collaborative process resulted in a jointly agreed-upon list of proposed changes
- Councils individually reviewed and discussed the proposed list
- Once authorized by all three partner Councils, a legal review was conducted and the text amendments were prepared for final authorization

This second review of the agreement can benefit from learnings of the 2017-2018 review, and should therefore be able to be completed in a shorter duration.

Financial Implications

There are no immediate financial implications expected from the formal review of the MJSB Agreement.

THIS AGREEMENT is made this , 2018.

AMONG: THE MUNICIPALITY OF THE DISTRICT OF LUNENBURG
(hereafter "MODL")

and

THE TOWN OF BRIDGEWATER
(hereafter "TOB")

and

THE TOWN OF MAHONE BAY
(hereafter "TOM B")

The parties to this agreement are each responsible for the provision of municipal services. They are entering into this agreement to establish a mechanism to allow them to act jointly in the provision of municipal services, and to report to Councils regularly on progress towards greater sharing of services.

Notwithstanding the above, it should be noted that the purpose of the Board established herein is not to achieve the amalgamation of the municipal unit parties into a single municipal unit. The parties hereto acknowledge that pursuit of shared services to increase capacity and/or efficiency is a valuable pursuit in and of itself, and nothing in this agreement should be construed as either encouraging or discouraging amalgamation.

Definitions

1.

- (a) "Act" means Municipal Government Act, S.N.S, as amended;
- (b) "Parties" means collectively the Town of Mahone Bay, Town of Bridgewater and the Municipality of the District of Lunenburg;
- (c) "Shared Municipal Services" means those municipal services provided by the Joint Services Board and as defined in the numbered Schedules of this Agreement

Establishment of Authority

- 2. Pursuant to Section 60 of the Act, the parties have established a Joint Services Board to provide shared municipal services to the parties and their residents, to be known as the "Municipal Joint Services Board, Lunenburg Region" (hereinafter referred to as the "Joint Services Board" and/or the "Board").

Body Corporate

3. The Joint Services Board, also herein referred to as the "Board", is a body corporate pursuant to the provisions of Section 60 of the Act with the corporate powers set out in this agreement.

Members

4. (1) The members of the Joint Services Board are the parties.
- (2) Additional member municipalities may join the Joint Services Board by amendment to this agreement consented to by the Council of each of the parties.

Joint Services Board

5. (1) The Joint Services Board shall be governed by a Board of Directors, which shall consist of:

3 members and an alternate, appointed by the Town of Bridgewater
3 members and an alternate appointed by the Town of Mahone Bay
3 members and an alternate appointed by the Municipality of the District of Lunenburg
- (2) Each participating municipality shall appoint members (who may, but need not, be members of the council) to be that municipality's voting Directors on the Board.
 - a) Directors shall be appointed to the Board for a term as set by each participating/appointing municipality with said term not to be less than one year and not more than four years.
 - b) Any director appointed by a municipal council serves at the pleasure of that Council and may be replaced by the council at any time.
 - c) Notwithstanding the foregoing, in the event of any vacancy that occurs with respect to a Director, the Council appointing such member shall appoint a replacement within six weeks after receipt of notice of vacancy from the Board.
- (3) A quorum of the Board shall be a majority of its serving Directors
- (4) No Director shall vote on any question relating to the provision of services which his or her Municipality is not receiving, subject to the proviso that the delivery of such services may impact the Shared Services Authority's ability to deliver other services, or that such question may or will impact that Director's Municipality, in which case the Director shall notify the Board of his or her intention to participate in the vote, state the reasons behind such intention , after which the Director shall be permitted to vote on such question or questions.

Objects of the Board

6. The prime objective of the Board is to administer on behalf of the participating municipality the joint services assigned to the Board as per each schedule attached to the agreement. The object of the Board is also to identify opportunities for increased sharing of services among the partner municipalities, and at the request of the partners, develop joint service agreements with the partners, and operate the services as agreed.
 - To make the most out of every municipal tax dollar raised;
 - To create a more sustainable local government organization;

- (1) Services to be shared through the Board will be established through individual schedules to this Agreement, which will outline the service requirements, reporting, and financial conditions of the transfer of assets and liabilities from the partner municipal units.
- (2) The Board will communicate regularly with the partner councils on its progress in identifying shared services, on its operating performance and future plans.
- (3) The Board will liaise with other organizations as required to further the shared services goals.
- (4) The Board may enter into agreements with other organizations to provide municipal services transferred to it through this agreement.

Area of Jurisdiction

7. The jurisdiction of the Board is the geographic area of the parties, and the Board may also, by contract, provide services in additional municipalities.

Chief Operating Officer

8. (1) The Board of Directors shall appoint a Chief Operating Officer to manage the operations of the Board. The Board of Directors shall provide directions for an annual performance assessment of the Chief Operating Officer.

(2) Notwithstanding subsection 8(1), the Board may appoint an alternate position(s) in lieu of a Chief Operating Officer to manage the specified operations of the Board. The Board of Directors shall provide directions for an annual performance assessment of this alternate position(s).

(3) The Chief Operating Officer, or alternate, shall report directly and be accountable to the Board of Directors, through the Chair.

(4) The parties agree that the Board shall adopt the Chief Administrative Officer model of governance in compliance with Sections 28 to 31 of the Act for the Chief Operating Officer's role.

(5) Not less than annually, the Chief Operating Officer shall meet with each Chief Administrative Officer, or alternate, of the parties to assess overall service delivery in the preceding 12 months and to plan for the anticipated needs, costs, and delivery of services for the ensuing 12 months and beyond.

Annual Business Plan

9. (1) The Chief Operating Officer, or alternate, shall be responsible to present to the Board and the Board shall in each year adopt an annual business plan for the coming fiscal year and a long-range business plan, each of which are subject to the approval of the Councils. The annual business plan and the long range business plan shall promote improvement and efficiency in service delivery, asset management and cost allocation, based upon generally accepted best practices, Municipal Financial Indicators and benchmarks.

(2) Subsections 10(2), 10(3) and 10(5) apply to the annual business plan and the longrange business plan. Further to these requirements, and not less than 45 days in advance of presentation to the Board, the Chief Operating Officer, or alternate, shall confer with the Chief

Administrative Officer of each party, with respects to both requested future levels of service to be provided and with respect to the estimated budgetary consequences arising therefrom.

Operating Budget

10. (1) Following the consultation process required in subsection 9(2) the Chief Operating Officer, or alternate, shall prepare a recommended operating budget in accordance with the best available financial information, prepared in accordance with the applicable accounting standards. Such budget shall contain the recommended operating expenditures required to provide the services provided for in this Agreement.
- (2) The Annual Operating Budget, after approval by the Board, is subject to the approval of the Councils.
- (3) Councils are deemed to have approved the annual operating budget pursuant to this section where at least two parties (or a majority if there are more than three parties) representing at least 51% of the municipal operating contributions have approved the budget. (Reference may be made to Section 19 for an explanation of Operating Contributions).
- (4) The Annual Operating Budget shall be submitted by the Board to the Chief Administrative Officer of each party on or before January 15 in the fiscal year preceding the fiscal year for which it is to have effect. Pending Budget Approval pursuant to subsection 10(3) the Board shall not expend funds in excess of the prior year's budget on a monthly pro rata basis.
- (5) If a party fails to approve the Annual Operating Budget but does not notify the Board that it has refused to approve the Annual Operating Budget within sixty days after it was received, that party is deemed to have approved the Annual Operating Budget as submitted.
- (6) If the Annual Operating Budget is not approved at the start of a fiscal year, the Board may borrow to cover the operating costs of the Board for the budget approved by the Board, provided that the amount so borrowed does not exceed fifty per cent of the gross operating revenue of the Board for the preceding fiscal year.
- (7) Any surplus or deficit from a prior year is to be included in the operating budget for the subsequent fiscal year. For greater certainty, parties will not be required to make separate payments to the Board to cover their share of any deficit, nor are they entitled to a distribution of any surplus.

Supplementary Budgets

11. (1) The Board may not expend money in excess of that budgeted in the Annual Operating Budget and any supplementary budget.
- (2) The Board may from time to time adopt supplementary budgets with respect to expenditures not included in the annual operating budget provided that the total of all such supplementary budgets does not exceed \$100,000 and is required to provide the services provided for in this Agreement.

- (3) The Board may, with the approval of the Councils, adopt a supplementary budget for expenditures that exceed \$100,000.
- (4) Councils are deemed to have approved a supplementary budget pursuant to this section where at least two parties (or a majority if there are more than three parties) representing at least 51% of the municipal operating contributions have approved the supplementary budget.

Annual Capital Budget

12. (1) Following the consultation process required in subsection 9(2) the Chief Operating Officer, or alternate, shall prepare and recommend a capital budget in accordance with the best available financial information, prepared in accordance with accepted accounting standards. Such budget shall include all proposed expenditures and funding sources, required to provide the services provided for in this Agreement.
- (2) The Annual Capital Budget, after approval by the Board, is subject to the approval of the Councils.
- (3) Subsections 10(2), 10(3) and 10(5) apply to the Annual Capital Budget.
- (4) The Board shall be responsible for any capital borrowing required to implement the Annual Capital Budget.
- (5) The Council of each party undertakes to guarantee any capital borrowings required to implement the Annual Capital Budget, with each unit guaranteeing an amount equal to their units percentage of the total municipal unit's contribution to the capital budget.
- (6) The Annual Capital Budget shall be submitted by the Board to the Chief Administrative Officer of each party on or before January 15 in the fiscal year preceding the fiscal year for which it is to have effect.

Five-year Capital Plan

13. (1) Following the consultation process required in subsection 9(2) the Chief Operating Officer, or alternate, shall, in each year, present to the Board and the Board shall adopt a FiveYear Capital Plan, subject to the approval of the councils.

- (2) Subsections 10(2), 10(3) and 10(5) apply to the Five-year Capital Plan.

13(A) Addition of Services:

- 1) In accordance with the objects of the Board, the goal of the Board is to work to outline and explore new opportunities for shared services.
- 2) Recommendations on potential services to consider may originate from the Board or one of the partner Councils.
- 3) A proposal to evaluate a new shared service must be approved by at least two parties (or a majority if there are more than three parties) prior to beginning a review. Any professional service provider costs associated with the review to be payable to third parties must be borne solely by the party Council(s) undertaking the review, with each party Council's operating contributions to the Board to be used as a guide in determining the proportionate costs of each party Council,

although the party Councils may negotiate among themselves to contribute in any other proportion.

- 4) The review proposal to partners must include:
 - a. The activities and authorities to be considered;
 - b. Related policy or strategic decisions that will remain with partner Councils;
 - c. The benefit hoped to be achieved by entering into a shared service arrangement; and
 - d. An estimated cost to complete the evaluation.
- 5) An evaluation shall consider different service delivery models, for example:
 - a. Provision of the service by the Board;
 - b. Joint contracting with a 3rd party for provision of the service; or
 - c. Provision of service by one of the partners.
- 6) If, after completing an evaluation, the Board is supportive of creating a new shared service, the Board may provide a recommendation to partner Councils which shall include:
 - a. a service delivery model;
 - b. the base level of service proposed to be provided partners, as well as any additional services that may be provided to individual units;
 - c. A proposed cost model for the service;
- 7) Each partner shall have the opportunity to consider the proposed shared service arrangement and come to a decision based on the best interests of the each respective partner municipality.

13(B) For greater clarity, Section 13(A) does not exclude any of the participating units from exploring other service sharing arrangements outside of this agreement.

Contracting

14. (1) The Board may contract with other municipalities to provide municipal services to them or to utilize their services, facilities or expertise.
- (2) The Board may contract with municipal units that are parties to this Agreement to provide additional services to them or to utilize their facilities or expertise.
- (3) The Board may contract with other persons to provide services to them or to obtain services from them, either on or off the Board's sites, and whether the service is expressly one of the Board's objectives pursuant to Section 6 or otherwise.
- (4) When the Board contracts with a municipality or other person to provide a service or an addition to service, the contract must not impose any additional net cost on the Board and/or parties to this Agreement.
- (5) Notwithstanding subsection (4), the Board may absorb part of the cost of the service with the approval of the Councils of the parties to this Agreement
- (6) Councils are deemed to have approved any matter pursuant to subsection (5)

where at least two parties (or a majority if there are more than three parties) representing at least 51% of the total municipal operating contributions have approved the matter.

Disposal of Assets

15. (1) The Board may dispose of any of its assets but the disposal of any asset valued at over \$100,000 is subject to the approval of the Councils.
- (2) Councils are deemed to have approved any disposition pursuant to this section where at least two parties (or a majority if there are more than three parties) representing at least 51% of the municipal operating contributions have approved the disposition.

Fiscal Year

16. The fiscal year of the Board is the fiscal year of a municipality.

Powers

17. (1) The Board has, for the purpose of carrying out its responsibilities pursuant to this agreement,
- (a) the exclusive authority to manage, operate and maintain any facility operated by it (whether owned by it or not) within the approved budgets; (b) the authority to enter into contracts authorized by this agreement;
 - (c) the authority to generate revenue by charging for the services provided by the Board, including the establishment of fees of all kinds;
 - (d) the ability to establish:
 - (i) rules and procedures governing meetings of the Board;
 - (ii) internal policies respecting the operation and management of the Board including signing officers and auditors;
 - (iii) internal policies respecting conditions of employment, purchasing policies, disposal of assets policies, records management and like matters;
 - (iv) generally all necessary rules, regulations and policies needed to achieve the objectives of the Board.
 - (e) the power to borrow pursuant to the provisions of the Municipal Government Act and with the approval of the council of each party for any capital borrowing;
 - (f) the power to establish operating and capital reserve funds;
 - (g) the power to make provision for the use of equipment, facilities and services;

- (h) the power to retain personnel;
- (i) the power to establish rates, charges and fees for services provided by the Board;
- (j) the power to hold, acquire and, subject to the terms of this agreement, dispose of real property;
- (k) the power to acquire assets, provided that the acquisition of any asset valued at over \$100,000 not included in the year's approved Annual Capital Budget requires the approval of the councils;
- (l) the power to dispose of assets as provided in this agreement;
- (m) the authority to apply for grants, rebates and other revenues that will reduce the net cost of the services provided;
- (n) commence and/or defend legal causes of action and/or any other legal thing or proceeding; and
- (o) such other powers as may be necessary or incidental to the achievement of its objectives.

(2) Councils are deemed to have approved any matter pursuant to clause (1) (k) where at least two parties (or a majority if there are more than three parties) representing at least 51% of the municipal operating contributions have approved the matter.

Financial and Performance Reporting

18. (1) The Board shall report on its operational performance and financial position to each of the parties at least monthly. In addition, the Board will provide quarterly billing adjustment reports by service to the partners that would reflect the extent of use of each service and variance from the budget.
- (2) The Board shall provide the parties with audited financial statements as soon after the end of its fiscal year as is feasible, and in no event later than September 1 in the subsequent fiscal year.
- (3) The Board shall provide the parties with unaudited financial statements as soon after the end of its fiscal year as possible, and in no event later than May 30 in the subsequent fiscal year.
- (4) Unless specified differently in the service schedule, each service shall be reviewed once every 4 years to assess the extent to which the shared service is meeting its objective(s).

Financing

19. (1) The Joint Services Board shall deliver the Shared Services to the Parties on a user pay/unit costs basis or an alternate basis and as more specifically defined in the Schedules hereto for each Joint Service provided.
- (2) All parties will pay their costs of the approved joint services budget on a monthly basis, in a manner that minimizes the need for short term borrowing by the Board for operating expenses.
- (3) User fees will generally be set at a level to recover the costs of the Board including overhead and debt charges.

Limitations

20. The Joint Services Board is bound by
- (a) the Municipal Government Act, including Part XX (freedom of information and protection of privacy);
 - (b) the Privacy Act (Canada);
 - (c) the agreement on interprovincial trade and applicable provincial government procurement policies; and
 - (d) any general municipal agreements to which all of the parties to this agreement have consented.

Alterations

21. This agreement may only be altered by agreement in writing approved by the Council of each party.

Termination

22. (1) The parties may, if approved by the Council of each party, terminate this agreement on such terms as to the distribution of the assets and liabilities of the Joint Services Board as may be agreed.
- (2) If the parties are unable to agree on the division of the assets and liabilities of the Joint Services Board, those assets, liabilities and future liabilities shall be divided according to the respective shares of each party in the equity of the Joint Services Board as determined by a Certified Business Valuator, as of the date of termination.
- (3) The share of a party in the equity of the Joint Services Board is determined by their proportional share of the costs of the services for which that unit has received as is evidenced in the Schedules to this Agreement.
- (4) In the event a party or parties cannot agree to the determination of the equity as provided for in subsection 22(3), the equity shall be as determined by a Certified Business Valuator, as of the date of termination.

Termination by One Party

Curtailment/Withdrawal of Shared Services by One Party

- 23 . (1) Subject to subsections 22(2), 23(3), 23(4), 23(5) and 23(6) a participating party is entitled to request a curtailment of or withdrawal from any Shared Service being provided to it by Shared Services Authority. The manner and timing of such curtailment or withdrawal shall be negotiated between the Municipality and the Board of Directors, following the analysis and recommendation of the Chief Operating Officer.
- (2) Any party may terminate its participation in this agreement by providing each of the other parties with notice to that effect, whereupon the party opting to withdraw must provide a minimum of five (5) years' notice of the effective date of that party's withdrawal in order to cease to be a party to this Agreement. Notwithstanding the foregoing, notice periods for Schedules to this Agreement subsequent to Schedule 1 may vary, and reference must be had to those particular Schedules.
- (3) A party that withdraws from this agreement or from a provision of a service is not entitled to receive any assets of the Joint Services Board without unanimous agreement of the remaining participating parties and shall be responsible for severance and other costs imposed by its withdrawal, and
- (4) A party continues to be liable after termination of its participation in this Agreement or from a provision of a service for its proportionate share, equal to its share as shown on the books of the Joint Services Board as of the termination date, of (a) any outstanding borrowings of the Joint Services Board;
- (b) any outstanding closure or clean-up costs with respect to facilities operated by the Joint Services Board in the provision of a service, whether closed or yet to be closed, excluding only any costs imposed by actions at the site after the withdrawal;
- (c) any termination costs for employees of the Joint Services Board made redundant because the party ceased to be a party to this agreement, or its withdrawal from a service; and
- (d) any liabilities of the Joint Services Board existing at the time of its withdrawal
- (5) A party that has terminated its participation in this agreement or withdraws from the provision of a service is not entitled to any share in the assets of the Joint Services Board.
- (6) A party that has terminated its participation in this agreement or from the provision of a service under this Agreement may be liable for future contributions to the Joint Services Board. Any such future contributions shall be ultimately determined by a competent mediator or arbitrator appointed by the Municipal Units.

Whole Agreement

24. This agreement, together with any amendments in writing, constitutes the whole agreement among the parties on this subject notwithstanding any other allegations or alleged agreements or undertakings.

Review

25. The parties agree to conduct a formal review of this agreement (a) every four years;
- and
- (b) whenever the membership changes, either by the agreed addition of a new party or by the dissolution, merger or termination of any party.
26. Should a municipality experience a service issue with a service outlined in a schedule to this agreement:
- 1) the Chief Administrative Officer shall put the concern in writing to the Chief Operating Officer.
 - 2) the Chief Operating Officer and Chief Administrative Officer will strive to resolve the matter within 60 calendar days.
 - 3) if the matter is not resolved the issue will be placed on the next Board meeting agenda following the 60-day period.
 - 4) After considering the matter, if the Board is not able to identify a resolution to the issue, notice of the unresolved matter will be given to the partner Council.
 - 5) The Council may initiate the dispute resolution process as identified in s. 27 of this agreement.

Dispute Resolution

27. (1) In the event the parties cannot agree on any matter not specified in this agreement or on the interpretation of this agreement, they agree to refer the matter of disagreement to a single arbitrator pursuant to the provisions of the Arbitration, and more particularly as follows:
- a) The single arbitrator shall be such as the parties may agree to on or before thirty (30) days from submission by either party of the dispute to arbitration; in default of agreement on or before the expiration of such thirty (30) day, then within ten (10) days thereafter each party shall appoint an arbitrator, and the two so chosen shall appoint a third arbitrator. If either party defaults in such appointment within the said ten (10) days, the arbitrator appointed by the other party shall act as sole arbitrator as if appointed by both parties.
 - b) The costs of such arbitration shall be born equally by the parties unless otherwise ordered by the arbitrator.

Governing Law

28. The law governing this agreement is the law of Nova Scotia.

DATED at Bridgewater, in the County of Lunenburg and Province of Nova Scotia, the day and year first above written.

IN THE PRESENCE OF:	)	THE MUNICIPALITY OF THE DISTRICT
	)	OF LUNENBURG
)	
	)	Per: _____
)	
)	
	)	Per: _____
)	
)	
	)	THE TOWN OF BRIDGEWATER
)	
	)	Per: _____
)	
)	
	)	Per: _____
)	
)	
	)	THE TOWN OF MAHONE BAY
)	
)	
	)	Per: _____
)	
)	
	)	Per: _____

SCHEDULE 1 - SOLID WASTE MANAGEMENT

1. Definitions

- (a) "Full Costs" means all costs associated with the provision of a service, including operating, capital, borrowing costs and principle payments, but does not include amortization (b) "Waste Disposal Agreement" means the Inter-Municipal Agreement executed on June

29, 2000 between the Municipality of the District of Lunenburg, the Town of Bridgewater, the Town of Mahone Bay and the Town of Lunenburg

- (c) "Waste Disposal Site" means approximately 160 acres of land at Whynott' s Settlement, Lunenburg County on which there are presently solid recovery and disposal systems, and septic waste treatment systems and which is more fully described in Schedule I-A, attached hereto.

2. General

The parties to the Board Agreement hereby agree through this Schedule to manage municipal solid waste resources and waste water resources at the Waste Disposal Site, and in particular to authorize the Board to:

- a operate, maintain and further develop an integrated solid waste resource management system for the parties which is environmentally sound, socially acceptable and financially feasible;
- (b) strive for the optimum balance between maximizing long term benefits with regard to waste-resource diversions from disposal and minimizing the capital and operating costs of implementing the solid waste resource management system; (c) strive for economic self-sufficiency;
- (d) maintain and improve programs aimed at waste reduction, reuse, recycling, composting, household hazardous waste, construction and demolition debris, and residential waste management that will achieve Provincial targets and that will comply with the disposal bans imposed by the Solid Waste Resource Management Regulations; make regulations establishing what waste may be disposed of, and where; (e) maintain the Solid Waste Collection System(s) for the parties;
- (f) exceed the Provincially mandated diversion targets where it is deemed environmentally, socially or financially beneficial to do so;
- (g) increase public awareness and participation in the solid waste management system;
- (h) ensure consultation with the public to ensure decisions made by the Authority are sensitive to the needs and desires of the population;

- (i) operate the solid waste resource management system in a financially responsible and equitable manner on behalf of the municipal partners; and (j) adopt a business model for the provision of services.

3. Financial

- (a) In formulating the operating budget, the Chief Operating Officer or alternate shall ensure that the full costs of the solid waste management service are recovered through user fees.
- (b) The Board may generate revenue by charging for the services provided by the Board, including the establishment of tipping or dumping or disposal fees and other fees of all kinds;
- (c) The Board will establish reserves for closure costs of any facility operated by the Board for which adequate closure funds are not otherwise provided.
- (d) Subject to subsection 19 (1) and 19(2) all parties will pay tipping fees for all curbside waste collected and brought to the site operated by the Board. Upon demonstration of the need of funds for cash flow, each party shall, at the commencement of a fiscal year, advance to the Board one-twelfth of each parties estimated contribution to the fiscal years operating budget. At the close of the fiscal year the Board shall reconcile the actual contribution for the advance payment to the estimated amount and invoice or refund the parties as appropriate.
- (e) All tipping fees will be set at a level sufficient to recover all of the costs of the Board related to waste management at the Waste Disposal Site, including overhead and debt charges.
- (f) Subject to subsection 19(1) Tipping fees for persons who are not parties to this agreement (including private collectors and ICI waste) shall be at least as high as those charged to the parties. Notwithstanding 3(f) a party or parties to this Agreement may choose to have a lower tipping fee for non-curbside waste generated within their respective unit(s), which shall be at no additional net costs to the Board.

4. Previous Agreement

- (a) The agreement among the parties entered into June 29, 2000 and referred to as the Waste Disposal Agreement, as from time to time amended, is terminated as of March 31, 2013, being the effective date of the commencement of operation pursuant to Schedule 1, clause 4(d)

- (b) Notwithstanding subsection (1), Section 4 of the Waste Disposal Agreement respecting ownership and disposition of the site, and Section 13 respecting site closure costs, continue in force.
- (c) Any vested interest held by a municipality shall not be paid out on the termination of the Waste Disposal Agreement, but shall be paid out on the termination of participation in this agreement pursuant to sections 21 or 22, notwithstanding the provisions of subsections 22 (2) and 22 (3).
- (d) The Joint Services Board shall, effective the first day of April 2013, (the "Effective Date") commence operation and maintenance of the lands, equipment, fixtures and facilities used in the provision of the solid waste management services
- (e) The Parties shall take such actions including without limitation, pass such resolutions of Council, issue such Notices, make such applications, and agree on the transfer of assets as may be required to dissolve the "Waste Disposal Agreement".

5. Assets and Liabilities

- (a) The Board shall assume all assets, including lands and fixtures thereon, on or before the effective date.
- (b) All obligations of the Parties established in the Waste Disposal Agreement shall continue unabated, except as otherwise specifically noted herein.
- (c) The Parties shall jointly and severally take such steps, execute such deeds or other documents, pass such resolutions and grant such consents as necessary or required to effect the transfer of assets to the Board.
- (d) Notwithstanding anything contained herein, the Parties, acknowledge and agree that the Board shall be a successor employer as contemplated in s. 31 and 32 of the Trade Union Act, R.S.N.S 1989, c.475 as amended, in relation to those employees who have rights under existing collective agreements, or who have certain rights under the Trade Union Act by virtue of having established a collective recognized under the Trade Union Act with rights to bargain on behalf of such employees.
- (e) Furthermore, the Parties acknowledge and agree that employees not covered by the preceding paragraph shall be deemed to be serving the Board with the continuity of their employment unbroken from the precedecessory employer as contemplated in s. 12 of the Labour Standards Code R.S.N.S. 1989, c. 246, as amended.

MBDFD Ariel Devise Proposal

Mahone Bay & District Fire Department would like to propose we purchase a used 2009 ariel devise, which would provide the fire service area with this much needed piece of equipment as well as proived a much safer work environment for our firefighters when working at heights.

We would suggest that we would sell our current 2009 1500 gpm pumper that carries 500 gallons of water with a 2008 Trex Ariel ladder truck that carries 250 gallons of water with a 2000 gpm pump.



Proposed Truck



Current Truck

Advantages

- Will provide safe work platform for firefighters at heights
- Provide HIGHLY advantages rescue capabilities in fire and rescue related situations
 - Below grade rescue capabilities
- Much needed firefighting capabilities needed for our large buildings such as the churches and the new nursing home and other tall buildings in our area.

Expenses

- Asking purchase price 399 000\$ American Dollars(negotiable)
 - Estimated 7000\$ to do fully certified inspection
 - 15 000\$ estimated in upgrades we may need and decals
- Any repairs are unestimated but would have number value when inspection was completed.
- Yearly expense 5-7k for inspections , specialized techs come once a year to inspect ladder cost is estimated as partial cost shared with DND for their inspections of the same ladder

Incomes

- Sell Truck 1 value given my Rocky Mountain Phoenix 300 000\$
- We have been doing a lot of fund raising efforts to help with department expenses
 - Been selling surplus equipment helping build reserve

- Possible donations from Mcleod group?

Report of the Clerk to Council

A Public Hearing was held on September 12, 2023 to receive verbal and written submissions regarding the Town of Mahone Bay draft Fire Services Bylaw.

2 members of the public were in attendance

4 members of the public in attendance virtually

3 members of the public presented comments to the Hearing

0 written submissions were received prior to the hearing

0 written submissions were received at the hearing

The hearing adjourned at 6:50 p.m.

Respectfully submitted,

A handwritten signature in blue ink that reads "Kelly Redden".

Kelly Redden

Town Clerk



To: Mahone Bay Town Council

From: Mahone Bay Tourism and Chamber of Commerce (MBTCC)

Re: Completion of First Nation's Memorial Garden at the Visitor Information Centre

In the Spring of 2023, the MBTCC completed a memorial garden to commemorate the VIC site as a traditional stopping place for Mi'kmaq people. The garden is a semicircular stone design to the right of the VIC building and is planted with traditional plants used by Mi'kmaq people in their daily lives. The garden is thriving.

In thinking about a centre piece for the garden, a Committee composed of representatives of the Town Council (Suzanne Lohnes-Croft), the Acadia First Nation (Natteal Batiste) and the MBTCC (Pamela Segger) was formed. The Committee selected the attached traditional logo to serve as the centre piece for the Garden.

The image will be printed on a 4 foot square tin sign and mounted on 4 posts which will tilt the sign on a 45 degree angle backwards from the viewer. The sign will be weather-proofed and both the sign and the garden will be maintained by MBTCC. The sign will be accompanied by a QR code which will direct visitors to other sites including the Mahone Bay Museum and the Acadia First Nation where they can learn more about native heritage in the area.

The sign has the endorsement and support of the Acadia First Nation and the MBTCC.

This submission respectfully requests approval of Council to proceed with installation of the sign at the VIC

See mock-up attached:



The LCSSP is a free confidential community-based non-profit service that works collaboratively with BPS, RCMP, and many community partners to help address the safety concerns of older adults (55 years of age+), residing in Lunenburg County. Service is provided through awareness campaigns, advocacy, community outreach projects, educational programs, community presentations and one to one service.

LCSSP response to this month's extreme weather conditions: With the **extreme heat and humidity** there has been an identified need for fans for seniors to cool and move air for those who are immune compromised. LCSSP reached out to the United Way and quickly collaborated with SSODA and Energize Bridgewater to address this concern. Together, we are purchasing and distributing fans to those in need. United Way is assisting with the acquisition of the fans. E.B has taken on administration needs along with some distribution/storage/identifying individuals in need. SSODA and LCSSP are identifying need and distributing fans. Three key components of this project are low income, health risk and confidentiality. (for LCSSP – seniors)

In response to the **extreme rain/flooding** event, LCSSP has reached out in collaboration with the Red Cross in identifying and supporting seniors in need with resources and system navigation. Home visits interrupted by washouts have shifted to phone calls or rescheduled where appropriate.

LCSSP updates/trends:

- Work continues with the research and development of ***Seniors' Mental Wellness toolkit*** including local resources to connect with. The toolkit will include a brochure, presentation/workshop (digital and hard copy) and a quick reference card for local contact numbers.
- Dates for **Seniors' Safety Academy** Oct 12 -Nov 16/2023 at the OHC in Chester. Presenters have confirmed their availability, topic and timeslots. Poster designed and will be shared in September.
- Note there were no presentations or pops scheduled for July.
- Attended via TEAMS **Seniors Access to MHA** (Intake and General Access to MHA Services) on July 11th.
- Attended province wide **Seniors Safety Coordinators meeting July 24th**.

Lunenburg County Seniors' Safety Program

Monthly Report – July 2023

prepared: August 01, 2023

- Attended ESS's in person **Wellness at Work Conference**, at the Bridgewater Curling Club, for frontline workers on July 25th. Highlights included embedding multicultural/LGBTQ+ inclusion within our work and professional selfcare.
- Collaborative Home Visits in June with Continuing Care Coordinator, SSODA, BPS and RCMP. Collaborative client specific meetings with Adult Protections, St. Vincent de Paul, Seniors Community Health Team, Soul's Harbour, Western Housing Authority, SSRH/NSHA, MLA's office.

Referrals: 14

New Referrals: **17** Re Referrals: **3** Home/site Visits: **15** Active clients: **69**
Closed files: **15**

New Referrals Service Area in Municipal Units (#'s have been rounded either up/down)	%
MODC	23.5%
MODL	17.5%
Mahone Bay	6%
Lunenburg	6%
Bridgewater	47%

Referral Source:

Community Partner **30%** Self/Family **35 %** RCMP **17.5%** BSP **17.5%**

Areas of concern: Safe Housing, Fraud/Scams, Community resources/connections, Health Care, Seniors' Mental Health/Addictions.

LCSSP Client Emergency Contingency Fund (CECF):

The CECF continues to serve the community in partnership with other organizations to help mitigate risk for seniors experiencing financial hardship. **The July 31, 2023 float count balance is: \$2,881.66. \$43.68** fan purchase for client with COPD. **\$40.00** gas card for client to travel to therapy. Donation to the CECF in the amount of **\$2000.00** by the United Way (Thank you for your continued support).

*'Thank you to all Lunenburg County Seniors' Safety Program supporters.
We couldn't do what we do without you.'*



A meeting of the Policy & Strategy Committee for the Town of Mahone Bay was held on Monday, July 24, 2023 at 7:05 p.m. in Council Chambers.

Present:

Mayor David Devenne
Deputy Mayor Francis Kangata
Councillor Penny Carver
Councillor Joseph Feeney
Councillor Suzanne Lohnes-Croft (virtual)
Councillor Richard Nowe
Councillor Kelly Wilson
CAO, Dylan Heide
Deputy CAO, Eric Levy (virtual)
Manager of Finance, Ashley Yeadon-Wentzell (virtual)

Absent: Town Clerk, Kelly Redden (with regrets)

Gallery:

Let us begin by acknowledging that we are gathered today in Mi'kma'ki. The ancestral, present and future territory of the Mi'kmaw people. Today, we gather with the intent followed by the living Peace and Friendship Treaties - with respect, cooperation and coexistence.

1. Approval of Agenda

A motion by Councillor Carver, seconded by Councillor Wilson, "THAT the agenda be approved as amended to include Security Cameras as item 4.b)." Motion carried.

2. Minutes

The minutes of the regular meeting on May 29, 2023 had not been included in the meeting package and therefore approval was deferred to the Committee's next meeting.

3. Discussion – Draft Reserves Policy

Members discussed the possible composition of the proposed reserves policy, drawing on examples from other municipalities. Staff received substantial input which will be used to develop a draft policy for presentation back to the Committee at a future meeting.

4. Grants to Organizations Policy

Members discussed the current Grants to Organizations Policy and opportunities for improvements. Staff received substantial input which will be used to develop a draft amended policy for presentation back to the Committee at a future meeting.

4.b) Security Cameras

Members discussed the use of security cameras by the Town, in light of recent vandalism and property damage concerns, and agreed not to make any changes to the Town's current practice.

5. Next meeting

5.1 Date and Time

The next meeting of the Policy and Strategy Committee will be held at 7pm on Monday, September 25, 2023.

5.2 Agenda for next meeting

It was agreed that the agenda for the next meeting would include the review and update of the Town's human resources policies, unless other issues arose requiring more timely consideration.

With no further agenda items, the meeting adjourned at 9:01 PM.

TOWN OF MAHONE BAY

TOWN OF MAHONE BAY

Chair, Mayor David Devenne

CAO, Dylan Heide (Recording)



**Quarterly Police Report
Town of Mahone Bay
April to June 2023**

1. LUNENBURG DISTRICT STAFF

- 1 Staff Sergeant
- 2 Sergeants
- 6 Corporals
- 34 Constables
- 1 Reserve Constable
- 7 Administrative Staff
- Crime Analyst (Covers numerous areas including Lunenburg District)
- Senior Safety Coordinator (Jointly Managed with BPS)

2. SOUTHEAST TRAFFIC SERVICES

- Six-member provincial unit working out of Lunenburg District (Chester Office)
- Dedicated traffic enforcement throughout Lunenburg and Queens Counties.

3. LUNENBURG DISTRICT FLEET

- (11) Patrol Cars
- (7) Patrol SUVs
- (5) Unmarked Police Vehicles
- (1) Police Boat
- (1) 4 Seat UTV (Side x Side)
- (4) Patrol Bicycles

4. DISTRICT FACILITIES

- Chester Detachment
- Lilydale Detachment
- Cookville Detachment

5. CALLS FOR SERVICE

Between April 1st and June 30th, 2023 Lunenburg District RCMP received 2,772 calls for service which included Criminal Code, Controlled Drugs and Substance Act, and Provincial Act Investigations.

Various calls for service statistics within Lunenburg District:

- Lunenburg District members conducted 50 check stops in various locations throughout the county.
- False Alarms - 29
- Wellbeing Checks - 65
- Mental Health Calls – 145
- Sudden Death – 28
- Crime Prevention - 30
- 911 calls - 57
- Assistance to GP –14

Calls for service specific to the Town of Mahone Bay:

Between April 1st and June 30th, 2023 RCMP received 91 calls for service in the town of Mahone Bay which included Criminal Code, Controlled Drugs and Substance Act, and Provincial Act Investigations.

- Check Stops – 6
- Written Warnings – 8
- Summary Offence Tickets – 7
- Parking Offences - 1
- False Alarms – 3
- 911 Calls – 3
- Sudden Deaths – 0
- Crime Prevention – 1
- Fraud- 4

Calls for Service

Here's a breakdown of some of the notable calls for service in Mahone Bay:

- On April 9th, 2023 RCMP Traffic Services were in the Town of Mahone Bay conducting pro-active traffic enforcement. A motorist was stopped for Driving While Suspended as per checks completed on the license plate. After speaking with the driver, the member detected liquor on his breath and made a demand for the Approved Screening Device. The 27-year-old male blew a warn and was issued a 7 day suspension as well as a summary offence ticket for driving while suspended.
- On June 13th, 2023 RCMP received a call from Mahone Bay Irving advising that a male had come into their business advising that he had been stabbed. The male victim was walking on the Bay to Bay Trail between Lunenburg and Mahone Bay when he was attacked by an unknown person and robbed of his personal belongings. The male suffered non-life-threatening injuries, was treated in hospital and released. No suspects have been identified at this time. The matter is still under investigation.
- On June 19th, 2023 RCMP received a report of an impaired driver in the Town of Mahone Bay. The vehicle was located on Clearway Street and the driver was read the demand for the Approved Screening Device, the test resulted in a fail. A 38-year-old female was arrested for impaired driving and taken to the Cookville Detachment to provide breath samples; as a result charges will be laid for Impaired Operation Over 80mg% and Impaired Operation.
- On June 27th, 2023 Mahone Bay NSLC reported the theft of 5 bottles of liquor from their store, valued at \$151.40 that had occurred the previous day. Several hours later Mahone Bay NSLC reported a second theft of 2 bottle of liquor valued at \$107.00. The suspect fled on foot and RCMP were not able locate him at the time. From the surveillance footage captured from NSLC RCMP were able to identify the suspect. The 29-year-old male was arrested for another matter and taken to court, several charges were laid including charges of theft for these two incidents in Mahone Bay.

6. District Resources:

Lunenburg County District is in great shape with regards to employee positions. We currently face a couple of vacancies however we expect these to be filled quickly.

- S/Sgt. Victor Whalen is the District Commander and works out of the Cookville Detachment.
- Sgt. Kelly Plamondon works out of the Cookville office and is one of the Operations Sergeants for Lunenburg District.
- Sgt. Brent Johnston works out of the Chester Detachment and is one of the Operations Sergeants for Lunenburg District. .
- Cpl. Matt Leggett and Cpl. Walter Goliath are Team Leaders of their respective Watches. They also both work out of the Cookville Detachment.
- Cpl. Kyle Doane and Cpl. Brad Williams work out of the Chester Detachment as the Team Leaders for their respective watches.
- Cpl. Traci Johnston is the RCMP's representative for the Towns of Lunenburg and Mahone Bay. Cpl. Johnston also supervises Lunenburg District's Community Policing program and School Safety Resource program.
- Cst. Gord Giffin (RCMP) works within the Criminal Intelligence Service of Nova Scotia. Based at the Bridgewater Police Service Office he is responsible to gather local intelligence on crime within Lunenburg County.
- Cpl. Derek McAlpine (RCMP) supervises GIS and SCEU in Lunenburg District. Cst. Aaron Bishop (RCMP) is our Street Crime Enforcement Officer currently working out of Bridgewater Police Office as part of an integrated team working with Bridgewater Police Service. Cst. Paul McCallion (RCMP) is our General Investigative Section member for Lunenburg District working out of the Cookville Detachment.
- Currently within the District there were five members on long-term ODS (over 30 days). One of these ODS members has recently signed her retirement papers after 25 years of dedicated service bringing LTODS down to 4. We currently have two members on Graduated Return to Work. We currently have five vacancies, one being the Court Liaison position (Cst.). The process of finding replacements for these positions have already been initiated. Two members from outside of division have been identified as well as an experienced police officer and the other two positions are expected to be filled in the coming months.

7. SCHOOL SAFETY RESOURCE OFFICERS (Lunenburg County)

Corporal Traci Johnston has taken over responsibilities in managing the Lunenburg Town office as well as the school resource officer program and community policing victim services officer program. Corporal Johnston began this position on October 1st but was acting in the Chester Operations Sergeant role until the end of December.

Constable Ted Baily has been seconded to A Watch for the summer and will return to his substantive role as the SSRO for Lunenburg District Schools in September. Constable Leah Beaton works weekdays assisting the general duty members as well as assisting with community events while schools are out for the summer. She will return to her role as SSRO for Lunenburg District in September. remains in the SSRO role at the present time but will be assisting with general duty calls during the summer months when schools are not in session.

The role of our SSROs is to work with local schools delivering programs concerning a range of topics including cyber bullying, consent and other social media topics. They are engaged with school staff regarding concerns of drug use and bullying at the school and on the buses. The SSRO's have been pro active in the school zones for traffic related concerns.

Cst. Bailey works out of the Chester Detachment while Cst. Beaton works out of the Cookville Detachment.

8. COMMUNITY POLICING VICTIMS SERVICES OFFICER (Lunenburg County)

Constable Sonia Upshaw has been seconded to C Watch for a period of time to assist with calls for service however she remains active in the community and takes part in a variety community events as well as completes presentations for community groups. If you or someone you know have any community activities or special events that you would like the RCMP in attendance please contact Cpl. Traci Johnston at the Lilydale Detachment by calling 902-634-8674 or by email: Traci.johnston@rcmp-grc.gc.ca or Cst. Upshaw at the Chester Detachment by calling 902-275-3583 or by email: Sonia.upshaw@rcmp-grc.gc.ca

9. SOUTH SHORE STREET CRIME (LCD SCEU) / GIS

The Street Crime Enforcement Unit is a three-member investigative unit integrated with the Bridgewater Police Service (2 RCMPs and 1 Bridgewater Police Member that is led by Cpl. Derek McAlpine of the RCMP. SCEU's mandate is to investigate low to mid-level organized crime and primarily investigates offences under the Controlled Drugs and Substances Act (CDSA) and Criminal Code.

Lunenburg District General Investigative Section consists of 1 RCMP, Cst. Paul McCallion who has recently assumed this position. The mandate of the GIS unit is to investigate more serious, complex and time-consuming investigations.

Unit Quarterly Summary: (Success Stories)

Quarterly Summary: (Success Stories)

SCEU investigated a suspected trafficker of cocaine in the Bridgewater area of Lunenburg County. As a result of the investigation a targeted vehicle stop and the execution of a Search Warrant were conducted. A male and female are currently facing charges of Possession for the Purpose of Trafficking. Evidence of drug trafficking, cocaine, methamphetamine, hydromorphone, along with a large quantity of Canadian Currency was seized. The matter is still before the courts.

SCEU investigated a suspected trafficker of cocaine in the Bridgewater area of Lunenburg County. The result of the investigation the lead to the execution of a Search Warrant at a Bridgewater home. Two females and a male are currently facing charges of Possession for the Purpose of Trafficking. Evidence of drug trafficking along with cocaine was seized. The matter is still before the courts.

SCEU received information that a male and female recently arrested and charged with possession for the purpose of trafficking were continuing to do so from a Bridgewater residence. Investigation lead to the execution of a search warrant where a quantity of cocaine, methamphetamine and Canadian currency were seized. A male and female face further charges of possession for the purpose of trafficking and breaching release order conditions. The matter is still before the courts.

SCEU investigated a suspected trafficker of cocaine in the Bridgewater area of Lunenburg County. The result of the investigation the lead to the execution of a Search Warrant at the Bridgewater Motel. A female and a male are currently facing charges of trafficking cocaine after evidence of drug trafficking was seized. The matter is still before the courts.

SCEU investigated a couple suspected of trafficking of cocaine in the Bridgewater and Lunenburg County area. As a result of the investigation a targeted vehicle stop in Chester Basin was conducted where investigators seized over 100 grams of cocaine, 40 hydromorphone capsules, and fentanyl patches. A male and two females are currently facing several charges of possession for the purpose of trafficking. The matter is still before the courts.

SCEU began an investigation into cocaine trafficking in Indian Point, NS, after a number of complaints from local residents. As a result of the investigation a search warrant was executed at an Indian Point residence and investigators seized over 60 grams of cocaine, evidence of drug trafficking and drug paraphernalia. A female has been charged with possession for the purpose of trafficking and breaching a release order. The matter is still before the courts.

Over a 6 week period between April and May the South Shore SCEU and Kings County SCEU came together with a joint effort to focus on a number of persons in both areas that have been the focus of recent drug trafficking intelligence. As a result of this coordinated effort 12 search warrants were executed and a total of 29 persons were arrested and are facing 113 charges. This project brought together investigators from the Bridgewater Police Service, Kentville Police Service, and the Lunenburg and Kings County RCMP.

SCEU currently has a number of investigations into drug trafficking in the county and have been working closely with the Halifax Integrated Drug Unit, the RCMP's Federal Serious and Organized Crime Section and various South West Nova SCEU's as parts of these investigations.

Convictions

A male previously arrested and charged by the SCEU Unit with a number of theft and break and enter offenses plead guilty and was sentenced to 12 months custody followed by a period of probation.

Human Resources:

SCEU and GID are currently fully staffed. Cst. BISHOP from SCEU will be temporarily redeployed to front line police duties over the next 6 weeks to help alleviate gaps during the summer leave period.

SCEU/GIS Statistics for the quarter are:

- 9 Criminal Code Search Warrants Executed;
- 7 Other Criminal Code Judicial Authorizations obtained;
- 13 targeted offenders searched/arrested/charged involved in drug trafficking and property crime in Lunenburg County;
- \$37,060 Estimated street value of drugs seized;
- \$6,930.00 Value of Property Seized/Recovered;
- \$11,493.00 Cash Seized.

10. Quarterly Traffic Statistics

Please see below the combined traffic work conducted by South Shore Traffic Services as well as Lunenburg County District members aimed at reducing serious motor vehicle collisions and to help improve safety on our roadways.

- 480 SOTS
- 347 Written Warnings
- 62 Checkpoints

Respectfully submitted,

Corporal Traci Johnston



Town of Mahone Bay Quaterly Statistics
(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type		2023	2023	Amount of Change	Total for 2023
		Q2	Q1		
		Current	Previous		
Crimes Against Persons					
Offences Related to Death	0	0	0	0	
Sexual Offences	0	0	0	0	
Assault	4	2	2	6	
Kidnapping/Hostage/Abduction	0	0	0	0	
Robbery	1	0	1	1	
Extortion / Intimidation	0	0	0	0	
Criminal Harassment	0	1	-1	1	
Indecent | Harassing Comm.	0	0	0	0	
Uttering Threats	1	0	1	1	
Property Crime					
Arson	0	0	0	0	
Break and Enter	1	0	1	1	
Unlawfully in a Dwelling House	0	0	0	0	
Theft Over	1	0	1	1	
Theft of Motor Vehicle	0	0	0	0	
Theft of Other MV / Motorcycle	0	0	0	0	
Take MV w/o Consent	0	0	0	0	
Theft Under	2	0	2	2	
Shoplifting	4	2	2	6	
Theft (mail, bicycle, et al)	0	0	0	0	
Theft from Motor Vehicle	0	0	0	0	
Possession of Stolen Goods	0	0	0	0	
Fraud	4	2	2	6	
Identity Theft	0	0	0	0	
Mischief	4	1	3	5	
Drug Enforcement					
Possession	0	0	0	0	
Trafficking	1	0	1	1	
Import/Export	0	0	0	0	
Production	0	0	0	0	
Other	0	0	0	0	



Town of Mahone Bay Quaterly Statistics
(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type		2023	2023	Amount of Change	Total for 2023
		Q2	Q1		
		Current	Previous		
Traffic					
Dangerous Op of MV	0	0	0	0	
Distracted Driving	0	0	0	0	
Impaired by Alcohol	1	0	1	1	
Impaired by Drug	0	0	0	0	
Failure/Refusal	0	0	0	0	
Driving while Disqualified	1	0	1	1	
Fail to Stop or Remain	0	1	-1	1	
Seatbelt Violation	2	3	-1	5	
Intersection Violation	0	0	0	0	
Speeding Violation	4	1	3	5	
Insurance Violation	1	1	0	2	
Road Side Suspension (Alcohol)	1	0	1	1	
Road Side Suspension (Drug)	0	0	0	0	
Collision - Fatal	0	0	0	0	
Collision - Non - Fatal Injury	0	0	0	0	
Collision - Reportable	3	5	-2	8	
Collision - Non Reportable	3	5	-2	8	
Off-Road Vehicle Collision	0	0	0	0	
Municipal By-laws	0	2	-2	2	
Other Traffic Offence/Violation	6	9	-3	15	
Other Traffic Related Duties	0	0	0	0	
Checkstop	6	2	4	8	
Other					
911 Call	3	1	2	4	
Breach of Court Order	0	2	-2	2	
Liquor Act	0	0	0	0	
Mental Health Act	0	0	0	0	
Missing Person	1	0	1	1	
Municipal Bylaw - Other	0	0	0	0	
Other	24	20	4	44	
Sudden Death	0	2	-2	2	
Suspicious P|V|P	1	1	0	2	
Wellbeing Check	8	2	6	10	
Trespass At Night	0	0	0	0	
HPA (COVID-19) - Offences only	0	0	0	0	
HPA (COVID-19) - Other activities	0	0	0	0	
QUA (COVID-19) - Offences Only	0	0	0	0	
QUA (COVID-19) - Other Activities	0	0	0	0	
Total Founded & SUI Occurrences	88	65	23	153	
Total Occurrences*	91	67	24	158	

*Includes Unfounded and Unsubstantiated



Town of Mahone Bay Monthly Statistics Overview

(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	2023
	April	May	June
Crimes Against Persons			
Offences Related to Death	0	0	0
Sexual Offences	0	0	0
Assault	0	2	2
Kidnapping/Hostage/Abduction	0	0	0
Robbery	0	0	1
Extortion / Intimidation	0	0	0
Criminal Harassment	0	0	0
Indecent | Harassing Comm.	0	0	0
Uttering Threats	0	1	0
Property Crime			
Arson	0	0	0
Break and Enter	0	1	0
Unlawfully in a Dwelling House	0	0	0
Theft Over	0	1	0
Theft of Motor Vehicle	0	0	0
Theft of Other MV / Motorcycle	0	0	0
Take MV w/o Consent	0	0	0
Theft Under	0	1	1
Shoplifting	1	1	2
Theft (mail, bicycle, et al)	0	0	0
Theft from Motor Vehicle	0	0	0
Possession of Stolen Goods	0	0	0
Fraud	2	2	0
Identity Theft	0	0	0
Mischief	2	2	0
Drug Enforcement			
Possession	0	0	0
Trafficking	0	1	0
Import/Export	0	0	0
Production	0	0	0
Other	0	0	0



Town of Mahone Bay Monthly Statistics Overview

(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	2023
	April	May	June
Traffic			
Dangerous Op of MV	0	0	0
Distracted Driving	0	0	0
Impaired by Alcohol	0	0	1
Impaired by Drug	0	0	0
Failure/Refusal	0	0	0
Driving while Disqualified	1	0	0
Fail to Stop or Remain	0	0	0
Seatbelt Violation	0	2	0
Intersection Violation	0	0	0
Speeding Violation	1	3	0
Insurance Violation	1	0	0
Road Side Suspension (Alcohol)	1	0	0
Road Side Suspension (Drug)	0	0	0
Collision - Fatal	0	0	0
Collision - Non - Fatal Injury	0	0	0
Collision - Reportable	0	1	2
Collision - Non Reportable	0	1	2
Off-Road Vehicle Collision	0	0	0
Municipal By-laws	0	0	0
Other Traffic Offence/Violation	3	0	3
Other Traffic Related Duties	0	0	0
Checkstop	2	3	1
Other			
911 Call	2	0	1
Breach of Court Order	0	0	0
Liquor Act	0	0	0
Mental Health Act	0	0	0
Missing Person	0	0	1
Municipal Bylaw - Other	0	0	0
Other	10	10	4
Sudden Death	0	0	0
Suspicious P|V|P	0	0	1
Trespass At Night	0	0	0
Wellbeing Check	3	2	3
HPA (COVID-19) - Offences only	0	0	0
HPA (COVID-19) - Other activities	0	0	0
QUA (COVID-19) - Offences Only	0	0	0
QUA (COVID-19) - Other Activities	0	0	0
Total Founded & SUI Occurrences	29	34	25
Total Occurrences*	30	35	26

**Includes Unfounded and Unsubstantiated*



Lunenburg County District Quarterly Statistics
(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	Amount of Change	Total for 2023
	Q2	Q1		
	Current	Previous		
Crimes Against Persons				
Offences Related to Death	0	1	-1	1
Sexual Offences	13	12	1	25
Assault	59	42	17	101
Kidnapping/Hostage/Abduction	1	0	1	1
Robbery	1	0	1	1
Extortion / Intimidation	4	1	3	5
Criminal Harassment	18	10	8	28
Indecent | Harassing Comm.	14	9	5	23
Uttering Threats	39	35	4	74
Property Crime				
Arson	5	0	5	5
Break and Enter	31	23	8	54
Unlawfully in a Dwelling House	2	2	0	4
Theft Over	7	4	3	11
Theft of Motor Vehicle	3	6	-3	9
Theft of Other MV / Motorcycle	4	0	4	4
Take MV w/o Consent	0	1	-1	1
Theft Under	43	29	14	72
Shoplifting	22	22	0	44
Theft (mail, bicycle, et al)	4	3	1	7
Theft from Motor Vehicle	7	0	7	7
Possession of Stolen Goods	0	1	-1	1
Fraud	67	53	14	120
Identity Theft	4	1	3	5
Mischief	107	62	45	169
Drug Enforcement				
Possession	2	2	0	4
Trafficking	9	5	4	14
Import/Export	0	0	0	0
Production	0	0	0	0
Other	2	3	-1	5



Lunenburg County District Quarterly Statistics
(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	Amount of Change	Total for 2023
	Q2	Q1		
	Current	Previous		
Traffic				
Dangerous Op of MV	2	0	2	2
Distracted Driving	7	32	-25	39
Impaired by Alcohol	48	32	16	80
Impaired by Drug	0	0	0	0
Failure/Refusal	2	0	2	2
Driving while Disqualified	17	17	0	34
Fail to Stop or Remain	7	10	-3	17
Seatbelt Violation	9	10	-1	19
Intersection Violation	23	21	2	44
Speeding Violation	441	346	95	787
Insurance Violation	18	12	6	30
Road Side Suspension (Alcohol)	1	0	1	1
Road Side Suspension (Drug)	1	0	1	1
Collision - Fatal	2	0	2	2
Collision - Non - Fatal Injury	17	13	4	30
Collision - Reportable	93	93	0	186
Collision - Non Reportable	34	39	-5	73
Off-Road Vehicle Collision	5	2	3	7
Municipal By-laws	4	2	2	6
Other Traffic Offence/Violation	393	318	75	711
Other Traffic Related Duties	7	5	2	12
Checkstop	50	49	1	99
Other				
911 Call	57	54	3	111
Breach of Court Order	21	19	2	40
Liquor Act	6	4	2	10
Mental Health Act	145	108	37	253
Missing Person	10	6	4	16
Municipal Bylaw - Other	7	1	6	8
Other	568	400	168	968
Sudden Death	28	21	7	49
Suspicious P|V|P	57	55	2	112
Wellbeing Check	65	44	21	109
Trespass At Night	4	0	4	4
HPA (COVID-19) - Offences only	0	0	0	0
HPA (COVID-19) - Other activities	0	1	-1	1
QUA (COVID-19) - Offences Only	0	0	0	0
QUA (COVID-19) - Other Activities	0	0	0	0
Total Founded & SUI Occurrences	2,617	2,041	576	4,658
Total Occurrences*	2,772	2,165	607	4,937

*Includes Unfounded and Unsubstantiated



Lunenburg County District Monthly Statistics Overview

(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	2023
	April	May	June
Crimes Against Persons			
Offences Related to Death	0	0	0
Sexual Offences	6	3	4
Assault	8	24	27
Kidnapping/Hostage/Abduction	0	1	0
Robbery	0	0	1
Extortion / Intimidation	2	0	2
Criminal Harassment	5	6	7
Indecent | Harassing Comm.	5	4	5
Uttering Threats	13	17	9
Property Crime			
Arson	2	0	3
Break and Enter	7	17	7
Unlawfully in a Dwelling House	0	0	2
Theft Over	3	2	2
Theft of Motor Vehicle	1	0	2
Theft of Other MV / Motorcycle	1	2	1
Take MV w/o Consent	0	0	0
Theft Under	15	16	12
Shoplifting	7	5	10
Theft (mail, bicycle, et al)	2	0	2
Theft from Motor Vehicle	4	2	1
Possession of Stolen Goods	0	0	0
Fraud	23	20	24
Identity Theft	1	1	2
Mischief	28	40	39
Drug Enforcement			
Possession	1	1	0
Trafficking	1	5	3
Import/Export	0	0	0
Production	0	0	0
Other	0	0	2



Lunenburg County District Monthly Statistics Overview

(Includes Traffic Services and Occurrences taken by Call Back Unit)

Protected "A"

Type of Crime & Occurrence Type	2023	2023	2023
	April	May	June
Traffic			
Dangerous Op of MV	1	1	0
Distracted Driving	5	0	2
Impaired by Alcohol	13	17	18
Impaired by Drug	0	0	0
Failure/Refusal	1	0	1
Driving while Disqualified	9	6	2
Fail to Stop or Remain	1	3	3
Seatbelt Violation	1	6	2
Intersection Violation	9	8	6
Speeding Violation	212	122	107
Insurance Violation	7	5	6
Road Side Suspension (Alcohol)	1	0	0
Road Side Suspension (Drug)	0	1	0
Collision - Fatal	1	0	1
Collision - Non - Fatal Injury	4	5	8
Collision - Reportable	23	27	43
Collision - Non Reportable	5	13	16
Off-Road Vehicle Collision	1	2	2
Municipal By-laws	0	0	4
Other Traffic Offence/Violation	151	114	128
Other Traffic Related Duties	1	3	3
Checkstop	16	15	19
Other			
911 Call	20	15	22
Breach of Court Order	7	6	8
Liquor Act	0	0	6
Mental Health Act	43	45	57
Missing Person	3	3	4
Municipal Bylaw - Other	1	2	4
Other	156	188	224
Sudden Death	5	13	10
Suspicious P|V|P	19	9	29
Wellbeing Check	18	21	26
Trespass At Night	3	0	1
HPA (COVID-19) - Offences only	0	0	0
HPA (COVID-19) - Other activities	0	0	0
QUA (COVID-19) - Offences Only	0	0	0
QUA (COVID-19) - Other Activities	0	0	0
Total Founded & SUI Occurrences	872	816	929
Total Occurrences*	916	863	993

*Includes Unfounded and Unsubstantiated

The LCSSP is a free confidential community-based non-profit service that works collaboratively with BPS, RCMP, and many community partners to help address the safety concerns of older adults (55 years of age+), residing in Lunenburg County. Service is provided through awareness campaigns, advocacy, community outreach projects, educational programs, community presentations and one to one service.

LCSSP response to extreme heat and humidity - there has been an identified need for fans for seniors to cool and move air for those who are immune compromised. LCSSP reached out to the United Way and quickly collaborated with SSODA and Energize Bridgewater to address this concern. Together, we are purchasing and distributing fans to those in need. United Way is assisting with the acquisition of the fans. E.B has taken on administration needs along with some distribution/storage/identifying individuals in need. SSODA and LCSSP are identifying need and distributing fans. Three key components of this project are low income, health risk and confidentiality. (for LCSSP – seniors) *LCSSP has distributed 7 fans to seniors in need.*

LCSSP updates/trends:

- Work continues with the research and development of **Seniors' Mental Wellness toolkit** including local resources to connect with. The toolkit will include a brochure, presentation/workshop (digital and hard copy) and a quick reference card for local contact numbers. A workable template has been developed.
- Dates for **Seniors' Safety Academy** Oct 12 -Nov 16/2023 at the OHC in Chester. Presenters have confirmed their availability, topic and timeslots. Poster is now being shared in September. Space is limited so registration is required.
- Presentations August 8th to the Town of Lunenburg with LCSSP Chair David Murdoch. Thank you, David.
- Collaborative Home Visits in August with Continuing Care Coordinator, BPS and RCMP.
- Collaborative client specific meetings with Adult Protection, Seniors Community Health Team, Soul's Harbour, Western Housing Authority, SSRH/NSHA, MLA's offices and SSODA.

Lunenburg County Seniors' Safety Program

Monthly Report – August 2023

prepared: September 05, 2023

Referrals: There have been multiple referrals for the same client.

New Referrals: **14** Re Referrals: **4** Home/site Visits: **26** Active clients: **61**
Closed files: **22**

New Referrals Service Area in Municipal Units (#'s have been rounded either up/down)	%
MODC	14%
MODL	36%
Mahone Bay	7%
Lunenburg	7%
Bridgewater	36%

Referral Source:

Community Partner **21%** Self/Family **43 %** RCMP **21%** BSP **15%**

Areas of concern: Seniors' Mental Health/Addictions, Safe Housing, Fraud/Scams, Community resources/connections, Health Care (no primary care physician).

LCSSP Client Emergency Contingency Fund (CECF):

The CECF continues to serve the community in partnership with other organizations to help mitigate risk for seniors experiencing financial hardship. **The August 31, 2023 float count balance is: \$2,846.66. \$30** for replacement ID and \$5 for transportation).

*'Thank you to all Lunenburg County Seniors' Safety Program supporters.
We couldn't do what we do without you.'*





UPDATES FROM SSODA AS OF JULY 31, 2023



INTAKES

14 intakes were completed June 2023. In total, **364** intakes have been completed from May 25, 2022 to July 31, 2023.

104 households currently experiencing homelessness

BREAKDOWN OF HOUSEHOLDS FROM TOTAL INTAKES

Families - 151
Seniors - 88
Veterans - 10
Indigenous - 40
African NS - 11
Youth(25 & under) - 54
Latin Hispanic - 1
Other - 16

ORIGIN OF HOUSEHOLDS

162 residing in Bridgewater
105 residing in MODL
43 residing in Queens
13 residing in Lunenburg
19 residing in Chester
15 residing in Mahone Bay
19 did not disclose

CHRONIC HOMELESSNESS IN OUR COMMUNITY



43 households currently experiencing chronic homelessness

MOST COMMON SLEEPING ARRANGEMENTS

- Renting - Pending an Eviction Notice
- Couch Surfing - Safe
- Hotel Stay
- Renting Unsafely

TOP REASONS FOR HOUSING LOSS

- Building being Sold
- Leaving home due to Domestic Violence
- Eviction due to Renovations
- *Eviction due to Breach of Conditions

*A breach of conditions includes a breach by either the property owner or the tenant



124 identified as experiencing energy poverty. Totalling **\$99,654.80** in NS power arrears.

AVERAGE NUMBER OF MONTHS EXPERIENCING HOMELESSNESS:

4 months

COMMUNITY REFFERALS

Part of our delivery of services includes ensuring households engaging in the Coordinated Access System have access to local resources offered by our partners, requiring a collaborative approach. Here are the total number of referrals to SSODA from the Community since our opening date:

Self Referral - 236
Harbour House - 15
Schools Plus - 10
St Vincent De Paul - 3
YMCA Youth Outreach - 4
Income Assistance - 37
Police/RCMP - 1
Senior Safety - 3
Souls Harbour Rescue Mission - 10
Agency outside of Lunenburg County - 14
Hospital -20
Justice / Probation - 4
Legion - 2



SSODA HAS CONNECTED 89 HOUSEHOLDS TO HOUSING SINCE MAY 2022.

**CONTACT US:
INTAKE@SSODA.ORG
(902)521-0994**

SENIORS' SAFETY ACADEMY

AT OUR HEALTH CENTRE IN CHESTER, NS

**FREE EVERY
THURSDAY
1 to 3:30 p.m.**

OCTOBER

12

TO

NOVEMBER

16

Learn from experts, including RCMP, Legal Aid lawyers, and the Alzheimer Society!

TOPICS WILL INCLUDE ...

- **FRAUD & SCAM PREVENTION**
- **WILLS & POWER OF ATTORNEY**
- **SENIORS' MENTAL HEALTH**
- **ALZHEIMER'S AND DEMENTIA**
- **EMERGENCY PREPAREDNESS**
- ... AND MORE!**

SPOTS ARE LIMITED AND REGISTRATION IS REQUIRED

You can register by contacting the Lunenburg County Seniors' Safety Program office by e-mailing lisa.bennett@bridgewaterpolice.ca or phone us at 902-543-3567.

LOCATION

Our Health Centre, 3769 Highway 3,
Chester, NS (2nd Floor)

THE SENIORS' SAFETY ACADEMY IS MADE POSSIBLE BY

