VILLAGE OF BELCARRA
REGULAR COUNCIL MEETING AGENDA
Village Hall
November 4, 2024
7:00 PM

This meeting is live streamed and recorded by the Village of Belcarra
To view the meeting click: Village of Belcarra - YouTube

Note: This agenda is also posted on the Village's website at www.belcarra.ca

The purpose of a Council meeting is to enact powers given to Council by using bylaws or resolutions. This is the venue for debate of issues before voting on a bylaw or resolution.

We wish to acknowledge that this meeting is taking place on the unceded territory of the Coast Salish Peoples. Tum-Tumay-Whueton, or Belcarra, is home to an ancestral village of the Tsleil-Waututh Nation. We are thankful to conduct our work within their territory.

COUNCIL
Mayor Jamie Ross
Councillor Carolina Clark
Councillor Joe Elworthy
Councillor Janet Ruzycki
Councillor Liisa Wilder

1. CALL TO ORDER

2. APPROVAL OF THE AGENDA

3. ADOPTION OF MINUTES

3.1 Regular Council Meeting, October 21, 2024

Recommendation:

That the minutes from the Regular Council Meeting held on October 21, 2024 be adopted.

4. PUBLIC INPUT (15 minutes)

A period of fifteen (15) minutes will be made available on each Regular Council Meeting Agenda for members of the public to make submissions to Council. Any person wishing to speak during Public Input Period must so indicate by raising their hand. Each person will be permitted 2 minutes to comment on items presented on the agenda. A second opportunity to speak is permitted when all other interested parties have had an opportunity to provide their comments. Comments must be directed to the Chair of the meeting and not to individual members of Council. Public Input Period is a venue for submissions in the form of statements. Questions can be directed to Question Period at the end of the agenda.

5. DELEGATIONS

5.1 Asifa Hirji, Lead Engagement Partner, and Jordan Patterson, Senior Manager, KPMG

- Presentation of the Audit Planning Report for the year ending December 31, 2024

Recommendation:

That the Audit Planning Report for the year ending December 31, 2024, be received into the record for information.

6. ITEMS ON CONSENT AGENDA

Council may adopt in one motion all recommendations appearing on the Consent Agenda, or prior to the question on the vote, any Council member may request that an item be removed from the Consent Agenda and placed in Section 7 for debate or discussion, voting in opposition to a recommendation, or declaring a conflict of interest with an item.

6.1 Correspondence

6.1.1 Cory Heavener, Provincial Director of Child Welfare and Renaa Bacy, Provincial Director of Adoption, Ministry of Children and Family Development, email proclaiming November as Adoption and Permanency Awareness Month.

6.2 Reports

6.3 Recommendation to Receive Items on Consent

That the item on the Consent Agenda of the November 4, 2024 Village of Belcarra Regular Council Meeting be received into the record.

7. ITEMS REMOVED FROM THE CONSENT AGENDA

8. CORRESPONDENCE/PROCLAMATIONS (ACTION ITEMS)

9. UNFINISHED BUSINESS

10. STAFF REPORTS

10.1 Stewart Novak, Manager, Municipal Services, report dated November 4, 2024 regarding the Village of Belcarra Water System Capital Works Plan by WSP Canada Inc.

Recommendation:

That the report dated ~~October 16, 2024~~ November 1, 2024 written by WSP Canada Inc. titled "Village of Belcarra Water System Capital Works Plan" be received into the record for information.

Appendix A – Pages 53 and 60 revised (text highlighted)

10.2 Paula Richardson, Chief Administrative Officer and Ken Bjorgaard, Financial Consultant, report dated November 4, 2024 regarding an update of the 2023 Strategic Plan

Recommendation:

That the report titled "Strategic Plan Update" dated November 4, 2024 be received for information.

10.3 Paula Richardson, Chief Administrative Officer, report dated November 4, 2024 regarding Quarterly Department Reports – For the Quarter ending September 30, 2024

Recommendation:

That the report dated November 4, 2024 titled "Quarterly Department Reports – For Quarter ending September 30, 2024" be received into the record for information.

10.4 Paula Richardson, Chief Administrative Officer and Ken Bjorgaard, Financial Consultant, report dated November 4, 2024 regarding a Council Indemnity Increase

Recommendation:

That Village of Belcarra Council Indemnity Bylaw No. 631, 2024 be read a first, second and third time.

10.5 Paula Richardson, Chief Administrative Officer, report dated November 4, 2024 regarding the conclusion of the Official Community Plan Review Committee

Recommendation:

That the work of the Official Community Plan Review Committee be considered complete upon the adoption of Official Community Plan Bylaw No. 631, 2024; and further

That the Official Community Plan Review Committee be officially dissolved.

10.6 Stewart Novak, Manager, Municipal Services, report dated November 4, 2024 regarding staff responses to questions from a resident.

Recommendation:

That the report dated November 4, 2024 titled "Responses to Resident Questions re: Belcarra Water Distribution System" be received into the record for information.

11. BYLAWS

12. RELEASE OF ITEMS FROM CLOSED COUNCIL MEETINGS

13 MAYOR AND COUNCILLOR REPORTS

Mayor Ross attended the following events:

- TransLink Mayors' Council – October 31, 2024
- Metro Vancouver Board Meeting – November 1, 2024

13.1. CHIEF ADMINISTATIVE OFFICER REPORT

14. OTHER MATTERS DEEMED EXPEDIENT

15. NOTICES OF MOTIONS AND MATTERS FOR INTRODUCTION AT FUTURE MEETINGS

16. PUBLIC QUESTION PERIOD

The public is invited to ask questions of Council regarding any item pertaining to Village business. A person wishing to make a submission will be limited to two (2) minutes and the submission must be in the form of a question. A second opportunity to ask a follow up or new question is permitted if no one else is waiting to participate. Questions, including follow up questions, must be directed to the Chair of the meeting and not to individual members of Council or staff. If a question(s) to staff arises during Public Question Period, the question(s) must be addressed to the Chair and the Chair can request clarification from staff.

The total session is limited to 20 minutes and will be completed by 11:00 pm unless extended with approval of Council through an affirmative vote.

17. ADJOURNMENT

VILLAGE OF BELCARRA
REGULAR COUNCIL MEETING MINUTES
October 21, 2024

This meeting was held in Council Chambers and live streamed at
Village of Belcarra - YouTube

Council in Attendance
Councillor Carolina Clark
Councillor Joe Elworthy
Councillor Janet Ruzycki
Councillor Liisa Wilder

Council Absent
Mayor Jamie Ross

Staff in Attendance
Paula Richardson, Chief Administrative Officer
Stewart Novak, Public Works & Emergency Preparedness Coordinator
Amanda Seibert, Corporate Officer/Recording Secretary
Jane Dreier, Clerk

Others in Attendance
Jason Potter, Senior Transportation Planner, Bunt & Associates Engineering
Laura Beveridge, Planning Consultant, Pooni Group
Manjit S. Sohi, Consultant, Sohi Consulting and Code Solutions
Peter Smith, Smithcraft Architecture
Eric White, Land Use and Planning Consultant, RWPAS Ltd.

Note: The meeting was chaired by Councillor Wilder as Acting Mayor as Mayor Ross was absent.

We wish to acknowledge that this meeting took place on the unceded territory of the Coast Salish peoples. Tum-Tumay-Whueton, or Belcarra, is home to an ancestral village of the Tsleil-Waututh Nation. We are thankful to conduct our work within their territory.

1. CALL TO ORDER

Acting Mayor Wilder called the meeting to order at 7:01 pm

2. APPROVAL OF THE AGENDA

2.1 Regular Council Meeting, October 21, 2024

Moved by: Councillor Ruzycki
Seconded by: Councillor Clark

That the agenda for the Regular Council Meeting of October 21, 2024 be approved as circulated.

CARRIED

3. ADOPTION OF MINUTES

3.1 Special Council Meeting, October 7, 2024

Moved by: Councillor Elworthy
Seconded by: Councillor Ruzycki

That the minutes from the Special Council Meeting held on October 7, 2024 be adopted.

CARRIED

3.2 Regular Council Meeting, October 7, 2024

Moved by: Councillor Clark
Seconded by: Councillor Elworthy

That the minutes from the Regular Council Meeting held on October 7, 024 be adopted.

CARRIED

4. PUBLIC INPUT

The Acting Mayor outlined the procedure for Public Input.

Penny Moen, Belcarra resident, reminded residents of the Halloween event to be held at the Village Hall on Saturday, October 26 from 2:00 pm to 5:00 pm, complete with games and treats and encouraged all to bring their kids out.

5. DELEGATIONS AND PRESENTATIONS

5.1 Bunt & Associates Engineering Ltd.

- **Jason Potter, M.Sc., PTP | Associate | Senior Transportation Planner**

The Chief Administrative Officer introduced Jason Potter, Associate and Senior Transportation Planner from Bunt & Associates Engineering Ltd. She advised that Bunt & Associates Engineering Ltd. is the successful proponent of the recent RFP for the Belcarra Active Transportation Network Plan, and that Jason will provide an overview of the process that is currently underway.

The Senior Transportation Planner gave a presentation outlining the Belcarra Active Transportation Network Plan. He stated that the process was just beginning and introduced the consulting team. He advised on the purpose and objective of the plan, what the consultants planned to do moving forward, the process to engage the community and next steps following the introduction. He also advised that the launch date for the project will be October 28, 2024.

The Senior Transportation Planner responded to questions from members of Council.

6. ITEMS ON CONSENT AGENDA

6.1 Correspondence

6.1.1 Ralph Drew, Belcarra resident, email dated September 27, 2024 regarding the Proposed Farrer Cove Access Road Project

6.2 Reports

No items

6.3 Recommendation to Receive Items on Consent

Moved by: Councillor Clark
Seconded by: Councillor Ruzycki

That the item on the Consent Agenda of the October 21, 2024 Village of Belcarra Regular Council Meeting be received into the record.

CARRIED

7. ITEMS REMOVED FROM THE CONSENT AGENDA

No items

8. CORRESPONDENCE/PROCLAMATIONS (ACTION ITEMS)

No items

9. UNFINISHED BUSINESS

9.1 Motion by Councillor J. Ruzycki (brought forward as a Notice of Motion at the Regular Council Meeting of October 7, 2024)

MAIN MOTION
Moved by: Councillor Ruzycki
Seconded by: Councillor Clark

That staff be directed to prepare a report responding to questions in a letter from Ian Devlin provided at the September 23, 2024 Council Meeting.

MOTION TO AMEND
Moved by: Councillor Clark
Seconded by: Councillor Ruzycki
That the text "by the next Council meeting on November 4, 2024" be added following the text "September 23, 2024 Council Meeting."

AMENDMENT CARRIED

Question on the Main Motion
The question was then called on the Main Motion as amended.

MAIN MOTION AS AMENDED
That staff be directed to prepare a report responding to questions in a letter from Ian Devlin provided at the September 23, 2024 Council Meeting by the next Council meeting on November 4, 2024.

CARRIED AS AMENDED

10. STAFF REPORTS

10.1 Paula Richardson, Chief Administrative Officer and Laura Beveridge, Planning Consultant, Pooni Group, report dated October 21, 2024 regarding Corporate Policy No. 232 Land Disposition Policy

The Chief Administrative Officer introduced the topic and introduced Laura Beveridge, Planning Consultant, Pooni Group.

The Planning Consultant gave a presentation providing information on the proposed land disposition policy. She outlined the purpose of the policy, the process for disposition established by the policy, spoke on what the policy will apply to, highlighted the process involved in the right of first refusal and outlined how proceeds from a sale may be used. She provided information on the next steps to be taken upon approval of the policy and the process which will be followed for the sale of a Village-owned road end.

The Planning Consultant advised that an amendment to the Official Community Plan bylaw is not required.

Moved by: Councillor Elworthy
Seconded by: Councillor Ruzycki

That Corporate Policy No. 232 Land Disposition Policy be approved.

CARRIED

10.2 Paula Richadson, Chief Administrative Officer and Manjit S Sohi, Consultant, Sohi Consulting and Code Solutions, report dated October 21, 2024 regarding Temporary Use Permit No. 2019-01 Extension (2024 Amendments) for 8 Corners Canada Inc, 123 Dough Canada, Inc., and ELC Canada, Inc.

The consultant reviewed the report. He provided details on the requests by the applicant and highlighted sections of the Temporary Use Permit.

The consultant and the applicant responded to questions and concerns of Council.

Moved by: Councillor Ruzycki
Seconded by: Councillor Clark

That Temporary Use Permit No. 2019-01 extension for one term not exceeding 3 years from October 21, 2024 requested by 8 Corners Canada Inc., 123 Dough Canada, Inc., and ELC Canada, Inc., be approved as amended and be referred to as Temporary Use Permit No. 2019-01 Extension (2024 Amendments) upon approval; and further

That the Mayor and Chief Administrative Officer be authorized to sign Temporary Use Permit No. 2019-01 Extension (2024 Amendments).

CARRIED

It was the consensus of Council that staff be directed to follow up on fire safety and the condition of the water tank on the property.

10.3 Paula Richardson, Chief Administrative Officer and Eric White, Land Use and Planning Consultant, RWPAS Ltd., report dated October 21, 2024 regarding the Village of Belcarra Housing Needs Report Update

The Land Use and Planning Consultant gave a presentation providing information on the Housing Needs Report (HNR) Update as legislated by the Provincial Government. He outlined how the Village can proceed to meet the Provincial requirements. He provided details on what a housing needs report is, explained the standardized HNR method provided by Metro Vancouver and outlined the next steps in the development of an interim housing needs report.

Moved by: Councillor Ruzycki
Seconded by: Councillor Clark

That staff be directed to update the existing Village of Belcarra Housing Needs Assessment Report prior to January 1, 2025 to incorporate the most recent Housing Needs data provided by Metro Vancouver.

CARRIED

11. BYLAWS

No items

12. RELEASE OF ITEMS FROM CLOSED COUNCIL MEETINGS

The following item was released from Closed Council Status:

- October 7, 2024 Closed Council Meeting:

Item 4.4 Update to the 2023 Strategic Plan – to be presented at the November 4, 2024 at the Regular Council Meeting

13. MAYOR AND COUNCILLOR REPORTS

Acting Mayor Wilder

Acting Mayor Wilder attended a Joint Council Workshop for the City of Port Moody, the City of Port Coquitlam, the City of Coquitlam, the Village of Anmore and the Village of Belcarra hosted by the City of Port Moody on October 16, 2024.

She reminded residents that the Coats for Kids Campaign will begin on November 1, 2024 and that a donation box will be made available at the Village Hall.

Acting Mayor Wilder expressed her gratitude to the Public Works staff for the work done on the weekend during the atmospheric river. She also thanked community members who made efforts to keep ditches, catch basins and drains clear.

Councillor Clark

Councillor Clark attended a Metro Vancouver Budget Workshop Meeting on behalf of Mayor Ross. She thanked Public Works staff for their work on the weekend as well as residents who assisted in keeping water drainage paths clear. She also thanked Public Works staff for the patching work done on Bedwell Bay Road.

Councillor Elworthy

Councillor Elworthy thanked staff for the work done on the weekend during the atmospheric river. He commented on the amount of debris coming down from higher elevations and on the amount of runoff to be dealt with.

The Public Works and Emergency Preparedness Coordinator commented on the number of new water flows coming from higher levels and advised on creeks which changed paths. He also advised on the work done by the Public Works staff.

Councillor Ruzycki

Councillor Ruzycki commented on the atmospheric river being dealt with on the weekend. She expressed that the ditches along Bedwell Bay Road performed well in handling the large amount of water.

13.1 CHIEF ADMINISTRATIVE OFFICER'S REPORT

The Chief Administrative Officer attended the Joint Council Workshop hosted by the City of Port Moody and chaired by Mayor Meghan Lahti. She advised on topics covered at the workshop.

The Chief Administrative Officer expressed appreciation to the Public Works staff for their work over the weekend during the atmospheric river event. She also thanked those residents who assisted in keeping catch basins clear.

The Chief Administrative Officer reported that a budget of $7,750 was approved to allow Pooni Group to develop a land disposition policy and that the scope of work in this budget has been completed. She advised that additional items were required to advance the work on land disposition which were beyond the budget and that a line item will be added to the 2025 budget to allow work to continue. She also advised that upon the sale of a property, cost recovery may be achieved.

14. OTHER MATTERS DEEMED EXPEDIENT

No items

15. NOTICES OF MOTION AND MATTERS FOR INTRODUCTION AT FUTURE MEETINGS

No items

16. PUBLIC QUESTION PERIOD

The Acting Mayor outlined the procedure for Public Question Period.

Ian Devlin, Belcarra resident, commented on the atmospheric river on the weekend, indicating this event was the second in two years. He advised on the state of the water level in front of his house during the storm and expressed that he felt the problem culvert was on Main Avenue. He asked what will be done with this flow and expressed his view that the existing culvert should be replaced with a larger one as per the 2017 Drainage Study.

The Public Works and Emergency Preparedness Coordinator advised that on the priorities of work pertaining to culverts. He also referred to other issues impacting potential culvert replacements such as culverts historically installed by residents which are running parallel to roads.

Deborah Struk, Belcarra resident, commented on the disposition of surplus land and asked whether future consideration will be given to applying a rental fee for the use of road ends by residents to allow for an increase in Village revenue.

Acting Mayor Wilder advised that the topic has been brought forward in the past and will be part of the discussion on the disposition of road ends.

Sy Rodgers, Belcarra resident, referred to the registration of road ends with the Land Titles Office and asked if the Village will consider registering six or seven lots at a time to save money.

The Acting Mayor advised that this will be part of the future discussion on land disposition.

The Chief Administrative Officer advised on the encroachment issue.

Jim Chisholm, Belcarra resident, referred to a water tank on the ELC lands and asked if the Public Works and Emergency Preparedness Coordinator was aware of specifics of the tank, namely its size and the amount of time it can provide water for firefighting for the present operation and the facilities on the property. He asked if the Fire Department is aware of the hours of fire protection time available.

The Public Works and Emergency Preparedness Coordinator stated he could not comment on a building department or fire department issue; however, he advised that the reservoir and the fire hydrant should be approved to National Fire Protection Association (NFPA) and engineering standards.

Penny Moen, Belcarra resident, reminded all of the Halloween event being held at the Village Hall on Saturday, October 26 and advised that C.R.A.B. will host a fire works event on October 31 in the park.

Ian Devlin, Belcarra resident, referred to a large swale running parallel to the Tatlow Trail and expressed concern that during the recent atmospheric event, the swale was full of water which ran across a ditch area and onto the roadbed, possibly undermining that roadbed. He asked when something will be done about the swale and commented that this same situation occurred during the last atmospheric river.

17. ADJOURNMENT

Moved by: Councillor Elworthy
Seconded by: Councillor Ruzycki

That the October 21, 2024 Regular Council Meeting be adjourned.

CARRIED

The meeting was adjourned at 9:06 pm

Certified Correct:

Liisa Wilder Acting Mayor	Amanda Seibert Corporate Officer

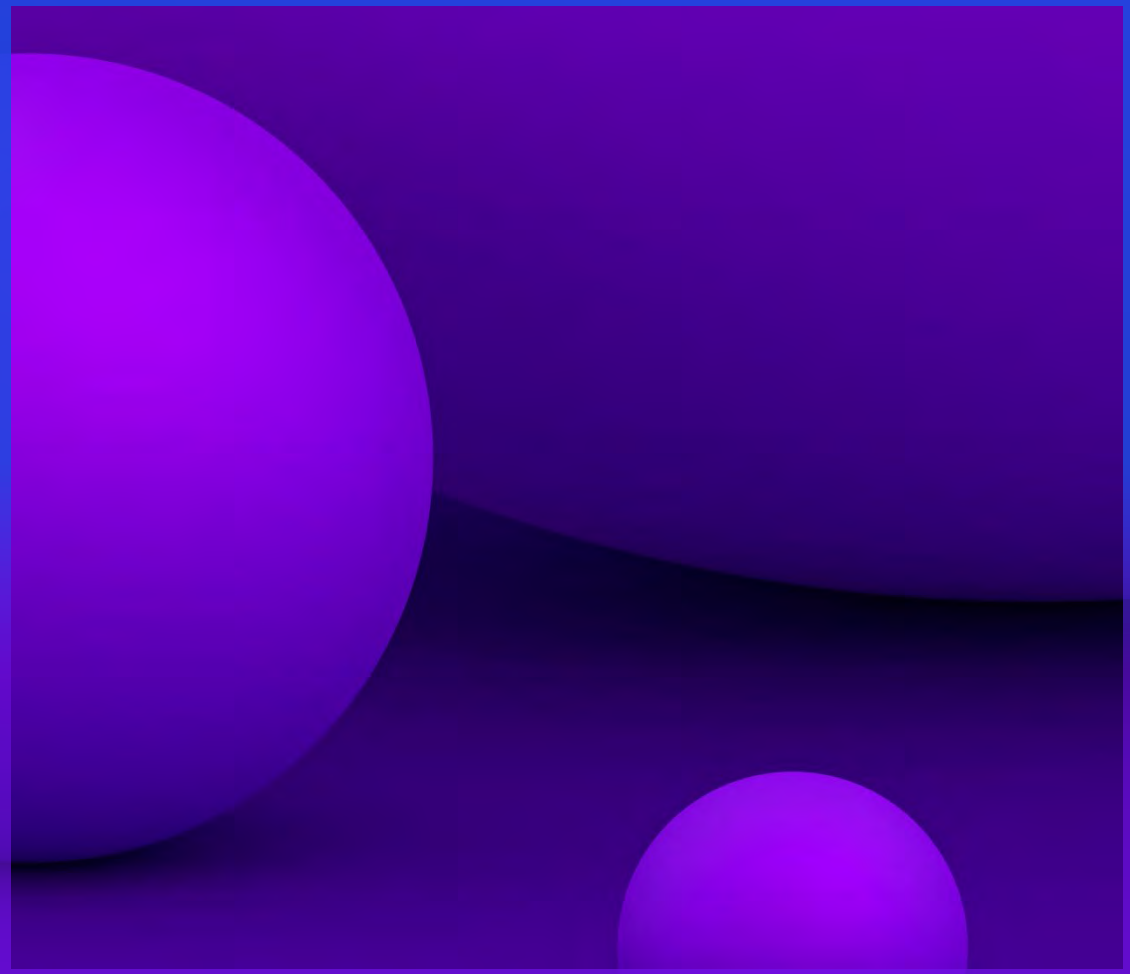
KPMG

5.1

Village of Belcarra

KPMG LLP

Audit Planning Report for the year ending December 31, 2024



Prepared as of October 30, 2024, for presentation on November 4, 2024

kpmg.ca/audit

KPMG contacts

Key contacts in connection with this engagement

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Senior Manager
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Table of contents

The purpose of this report is to assist you, as a member of Council in your review of the plan for our audit of the financial statements. This report is intended solely for the information and use of management and Council and should not be used for any other purpose or any other party. KPMG shall have no responsibility or liability for loss or damages or claims, if any, to or by any third party as this report to Council has not been prepared for, and is not intended for, and should not be used by, any third party or for any other purpose.

Digital use information

This Audit Planning Report is also available as a “hyper-linked” PDF document.

If you are reading in electronic form (e.g. In “Adobe Reader” or “Board Books”), clicking on the home symbol on the top right corner will bring you back to this slide.

Click on any item in the table of contents to navigate to that section.

Highlights

No matters to report

Matters to report – see link for details

Scope

Our audit of the financial statements of the Village of Belcarra (the "Village") as of and for the year ending December 31, 2024 will be performed in accordance with Canadian generally accepted auditing standards.

Audit strategy

Materiality $72,000

Audit quality and independence

- Audit quality
- Independence

Current developments

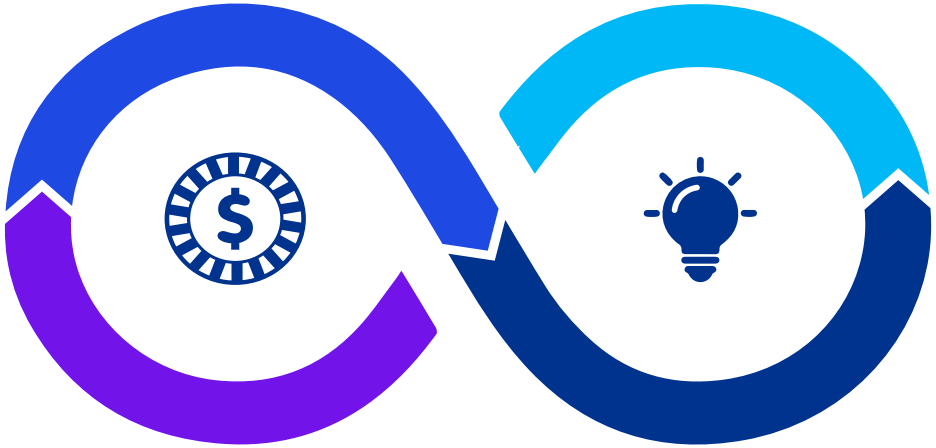
- Current developments
- Thought leadership and insights

Risk assessment

- Risk of management override of controls
- Other significant risks
- Risk of fraudulent revenue recognition
- Other risks of material misstatement

- Tangible capital assets
- Payroll and other operating costs
- Revenue – Initial implementation of new PS 3400 *Revenue* accounting standard

Materiality



We ***initially determine materiality*** at a level at which we consider that misstatements could reasonably be expected to influence the economic decisions of users. Determining materiality is a matter of ***professional judgement***, considering both quantitative and qualitative factors, and is affected by our perception of the common financial information needs of users of the financial statements as a group. We do not consider the possible effect of misstatements on specific individual users, whose needs may vary widely.

We ***reassess materiality*** throughout the audit and revise materiality if we become aware of information that would have caused us to determine a different materiality level initially.

Plan and perform the audit

We ***initially determine materiality*** to provide a basis for:

- Determining the nature, timing and extent of risk assessment procedures;
- Identifying and assessing the risks of material misstatement; and
- Determining the nature, timing, and extent of further audit procedures.

We design our procedures to detect misstatements at a level less than materiality in individual accounts and disclosures, to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality for the financial statements as a whole.

Evaluate the effect of misstatements

We also ***use materiality*** to evaluate the effect of:

- Identified misstatements on our audit; and
- Uncorrected misstatements, if any, on the financial statements and in forming our opinion.

Initial materiality

Materiality

$72,000

(2023: $65,000)

Total forecasted expenses for the year ended December 31, 2024

$2,478,000

(2023 actual: $2,508,000)

Percentage of benchmark

2.9%

Professional standards prescribe between 0.5% to 3.0%

Audit misstatement posting threshold

$3,600

(2023: $3,250)

Risk assessment summary

Our planning begins with an assessment of risks of material misstatement in your financial statements.

We draw upon our understanding of the Village and its environment (e.g. the industry, the wider economic environment in which the organization operates, etc.), our understanding of the Village's components of its system of internal control, including our business process understanding.

		Risk of fraud	Risk of error	Preliminary risk rating
●	Management override of controls	✓		Significant
●	Tangible capital assets		✓	Base
●	Payroll and other operating costs		✓	Base
●	Initial implementation of new PS 3400 *Revenue* accounting standard		✓	Base

● PRESUMED RISK OF MATERIAL MISSTATEMENT ● OTHER RISK OF MATERIAL MISTATEMENT

Significant risk

Management override of controls (non-rebuttable significant risk of material misstatement)

RISK OF FRAUD

Presumption of the risk of fraud resulting from management override of controls

Why is it significant?

Management is in a unique position to perpetrate fraud because of its ability to manipulate accounting records and prepare fraudulent financial statements by overriding controls that otherwise appear to be operating effectively. Although the level of risk of management override of controls will vary from entity to entity, the risk nevertheless is present in all entities.

Our planned response

As this presumed risk of material misstatement due to fraud is not rebuttable, our audit methodology incorporates the required procedures in professional standards to address this risk. These procedures include:

- testing of journal entries and other adjustments
- performing a retrospective review of estimates
- evaluating the business rationale of significant unusual transactions.

Required inquiries of Council

Inquiries regarding risk assessment, including fraud risks

- What are Council's views about fraud risks, including management override of controls, in the Village? And have you taken any actions to respond to any identified fraud risks?
- Is Council aware of, or has Council identified, any instances of actual, suspected, or alleged fraud, including misconduct or unethical behavior related to financial reporting or misappropriation of assets?
  - If so, have the instances been appropriately addressed and how have they been addressed?
- How does Council exercise oversight of the Village's fraud risks and the establishment of controls to address fraud risks?

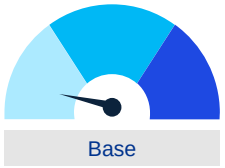
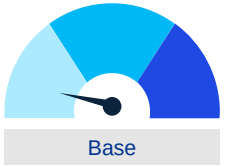
Inquiries regarding processes

- Is Council aware of tips or complaints regarding the Village's financial reporting (including those received through the internal whistleblower program, if such programs exist)? If so, what was Council's responses to such tips and complaints?

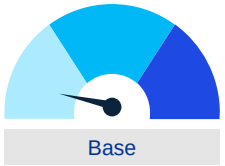
Inquires regarding related parties and significant unusual transactions

- Is Council aware of any instances where the Village entered into any significant unusual transactions?
- What is Council's understanding of the Village's relationships and transactions with related parties that are significant to the Village?
- Is Council concerned about those relationships or transactions with related parties? If so, the substance of those concerns?

Other risks of material misstatement

Area	Level of risk due to error	Our planned response
Tangible capital assets ("TCA")		• Update our understanding of the process activities and controls. • Select a sample of TCA additions and agree the amount recorded to supporting documentation. Ensure the TCA additions are capital in nature. • Perform analytical procedures to ensure the amortization expense recorded is complete and accurate. • Review significant agreements for contractual capital commitments and ensure any required disclosures are included in the financial statements.
Payroll and other operating costs		• Update our understanding of the process activities and controls over operating expenses, including payroll. • Select a sample of payroll expenses and agree the amount recorded to a pay stub, employment agreement and bank statement. • Select a sample of non-payroll operating expenses from the general ledger and agree the amount recorded to supporting documentation (e.g. invoices). • Select a sample of payments made, invoices received and amount recorded subsequent to year-end to ensure expenses are recorded in the appropriate fiscal year.

Other risks of material misstatement (continued)

Area	Level of risk due to error	Our planned response
Initial implementation of new PS 3400 *Revenue* accounting standard **Background**: The new accounting standard PS 3400 *Revenue* (“PS 3400”) is effective for the Village’s 2024 fiscal year. The new standard establishes a single framework to categorize revenue to enhance consistency of revenue recognition and its measurement. Refer to Appendix 2 for further details.		• Review management’s analysis of the impact of PS 3400 on the Village’s accounting policies for revenue recognition. • If there are adjustments to revenue recognized as a result of the implementation of PS 3400, review management’s calculations, including the completeness and accuracy of data used in the calculations. • Review the financial statement note disclosure to ensure it complies with the requirements in PS 3400.

Key milestones and deliverables

Oct – Nov 2024

Planning & risk assessment

- Kick-off with management
- Planning and initial risk assessment procedures, including identification and assessment of risks of misstatements and planned audit response for certain processes
- Update our understanding of the Entity and its environment
- Inquire of management about risks of material misstatement
- Perform inquiries with Council
- Present audit planning report to Council

Dec 2024

Risk assessment & interim work

- Evaluate components of internal control
- Perform process walkthroughs for certain business processes
- Complete risk assessment procedures
- Update understanding of IT applications and environments
- Perform interim substantive audit procedures

Mar – Apr 2025

Year-end fieldwork and reporting

- Perform remaining substantive audit procedures
- Evaluate results of audit procedures, including control deficiencies and audit misstatements identified (if any)
- Review financial statement presentation and disclosures
- Present audit findings report to Council and complete required communications
- Issue audit report on financial statements

How do we deliver audit quality?

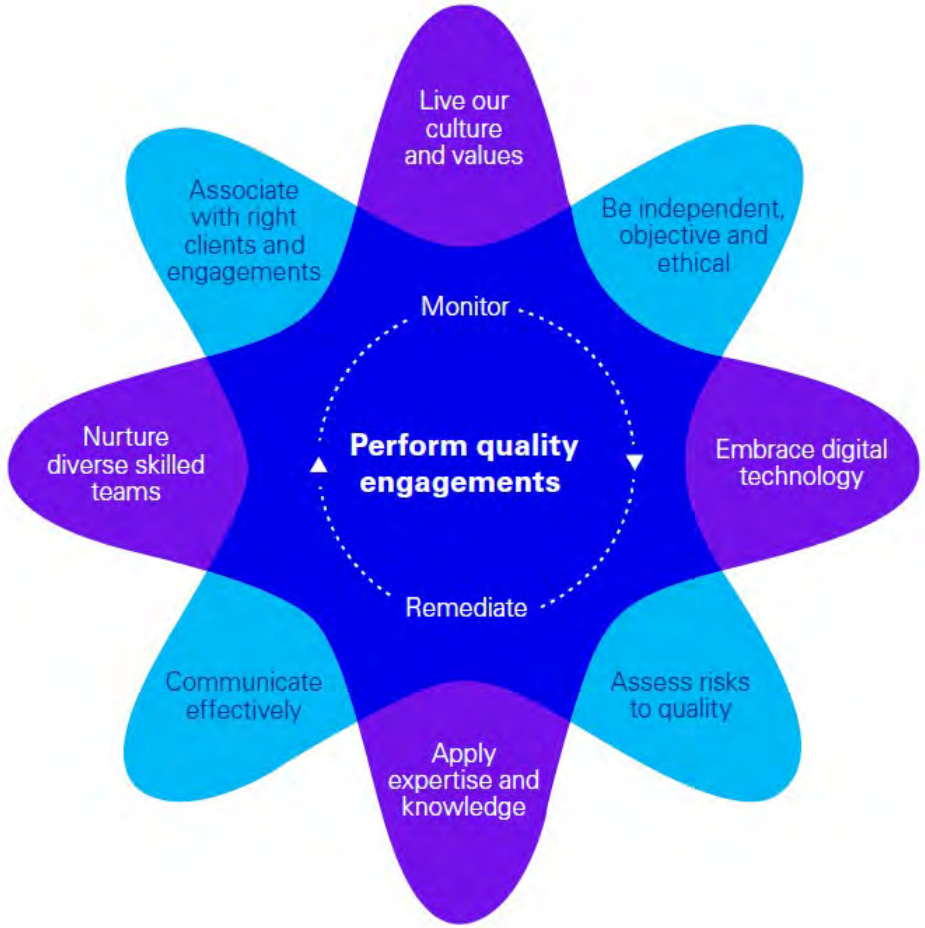
Quality essentially means doing the right thing and remains our highest priority. Our Global Quality Framework outlines how we deliver quality and how every partner and staff member contributes to its delivery.

The drivers outlined in the framework are the ten components of the KPMG System of Quality Management (SoQM). Aligned with ISQM 1/CSQM 1, our SoQM components also meet the requirements of the International Code of Ethics for Professional Accountants (including International Independence Standards) issued by the International Ethics Standards Board for Accountants (IESBA) and the relevant rules of professional conduct / code of ethics applicable to the practice of public accounting in Canada, which apply to professional services firms that perform audits of financial statements. Our Transparency Report includes our firm's Statement on the Effectiveness of our SoQM.

KPMG Canada Transparency Report

We define 'audit quality' as being the outcome when:

- audits are **executed consistently**, in line with the requirements and intent of **applicable professional standards** within a strong **system of quality management;** and
- all of our related activities are undertaken in an environment of the utmost level of **objectivity, independence, ethics** and **integrity.**

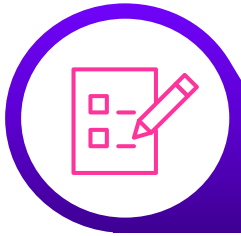


Doing the right thing. Always.

Appendices

1. Required communications
2. Current developments
3. Thought leadership and insights

Appendix 1: Required communications



Engagement letter

The objectives of the audit, our responsibilities in carrying out the audit, as well as management's responsibilities, are set out in the engagement letter provided to Council in a prior year. A copy of the engagement letter is available from KPMG or management upon request.

Appendix 2: Current developments

Auditing standards

Effective for periods beginning on or after December 15, 2024

ISA 260/CAS 260

Communications with those charged with governance

ISA 700/CAS 700

Forming an opinion and reporting on the financial statements

Click here for information about CAS 260 and CAS 700 from CPA Canada:

Amended CAS 260 and CAS 700

Appendix 2: Current developments (continued)

Accounting standards

Standard	Summary and implications
Revenue **(Effective for the Village's 2024 fiscal year)**	• The new standard PS 3400 *Revenue* is effective for fiscal years beginning on or after April 1, 2023. • The new standard establishes a single framework to categorize revenue to enhance the consistency of revenue recognition and its measurement. • The standard notes that in the case of revenue arising from an exchange transaction, a public sector entity must ensure the recognition of revenue aligns with the satisfaction of related performance obligations. • The standard notes that unilateral revenue arises when no performance obligations are present, and recognition occurs when there is authority to record the revenue and an event has happened that gives the public sector entity the right to the revenue.
Purchased Intangibles **(Effective for the Village's 2024 fiscal year)**	• The new Public Sector Guideline 8 *Purchased intangibles* is effective for fiscal years beginning on or after April 1, 2023 with earlier adoption permitted. • The guideline allows public sector entities to recognize intangibles purchased through an exchange transaction. The definition of an asset, the general recognition criteria and GAAP hierarchy are used to account for purchased intangibles. • Narrow scope amendments were made to PS 1000 *Financial statement concepts* to remove the prohibition to recognize purchased intangibles and to PS 1201 *Financial statement presentation* to remove the requirement to disclose purchased intangibles not recognized. • The guideline can be applied retroactively or prospectively.

Appendix 2: Current developments (continued)

Accounting standards (continued)

Standard	Summary and implications
Public Private Partnerships ("P3") **(Effective for the Village's 2024 fiscal year)**	• The new standard PS 3160 *Public private partnerships* is effective for fiscal years beginning on or after April 1, 2023. • The standard includes new requirements for the recognition, measurement and classification of infrastructure procured through a public private partnership. • The standard notes that recognition of infrastructure by the public sector entity would occur when it controls the purpose and use of the infrastructure, when it controls access and the price, if any, charged for use, and it controls any significant interest accumulated in the infrastructure when the P3 ends. • The public sector entity recognizes a liability when it needs to pay cash or non-cash consideration to the private sector partner for the infrastructure. • The infrastructure would be valued at cost, which represents fair value at the date of recognition with a liability of the same amount if one exists. Cost would be measured in reference to the public private partnership process and agreement, or by discounting the expected cash flows by a discount rate that reflects the time value of money and risks specific to the project. • The standard can be applied retroactively or prospectively.

Appendix 2: Current developments (continued)

Accounting standards (continued)

Standard	Summary and implications
Concepts Underlying Financial Performance	• The revised Conceptual Framework is effective for fiscal years beginning on or after April 1, 2026 with early adoption permitted. • The framework provides the core concepts and objectives underlying Canadian public sector accounting standards. • The ten chapter conceptual framework defines and elaborates on the characteristics of public sector entities and their financial reporting objectives. Additional information is provided about financial statement objectives, qualitative characteristics and elements. General recognition and measurement criteria, and presentation concepts are introduced.

Financial Statement Presentation	• The proposed section PS 1202 *Financial statement presentation* will replace the current section PS 1201 *Financial statement presentation*. PS 1202 *Financial statement presentation* will apply to fiscal years beginning on or after April 1, 2026 to coincide with the adoption of the revised conceptual framework. Early adoption is permitted.
	• The proposed section includes the following:
	  • Relocation of the net debt indicator to its own statement called the statement of net financial assets/liabilities, with the calculation of net debt refined to ensure its original meaning is retained.
	  • Separating liabilities into financial liabilities and non-financial liabilities.
	  • Restructuring the statement of financial position to present total assets followed by total liabilities.
	  • Changes to common terminology used in the financial statements, including re-naming accumulated surplus (deficit) to net assets (liabilities).
	  • Removal of the statement of remeasurement gains (losses) with the information instead included on a new statement called the statement of changes in net assets (liabilities). This new statement would present the changes in each component of net assets (liabilities), including a new component called “accumulated other”.
	  • A new provision whereby an entity can use an amended budget in certain circumstances.
	  • Inclusion of disclosures related to risks and uncertainties that could affect the entity’s financial position.

Appendix 2: Current developments (continued)

Accounting standards (continued)

Standard	Summary and implications
Employee Future Benefit Obligations	• The Public Sector Accounting Board has initiated a review of sections PS 3250 *Retirement benefits* and PS 3255 *Post-employment benefits, compensated absences and termination benefits*. • The intention is to use principles from International Public Sector Accounting Standard 39 *Employee benefits* as a starting point to develop the Canadian standard. • Given the complexity of issues involved and potential implications of any changes that may arise from the review of the existing guidance, the new standards will be implemented in a multi-release strategy. The first standard will provide foundational guidance. Subsequent standards will provide additional guidance on current and emerging issues. • The proposed section PS 3251 *Employee benefits* will replace the current sections PS 3250 *Retirement benefits* and PS 3255 *Post-employment benefits, compensated absences and termination benefits*. It will apply to fiscal years beginning on or after April 1, 2026. Early adoption will be permitted and guidance applied retroactively. • This proposed section would result in public sector entities recognizing the impact of revaluations of the net defined benefit liability (asset) immediately on the statement of financial position. Organizations would also assess the funding status of their post-employment benefit plans to determine the appropriate rate for discounting post-employment benefit obligations. • The Public Sector Accounting Board is in the process of evaluating comments received from stakeholders on the exposure draft.

Appendix 3: Thought leadership and insights

2024 Canadian CEO Outlook

KPMG interviewed more than 800 business owners and C-suite leaders across Canada on a variety of topics ranging from their top-of-mind concerns to their acquisition plans, the risks and rewards of artificial intelligence (AI), productivity, the omnipresent threat of cybercrime, and the impact of aging demographics on the workforce.

Click here to access KPMG's portal.

Future of Risk

Enterprises are facing an array of reputational, environmental, regulatory and societal forces. To navigate this complex landscape, the C-suite should seek to embrace risk as an enabler of value and fundamentally transform their approach. KPMG's global survey of 400 executives reveals that their top priorities for the next few years are adapting to new risk types and adopting advanced analytics and AI. As organizations align risk management with strategic objectives, closer collaboration across the enterprise will be essential.

Click here to access KPMG's portal.

Resilience Amid Complexity

In today's rapidly evolving and interconnected business landscape, organizations face unprecedented challenges and an increasingly complex and volatile risk landscape that can threaten their competitiveness and future survival. We share revealing real-world examples of how companies have overcome their challenges and emerged stronger as the rapid pace of change accelerates and look at the key components of KPMG's enterprise resilience framework and how it is helping these businesses build resilience and achieve their strategic objectives in an increasingly uncertain world.

Click here to access KPMG's portal.

Future of Procurement

Procurement is at an exciting point where leaders have the opportunity to recast their functions as strategic powerhouses. In this global report we examine how these forces may affect procurement teams and discuss how procurement leaders can respond – and the capabilities they will need to thrive. Our insights are augmented by findings from the KPMG 2023 Global Procurement Survey, which captured the perspectives of 400 senior procurement professionals around the globe, representing a range of industries.

Click here to access KPMG's portal.

Appendix 3: Thought leadership and insights (continued)

Artificial Intelligence in Financial Reporting and Audit

Artificial intelligence (AI) is transforming the financial reporting and auditing landscape, and is set to dramatically grow across organizations and industries. In our new report, KPMG surveyed 1,800 senior executives across 10 countries, including Canada, confirming the importance of AI in financial reporting and auditing. This report highlights how organizations expect their auditors to lead the AI transformation and drive the transformation of financial reporting. They see a key role for auditors in supporting the safe and responsible rollout of AI, including assurance and attestation over the governance and controls in place to mitigate risks.

Click here to access KPMG's portal.

Control System Cybersecurity Annual Report 2024

Based on a survey of more than 630 industry members (13% from government organizations), this report reveals that while the increase in cyberattacks is concerning, organizations have become more proactive in their cybersecurity budgets, focused on prevention, and acknowledging the threat of supply chain attacks. Furthermore, the report highlights a pressing need for skilled cybersecurity professionals in the face of escalating cyber threats. Explore the full report to help gain a clearer understanding of the growing cyber threat landscape and learn how to overcome the roadblocks to progress.

Click here to access KPMG's portal.

Cybersecurity Considerations 2024: Government and Public Sector

In every industry, cybersecurity stands as a paramount concern for leaders. Yet, for government and public sector organizations, the game of digital defense takes on a whole new level of intensity. The reason? The sheer volume and sensitivity of data they manage, which can amplify the potential fallout from any breach. These agencies are the custodians of a vast array of personal and critical data, spanning from citizen welfare to public safety and national security. This article delves into the pivotal cybersecurity considerations for the government and public sector. It offers valuable perspectives on critical focus areas and provides actionable strategies for leaders and their security teams to fortify resilience, drive innovation, and uphold trust in an ever-changing environment.

Click here to access KPMG's portal.

Appendix 3: Thought leadership and insights (continued)

Why the Public Sector Must Take the Lead in Sustainability Reporting

As the world prepares for the implementation of sustainability reporting standards from the International Sustainability Board (ISSB), the need for public sector leadership is pronounced. While governments around the world have collaborated on vital policy and regulatory solutions, they have yet to provide sustainability reporting for their own government reporting entities. This presents a major obstacle to global sustainability ambitions, particularly considering the vast physical infrastructure, non-renewable resources, rare earth elements, water and natural assets controlled by governments around the world. .

Click here to access KPMG's portal.

Fighting Modern Slavery in Canadian Supply Chain

The deadline for the first year of reporting under Canada's Fighting Forced Labour and Child Labour in Supply Chains Act (the Act) was May 31, 2024. Under the Act, eligible entities are required to publicly report on steps taken to reduce the risk of forced labour and child labour in their business and supply chain. KPMG in Canada reviewed 5,794 report submissions for the act to identify key takeaways.

Click here to access KPMG's portal.

ESG for Cities Webinar Series

Cities and municipalities play a crucial role to drive climate action and resilience measures, acting as stewards for the communities they serve – including their constituents, and public, private and non-profit organizations. With the physical impacts of climate changes – including floods, wildfires and droughts – accelerating in terms of both increased frequency and severity, city and municipal leaders are increasingly considering how they can tackle the multifaced challenge of achieving net zero greenhouse gas (GHG) emissions by 2050. KPMG in Canada's Public Sector and ESG practices completed a three-part national webinar series focusing on the journey to net zero – from strategic planning and stakeholder engagement to the implementation at the asset and operational level, and subsequent reporting obligations.

Click here to access KPMG's portal.

Building a Successful Transformation Program

Today's government and public sector organizations have a rapidly evolving customer service relationship with the populations they serve. Canadians are used to finding and accessing information and services easily and conveniently through digital channels. When digital interactions don't meet expectations or become obstacles to program access, service delivery innovation and other stakeholder objectives are not met.

Click here to read KPMG's article.

Appendix 3: Thought leadership and insights (continued)

Our latest thinking on the issues that matter most to the Committees, Board and management.

KPMG Audit & Assurance Insights
Curated research and insights for audit committees and boards.

Accelerate 2024
The key issues driving the audit committee agenda in 2024.

Board Leadership Centre
Leading insights to help board members maximize boardroom opportunities

Sustainability Reporting
Resource centre on implementing the new Canadian reporting standards

Audit Committee Guide – Canadian Edition
A practical guide providing insight into current challenges and leading practices shaping audit committee effectiveness in Canada.

Appendix 3: Thought leadership and insights (continued)

KPMG research shows that:

Eighty-seven percent of IT decision makers believe that technologies powered by AI should be subject to regulation.

- Of that group, 32 percent believe that regulation should come from a combination of both government and industry.
- Twenty-five percent believe that regulation should be the responsibility of an independent industry consortium.

Ninety-four percent of IT decision makers feel that firms need to focus more on corporate responsibility and ethics while developing AI solutions.

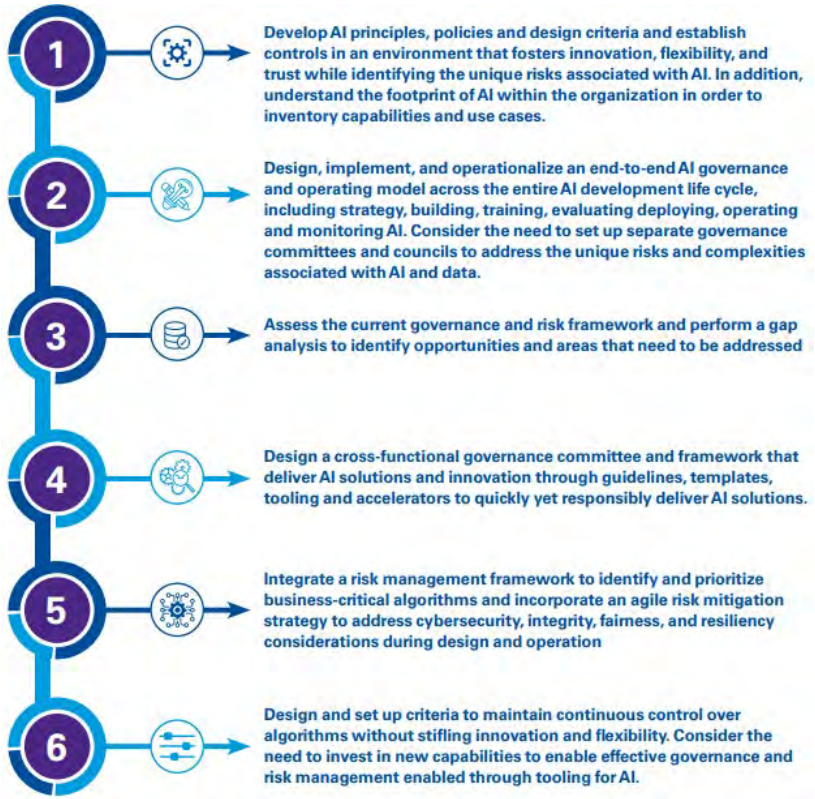
Source:

Per a study of 300 ITDMs from the UK and the US, conducted by Vanson Bourne on behalf of SnapLogic:

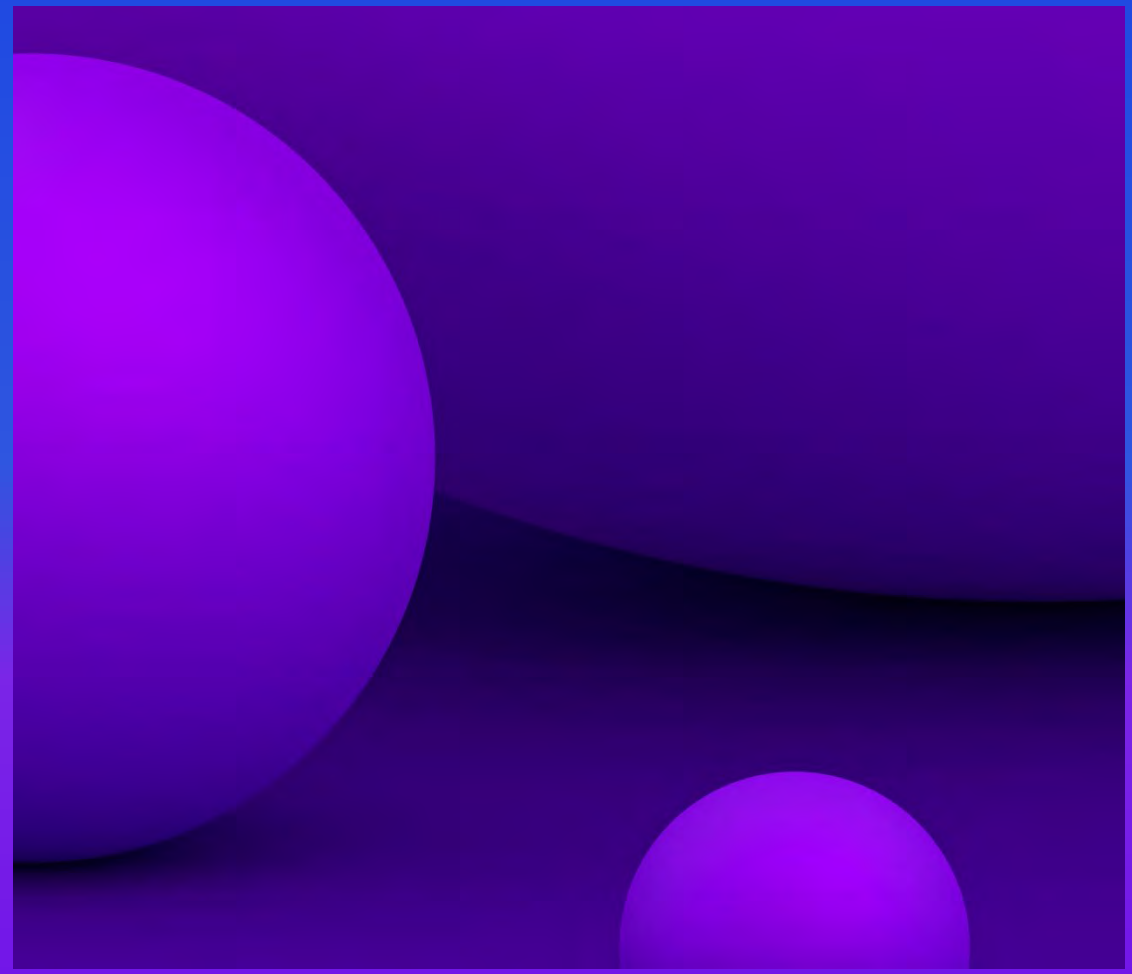
https://www.businesswire.com/news/home/20190326005362/en/AI-Ethics-Deficit-%E2%80%94-94-Leaders-Call

For AI solutions to be transformative, trust is imperative. This trust rests on four main anchors: integrity, explainability, fairness, and resilience. These four principles (enabled through governance) will help organizations drive greater trust, transparency, and accountability.

1. **Integrity** — algorithm integrity and data validity including lineage and appropriateness of how data is used
2. **Explainability** — transparency through understanding the algorithmic decision-making process in simple terms
3. **Fairness** — ensuring AI systems are ethical, free from bias, free from prejudice and that protected attributes are not being used
4. **Resilience** — technical robustness and compliance of your AI and its agility across platforms and resistance against bad actors



home.kpmg/ShapeofAIGovernance



kpmg.ca

Mayor Jamie Ross
Village of Belcarra

E-mail: belcarra@belcarra.ca

Dear Mayor Ross and council:

As the Provincial Director of Child Welfare and the Provincial Director of Adoption, we are delighted and honoured to proclaim November as Adoption and Permanency Awareness Month. This annual proclamation offers an opportunity to celebrate the many families in the province who have opened their hearts and homes to welcome children and youth as permanent members of their family.

November is also about recognizing that there are children and youth who need a permanent home to call their own with caring adults who will nurture and support them and champion their successes. It is our hope to see a province where children and youth can grow up in a loving home that encourages them to thrive.

We would be grateful if you shared the following resources and support services with your community members:

- Adopt BC Kids - an online portal that provides British Columbians wishing to adopt children and youth from foster care with information and guidance through their adoption application.
- The Ways to adopt in British Columbia Website provides information on adoption in British Columbia, such as infant adoption, relative and step-parent adoption, and adopting a child or youth from another country.
- https://belongingnetwork.com (formerly Adoptive Families Association of BC) - provides information and support services for families who wish to adopt now or in the future.
- https://adoption-bc.com - a detailed and comprehensive guide to additional adoption resources.

Thank you for your continued leadership and support in helping us raise awareness about adoption, celebrate adoptive families, and find loving, permanent homes for British Columbia's children and youth.

Sincerely,

Cory Heavener
Provincial Director of Child Welfare

Renaa Bacy
Provincial Director of Adoption

Sent on behalf of the Provincial Directors by:

EXECUTIVE OPERATIONS CLIENT RELATIONS
Client Relations Branch
Executive Operations
Ministry of Children and Family Development

COUNCIL REPORT

File No. 5600-10-10

Date: November 4, 2024

From: Stewart Novak, Manager, Municipal Services

Subject: Village Of Belcarra Water System Capital Works Plan by WSP Canada Inc.

Recommendation:

That the report dated October 16, 2024 written by WSP Canada Inc. titled “Village of Belcarra Water System Capital Works Plan” be received into the record for information.

Purpose:

To present a report to Council outlining the work carried out by WSP Canada Inc. to determine the precise maximum fire flow needs and provide conceptual capital projects to address system deficiencies to improve fire flows throughout the network. Consideration towards storage volume expansion is also provided.

Background:

In September of 2022, WSP Canada Inc. (WSP) was retained by the Village of Belcarra to develop an existing water model using the AutoCAD drawings developed by WSP in 2017 and a 5-meter contour map for the Village. As a result, WSP provided a report titled “Village of Belcarra Hydraulic Water Model Development Report”.

This report summarized the model development and calibration efforts and presented recommendations on further studies to identify upgrades to address any deficiencies in the existing system. These recommendations were incorporated into Council’s 2023 Strategic Plan.

On March 12, 2024, WSP was again retained by the Village of Belcarra to identify options addressing known water system deficiencies identified in the “Village of Belcarra Hydraulic Water Model Development Report”. WSP was also tasked with refining the fire flow requirements for the two municipal buildings in the Village using Fire Underwriters Survey (FUS) calculations, with the goal being to lower the overall storage volume requirements by determining the precise maximum fire flow needs.

Conceptual capital projects were also to be identified to address system deficiencies to improve fire flows throughout the network, as well as consideration towards storage volume expansion.

Conclusion

The intent of the WSP Canada Inc. report titled “Village of Belcarra Water System Capital Works Plan” is to provide information on refining fire flow requirements using Fire Underwriters Survey calculations and to identify options that may improve water system capacity during fire flow events.

It is anticipated that some or all of the recommendations within the report may be used in Council’s future strategic planning.

Prepared by: Stewart Novak,
Manager, Municipal Services

Concurrence: Paula Richardson,
Chief Administrative Officer

The following appendices are hereby attached:

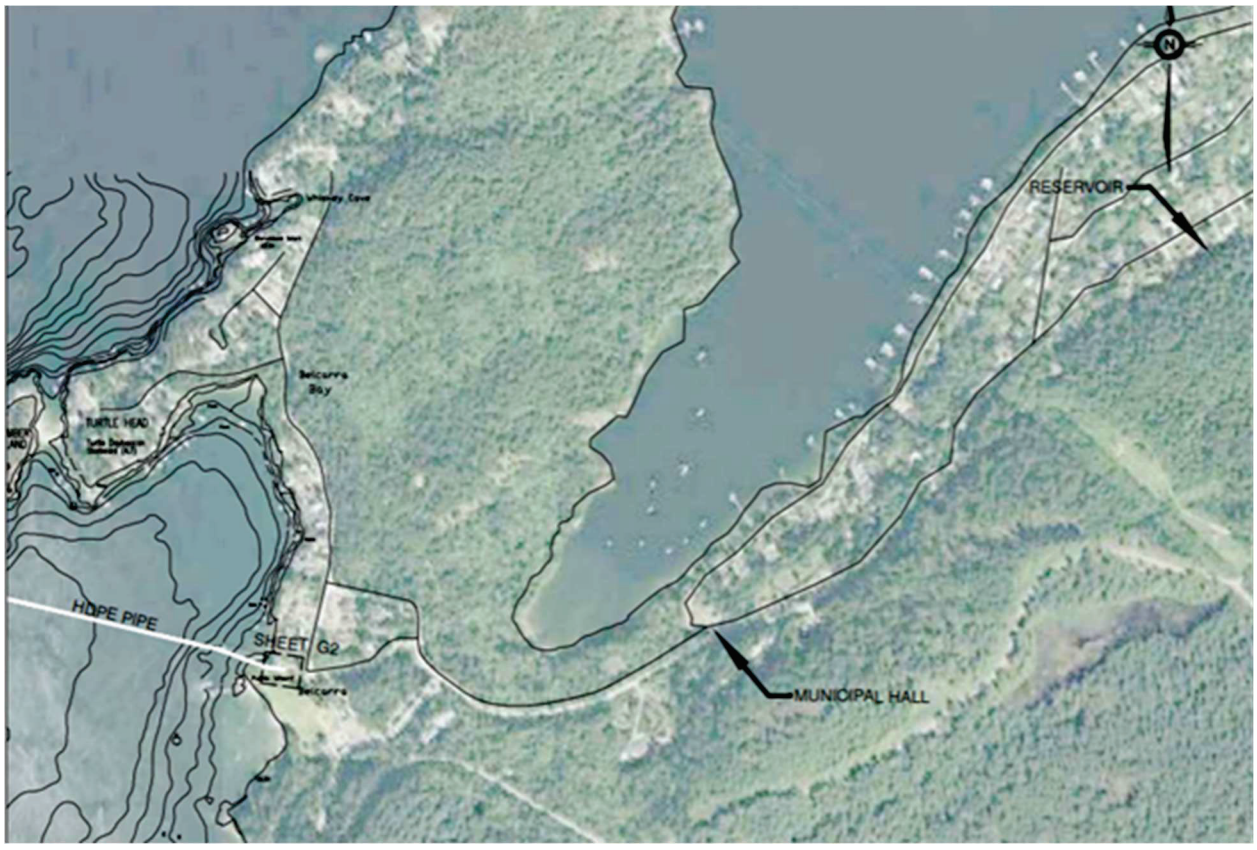
Appendix A – Village of Belcarra Water System Capital Works Plan Report
Appendix B – Village of Belcarra Hydraulic Water Model Development Report

APPENDIX A to Item 10.1
REVISED

VILLAGE OF BELCARRA
REPORT NUMBER: 211-09148-00

VILLAGE OF BELCARRA WATER SYSTEM CAPITAL WORKS PLAN

NOVEMBER 01, 2024



VILLAGE OF BELCARRA WATER SYSTEM CAPITAL WORKS PLAN

VILLAGE OF BELCARRA

FINAL

PROJECT NO.: 211-09148-00
DATE: NOVEMBER 01, 2024

WSP
100 – 840 HOWE STREET
VANCOUVER, BC V6Z 2M1

T: +1 604-685-9381
WSP.COM

November 01, 2024

Village of Belcarra
4048 Bedwell Bay Road
Belcarra BC, V3H 4P8

Attention: Stewart Novak, Public Works & Emergency Preparedness Coordinator

Dear Mr. Novak:

Subject: Water System Capital Works Plan

WSP Canada Inc. is pleased to submit to the Village of Belcarra one (1) digital copy of the Village of Belcarra Water System Capital Works Plan Report.

Yours sincerely,

Sinead McNally, P.Eng.
Project Manager, Infrastructure

FS/SM/ab
Encl
WSP ref.: 211-09148-00

Suite 1000
840 Howe Street
Vancouver, BC VZ 2M1
wsp.com

REVISION HISTORY

October 10, 2024	Draft Submission		
Prepared by	Reviewed By	Approved By	
Fardin Sharif Sinead McNally, P.Eng.	Jack Lee, P.Eng., FEC	Ana Kovacevic, PMP	
October 16, 2024	Final Submission		
Prepared by	Reviewed By	Approved By	
Fardin Sharif	Sinead McNally, P.Eng.	Ana Kovacevic, PMP	
November 1, 2024	Final Submission		
Prepared by	Reviewed By	Approved By	
Fardin Sharif	Ana Kovacevic, PMP Michael Levin, P.Eng., PMP	Sinead McNally, P.Eng.	

SIGNATURES

PREPARED BY

Fardin Sharif

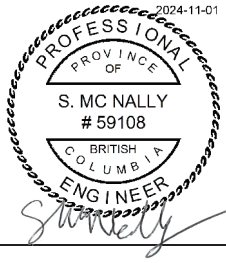
Fardin Sharif, PhD
Project Engineer

REVIEWED BY

Michael Levin, P.Eng., PMP
Technical Reviewer

APPROVED BY

WSP Canada Inc.
Engineers & Geoscientist BC
Permit Number:1000200



Sinead McNally, P.Eng.
Project Manager

WSP prepared this report solely for the use of the intended recipient, Village of Belcarra, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

The original of this digital file will be conserved by WSP for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP, its integrity cannot be assured. As such, WSP does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

CONTRIBUTORS

CLIENT

Public Works & Emergency Preparedness Coordinator	Stewart Novak

WSP

Project Manager	Sinead McNally, P.Eng.
Technical Reviewer	Jack Lee, P.Eng., FEC
Technical Reviewer	Michael Levin, P.Eng., PMP
Technical Advisors	Ana Kovacevic, PMP
Project Engineer	Fardin Sharif

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APPENDICES

1 INTRODUCTION

1.1 PURPOSE

WSP Canada Inc. (WSP) was retained by the Village of Belcarra (the 'Village') to identify options that would address known water system deficiencies identified in the "Village of Belcarra Hydraulic Water Model Development Report" (2022).

The focus of this report is to refine the fire flow requirements for the two municipal buildings in the Village using Fire Underwriters Survey (FUS) calculations. The goal is to lower the overall storage volume requirements by determining the precise fire flow needs. Conceptual capital projects are also identified to address system deficiencies to improve fire flows throughout the network, as well as consideration towards storage volume expansion. The various improvement options are assessed based on Class D order of magnitude cost estimates, criticality, ease of implementation, and their social and environmental impacts.

This report summarizes the completed modeling and optioneering work, prioritized capital projects, cost estimates, and recommendations for next steps and further study. Additionally, maps are created to show the locations of all proposed capital projects.

1.2 SCOPE OF WORK

The scope of work for this assignment is as follows:

- Gather and review all existing information related to water supply, such as studies, reports, drawings, etc. from the Village.
- Conduct complete FUS calculations to refine the fire flow requirements for the two municipal buildings to reduce overall storage volume requirements based on refined fire flow requirements.
- Update the Village's water model in Bentley's WaterCAD to address issues related to fire flows and storage capacity.
- Recommend further capital upgrades required to meet the Village's level of service assessment criteria and address known water system deficiencies.

1.3 DATA COLLECTION AND INFORMATION REVIEW

The "Village of Belcarra Hydraulic Water Model Development Report" (2022) was referenced in defining the design criteria. The design criteria are in accordance with the Village of Belcarra Waterworks Bylaw No.456, 2012, Village of Belcarra Subdivision and Development Bylaw No. 492, 2015, Water Supply for Public Fire Protection in Canada, 2020 and MMCD design guidelines. The Village provided record drawings of the Municipal Hall and Fire Station buildings, which were utilized for FUS calculations. Table 1 lists the data collected and reviewed by WSP to update the model. The Village's latest water model, developed in 2022, was used to support and complete the assessment.

Table 1: Data Collection Summary

DESCRIPTION	DATA TYPE	SOURCE	PURPOSE
Civil Water System Overall Plan	AutoCAD	WSP	Context
Belcarra Water System Overview	PDF	Village of Belcarra	Context
Village of Belcarra Hydraulic Water Model Development Report (2022)	PDF	WSP	Existing deficiencies
Water Supply for Public Fire Protection in Canada (2020)	PDF	Fire Underwriters Survey	Fire flow calculation
Village of Belcarra Bylaw 492 – Subdivision and Development (2015)	PDF	Village of Belcarra	Level of Service Criteria

2 FIRE SUPPLY FOR PUBLIC FIRE PROTECTION

The following sections are a summary of the fire supply assessment of the two municipal building in the Village. A detailed description of the assessment is outlined in Appendix A along with detailed calculations.

2.1 ASSESSMENT OF WATER DISTRIBUTION SYSTEM

The water model and the accompanying "Village of Belcarra Hydraulic Water Model Development Report" (2022) prepared by WSP highlighted deficiencies in the system related to the current network's capability to meet the required fire flow requirements, which are assigned based on land use. Specifically, storage volume deficiencies at the Tatlow Reservoir are based on the minimum fire flow needed in the Village, corresponding to a 90 L/s institutional fire flow for the two municipal buildings, including the Municipal Hall and Fire Station, whereas the rest of the Village requires a 60 L/s residential fire flow.

2.2 FIRE UNDERWRITERS SURVEY (FUS) CALCULATIONS

FUS calculations were conducted to refine fire flow requirements, aiming to reduce storage volume needs. The FUS follows the Canadian Classification Standard for Public Fire Protection (CCPFP) to evaluate fire defenses, focusing on the water supply's ability to deliver adequate water for major fires.

2.3 DETERMINATION OF REQUIRED FIREFLOW

The required fire flow (RFF) is the amount of water in litres per minute (LPM) necessary to control and extinguish a fire in a specific building or group of buildings. The calculation method can vary, but one common approach used in the FUS, and the Insurance Services Office (ISO) involves several steps and factors. To determine the estimated amount of water required to confine and control a fire in a building or a group of buildings, Fire Underwriters Survey uses the following base formula:

$$RFF = 220C\sqrt{A}$$

where A is the total effective floor area in square metres, and C is a factor based on the type of construction of the building. A fire flow analysis was conducted under FUS conditions for the Municipal Hall and Fire Hall buildings.

The following factors were considered when calculating the fire flow requirement of the buildings:

- Total Effective Area and Construction Coefficient
- Occupancy and Content Adjustment Factor
- Automatic Sprinkler Protection
- Exposure Adjustment Charges

Each of these items are detailed in Appendix A along with the calculations for the two buildings.

2.3.1 TOTAL EFFECTIVE AREA AND CONSTRUCTION COEFFICIENT (C)

The Municipal Hall and Fire Hall buildings were assessed for their total effective area and construction type. The Municipal Hall, built in 1984 with an addition in 1998, has a total floor area of 231 square metres and is of wood frame construction. The Fire Hall, a two-story building with wood framing and cinder blocks, has a total floor area of 217 square metres.

2.3.2 OCCUPANCY AND CONTENT AJUSTMENT FACTOR

This factor adjusts the base fire flow requirement based on the building's usage and fire risk. Buildings with highly combustible contents have higher adjustment factors, reflecting increased fire flow needs.

2.3.3 AUTOMATIC SPRINKLER PROTECTION

Automatic sprinkler systems can reduce the required fire flow by up to 50%. The effectiveness of the sprinkler system, its design, and maintenance are crucial. Additional reductions are possible if the system meets specific criteria, such as being fully supervised and having a standard water supply.

2.3.4 EXPOSURE ADJUSTMENT CHARGES

The required fire flow may increase based on the severity of exposure to the subject building and the distance between exposed risks. For the Municipal Hall and Fire Station, the fire flow requirements increased by 75% and 60%, respectively, due to their proximity to other structures and forest areas.

2.4 FUS ANALYSIS RESULTS

The FUS calculations were conducted to refine the fire flow requirements for two municipal buildings including Municipal Hall and Fire Station. The process involved evaluating the property's location, construction materials, occupancy type, fire protection measures (like sprinklers or alarms), and proximity to fire stations or hydrants. The fire flow required in the Village is 117 L/s for the municipal building and 100 L/s for the fire station, as determined by FUS calculations, which include a 50% reduction factor of an automatic sprinkler system. The FUS calculations require a higher fire flow than the 90L/s outlined in previous analysis. The highest fire flow typically governs, therefore the minimum required fire flow for the municipal building and fire station is 117 L/s and 100 L/s respectively based on the latest analysis. Detailed calculations are presented in Appendix A. ***REVISED NOVEMBER 1, 2024***

3 HYDRAULIC ANALYSIS

The previous modelling and assessment completed by WSP in 2022 determined that there are no existing deficiencies with service pressures under either ADD or PHD conditions, as per the Village's Subdivision and Development Bylaw No. 492. There are some model nodes at high elevations along Main Ave in the gravity fed Zone 1 where pressures are below 40 psi; however homes in this location are supplied by watermains in the higher pressure Zone 2 where service pressures are adequate.

The previous modelling and assessment completed by WSP in 2022 determined that there are existing fire flow deficiencies in the Village. The two hydrants (model nodes) that require upwards of 90 L/s of fire flow, namely the Municipal Hall and the fire station, as well as a majority (86%) of the nodes that require 60 L/s of fire flow, are deficient. Existing fire flows generally range from 41 L/s to 59 L/s. The "Village of Belcarra Hydraulic Water Model Development Report" (2022) contains further detail.

There is therefore insufficient capacity in the Village's current water network to provide residential fire flows, as well as fire flows to the Municipal Hall and fire station, which have FUS calculation revised fire flow requirements of 117 L/s and 100 L/s for respectively.

The hydraulic water model from the "Village of Belcarra Hydraulic Water Model Development Report" (2022) was used for this analysis The following upgrade Scenarios were identified to address these fire flow deficiencies in the distribution system.

- Scenario 1: Pipe upgrades to ensure the hydrants are capable of delivering a minimum fire flow of 60 L/s. Two watermain improvement projects were reviewed and outlined in Table 2.

Table 2: Proposed Water System Improvements for Existing System Under Scenario 1

IMPROVEMENT ID	PROJECT DETAILS
WAT1	Replace 137 m of 200 mm watermain with 300 mm along from Reservoir to Main Ave. Replace 115 m of 200 mm watermain new 300 mm Main Ave to Bed Well Bay Rd.
WAT2	Replace140 m of 200 mm watermain new 300 mm along Coombe Lane from Whiskey Cove Lane.

- Scenario 2: Additional pipe improvements to ensure hydrants can deliver a minimum fire flow of 60 L/s, and around 120 L/s near municipal buildings. This includes one significant watermain upgrade, in addition to the improvements for WAT1 outlined in Scenario 1, as detailed in Table 3.

Table 3: Proposed Water System Improvements for Existing System Under Scenario 2

IMPROVEMENT ID	PROJECT DETAILS
WAT1	Replace 137 m of 200 mm watermain with 300 mm along from Reservoir to Main Ave. Replace 115 m of 200 mm watermain new 300 mm Main Ave to Bed Well Bay Rd.
WAT3	Replace 732 m of 200 mm watermain with 300 mm along Bed Well Bay Rd from Tatlow Rd to Young Rd

3.1 FIRE FLOWS DURING MAXIMUM DAY DEMAND

Fire flow deficiencies generally govern the improvement works required for the system. Deficiencies are dominant within the entire system identified in the "Village of Belcarra Hydraulic Water Model Development Report" (2022). Fire flow analysis was conduced under MDD conditions, after assigning fire flow to hydrants and considering

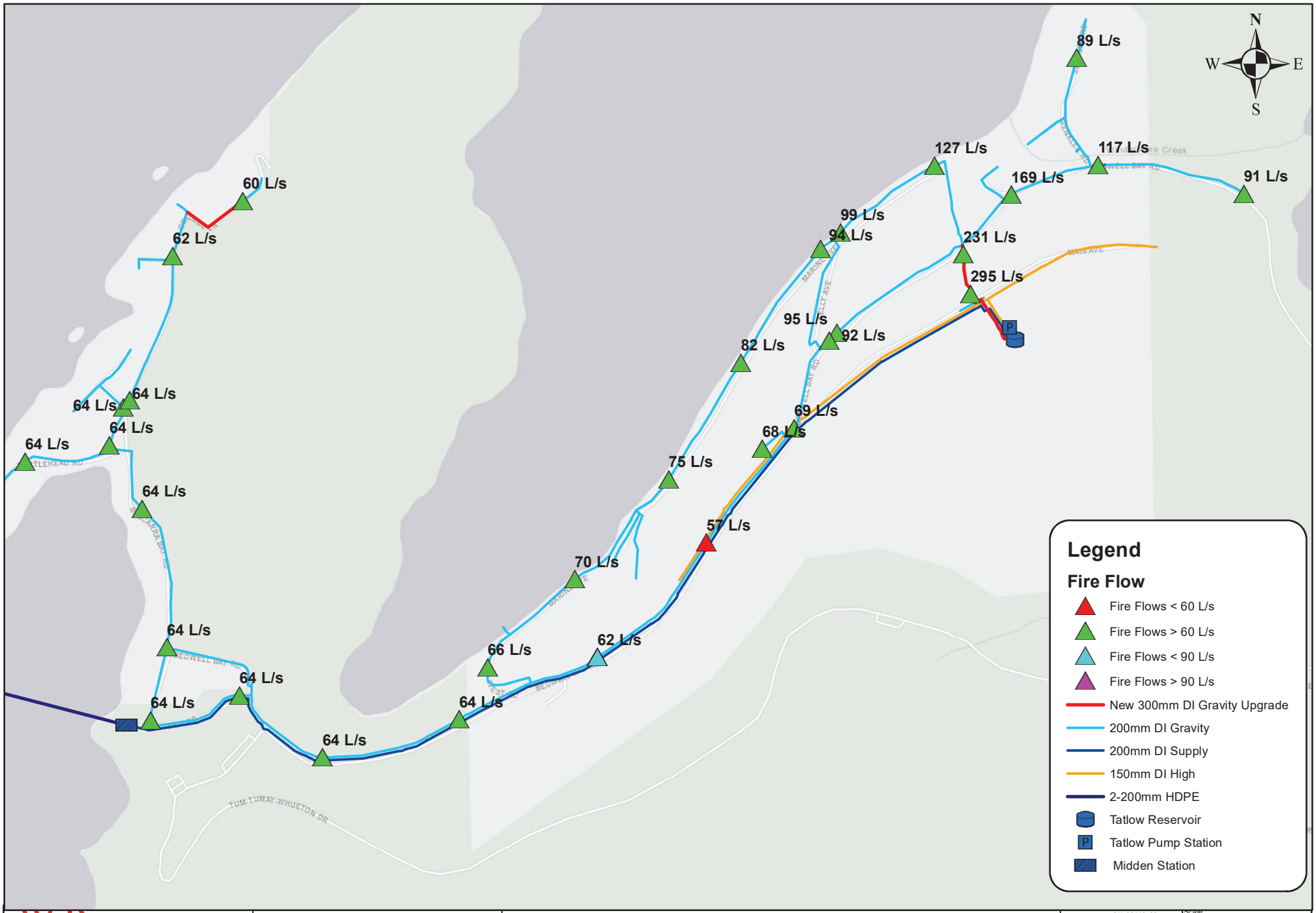
upgrades. The required fire flow for the municipal building and fire station in the Village is 117 L/s and 100 L/s respectively as discussed in Section 3. The rest of the Village only requires a 60 L/s residential fire flow.

- SCENARIO 1: PIPE UPGRADES TO ENSURE HYDRANTS DELIVER A MINIMUM OF 60 L/S FIRE FLOW

  The results of the fire flow analysis under MDD conditions for scenario 1 are summarized on Figure 1, which illustrates the fire flow upgrades throughout the system. As can be seen in Figure 1, under this upgrade scenario, the deficiencies are resolved at the entire system except municipal building located at Bedwell Bay Road, fire station and one residential building. A majority of the nodes that require 60 L/s of fire flow are satisfied and can provide fire flows between 60L/s – 231 L/s.

- SCENARIO 2: PIPE UPGRADES TO ENSURE HYDRANTS DELIVER A MINIMUM OF 60 L/S FF AND APPROXIMATELY 120 L/S AT THE MUNICIPAL BUILDINGS

  The fire flow analysis results under MDD conditions for Scenario 2 are summarized in Figure 2, which highlights the fire flow improvements across the system. As shown in Figure 2, this upgrade scenario successfully addresses deficiencies throughout the entire system. Most nodes requiring a fire flow of 60 L/s are now able to deliver between 61 L/s and 296 L/s.



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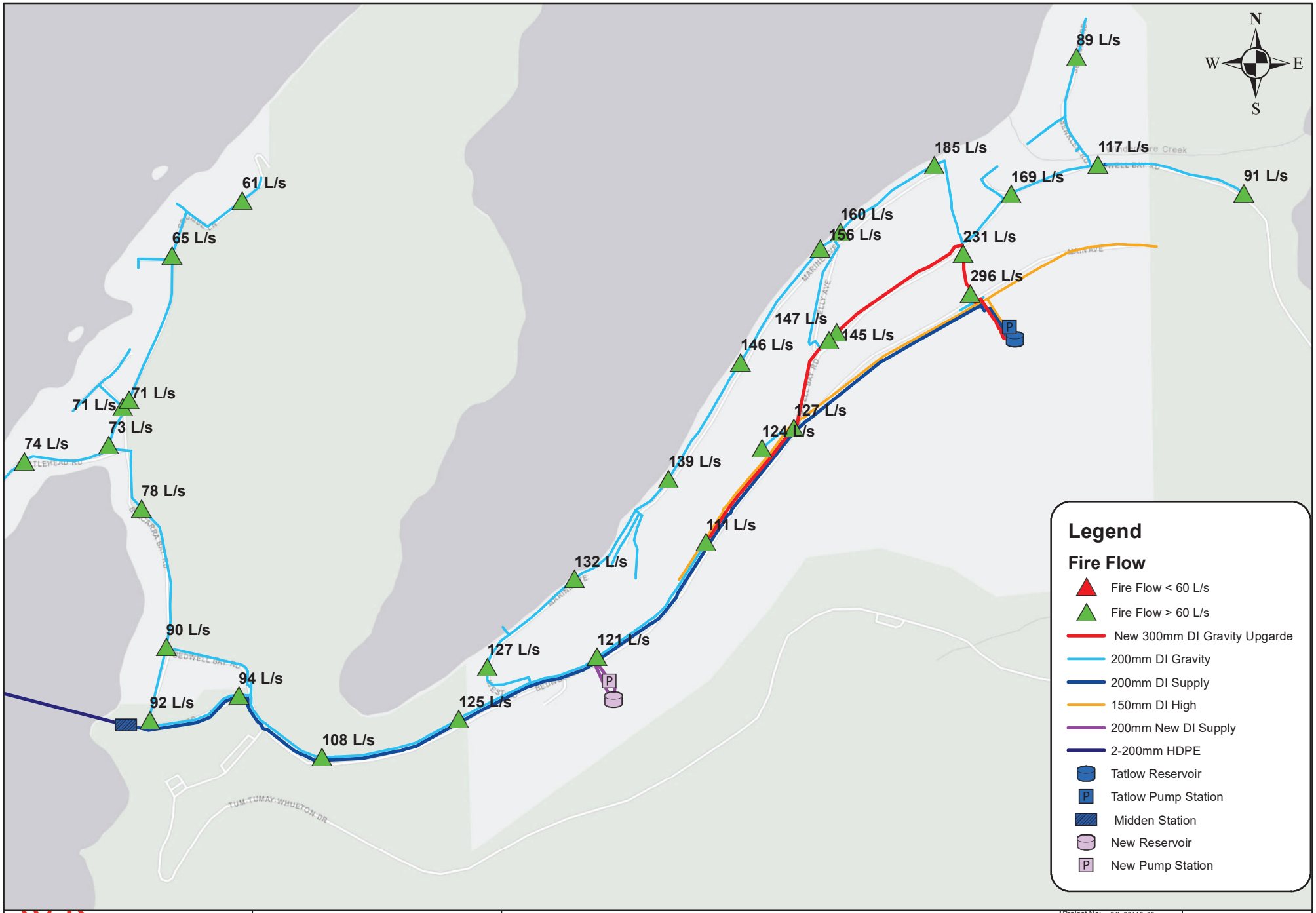
Client: VILLAGE OF BELCARRA

VILLAGE OF BELCARRA WATER SYSTEM CAPITAL WORKS PLAN

AVAILABLE FIRE FLOWS COINCIDENT TO MDD UPGRADE

Project No:	211–09148–00
Designed:	FS
Drawn:	FS
Approved:	AK
Scale	0 45 90 180 Meters, 1:10,000 @ Letter
Figure 1	
Map No	
Date	OCTOBER 2024
Revision	
Revision Date	

Path: C:\Users\CAFS077950\Desktop\Belcarra Water Model Capital Plan\Arcmap files\New folder\New\Figure 1 MI



Vancouver Office , #1000 - 840 Howe St
Tel (604) 685 9381

Client: VILLAGE OF BELCARRA

VILLAGE OF BELCARRA WATER SYSTEM CAPITAL WORKS PLAN

AVAILABLE FIRE FLOWS COINCIDENT TO MDD UPGRADE

Project No:	211-09148-00
Designed:	FS
Drawn:	FS
Approved:	AK
Figure 2	
Scale	1:10,000 @ Letter
Map No	
Revision	
Date	OCTOBER 2024
Revision Date	

Path: C:\Users\CAFS077950\Desktop\Belcarra Water Model Capital Plan\Arcmap files\New folder\New\Figure 2 MI

3.2 STORAGE CAPACITY ANALYSIS

Water storage reservoirs are positioned at certain elevations to create pressure zones within the distribution network, helping to balance and optimize the supply and delivery of water. Reservoirs can store water during periods of low demand and supplement the supply during peak demand times. Reservoirs are generally designed to refill daily and have sufficient capacity to provide balancing storage, typically estimated at 25% of the maximum daily demand for the area served by the reservoir and they need to be sized for fire flow. The volume requirements for storage are calculated using the following formula:

$$Required\ Storage\ Volume = A + B + C$$

Where:

- A = Fire Storage (required extent and duration of fire flow as outlined in Table 4)
- B = Balancing Storage (5% of Maximum Day Demand served by the Reservoir)
- C = Emergency Storage (25% of the sum of A and B)

The required storage volume was calculated for a range of fire flows represented in the table below, from 60 L/s required for residential to 117 L/s for the municipal building.

Table 4: Tatlow Reservoir Storage Capacity Analysis

VOLUME (ML)	60 LPS AT 1.5 HRS FIRE FLOW	90 LPS AT 2 HRS FIRE FLOW	117 LPS AT 2 HRS FIRE FLOW
A – Fire Storage	0.32	0.65	0.84
B – Balancing Storage	0.18	0.18	0.18
C – Emergency Storage	0.13	0.21	0.26
A+B+C = Required Storage	0.63	1.03	1.28
Available Storage	0.27	0.27	0.27
Excess / Deficiency	-0.36	-0.77	-1.01
Excess / Deficiency with 20 L/s constant supply from Marine pipelines	-0.25	-0.62	-0.86

Table 4 illustrates a storage volume shortfall in the reservoir, which impacts the ability to meet current service needs. This deficiency is evident whether considering the fire flow requirement of 90 liters per second (L/s) or the refined requirement of 117 L/s based on FUS calculations. The shortfall is only somewhat mitigated by a consistent supply of 20 L/s from the marine pipeline.

3.3 SITE CONSIDERATIONS

As outlined in Section 3.4, additional storage capacity is required for the Village for fire protection. On October 16, 2023, WSP visited the Tatlow Reservoir site and another potential site behind the fire hall to assess their viability for additional reservoir capacity. The Tatlow Reservoir site was found to be problematic due to limited space for maintenance, chlorination system expansion, and conventional reservoir construction. The site behind the fire hall appeared more feasible and accessible, although it does have some challenges including:

- Clarification of rights of way and property rights, as the site may be near a fire break.
- Consideration of environmental impact and permitting issues.
- Difficulty in earthworks and platform construction due to the sloped terrain.
- Challenging access via a steep gravel track.
- Uncertainty about the availability of bulk power.
- The feasibility of bulk filling the proposed reservoir and its connection to the network.

. Other potential sites, not visited on October 16, 2023 but previously discussed with the Village, include the existing Dutchman Reservoir site (which WSP inspected last summer) and a possible new, undeveloped site at a higher elevation than the Tatlow Reservoir. The latter would require construction, permitting, and land acquisition on Crown Land, and was previously considered unfavorable by Village staff. An alternative option is to install a reservoir on the municipal hall property. This location would be closer to the tie in to watermain than the site behind the fire hall, however it is at a lower elevation.

4 OPTIONS

This section outlines three potential options to resolve the water storage deficiencies in the Village's water supply system and incorporates the system upgrades outlined in Section 3. Each option presents a different approach to managing the existing Tatlow Reservoir and constructing new infrastructure.

4.1 OPTION 1 - SYSTEM UPGRADES AND EXISTING STORAGE

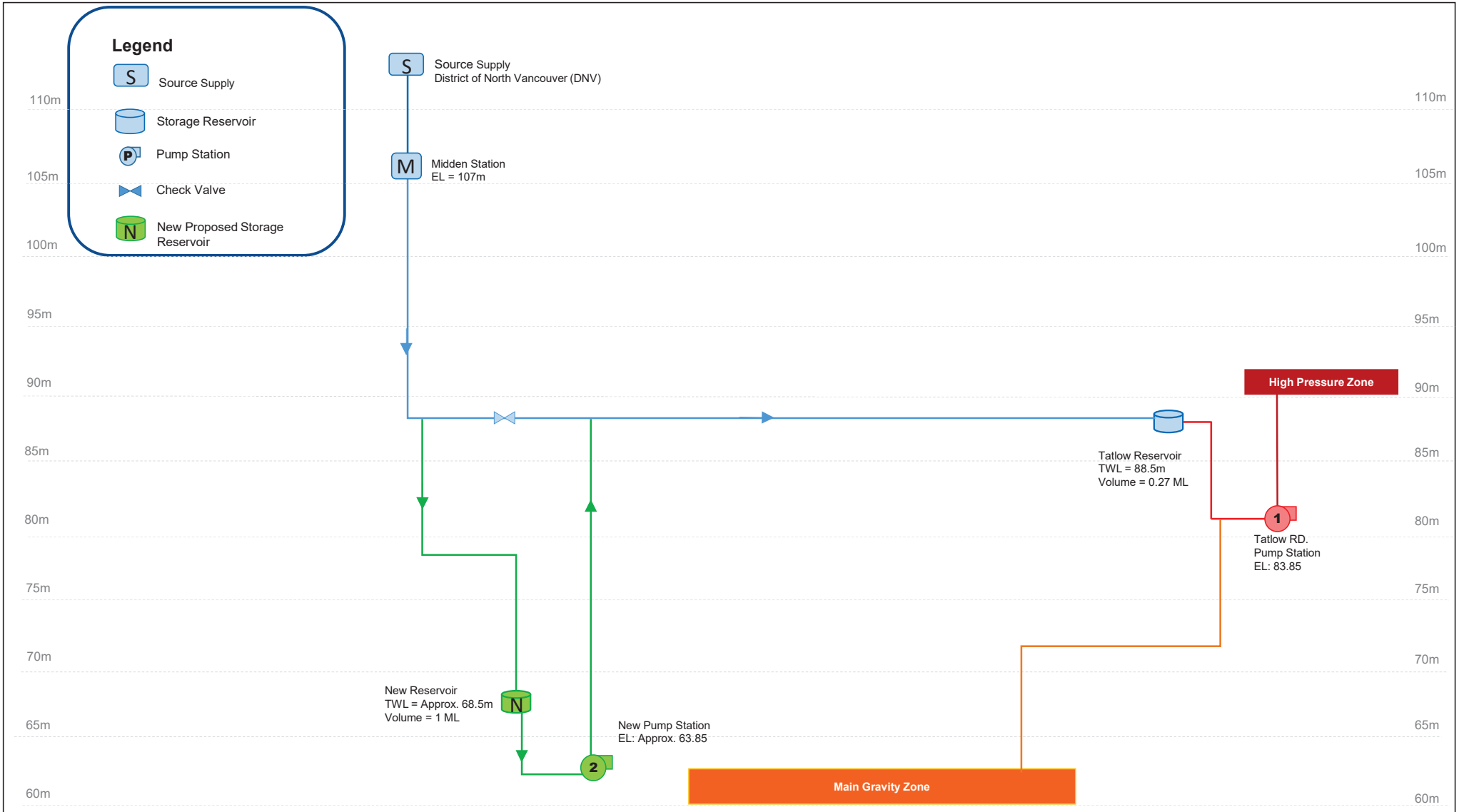
Option 1 involves implementing the system upgrades outlined in Section 3 for Scenario 1 while maintaining the existing storage at Tatlow Reservoir. The current tank, with the proposed system upgrades, can provide 60 L/s of fire flow for 1 hour. The system upgrades include the replacement of 392 m of existing mains on Main Ave and Coombe Lane with 300 mm watermains as shown on Figure 1. Water age analysis was not completed as part of the scope of this report. However, it may be a issue for the WAT2 upgrade on Coombe Lane as it is located at a dead-end and could require further analysis. ***REVISED NOVEMBER 1, 2024***

To reduce fire flow requirements at the two municipal buildings the Village could add sprinklers and clear trees around the buildings within a 20 m limit.

4.2 OPTION 2 - DUAL RESERVOIR SITES

This option includes the construction of new reservoir(s) at the site behind the municipal fire hall while maintaining the existing Tatlow Reservoir (Figure 3). The elevation of this site is unconfirmed, however, using available contour information it appears approximately 20 m below the existing Tatlow Reservoir. As a result, the reservoir can not feed the system directly, instead the water from the new reservoir will need to be pumped to Tatlow Reservoir before being distributed through the system. The new reservoir will be sized to address the approximately 1 ML storage deficiency outlined in Section 3.4. By constructing separate inlet and outlet pipes to the new reservoir, a chlorination system at this location will not be required, however the proposed chlorination system at Tatlow Reservoir will still be required. Figure 4 outlines the hydraulic schematic of Option 2.

Figure 3: Reservoir Sites



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Client: VILLAGE OF BELCARRA

Water System Hydraulic Schematic (Option 2)

Project:	211-09148-00
Drawn:	FS
Approved:	AK
Scale:	Not to Scale
Figure 4	
Map No:	
Date:	October 2024
Revision:	
Revision Date:	

The system upgrades for 120 L/s FF outlined for Scenario 2 in Section 3 will also be required in this option. These upgrades include 732 m of 300 mm watermain upgrades in addition to the 252 m outlined in Scenario 1 as well as the installation of 168 m of 200 mm new watermain to connect the reservoir to the supply mainline.

Operationally, the Village will need to manage two reservoir sites, each with its own pump station. This option provides the system's storage capacity requirement and achieves 120 L/s fire flow within the system. However, it also increases operational complexity and maintenance costs, and requires higher initial capital expenditure due to the need for a pump station at the new reservoir site.

4.3 OPTION 3 - SINGLE RESERVOIR SITE

This option considered constructing a new reservoir at a new site and decommissioning the existing tank at Tatlow Reservoir. As discussed in Section 3.4, a number of sites were discussed with the Village for the potential location of the new reservoir, including the site behind the municipal fire hall and a new site behind the existing Tatlow Reservoir. As part of this study, the site behind the municipal fire hall was considered.

As outlined in Section 4.2 the elevation at this site has not been confirmed, however using the available contour information, it is assumed for the purpose of this study that it is approximately 20 m below Tatlow Reservoir. Due to the lower elevation, the majority of the Village would have water only if it were pumped from the reservoir. This would result a larger pump station required than that discussed in Option 2. The advantages include simplified operations with only one reservoir site in operation, however it would result in higher operation costs.

4.4 COST ESTIMATE ANALYSIS

Class "D" Cost Estimates have been prepared for the improvement works defined in the previous sections. Cost estimates are based on values obtained from suppliers, WSP's internal cost database containing previous water system projects in municipalities across BC. Options 1 and 2 were costed in Table 5 below. Option 3 has been excluded from the cost analysis due to the various uncertainties that currently prevent the completion of a Class D cost estimate, including site location.

Table 5: Class "D" Construction Cost Estimate

	DESCRIPTION	UNIT	QUANTITY	UNIT RATE	COST
Option 1	Site Works	LS	1	$67,000	$67,000
	300 mm Watermain	l.m.	392	$1,230	$483,000
	General (including 40% contingency)	L.S	1	$429,000	$429,000
				TOTAL	**$979,000**
Option 2	Watermain Distribution System	L.S	1	$1,330,000	$1,330,000
	Reservoir	L.S	1	$1,374,000	$1,374,000
	Pump Station	L.S	1	$1,146,000	$1,146,000
	General (including 40% contingency)	L.S	1	$2,695,000	$2,695,000
				TOTAL	**$6,545,000**

Table 5 outlines the cost estimate details for the upgrades. It is important to note construction costs were estimated based on the assumptions that the existing hydrants and service connections will be reconnected into the new watermains. Quantities are approximated based on the information available from the Village of Belcarra GIS information system. In Option 2, the pump station is assumed to require a small building with a duty standby pump arrangement, flow meter and a backup generator on the same site as the reservoir. For the purpose of this cost estimate, it is assumed that the site can allow one reservoir to be constructed. This cannot be confirmed until a feasibility study and conceptual design is completed.

Refer to Appendix B for the detailed cost estimates of the proposed improvement works.

5 NEXT STEPS

Before proceeding with the conceptual design for a new reservoir, the model study/analysis must first confirm the following:

- The water source and method for filling the reservoir.
- The required storage volume.
- The necessary average and peak flows to supply the network from the reservoir.
- The daily cycling process to prevent water stagnation.

After identifying the feasible reservoir site(s) and finalizing the design basis, the concept development and site comparison can take place, leading to the selection of a preferred site. The first step in this process would be an additional site visit to assess the practical feasibility of the potential reservoir expansion sites.

For the conceptual study, WSP would propose the following scope:

- Concept development for each site
- Confirm the required infrastructure scope for each site
- Water supply to the reservoir
- Number and volume of reservoir(s)
- Residual disinfection requirements
- Booster pump requirements
- Bulk water supply from the reservoirs to the network
- Bulk electrical supply and standby generation
- Control and SCADA needs
- Compare sites on qualitative basis and select a Go-Forward option
- Go-Forward Option Conceptual design development and Technical Memorandum with:
    - Basis of Design
    - Preliminary Process Flow Diagrams (PFDs)

6 SUMMARY AND RECOMMENDATIONS

WSP assessed the impacts of the proposed watermain upgrades on available fire flows within the Village's existing water network.

Fire flow analysis was conducted under MDD conditions. The fire flow required in the Village is 117 L/s for the municipal building and 100 L/s for the fire station, as determined by FUS calculations.

A number of scenarios were identified within this report for addressing fire flow deficiencies:

- Scenario 1: Pipe upgrades so that hydrants are at least capable of 60 L/s fire flow.
- Scenario 2: pipe upgrades so that hydrants are at least capable of 60 L/s fire flow and approximately 120 L/s at the municipal buildings.

The fire flow analysis under MDD conditions for Scenario 1 indicates that most system deficiencies are resolved except for a municipal building on Bedwell Bay Road, a fire station, and one residential building. Most nodes requiring 60 L/s of fire flow now provide between 60 L/s and 231 L/s.

In Scenario 2, detailed in Figure 2, the upgrades successfully address deficiencies across the entire system, with most nodes delivering fire flows between 61 L/s and 296 L/s.

Using these scenarios and reviewing options for addressing the water storage deficiency within the system, three options were presented.

- Option 1: Scenario 1 system upgrades for 60 L/s fire flow and existing storage capacity at Tatlow Reservoir.
- Option 2: dual reservoir sites and Scenario 2 system upgrades
- Option 3: single reservoir site with pump station to pump water around the system

A feasibility study is required to carry out a review of the possible sites to confirm suitability. Once the suitable reservoir site(s) have been identified and the design criteria finalized, concept development and site comparison can occur, resulting in the selection of a preferred site.

APPENDIX

A FUS CALCULATIONS

FIRE SUPPLY FOR PUBLIC FIRE PROTECTION

ASSESSMENT OF WATER DISTRIBUTION SYSTEM

The water model and the accompanying "Village of Belcarra Hydraulic Water Model Development Report" (2022) prepared by WSP highlighted deficiencies in the system related to the current network's capability to meet the required fire flow requirements, which are assigned based on land use. Specifically, storage volume deficiencies at the Tatlow Reservoir are based on the maximum fire flow needed in the Village, corresponding to a 90 L/s institutional fire flow for the two municipal buildings, including the Municipal Hall and Fire Station, whereas the rest of the Village only requires a 60 L/s residential fire flow.

Prior to the optioneering works, FUS calculations were conducted to refine the fire flow requirements for the two municipal buildings in the Village, with the objective of reducing overall storage volume requirements based on refined maximum fire flow requirements. FUS uses the Canadian Classification Standard for Public Fire Protection (CCPFP) to set the criteria for evaluating a community's fire defenses. This assessment is used for fire insurance grading and classification within the Canadian property and casualty insurance industry. Water supply is one of the key components evaluated by FUS in the public fire protection system. The FUS assessment of a water distribution system focuses primarily on its ability to reliably deliver adequate water to control major fires throughout the service area, utilizing sufficient and suitable hydrants. To qualify for fire insurance grading recognition within the CCPFP, a water distribution system must meet the following minimum requirements: it must deliver at least 17 L/s(1000 LPM) for one hour (for dwellings and simple risks) or 34 L/s (2000 LPM) for two hours (for commercial lines insured risks), in addition to any domestic consumption at the Maximum Day Demand.

In the FUS assessment of a water distribution system, significant emphasis is placed on its ability to reliably deliver sufficient water to control major fires throughout the service area using adequate and suitable hydrants. The installation of automatic sprinkler systems in buildings greatly enhances a community's fire protection. It is important to note that sprinkler protection is mainly evaluated as part of private protection in the underwriting process. However, any property that is fully protected with a sprinkler system designed and installed according to NFPA 13, maintained and tested in accordance with NFPA 25, and has a water supply system meeting the requirements of this document, along with a fire department response meeting the criteria for fire insurance grading recognition, may be considered adequately protected even with a longer-than-normal response time. This is because the sprinkler system can effectively control fire growth, allowing the extended response time to be more effective.

DETERMINATION OF REQUIRED FIRE FLOW

The required fire flow is the amount of water necessary to control and extinguish a fire in a specific building or group of buildings. The calculation method can vary, but one common approach used in the FUS, and the Insurance Services Office (ISO) involves several steps and factors. To determine the estimated amount of water required to confine and control a fire in a building or a group of buildings, Fire Underwriters Survey uses the following base formula:

$$RFF = 220C\sqrt{A}$$

where A is the total floor area in square metres, and C is a factor based on the type of construction of the building. A fire flow analysis was conducted under FUS conditions for the Municipal Hall and Fire Hall buildings.

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The process of calculating fire flow starts with identifying the building classification (residential, commercial, industrial) to determine applicable fire flow standards. The base fire flow is then calculated using FUS guidelines, with adjustments made for construction type, occupancy type, exposure to adjacent buildings, and the building's height and area. Reductions are applied for fire protection features like sprinkler systems. The total required fire flow is determined by combining the base fire flow with these adjustments and reductions. The water supply system is evaluated through hydrant flow tests to verify that it meets the required flow for the specified duration and can handle the maximum day demand.

TOTAL EFFECTIVE AREA AND CONSTRUCTION COEFFICIENT (C)

To determine a required fire flow for an individual building, the Total Effective Area that would be affected during the design fire must be determined. The Municipal Hall was originally built in 1984, with an addition added in 1998. The total floor area is approximately 231 square meters. It is a one-story building with a storage loft at the west end. The construction type includes a wood frame, concrete foundation, asphalt shingles, cedar siding, and stucco. The building consists of 3 office areas, a reception area, 2 washrooms, a kitchen, a meeting hall, a storage room, and an archive room. A two-story Fire Hall building is constructed with a mix of wood framing and cinder blocks with a total floor area of 217 square meters. The building consists of 2 office areas, 2 washrooms and a parking area.

The Construction Coefficient (C) is the second factor used in fire flow calculations to adjust for the type of construction material of a building. It accounts for the varying degrees of fire resistance and combustibility associated with different construction types. When determining the predominate Construction Coefficient of a building, the following reference terms are used by fire underwriters and fire departments. Table 1 lists Construction Coefficient based on construction type and material. Two municipal buildings (e.g. Municipal Hall and Fire Station) are considered to be of Wood Frame construction (Type V) when structural elements, walls, arches, floors, and roofs are constructed entirely or partially of wood or other material.

Table 1: Construction Coefficient based on Construction material

CONSTRUCTION MATERIAL	CONSTRUCTION TYPE	CONSTRUCTION COEFFICIENT (C)
Wood Frame	Type V	1.5
Mass Timber (Encapsulated)	Type IV-A	0.8
Mass Timber (Rated Mass Timber)	Type IV-B	0.9
Mass Timber (Ordinary)	Type IV-C	1
Mass Timber (Un-Rated)	Type IV-D	1.5
Ordinary (Joisted Masonry)	Type III	1
Non-combustible	Type II	0.8
Fire Resistive	Type I	0.6

The Total Effective Area for a building classified with a Construction Coefficient from 1.0 to 1.5 is 100% of all Floor Areas in square meters are considered in determining the Total Effective Area to be used in the formula. For open parking garages, the Total Effective Area is the largest floor.

OCCUPANCY AND CONTENT ADJUSTMENT FACTOR

The Occupancy and Content Adjustment Factor adjusts the base fire flow requirement based on the building's usage and the associated fire risk. This factor accounts for the fire risk associated with the type of occupancy or use of the building and the combustibility of

the building contents. Table 2 provides a summary of adjustment factors based on level of combustibility. Buildings with highly combustible contents will have a higher content adjustment factor, reflecting the increased risk and higher fire flow requirement needed to extinguish a fire in such buildings.

Table 2: Occupancy and Content Adjustment Factors

DESCRIPTION OF CONTENTS	ADJUSTMENT FACTOR
Non-combustible contents	- 0.25
Limited combustible contents	-0.15
Ordinary combustible contents	0.00
Moderately high combustible contents	+0.15
Highly combustible contents	+0.25

In this calculations, standard level of ordinary combustibility expected in most residential and commercial buildings (e.g. typical household items or retail goods) is used.

AUTOMATIC SPRINKLER PROTECTION

Automatic sprinkler protection is a key factor in reducing the required fire flow up to 50% by enhancing a building's ability to control and suppress fires. The presence and effectiveness of an automatic sprinkler system can significantly impact fire flow calculations. The reduction in required fire flow due to sprinklers depends on the type of sprinkler system, its design, and its maintenance. Table 3 summarizes sprinkler reduction factors.

Table 3: Sprinkler Credits

SYSTEM DESIGN	SPRINKLER CREDITS
Automatic sprinkler protection designed and installed in accordance with NFPA 13	30%
Water supply is standard for both the system and Fire Department hose line	10%
Fully supervised system	10%

The initial credit of Automatic Sprinkler Protection is a maximum of 30% based on the system designed and installed in accordance with NFPA 13. To qualify for an additional 10% reduction, a standard water supply for both the sprinkler system and fire department hose lines is required. The conditions are: (a) the sprinkler system must be supplied by a pressurized water supply system, either public or private, designed and built with no major non-conformance issues, adhering to Part 1 of the Water Supply for Public Fire Protection for fire insurance grading recognition; (b) the calculated demand for the maximum sprinkler design area operation, including hose stream requirements, must be below the available water supply curve at the corresponding flow rate and pressure, with an appropriate safety margin to account for differences between the hydrant flow test conditions and the Maximum Day Demand conditions; (c) the volume of water available must be adequate for the total flow rate, including the maximum sprinkler design area operation, required hose streams, and Maximum Day Demand for the full duration of the design fire event; and (d) residual pressure at all points in the water supply system must be maintained at not less than 150 kPa during the flowing of the sprinkler and required hose streams, plus Maximum Day Demand. Additionally, a final 10% reduction can be applied for a fully supervised system.

EXPOSURE ADJUSTMENT CHARGES

The required fire flow of a subject building may be increased depending on the severity of exposed (ex. structures, stored materials, forest, etc.) to the subject building and the distance between the exposed risks and the subject building. This charge considers the

usage of water supplies to prevent exposed risks from igniting or being damaged during a major fire incident in the subject building. These adjustments ensure that the fire flow requirement adequately reflects the increased hazard due to exposure from neighboring properties. Table 4 outlines the maximum exposure adjustment charges to subject building and the exposed risk:

Table 4: Exposure Charges

SEPARATION DISTANCE	ADJUSTMENT CHARGE
0 m to 3 m	25%
3.1 m to 10 m	20%
10.1 m to 20 m	15%
20.1 m to 30 m	10%
Greater than 30 m	0%

The separation distance was evaluated based on the property's location. For the Municipal Hall, the maximum distance from the nearest building (e.g., Fire Station) is 20 meters to the north and 5 meters from the forest area to the south, east, and west. The maximum separation distance for the Fire Station is 20 meters on the north and east sides, and 5 meters on the west and south sides. As a result, the fire flow requirements have increased by 75% for the Municipal Hall and 65% for the Fire Station (refer to attached spreadsheets).

FUS ANALYSIS RESULTS

The FUS calculations were conducted to refine the fire flow requirements for two municipal buildings including Municipal Hall and Fire Station. The process involved evaluating the property's location, construction materials, occupancy type, fire protection measures (like sprinklers or alarms), and proximity to fire stations or hydrants. The maximum fire flow required in the Village is 117 L/s for the municipal building and 100 L/s for the fire station, as determined by FUS calculations, which include a 50% reduction factor of an automatic sprinkler system. Detailed calculations are presented in attached spreadsheets.

PRELIMINARY FIRE FLOW ESTIMATE

HLE FILE No.:	
DATE:	October 8, 2024
PROJECT:	Belcarra - Fire Station
LOCATION:	
CALC BY:	FS

A) TYPE OF CONSTRUCTION: Woodframe Building

B) NO. OF STORIES: 2

C) FIRE FLOW: $f = 220 * c * \sqrt{a}$

A = Total Floor Area **a=** 217 **m^2**

The total floor area in square metres (including all stories, excluding basements at least 50% below grade) of the building being considered.

C = Coefficient related to the type of Construction **c=** 1.5

= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unproctected metal structural components, masonry or metal walls)
= 0.6 for fire resistive construction (fully protected frame, floors, roof)

f= 5,000 **L/min**

D) OCCUPANCY:

Non combustible	-25%
Limited combustible	-15%
Combustible	No charge
Free Burning	15%
Rapid Burning	25%

ADD OR SUBTRACT (±) 15 **% of C** 5,750 **L/min**

E) AUTOMATIC SPRINKLER REDUCTION (yes/no): yes

Complete automatic sprinkler protection up to 50% reduction

SUBTRACT (-) 50 **% of D** 2,875 **L/min**

F) EXPOSURE:

Separation:			Max. Charge:
0	to	3	25%
3.1	to	10	20%
10.1	to	20	15%
20.1	to	30	10%
30	>		0%

Distance:

1. North	20.0	meters	10.0	%
2. South	5.0	meters	20.0	%
3. East	20.0	meters	10.0	%
4. West	5.0	meters	20.0	%
	ADD TOTAL (+)		60	**% of D**

G) FIRE FLOW REQUIREMENT= 6,000 **L/min**

100 **L/sec**

PRELIMINARY FIRE FLOW ESTIMATE

HLE FILE No.:	
DATE:	October 8, 2024
PROJECT:	Belcarra - Municipal Hall
LOCATION:	
CALC BY:	FS

A) TYPE OF CONSTRUCTION: Woodframe Building

B) NO. OF STORIES: 1

C) FIRE FLOW: $f = 220 * c * \sqrt{a}$

A = Total Floor Area **a=** 231 **m^2**

The total floor area in square metres (including all stories, excluding basements at least 50% below grade) of the building being considered.

C = Coefficient related to the type of Construction **c=** 1.5

= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
= 0.6 for fire resistive construction (fully protected frame, floors, roof)

f= 5,000 **L/min**

D) OCCUPANCY:

Non combustible	-25%
Limited combustible	-15%
Combustible	No charge
Free Burning	15%
Rapid Burning	25%

ADD OR SUBTRACT (±) 15 **% of C** 5,750 **L/min**

E) AUTOMATIC SPRINKLER REDUCTION (yes/no): yes

Complete automatic sprinkler protection up to 50% reduction

SUBTRACT (-) 50 **% of D** 2,875 **L/min**

F) EXPOSURE:

Separation:			Max. Charge:
0	to	3	25%
3.1	to	10	20%
10.1	to	20	15%
20.1	to	30	10%
30	>		0%

Distance:

1. North	20.0	meters	20.0	%
2. South	5.0	meters	20.0	%
3. East	5.0	meters	20.0	%
4. West	5.0	meters	20.0	%
	ADD TOTAL (+)		75	**% of D**

G) FIRE FLOW REQUIREMENT= 7,000 **L/min**

117 **L/sec**

APPENDIX

B COST ESTIMATES

VILLAGE OF BELCARRA

Village of Belcarra
Upgrade Deficiencies in Existing Water System - Option 1
Class 'D' Cost Estimate

Item #	Description	Unit	Unit Price $	Quantity	Price
1	**SITE WORKS**				
1.1	Removal and Disposal of Asphalt	lineal m	$ 50	392	$ 19,600
1.2	Surface Restoration *Rough site grading along alignment, entire 2m ROW width*	lineal m	$ 120	392	$ 47,040
	Sub-Total Site Works				**$ 67,000**
2	**Water Distribution System**				
2.3	Watermain 300mm PVC *all depths, imported backfill*	lineal m	$ 1,230	392	$ 482,160
	Sub-Total Water Distribution				**$ 483,000**
	Sub-Total				**$ 550,000**
GEN 1	Contingency (Class D)			50%	$ 275,000
GEN 2	Commissioning			1%	$ 5,500
GEN 3	Warranty			1%	$ 5,500
GEN 4	Traffic Management			3%	$ 16,500
GEN 5	Environmental / Erosion Sediment Control			3%	$ 16,500
GEN 6	Rock and Contaminated Soil Removal / Disposal			1%	$ 5,500
GEN 7	Insurance & Bond			1%	$ 5,500
GEN 8	Mob/Demob			3%	$ 16,500
GEN 9	Engineering Design			15%	$ 82,500
	Total				**$ 979,000**

This estimate has been prepared on the following assumptions:

1. This estimate has been produced in advance of design drawings, further design information, and quantities; this estimate is subject to review as new information is available. Quantities that are unavailable at this stage have been captured based on unit costs for similar recently tendered & estimated work in other municipalities.
2. The cost estimate utilized the WaterCAD model to determine quanitites. Where watermain replacements are proposed, the unit rate excludes the replacement of service connections and hydrant connections.
3. Costs exclude considerations/items such as GST, operational costs, and deviation of existing unknown services or extraordinary conditions.
4. This estimate has been based on prices in September 2024. Pricing and lead times are subject to change as they currently have shown to be volatile from materials & equipment suppliers within the industry, due to the current market conditions and other global issues.
5. The estimate is based on excavated material having little need for rock removal and contaminated soil (1% of excavated volume) with a 1% budget allocation for disposal.

VILLAGE OF BELCARRA

Village of Belcarra

Upgrade Deficiencies in Existing Water System - Option 2

Class 'D' Cost Estimate

Item #	Description	Unit	Unit Price $	Quantity	Price
1	**Water Distribution System**				
1.1	Watermain 300mm PVC *all depths, imported backfill*	lineal m	$ 1,230	984	$ 1,211,000
1.2	Site Works *surface restoration (assuming 2m width)*	lineal m	$ 120	984	$ 119,000
	Sub-Total Water Distribution				**$ 1,330,000**
2.0	**Reservoir**				
2.1	1.01 ML Reservoir *Reservoir (assuming one tank 12m diameter, 9m height), siteworks, mechnical, electrical, structural*	m3	$ 1,200	1001	$ 1,202,000
2.2	Watermain 200mm PVC *all depths, imported backfill*	lineal m	$ 1,020	168	$ 172,000
	Sub-Total Reservoir				**$ 1,374,000**
3.0	**Pump Station**				
3.1	**Site Works**				
3.1.1	Grading & Landscape Restoration	LS	$ 15,000	1	$ 15,000
3.1.2	Excavation	LS	$ 20,000	1	$ 20,000
3.1.3	On-Site Piping	LS	$ 20,000	1	$ 20,000
3.2	**Mechanical**				
3.2.1	Pump *55kW Pump, 60 L/s*	Each	$ 125,000	2	$ 250,000
3.2.2	Valves	LS	$62,000	1	$ 62,000
3.2.3	Flowmeter	Each	$26,000	1	$ 26,000
3.2.4	Ventilation	LS	$18,000	1	$ 18,000
3.2.5	Piping (Stainless Steel 304)	LS	$90,000	1	$ 90,000
3.2.6	Mechanical Installation labour	LS	$31,000	1	$ 31,000
3.3	**Structural**				
3.3.1	Pump Station Foundation	LS	$76,000	1	$ 76,000
3.3.2	Pump Station Building incl. finishes	LS	$97,000	1	$ 97,000
3.4	**Electrical**				
3.4.1	Power Service (Underground Cable & Conduit)	LS	$97,000	1	$ 97,000
3.4.2	MCC	LS	$111,000	1	$ 111,000
3.4.3	Backup Generator & ATS	LS	$100,000	1	$ 100,000
3.4.4	Instrumentation & Controls	LS	$51,000	1	$ 51,000
3.4.5	SCADA Equipment	LS	$31,000	1	$ 31,000
3.4.6	Miscellaneous conduits, conductors, wiring and terminations	LS	$51,000	1	$ 51,000
	Sub-Total Pump Station				**$ 1,146,000**
	Sub-Total				**$ 3,850,000**
GEN 1	Contingency (Class D)			40%	$ 1,540,000
GEN 2	Commissioning			1%	$ 38,500
GEN 3	Warranty			1%	$ 38,500
GEN 4	Traffic Management			5%	$ 192,500
GEN 5	Environmental / Erosion Sediment Control			3%	$ 115,500

GEN 6	Rock and Contaminated Soil Removal / Disposal	1%	$	38,500
GEN 7	Insurance & Bond	1%	$	38,500
GEN 8	Mob/Demob	3%	$	115,500
GEN 9	Engineering Design	15%	$	577,500
	Total		**$**	**6,545,000**

This estimate has been prepared on the following assumptions:

1. This estimate has been produced in advance of design drawings, further design information, and quantities; this estimate is subject to review as new information is available. Quantities that are unavailable at this stage have been captured based on unit costs for similar recently tendered & estimated work in other municipalities.
2. The cost estimate utilized the WaterCAD model to determine quanitites. Where watermain replacements are proposed, the unit rate excludes the replacement of service connections and hydrant connections.
3. Costs exclude considerations/items such as GST, operational costs, land acquistion and deviation of existing unknown services or extraordinary conditions.
4. This estimate has been based on prices in September 2024. Pricing and lead times are subject to change as they currently have shown to be volatile from materials & equipment suppliers within the industry, due to the current market conditions and other global issues.
5. The estimate is based on excavated material having little need for rock removal and contaminated soil (1% of excavated volume) with a 1% budget allocation for disposal.

APPENDIX B to Item 10.1

VILLAGE OF BELCARRA
REPORT NUMBER: 211-09148-00

VILLAGE OF BELCARRA HYDRAULIC WATER MODEL DEVELOPMENT

SEPTEMBER 02, 2022

CONFIDENTIAL

VILLAGE OF BELCARRA WATER MODEL DEVELOPMENT

VILLAGE OF BELCARRA

FINAL
CONFIDENTIAL

PROJECT NO.: 211-09148-00
DATE: SEPTEMBER 02, 2022

WSP
100 – 840 HOWE STREET
VANCOUVER, BC V6Z 2M1

T: +1 604-685-9381
WSP.COM

September 02, 2022

Confidential

Village of Belcarra
4048 Bedwell Bay Road
Belcarra BC, V3H 4P8

Attention: Paula Richardson, Acting Chief Administrative Officer;
Stewart Novak, Public Works & Emergency Preparedness Coordinator

Dear Ms. Richardson & Mr. Novak:

Subject: Water Model Development

WSP Canada Inc. is pleased to submit to the Village of Belcarra one (1) digital copy of our Village of Belcarra Water Model Development Report.

Yours sincerely,

Michael Levin, P.Eng., PMP
Project Manager, Infrastructure

SG/ML/ab
Encl
WSP ref.: 211-09148-00

Suite 1000
840 Howe Street
Vancouver, BC VZ 2M1
wsp.com

REVISION HISTORY

SECOND ISSUE

September 1, 2022	Draft Submission	
Prepared by	Approved By	
Sanwal Gilani, E.I.T.	Michael Levin, P.Eng., PMP	
September 2, 2022	Final Submission	
Prepared by	Approved By	
Sanwal Gilani, E.I.T.	Michael Levin, P.Eng., PMP	

SIGNATURES

PREPARED BY

September 2, 2022

Sanwal Gilani, E.I.T.
Project Engineer

Date

APPROVED BY

September 2, 2022

Michael Levin, P.Eng., PMP
Project Manager

Date

WSP prepared this report solely for the use of the intended recipient, Village of Belcarra, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

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CONTRIBUTORS

CLIENT

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Village Operations Staff	Brad Smith
Village Operations Staff	Lance Fortier

WSP

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Project Engineer	Sanwal Gilani, E.I.T.

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FIGURES

APPENDICES

1 INTRODUCTION

1.1 PURPOSE

WSP Canada Inc. (WSP) was retained by the Village of Belcarra (the 'Village') to develop the Village of Belcarra water model to represent the existing water model and to provide recommendations on further studies to identify capital upgrades to address any issues in the existing system.

The purpose of this assignment was to develop the model using the AutoCAD drawing developed by WSP in 2017 and a 5-meter contour map for the Village. The hydraulic model was developed in WaterCAD, but will also be delivered in EPANET, which is a non-proprietary and free software. This is done to allow the Village to take ownership of the computer water model in the future for their own internal use.

This report summarizes the model development and calibration efforts as well as presents recommendations on further studies to identify upgrades to address any deficiencies in the existing system. This will provide guidance for improved and more transparent decision-making for the management and operation of the Village's water utility system.

1.2 SCOPE OF WORK

The scope of work for this assignment is as follows:

- Gather and review all existing information related to water supply, such as studies, reports, drawings, etc. from the Village.
- Provide a summary of the water system.
- Discuss assumptions for existing populations and scenarios.
- Develop the water model in Bentley's WaterCAD and convert it to the latest version of U.S. EPA's EPANET.
- Conduct a hydraulic analysis to identify issues related to service pressures, fire flows, storage capacity, and water age.
- Recommend further studies to identify capital upgrades required to meet the Village's level of service assessment criteria.

1.3 DATA COLLECTION AND INFORMATION REVIEW

The Village provided record drawings that were used to develop the model. Table 1 lists the data collected and reviewed by WSP to develop the model. The information was provided in electronic format, and consists of geospatial data, drawings, records, and reports of previous relevant studies.

Table 1: Data Collection Summary

DESCRIPTION	DATA TYPE	SOURCE	PURPOSE
Civil Water System Overall Plan (see Figure 1)	AutoCAD	WSP	Model Development
Belcarra Water System Overview	PDF	Village of Belcarra	Model Development
Tatlow Road Reservoir and Pump Station Valve Operational Procedures – Record Drawing	PDF	Village of Belcarra	Model Development
Tatlow Fire Pump Plate	JPEG	Village of Belcarra	Model Development
Metro Vancouver Water Consumption Statistics Report (March 2021)	PDF	Village of Belcarra	Demand Estimation
Belcarra Water Consumption from Billings	.xlsx	Village of Belcarra	Demand Estimation
Belcarra Park Meter Readings	.xlsx	Village of Belcarra	Demand Estimation
Available Capacity of Pipeline Supply from DNV Memo (2022)	PDF	WSP	Demand Estimation
Village of Belcarra Bylaw 492 – Subdivision and Development (2015)	PDF	Village of Belcarra	Level of Service Criteria

2 EXISTING WATER SYSTEM

2.1 WATER SYSTEM OVERVIEW

The District of North Vancouver (DNV) has been the primary supplier of potable water for the Village since 2011. Water is supplied from the DNV via two 200 mm High Density Polyethylene (HDPE) marine pipelines which are currently located at the bottom of the waterway between the Deep Cove area and Belcarra Pier. These watermains are approximately 1,400 m in length and feed potable water from the DNV at Strathcona Road to the Village at the intersection of Midden Road and Belcarra Bay Road.

The water is supplied at a maximum instantaneous flow of 20 L/s at a hydraulic grade of 107 m. It is then transported to the Tatlow Road Reservoir at a maximum tank water level (TWL) of 88.5 m through a 200 mm Ductile Iron (DI) watermain.

Potable water is supplied to the two pressure zones within the Village from the Tatlow Road Reservoir via a 200 mm DI gravity main and a 150 mm DI high pressure main.

Table 2 provides a summary of the Belcarra water system infrastructure. Figure 1 is the AutoCAD drawing developed by WSP in 2017 which illustrates the water system infrastructure.

Table 2: Belcarra Water System Overview

ITEM	QUANTITY
Number of Water Sources	1
Number of Reservoirs	1
Number of Pressure Zones	2
Number of Pump Stations	1
Number of Hydrants	35
Length of Watermains (Potable)	11.98 km

DISTRICT OF NORTH VANCOUVER

CITY OF PORT MOODY

VILLAGE OF BELCARRA

JUG ISLAND

COSY COVE

INDIAN ARM

BEDWELL BAY

SASAMAT LAKE

WOODHAVEN

HAMBER ISLAND

BOULDER ISLAND

BELCARRA BAY

B.C. HYDRO RIGHT-OF-WAY

B.C. HYDRO RIGHT-OF-WAY PLAN 31854

D.L. LINE

LANE

COMBE LANE

PIPELINE

WHISKEY COVE LANE

WHISKEY COVE

LOWER ZONE

UPPER ZONE

SALISH ROAD

TURNER ROAD

TURNLEAD ROAD

BELCARRA BAY ROAD

BEDWELL BAY ROAD

MARINE AVENUE

SENKLER ROAD

BOWSER AVENUE

WINDERMERE CREEK

WATSON ROAD

TAYLOR ROAD

KELLY ROAD

MAIN AVENUE

DOUGLAS ROAD

DOUG ROAD

WEST ROAD

MIDDEN ROAD

BELCARRA PARK

TATLOW RD. PUMP STATION CHLORINE ANALYZER

TATLOW ROAD RESERVOIR
T.W.L.=88.50m
NOMINAL DIMENSION 26ftø 18ft HIGH
USEABLE CAPACITY 58,800 I.G.
3,360 I.G./ft
CONC. FOUNDATION ELEV. 83.06m

FROM DISTRICT OF NORTH VANCOUVER
2-200ø DR 7.3 HDPE WATERMAIN

MIDDEN RD. PIG RECEIVING BLD. PIGGING PORT

Rem. Pcl."48" #4084 (WORKS YARD) PLAN 3014

#4086 (RECYCLE DEPOT)

LEGEND:

SIZE	ITEM	SYMBOL
200ø	2-DR7.3 HDPE WATERMAIN FROM NNV	
200ø	D.I. WATERMAIN SUPPLY SYSTEM	
200ø	D.I. WATERMAIN DISTRIBUTION SYSTEM	
150ø	D.I. WATERMAIN HIGH PRESSURE	
	AIR RELEASE VALVE	Ⓐ
	BLOWOFF/BLOWDOWN VALVE	Ⓑ
	HYDRANT	
	PIGGING PORT	
	SAMPLING STATION	
	CHLORINE INJECTION SITE	
	CHLORINE SYSTEM ANALYZER SITE	
	PESERVOIRS	
	VALVE	

Revision	Amendment	Approved	Revision Date

Village of Belcarra
Between Forest and Sea

OPUS
North Vancouver Office
604-990-4800
210-889 Harbourside Drive
North Vancouver BC
V7P 3S1, Canada

Designed	Approved	Approved Date
Drawn	**Scales**	

Project
VILLAGE OF BELCARRA
BELCARRA, BC
WATERMAIN PROJECT

Sheet
CIVIL
WATER SYSTEM OVERALL PLAN

Project No.	Sheet. No.	Revision
D-26911.01	####	####

1:1 @ ANSI D
0 10 20 30 40 50 60 70 80 90 100 mm

300 mm
200
100
50
10 mm
0

Original Sheet Size ANSI D [22"x34"] Plot Date 2017-10-31 at 2:06:45 PM Path M:\BELCARRA, VILLAGE OF\D-26911.01\(C) Civil\+AutoCAD\D-26911.01 C101.dwg A1

3 DESIGN CRITERIA

The design criteria used to review the system's minimum and maximum service pressures, storage volume, available fire flows, and other standards are outlined in this section. The design criteria are in accordance with the Village of Belcarra Waterworks Bylaw No.456, 2012, Village of Belcarra Subdivision and Development Bylaw No. 492, 2015, and MMCD design guidelines. Table 3 below provides a summary of the design standards utilized.

Table 3: Design Criteria

DESIGN PARAMETER	VALUE		
Minimum pressure during MDD + FF	20 psi		
Minimum pressure during PHD	40 psi		
Maximum pressure during ADD	120 psi		
Fire Flow Demand	Land Use	Fire Flow (L/s)	Duration (Hrs)
	Residential single family	60	1.5
	Cluster housing	120	2
	Suburban	60	1.5
	Institutions	90	2
	Isolated commercial	90	2
	Small grp. commercial	120	2
Per Capita Demand	ADD – 500 L/capita/day MDD – 1000 L/ capita/day (2xADD) PHD – 2000 L/ capita/day (4xADD)		
Hazen-William's 'C' Values	For all mains 250 mm and larger – 115 For all mains 200 mm and smaller – 100		
Storage Tank Volume Requirement	Volume=A+B+C Where: A = Fire Storage (required extent and duration of fire flow as noted above) B = Equalization Storage (25% of Maximum Day Demand serviced by the Storage Reservoir) — C = Emergency Storage (25% of A + B)		

4 MODEL AND SCENARIO DEVELOPMENT

4.1 MODEL SOFTWARE SELECTION

The hydraulic model was developed in WaterCAD, as the modelling platform allows for all components of the distribution network to be represented dynamically, with allowance for multiple scenarios to be generated, including fire flow simulations. However, the model will be delivered in EPANET, which is a non-proprietary and free software to allow the Village to take ownership of the computer water model in the future for their own internal use. Recent record drawings and 5 m contour data was the primary source of data used for the model development.

4.2 MODEL DEVELOPMENT OVERVIEW

4.2.1 JUNCTIONS

Junctions in the model represent changes in pipe material or diameter in the distribution network and indicate intersections of pipes or locations of hydrants. Data from the AutoCAD drawing illustrated in Figure 1 was used for watermains and other water infrastructure which has been used to create the existing network in the model. New junctions that were added to the model were assigned pressure zone and elevation according to the contour information. There are currently 35 hydrants in the Belcarra water distribution system.

4.2.2 PIPES

Watermains in the Belcarra distribution network are modelled in WaterCAD as pipes with pressure drop due to friction estimated using the Hazen–William's equation. In this formulation, friction is proportional to the C-factor, which is a measure of pipe smoothness and dependent on pipe material and install year. The model was developed to include pipe material and size using information contained in the AutoCAD drawing shown in Figure 1. Assigned C-factors are described in greater detail in the Model Calibration section of this report.

The majority of the watermains are Ductile Iron (DI). There are two HDPE marine pipelines which supply potable water to the Village from the DNV. The majority of Belcarra's 11.98 km potable water distribution network consists of pipes that are 200 mm in diameter (83%), with 17% of the network being 150 mm in diameter.

4.2.3 RESERVOIRS

Reservoirs in WaterCAD represent raw water sources. The DNV source is represented in the model as a reservoir with a static water level of 107 m.

4.2.4 TANKS

Tanks in WaterCAD represent storage in the distribution system. There is only one active storage reservoir in the Belcarra water distribution system constructed in 1999. The Tatlow reservoir receives water from a gravity main from the DNV source and has a top water level of 88.50 m and a capacity of 58,800 imperial gallons (or 0.27 ML). WSP reviewed reservoir information such as capacity, base elevation and top water level provided by the Village. The design life of the Tatlow Reservoir is estimated to be 50 years, however a detailed condition assessment would be required to determine its current state and estimated remaining service life. WSP is currently in discussions with

Village staff on a condition assessment plan taking into account the unique circumstances of the site (i.e. the difficult and steep terrain locally).

4.3 SCENARIO DEVELOPMENT

The hydraulic water model was used to assess the existing hydraulic performance of the water network under Average Day, Maximum Day Demand, and Peak Day Demand conditions. In addition, a water age analysis was conducted, and fire flows coincident to MDD were also assessed. Prior to conducting these analyses, base demands were first determined for each demand scenario and water age analysis.

4.3.1 AVERAGE DAY DEMAND

The Average Day Demand is the average demand in a year regardless of season. The value is useful in analyzing historic demands and patterns and in assessing maximum service pressures in the water system.

Based on recent consumption data received from the DNV, the highest ADD recorded for the Belcarra system between 2016 and 2021 was 3.4 L/s in 2020. Using the park meter data provided by the Village, the highest recorded ADD was 0.8 L/s in 2020. The cumulative ADD including DNV consumption records and park flows is 4.2 L/s for 2020, equating to 535 L/capita/day based on a residential population of 678 persons (2021 BC Stats).

The calculated ADD for 2020 is 7% higher than the ADD calculated using the 500 L/capita/day consumption rate in the Village's Subdivision and Development bylaw. The flows during 2020 are higher than typical demands experienced by the Village in recent years. The high 2020 demand may potentially be considered an outlier due to COVID correlating to a higher water usage. It is suggested that the Village continue to monitor annual consumption trends in the short-term to determine if 2020 was an outlier and if model demands can be adjusted down to a more representative year, or if it worthwhile revising the per capita consumption rates in the Bylaw to reflect higher domestic usage.

For the purposes of this study, the 2020 ADD was chosen as representative of existing demands in the model as it is a more conservative estimate.

Demands were proportionally assigned to each parcel in the system based on user type. From the Village's Zoning Bylaw 510, 2018, it was determined that a majority of the lots fall under 'one family residential zone (RS-1)'. There is one 'civic institutional (CI-I)' lot and three 'regional park (P-1)' lots. Civic and park demands totaling 0.8 L/s were proportionally split amongst the four ICI lots. The residential portion of the overall ADD (3.4 L/s) was proportionally split amongst the remaining parcels in the Village.

4.3.2 MAXIMUM DAY DEMAND

The Maximum Day Demand gives an estimation of the maximum water usage per capita for one day (presumably the hottest summer day) in a given year. It is used for sizing storage reservoirs, distribution system pumping capacities, and transmission mains. Due to a lack of daily flow data, a multiplication factor of 2*ADD was used to establish the 2020 MDD, in line with the Village's current design standards as discussed in Section 3. This resulted in an MDD of 8.3 L/s.

4.3.3 PEAK HOUR DAY DEMAND

The Peak Hour Demand is an estimation of the maximum water usage of the system in an hour during a day in a given year, which typically occurs on or around the day when MDD occurs. The PHD is recorded through water usage from the source, as well as balancing storage in the system reservoirs. In the absence of reservoirs, the supply must meet this demand. PHD is typically used to assess low pressures in water systems. Due to a lack of hourly flow data, a multiplication factor of 4*ADD was used to establish the 2020 MDD, in line with the Village's current design standards as discussed in Section 3. This resulted in a PHD of 16.6 L/s.

5 MODEL CALIBRATION

5.1 BACKGROUND

"Water-distribution-model calibration consists of comparing model results with field measurements, making adjustments to a model, and reviewing field data to improve agreement between the two. The calibration process should result in a more accurate model as well as a better understanding of the strengths and weakness of the model – and in many cases a better understanding of the distribution system itself".

(Committee Report: Defining Model Calibration, AWWA, 2013)

A water model is a decision-support tool. Although a water model can be calibrated to accurately perform an analysis of fire flows, water quality, and/or energy requirements, a model that is calibrated for one of these analyses may not be well calibrated for another. It is how the water model will be used as a decision support tool that will dictate the type and extent of model calibration.

The hydraulic calibration of a water model for fire flow analysis provides a model that is well suited to assess other demands on the system such as ADD and MDD and how these demands impact the sizing of reservoirs, sizing of transmission and distribution watermains, pumping capacity, PRV settings, etc. The calibration of the hydraulic water model for a fire flow analysis therefore provides the Village with a tool to develop a cost-effective strategy to manage and upgrade its potable water infrastructure to meet the demands of the current population as well as anticipated growth.

Calibration of a water model is an iterative review process encompassing the details of each component of the water system including: the length, diameter, material, and roughness factors of the watermains; node demands and elevations; and PRV configurations and operational settings. The calibration process allows for confirmation and, where appropriate, revisions to the assumptions and/or estimates made in the development of the model.

Calibration requires confirmation of the model predictions by comparison to field measurements. A hydrant flow testing program was developed such that static and residual pressures within the water distribution network could be recorded during a simulation of fire flows, as well as any special operational changes to the system (such as main closures, valve closures, etc.). The recorded field results are then compared to the computer water model predicted results through the calibration process.

A hydraulic water model is considered calibrated if 10% of the network is calibrated to within 10% of field-recorded static and residual flows.

5.2 METHODOLOGY

A program for multi-pressure and C-factor hydrant flow testing was developed for the purpose of collecting field data from which to calibrate the constructed hydraulic water model. Due to the number and location of fire hydrants and in-line isolation valves, multi-pressure hydrant testing and C-factor testing locations were limited in the Belcarra system. In order to get useful results for the Belcarra system, WSP conducted a scaled down multi-pressure test set, 3 C-factor tests and 1 one-point C-factor test.

A multi-pressure hydrant flow testing program includes fully opening a pre-determined hydrant and measuring flow from it, while simultaneously recording residual pressures at four other hydrants in the surrounding area, within the same pressure zone. However, due to the number and locations of fire hydrants and in-line vales, the type of testing available within the Village is limited. For this reason, the full multi-pressure test as described above is not able to be implemented in the Village. In order to get useful results for the Village, WSP conducted a scaled down multi-pressure test.

A C-factor hydrant flow testing program includes isolating supply to and fully opening a pre-determined hydrant and measuring flow from it, while simultaneously recording residual pressures at the flow hydrant and at an adjacent hydrant upstream. The procedure used to collect data for model calibration is outlined as follows:

- For multi-pressure hydrant flow testing, three high resolutions pressure loggers (± 0.2% of full scale) were installed on predetermined hydrants within the test zone and one was installed on the hydrant adjacent to the flow hydrant. For C-factor hydrant flow testing, two pressure loggers were installed on the hydrants immediately upstream of the flow hydrant;
- One 2.5-inch turbine flow meter (accuracy 0.5%) was installed on a predetermined flow hydrant port to achieve full hydrant flow, this was repeated two more times within each test set;
- Village field crews monitored flow and supervised drainage and dechlorination;
- Flow rates were recorded form an analog readout meter. This flow is later used to simulate flow in the water model to calibrate the modelled system pressure changes to those recorded by the pressure loggers; and,
- Pressure loggers were removed, stopped, and downloaded into a computer program. From this recorded data, static and residual pressures were later retrieved.

The following were considered in the selection of the multi-pressure hydrant flow and pressure locations to obtain representative coverage of the zone:

- All hydrants are in the same pressure zone;
- General location and populated areas; and,
- Land use.

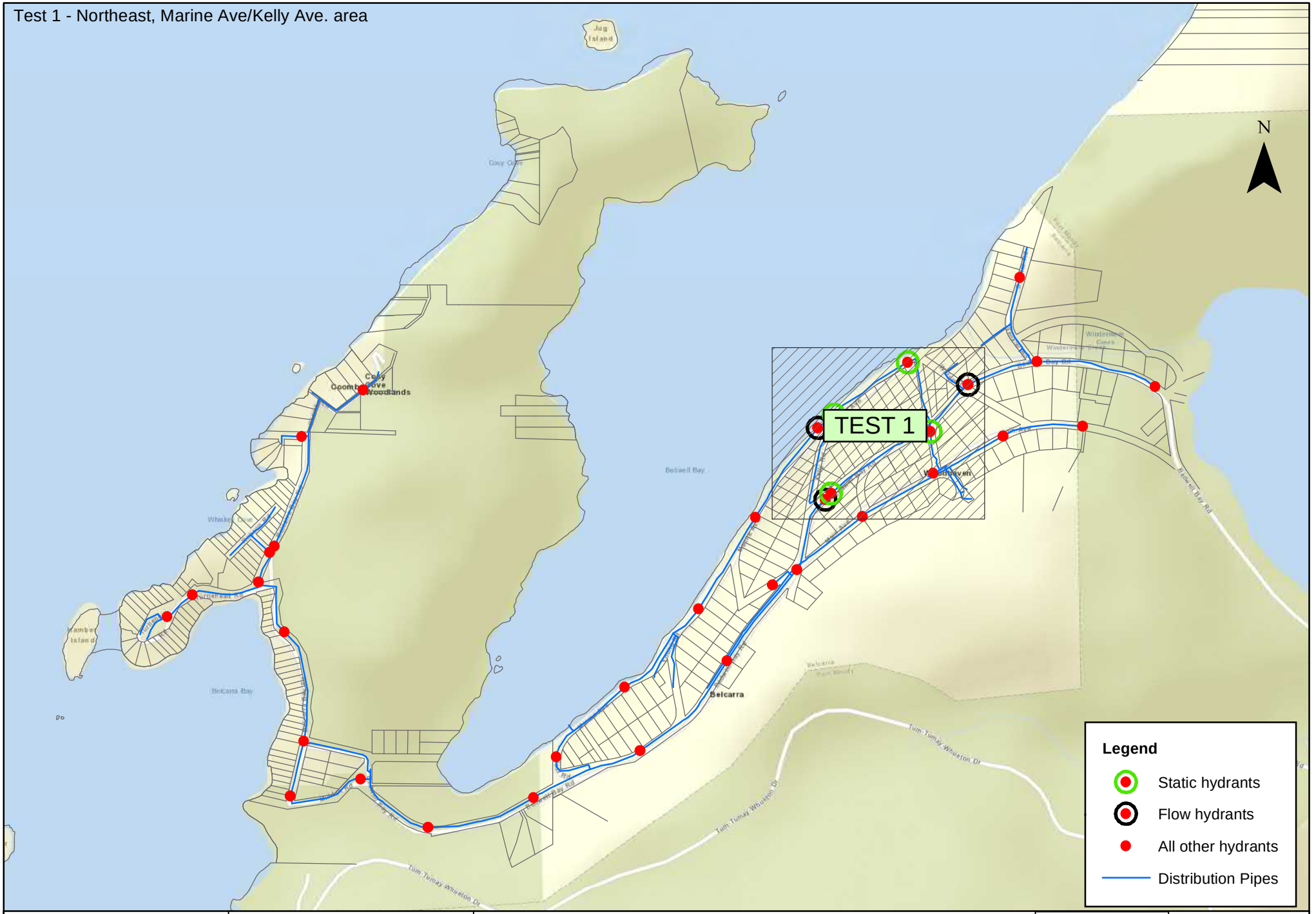
The following were considered in the selection of the C-factor hydrant flow test and pressure locations to obtain representative coverage of the system's watermains:

- All hydrants are in the same pressure zone;
- Range of pipe diameters; and,
- Range of pipe materials.

Four C-Factor tests were conducted across the Village's two pressure zones and are presented in detail in Appendix A

Figure 2 and Figure 3 illustrate the hydrant testing locations.

Test 1 - Northeast, Marine Ave/Kelly Ave. area



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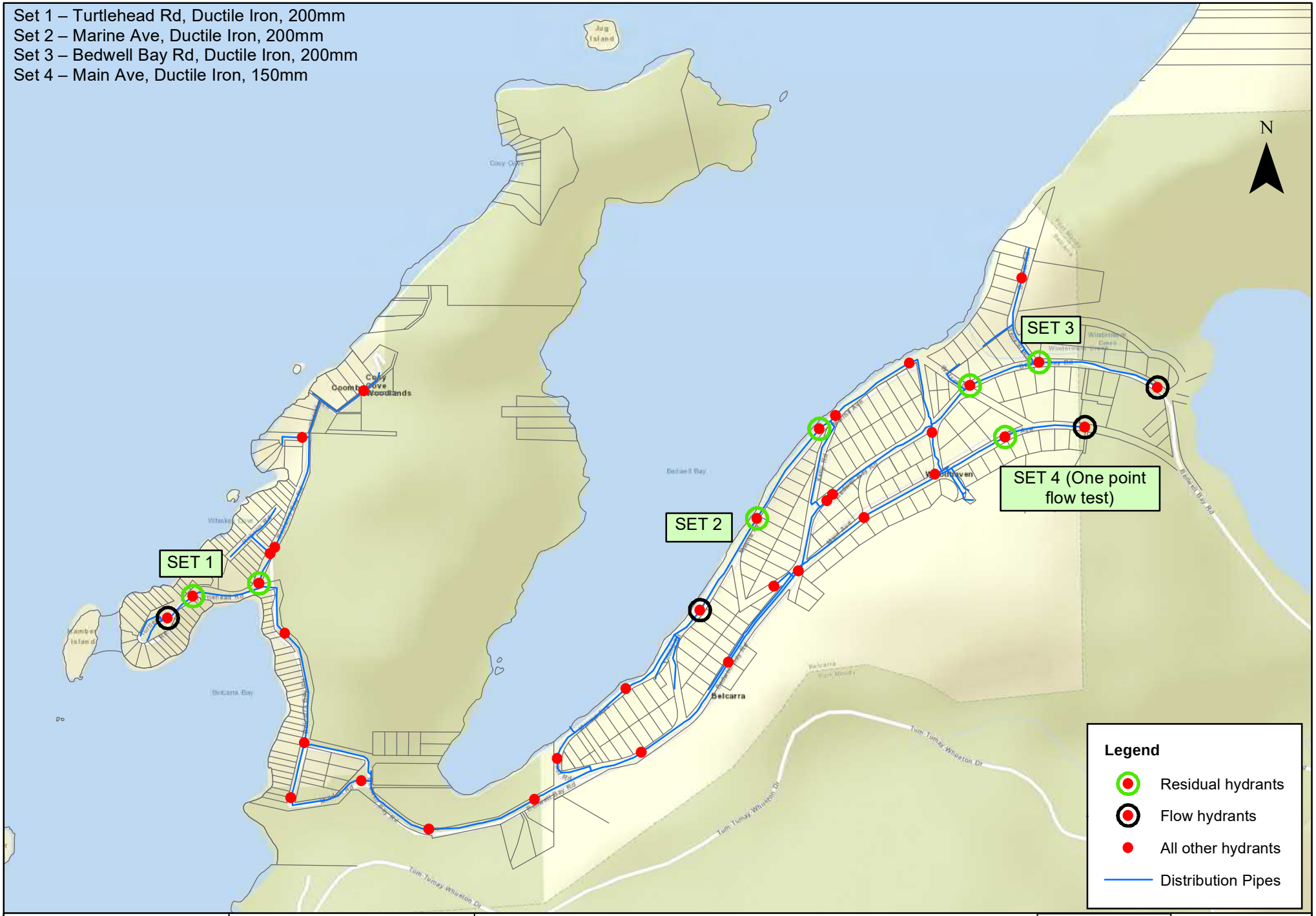
VILLAGE OF BELCARRA

Village of Belcarra
Multi-Pressure Hydrant Flow Test Overview

Drawn By:	Approved By:
SG	ML
Revions:	

Scale 0 110 220 Meters
1:12,500 @ Letter

Figure 2	JUNE 2022
Project No:	211-09148-00



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VILLAGE OF BELCARRA

Village of Belcarra
C-Factor Test Overview

Drawn By:	Approved By:
SG	ML
Revions:	

Scale 0 110 220 Meters
1:12,500 @ Letter

Figure 3	JUNE 2022
Project No:	211-09148-00

5.2.1 CALIBRATION PARAMETERS

Recorded system demands at the Midden Road Station were provided by Village operations staff to determine the actual water usage during the days the hydrant flow tests were carried out. Table 4 summarizes the recorded demands and reservoir level for the calibration scenario and compares the values to the calculated values in the model.

Table 4: Recorded Parameters during Hydrant Flow Testing

PARAMETER	MODEL	CALIBRATION	DIFFERENCE
ADD (L/s)	4.16	6.92	60%
Reservoir Level	95%	95%	0%

As noted in Table 4, the ADD demand was inflated by 60% to capture conditions on the day of field testing. Likewise, the Tatlow Reservoir level was kept at 95% to match the boundary conditions on the day of testing.

5.3 RESULTS AND DISCUSSION

5.3.1 C-FACTOR FIELD CALIBRATION RESULTS

Watermain materials and diameters were based on available record drawings and the AutoCAD drawing shown in Figure 1. Typical C-factor values were assigned in the model based on the Village's standards outlined in Section 3 and further adjusted based on the calibration results.

C-factor verification was completed using the Hazen-Williams equation, by calculating the C-factor value that provides the closest calculated headloss in comparison to field recorded results. Where some values fell within expected values for C-factor, these have been used and included as updated values into the hydraulic water model. Where values did not fall within expected values, WSP did not include the C-factors into the water model. Poor correlation is due to suspected field measurement errors or other unknown sources of errors such as valve configurations in the field which were not fully closed as envisioned, or unknown connections. Because of this, C-factor test set #2 and set #3 have not been included into to water model.

Table 5 shows the calibrated C-factor values for sets #1 and #4.

Table 5: C-Factor Calibration Results

FLOW TEST	MATERIAL	DIA (mm)	ZONE	CALIBRATED C-FACTOR	FIELD RECORDED HEADLOSS (m)	CALIBRATION CALCULATED HEADLOSS (m)	%DIFFERENCE
Set #1	DI	180	1 (Gravity)	130	7.50	7.91	5.4%
Set #4	DI	150	2 (High Pressure)	115	8.97	8.94	-0.30%

The flow hydrant for set#1 is located on Turtlehead Road. This section is considered a dead-end and may experience low flow. This length of pipe may also experience potential tuberculation and as such, the diameter of the pipe was reduced by 10% from 200 mm to 180 mm, to be confirmed by Village staff.

5.3.2 MULTI-PRESSURE FIELD CALIBRATION RESULTS

The results of the multi-pressure test indicated a poor correlation between the field pressure measurements and computer predicted results when using previously assigned C-factors, as illustrated in Table 7.

Using the calibrated C-factors (as shown in Table 6), the results of the calibration process indicate a good correlation between the field pressure measurements and computer predicted results, as shown in Table 8.

Table 6: Calibrated C-Factors

PIPE MATERIAL	PIPE DIAMETER	CALIBRATED C-FACTOR
Ductile Iron	200	130
Ductile Iron	150	115

Table 7: Uncalibrated Multi-Pressure Test Results

Date	Flow set no.	Pressure Zone	Hydrant Test No. & Time	Flow (GPM)	Flow (L/s)	Test ID	Hydrant	Hydrant Elev. (m)	Field Result					Computer Result				Static Pressure Diff (psi)	% diff Static Pressure	Residual Pressure Diff (psi)	% diff Residual Pressure	Demand Boundary Conditions
									Static (psi)	Residual (psi)	Static HGL (m)	Residual HGL (m)	Pressure Drop (psi)	Static (psi)	Residual (psi)	Static HGL (m)	Residual HGL (m)					
			Q1			S1Q1	H-28	32.9														
			Start			R1	H-14	8.7	107.9	99.8	84.6	78.9	8.0	113.0	96.0	88.2	76.2	5.1	5%	-3.8	-4%	
			10:24:00 AM	937	70.98	R2	H-16	46.8	59.6	51.6	88.6	83.0	8.0	59.0	43.0	88.2	77.0	-0.6	-1%	-8.6	-17%	
			End			R3	H-10	11.0	104.6	96.6	84.5	78.9	8.0	109.0	93.0	87.7	76.4	4.4	4%	-3.6	-4%	
			10:29:00 AM			R4	H-30	42.0	61.4	53.5	85.1	79.5	7.9	66.0	49.0	88.4	76.4	4.6	8%	-4.5	-8%	
			Q2			S1Q2	H-36	42.1						65.0								
			Start			R1	H-14	8.7	107.5	99.0	84.3	78.4	8.5	113.0	89.0	88.2	71.3	5.5	5%	-10.0	-10%	
20-Jul-22	1	2	10:37:00 AM	1062	80.47	R2	H-16	46.8	59.1	51.3	88.3	82.8	7.7	59.0	40.0	88.2	74.9	-0.1	0%	-11.3	-22%	1.66 ADD
			End			R3	H-10	11.0	104.3	94.9	84.3	77.8	9.3	109.0	82.0	87.7	68.7	4.7	5%	-12.9	-14%	
			10:42:00 AM			R4	H-30	42.0	61.1	51.2	84.9	78.0	9.8	66.0	36.0	88.4	67.3	4.9	8%	-15.2	-30%	
			Q3			S1Q3	H-37	9.3						112.0								
			Start			R1	H-14	8.7	107.2	95.3	84.1	75.7	12.0	113.0	83.0	88.2	67.1	5.8	5%	-12.3	-13%	
			10:46:00 AM	1172	88.80	R2	H-16	46.8	58.8	48.5	88.1	80.9	10.3	59.0	36.0	88.2	72.1	0.2	0%	-12.5	-26%	
			End			R3	H-10	11.0	104.0	89.9	84.1	74.2	14.1	109.0	73.0	87.7	62.3	5.0	5%	-16.9	-19%	
			10:51:00 AM			R4	H-30	42.0	60.8	47.8	84.7	75.6	12.9	66.0	33.0	88.4	65.2	5.2	9%	-14.8	-31%	

Table 8: Calibrated Multi-Pressure Test Results

Date	Flow set no.	Pressure Zone	Hydrant Test No. & Time	Flow (GPM)	Flow (L/s)	Test ID	Hydrant	Hydrant Elev. (m)	Field Result					Computer Result				Static Pressure Diff (psi)	% diff Static Pressure	Residual Pressure Diff (psi)	% diff Residual Pressure	Demand Boundary Conditions
									Static (psi)	Residual (psi)	Static HGL (m)	Residual HGL (m)	Pressure Drop (psi)	Static (psi)	Residual (psi)	Static HGL (m)	Residual HGL (m)					
			Q1			S1Q1	H-28	32.9														
			Start			R1	H-14	8.7	107.9	99.8	84.6	78.9	8.0	113.0	102.0	88.2	80.5	5.1	5%	2.2	2%	
			10:24:00 AM	937	70.98	R2	H-16	46.8	59.6	51.6	88.6	83.0	8.0	59.0	49.0	88.2	81.2	-0.6	-1%	-2.6	-5%	
			End			R3	H-10	11.0	104.6	96.6	84.5	78.9	8.0	109.0	99.0	87.7	80.6	4.4	4%	2.4	3%	
			10:29:00 AM			R4	H-30	42.0	61.4	53.5	85.1	79.5	7.9	66.0	55.0	88.4	80.6	4.6	8%	1.5	3%	
			Q2			S1Q2	H-36	42.1						65.0	47.0							
			Start			R1	H-14	8.7	107.5	99.0	84.3	78.4	8.5	113.0	98.0	88.2	77.6	5.5	5%	-1.0	-1%	
20-Jul-22	1	2	10:37:00 AM	1062	80.47	R2	H-16	46.8	59.1	51.3	88.3	82.8	7.7	59.0	47.0	88.2	79.8	-0.1	0%	-4.3	-8%	0.83 MDD
			End			R3	H-10	11.0	104.3	94.9	84.3	77.8	9.3	109.0	93.0	87.7	76.4	4.7	5%	-1.9	-2%	
			10:42:00 AM			R4	H-30	42.0	61.1	51.2	84.9	78.0	9.8	66.0	47.0	88.4	75.0	4.9	8%	-4.2	-8%	
			Q3			S1Q3	H-37	9.3						112.0	88.0							
			Start			R1	H-14	8.7	107.2	95.3	84.1	75.7	12.0	113.0	94.0	88.2	74.8	5.8	5%	-1.3	-1%	
			10:46:00 AM	1172	88.80	R2	H-16	46.8	58.8	48.5	88.1	80.9	10.3	59.0	45.0	88.2	78.4	0.2	0%	-3.5	-7%	
			End			R3	H-10	11.0	104.0	89.9	84.1	74.2	14.1	109.0	87.0	87.7	72.2	5.0	5%	-2.9	-3%	
			10:51:00 AM			R4	H-30	42.0	60.8	47.8	84.7	75.6	12.9	66.0	46.0	88.4	74.3	5.2	9%	-1.8	-4%	

5.3.3 CALIBRATION SUMMARY

100% (18/18 of the hydrant tests were successfully calibrated, showing less than 10% differences between field-recorded and model predicted values. It should be noted that the calibrated hydrants represent approximately 50% of the water distribution system, which is sufficient for the purposes of this model. Model calibration error is approximately within 5 psi of actual. While the model appears to be sufficiently calibrated for the current system modelling analysis, pipe conditions should be field checked to improve the accuracy of and confidence in the model. Specifically, the section of watermain from Belcarra Bay Road to the dead end on Turtlehead Road should be verified for signs of tuberculation.

6 HYDRAULIC ANALYSIS

This section assesses the capacity of the Belcarra water distribution system with respect to its ability to convey adequate flows to meet service pressure requirements and fire flows throughout the network system under existing ADD, MDD, PHD conditions, as well as a storage capacity and water age analysis. The Belcarra hydraulic water model developed and calibrated as part of this study was specifically used to carry out this analysis.

6.1 PRESSURES DURING AVERAGE DAY DEMAND

As discussed in Section 3, the allowed normal operating range for the Belcarra water distribution system is 40 psi to 120 psi.

The maximum service pressure within each zone occurs at the properties at the lowest elevation compared to the HGL of the zone set by a reservoir, and typically occurs under low demand conditions. ADD represents low demand conditions and is typically used to identify nodes with pressure exceedances.

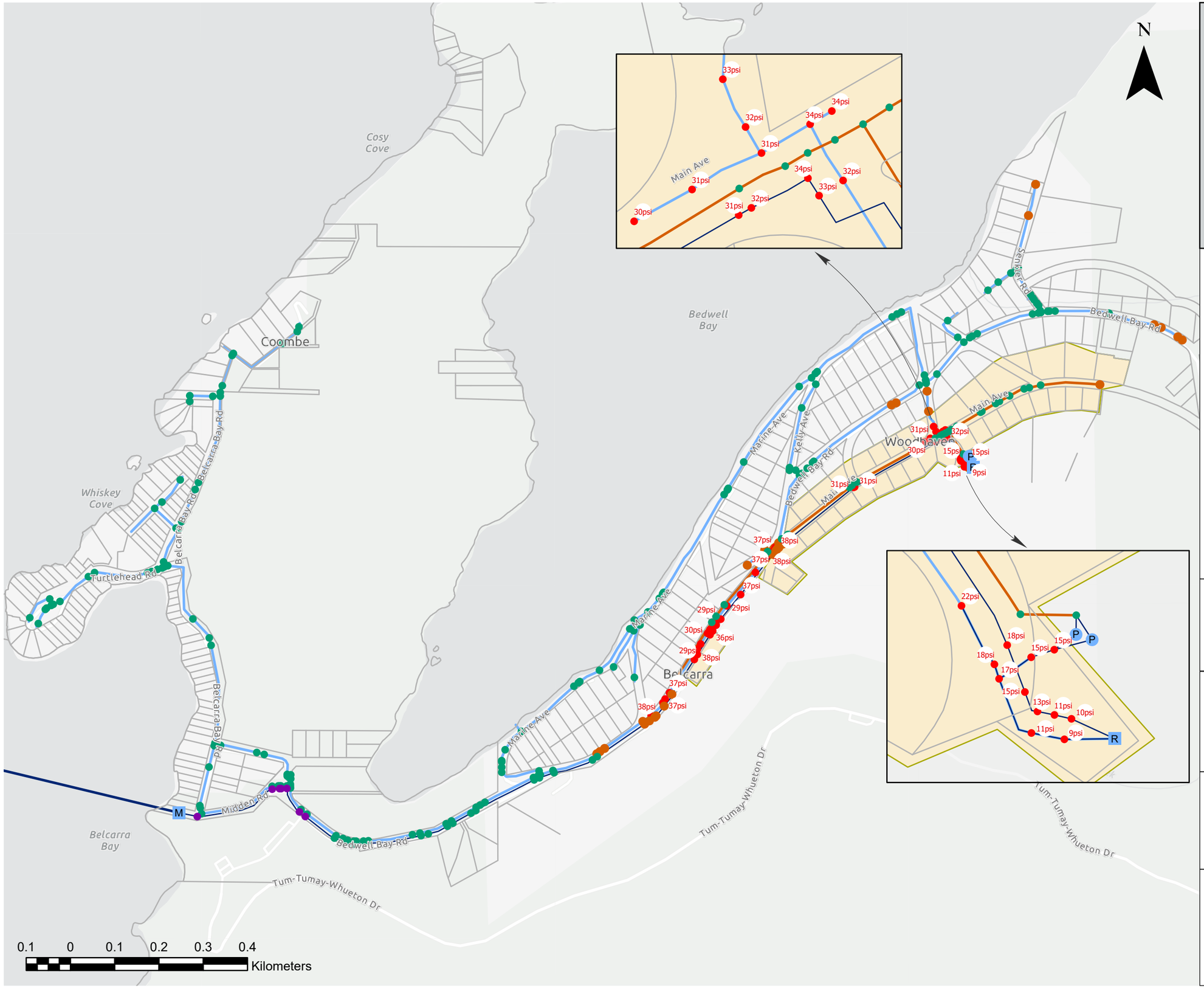
Table 9 summarizes the maximum service pressures assessed under ADD conditions for the existing system. Figure 4 presents an overview of available service pressures under ADD conditions.

Table 9: Nodes not in Compliance with Service Pressure Requirements (ADD)

PRESSURE ZONE	NO. NODES >120 PSI	NO. NODES >150
Gravity (Zone 2)	7	0
High Pressure (Zone 1)	0	0
Total	7	0
Total Percent of System	2.4%	0%

As noted in Table 9, there are 7 pressure exceedances in Zone 2 that occur under ADD conditions. All of the pressure exceedances are on the supply line within Zone 2 which transports potable water from Midden Station to the Tatlow Reservoir. As such, these pressure exceedances are considered acceptable as they do not impact service pressures and only make up 2.4% of the system.

All of the nodes within Zone 1 under ADD conditions are in compliance with service pressure requirements.



Legend

- High Pressure Zone
- ADD Pressures
  - <40 psi
  - 40-60 psi
  - 60-120 psi
  - 120-150 psi
- 200mm DI Supply Main
- 150mm DI High Pressure Main
- 200mm DI Gravity Main
- 2-200mm HDPE Supply
- R Tatlow Reservoir
- P Tatlow Pump Station
- M Midden Station

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Figure 4

Pressures During Average Day Demand

Drawn: S. Gilani

Approved: M. Levin

Project: 211-09148-00

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6.2 PRESSURES DURING PEAK HOUR DEMAND

The minimum service pressure within each zone occurs at the properties at the highest elevation compared to the HGL of the zone set by a reservoir, and typically occurs under high demand conditions. PHD represents high demand conditions and is typically used to identify nodes with pressure exceedances.

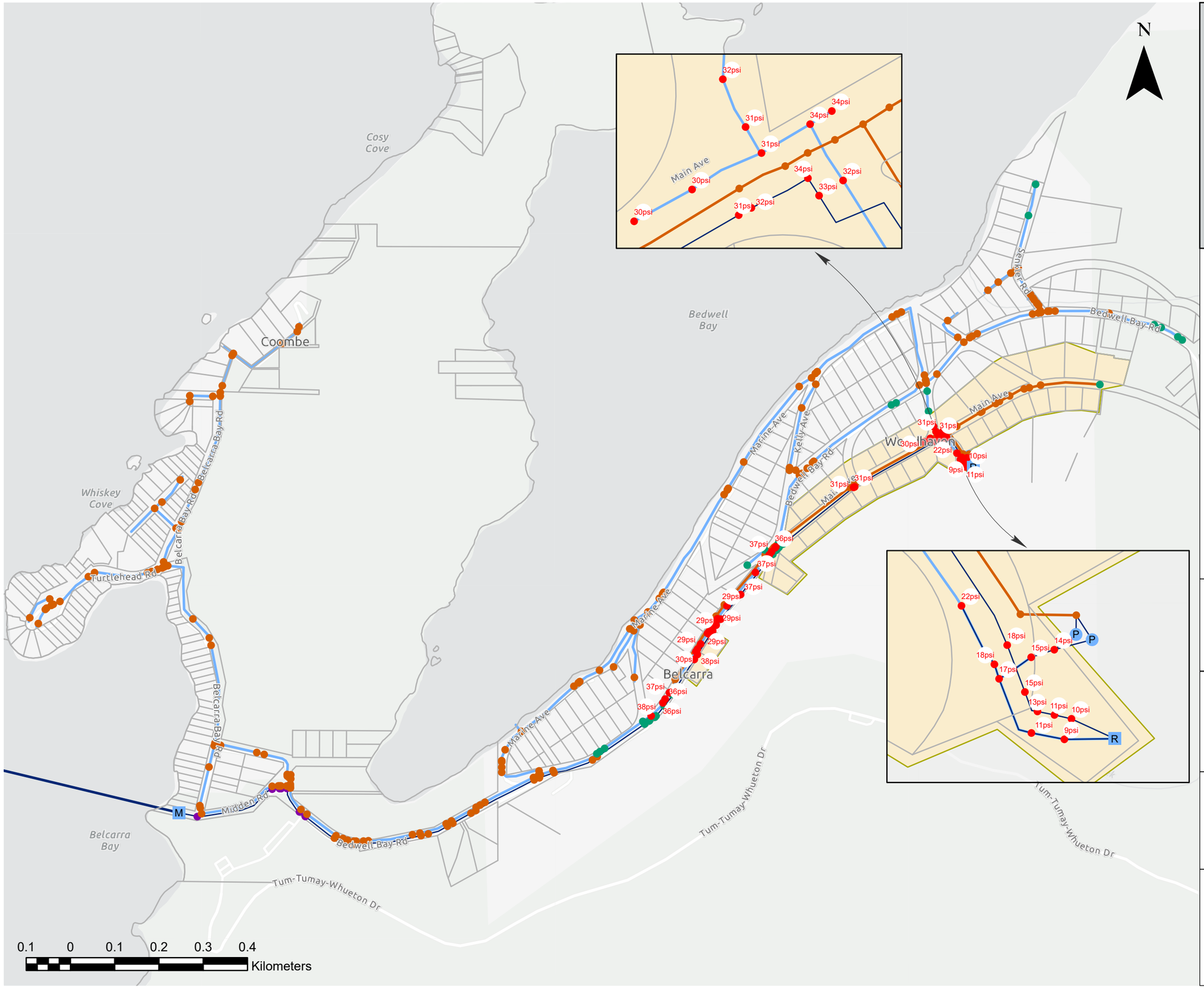
Table 10 summarizes the minimum service pressures assessed under PHD conditions for the existing system. Figure 5 presents an overview of available service pressures under PHD conditions.

Table 10: Nodes not in Compliance with Service Pressure Requirements (PHD)

PRESSURE ZONE	NO. NODES <40 PSI
Gravity (Zone 2)	51
High Pressure (Zone 1)	0
Total	51
Total Percent of System	17.8%

As noted in Table 10, there are 51 pressure deficient nodes in Zone 2 that occur under PHD conditions. A majority of the pressure deficient nodes are on the supply line within Zone 2 which supplies water from Midden Station to the Tatlow Reservoir. The remaining pressure deficient nodes within Zone 2 are along Main Avenue, and experience pressures between 30 psi – 40 psi.

All of the pressures within Zone 1 under PHD conditions are in compliance with service pressure requirements.



Legend

- High Pressure Zone
- PHD Pressures
  - <40 psi
  - 40-60 psi
  - 60-120 psi
  - 120-150 psi
- 200mm DI Supply Main
- 150mm DI High Pressure Main
- 200mm DI Gravity Main
- 2-200mm HDPE Supply
- R Tatlow Reservoir
- P Tatlow Pump Station
- M Midden Station

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Figure 5

Pressures During Peak Day Demand

Drawn: S. Gilani

Approved: M. Levin

Project: 211-09148-00

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6.3 FIRE FLOWS DURING MAXIMUM DAY DEMAND

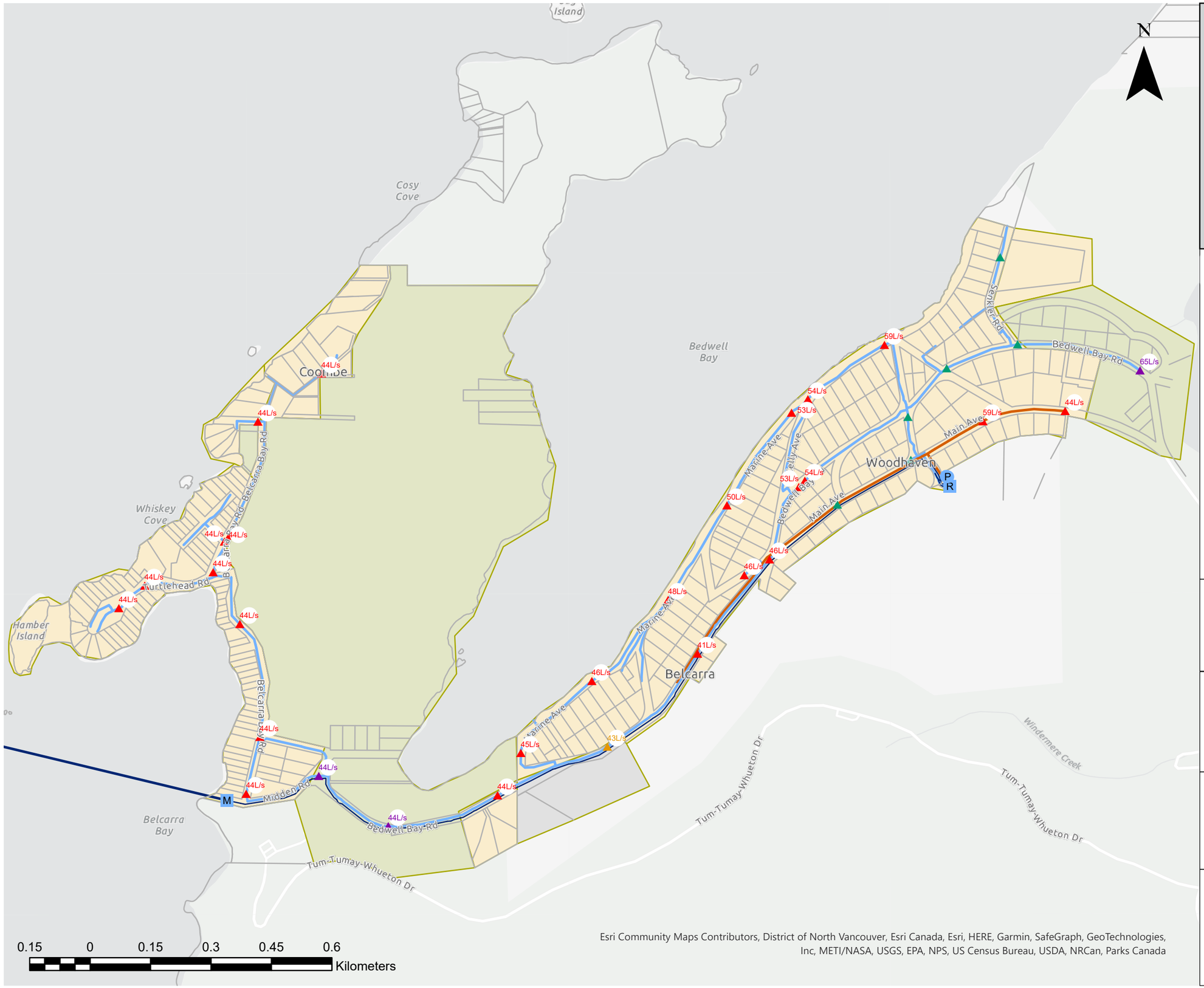
Fire flow analysis was conduced under MDD conditions, after assigning fire flow to hydrants as described in Section 3. The results of the fire flow analysis under MDD conditions are summarized on Figure 6, which illustrates the fire flow requirements throughout the system and identifies where deficiencies are occurring. Results from the fire flow analysis broken down by zone and deficiencies are summarized in Table 11.

Table 11: Demand Nodes with Deficient Fire Flow (MDD)

PRESSURE ZONE	NO. OF DEFICIENT NODES	% OF ZONE
Gravity (Zone 2)	27	84.4%
High Pressure (Zone 1)	2	66.7%
Total	29	82.9%

There are a total of 35 hydrants within the Belcarra distribution system, 88.6% of which require 60 L/s of fire flow, and the remaining 11.4% require 90 L/s of fire flow under MDD conditions. All of the nodes that require 90 L/s of fire flow are deficient and are located within Zone 2. A majority (86%) of the nodes that require 60 L/s of fire flow are deficient and can provide fire flows between 41 L/s – 59 L/s.

Under worst-case scenarios, when fire-fighting efforts overlap with peak summer consumption periods, the hydrants will still provide flows, however there would be an increased risk of cavitation and watermain breaks if residual pressures drop below 20 psi to provide those necessary fire flows. These deficiencies are a result of dead-end nodes and low flow to mid block hydrants.



Legend

- RS-1
- P-1
- CI-1

R-1 Hydrants
- <60 L/s
- >60 L/s

P-1 Hydrants
- <90 L/s

CI-1 Hydrants
- <90 L/s

- 200mm DI Gravity Main
- 150mm DI High Pressure Main
- 200mm DI Supply Main
- 2-200mm HDPE Supply
- R Tatlow Reservoir
- P Tatlow Pump Station
- M Midden Station

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Figure 6

Fire Flows During Maximum Day Demand

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Approved: M. Levin

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6.4 WATER AGE UNDER AVERAGE DAY DEMAND

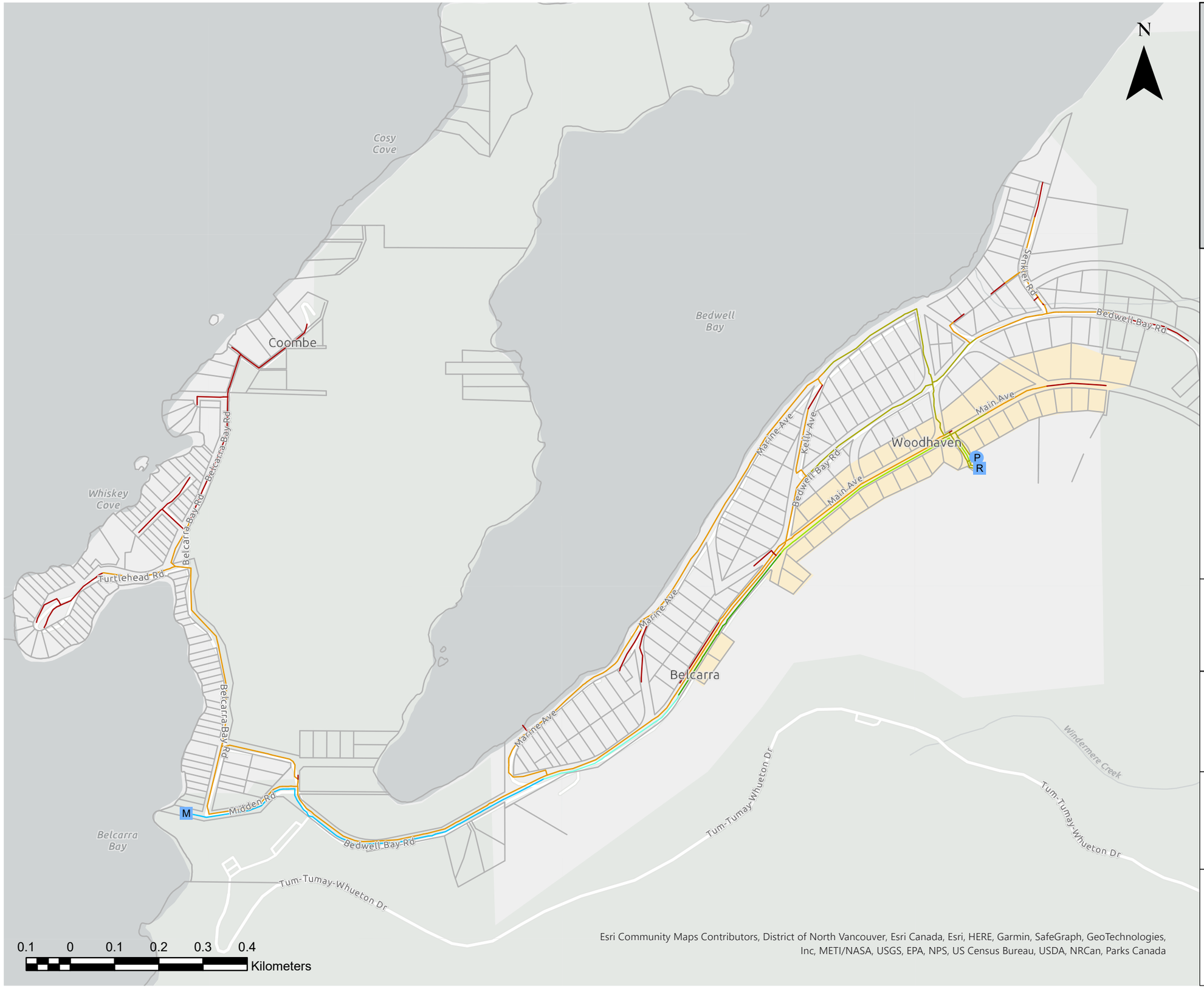
Water age refers to the time spent by a parcel of water in the network, to travel from the source (i.e., reservoir) to consumers. New water entering the network from reservoir enters with an age of zero. Various potential chemical, biological, and physical issues can arise from long retention times. These include disinfection by-products formation, microbial growth, sediment deposition, and colour changes (USEPA, 2002). Water age is a function primarily of water demand and system operation. As water demand decreases, the amount of time any given liter of water is resident in the distribution system increases. According to research papers by the USEPA (AWWA, 2015) and the Water Industry Database (AWWA and AWWARF, 1992), the average water age within a distribution system is 1.3 days with retention times less than 3 days being considered typically acceptable.

A water age analysis was conducted under ADD as it represents low demand conditions to conservatively assess the retention time within the Belcarra water distribution system. The results of the water age analysis are summarized on Figure 7, which illustrates the water age throughout the system. Results from the analysis broken down by zone and retention times are summarized in Table 12.

Table 12: Water Age During ADD

WATER AGE	HIGH PRESSURE (ZONE 1)	GRAVITY (ZONE 2)	% OF SYSTEM
<10 hours	0%	7.7%	7.0%
10 – 15 hours	0%	3.6%	3.2%
15 – 20 hours	0%	3.3%	3.0%
20 – 25 hours	0%	3.8%	3.5%
1 – 2 days	29.7%	14.3%	15.7%
2 – 3 days	59.5%	50.3%	51.1%
3 – 7 days	10.8%	17.0%	16.5%

As noted in Table 12, a majority (83.5%) of the system experiences a retention time of less than 3 days. The remaining 16.5% of pipes within the system account for all of the dead-ends which experience water age greater than 3 days.



Legend

- High Pressure Zone
- R Tatlow Reservoir
- P Tatlow Pump Station
- M Midden Station

Water Age

- <10 hours
- 10 - 15 hours
- 15 - 20 hours
- 20 - 25 hours
- 1 - 2 days
- 2 - 3 days
- 3 - 7 days

Client: VILLAGE OF BELCARRA

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Figure 7

Water Age During Average Day Demand

Drawn: S. Gilani

Approved: M. Levin

Project: 211-09148-00

Date Printed: 2022-09-02 10:02 AM

6.5 STORAGE CAPACITY ANALYSIS

Water storage reservoirs are located at specific elevations to establish pressure zones within the distribution system, and are used to balance and optimize supply and delivery of water. If properly sized, reservoirs will store water during low demand periods and supplement the source supply during peak hour demand. Typically, reservoirs are designed to refill every day and to have adequate storage capacity to provide for balancing storage, which is estimated as 25% of maximum day demand in the area serviced by the reservoir, fire storage based on the FUS recommended flows and durations listed in Table 3, and an allowance for emergency storage which is 25% of balancing and fire storage as summarized in Section 3 under Design Criteria.

Table 13 summarizes the storage reservoir volume calculation for the Tallow Reservoir. The fire storage required is governed by the highest fire flow and duration requirement in its service area, which is 90 L/s for 2 hours. However, a separate storage capacity analysis for a fire flow requirement of 60 L/s for 1.5 hours has also been included for comparative purposes, as 60 L/s is the predominant fire flow requirement in the Village. Lastly to note, although storage capacity calculations typically do not factor in any other supply sources (i.e., additional flows from pump stations, PRVs, etc.), the impact of the 20 L/s supply from the marine pipelines has been included for comparative purposes.

Table 13: Tatlow Reservoir Storage Capacity Analysis

VOLUME (ML)	SCENARIO 1 60 LPS AT 1.5 HRS FIRE FLOW REQUIRED	SCENARIO 2 90 LPS AT 2 HRS FIRE FLOW REQUIRED
A – Fire Storage	0.32	0.65
B – Balancing Storage	0.18	0.18
C – Emergency Storage	0.13	0.21
A+B+C – Required Storage	0.63	1.03
Available Storage	0.27	0.27
Excess / Deficiency?	**-0.36**	**-0.77**
Excess / Deficiency with 20 L/s constant supply from Marine pipelines	**-0.25**	**-0.62**

As noted in Table 13, the above analysis indicates there is a storage volume deficiency in the Tatlow Reservoir with respect to meeting existing service needs, whether considering the maximum fire flow requirement of 90 L/s in the service area or a reduced 60 L/s requirement to meet minimum residential fire flow and duration requirements. The deficiencies are slightly ameliorated when considering a constant 20 L/s supply of source water from the marine pipelines.

7 SUMMARY AND RECOMMENDATIONS

WSP reviewed available existing information related to the water distribution system to develop the Village of Belcarra water model to represent the existing water network.

The DNV has been the primary supplier of potable water for the Village, and supplies water from Strathcona Road to Midden Station in Belcarra. The water from Midden Station is transported through a 200 mm DI main to the Tatlow Road Reservoir. Potable water from the Tatlow Road Reservoir is supplied to the two pressure zones with the Village via a 200mm DI gravity main and a 150 mm DI high pressure main.

The design life of the Tatlow Reservoir is estimated to be 50 years, however a detailed condition assessment is recommended to determine its current state and estimated remaining service life. WSP is currently in discussions with Village staff on a condition assessment plan taking into account the unique circumstances of the site (i.e. the difficult and steep terrain locally).

Watermain materials, diameters, junctions, elevations, and reservoir details were based on available record drawings, 5 m contour data, and the AutoCAD drawing developed by WSP in 2017 which illustrates the water system infrastructure. Watermain age (which is unknown for the network at this time) is a key parameter in assigning roughness coefficients; **it is recommended to investigate the pipe vintages to further refine the model.**

The demands were determined using the billing data received from the DNV and park meter data provided by the Village. The highest consumption was experienced during 2020, and as such this was used to establish Average Day Demand. Due to a lack of hourly and daily flows, global peaking factors of 2 and 4 were used for MDD/ADD and PHD/ADD, respectively, based on the Village's Subdivision and Development bylaw. **It is recommended that hourly and daily flow data be collected, and the model be updated in subsequent years to reflect actual peak consumption patterns.**

The high 2020 demand may potentially be considered an outlier due to COVID correlating to a higher water usage. **It is suggested that the Village continue to monitor annual consumption trends in the short-term to determine if 2020 was an outlier and if model demands can be adjusted down to a more representative year, or if it worthwhile revising the per capita consumption rates in the Bylaw to reflect higher domestic usage.**

The model was successfully calibrated after conducting field testing, yielding less than 10% differences between field-recorded and model predicted values. **As noted during field testing in Section 5.3, some dead-end pipes within the system may experience potential tuberculation which should be confirmed by Village staff. If this is the case, these pipes should be monitored, cleaned, and replaced if needed.**

Using the calibrated model, a water system assessment was performed to evaluate the distribution system's ability to meet desired levels of service. Under ADD conditions, 7 nodes experienced pressure exceedances within Zone 2. All of these nodes are on the supply line which transports water from Midden Station to the Tatlow Reservoir. All of the nodes within Zone 1 were in compliance with the service pressure requirements under ADD conditions.

Under PHD conditions, there are 51 pressure deficient nodes within Zone 2. A majority of these pressure deficient nodes are on the supply line, with a few along Main Avenue and the area surrounding the Tatlow reservoir. All of the nodes within Zone 1 were in compliance with the service pressure requirements under PHD conditions.

Fire flow analysis was conducted under MDD conditions. All of the nodes that require 90 L/s of fire flow were deficient and were located within Zone 2. A majority (86%) of the nodes that require 60 L/s of fire flow were also deficient. Available fire flows typically range from 41 L/s to 59 L/s at present.

A water age analysis was conducted under ADD conditions. It was determined that a majority (83.5%) of the system experiences a retention time of less than 3 days, which is considered acceptable. The remaining pipes within the system account for all of the dead-ends which experience water age greater than 3 days.

A storage capacity analysis was conducted on the Tatlow Reservoir which has an existing storage capacity of 0.27 ML. It was determined that the Tatlow reservoir has a storage volume deficiency of 0.77 ML. Taking into account a constant 20 L/s supply of source water from the marine pipelines, the storage volume deficiency is reduced to 0.62 ML. The fire storage required is governed by the highest fire flow and duration requirement in its service area,

which is 90 L/s for 2 hours. A separate analysis assuming a 60 L/s fire flow requirement for 1.5 hours was conducted for comparative purposes, as 60 L/s is the predominant fire flow requirement in the Village; the storage volume deficiencies in this case is reduced to 0.25 ML and 0.36 ML, with and without the marine pipeline supply, respectively.

It is recommended that further modelling analysis should be conducted to determine possible upgrades required to improve the existing system. These upgrades may include the following:

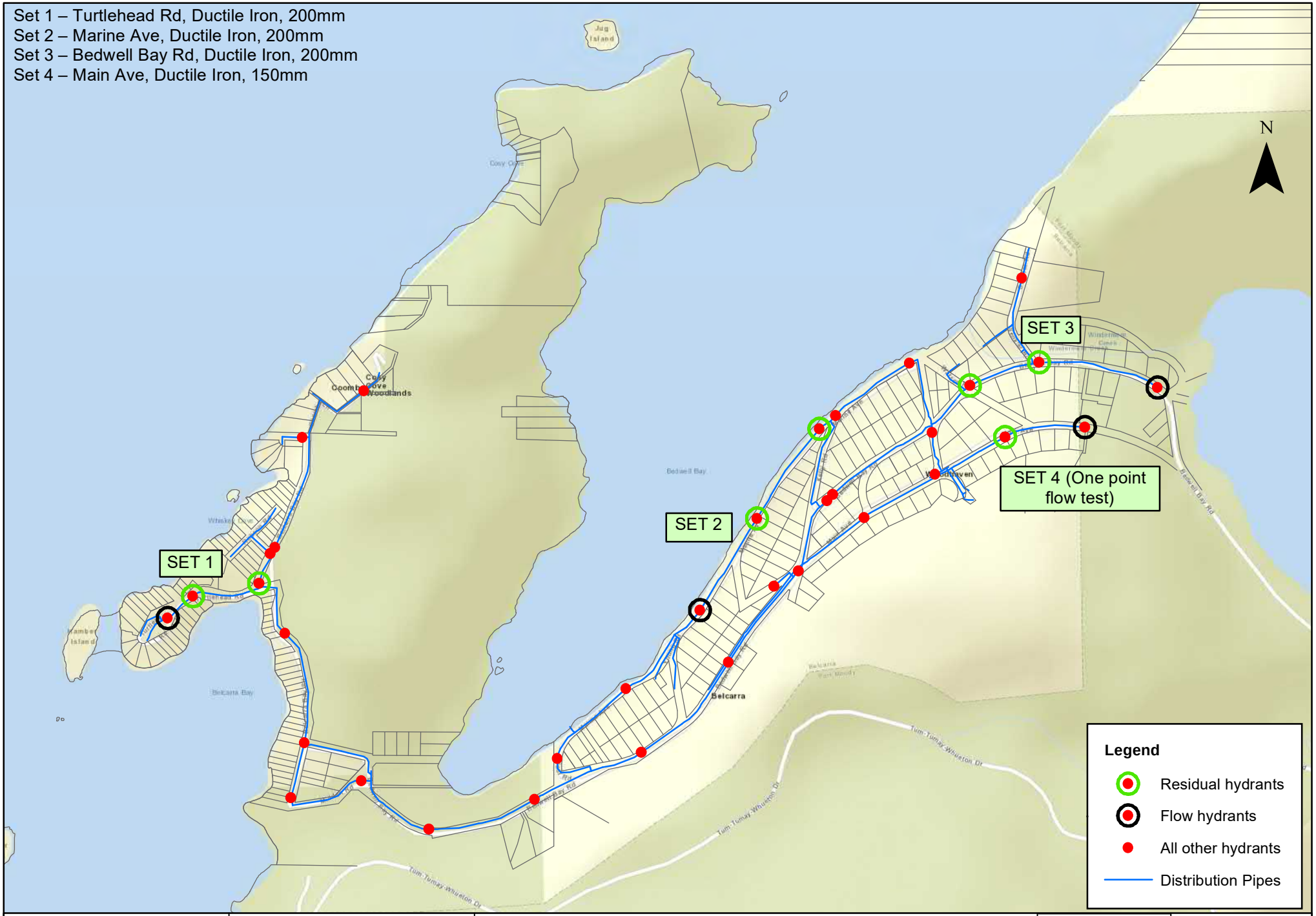
- Additional storage at the existing Tatlow Reservoir or at a higher elevation
- Creation of smaller pressure zones through pumping or PRVs
- Watermain looping
- Flushing programs

These potential upgrades may assist with addressing fire flow and service pressure deficiencies, increasing flows to dead end nodes, improving available storage capacity, and reducing water retention within the system.

APPENDIX

A HYDRANT TESTING

Set 1 – Turtlehead Rd, Ductile Iron, 200mm
Set 2 – Marine Ave, Ductile Iron, 200mm
Set 3 – Bedwell Bay Rd, Ductile Iron, 200mm
Set 4 – Main Ave, Ductile Iron, 150mm



North Vancouver Office , #210 - 889 Harbourside Drive
Tel (604) 990 4800 Fax (604) 990 4805

VILLAGE OF BELCARRA

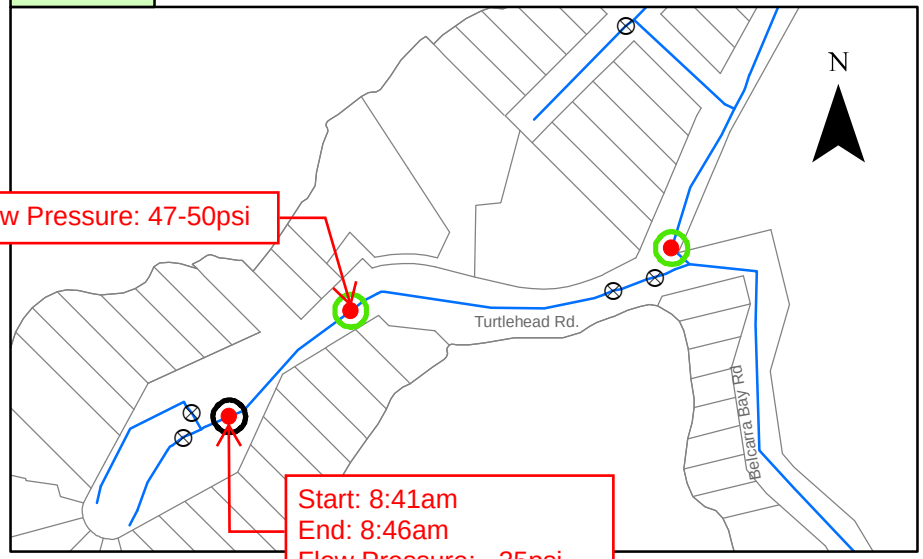
Village of Belcarra
C-Factor Test Overview

Drawn By:	Approved By:
SG	ML
Revions:	

Scale 0 110 220 Meters
1:12,500 @ Letter

Map No. 01	JUNE 2022
Project No:	211-09148-00

SET 1



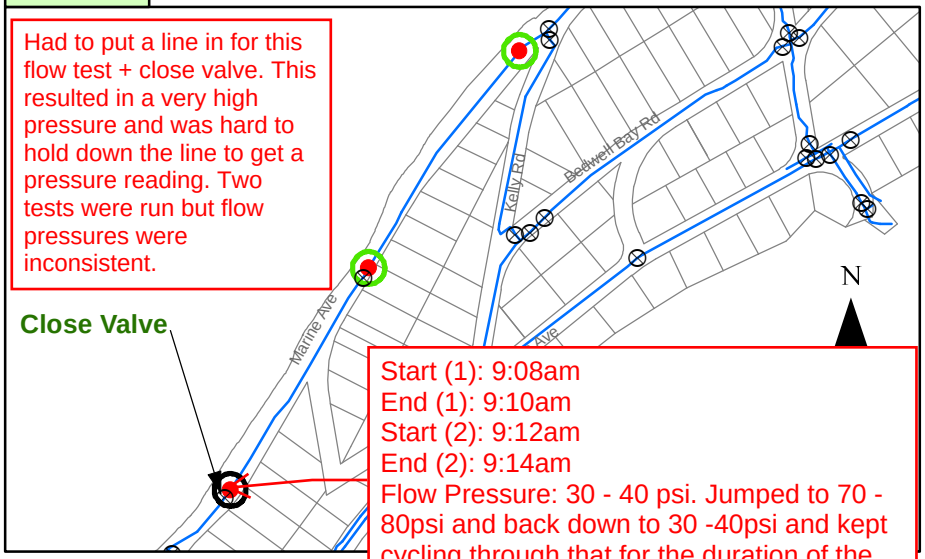
Flow Pressure: 47-50psi

Start: 8:41am
End: 8:46am
Flow Pressure: ~35psi

SET 2

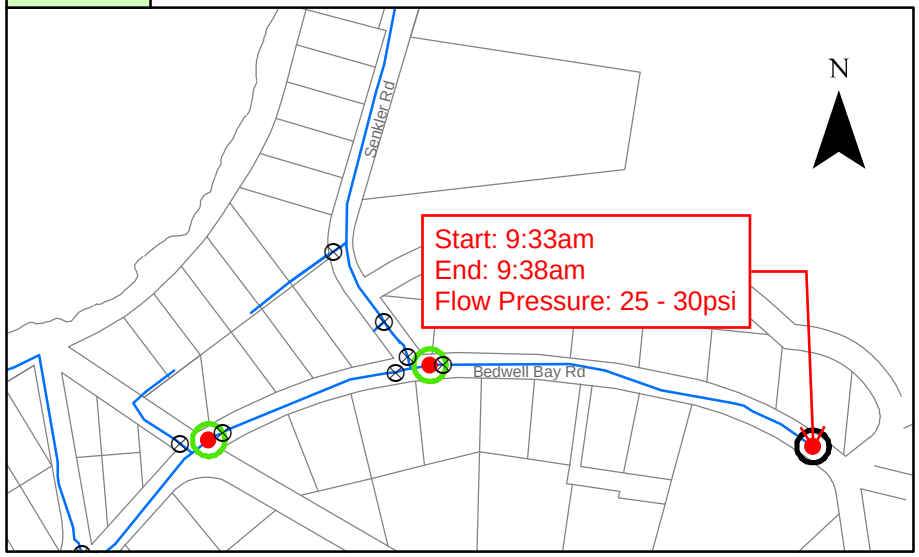
Had to put a line in for this flow test + close valve. This resulted in a very high pressure and was hard to hold down the line to get a pressure reading. Two tests were run but flow pressures were inconsistent.

Close Valve



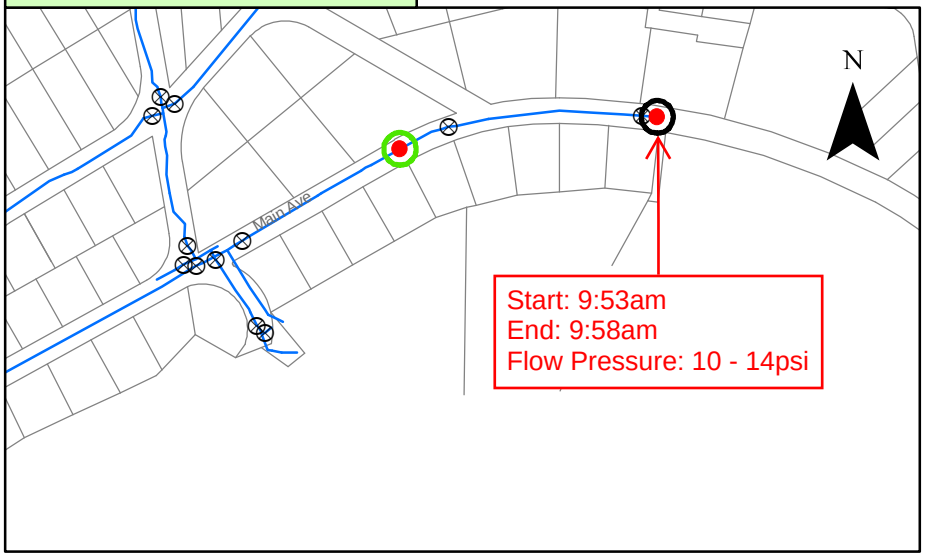
Start (1): 9:08am
End (1): 9:10am
Start (2): 9:12am
End (2): 9:14am
Flow Pressure: 30 - 40 psi. Jumped to 70 - 80psi and back down to 30 -40psi and kept cycling through that for the duration of the test.

SET 3



Start: 9:33am
End: 9:38am
Flow Pressure: 25 - 30psi

SET 4 (One point flow test)



Start: 9:53am
End: 9:58am
Flow Pressure: 10 - 14psi

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VILLAGE OF BELCARRA

Legend

- Residual hydrants
- Flow hydrants
- Valves
- Watermain (distribution)

Village of Belcarra C-Factor Test

Drawn By:	Approved By:
SG	ML
Revisions	

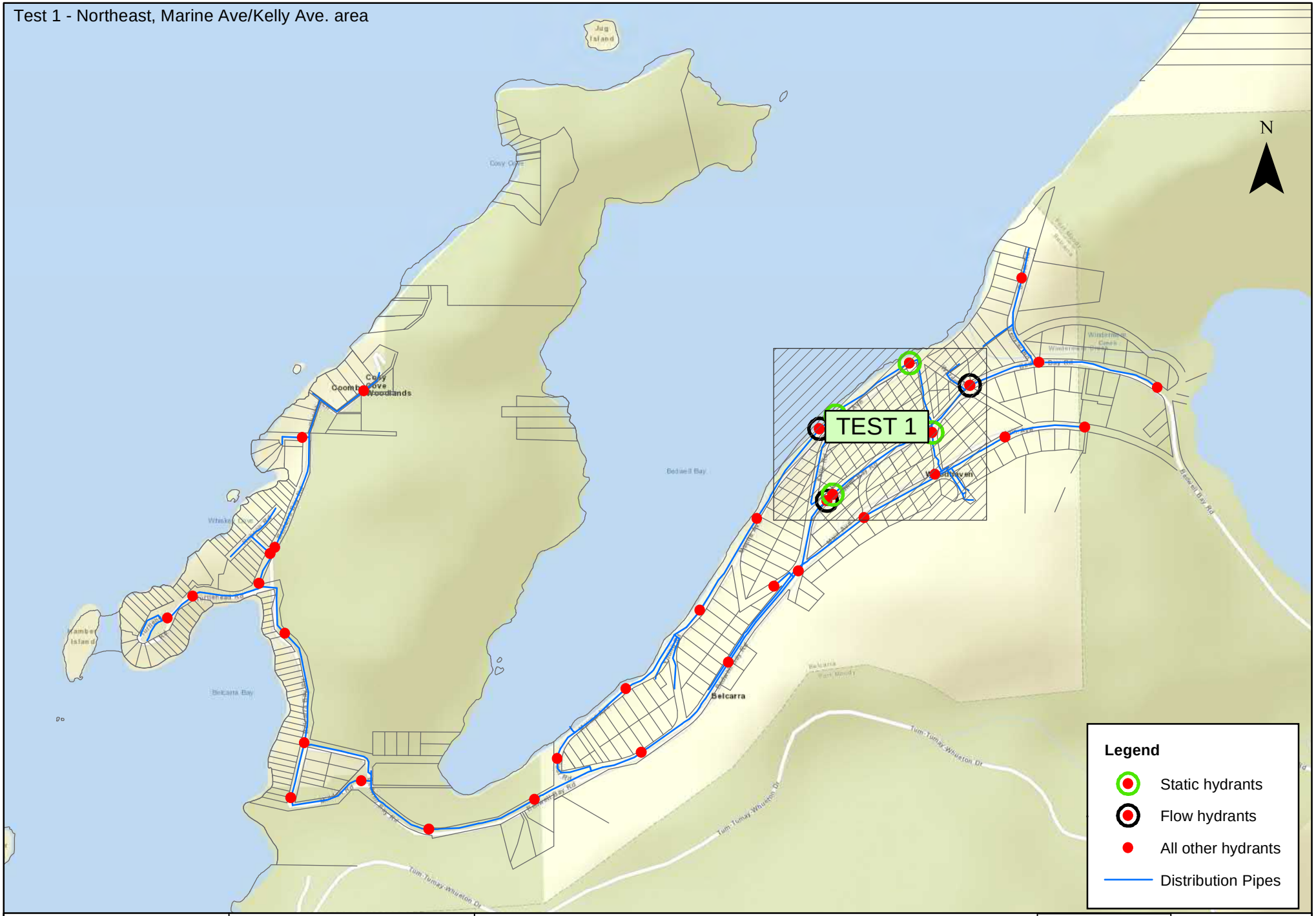
Scale: 0 25 50 100 Meters

Map No. 02 | JUNE 2022

Project No: 211-09148-00

Path: C:\Users\casg071866\Desktop\Belcarra\Hydrant Testing\C-Factor 1-4.mxd

Test 1 - Northeast, Marine Ave/Kelly Ave. area



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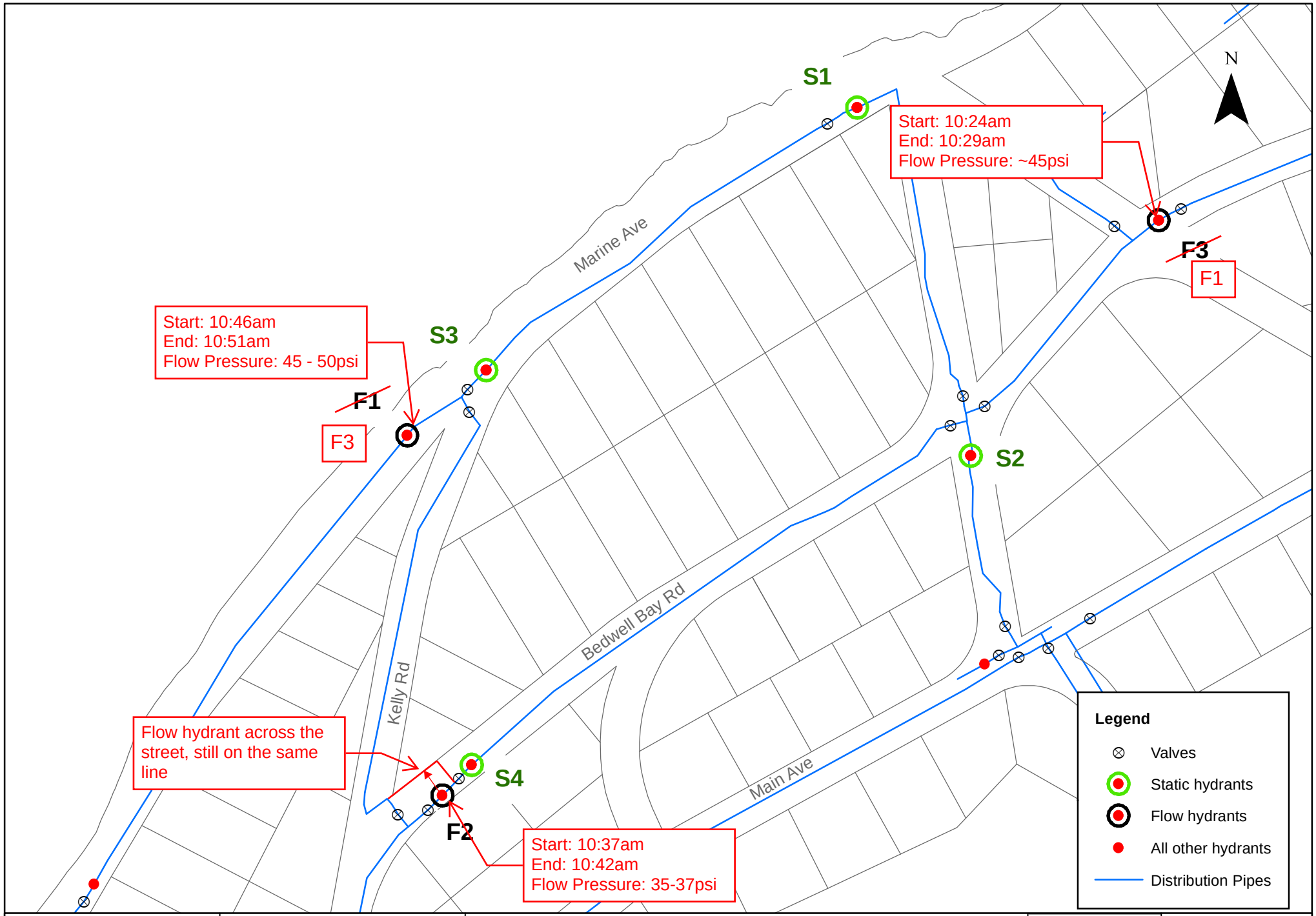
VILLAGE OF BELCARRA

Village of Belcarra
Multi-Pressure Hydrant Flow Test Overview

Drawn By:	Approved By:
SG	ML
Revions:	

Scale 0 110 220 Meters
1:12,500 @ Letter

Map No. 03	JUNE 2022
Project No:	211-09148-00



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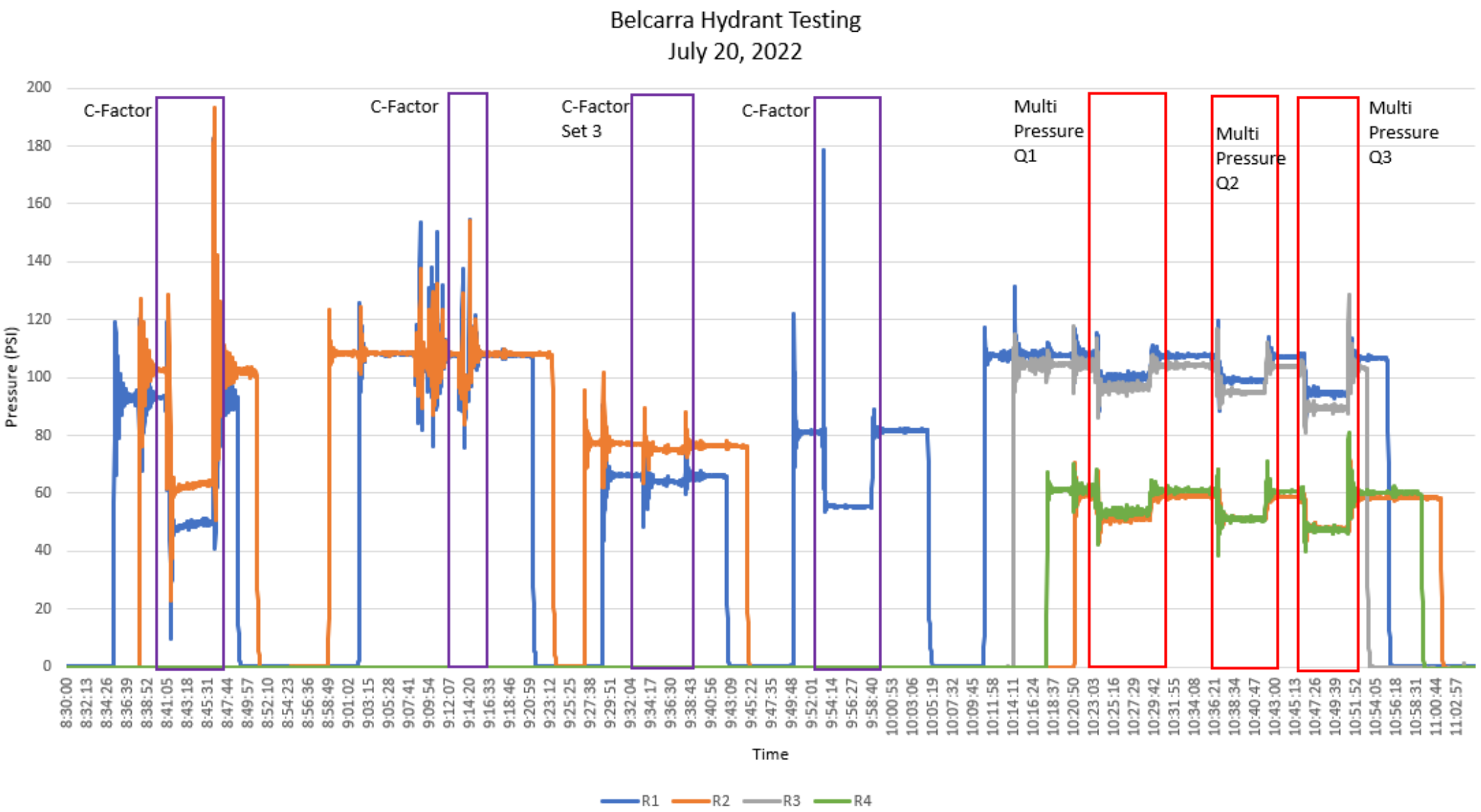
VILLAGE OF BELCARRA

Village of Belcarra
Multi-Pressure Hydrant Flow Test 1

Drawn By:	Approved By:
SG	CL
Revions:	

Scale 0 20 40 Meters
1:2,500 @ Letter

Map No. 04	JUNE 2022
Project No:	211-09148-00


Belcarra Hydrant Testing
July 20, 2022
C-Factor
C-Factor
C-Factor
Set 3
C-Factor
Multi
Pressure
Q1
Multi
Pressure
Q2
Multi
Pressure
Q3
Pressure (PSI)
200
180
160
140
120
100
80
60
40
20
0
8:30:00
8:32:13
8:34:26
8:36:39
8:38:52
8:41:05
8:43:18
8:45:31
8:47:44
8:49:57
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8:54:23
8:56:36
8:58:49
9:01:02
9:03:15
9:05:28
9:07:41
9:09:54
9:12:07
9:14:20
9:16:33
9:18:46
9:20:59
9:23:12
9:25:25
9:27:38
9:29:51
9:32:04
9:34:17
9:36:30
9:38:43
9:40:56
9:43:09
9:45:22
9:47:35
9:49:48
9:52:01
9:54:14
9:56:27
9:58:40
10:00:53
10:03:06
10:05:19
10:07:32
10:09:45
10:11:58
10:14:11
10:16:24
10:18:37
10:20:50
10:23:03
10:25:16
10:27:29
10:29:42
10:31:55
10:34:08
10:36:21
10:38:34
10:40:47
10:43:00
10:45:13
10:47:26
10:49:39
10:51:52
10:54:05
10:56:18
10:58:31
11:00:44
11:02:57
Time
R1
R2
R3
R4

COUNCIL REPORT

Date: November 4, 2024

From: Paula Richardson, Chief Administrative Officer and Ken Bjorgaard, Financial Consultant

Subject: Strategic Plan Update

Recommendation:

That the report titled “Strategic Plan Update” dated November 4, 2024 be received for information.

Purpose:

The purpose of this report is to present the approved changes to Council’s Strategic Plan and related Work Plan Priorities.

Report:

Council’s Strategic Plan and related Work Plan Priorities have been updated to incorporate the following changes:

Items Removed from the Strategic Work Plan Priorities	
ACTIONS TO ACHIEVE RESULTS	**Reasons for Removing from Work Plan Priorities**
Write and adopt internal communications protocols	Low priority and other complementary policies and practices already exist, e.g. Council Correspondence Policy, Administrative & Public Works operational updates, etc.
Write, approve, implement and monitor communications strategy including social media presence	This initiative happens on an as needed basis currently and adding a formal structure would take up staff resources.
Develop and adopt Policy on Council versus Administrative Policies/Procedures	Original report brought to Council by Financial Consultant. Low priority and would add little value to the Village.

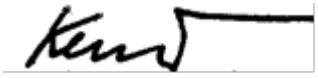
Items Changed Within Strategic Work Plan Priorities				
ACTIONS TO ACHIEVE RESULTS	**Assigned Human Resources**	**Revised Completion Date**	**Source of Funds (SoF) or Additional Budget Requirements (ABR)**	**Explanation of Changes**
Complete water metering business case	Contractor(s)	By September ~~2024~~ 2025	SoF - ~~$40K~~ capital budget for universal water metering in 2024 ABR to be determined for any additional capital and operating costs	This item will require significant staff involvement. Completing a review of Belcarra Park water charges is a separate item within the strategic plan.
Complete WARD service review including review of current service provider and the option of utilizing Recycle BC to save costs	Public Works & Emergency Preparedness Coordinator & Contractor(s)	By June of 2025	ABR of up to $15,000 from Financial Stabilization Reserve	The Village is at risk with its current service provider, in terms of financial and service delivery risk, and needs to move towards potential solutions as soon as possible.
Review of WARD infrastructure to match services provided	Public Works & Emergency Preparedness Coordinator & Contractor	By June of 2025	~~N/A~~ Part of ABR above	As above.
Hold Community information ~~townhall~~ meetings to ~~engage with citizens on topics of interest and to provide community updates~~ inform citizens as needed	Corporate Officer	~~Starting in 2023~~ Ongoing	N/A	Community information meetings held on specific topics are generally more productive than general townhall meetings.

New Items Included in the Strategic Work Plan Priorities				
PROJECTS	**ASSIGNED HUMAN RESOURCES**	**EXPECTED COMPLETION DATE**	**SOURCE OF FUNDS (SOF) OR ADDITIONAL BUDGET REQUIREMENTS (ABR)**	**COMMENTS**
Potential Development of Road Ends – the focus is on creating sellable road end lots to pay Capital projects such as a new firehall and to place the Village in a more favorable fiscal position.	CAO and Contractor(s)	By June of 2025	ABR of up to $20,000 from Financial Stabilization Reserve	Only most sellable lot(s) would be pursued with any sales proceeds from first sales funding development work.
Investigation of New Firehalls – significant staff time has been and is being spent on all of the issues around the new firehalls, including the current cost sharing arrangement.	CAO and Contractor(s)	By June of 2025	ABR of up to $20,000 from Financial Stabilization Reserve	This is not an optional initiative, and the Village's interests need to be protected by undertaking financial due diligence and in communicating financial implications to residents.

Summary

Council's Strategic Plan/Work Plan Priorities, as shown in Appendix "A", has been updated to include the aforementioned changes. It is recognized that Council's goals can only be achieved when the priorities and outcomes are clear, and the necessary resources are assigned.

Prepared by: Paula Richardson,
Chief Administrative Officer



Prepared by: Ken Bjorgaard
Financial Consultant

The following appendices are attached hereto:

- Appendix "A" – Status of Strategic Priorities Work Plan Initiatives as at September 30, 2024 (includes updated Strategic Priorities)

APPENDIX "A" – STATUS OF STRATEGIC PRIORITIES WORK PLAN INITIATIVES AS AT SEPTEMBER 30, 2024 (INCLUDES UPDATED PRIORITIES)

MANAGING OUR ASSETS & INFRASTRUCURE
We will manage and safeguard our assets and infrastructure

Asset Management Program

OUTCOMES/MEASURES OF ACHIEVEMENT

- Functioning ongoing asset management program
- Complete inventory of assets broken down into asset components with respective estimated remaining useful life of major components
- All assets and infrastructure recorded in GIS system
- Multi-year condition assessment schedule as identified through asset management program
- Completion of condition assessments for key infrastructure on a yearly basis

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete review and undertake field work to provide breakdown of asset components (including remaining useful lives) and update GIS system accordingly	Contractor(s)	By Sept. 2024 and updated annually	**SoF** - within existing annual $30K asset management budget with funding coming from Community Building Fund with approved grant	Part of overall project budget (includes $25K UBCM grant) which includes asset management, condition assessments, long-term financial plan & financial sustainability report.	Financial Consultant	Project has been completed. Project was completed by LandInfo Technologies. **COMPLETE**
2. Complete 5-year condition assessment schedule for assessing key assets and update annually	Contractor(s) and Public Works & Emergency Preparedness Coordinator	By Sept. 2023 and updated annually by Sept. of each year	**SoF** - within existing annual $30K asset management budget with funding coming from Community Building Fund	Part of overall project budget (includes $25K UBCM grant) which includes asset management, condition assessments, long-term financial plan & financial sustainability report.	CAO	Project has been completed with condition assessment schedule included in Asset Management Report. **COMPLETE**
3. Complete annual condition assessments	Contractor(s)	By Sept. of each year starting in 2024	**SoF** - within existing annual $30K asset management budget with funding coming from Community Building Fund		Public Works & Emergency Preparedness Coordinator	Work will start in 2024 based on the above condition assessment schedule.

MANAGING OUR ASSETS & INFRASTRUCURE

We will manage and safeguard our existing assets and infrastructure

Renewal of Existing Infrastructure & Assets

OUTCOMES/MEASURES OF ACHIEVEMENT

- Long-term infrastructure/asset renewal and replacement schedule for existing assets based on asset management results including drainage systems, roads, water and WARD
- Completion of priority infrastructure projects including drainage and roads (see Key Project Lists)

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete long-term financial estimates and plan for infrastructure/asset replacements (based on asset management and condition assessment results)	Contractor(s)	By Sept. 2024	**ABR** - part of additional $20K to come from Community Building Fund		Public Works & Emergency Preparedness Coordinator	Project is complete with minor updates to be provided based on any new information/data. Asset Management information has been incorporated into long-term financial plan estimates. **COMPLETE**
2. Update long-term financial estimates and plan for infrastructure/assets renewal annually	Contractor(s)	Annually by August of each year starting in 2025	**ABR** – part of additional $20K to come from Community Building Fund		Public Works & Emergency Preparedness Coordinator	The updates will start in 2024 for the 2025 budget cycle.
3. Integrate long-term infrastructure/asset replacement plan into long-term financial plan	Financial Consultant	Annually by September of each year starting in 2024	**ABR** – part of additional $20K to come from Community Building Fund		CAO	This work has been completed and will be updated each year based on latest infrastructure/ asset replacement data. **COMPLETE**
4. Tender and complete priority infrastructure projects identified including drainage and roads priorities (see Key Project Lists)	Contractor (Project Manager) Public Works & Emergency Preparedness Coordinator	Annually	Project based budgets and **ABR** to be determined with funding from existing reserve funds and Growing Communities Fund ($759,000 initial balance)	Funds to be added to capital budgets for project management	CAO	See progress reports forwarded to Council on infrastructure projects; Marine Avenue is in progress. Tender has been awarded. Construction schedule underway.

MANAGING OUR ASSETS & INFRASTRUCURE

We will manage and safeguard our existing assets and infrastructure

Road Ends & Firehalls

OUTCOMES/MEASURES OF ACHIEVEMENT

- Identification of Road End properties that can be sold
- Sale of Road End property(ies)
- Solution for new Firehalls including an equitable cost sharing arrangement

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Potential Development of Road Ends – the focus is on creating sellable road end lots to pay for Capital projects such as a new firehall and to place the Village in a more favorable fiscal position	CAO and Contractor(s)	By June of 2025	**ABR** of up to $20,000 from Financial Stabilization Reserve	Only most sellable lot(s) would be pursued with any sales proceeds from first sales funding development work.	CAO	In progress
2. Investigation of new firehalls including the current cost sharing arrangement	CAO and Contractor(s)	By June of 2025	**ABR** of up to $20,000 from Financial Stabilization Reserve	The Village's interests need to be protected by undertaking financial due diligence and in communicating financial implications to residents.	CAO	In progress

MANAGING OUR ASSETS & INFRASTRUCURE

We will manage and safeguard our existing assets and infrastructure

Water System Improvements

OUTCOMES/MEASURES OF ACHIEVEMENT

- Assessment, excavation and fencing of existing water reservoir completed
- Clear options for addressing water system deficiencies defined
- Budget and schedule water system changes to address deficiencies
- Business case for universal water metering completed
- Review of water charges for Belcarra Park as per Metro Vancouver agreement completed

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete engineering report and work on water reservoir	Contractor(s)	By July ~~2023~~ 2024	**SoF** - $30K Water Engineering Capital Budget and $45K Water Capital Budget for excavation and fencing around reservoir. **ABR** for additional chlorination design work to be determined	Currently have capital budgets of $20K in 2024 and $20K 2025 for Water System Engineering which can be reallocated to actual project work	Public Works & Emergency Preparedness Coordinator	The excavation and fencing have been completed. Chlorination system design has been presented at the September 6 Council meeting.
2. Engineering report and recommendations on options for addressing water system deficiencies including risk factors and budgets	Contractor(s)	By September ~~2023~~ 2024	**ABR** – to be determined with funding from Community Building Fund	Currently have capital budgets of $20K in 2024 and $20K 2025 for Water System Engineering which can be reallocated to actual project work	Public Works & Emergency Preparedness Coordinator	Work is on track for 2024.
3. Final decision(s) on projects and budgets for addressing water deficiencies in part based on risk tolerance	Council	By October ~~2023~~ 2024	Project based budgets and **ABR** to be determined with funding from Growing Communities Fund ($759,000 initial balance)	Council decision(s) required. Budgets should include engineering and project management costs	Public Works & Emergency Preparedness Coordinator	Subject to the above report being received.
4. Provide for water system improvements in long-term financial plan	Financial Consultant	By October ~~2023~~ 2024	N/A	Projects to be completed as per long-term financial plan	CAO	All decisions or outcomes from above will be incorporated into the long-term financial plan once the decisions are finalized.
5. Complete water metering business case	Contractor(s)	By September ~~2024~~ 2025	**SoF** - $40K capital budget for universal water metering in 2024 **ABR** to be determined for any additional capital and operating costs	Will need to generate same revenue with meters as without meters	CAO	This item will require significant staff involvement and has been deferred as noted. The deferment was part of the Strategic Priorities update.
6. Complete review of Belcarra Park water charges	Financial Consultant	By October ~~2023~~ 2024	Within existing operating budget		CAO	History of charges in agreements with Metro Vancouver have been researched and a meeting needs to be set up with Metro Vancouver to discuss options.

MANAGING OUR ASSETS & INFRASTRUCURE

We will manage and safeguard our existing assets and infrastructure

Waste & Recycle Depot (WARD) Improvements

OUTCOMES/MEASURES OF ACHIEVEMENT

- Formal review of WARD services and infrastructure completed
- Options for changes in services and service levels outlined including cost control options
- Plan, budget and schedule for changes to WARD services and infrastructure

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete WARD service review including review of current service provider and the option of utilizing Recycle BC to save costs	Public Works & Emergency Preparedness Coordinator & Contractor(s)	By June of 2025	ABR of up to $15,000 from Financial Stabilization Reserve	Need to provide for cost stability and certainty into the future	CAO	This project has been accelerated, as the Village is at risk with its current service provider. This was part of the Strategic Priorities update.
2. Review of WARD infrastructure to match services provided	Public Works & Emergency Preparedness Coordinator & Contractor(s)	By June of 2025	Part of ABR above	As above.	CAO	As above.
3. Recommendations and approvals related to service changes and infrastructure needed	Public Works & Emergency Preparedness Coordinator	By June of 2025	Project based budgets based on results of review; **ABR** to be determined for any additional capital and operating costs		CAO	Project will occur by 2025 before agreement with service provider expires in 2026.
4. Implementation of any approved changes including provision for changes in financial plan	Public Works & Emergency Preparedness Coordinator & Financial Consultant	By June of 2026	N/A		CAO	Project will occur by 2026 before agreement with service provider expires in 2026.

STEWARDING OUR COMMUNITY & ITS NATURAL ENVIRONMENT

We will care for our Community and value its natural environment

Managing our Natural Assets

OUTCOMES/MEASURES OF ACHIEVEMENT

- Inventory and mapping of our natural assets, e.g. tree canopies, wetland, riparian areas, etc., completed
- Plan and budget for maintaining tree canopies
- Ongoing tree trimming and maintenance program

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Completed inventory and mapping of natural assets and include in GIS system	Contractor(s)	By April 2024	**ABR** to be determined with funding from Climate Action Program funds	$40K of funding available annually for 3 years. Will also be applying for a grant to complete this project	Public Works & Emergency Preparedness Coordinator	Project has been completed and is part of Asset Management Plan. LandInfo Technologies completed the project. **COMPLETE**
2. Council report on ongoing budget needs for tree management program	Public Works & Emergency Preparedness Coordinator	By ~~June 2024~~ Spring 2025	**ABR** to be determined with adjustment in annual operating budget being made		CAO	A report will be provided in ~~2024~~. 2025
3. Operational plan to implement tree trimming and maintenance plan	Public Works & Emergency Preparedness Coordinator	By ~~September 2024~~ Ongoing	N/A		CAO	Results from above will be incorporated into the 2025 budget cycle.

STEWARDING OUR COMMUNITY & ITS NATURAL ENVIRONMENT

We will care for our Community and value its natural environment

Official Community Plan (OCP)

OUTCOMES/MEASURES OF ACHIEVEMENT

- Final OCP adoption
- OCP implemented into daily operations
- Ongoing monitoring of the OCP as a tool to guide development and growth

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Finalize OCP and conduct public hearing	Contractor(s)	By ~~July 2023~~ Early 2024	**SoF** - $20,000 in 2023 budget. Funding is from the Community Building Fund	Need to provide for review and update of OCP in long-term financial plan every 5 years	CAO	OCP has undergone public hearing and 2nd and 3rd readings. **COMPLETE**
2. Adopt OCP and implement the same into daily operations	CAO	Adoption by ~~Sept. 2023~~ March 2024 and implementation by ~~Nov. 2023~~ October 2024	N/A		CAO	The OCP received first and second reading on June 3, 2024 and has been sent to Metro Vancouver; adopted on October 7, 2024.
3. Prioritization of OCP action items and completion of action items	CAO	Ongoing	**ABR** to be determined	And additional spending to come forward as spending packages in budgeting process	CAO	Ongoing implementation and prioritization plan will be put in place once the OCP is adopted. Bylaws will be reviewed for amendments as required.
4. Ongoing monitoring of OCP and its effect on the community	CAO	Ongoing	N/A	Annual reports to be forwarded to Council	CAO	Ongoing monitoring plan will be put in place once the OCP is adopted.

STEWARDING OUR COMMUNITY & ITS NATURAL ENVIRONMENT

We will care for our Community and value its natural environment

Multi-Use Path, Trail and Road Shoulder (MTRS) Network

OUTCOMES/MEASURES OF ACHIEVEMENT

- Mapping and plan for multi-use paths/trails/road shoulder enhancement (MTRS) network within the community completed
- Funding for incremental buildout of MTRS network secured including grants
- Ongoing maintenance program for MTRS implemented
- Incremental construction of new MTRS as per plan and as funding allows

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete mapping of existing MTRS network and include in GIS system	Contractor(s)	By September 2023	**ABR** – $10,000 from Community Building Fund and/or other grants	Community Building Fund needs to be substantially used by 2024	Public Works & Emergency Preparedness Coordinator	Project has been completed and is part of the Asset Management Plan. LandInfo Technologies completed the project. **COMPLETE**
2. Create plan for incremental build out of MTRS network including budget requirements	Contractor(s)	By October ~~2023~~ 2024	**ABR** – $37,500 from Community Building Fund and/or other grants	Community Building Fund needs to be substantially used by 2024	CAO	The Active Transportation Network Plan (ATNP) work and been awarded to Bunt & Associates and completion is expected early in 2025. TransLink is providing a 50% grant for the project (total cost is $75,000).
3. Complete funding applications for new MRTS and secure grant funding	Grant Writer	Ongoing	**ABR** to be determined	Applications for next round of TransLink funding are due in the fall of 2023	Financial Consultant	See above grant application. The Active Transportation Plan will lead to a list of prioritized projects that will be used to apply for actual project or infrastructure grants through TransLink, etc.
4. Include budgets for maintaining existing MTRS network in long-term financial plan	Financial Consultant	Annually	**ABR** to be determined and to be included in annual operating budget		CAO	Funding is included in the long-term financial plan to maintain the network and will be re-visited each year. **COMPLETE**
5. Build out MTRS network including prioritized sections	Public Works & Emergency Preparedness Coordinator	Annually as approved	**ABR** to be determined and dependent upon grants obtained	Any new MTRS should include budget for ongoing maintenance	CAO	Budgets will be included in annual financial plan once the above Active Transportation Plan is completed and approved.

STEWARDING OUR COMMUNITY & ITS NATURAL ENVIRONMENT

We will care for our Community and value its natural environment

Re-Development of Tennis Court Site

OUTCOMES/MEASURES OF ACHIEVEMENT

- Plan and budget for amenities at the Tennis Court site in place
- Agreement with Metro Vancouver on plan and related amenities finalized
- Construction of amenities completed

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Report to Council on amenity options for tennis court site including associated budget implications and any First Nation requirements	CAO	By ~~October 2023~~ ~~June 2024~~ Spring 2025	N/A		CAO	Removed brush & worked with Invasive Species Council to remediate site. Ongoing work, staff meeting with other agencies.
2. Decision on amenities and budget for tennis court site	Council	By ~~March~~ ~~July 2024~~ See above	**ABR** to be determined with funding from Community Building Fund	Community Building Fund needs to be substantially used by 2024	CAO	Dependent upon the timing of the above noted report.
3. Presentation of tennis court site plan to Metro Vancouver and finalization of agreement on site improvements	Mayor & CAO	By ~~June September 2024~~ See above	N/A	Any First Nation issues to be addressed	CAO	Dependent upon the timing of the above noted report.
4. Construction of tennis court site amenities	Contractor(s) and Public Works & Emergency Preparedness Coordinator	By ~~June~~ October 2025	Based on approved budget(s) with additional operating costs to be provided for in financial plan		CAO	Dependent upon the timing of the above noted report.

FISCAL MANAGEMENT & FINANCIAL SUSTAINABILTY

We will operate in a fiscally responsible and financial sustainable manner

Fiscal Management

OUTCOMES/MEASURES OF ACHIEVEMENT

- Up and running Finance Committee
- Regular fiscal updates to Council and the community
- Council input into annual, long-term financial plans including capital review

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Create & approve Terms of Reference for a Finance Committee and start Committee meetings	Financial Consultant	By July of 2023 with quarterly meetings thereafter	N/A	Corporate Officer to set out meeting schedule	CAO	Project completed; Finance Standing Committee meetings are ongoing. **COMPLETE**
2. Complete fiscal updates and present to Council	Financial Consultant & Accounting Clerk	For the periods ending June and September of each year with the reports to be finalized by the end of the month following each of these periods	Within existing operating budget		CAO	Regular fiscal updates are being provided as scheduled. **COMPLETE**
3. Finance Committee to review and approve long-term capital and operating plans	Financial Consultant	By September of each year as part of the financial planning process	N/A	Plans to be presented at Finance Committee meetings	CAO	2024 – 2028 (5-year) financial plan and longer-term plan to 2038 have been completed and can be updated annually or as needed when major spending initiatives are under consideration. **COMPLETE**

FISCAL MANAGEMENT & FINANCIAL SUSTAINABILTY

We will operate in a fiscally responsible and financial sustainable manner

Financial Sustainability

OUTCOMES/MEASURES OF ACHIEVEMENT

- Long-term (15-year) operating and capital financial plans completed and updated annually
- Integration of infrastructure renewal/replacement plans with long-term financial plans
- Formal grant writing resources and process in place
- Ongoing grant applications submitted

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Create long-term (15 years) financial planning model with integration to infrastructure and capital plans (based on asset management results)	Financial Consultant	By October of 2023 with updates each year thereafter	**SOF** - $20K budgeted for this component - to come from UBCM grant	Part of overall project budget (includes $25K UBCM grant) which includes asset management, condition assessments, long-term financial plan & financial sustainability report.	CAO	Work on the integrated model has been completed and is easily updateable. **COMPLETE**
2. Produce report for Council and community based on long-term financial plan which also addresses financial sustainability	Financial Consultant	By October of 2023 with updates each year thereafter	**SOF** - $25K budgeted for this component to come from Community Building Fund	Part of overall project budget which includes asset management, condition assessments, long-term financial plan & financial sustainability report.	CAO	Community Financial Sustainability report was completed and recommendations within the report have been approved by Council for implementation. **COMPLETE**
4. Secure grant writing resource, provide list of grant targets and start application process	Financial Consultant & Grant Writer	Ongoing	**ABR** to be determined with grant resource to be charged to projects if possible	Ongoing database or list of eligible grant programs to be set up and maintained	CAO	A grant tracking system has been implemented and grants are being applied for. Other parties are being used as needed to support the grant writing process. **COMPLETE**

EMERGENCY MANAGEMENT & PREPAREDNESS We will make public safety a priority
Emergency Planning & Management
OUTCOMES/MEASURES OF ACHIEVEMENT ▪ Emergency management plan updated including consideration of climate change implications ▪ Mass notification system in place ▪ Inventory and replenishment of emergency supplies completed

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Review and update emergency management plan	Contractor(s) and Public Works & Emergency Preparedness Coordinator	By ~~June of 2024~~ Spring 2025	**ABR** to be determined with funding coming from grant	Will apply for grant	CAO	Working with other municipalities to develop next steps.
2. Implement mass notification system	Public Works & Emergency Preparedness Coordinator	By October of 2023	Budget estimated at $2,000 per year **SoF** existing operating budget	To be implemented n conjunction with Anmore	CAO	Project has been completed and mass notification (alerting) system is in place. **COMPLETE**
3. Complete Inventory of emergency supplies replenishment same as needed	Public Works & Emergency Preparedness Coordinator	By ~~August of 2024~~ Ongoing	**ABR** estimated at $15,000 with funding source to be determined		CAO	Project is in progress and will be completed in Spring 2025

EMERGENCY MANAGEMENT & PREPAREDNESS

We will make public safety a priority

Fire Safety including Wildfire Management

OUTCOMES/MEASURES OF ACHIEVEMENT

- Fire safety & resiliency plan finalized
- Wildfire prescriptive zones created and incrementally implemented
- Inclusion of Metro Vancouver Sasamat fire service tax requisition on tax notices

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete fire safety & resiliency plan	Contractor and Public Works & Emergency Preparedness Coordinator	By June 2023	**SoF** existing UBCM grant	Completed with grant funds	CAO	**COMPLETE**
2. Create and maintain wildfire prescriptive zones including development planning area	Contractor and Public Works & Emergency Preparedness Coordinator	By June ~~2023~~ ~~2024~~ Delayed by OCP	**SoF** existing UBCM grant	$5,000 to spent on public education from grant funds	CAO	Prescription area mapping has been completed. Development planning area was submitted and completed by B.A. Blackwell & Associates. Further work will be conducted in 2025 now that OCP adopted.
3. Remediation of forest prescription areas	Contractor(s) and Public Works & Emergency Preparedness Coordinator	Ongoing	**ABR** to be determined to address ongoing wildfire management. Goal is to fund with 100% grant funding if possible	To be completed with grant funding (to be applied for)	CAO	Further UBCM grants will be applied for to implement remediation.
4. Annual Metro Vancouver tax requisition for Sasamat fire service showing on tax notices	Accounting Clerk & Financial Consultant	By May of each year starting in 2024	N/A		CAO	Changes have been made to the tax notice and separate tax rates are included on the notice. **COMPLETE**

COMMUNICATION & COMMUNITY ENGAGEMENT
We will place a priority on communicating with our citizens, staff and partners

Communication & Community Engagement

OUTCOMES/MEASURES OF ACHIEVEMENT

- New protocol for community/public input and engagement at Council meetings in place
- Communication protocol for interaction between CAO, staff & Council formalized
- Communication strategy in place for engaging the public on key issues on an ongoing basis including the use of social media
- Implementation and monitoring of communication strategy

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Procedures for Community input & engagement at Council meetings written into updated Council Procedure bylaw	Corporate Officer	By September of 2023	N/A		*CAO*	New Council Procedure bylaw was adopted on December 4, 2023. **COMPLETE**
2. Hold Community information meetings to inform citizens as needed	Corporate Officer	Ongoing	N/A	Format for meetings including topics to be approved by Council	CAO	Item updated as part of Strategic Priorities update.

OPERATIONAL PRIORITIES & STRATEGIES

We will operate efficiently and effectively to provide value and service to our community and residents

Policies, Procedures & Bylaws

OUTCOMES/MEASURES OF ACHIEVEMENT

- Differentiation between Administrative and Council policies/procedures with a policy
- Rewrite, adopt and implement key policies, procedures & bylaws
- Monitoring of key policies, procedures & bylaws to gauge effectiveness and compliance
- Annual review of a least ten (10) impactful policies, procedures & bylaws on a rotating basis

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Develop, adopt and implement updated procurement policy	Financial Consultant	By ~~October of 2023~~ June 2024	N/A		CAO	Draft policy and report are substantially complete and will go forward to the Finance Standing Committee.
2. Develop, adopt and implement updated Human Resources policy	CAO	By September of 2023	N/A		CAO	Human resources policy developed and adopted and is being implemented **COMPLETE**
3. Develop, adopt and implement updated Council Procedure bylaw	Corporate Officer	By September of 2023	N/A		CAO	Council Procedure bylaw developed, adopted and implemented. **COMPLETE**
4. Conduct and document annual policy reviews including updating policies as needed	Corporate Officer	Annually by December 31st of each year starting in 2024	N/A		CAO	Review of policies is ongoing; a new privacy policy was completed and presented to Council.

OPERATIONAL PRIORITIES & STRATEGIES

We will operate efficiently and effectively to provide value and service to our community and residents

Operational Reporting & Updates

OUTCOMES/MEASURES OF ACHIEVEMENT

- Quarterly Council reports on public works operational priorities and progress including capital projects
- Quarterly Council reports on administration operational priorities and progress
- Quarterly updates on the status of Council's Strategic Priorities and Goals

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Complete reporting templates	CAO	By July of 2023	N/A		CAO	Templates have been finalized (see below). **COMPLETE**
2. Produce reports starting with the quarter ending August 31st, 2023	Corporate Officer (Administration reports) Public Works & Emergency Preparedness Coordinator (Public Works reports)	Reports to be submitted by the end of each month following quarter ends	N/A		CAO	All reports have been completed and are on schedule. **COMPLETE**

OPERATIONAL PRIORITIES & STRATEGIES

We will operate efficiently and effectively to provide value and service to our community and residents

Human Resources Planning

OUTCOMES/MEASURES OF ACHIEVEMENT

- Clear human resources plan for staff resource needs in short, medium & long-term
- Plan and terms for engaging external resources (consultants & contractors) to supplement staff
- Implementation of human resource plan including budgeting for resources as approved

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Council report and recommendations on staff resources	CAO	By ~~September 2023~~ ~~2024~~ Spring 2025	N/A		CAO	Project delayed due to OCP.
2. Council report on consulting resources and recommendations including engineering, finance planning, information technology, etc.	CAO	By ~~September 2023~~ ~~2024~~ Spring 2025	N/A		CAO	Report will be provided in 2025
3. Implementation of Human Resources plan including budgeting approved resources & undertaking request for proposals (RFPs) for outside resources as needed	CAO	By ~~March December 2024~~ Spring 2025	**ABR** to be determined and to be provided for within long-term operating financial plan		CAO	Based on results from above.

OPERATIONAL PRIORITIES & STRATEGIES

We will operate efficiently and effectively to provide value and service to our community and residents

Information Systems & Technology

OUTCOMES/MEASURES OF ACHIEVEMENT

- Secure and stable information systems with protection from threats
- E-commerce capability up and running
- Budget for IT system replacements and improvements including hardware and software
- Plan for content and maintenance of Village website
- Document management system options reviewed and recommendations provided

ACTIONS TO ACHIEVE RESULTS	Assigned Human Resources	Expected Completion Date	Source of Funds (SoF) or Additional Budget Requirements (ABR)	Comments	VoB Project Sponsor	Status Report September 30, 2024
1. Develop and implement staff training programs to make best use of existing programs and technology	CAO & Public Works & Emergency Preparedness Coordinator	By October of ~~2023~~ 2024 & ongoing	**ABR** to be determined with any changes to be considered as part of 2024 budget		CAO	Formal training program needs to be established; in part based on staff reviews.
2. Implement e-commerce capabilities for payments, look-ups, email responses, etc.	Financial Consultant & Accounting Clerk	By ~~May of 2024~~ To be determined	**ABR** to be determined with any changes to be considered as part of 2024 budget		CAO	Project has not started yet.
3. Review of website content and maintenance and plan for future use	Corporate Officer & Accounting Clerk	By June of 2024	**ABR** to be determined with any changes to be considered as part of 2025 budget		CAO	Work is ongoing
4. Conduct system review with IT provider to ensure maximum protection for Village system	CAO & Corporate Officer	By ~~March of 2024~~ Work is ongoing	**ABR** to be determined with any changes to be considered as part of 2025 budget		CAO	Work is ongoing
5. Create longer term budgets for IT hardware and software replacements	IT provider & Corporate Officer & Accounting Clerk	By September of 2024	**ABR** to be determined with any changes to be considered as part of 2025 budget	No additional budget required	CAO	Project has been completed as part of long-term financial plan. **COMPLETE**
6. Complete review of document management system options and provide recommendations	Contractor(s)	~~By September of 2024~~ To be determined	**ABR** to be determined with any changes to be considered as part of 2025 budget		CAO	Project has not started yet.

COUNCIL REPORT

Date: November 4, 2024

From: Paula Richardson, Chief Administrative Officer

Subject: **Quarterly Department Reports – For Quarter ending September 30, 2024**

Recommendation

That the report dated November 4, 2024 titled "Quarterly Department Reports – For Quarter ending September 30, 2024" be received into the record for information.

Purpose

The purpose of this report is to provide the quarterly departmental updates for administration and public works for the quarter ending September 30, 2024.

Background

As per the approved Strategic Priorities Work Plan the following departmental reports are to be forwarded to Council on a quarterly basis:

- Quarterly Council reports on administration operational priorities and progress
- Quarterly Council reports on public works operational priorities and progress including capital projects

Third quarter reports are included in the appendices to keep Council apprised of work done from July 2024 to the end of September 2024 in the administrative and public works departments. As with the previous quarterly reports, these updates are not intended to be a duplication or repeat of updates already provided in the Strategic Priorities Work Plan status report.

The quarter ending September 30, 2024 has continued to be busy for both the Administration and Public Works Department with day to day work being carried out to ensure residents continue to have the municipal service they rely on. This quarter included finalizing the Official Community Plan Regional Growth Strategy and maps with Metro Vancouver and continued work with consultants on a land disposition policy. Several larger projects outside of the strategic plan have come to the forefront during the third quarter which have required staff time and attention.

Conclusion

The quarterly departmental reports provide a summary of priorities and progress on work carried out on a day-to-day basis by both administration and public works. It gives Council the opportunity to view projects and work being carried out that are outside the scope of the Strategic Work Plan and which are also important in keeping Village business moving and at the forefront.

Prepared by: Paula Richardson
Chief Administrative Officer

and

Prepared by: Stewart Novak
Public Works and Emergency
Preparedness Coordinator

The following appendices are attached hereto:

Appendix A: Quarterly Administration Report – For Quarter Ending September 30, 2024
Appendix B: Quarterly Public Works Report – For Quarter Ending September, 2024

Quarterly Administration Report – For Quarter Ending September 30, 2024 Report date: November 4, 2024 (Completed by: CAO and Corporate Officer)			
Administrative Item	**Progress or Status**	**Key Challenges**	**Comments**
Attendance at various other agency meetings such as Metro Vancouver Parks Advisory Cttee & Regional Administrators Advisory Cttee, NG-911, Tsleil Waututh Nation, Vancouver Port Authority, SVFD Trustees Meeting and UBCM Conference	Ongoing	Time constraints	These meetings are attended by the CAO; there are frequently more meetings added
Day to day CAO support for Mayor and members of Council	Ongoing	Time constraints	
Organizing of UBCM Meeting Requests with Provincial Ministers and/or staff for 2024 Conference	Complete	Time consuming	Meetings were booked; work was done on discussion documents for attending Council members to take to meetings
Attendance of meetings hosted by Provincial Government re: Housing Legislation	Ongoing	Time constraints	These meetings are lengthy and very often include information which is targeted towards Planners; CAO attends meetings along with Belcarra's planning consultants
Policy Project Work	Ongoing	Detailed work; legal requirements to be considered; involvement of other staff in review of existing policies which may need revision or repeal in which case new policies will have to be written	This work is ongoing; work continues on a comprehensive policy review; the project is extensive and due to other projects with higher priority, it is worked on in increments by the Corporate Officer;

Administrative Item	Progress or Status	Key Challenges	Comments
Continued work on bylaws; development of new documents; review and update of older ones	Ongoing	Large number of bylaws which require updating or new bylaws to adhere to new legislative regulations	Council approved
Update of bylaws page for the website; continued maintenance of bylaws index	Ongoing		This work is ongoing, and the page is updated regularly as new bylaws are created or existing bylaws are amended
Processing of Freedom of Information (FOI) and Protection of Privacy Requests	Ongoing		For the quarter ending September 30, 2024 there have been three FOI requests
Compiling material for the legislatively required Freedom of Information Privacy Management Program	Ongoing	This is a large project and requires concentrated amounts of time working with the consultant as well as working through material the consultant has flagged for review and updating	Work continues in conjunction with a consultant to bring the Village into compliance; online educational workshops are planned for staff as well as members of Council in this quarter; documents are being gradually updated to meet legislative requirements
As per the above FOI Management Program, update of all forms within the file system to adhere to legislative standards; as many forms as possible on the website were made fillable	Ongoing	The work on forms is one aspect of the FOI management program and is detailed work	This type of work will continue as the consultant and staff work through ongoing requirements.
Agenda management	Ongoing	Time consuming and is all encompassing each week prior to an agenda	Ongoing work on agendas and council meetings Involves all of admin staff
Providing continued support for various administrative tasks (Clerk position)	Ongoing	working on new tasks being delegated to the position	Filing, answering phone, dealing with public, assists Mayor, bylaw ticketing and collections, miscellaneous assistance for other office staff

Administrative Item	Progress or Status	Key Challenges	Comments
Processing bylaw infraction ticketing and related questions, payments, collections and adjudication work for dispute of tickets	Ongoing	Time consuming; interactions with the public area occasionally unsettling dependent on approach of person(s) receiving a bylaw infraction ticket	Staff involved: Accounting Clerk, Admin Assistant, Bylaw Enforcement Officer
Processing resident parking passes, guest passes, construction permit parking	Ongoing		Updating expiry dates to parking passes as received; forms have been updated to include registration of contractors etc.
Taxes 2024	Complete	Time consuming; front desk and phone very busy during this time period for staff involved with taxes	Tax notices sent out, collection and payments continued into July
Government reporting, i.e. taxes, utilities, financial plan	Ongoing		
Continued work on moving the Official Community Plan Bylaw toward adoption	Ongoing	Time consuming for all staff members to ensure appropriate process is followed	RGS submitted to Metro Vancouver. Follow up work required on housekeeping amendments required by Metro Vancouver staff Note: The OCP Bylaw was adopted on October 7, 2024
Updating Highway Encroachment Files for docks	Ongoing	Tracking agreement expiries & insurance documents	This work is being carried out by Belcarra's administrative support person
Circulating and confirming attendance for Council on external meetings and events	Ongoing		This work is being carried out by Belcarra's administrative support person
Items for Closed Council meetings	Ongoing	Time consuming report preparation and meetings with legal counsel	Various items are provided to Council in Closed meetings

Administrative Item	Progress or Status	Key Challenges	Comments
ELC/Pooni Group meetings re: development application	Ongoing	Time consuming meetings; large volume of correspondence with back and forth between planners, proponent and staff	Work being conducted as per Council motion of November 6, 2023.
Road Ends	Ongoing	Time consuming; there continues to be a large amount of work required which is not part of the strategic plan; details and legal aspects are the priority for road ends work	Planning consultants have been engaged to continue work on investigating the sale of road ends; staff continue to be involved in all aspects of the investigation and regular/daily communication takes place on the subject
Land Disposition Policy	In progress	Time consuming	Staff attended numerous meetings with planning consultant as well as legal; reviews of all information carried out prior to report being provided Note: Policy approved on October 21, 2024
Sale of Waterfront Properties	Ongoing	Working with residents who brought forward correspondence, the MLA's office, Municipal Affairs and legal counsel; due to election, communication with Provincial Government entities was limited or not available at all	A meeting with residents who provided correspondence between themselves and the local MLA and Municipal Affairs led to the requirement for staff to communicate with legal counsel, and correspond with various levels of the Provincial Government.
Farrer Cove Access Route Follow up	Ongoing	Time consuming;	A report was provided by a consultant on June 3, 2024; this continues to be a complex situation and staff continuous to deal with requests and issues as they come forward

Administrative Item	Progress or Status	Key Challenges	Comments
Fire Protection Bylaw and Policy	Complete	Time; this was a larger project which required input from the SVFD Fire Chief	A new Fire Protection Bylaw was written in conjunction with the Fire Chief and adopted; amendments will be brought forward at a future Council meeting to correspond with the new Fire Safety Act
Updating of the Village's website	Ongoing	Time consuming, learning curve for new processes	Updates to the background aspect of the website continue; the CAO and Corporate Officer attended training with the goal of having increased efficiency with less reliance on the website designer
Obtaining legal advice on various topics	Ongoing	Time consuming; there are legal questions that need to be addressed; background information to be gathered and provided; meetings are held with legal to review material allowing staff to provide appropriate answers	Questions and concerns are raised by Council and residents which require legal viewpoints to give appropriate answers, many of these topics fall outside of the strategic plan parameters
Sasamat Volunteer Fire Department – Anmore/Belcarra Agreement	Ongoing	Time consuming	There is a large, complex scope of work involved in this topic; discussions with legal counsel continue; updates provided to Council; public notification provided to residents.
TUP Extension for ELC	Ongoing	Working through agreement with consultant; short time period to bring forward to Council	This work involved a consultant, the CAO and the Corporate Officer to ensure all was done correctly and work through the history of the original TUP Note: The TUP was approved by Council on October 21, 2024

Administrative Item	Progress or Status	Key Challenges	Comments
Active Transportation Network Plan (ATNP)	Ongoing	Time for new project	Staff participated in the RFP process; ongoing communication w Bunt & Associates to go through preliminary work involved with the project.
Tennis Court Site	Ongoing	Time Consuming	Staff met with Metro Parks and their preferred archaeological company and are investigating costs for various scenarios.

APPENDIX B to Item 10.3

Quarterly Public Works Report – For Quarter Ending September 30, 2024 Report date: November 4, 2024 (Completed by: Public Works and Emergency Preparedness Coordinator)			
Operational Item	**Progress or Status**	**Challenges**	**Comments**
▪ WARD operations	Status Normal	Exit lane shows signs of structural pitting. Will bring forward a report with recommendations.	Repair broken pavement along fence line. Complete Additional paving work required on exit lane.
▪ Ward Operations	Bin A & Bin C compressor buttons to be replaced.		Bin A & Bin C compressor buttons to be replaced. Complete
▪ Options for Addressing Water System Deficiencies	Work in progress. Report pending.		Report to be brought forward on Nov. 4, 2024 council meeting. WSP in attendance,
▪ Marine Ave - Mill & Fill (Marine)	In progress (designing) – approved at the January 22, 2024 Council Meeting		Detailed design & pricing. Complete. Contract awarded to Save On Paving. Work Pending.
▪ Bedwell Bay Upgrade Project (BBUP)	In progress. Concept design being developed for review.		Supporting grant funding has been approved. Complete. Council approved funding for preliminary and detailed design.
▪ Bedwell Bay Rd. Guard Rails	Complete		TransLink grant funding project complete. Application for TransLink funding renumeration submitted.
▪ Road Line and crosswalk painting.	Complete		MRN maintenance
▪ MRN Road repairs	Complete		Yearly road maintenance repairs. Total of 7 repairs

Operational Item	Progress or Status	Challenges	Comments
▪ Road crack sealing	Complete		Now part of staff's annual road maintenance program.
▪ Roadside ditching	Complete.	Scheduled yearly	Marine Avenue
▪ GIS Mapping – Mycivitas & Mergin Maps programs by Land Info Tech	Scoping & video condition assessment of culverts		Ongoing
▪ Municipal Water connection Permits	In progress		1 complete 1 in progress
▪ Tree Cutting Permits	In Progress		2 in progress
▪ Road Use Permits	In Progress		2 complete 3 in progress
▪ Hydrological study, Bedwell Bay Road	Study complete		Complete. Submitted to September 9, 2024 council meeting.
▪ Bedwell Bay Road drainage diversion	In Progress		Council approved a motion to include the drainage diversion in the BBUP planning.
▪ Dutchman Reservoir Graffiti	Complete	Paint over graffiti on the reservoir tank.	Complete - July 23rd 2024
▪ Strathcona Quarterly Inspection & Servicing	Ongoing	Repair leaking meter.	Leak repair complete. Latch sensor to be repaired.
▪ Tatlow Reservoir	Ongoing		Low water level set to 76%
▪ lay road mulch around reservoir path	Complete		
▪ Tatlow Reservoir	Complete	Scada system repair required. High Priority	New Scada Pack Installed & programmed.
▪ Tatlow Reservoir ▪ Service Altitude Valve	Complete		

Operational Item	Progress or Status	Challenges	Comments
▪ Hydrant Flushing	Complete		Annual flushing complete
▪ Responding to complaints & meeting with residents	Ongoing	Issues may require immediate assistance which changes the work plan for the day.	
▪ Bylaw Enforcement	Ongoing	Educating residents on bylaw regulations; continuing to issue tickets for bylaw violations	
▪ Tennis Court Site	Ongoing	Time Consuming	Staff met with Metro Parks and their preferred archaeological company and are investigating costs for various scenarios.

Meeting Attendance By Municipal Services Manager

- RTAC – TransLink Regional Transportation Advisory Committee
- TPSC – TransLink Transportation Planning Sub Committee
- REPC – Metro Regional Emergency Planning Committee
- IPREM – BC Integrated Partnership for Regional Emergency Management
- LGCAP – Local Government Climate Action Program
- EMCR – Southwest Emergency Management Partners – Seasonal Hazard Preparedness
- EMBC – Emergency Management BC – Northeast Sector Emergency Management Committee
- RCMP - Emergency Social Services
- Metro Vancouver – Miscellaneous meetings

COUNCIL REPORT

Date: November 4, 2024

From: Paula Richardson, Chief Administrative Officer & Ken Bjorgaard, Financial Consultant

Subject: Council Indemnity Increase

Recommendation:

That Village of Belcarra Council Indemnity Bylaw No. 631, 2024 be read a first, second and third time.

Purpose:

This report provides information on the Council indemnity increases for 2025 and introduces the Council Indemnity Bylaw for three readings.

Background:

According to data from Statistics Canada, the Vancouver CPI increase for the 12-month period ending August 31, 2024 was 3.0%. This increase has been built into the Village's Provisional 2025 Budget for Council to keep up with the cost of living. The Bylaw now being introduced enacts this increase for Council and the monetary impact is as follows:

	Annual 2024 Council Indemnities	Annual 2025 Council Indemnities	$ Change	% Change
Mayor	$24,961.56	$25,710.36	$748.80	3.0%
Councillors	$12,480.79	$12,855.24	$374.45	3.0%

It is recommended that Village of Belcarra Council Indemnity Bylaw No. 631, 2024 receive first three readings.

Prepared by: Ken Bjorgaard,
Financial Consultant

Concurrence: Paula Richardson,
Chief Administrative Officer

The following appendix is hereto attached:

Appendix A: Village of Belcarra Council Indemnity Bylaw No. 631, 2024

VILLAGE OF BELCARRA
Council Indemnity
Bylaw No. 631, 2024

A bylaw to provide for the payment of an indemnity to
Village of Belcarra Mayor and Councillors

WHEREAS the Municipal Council may, by bylaw, provide for the payment from annual general revenue, an indemnity to the Mayor and to each Councillor for the discharge of their duties of office;

NOW THEREFORE the Municipal Council of the Village of Belcarra in open meeting assembled enacts as follows:

1. This Bylaw may be cited for all purposes as the "Village of Belcarra Council Indemnity Bylaw No. 631, 2024".

2. The indemnity for the Mayor starting January 1, 2025 shall be the gross sum of $2,142.53 monthly.

3. The indemnity for each Councillor starting January 1, 2025 shall be the gross sum of $1,071.27 monthly.

4. The indemnities provided for in Section 2 and 3 above shall be paid by the Chief Administrative Officer, save and except for the provisions of Section 5 hereof.

5. In the event of any member of Council being absent from three consecutive regular Council meetings, the indemnity that would otherwise be due to that member shall not be paid to that member. This provision may be waived by a unanimous vote in favour thereof by the remaining members of Council.

6. If a portion of this bylaw is held invalid by a Court of competent jurisdiction, then the invalid portion must be severed, and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

7. This bylaw shall take force and come into effect as of January 1, 2025.

8. The “Village of Belcarra Council Indemnity Bylaw No. 620, 2023” is repealed effective January 1, 2025.

READ A FIRST TIME on

READ A SECOND TIME on

READ A THIRD TIME on

ADOPTED by the Council on

Jamie Ross
Mayor

Amanda Seibert
Corporate Officer

This is a certified a true copy of
Village of Belcarra Council Indemnity Bylaw No. 631, 2024

Chief Administrative Officer

COUNCIL REPORT

File: 6480-08

Date: November 4, 2024

From: Paula Richardson, Chief Administrative Officer

Subject: **Official Community Plan Review – Dissolution of Committee**

Recommendation

That the work of the Official Community Plan Review Committee be considered complete upon the adoption of Official Community Plan Bylaw No. 631, 2024; and further

That the Official Community Plan Review Committee be officially dissolved.

Purpose

To provide a report to Council providing a recap of the history of the Official Community Plan Review Committee formed in 2022 to bring the Village of Belcarra Official Community Plan to adoption and requesting that the Committee be officially dissolved.

Background

In January of 2022, Terms of Reference were developed for an Official Community Plan (OCP) Review Committee. The Committee was tasked with reviewing the existing Official Community Plan adopted in 2011 and providing recommendations for revisions and updates to Council.

Upon its formation, the Committee was comprised of eleven members, all of whom responded to an ad published on October 20, 2021. The members originally appointed were Larry Carlsen, Paul Degraaf, Ian Devlin, Jol Drake, Ralph Drew, Kevin Ferris, Tracy McRae, Mary-Ann Pope, Sandra Rietchel, Janet Ruzycki and Angela Yin. At the first meeting of the Committee on January 26, 2022, Ian Devlin was appointed Chair and Ralph Drew was appointed Vice-Chair. Councillor Carolina Clark was appointed as the Council representative.

The OCP Review Committee worked diligently on the plan with the assistance of consultants. The original consultants left the project in June 2022. The OCP Review Committee continued their work until the Municipal Election in October 2022. In November of 2022, the new Council sent a letter to OCP Review Committee members to request that they continue to their work as members of the Committee. A new planner, Phil Chapman, Chapman Planning & Consulting, was hired to assist with the completion of the plan and bring it forward for readings and adoption.

At the regular Council meeting held on February 20, 2024, the Village of Belcarra Official Community Plan Bylaw No. 621, 2024 received first reading and was forwarded to Public Hearing on April 8, 2024. At the regular Council meeting held on June 3, 2024, the Village of Belcarra Official Community Plan Bylaw No. 621, 2024 received second and third readings and staff were directed to submit the Regional Context Statement to the Metro Vancouver Regional Board for acceptance.

Village staff worked with Metro Vancouver staff to identify housekeeping amendments in the Regional Context Statement as presented in the Official Community Plan, most notably from 2011. Metro Vancouver staff presented a report at the September 27, 2024 regular meeting of the Board of Directors of the Metro Vancouver Regional District (Metro Vancouver) and the following motion was passed:

> "That the MVRD Board accept the Village of Belcarra Regional Context Statement as submitted to Metro Vancouver on June 12, 2024."

The Village of Belcarra Official Community Plan Bylaw No. 631, 2024 was adopted by Council on October 7, 2024.

Conclusion

The Official Community Plan process took place over almost 3 years. The OCP Review Committee is commended for their perseverance, support and hard work. Staff appreciated working with Committee members and thank them for their service to the Village. Staff recommend that the Official Community Plan Review Committee be officially dissolved.

Prepared by: Paula Richardson
Chief Administrative Officer

COUNCIL REPORT

File:

Date: November 4, 2024

From: Stewart Novak, Manager, Municipal Services

Subject: **Responses to Resident Questions re: Belcarra Water Distribution System**

Recommendation:

That the report dated November 4, 2024 titled "Responses to Resident Questions re: Belcarra Water Distribution System" be received into the record for information.

Purpose:

At the regular meeting of Council held on October 21, 2024 the following motion was passed:

> "That staff be directed to prepare a report responding to questions in a letter from Ian Devlin provided at the September 23, 2024 Council Meeting by the next Council meeting on November 4, 2024."

The purpose off the report is to provide a response to the questions put forward by a resident.

Background:

In response to the attached letter to Council dated September 12, 2024 regarding a summary of information related to outstanding items for the Village of Belcarra water distribution system, staff have prepared a table listing the questions and staff responses. Note that the numbering in the table mirrors the numbering in the original letter.

Question	Staff Response
1. Chlorination System for the Municipal Water System	
• The July 19th, 2021, letter from **'Fraser Health Authority' (FHA)** identified two areas that Council needs to address. First, the need for installation of a chlorination system, and second, a written monitoring plan to document that the requisite chlorine residual is maintained: *"Fraser Health recommended chlorine disinfection equipment be obtained for future needs in a 2019 inspection report."* In other words, the regulatory agency indicates they require a measurable chlorine level in the potable water supply.	• Regular monitoring of the chlorine residual is, and has always been, done according to the requirements put forward by Fraser Health. Random samples are taken every 2 weeks and once a month in the colder weather. Samples are delivered to the Fraser Health lab and results are provided in the yearly water quality report and submitted to Council before the July 1st due date.

Question	Answer
1. Chlorination System for the Municipal Water System (cont'd) • The Council meeting on September 25th, 2023, established a budget of $46,000 for installation of a chlorination system. It was further recommended that the project be identified in the Strategic Work Plan and that the Financial Plan be amended to reflect the work. Was this done?	• The $46,000 was for the detailed design of the chlorination system which was brought forward at the September 9, 2024 Council meeting.
• The chlorination system has been pending for over 11 months and staff advised Council that the FHA has been sent the plans for chlorination for their "approval". As a retired federal public health inspector, I know that such approval is unlikely as there is no technical expertise to undertake that responsibility, and the FHA would not assume the liability associated with that responsibility. The FHA only deals with the measurable chlorine levels in a potable water supply. The council should have asked for the actual timeline of this project — it should not have taken 11 months to get to this point.	• A report was brought forward on the chlorination system design with a request to submit to Fraser Health for permitting at the September 9, 2024 regular Council meeting. Permitting through the Fraser Health Authority is required for any expansion or alteration to a municipal water distribution system.
• The FHA recommended that Belcarra install a chlorination system within the municipal water system, and the municipality has had an engineering company (competent in public health water systems) designing the new system. A chlorination system design plan signed by a registered engineer takes the responsibility for the safety of the plan and I cannot understand why the FHA would want to assume the liability of interfering with the design of the chlorination system.	
2. Recommendations Re Inspection of Tatlow and Dutchman Creek Water Tanks • The WSP report of September 28th, 2023, included recommendations for correcting issues in the two water storage tanks — 7 for the Dutchman's Creek and 10 for Tatlow. How many of those recommendations have been acted upon? Those recommendations are as follows:	
3.1 Considering the report findings, it was recommended that the following actions be taken in response to the identified issues:	

Question	Answer
DUTCHMAN STEEL RESERVOIR 1. The eight loose anchor bolts should be tightened to ensure the stability and structural integrity of the tank. 2. It is recommended to overcoat the graffiti-covered area on the east face of the tank, approximately 18 square meters in size, to remove the graffiti and restore the tank's appearance. 3. No anodes were observed inside the tank. Due to the importance of anodes in corrosion protection, it should be confirmed whether they are required for this structure. 4. During the next scheduled emptying of the tank, clean off areas of surface rust as well as areas where loss of panel coating have been observed and recoat or patch with approved sealant as per manufacturer's specifications. 5. With the tank emptied, it is recommended that connectors, brackets, bolts, etc., be inspected, and cleaned recoated or patched with approved sealant where required. 6. It is recommended to remove the snag along the roadway for safety reasons and to prevent damage. 7. An in-person inspection of the emptied tank is also recommended as this will allow inspectors to assess the current condition, stability, and safety as well as provide a more detailed examination of visible defects.	1. Nuts were tightened down on the anchor bolts immediately after the inspection report being submitted. 2. Graffiti was removed in August (dry season) work progress is to be listed in the next quarterly report. 3. This issue has been discussed with WSP Engineering and will be addressed during planned interior tank repair. 4. This will be addressed during the planned interior tank repair. 5. This will be addressed during the planned interior tank repair (as above). 6. Cleared last year as indicated in the staff Quarterly Report. 7. See items 4 and 5 above.
3.1 Considering the report findings, it was recommended that, the following actions be taken in response to the identified issues:	
TATLOW STEEL RESERVOIR • The following actions be taken in response to the identified issues: 1. Implement effective drainage systems to address water collection on the uphill east side of the tank. This could be as straightforward as addition of a perimeter drain or regrading of the areas. 2. Monitor the corrosion on the embedded anchor bolts and take necessary actions if further deterioration is observed. 3. Clean and prevent algae growth on the panels, especially above the horizontal joint.	1. Complete as reported in the staff Quarterly Report 2. Ongoing 3. Completed

Question	Answer
4. Repair the localized coating loss areas to maintain the integrity of the coating system..	4. Pending
5. Conduct regular inspections and maintenance of electrical/SCADA equipment, roof, and roof vent.	5. Ongoing
6. Replace missing securing bolt on the Main Fill Valve Chamber hatch.	6. Completed
7. During the next scheduled emptying of the tank, clean off areas of surface rust as well as areas where loss of panel coating have been observed and patch with approved sealant.	7. This will be addressed during the planned interior tank repair.
8. No anodes were observed inside the tank. Due to the importance of anodes in corrosion protection, it should be confirmed whether they are required for this structure.	8. This issue has been reviewed with WSP Engineering and will be addressed during the planned interior tank repair.
9. With the tank emptied, it is recommended that connectors, brackets, bolts, etc., be cleaned of rust and inspected, and recoated or patched with approved sealant where required.	9. This issue has been reviewed with WSP Engineering and will be addressed during the planned interior tank repair.
10. An in-person inspection of the emptied tank is also recommended as this will allow inspectors to assess the current condition, stability, and safety as well as provide a more detailed examination of visible defects.	
Please advise as to the status of the following "top three" priorities for both tanks:	
a) Is there a need for anodes to be installed in the water storage tanks? (Items #3 for Dutchman, and Item #8 for Tatlow) b) Has an empty tank inspection been performed to clean-off areas of surface rust and patch with approved coating? (Item #7 for Dutchman and Item #9 for Tatlow) c) Has an engineering inspection of the empty tanks for visible defects been performed to assess the current condition, stability, and safety (Item #10 for Tatlow)	a) This issue is being reviewed with WSP Engineering and will be addressed during the planned interior tank repair. b) This issue is being reviewed with WSP Engineering and will be addressed during the planned interior tank repair. c) This issue is being reviewed with WSP Engineering and will be addressed during the planned interior tank repair.
3. Inspection of the Twin 200mm HDPE Pipes that supply Belcarra's Water System • Regarding the inspection frequency for the twin 200mm HDPE water mains under Indian Arm that supply Belcarra's water system, what is the recommended inspection frequency specified in Belcarra's 'Water System Operation and Maintenance Manual'?	• This project was pushed forward due to conflicts in scheduling and technical delays.

Question	Answer
• I suspect that inspection of the twin 200 mm HDPE water mains is overdue. Will the Council ensure that this critical inspection will be completed as specified in the 'Water System Operation and Maintenance Manual'?	
4. Letter to Council regarding Item 6.1.2 of July 22, 2024	
• With reference to Ralph Drew's email dated July 14th, 2024, regarding water main looping within Belcarra's water system, it was suggested that Belcarra approach Metro Vancouver (MV) Park staff regarding the following: *"There is one solution that warrants further consideration by Council and that is connection of Camp Sasamat (MV property) to the eastern end of the Bedwell Bay Road water main. Such a connection would be a win-win scenario which would eliminate the need to spill water at that end of the system."* • Such a connection would greatly assist Belcarra's water system by eliminating the need to spill water at the eastern water main dead-end on Bedwell Bay Road. Also, the additional water usage by Camp Sasamat would increase the overall flow within Belcarra's water system which would assist in maintaining the residual chlorine level. • It is budget time for the MV Parks Department and has MV Park staff been approached regarding this potential connection?	• This statement relates to all dead-end branch lines in our water distribution system. If all residents were connected to the water distribution system there would be less need to run water through our testing ports. The flushing of water in dead-end lines is a common practice in many municipalities through the use of auto flushers.

Prepared by: Stewart Novak
Manager, Municipal Services

Concurrence: Paula Richardson
Chief Administrative Officer