STAFF REPORT

File No.: PL-RZ-2025-0368
(Denman Community Housing Society)

DATE OF MEETING:	August 24, 2026
TO:	Denman Island Local Trust Committee
FROM:	Marlis McCargar, Island Planner Northern Team
SUBJECT:	Application to amend the OCP and LUB to allow for 8 units of Affordable Housing Applicant: Simon Palmer on behalf of the Denman Community Housing Society Location: PID 000-252-069; 3661 Piercy Road, Denman Island

RECOMMENDATION

1. **That Denman Island Local Trust Committee Bylaw No. 262 cited as "Denman Island Official Community Plan, 2008, Amendment No. 2, 2026" be read a first time.**

2. **That Denman Island Local Trust Committee Bylaw No. 263 cited as "Denman Island Land Use Bylaw, 2008, Amendment No. 2, 2026" be read a first time.**

3. **That the Denman Local Trust Committee Bylaw No. 262 cited as "Denman Island Official Community Plan, 2008, Amendment No. 2, 2026" and the Denman Local Trust Committee Bylaw No. 263 cited as "Denman Island Land Use Bylaw, 2008, Amendment No. 2, 2026" be referred to First Nations, Local Governments and agencies for comment.**

REPORT SUMMARY

The staff report introduces a draft bylaw to amend the Denman Island Official Community Plan (OCP) and Land Use Bylaw (LUB) to rezone a portion of PID 000-252-069 (Proposed Lot A) from Institutional to R4 Community Housing, which would permit the development of up to eight units of affordable housing.

The intent of the proposal is to enable the construction of eight rent-controlled, affordable housing units near Denman Village. The units would be owned and managed by the Denman Community Housing Society (DCHS, the applicant), which has signed a Memorandum of Understanding (MOU) with the property owner, Emcon. Under the MOU, DCHS would acquire a portion of the property for the purpose of developing the housing units, with the transfer of title contingent upon completion of the required OCP and LUB amendments described in this staff report.

Staff is recommending that the draft OCP and LUB Amendment bylaws in Attachment 1 and 2 of this report be given First Reading as presented. All relevant professional reports and background information are posted to the Islands Trust applications page.

BACKGROUND

The Denman Island Local Trust Committee (LTC) passed the following resolutions at the December 16, 2025 regular business meeting:

DE-2025-053
that the Denman Island Local Trust Committee request staff to prepare a draft bylaw to amend the Denman Island Official Community Plan, 2008, to enable application PL-RZ-2025-0368 (Denman Community Housing Society).

CARRIED

A draft bylaw to amend the OCP is included in Attachment 1 for LTC consideration.

DE-2025-054
that the Denman Island Local Trust Committee request staff to prepare a draft bylaw to amend Denman Island Land Use Bylaw, 2008, to enable application PL-RZ-2025-0368 (Denman Community Housing Society).

CARRIED

A draft bylaw to amend the LUB is included in Attachment 2 for LTC consideration.

DE-2025-055
that the Denman Island Local Trust Committee request the applicant for PL-RZ-2025-0368 (Denman Community Housing Society) to submit the following to the Local Trust Committee prior to a public hearing being considered/scheduled:

a. Confirmation from a qualified professional that the subject property PID 000-252-069, have adequate conditions to support community sewage treatment or other approved systems, compliant with the BC Sewerage System Regulation under the *Health Act* for the proposed increase in density;
b. A copy of the provincial water license intended to supply water to the 8 units of affordable rental housing;
c. A water management plan based to address:
    i. peak and expected water demand calculations;
    ii. water conservation commitments to exceed BC Building Code requirements;
    iii. minimum onsite storage capacity for potable, non-potable and fire suppression and types of storage being considered;
    iv. emergency considerations should temporary demand be greater than designed storage or well capacity;
    v. proposed plan for irrigation and grey-water re-use;
    vi. proposed groundwater monitoring and reporting; and
    vii. proposed stormwater management.

CARRIED

a. The applicant has submitted a Septic Concept Plan from B4 Engineering Inc., dated April 3, 2026 (Attachment 3).
b. The applicant has applied for a water license; application was submitted on June 24, 2025.
c. The applicant has submitted a Water Management Plan by Introba Canada LLP, dated May 6, 2026 (Attachment 4).

DE-2025-056

that the Denman Island Local Trust Committee request the applicant for PL-RZ-2025-0368 (Denman Community Housing Society) enter into a cost recovery agreement with the Islands Trust for the purposes of drafting:

a. A housing agreement for 8 units of affordable rental housing; and
b. A restrictive covenant for water conservation, groundwater monitoring and to ensure all buildings meet BC Energy Step Code Level 2, or other energy-efficiency measures identified.

CARRIED

The applicant has submitted a draft Housing Agreement. Staff are currently reviewing the draft and are preparing a cost recovery agreement to facilitate legal review. The LTC can expect to receive the draft Housing Agreement in the early 2027.

DE-2025-057

that the Denman Island Local Trust Committee request staff to send an early referral of PL-RZ- 2025-0368 (Denman Community Housing Society) to K'omoks First Nation.

CARRIED

Staff sent an early referral to K'omoks First Nation in March 2026 to share preliminary information about the project proposal. No response has been received to date. A formal referral will be sent out after first reading of draft bylaws Nos. 262 and 263.

DE-2025-058

that the Denman Island Local Trust Committee request staff to send an early referral of PL-RZ-2025-0368 (Denman Community Housing Society) to the Denman Island Fire Department and Islands Trust Freshwater Specialist for comment.

CARRIED

Staff sent an early referral to the Fire Department in March 2026 to share preliminary information about the project proposal. No response has been received to date. A formal referral will be sent out after first reading of draft bylaws Nos. 262 and 263.

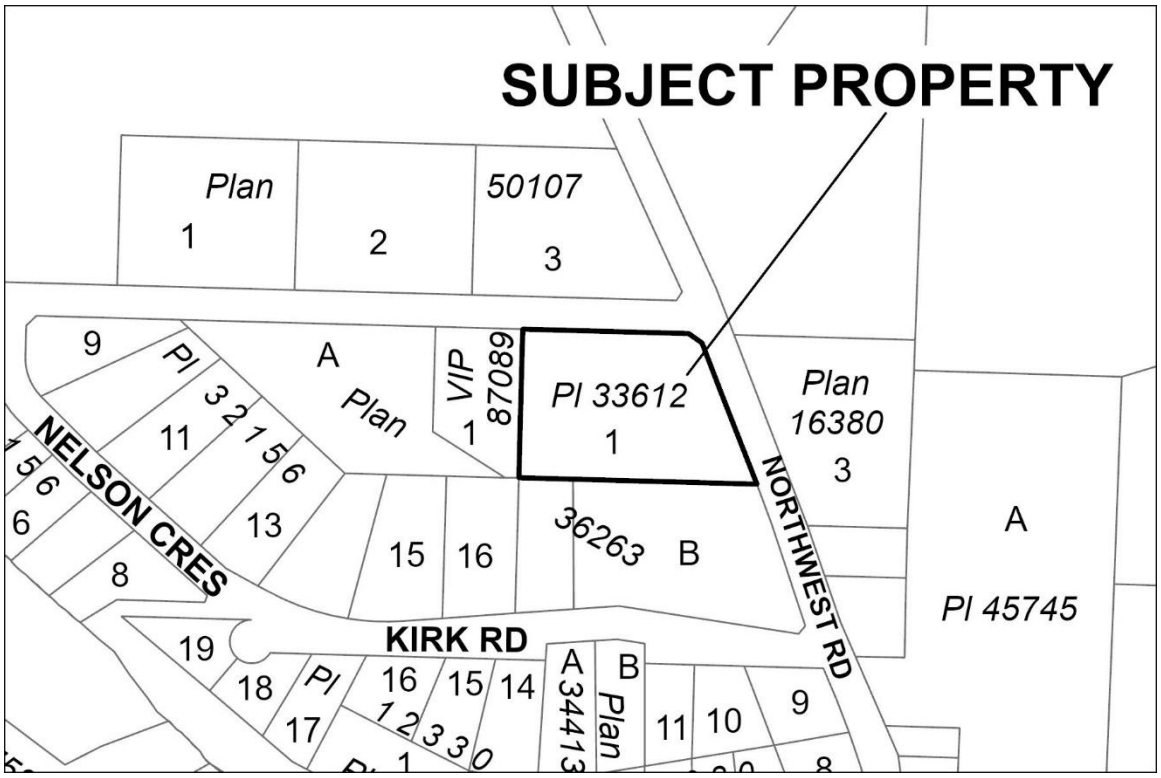


Figure 1: Subject Property Map – 3661 Piercy Road, Denman Island

ANALYSIS

Issues and Opportunities

All professional reports submitted by the applicant have been posted to the application page. Staff have identified the following preliminary issues and opportunities, discussed in more detail below:

- Summary of Draft Bylaw No. 262 (OCP)
- Summary of Draft Bylaw No. 263 (LUB)
- Consideration Restrictive Covenant
- Islands Trust Policy Statement
- Proposed Water Management Plan
- Septic Concept Plan

Summary of Draft Bylaw No. 262 (OCP)

The subject parcel is designated "Institutional" in the OCP. An OCP amendment is required because the proposal is not consistent with the objectives of this designation, which are:

> *"To support community-based fire, ambulance, health and support services, to encourage cultural enrichment and community education facilities and services, and to realise the need for many diverse community activities."*

Draft Bylaw No. 262 proposes to redesignate a portion of the subject parcel to a residential designation and to amend Appendix D – Density Banking to withdraw the remaining seven (7) densities from the density bank for allocation to the subject property for the proposed development. In addition, one (1) density will be allocated through Housing Policy 12, which currently has seven (7) densities remaining

available. Policy 12 does not require an OCP amendment for the use of these densities, provided the units are secured as affordable housing.

Concurrently with this application, staff are undertaking a major Housing Review project for the LTC, which includes proposed OCP amendments to remove the density bank and Housing Policy 12, which currently permits up to a five percent (5%) density increase. However, this application must be evaluated under the OCP and LUB policies and regulations currently in effect, including Housing Policy 12 and Appendix D – Density Banking.

Draft bylaws must be consistent with the OCP and LUB in effect at the time of consideration and adoption. Proposed policy changes associated with the Housing Review (Draft Bylaws No. 260 and No. 264) have no legal effect until adopted and therefore cannot be used in the preparation of these bylaws. If proposed bylaw Nos. 260 and 264 are adopted before these draft bylaws are considered for adoption, the draft bylaws may require revision to ensure consistency with the amended OCP and LUB.

Summary of Draft Bylaw No. 263 (LUB)

Draft Bylaw No. 263 (LUB – Attachment 1), if adopted, would amend the zoning of the subject property by rezoning a portion of the lands from Institutional (IN) to Affordable Rental Housing (R4) to permit a site-specific eight-unit affordable housing development comprised of detached dwelling units secured by housing agreements. The bylaw would also establish a site-specific Institutional (IN(5)) zone for the retained Institutional lands to permit a reduced minimum lot area for subdivision (from 1.0 hectare to 0.82 hectare).

Restrictive Covenant

As a condition of rezoning, a Section 219 restrictive covenant could be registered on the title of the subject property to secure matters associated with the proposed affordable housing development. Potential covenant provisions could include, but are not limited to:

- requiring privacy fencing and/or vegetation screening along interior or rear lot lines adjacent to residential and institutional properties; and

- requiring groundwater quality and quantity monitoring, with monitoring results submitted annually to Islands Trust.

The scope and content of any Section 219 covenant would be determined as part of the rezoning approval process, in consultation with the applicant, and would be subject to the direction and approval of the LTC.

Housing Agreement

The applicant has submitted a draft Housing Agreement, which is currently under staff review. The draft agreement includes revisions to reflect a non-profit community housing model and includes updated definitions relating to non-profit community housing, economic rent, and maximum monthly rent. Once the required cost recovery agreement has been completed, the Housing Agreement will be forwarded for legal review and subsequently brought forward for LTC's consideration at a later stage of the rezoning process.

Islands Trust Policy Statement

As the proposed Water Management Plan (WMP) has not been formally reviewed by the applicable staff, the Islands Trust Policy Statement checklist (ITPS) has not been completed for first reading. The checklists can be returned to the LTC for consideration at second reading upon technical review of the proposed WMP and possibly an approved groundwater license.

Proposed Water Management Plan (WMP)

The applicant has submitted a WMP (Attachment 4) for the eight units of affordable rental housing. The development consists of eight individual dwelling units, with a projected peak occupancy of 16 persons, and is proposed to be serviced by groundwater from a well located on 1400 Northwest Road.

The Water Management Plan indicates that the well has a confirmed sustainable yield of 0.25 L/s (21,600 L/day), which the applicant states is sufficient to meet the projected potable water demands of the proposed development. The applicant has applied for a provincial water licence for a portion of the available groundwater allocation and proposes water storage capacity equivalent to one day of maximum day demand. The plan also identifies proposed water conservation measures, demand calculations, water storage requirements, and ongoing groundwater monitoring through a data logging system.

An internal review of the proposed WMP will be undertaken to assess the technical considerations related to water supply, including water quantity, quality, and monitoring requirements. Staff will report back to the LTC with any technical comments or recommended conditions arising from the review.

Septic Concept Plan

The applicant has submitted a Septic Concept Plan letter from B4 Engineering Inc., dated April 3, 2026 (Attachment 3), in support of the proposed affordable housing development. The letter indicates that the subject property has suitable conditions to support a community sewage treatment system in accordance with the BC Sewerage System Regulation under the Health Act for the proposed increase in density.

Consultation

As this application proposes an amendment to the Official Community Plan, the LTC is required to conduct a consultation process involving a set of referrals that are independent of any public hearing process.

Following first reading of the bylaws, the referrals identified in this report will be sent out, including referrals to First Nations, provincial agencies, adjacent local governments, and select agencies. If the LTC wishes to include any additional referral agencies, staff should be advised at this time.

- Cowichan Tribes
- Halalt First Nation
- Da'naxda'xw/Awaetlala First Nation
- Qualicum First Nation
- Lyackson First Nation
- Penelakut Tribe
- Snuneymuxw First Nation
- Comox Valley Regional District
- School District #71 (Comox Valley)
- Hornby Island Local Trust Committee
- Denman Fire Department
- Island Health

- Snaw'Naw'As Nation
- Stz'uminus First Nation
- Te'Mexw Treaty Association
- Tsu'uubaa-asatx First Nation
- Tlowitsis First Nation
- Homalco First Nation (Xwemalhkwu)
- Tla'amin Nation
- Nanwakolas Council
- Wei Wai Kum Nation
- We Wai Kai Nation
- Mamalilikulla First Nation
- K'ómoks First Nation
- Ministry of Housing and Municipal Affairs

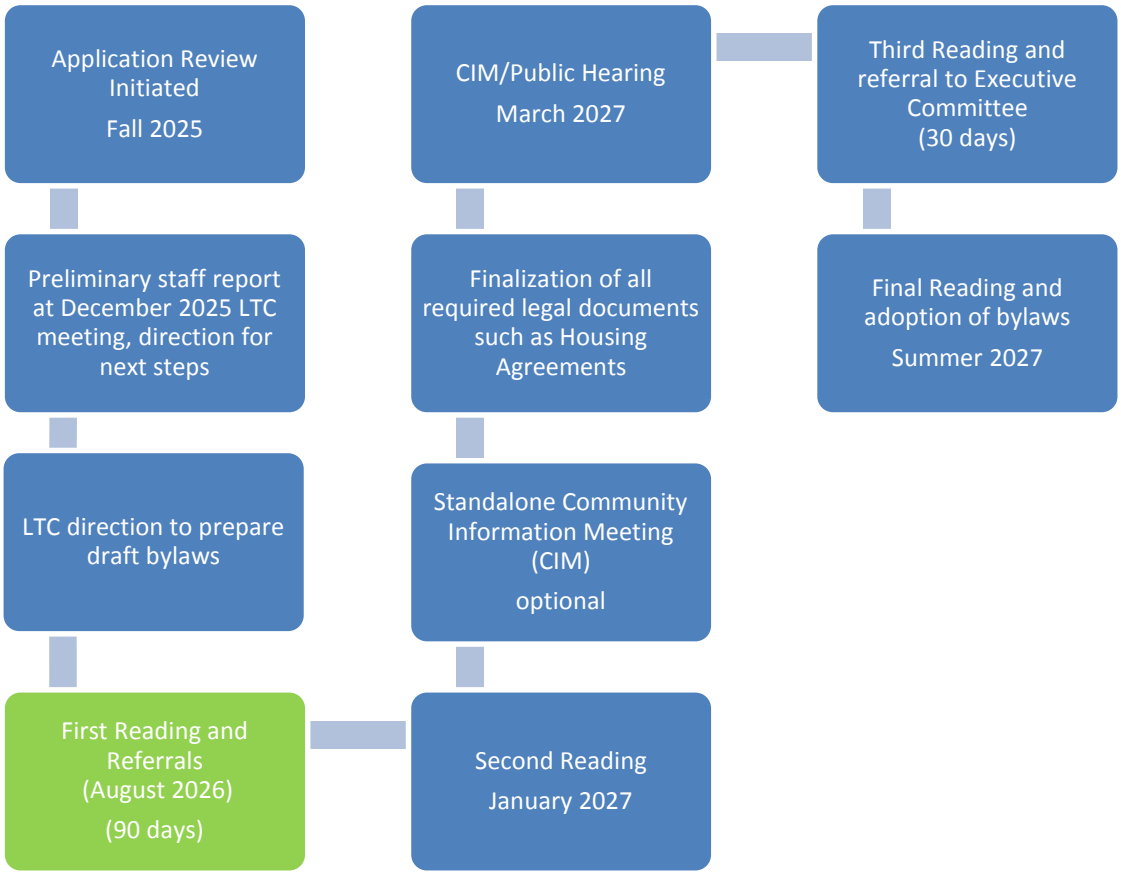
The applicant has requested that the standard 90-day referral period be reduced to six weeks. Staff recommend maintaining the 90-day period to allow adequate time for consultation, particularly given current First Nations response times, and to minimize procedural risk. The referral period should also be considered in the context of the LTC's meeting schedule and anticipated timing of bylaw consideration.

The LTC should consider if it wishes to undertake additional consultation than identified in this report, and direct staff accordingly.

Application Process Steps and Timing

The following process steps and approximate timelines may assist in managing applicant and community expectations in how an OCP/ LUB amendment application such as this, can be processed.

The timing for second reading is anticipated for January 2027. This timing reflects the 2026 local government election cycle and the absence of regular LTC meetings in the fall of 2026. Following the election, the new LTC is expected to be sworn in at its first meeting on November 16, 2026. However, it is staff's understanding that applications will likely not be considered at that meeting, as it will primarily be dedicated to orientation and onboarding of the new LTC. As a result, the next available opportunity for LTC consideration of the application is anticipated to be January 19, 2027.



Rationale for Recommendation

A draft bylaw has been prepared to amend the OCP and LUB and contemplate increased density. Staff recommend First Reading in order to advance formal consultation with First Nations, agencies and local governments. The staff recommendations are found on page 1 of this report.

ALTERNATIVES

1. **Direction to amend the draft bylaws**

   The LTC may wish to make amendments to the draft bylaws. Recommended wording for the resolution is as follows:

   That the Denman Island Local Trust Committee amend draft Bylaw No. 262, cited as the "Denman Island Official Community Plan, 2008, Amendment No. 2, 2026" by…

   That the Denman Island Local Trust Committee amend draft Bylaw No. 263, cited as the "Denman Island Land Use Bylaw, 2008, Amendment No. 2, 2026" by…

2. **Consider First and Second Reading.**

   The LTC may wish to give First and Second Readings of the draft bylaw simultaneously. If selecting this alternative, the LTC should be confident that the bylaw will not require significant changes following referrals. Recommended wording for the resolution is as follows:

   That the Denman Island Local Trust Committee Bylaw No. 262, cited as the "Denman Island Official Community Plan, 2008, Amendment No. 2, 2026", be read a second time.

That the Denman Island Local Trust Committee Bylaw No. 263, cited as the "Denman Island Land Use Bylaw, 2008, Amendment No. 2, 2026", be read a second time.

3. Proceed no further.

The LTC can choose this alternative at any stage in a bylaw amendment application. If this alternative is selected the application will proceed no further. The following resolution is recommended:

"*That the Denman Island Local Trust Committee proceed no further with application PL-RZ-2025-0368 for the following reasons (insert rationale).*"

NEXT STEPS

Should the LTC concur with the staff recommendations, bylaw referrals will be sent out requesting a response within 90 days of the date on the referral.

Submitted By:	Marlis McCargar, Island Planner	July 22, 2026
Concurrence:	Renée Jamurat, RPP MCIP, RPM	July 24, 2026

ATTACHMENTS

1. Draft Bylaw No. 262 (OCP)
2. Draft Bylaw No. 263 (LUB)
3. Septic Concept Plan from B4 Engineering Inc
4. Water Management Plan by Introba Canada LLP
5. Site Plan

DRAFT

DENMAN ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 262

A BYLAW TO AMEND DENMAN ISLAND OFFICIAL COMMUNITY PLAN
BYLAW NO. 185, 2008

The Denman Island Local Trust Committee, being the Trust Committee having jurisdiction in respect of the Denman Island Local Trust Area under the *Islands Trust Act,* enacts as follows:

1. CITATION

This Bylaw may be cited for all purposes as "Denman Island Official Community Plan, 2008, Amendment No. 2, 2026".

2. SCHEDULES

Denman Island Official Community Plan Bylaw No. 185, 2008 is amended as shown on Schedule 1, attached to and forming part of this bylaw.

3. SEVERABILITY

If any provision of this Bylaw is for any reason held to be invalid by a decision of any Court of competent jurisdiction, the invalid provision must be severed from the Bylaw and the decision that such provision is invalid must not affect the validity of the remaining provisions of the Bylaw.

READ A FIRST TIME THIS _____ DAY OF _____ 20____

PUBLIC HEARING HELD THIS _____ DAY OF _____ 20____

READ A SECOND TIME THIS _____ DAY OF _____ 20____

READ A THIRD TIME THIS _____ DAY OF _____ 20____

APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLANDS TRUST THIS
_____ DAY OF _____ 20____

APPROVED BY THE MINISTER OF MUNICPAL AFFAIRS THIS
_____ DAY OF _____ 20_

ADOPTED THIS _____ DAY OF _____ 20____

_____ _____
CHAIR SECRETARY

DENMAN ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 262

SCHEDULE 1

The Denman Island Official Community Plan No. 185, 2008, is amended as follows:

1. That the Residential Density Bank table of Appendix D, "Density Banking" be amended by the addition of a new entry, in sequential order, which reads as follows:

Authorising Bylaw	Date Added to or transferred from the Bank	Legal Description	Number of residential dwelling units added or deleted	Cumulative total of residential dwelling units in the bank
262	[date of adoption]	Lot 1, Section 18, Denman Island, Nanaimo District, Plan 33612	-7	7-7=0 (*as per standing resolution #2023-073) (* Final cumulative totals will be reconciled upon adoption of all relevant bylaws.)

2. Schedule C [Land Use Designations Map] is amended by changing the land use designations as follows:
   a. On portions of land legally described as Lot 1, Section 18, Denman Island, Nanaimo District, Plan 33612 the land use designation is changed:

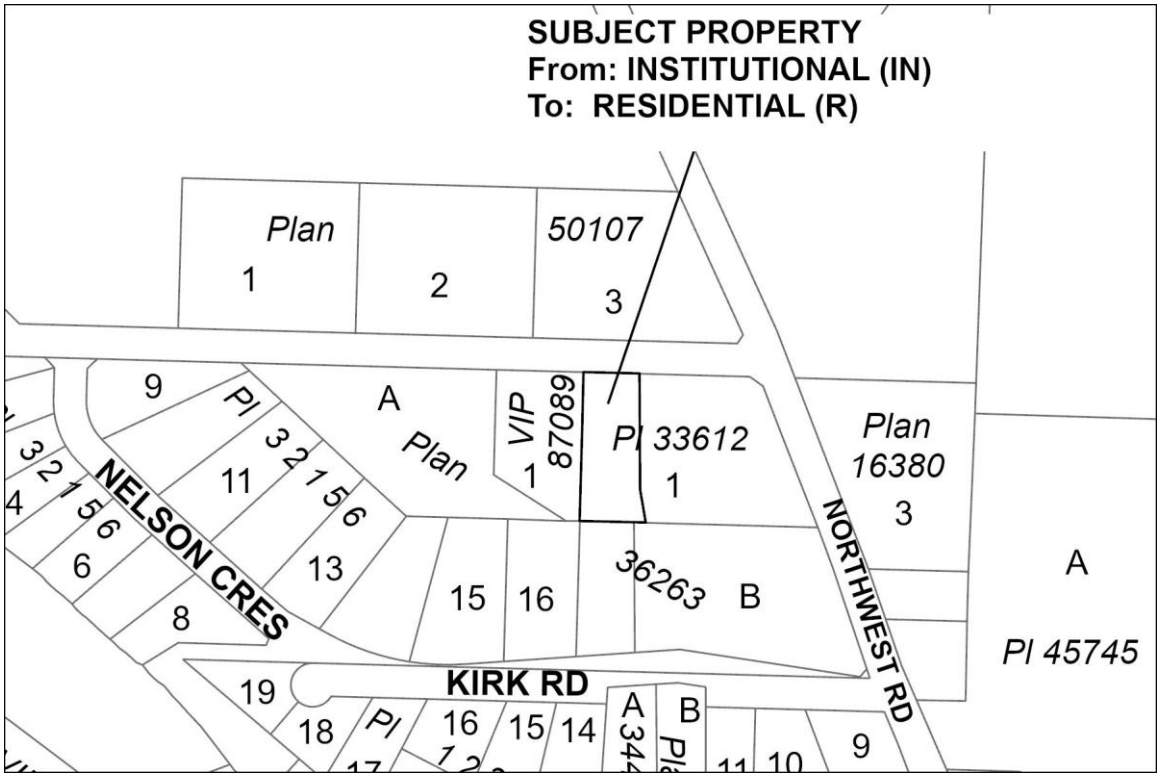
      from "Institutional" designation to "Residential" designation;

      as shown on Appendix No. 1 attached to and forming part of this bylaw.

DENMAN ISLAND LOCAL TRUST COMMITTEE

BYLAW NO. 262

Appendix No. 1



DRAFT

DENMAN ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 263

A BYLAW TO AMEND DENMAN ISLAND LAND USE BYLAW, 2008

The Denman Island Local Trust Committee, being the Trust Committee having jurisdiction in respect of the Denman Island Local Trust Area under the *Islands Trust Act,* enacts as follows:

1. Citation

   This bylaw may be cited for all purposes as "Denman Island Land Use Bylaw, 2008, Amendment No. 2, 2026".

2. Denman Island Local Trust Committee Bylaw No. 186, cited as "Denman Island Land Use Bylaw, 2008," is amended as per Schedule 1 attached to and forming part of this bylaw.

READ A FIRST TIME THIS _____ DAY OF _____ 20____

READ A SECOND TIME THIS _____ DAY OF _____ 20____

PUBLIC HEARING HELD THIS _____ DAY OF _____ 20____

READ A THIRD TIME THIS _____ DAY OF _____ 20____

APPROVED BY THE EXECUTIVE COMMITTEE OF THE ISLANDS TRUST THIS
_____ DAY OF _____ 20____

ADOPTED THIS _____ DAY OF _____ 20____

_____ _____

Chair **Secretary**

DENMAN ISLAND LOCAL TRUST COMMITTEE
BYLAW NO. 263

1. Schedule "A" of Denman Island Land Use Bylaw, 2008 is amended as follows:

1.1 PART 3 ZONE REGULATIONS, Section 3.3 "Residential Zoning Tables", Table 8 – Site Specific Regulations is amended by adding a new R4(3) Site Specific Zoning Code:

Table 8 - Site Specific Regulations

The regulations listed in tables 1 through 7 of this section apply to the land identified on Schedule B (the Zoning Map) by the site specific zoning code listed below on the left, except as varied by the relevant site specific regulation listed in this Table (Table 8)

Site Specific Zoning Code	Site Specific Regulations
R4(3)	1 Despite line 7 in Table 1 of this Section, the following is not permitted: • the keeping of chickens or other livestock; 2 Despite line 2 in Table 2 of this Section, a multi-family residential development in the R4(3) Zone may consist of detached dwelling units, provided all dwelling units are located on a single parcel and are secured as affordable dwelling units. 3 Despite line 3 in Table 3 of this Section, the maximum number of affordable dwelling units permitted per lot is 8. 4 Despite line 4 in Table 3 of this Section, the maximum combined lot coverage of buildings and structures is 25%. 5 Despite line 1 in Table 5 of this Section, the minimum setback of all buildings and structures, except for pump/utility house and water cisterns, is: • 4.0 metres from the front lot line; and • 3.0 metres from the interior and rear lot line. 6 Despite line 1 in Table 6 of this Section, the maximum gross floor area of a pump/utility house is 12 m^2. 7 Despite line 4 in Table 6 of this Section, the maximum gross floor area of an affordable dwelling unit is 52 m^2. 8 Despite Table 7 in this Section, the minimum lot area permitted by subdivision is 0.33 hectares. 9 Despite regulations 16 in Section 2.5, the minimum number of automobile parking spaces required is 1.0 space per affordable dwelling unit plus two visitor parking spaces. At least one of the required parking spaces must be accessible. 10 Despite regulations 9, 12, and 15 in Section 2.8, prior to issuance of a Siting and Use Permit, the applicant must provide proof of a water license authorizing groundwater withdrawal in an amount sufficient to service the permitted development.

1.2 PART 3 ZONE REGULATIONS, Section 3.6 “Community Zoning Tables”, Table 8 – Site Specific Regulations is amended by

Table 8 - Site Specific Regulations

The regulations listed in tables 1 through 7 of this section apply to the land identified on Schedule B (the Zoning Map) by the site specific zoning code listed below on the left, except as varied by the relevant site specific regulation listed in this Table (Table 8)

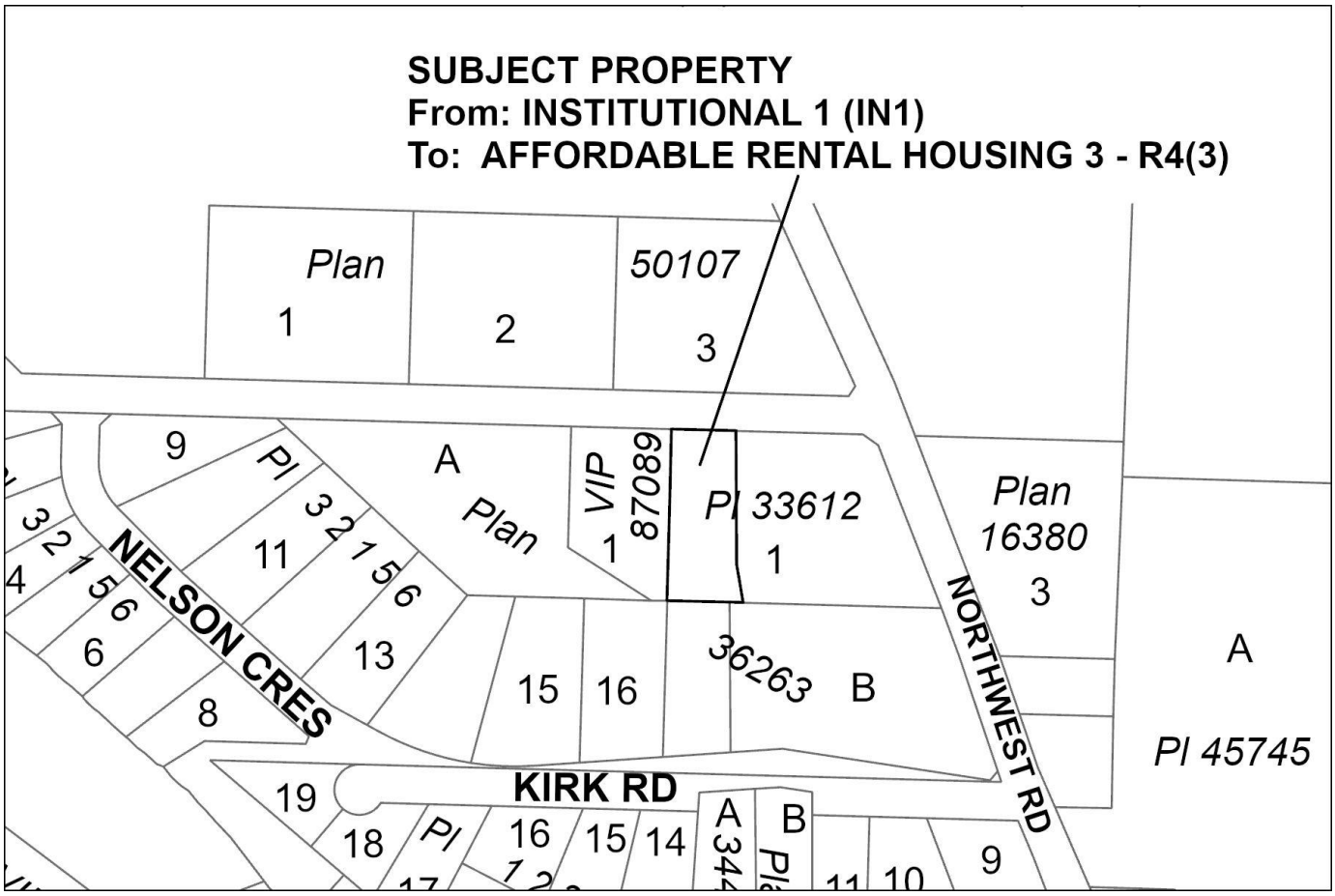
Site Specific Zoning Code		Site Specific Regulations
IN(5)	1	Despite line 1 in Table 7 of this Section the minimum lot area is 0.82 hectares

2. Schedule “B” of Denman Island Land Use Bylaw, 2008 is amended as follows:

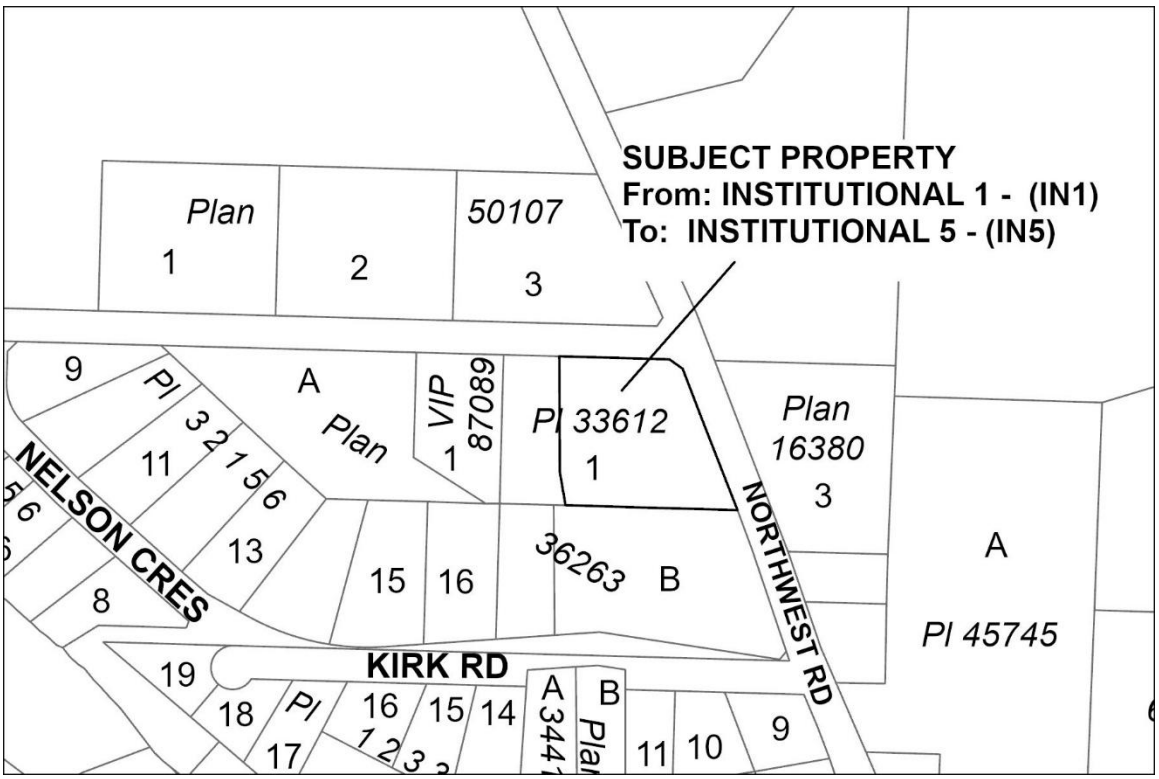
2.1. Schedule “B” – North Map, is amended by changing the zoning classification of a portion of PID 000-252-069 as shown on Plan No. 1 attached to and forming part of this bylaw, and by making such alterations to Schedule “B” of Bylaw No. 186 as are required to effect this change.

2.2. Schedule “B” – North Map, is amended by changing the zoning classification of a portion of PID 000-252-069 as shown on Plan No. 2 attached to and forming part of this bylaw, and by making such alterations to Schedule “B” of Bylaw No. 186 as are required to effect this change.

Plan No. 1


SUBJECT PROPERTY
From: INSTITUTIONAL 1 (IN1)
To: AFFORDABLE RENTAL HOUSING 3 - R4(3)
Plan 50107
1
2
3
9
Pl 32156
11
A Plan 87089 VIP
1
Pl 33612
1
Plan 16380
3
A
Pl 45745
NELSON CRES
6
8
13
15
16
36263 B
NORTHWEST RD
KIRK RD
19
18
Pl
16
15
14
A 34
B
11
10
9

Plan No. 2


SUBJECT PROPERTY
From: INSTITUTIONAL 1 - (IN1)
To: INSTITUTIONAL 5 - (IN5)
Plan
1
2
50107
3
9
Pl
3 2 1 5 6
11
A
Plan
VIP
87089
1
Pl 33612
1
Plan
16380
3
A
Pl 45745
NELSON CRES
13
15
16
36263
B
8
NORTHWEST RD
KIRK RD
19
18
Pl
17
16
15
14
A
B
11
10
9

4735 Sooke Road
Victoria, BC V9C 4C1

Date: April 03, 2026

RE: Denman Housing Society - Affordable Housing Neighbourhood - Septic Concept Plan

To Whom It May Concern,

This memo is to confirm that **B4 Engineering Inc.** has been retained and is **actively working on the septic system design** for the proposed affordable housing development at **Piercy Road**.

Our team has received the relevant project information and is currently progressing the design.

Concept Report

We reviewed the soils information in the area of the proposed sand mound field from the Trillium Borehole Logs you sent us. The soils in the area of the proposed sand mound field varies and shows 0.6m of sand and gravel fill over an organic layer then silty sand to the bottom of the test pits at 1.5m. The water table was at 1.1m deep in MW24-02 providing only 0.1m of dry native silty sand in that area. Based on the marginal soils conditions we propose a performance-based sand mound design following the BC Sewerage System Standard practice manual guidelines.

A summary of our proposed design is as follows;

Daily design flow 8 small 1br units at 600L/d/unit DDF = 4800L/d Average Daily ADF=2400L/d

Gravity service connections from each of the 8 small homes. 100mm PVC pipe at 2% slope.

Gravity collection pipe PVC DR 35 150mm at minimum 1% slope

Septic tank 3560 igal concrete tank (3.7m x 2.6m)

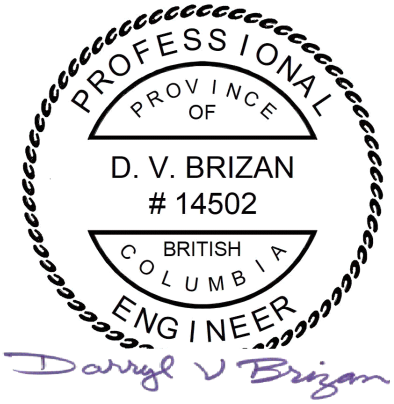
Bionest Treatment plant BN-1500 in a 2500igal concrete tank (4.2m x 2.7m)

Pump Chamber 2500igal Galcon single chamber concrete tank. (4.2m x 2.7m)

Sand mound dispersal field base area 25.8m x 12m. The septic system design work is underway and is expected to be completed and submitted shortly as part of the overall permitting process.

Based on the above, we confirm that the subject property PID 000-252-069, has adequate conditions to support a community sewage treatment system, compliant with the BC Sewerage System Regulation under the Health Act for the proposed increase in density of the proposed development.

Should you require any additional information or clarification, please do not hesitate to contact the undersigned.



Yours truly,

2026-04-15

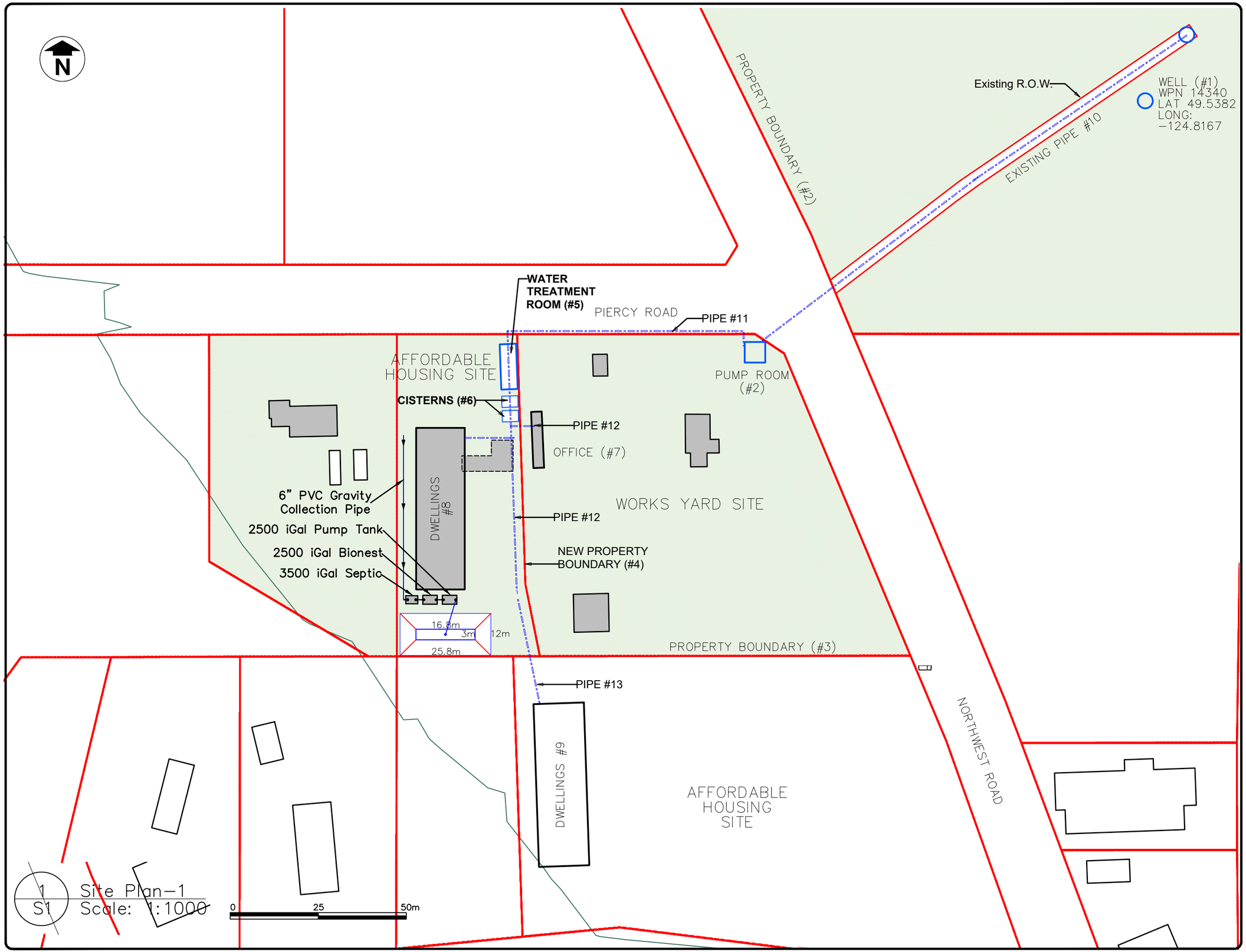
Darryl Brizan P.Eng.

B4 Engineering Inc EGBC PTP# 1001087

4735 Sooke Road, V9C 4C1

Email: darrylbrizan@b4engineering .com

Cell: 250-961-5208



B4 ENGINEERING INC
4735 Sooke Road
Victoria, BC V9C 4C1
Phone 250-961-5208

Professional Engineer Seal

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. V. BRIZAN
14502

Darryl V Brizan

2026-04-15
EGBC Permit Number 1001087

REVISIONS / ISSUE		
V1	04/10	FOR REVIEW

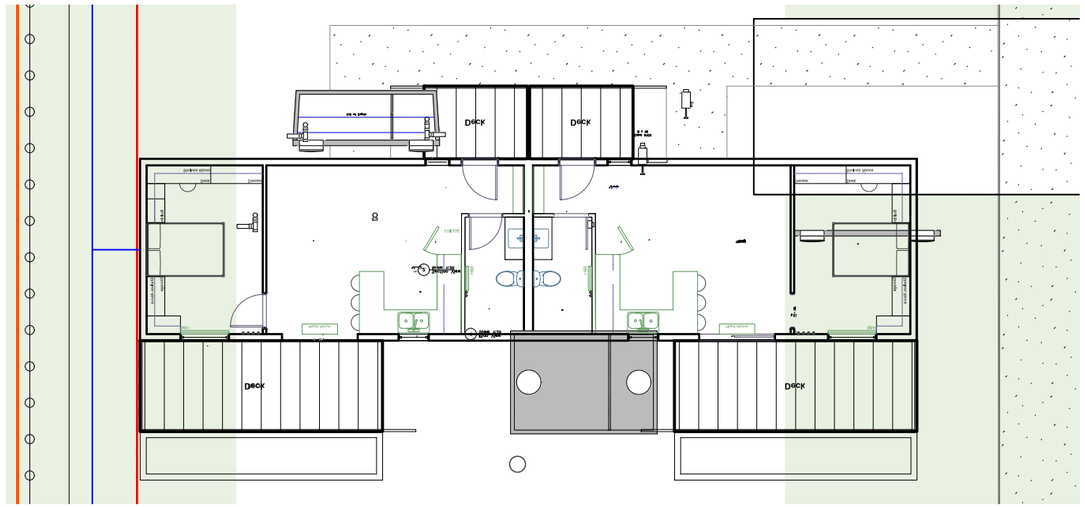
NOTES:

ENGINEER: DARRYL BRIZAN, P.Eng.
DRAWN BY: ASC
DATE DRAWN: April 10/2026
DRAWING FILE: B4 1503-01-V1
PROJECT ADDRESS:
Denman Housing Society -
Affordable Housing Neighbourhood

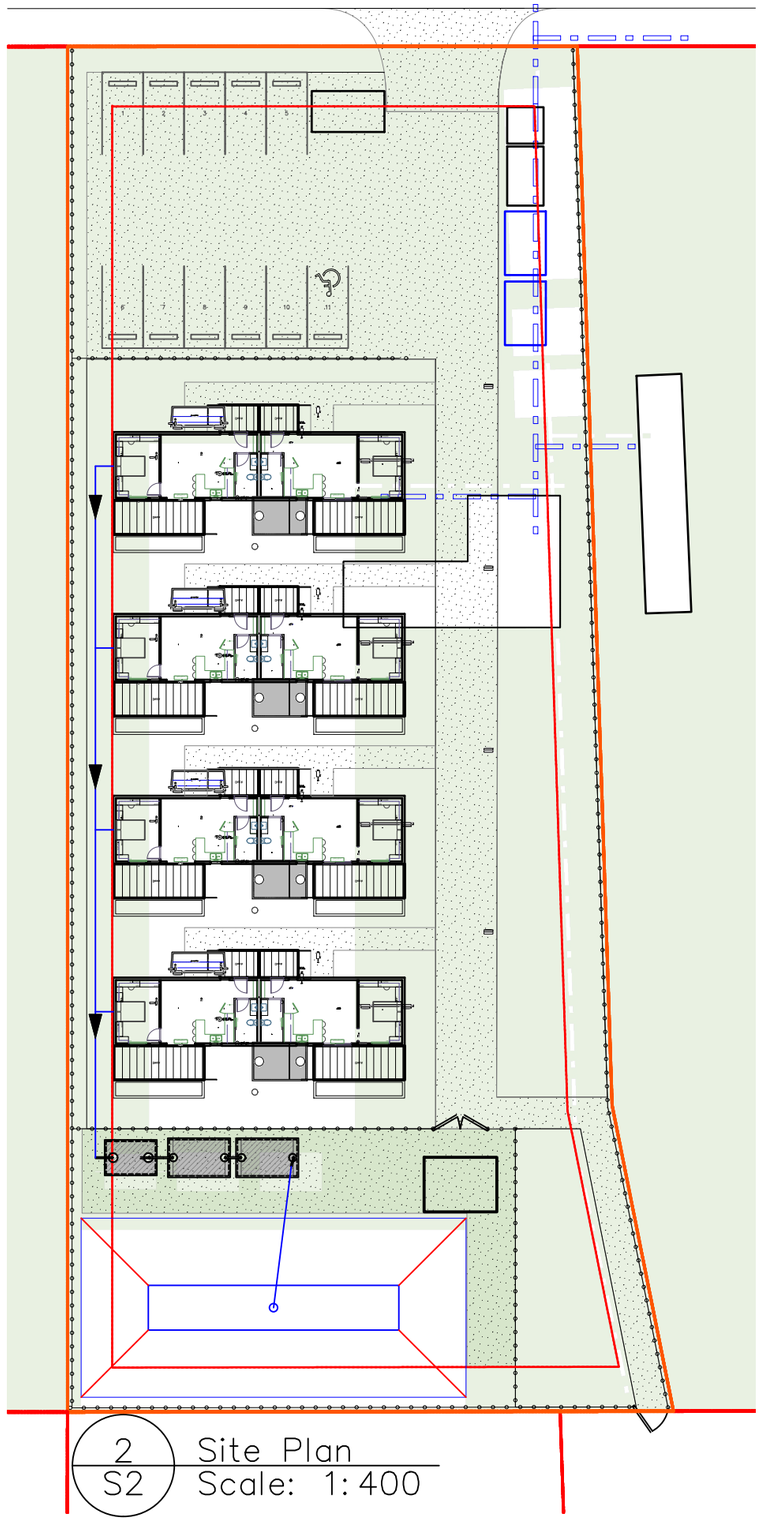
PROJECT NUMBER:
1503-01

DRAWING TITLE:
Site Plan

SHEET
S1



1 / S2 Site Plan
Scale: 1:150



2 / S2 Site Plan
Scale: 1:400

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2026-04-15
EGBC Permit Number 1001087

REVISIONS / ISSUE

V1	04/10	FOR REVIEW

NOTES:

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Denman Housing Society -
Affordable Housing Neighbourhood

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SHEET
S2

Denman Community Housing Society - Piercy Rd

DCHS WATER MANAGEMENT PLAN

May 6th, 2026.

Issue	Description	Date (MM.DD.YY)	Prepared By	Peer Reviewed By
1	Draft - Issued for Review	03.30.26	Gord Baird	Sharon McGeorge
2	Final – Issued for Review	04.02.26	Gord Baird	Sharon McGeorge
3	Final Version	04.15.26	Gord Baird	Sharon McGeorge
4	Final Version – formatting updated.	05.06.26	Sharon McGeorge	Sharon McGeorge

Project Name: Denman Community Housing Society – Piercy Rd Development

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V1.1

Table of Contents

1 INTRODUCTION

The Denman Community Housing Society is undertaking several initiatives focused on the development of community housing. This plan focuses on the water management required for the community housing planned for the proposed subdivision of Lot 1, Section 18, Denman Island, Nanaimo District, Plan 33612 – a portion of the 3361 Piercy Rd property known as the Emcon Works Yard.

Introba was contracted to develop a water management strategy for this development, to assess average and maximum daily demands, peak hourly demand, prepare an irrigation budget to allocate towards the demands, determine water storage needs for potable supply and suggest recommendations for fire storage based on best practices.

An initial part of the early assessment was to consider the use of rainwater and greywater to offset the demands of the groundwater well to serve the site, but for a development of 8 units and 16 occupants – the capital cost and operational detail of these supplementary systems would be disproportionate to the scale of the development and contrary to the Society's objective of delivering *community* housing in light of a robust water supply source.

Context of the surrounding properties is important to define the various proposed developments and their intended water sources.

The first proposed housing project was Denman Green located on the corner of Northwest Rd and Kirk rd (1151 Northwest Rd.). This project has received a water license for the proposed development on the eastern section of the property through a well located onsite. The western section was subsequently considered for an additional project that would have up to 20 occupants in a yet to be finalized process, but waters to serves this western portion of the Denman Green Site are considered as a future allocation from the well-intended to service the proposed subdivision at 3361 Piercy Rd and the Emcon Work Yard in this report.

The proposed subdivision for the 8-unit housing development, the focus of this report, would be seeking a water license from a well located on 1400 Northwest Rd (Well ID 14340, WTN 34154). Emcon Works Yard has a water license application in process and if approved would leave a remainder of the well's sustainable yield that would serve the projects proposed for the Piercy Rd subdivision and the western portion of Denman Green.

1.1 Executive Summary

This Water Management Plan addresses the potable water supply for the Denman Community Housing Society's proposed 8-unit community housing development on Piercy Road, Denman Island. The development comprises four duplex buildings accommodating a peak occupancy of 16 persons.

The sole water source is WTN 34154 (ID 14340), located at 1400 Northwest Road and owned by Emcon Services Inc., with a confirmed sustainable yield of 0.25 L/s (21,600 L/d). Emcon has a water license application into the Province requesting 10 m^3/day, and if approved would leave a remainder allocation of 11,600 l/d (11.6 m^3/d) for additional allocation.

For the proposed development, based on a per capita demand of 180 lcd (BC DWOG Section 21.4.1), the Average Day Demand (ADD) is 2,880 L/d, with a seasonal Peak Irrigation Demand (PID) of 756 L/d across 105 m^2 of irrigated area. The well's sustainable yield exceeds the combined ADD and PID by a factor of nearly six, confirming the adequacy of the source without supplementary supply.

Applying DWOG Table 21-1 peaking factors for systems serving up to 10 dwelling units (MDF 9.5, PHF 14.3), the Maximum Day Demand (MDD) is 28,116 L/d and the Peak Hourly Demand (PHD) is 2,166 L/hr (36.1 lpm). The proposed water system provides potable water storage equivalent to one full day of MDD (≥28,116 L) – a separate dedicated fire suppression cistern is not required as per discussion between DCHS and the local fire department.

Well flow allocations to the Piercy Rd development and western portion of the Denman Green property that draw from the well have been established using a 130% sizing factor on flow valves intend to apportion water to each development based on demand profile. The resulting flow allocations are:

1. 3.283 lpm for Piercy Road and
2. 4.453 lpm for a future 20 occupant project at 1151 Northwest Road, (western portion).
3. 6.94 lpm to accommodate the present water license request on the Emcon Works Yard.

All dwellings will incorporate water-efficient fixtures meeting National Plumbing Code (2020) standards and Energy Star laundry criteria. Continuous well depth monitoring via an Eno Scientific 670B data logger supports both the provincial water license requirements and ongoing operations.

This report references the Emcon Water License application presently being reviewed by the Province. This water license application is for 10 m^3/day. There is the proposed transition of the remainder of this Work Yard Site in 2033, and the water license, if approved by the Province would feasibly serve the demand of 50 additional occupants. This report cannot speak to the potential future occupancy as it is constrained to consider the water application under review when assessing the remainder capacity of the well to service the Piercy Rd project and the western portion of the Denman Green Project located at 1151 Northwest Rd.

Table 1 Executive Summary Table summarises the key parameters of the Water Management Plan for the Denman Community Housing Society — Piercy Road Development.

Table 1 Executive Summary Table

Parameter	Value	Reference / Notes
Project		
Location	3361 Piercy Rd, Denman Island	*Lot 1, Sec 18, Plan 33612*
Development	8 dwelling units (4 duplexes)	*Single bedroom; 2 occupants/unit*
Peak occupancy	**16**	
Architect	MacDonald Hagarty Architects	*Drawing A1.03 Rev H*
Water Source		
Well	WTN 34154 (ID 14340)	*1400 Northwest Rd*
Owner	Emcon Services Inc.	
Sustainable yield	**0.25 L/s ; 15 lpm; 21.6 m^3/d**	*Elanco 2024; 21,600 L/d*
Water Demand		
Demand per occupant	**180 lcd**	*DWOG (2024) Section 21.4.1*
Average Day Demand (ADD)	**2,880 L/d**	*16 × 180 lcd*
Peak Irrigation Demand (PID)	**756 L/d**	*105 m^2; 7.2 mm/d; May–Sept*
Maximum Day Factor (MDF)	**9.5**	*Table 21-1; ≤10 DU / 30 pop*
Maximum Day Demand (MDD)	**28,116 L/d**	*(MDF × ADD) + PID*
Peak Hour Factor (PHF)	**14.3**	*Table 21-1; ≤10 DU / 30 pop*
Peak Hourly Demand (PHD)	**2,166 L/hr (36.1 lpm)**	*PHF × ((ADD+PID)÷24)*
Water Storage		
Potable water storage	**≥ 28,116 L**	*1 day of MDD*
Well Allocation		
Piercy Rd allocation (130% of ADD and PID)	**3.283 lpm (4.73 m^3/d)**	*21.9% of sustainable yield*
Northwest Rd future allocation (130% ADD and PID)	**4.453 lpm (6.412 m3/d)**	*29.7% of sustainable yield*
Emcon Works Yard Water License Application	**6.94 lpm (10 m^3/d)**	*46.3% of sustainable yield*
Unallocated Well Capacity of WTN 34154/ID14340	**0.32 Lpm (0.458 m3/d)**	*2.1% of sustainable yield*
Water Efficiency		
Fixture standard	NPC (2020) Tables 2.2.10.6, 2.6.1.6	*BC Building Code compliant*
Laundry machine standard	Energy Star IWF ≤ 3.2	
Monitoring & Emergency		
Well depth logger	Eno Scientific 670B	*60-second recording interval*
Emergency reserve (at ADD)	**9.8 days**	*28,116 L ÷ 2,880 L/d*
Conservation measure	Irrigation curtailment	*756 L/d recoverable*

Regulatory Framework		
Drinking water authority	Island Health (VIHA)	*Operating permit required*
Design standard	BC DWOG (2024/2025)	*Part B; Design Guidelines Ch. 21*
Fire standard	NFPA 1142-2022	*Voluntary best practice*
Water license	Provincial (WSA)	*200 lcd combined allocation*

1.2 Water Source

The intended water source for this project is from the Emcon well located at Latitude: 49.53821, Longitude: −124.8167 (the "Well"), located on the property addressed 1400 Northwest Rd. This well is owned by Emcon Services Inc. (Emcon).

Elanco Enterprises performed a hydrological assessment of yield and wellhead protection in November 2024 (Elanco 2024). In their assessment, a sustainable yield of 0.25 L/s (21,600 L/d; 15 lpm) was determined, re-confirming findings from an earlier assessment from December 2023.

This report references the Elanco 2024 findings in preparation of the water budget and water balance in this report. Though this report is in focus of the proposed 8-unit housing development on Piercy Rd, the Well is anticipated to also supply water for a project intended to serve 20 occupants – development at 1151 Northwest Rd (western portion of Denman Green) and account for the water license application for the Emcon Works Yard under consideration by the Province. This Water Management Plan considers the potential future allocation of water demands when assessing the sustainable yield from the Well.

Table 2 Water Demand Parameters

Parameter	Value	Notes
WTN 34154 Sustainable Yield	0.25 L/s	*21,600 L/d; 15 lpm*
Units	8	*Single bedroom dwellings*
Occupants per unit	2	
Total peak occupancy	16	

2 WATER DEMAND

2.1 Average Day Demand (ADD)

BC DWOG Design Guidelines for Drinking Water Systems (2024), Section 21.4.1 places residential water use in the range of 180–1,500 lcd. The lower end of this range is consistent with efficient fixtures including ultra-low-flow dual-flush toilets, ultra-efficient washing machines, and low-flow shower heads. The Denman Community Housing Society project will incorporate such fixtures (refer to Section 4 – Building Code Water Efficiency).

The project comprises 8 units, each a single bedroom for a maximum of two occupants per housing unit. Peak occupancy is 16.

ADD = 180 lcd × 16 occupants = 2,880 L/d

2.2 Irrigation Demand

Irrigation is expected to be modest, comprising a small number of community garden beds and drought-resistant landscape plants. Irrigation demand is assessed as a seasonal component across an irrigated area totalling 105 m^2 for the period May 1 through September 30. A water budget for irrigation was determined based on irrigation needs of 50 mm/week/m^2 (50 litres per m^2 per week), equating to a daily allocation of 7.2 mm/m^2. Irrigation method is to be subsurface drip irrigation with minor hand watering.

- Peak Irrigation Demand (PID) = 105 m^2 × 7.2 mm/d = 756 L/d
- Total irrigation demand, May 1–Sept 30 (153 days) = 115,668 L

2.3 Comparison to Provincial Water License Application for Proposed Subdivision

A water license application has been submitted for the proposed Piercy Rd subdivision. That application was submitted prior to this report. This section compares what was submitted with that application in relation to the water demand assessment process used to inform this report. The Provincial application for a Water License by the DCHS estimated a combined total demand capacity of 200 L/occupant/day – comprising 180 lcd residential use and 20 lcd for irrigation, averaged over an annual timeframe. Our independent assessment confirms a comparable result.

Table 3 Comparison between Prov. Water License Application and Water Plan

Basis	Annual Volume	Per Occupant
Irrigation Demand		
Water License request (20 lcd × 16 × 365)	116,800 L	20.0 lcd
Water Management Plan (105 m^2 × 7.2 mm/d × 153 d)	115,668 L	19.8 lcd
Total Combined Annual Demand		
Water License Application (200lcd x 16 x 365)	1,168,000 L	200 lcd
Water Management Plan (ADD + Irrigation)	1,166,868 L	199.8 lcd

The modelled irrigation demand for this plan aligns within the water allocation requested in the water license application.

2.4 Maximum Day Demand (MDD)

Maximum Day Demand is determined by applying a Maximum Day Factor (MDF) to the ADD. The MDF applied to this project is 9.5, as per BC DWOG Design Guidelines (2024), Table 21-1 for systems serving up to 10 dwelling units (30 population).

Irrigation demand is treated as a separate deterministic load and is added to the peaked residential demand without application of a peaking factor, as it is a known, controllable, and schedulable water demand that does not exhibit the stochastic peaking behaviour of domestic use. Additionally, in times of conservation this irrigation demand can be immediately curtailed. This approach is consistent with the DWOG's guidance in Section 21.4.1 which states that outdoor water use should be included as a consideration added to MDD and PHD demands.

MDD = (MDF × ADD) + PID

MDD = (9.5 × 2,880 L/d) + 756 L/d

MDD = 27,360 + 756

MDD = 28,116 L/d

Note: The fundamental reason potable water storage is required is to buffer the MDD that has a low potential of occurring. The well allocation to Piercy Rd (4,727 L/d under the 130% flow control valve) exceeds the average daily demand including irrigation (3,636 L/d), but is well below the Maximum Day Demand of 28,116 L/d. Storage is therefore required to buffer between the steady well delivery and peak demand events.

2.5 Peak Hourly Demand (PHD)

The Peak Hourly Demand is the maximum hourly flow rate through a system. It is used to design the volume of flow that must be accommodated in attaining chlorine CT, and for the sizing of UV treatment and supply pumps.

The calculation of PHD applies the Peak Hour Factor (PHF) to the average hourly combined demand (ADD + PID). The PHF for this project is 14.3 (as per BC DWOG Design Guidelines (2024), Table 21-1 for systems serving up to 10 dwelling units). The combined demand is used as the conservative design basis for treatment equipment sizing, as the treatment train must be capable of delivering the full instantaneous demand under all operating conditions.

PHD = PHF × ((ADD + PID) ÷ 24hrs)

PHD = 14.3 × ((2,880 + 756) ÷ 24)

PHD = 14.3 × 151.5

PHD = 2,166 L/hr (36.1 lpm)

2.6 Water Demand Summary

Table 4 Water Demand Summary

Parameter	Value	Notes
Daily demand per occupant	180 L/d	*BC DWOG Section 21.4.1*
Average Day Demand (ADD)	**2,880 L/d**	*16 occupants × 180 lcd*
Peak Irrigation Demand (PID)	756 L/d	*105 m^2 × 7.2 mm/d; May–Sept*
ADD + PID (Peak Seasonal ADD)	3,636 L/d	*2,880 L/d + 756 L/d*
Maximum Day Factor (MDF)	9.5	*Table 21-1; ≤10 DU*
Maximum Day Demand (MDD)	**28,116 L/d**	*(MDF × ADD) + PID*
Peak Hour Factor (PHF)	14.3	*Table 21-1; ≤10 DU*
Peak Hourly Demand (PHD)	**2,166 L/hr**	*PHF × ((ADD+PID)÷24) = 36.1 lpm*

3 WATER STORAGE

3.1 Potable Water Storage

The system design accommodates MDD by providing a potable water storage capacity equivalent to 1 day of MDD without reliance on the well. This ensures that the system can meet peak demand events from storage while the well continuously replenishes the cistern at its sustainable yield. The rate of flow to meet the replenishment of the ADD and Irrigation demand (3,636 L/d) is 2.525 L/min.

Potable water storage required ≥ 28,116 L (7,427 US gal)

At the ADD of 2,880 L/d (excluding irrigation), this storage volume represents approximately 9.8 days of average residential demand – providing substantial reserve capacity under normal operating conditions.

3.2 Fire Suppression Water Storage

Although fire water storage was initially considered, the fire chief has confirmed that no water storage is required for this property. Noting that the road access along the side of the property is sufficient.

4 BUILDING CODE WATER EFFICIENCY

To meet the efficiency commitments set out in the BC Building Code, the maximum water flow rates for fixtures deemed "efficient" are expressed in the National Plumbing Code (2020), Tables 2.2.10.6 and 2.6.1.6. The following criteria will be met:

Table 5 BC Building Code Efficiency Commitments

Fixture	Maximum Flow / Flush
Toilet – single flush	4.8 L/flush
Toilet – dual flush	4.8 L / 6.0 L
Shower head	≤ 7.6 lpm
Kitchen sink	≤ 8.33 lpm
Lavatory sink	≤ 5.7 lpm

Additionally, laundry machines will meet the Energy Star Certification Standard for Integrated Water Factor (IWF) of 3.2 or lower.

5 WELL MONITORING PROGRAM

The well monitoring program supports both the water license requirements of the Province of BC and the needs of general operations and maintenance. The monitoring program includes a measure of total water flow from the well, water flow through the treatment system for the development, and datalogging of the well depth.

5.1 Well Depth Data Logging

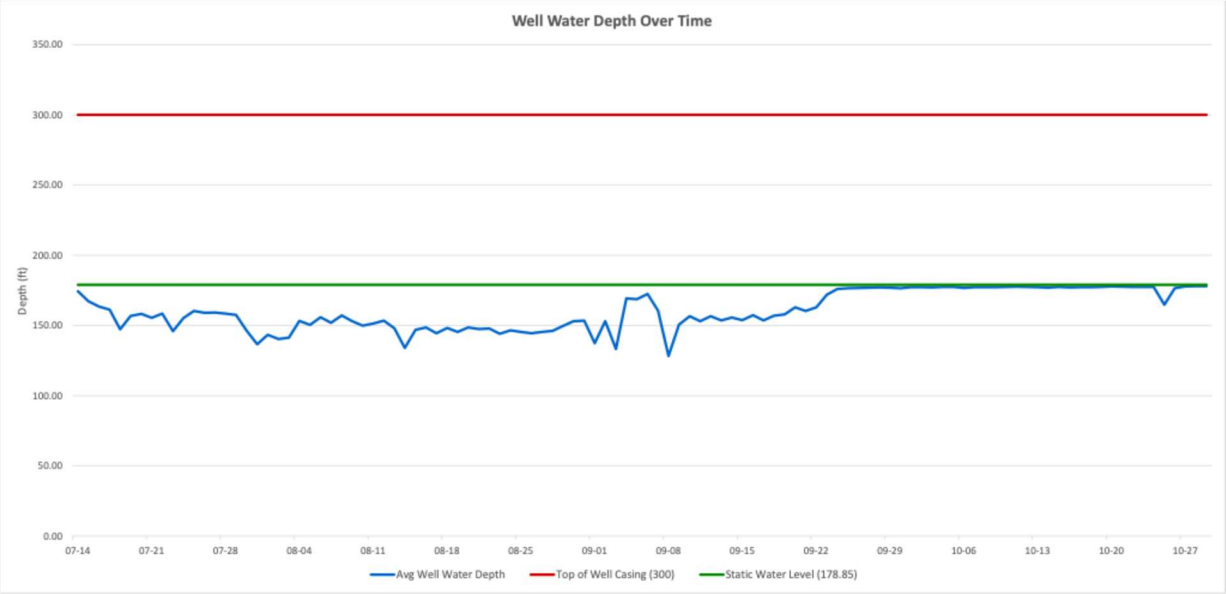
Well usage is to be recorded (and annually reported to the Province) using a totalizing water meter. Each water license holder is accountable to document and share with the Province their annual use in relation to their allocation.

Well depth is to be recorded continuously by use of an Eno Scientific Well Watch 670B Sonic Depth Data Logger or equivalent. This is not a requirement of the Province, but it is a supportive aid for all licenses tied to the well, and builds a baseline of the well's response and allows all license holders valuable information to ensure the health of their shared well.

Settings for data logging should be set to observe pumping cycles and would be downloaded annually to observe maximum water drop across cycles, average daily cycle, recharge curve, and static water level.

Recording Interval: 60 seconds. Eno-Scientific has built in alarm to sound if depth drops below a predetermined water level.

Figure 1 Example Eno Scientific Well Depth Output



6 EMERGENCY / BACKUP WATER

As part of the requirements to receive an operating permit through the local health authority (VIHA), the Water Systems Plan submitted as part of the small water operating system application process must include an Emergency Water and Drought Plan. Additionally, the design requirements for all water systems include ensuring that there is the equivalent of 1 day's storage equivalent to meet the needs of the MDD.

For this system, the MDD storage of 28,116 L represents approximately 9.8 days of the ADD residential demand (2,880 L/d), providing substantial emergency reserve under average consumption conditions. During a drought or conservation event, irrigation demand (756 L/d) can be voluntarily curtailed, further extending the effective duration of stored water.

7 WELL ALLOCATION

The Elanco 2024 report noted that the well sustainable yield was determined to be 0.25 L/s (15 lpm). This Management Plan incorporates the flow demands placed upon the well from the Piercy Rd project (focus of this report) and potential allocation needs for a future adjoining project on 1151 Northwest Rd., (western section of the Denman Green project), and the current

water license application by Emcon for their Work Yard site. The Works Yard Site water license is used in this assessment as it will become the legal entity (appurtenancy) associated with the property and transferred with the property.

The proposed method to ensure a controlled allocation for this and future potential draws upon the well is to determine the maximum daily flow demands from the well for the Piercy Rd project, the potential Northwest Rd project, along with the requested allocation by Emcon, and lastly determine the remainder yield capacity of the well.

Flow control valves will ensure controlled apportionment through capped flows. Flow valves operated at their maximum rated capacity pose a large pressure drop across the valve body, resulting in pumping systems needing to accommodate high pressure head to meet specified flow rates. To alleviate this, flow control valves are sized 30-40% higher than the intended flow, resulting in lower head losses and providing a built-in safety margin. For this plan a 30% safety margin is used.

Table 6 WTN 34154 - Water Allocation in relation to sustainable yield

Allocation Parameter	Value	Calculation
Piercy Rd – Current Project		
Units / occupants	8 / 16	
ADD	2,880 L/d	16 × 180 lcd
PID *(based on estimated area from architects' plans)*	756 L/d	105 m^2 × 7.2 mm/d
Well flow allocation (130% of combined ADD and PID)	3.283 lpm (4.73 m^3/d)	((2,880+756)÷1440) × 1.30
Northwest Rd – Adjoining Property – Future Allocation		
Occupants	20	
ADD	3,600 L/d	20 × 180 lcd
PID *(based on estimated area from architects' plans)*	1,332 L/d	185 m^2 × 7.2 mm/d
Well flow allocation (130% of combined ADD and PID)	4.453 lpm (6.412 m^3/d)	((3,600+1,332)÷1440) × 1.30
Emcon Works Yard – Water License Application	6.94 lpm (10 m^3/d)	As per water license application
Unallocated Well Yield - remaining yield	0.32 lpm (0.458 m^3/d)	
Well Yield Summary		
Sustainable yield	15.000 lpm	0.2500 L/s
Piercy Rd allocation	3.283 lpm	0.0547 L/s
Northwest Rd allocation (future)	4.453 lpm	0.0742 L/s
Emcon Water License Application	6.94 lpm	0.1157 L/s
Total Allocated Yield	**14.68 lpm**	**97.9% of sustainable yield**

Even with both developments fully allocated at 130% of their combined ADD and PID and allowance for the potential of the Emcon water license allocation for 10 m^3/day, 2.1% of the well's sustainable yield remains unallocated. This provides a safe margin for operational flexibility, and well yield variation of the well resource.

8 TREATMENT DESIGN PARAMETERS

8.1 Treatment System Overview

The treatment system is regulated by the local health authority (VIHA). This plan is not intended as a design but does assess a most practical treatment approach to facilitate storage planning. At the time of application to VIHA for a construction permit and Small Water Operating permit, a fulsome design would be prepared as part of the application package submitted to the AHJ, recognizing treatment is based on determination of the risks posed to the water source and population served.

For this plan, a high-level discussion is presented based on the most practical approach. Source waters can either be treated and stored in a clearwell and then supplied to the end use, or source waters can be stored untreated then upon demand treated upstream of distribution and supplied to end use. The second option does not involve the storage of treated water.

The MDD storage volume requirements for this development place the required stored volume of water at 9.8 days of use at the ADD demand levels – this creates too long a residence period for stored chlorinated waters due to chlorine residual decay. For this reason, the best option is for treatment to be situated downstream of storage and upstream of distribution.

8.2 Design flow

Design flow influences treatment system specifications. Treatment design flows can be based on PHD or another defensible method to justify peak water demand flow rates. PHD as per the above calculations is 36.1 L/min. Therefore, any chlorination and UV system employed would need to meet these requirements to achieve the acceptable treatment standards as assessed by the designer.

For this plan, we are assuming two forms of disinfection inclusive of UV and chlorination due to prior history of coliforms found in well samples, and due to the ownership and location of the well (WTN 34154) located on a separate lot and owned by others.

8.3 Chlorination

Chlorination is best achieved through dose based on set concentration to achieve a residual of 1.0 mg/L (1 ppm). This is achieved using a water meter with pulsed output that informs a chlorine injection pump to increase/decrease injection rate based on flow rate. Upon injection chlorine must achieve a CT value, a value that is achieved by a specific chlorine residual (mg/L) in contact with the water for a specified time to achieve a Log Reduction for pathogens as prescribed in the DWOG (2024).

For this development, it is recommended to use a baffle tank array to achieve the required CT time for distribution. This is likely achieved through the uses of two 450 L baffle tanks if target residual is set to 1 mg/L. This can be accommodated within the water treatment shed proposed and does not require an additional storage cistern outside beyond what is required to meet the MDD.

Figure 2 Chlorine CT and Storage Assessment

Theoretical Detention Time (T):		
Q	PHD (peak Hourly Demand) [lpm/min]	**36.1**
	Volume Pipe 1:	
	radius (mm)	12.5
	Length (m)	5
	Baffle factor pipe 1	1
VP1	Adjusted Volume (l)	2.454
	Volume Pipe 2:	
	radius (mm)	0
	Length (m)	0
	baffle factor pipe 2	0
VP2	Adjusted Volume (l)	0
	Baffle/Contact Tank 1:	
	Volume BT1 (L)	450
	Baffle factor BF1	0.6
VT1	Adjusted Volume (l)	270
	Baffle/Contact Tank 2:	
	Volume BT2 (L)	450
	Baffle factor BF2	0.6
VT2	Adjusted Volume (l)	270
TAV	**Total Volume (l)** (VP1 + VP2 + VT1 + VT2)	**542.454**
	Theoretical Detention Time (min) = TAV÷Q	**15.026**
Chlorine Concentration Contact Time (CT)		
C	Chlorine Residual (mg/l)	1
CT (min•mg/L) = C(mg/L) x T(min)		**15.03**

9 STORMWATER

9.1 Scope Note

Introba is not providing civil stormwater design for this project. The following is general guidance only, intended to give the client an order-of-magnitude sense of expected runoff and a plausible management concept. All design, sizing, and permitting of stormwater infrastructure remains with the civil engineer.

9.2 Expected Flows

The development's impervious surfaces total approximately 1,472 m^2 (357 m^2 of roof and 1,115 m^2 of driveway, pathways, and decks). Using PCIC climate-projected IDF data for Comox A station (RCP 8.5) and standard runoff coefficients, the indicative runoff volumes and peak flow are:

Table 7 Rainfall Design Events - Expected Flows

Design event*	**Near-term (2011–2040)** **Rainfall → Runoff volume / flow**	**Climate-adjusted (2071–2100)** **Rainfall → Runoff volume / flow**
1:10 year, 24-hour (rain garden sizing)	91 mm → ~115 m^3	113 mm → ~143 m^3
1:100 year, 24-hour (overflow check)	127 mm → ~178 m^3	158 mm → ~221 m^3
1:10 year, 1-hour (peak conveyance flow)	17 mm/hr → ~6 L/s	21 mm/hr → ~7 L/s
1:10 year, 15-minute (BCBC Appendix C, Table C-2 — building plumbing / roof drainage per NPC 2020)**	10 mm (Comox station)	Not applicable (used BCBC 2024 Appendix C Table C-2 as published)

**Values are presented in the format "rainfall → resulting volume or flow." The 24-hour rows use depth (mm) to drive runoff volume (m^3); the 1-hour and 15-minute rows use intensity (mm/hr) to drive peak flow (L/s). These are preliminary order-of-magnitude figures, not design values.*

***Note on the 15-minute row: BC Building Code Appendix C, Table C-2 publishes a 1:10 year 15-minute rainfall intensity for selected BC locations. This value is used by the building plumbing designer for sizing roof drains, downspouts, and overflow scuppers per National Plumbing Code 2020 Section 2.4. Denman Island is not listed individually in Table C-2; the value of 10 mm is taken from the Comox station, which is the closest listed location (the same station used for the PCIC IDF data above).*

9.3 Likely Management Concept

Site soils (SIFT polygon 105272: Ronald loam over glacial till, 80%; Hiller sandy loam colluvium, 20%) include a duric (impervious) horizon at typical depths of 50–100 cm that constrains deep infiltration. The most likely design approach is a series of distributed shallow rain gardens sited above the duric horizon, sized collectively to manage the 1:10 year design storm and configured to spread runoff across the site rather than concentrate it in a single deep facility. Additional design strategies to reduce impermeable surface area include permeable pathways and parking areas, and building foundations atop helical piles. These design features would be assessed through Civil design and would mitigate design flows noted above.

9.4 Overflow Concept

Rain garden overflows would be directed south via a shallow surface conveyance (vegetated swale or low-gradient pipe) to the wetland transecting the connected properties from the southeast corner of the Piercy Rd property through to the Denman Green property where the wetland travels on contour NE to SW. Stormwater management can be well coordinated due to the joint projects of the DCHS's ownership of the lands. The wetland discharge would be designed by the civil engineer in alignment with other proposed projects discharging to the same receiving feature. The wetland provides a defensible receiving location for infrequent extreme-event overflows. Civil engineer scope would notably include sizing of the swale/pipe and outlet, energy dissipation, erosion protection at the wetland edge, beneficial impacts of helical piles and permeable surfaces, and confirmation of any applicable provincial requirements for discharges to wetland habitat.

Report review by:

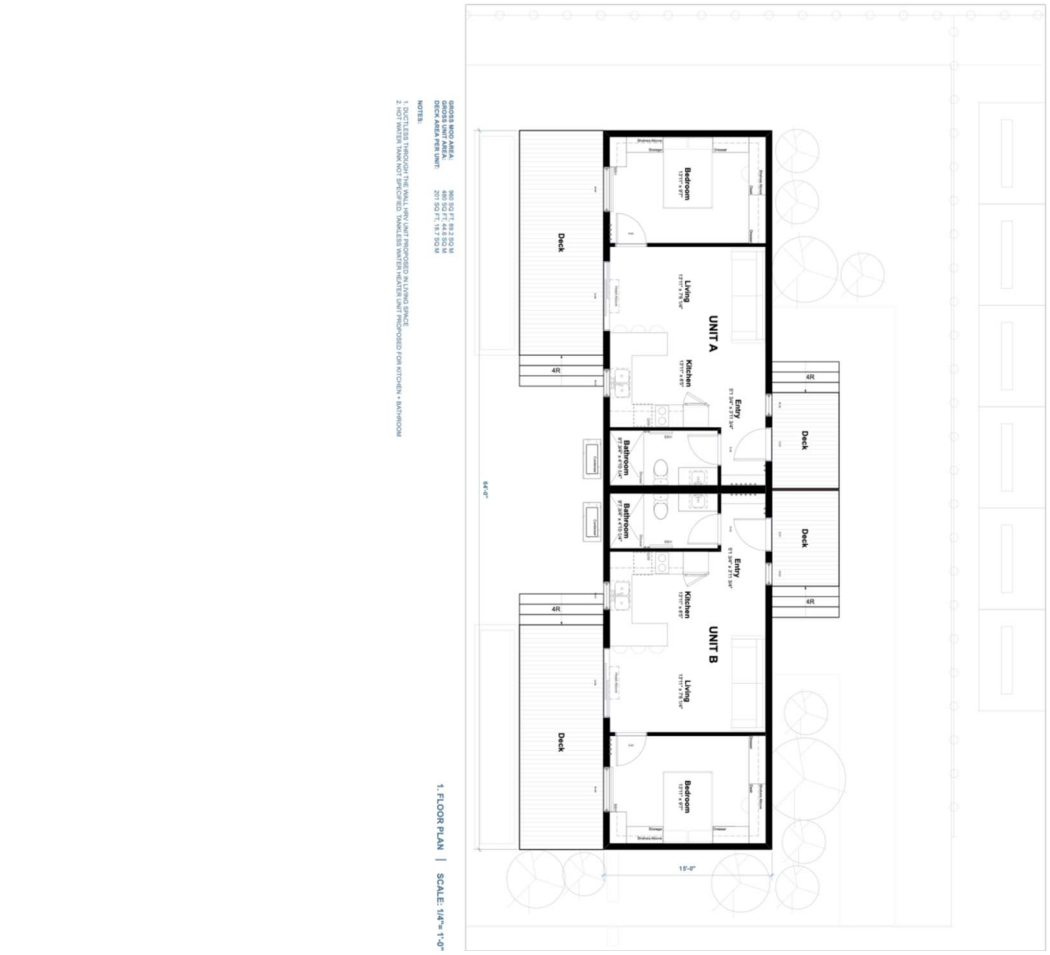
INTROBA

Sharon McGeorge, P.Eng.
Digital Practice Manager

Permit to Practice Number: 1001785

APPENDICES

APPENDIX A – Architectural Drawing



REFERENCES

The following reference documents were used to support the analysis and design parameters presented in this Water Management Plan.

Provincial Legislation and Regulation

British Columbia. *Drinking Water Protection Act*, SBC 2001, c. 9. Victoria, BC: Queen's Printer. Current to 2024.

British Columbia. *Drinking Water Protection Regulation*, BC Reg 200/2003. Victoria, BC: Queen's Printer. Current to 2024.

British Columbia. *Water Sustainability Act*, SBC 2014, c. 15. Victoria, BC: Queen's Printer. Current to 2024.

British Columbia. *Water Sustainability Regulation*, BC Reg 36/2016. Victoria, BC: Queen's Printer. Current to 2024.

British Columbia. *Groundwater Protection Regulation*, BC Reg 39/2016. Victoria, BC: Queen's Printer. Current to 2024.

BC Drinking Water Officers' Guide (DWOG)

BC Ministry of Health, Environmental Health Services. *Drinking Water Officers' Guide*, Consolidated Version, April 2025. Victoria, BC. [Part A: Legislation & Policy; Part B: Design Guidelines; Part C: Treatment Objectives; Part D: Water Quality Standards.]

- Part B: *Design Guidelines for Drinking Water Systems* (2024). Chapter 21: Small Water Systems. Section 21.4.1 (Water Demand), Table 21-1 (Peaking Factors: MDF and PHF for systems ≤10 DU / 30 population), Table 21-2 (Water Use Benchmarks by Facility Type).
- Part C: *Treatment Objectives for Drinking Water Systems*. Disinfection requirements, CT calculations, 4-log virus and 3-log Giardia/Cryptosporidium inactivation targets, UV dose requirements, and chlorine residual maintenance standards.

Building and Plumbing Codes

National Research Council Canada. *National Plumbing Code of Canada 2020* (NPC 2020). Table 2.2.10.6 (Maximum Flow Rates for Water-Efficient Fixtures), Table 2.6.1.6 (Maximum Flush Volumes). Ottawa: NRC.

British Columbia. *BC Building Code 2024*. Office of Housing and Construction Standards, Ministry of Housing. Victoria, BC.

Fire Protection

National Fire Protection Association. *NFPA 1142-2022: Standard on Water Supplies for Suburban and Rural Fire Fighting*. Quincy, MA: NFPA. [Section 4.3 Minimum Water Supply; Section 6.2 Occupancy Hazard Classification; Section 7.3 Usable Volume Factor.]

Fire Underwriters Survey (FUS). *Water Supply for Public Fire Protection*. 2020 Edition. Richmond Hill, ON: SCM Risk Management Services Inc.

Hydrogeological Assessment

Elanco Enterprises Ltd. *Hydrogeological Assessment of Yield and Source Protection for a Well Located at 1400 Northwest Road, Denman Island, B.C.* (WTN 34154). November 2024. Prepared for Denman Community Housing Society. [Sustainable yield determination: 0.25 L/s; wellhead protection; GARP assessment.]

Elanco Enterprises Ltd. *Hydrogeological Assessment — Preliminary Yield Confirmation*. December 2023. Prepared for Denman Community Housing Society.

Health Authority Guidelines

Vancouver Island Health Authority (Island Health). *Guidelines for the Approval of Water Supply Systems*. 2018. Victoria, BC: VIHA Environmental Health.

BC Ministry of Health. *Small Water System Guidebook for Owners and Operators*. Victoria, BC.

Prior Engineering Reports

Integral Group (McGeorge, S., P.Eng., LEED AP). *Denman Green — Water Plan: Potable Water Plan — Denman Green Housing Development*. V1.1, August 10, 2021. Prepared for Denman Housing Association. Victoria, BC: Integral Group (

Design Standards and Technical References

BC Ministry of Forests, Lands, Natural Resource Operations & Rural Development. *Design Guidelines for Rural Residential Community Water Systems*. March 2012. Utility Regulation Section, Water Management Branch. Victoria, BC.

Energy and Appliance Standards

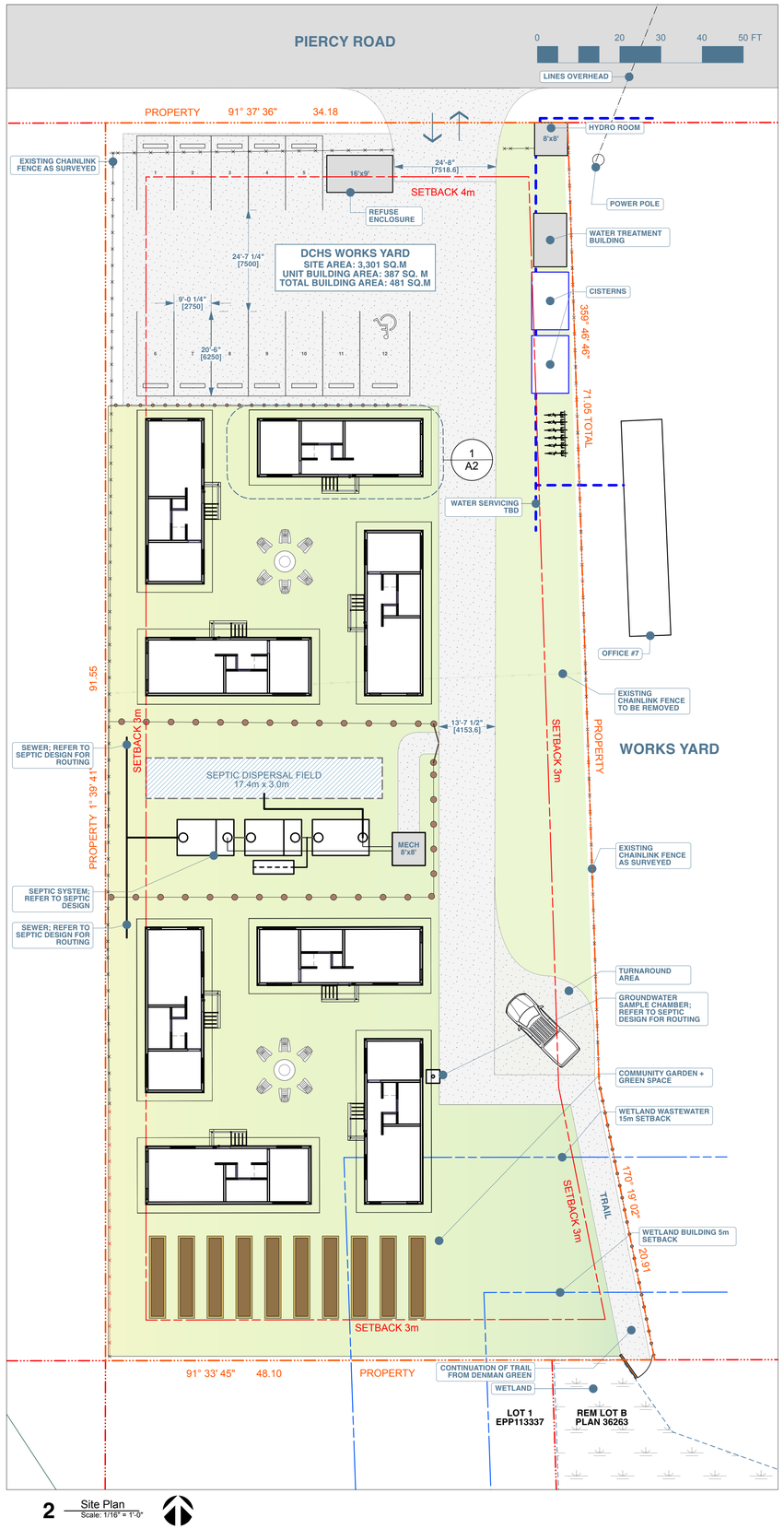
Natural Resources Canada / U.S. Environmental Protection Agency. *Energy Star Certification: Residential Clothes Washers*. Integrated Water Factor (IWF) ≤ 3.2.

Monitoring Equipment

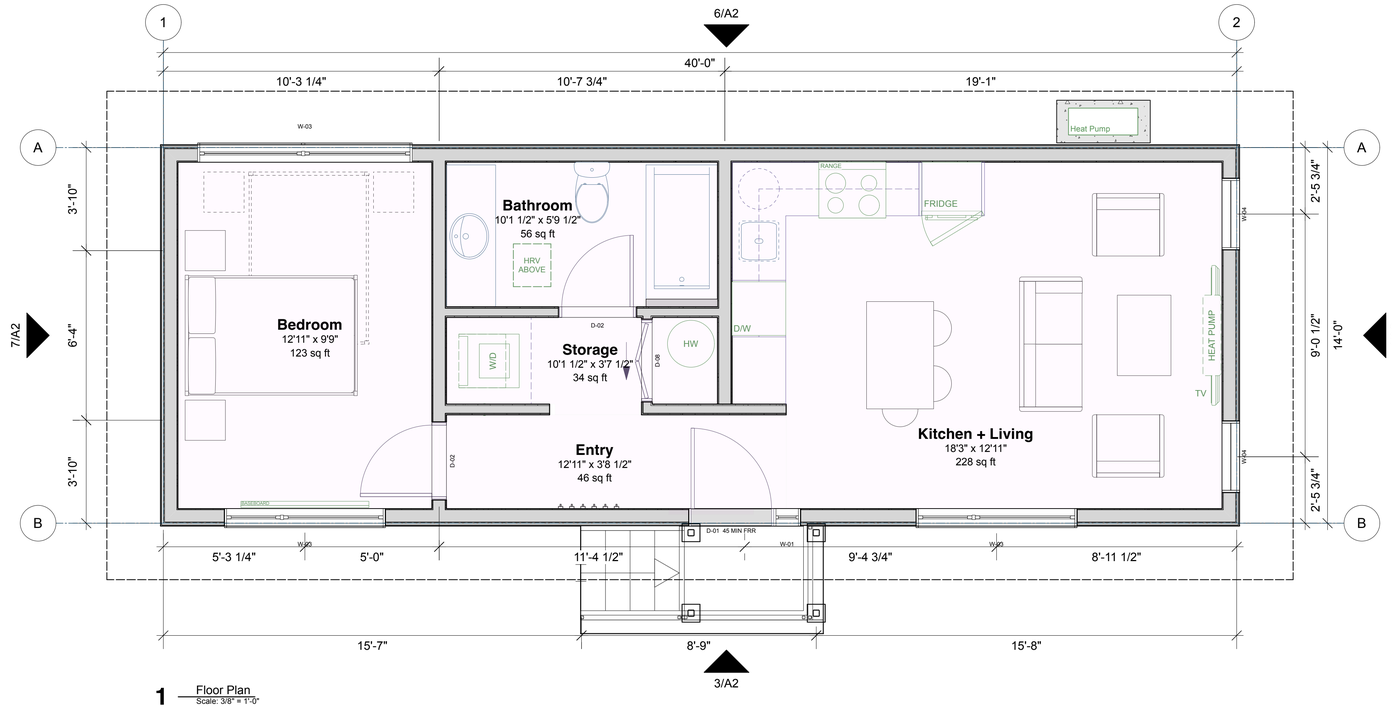
Eno Scientific. *Well Watch 670B Sonic Depth Data Logger*. Product documentation and specifications. Eno Scientific, LLC.

Architectural Drawings

MacDonald Hagarty Architects Ltd. *Denman Community Housing Society — Site Plan and Building Layouts*. Drawing A1.03, Revision H, dated 2026-03-05.

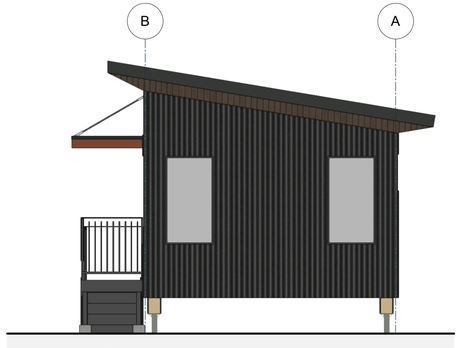


2 Site Plan
Scale: 1/16" = 1'-0"

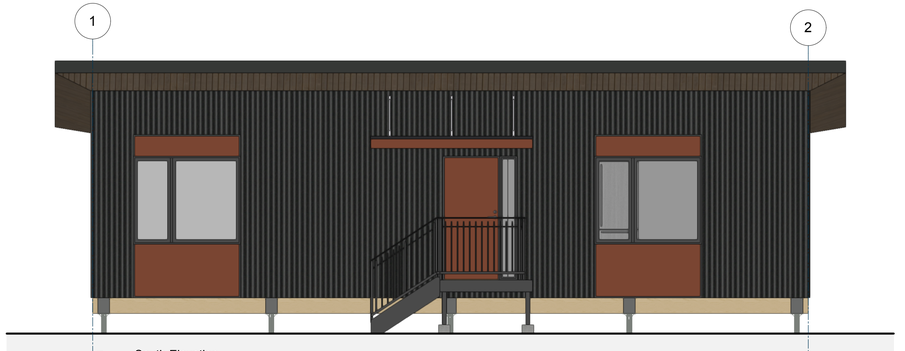


1 Floor Plan
Scale: 3/8" = 1'-0"

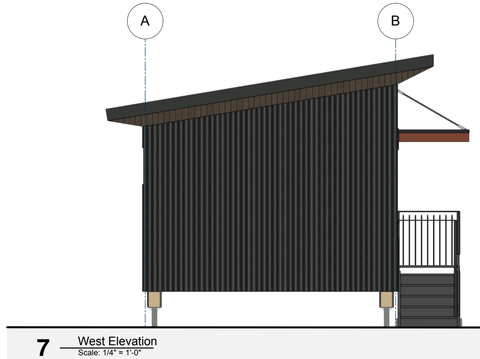
GROSS UNIT AREA: 503 SQ FT, 46.7 SQ M



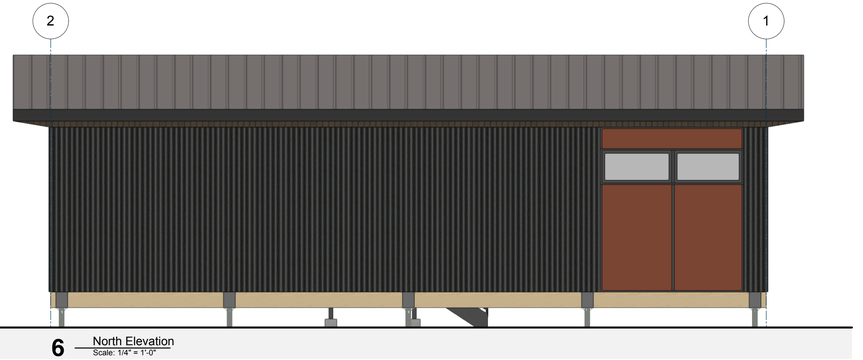
4 East Elevation
Scale: 1/4" = 1'-0"



3 South Elevation
Scale: 1/4" = 1'-0"



7 West Elevation
Scale: 1/4" = 1'-0"



6 North Elevation
Scale: 1/4" = 1'-0"

MacDonald Hagarty Architects Ltd.
Unit E - 1902 Comox Avenue, Comox, BC, V9M 3M7

NOTES

NOT FOR CONSTRUCTION

ISSUE

NO.	Y M D	ISSUE
A	2026-07-28	Issued for Review
B	2026-08-05	Issued for Consultant Review
C	2026-08-13	Issued for Review

REVISION

NO.	Y M D	ISSUE

CLIENT

Denman Community Housing Society
A Community Land Trust

SEAL

PROJECT

DCHS Works Yard

SHEET TITLE

Site Plan + Elevations

DRAWING NO.

A2