Making a difference...together

Integrated Water Services
479 Island Highway
Victoria. BC, Canada V9B 1H7

T: 250.474.9600
F: 250.474.4012
www.crd.bc.ca

March 28, 2013

5240-20

COPY

File: Cedar Lane

Mr. Brian Bedford
Infrastructure Resource Officer
Infrastructure & Finance Branch
Ministry of Community, Sport & Cultural Development
PO Box 9838 Stn. Prov. Govt.
Victoria, BC
V8W 9T1

Dear Mr. Bedford:

BCCWIP # 4182, CEDAR LANE WATER SYSTEM, CAPITAL REGIONAL DISTRICT

The Capital Regional District (CRD) has completed water system improvements at its Cedar Lane water system on Salt Spring Island. The following information summarizes the reporting requirements related to the British Columbia Community Water Improvement Program.

The work that was completed includes the construction of a new pipe connection of 270 m between two wells (Wells #1 and #5), a new 30,000 lg bolted steel storage tank, demolition of the old storage tank, construction of a new water treatment system and building to replace the original system, miscellaneous watermains to connect the system and related SCADA /electrical upgrades. Rehabilitation of the wells was not undertaking in this project.

In support of this work, the Vancouver Island Health Authority issued Construction Permits W-S-1176, W-S-1230 and W-S-1415 related to the Drinking Water Protection Act (copies attached). The design information and desired performances were identified in the CRD's correspondence of August 18, 2009 to the VIHA and related design/record drawings (six attached).

The new water treatment building was constructed near the tank site between Lots 5 and 6 on Cedar Lane and its floor area is approximately 9 square metres. The building was constructed from locally available materials (wood and concrete construction).

The CRD has adopted a region wide water conservation program including a number of means for reducing water usage (refer to the attachment). Water usage by the Cedar Lane customers is considered low and the users to the system are charged based on usage (CRD Bylaw 3777). Further, the community has experienced limited groundwater supply and it is in the customers interest to conserve water. A draft water conservation plan has been prepared and is proposed to be brought forward for consideration by the Cedar Lane Water Commission.

The existing wells have been identified under the Ground Water Protection Act as follows: Well #1 – Well ID No. 94636, Well #2 – Well ID No. 19891, Well # 3 – Well ID No. 19897, Well #4 – Well

ID No. 19898, and Well # 5 – Well ID No. 19893. Due to the limited groundwater supply the CRD has committed to maintaining the existing wells as a potential future water supply.

The system has been classified by the Environmental Operators Certification Program and deemed to be a Small Water System (Facility # 1380). A copy of the facility classification is attached. The Final Report is attached, including a photograph of the plaque mounted on the facility.

The CRD wishes to thank the Province of British Columbia for the assistance with accomplishing improvements to the water system at the community of Cedar Lane on Salt Spring Island.

If you have any questions please contact the undersigned.

Yours truly,

Scott Mason, B.Sc., P.Eng.
Manager, Regional Water
Infrastructure Engineering
Integrated Water Services
Capital Regional District

Attachments: various

cc: Tim Tanton, P.Eng. Senior Manager, Infrastructure Engineering, IWS, CRD

Ministry of Community Services
Local Government Infrastructure and Finance Branch
4th Floor, 800 Johnson Street
Mailing Address:
PO Box 9838, Stn. Prov. Govt.
Victoria, British Columbia, V8W 9T1

British Columbia Community Water Improvement Program Final Report

Note: As detailed in the terms and conditions to the Local Government Grants Program grant, the ministry requires a final report of progress on your project. Please complete the report form and return it to the ministry. For further information please contact the Municipal Engineering Services at telephone: (250) 387-4060 or fax: (250) 356-1873.

A. Project Data:

Applicant:	Description of Project: Cedar Lane Water Treatment Upgrade	BCCWIP Number: 4182

Project Cost	Per Application	Actual	Variance
Total Project Cost	475,000	470,560	$ 4,440
Provincial Contribution	316,667	100,063	216,604

Please provide a brief explanation of the variance:
$2,960 due to $4,440 less Project costs.
$213,644 due to outstanding technical conditions

B. Local Proponent Comment:

What did your community achieve through the construction of this project? (eg. enhancement of local economy; use of innovative technology; environmental/health quality enhancement; local job creation etc.) Attach an additional sheet if required.

- LOCAL MATERIAL SUPPLIERS & LABOUR FORCE BENEFITED
- IMPROVED DRINKING WATER QUALITY.

C. Certification of Completion:

This will certify that project number (), as described in section A above, is now complete, operational and constructed in accordance with the contract between ourselves and the Province of British Columbia with revisions as approved by the Ministry of Community Services.

Principal Appointed Officer (please print):				
Signature:		Date: YYYY	MM	DD
Project Manager (please print):	Scott Mason			
Signature:		Date: 2013	03	28

Please fax this form once it has been completed in full, along with a **photo of the permanent plaque**, to (250) 356-1873 attention Municipal Engineering Services

VANCOUVER ISLAND health authority

January 18, 2010

File: W-S, CRD ES
Your File: 5280-65.65

Capital Regional District Environmental Services
625 Fisgard Street
PO Box 1000
Victoria BC V8W 2S6

Attention: Mr. R.H. Edwards, P. Eng. – Design Engineer, Engineering Services Division

Dear Sir:

Re: W-S-1176 – Cedar Lane Water Works District – 2009 Improvements

Please find enclosed **Water Supply System Construction Permit No. W-S-1176**, issued under Section 7 of the **Drinking Water Protection Act**, authorizing construction of the water system improvements at Cedar lane including:

- The Well #1 Water Treatment building c/w ultraviolet deactivation followed by a chlorine residual & booster pumps to pressurize the distribution system, and,

- The Well #5 Water Treatment building c/w ultraviolet deactivation followed by a chlorine residual, also with a recirculation pump to maintain the chlorine residual in the nearby 12,000 Ig storage reservoir, followed by booster pumps to pressurize the distribution system, and,

all in order to facilitate the removal of the standing "Boil Water Notice" planned for early 2010. Please contact the Vancouver Island Health Authority's, Environmental Health Officer, Mr. Chris Laughlin at (250) 475-1158 to discuss cancelling the "Boil Water Notice." The Cedar Lane Water Works District is an existing 37-lot residential subdivision located along Mansell Road near the community of Ganges, as found on Saltspring Island, BC. The waterworks are now operated by the CRD Environmental Services Division.

This permit is valid for one year and is not transferable unless the Issuing Official or the Drinking Water Officer approves the transfer. This permit is subject to the following terms:

.../2

Health Protection &
Environmental Services
3rd Floor 6475 Metral Drive
Nanaimo BC V9T 2L9

Public Health Engineering
Ph: (250) 755-6299
Fax: (250) 755-3372

Design Amendments and Conditions: The submitted design must be amended to address the following item(s), or during construction the following item(s) must be attended to, as a condition of this permit:

1)\ Plan for conducting "THM Potential" laboratory water quality tests in 2010.

Design Deviations: This permit applies exclusively to the works as approved. Any subsequent design modifications will require the submission of amended drawings to the Issuing Official or Drinking Water Officer and approval obtained before installation of the amended works.

Disinfection: It is the responsibility of the water distribution system owner (CRD ES) to ensure that, following the completion of construction, repair, or draining and refilling of any portion of the system affected, and prior to the delivery of water to customers served by these works, all waterworks affected by this permit are disinfected in accordance with the appropriate American Water Works Association (AWWA) standard or equivalent. Chlorinated water used for disinfection of all waterworks shall not be directly discharged into the environment without the permission of the Ministry of Environment, and/or Fisheries and Oceans Canada.

The water supplier (CRD ES) shall maintain records of the completion date of the permitted work, and the results of the bacteriological testing conducted as part of the disinfection protocol. The water supplier shall notify the Vancouver Island Health Authority if bacteriological tests are unacceptable. These records shall be made available to the public health engineer or Vancouver Island Health Authority personnel upon request.

Sewers: It is the responsibility of the water distribution system owner (CRD ES) to ensure that mains under construction or repair are not contaminated by seepage or effluent from sewers or storm drains.

Water Quality observations:

1) Maintenance procedures should be reviewed given the recurrence of non-coliform bacteria counts after the 2009 Improvements were completed.

2) The water characteristics of this groundwater supply from Wells #1 and #5 is highly mineralized with a:

TDS, Total dissolved solids	300 – 600 mg/l	AO < 500
Conductivity	500 -1,200 US/cm	AO < 400
Hardness	174 mg/l	AO 80 – 100
UVT	88%	

.../3

3) Of interest are the following parameters and Aesthetic Objectives, AO

Iron	0.09 mg/l	AO<0.30	Okay
Manganese*	0.24	AO<0.04	x 5
Strontium	0.47	2 is normal	Okay
Chloride*	213	AO<250	Watch
Fluoride	0.2	1.5 MAC	Okay
Sulphate	18	AO<500	Okay
TOC*	17	AO<4	Test

3.1) The Total Organic Carbon, (TOC) level indicates that the THM potential should be evaluated given chlorine is added there.
3.2) The Chloride level is approaching the Aesthetic Objective limit.
3.3 Manganese exceeds the Aesthetic Objective by approximately 5 times, and could be problematic for staining.

This document grants authorization under Section 7 of the **Drinking Water Protection Act** only, and does not constitute permission or consent under any other Act or authority.

Please contact Public Health Engineering through the Vancouver Island Health Authority in Nanaimo, should there be any questions concerning the above.

Yours truly,

Original signed by

John L. Spencer, P. Eng.
Public Health Engineer
Vancouver Island Health Authority

ec: Chris Laughlin, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office
Robert Gutierrez., Chief Building Inspector, CRD Building Dept., Victoria

Enclosures: Permit + Sketch

As-Constructed drawing set distribution: (EHO has one already)
PHE (2)
Strata Owners c/o CRD Env (2)
CRD Building Dept (1)

Schematic drawing distribution:
PHE (2)
EHO(1)
Strata Owners c/o CRD Env (2)
CRD Building Dept (1)

VANCOUVER ISLAND health authority

W-S-CRD ES

Water Supply System Construction Permit
NO. W-S-1176

To: Capital Regional District Environmental Services **Cedar Lane Water System – 2009 Works**

This is to certify that:

The schematic drawing No. 26-D210-1 (Issue 1) (Rev. 1) dated October 29, 2009, revised November 6, 2009, prepared and submitted December. 23, 2009, and the engineering as-constructed drawings numbered 26-D206-1 (Issue 1), 26-D206-2 (Issue 1) and 26-D206-3 (Issue 1) dated March 20, 2009, prepared and submitted December 23, 2009 all by R.H. Edwards, P. Eng. of the Capital Regional District Environmental Services division. The said drawings *portray individual water treatment buildings for Wells #1 and #5 and other related appurtenances* to serve the existing and future development at Cedar Lane Water Works, on Salt Spring Island, B.C., and submitted in accordance with Section 7 of the **Drinking Water Protection Act** have been reviewed and proposed construction, alteration or extension may be commenced in accordance with the approved plans and the terms and conditions contained in the letter of transmittal.

This document certifies that the plans and specifications for the proposed works have been reviewed pursuant to the current "Guidelines for the Approval of Waterworks" issued by the Vancouver Island Health Authority and that the plans and specifications meet the protection requirements outlined in the Guidelines.

*The standards of structural integrity and safety of the works have not been considered and are not the subject of this Permit. This document grants authorization under Section 7 of the **Drinking Water Protection Act** only, and does not constitute permission or consent under any other Act or authority.*

Original dated January 18, 2010

Date Issued

Original signed by

John L. Spencer, P. Eng.
Public Health Engineer

ec: Chris Laughlin, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office
Robert Gutierrez., Chief Building Inspector, CRD Building Dept., Victoria

VANCOUVER ISLAND health authority

March 11, 2010

File: W-S, CRD ES

Capital Regional District Water Services
479 Island Highway
Victoria BC V9B 1H7

Attention: R.H. Edwards, P.Eng.

Dear Sir:

Re: Water Construction Permit No. W-S-1230 – Cedar Lane Water System, Saltspring Island

Please find enclosed **Water Supply System Construction Permit No. W-S-1230**, as issued under the authority of Section 7 of the **Drinking Water Protection Act.** This permit authorizes the construction of a 30,000 Igal. epoxy-coated steel tank reservoir to replace the existing 10,000 Igal. steel tank, at the "Cedar Lane Water Works District." The "Cedar Lane Water Works District" is an existing 37-lot residential subdivision located along Mansell Road near the community of Ganges, all situated on Saltspring Island, BC. The waterworks are now owned and operated by the CRD Environmental Services Division.

Prior permit W-S-1176 was issued January 18, 2010 by this office for the "2009 Waterworks Improvements" that included two water treatment buildings, one each for Well #1 and Well #5. The conditions of that permit remain in effect and are to be considered in addition to those of this permit.

This permit is valid for one year and is not transferable unless the transfer is approved by the Issuing Official or the Drinking Water Officer. This permit is subject to the following terms:

Design Amendments and Conditions: The submitted design must be amended to address the following item(s), or during construction the following item(s) must be attended to, as a condition of this permit:

1. Construction shall not commence until a Letter Report from a Geotechnical Engineer approving **the constructed reservoir base** for its intended use has been received and approved by the CRD (and copied to VIHA.)
2. **Show prominently** on each construction drawing sheet a reference to "Vancouver Island Health Authority Water Supply System Construction Permit W-S-1230," or equivalent.

.../2

Health Protection & Environmental Services
3rd Floor, 6475 Metral Drive
Nanaimo BC V9T 2L9

Public Health Engineering
Ph: 250-755-6299
Fax: 250-755-3372

3. CRD shall add the following items to the project and drawings:
   3.1. Ensure **erosion protection** is considered downstream of the reservoir drainpipe outlet.
   3.2. Provide at least a 2 m. x 2 m. **concrete apron** in front of the ground-level "access hatch" to create a "clean zone" for placing disinfected clothing and boots etc. during maintenance.
   3.3. Please ensure all **normally-closed valves** are labeled accordingly on the construction drawing sets.
   3.4. **Ensure separate inlets and outlets** are provided for in the base design of the reservoir, with their piping to extend at least 3 m. beyond the edge of the circular concrete base.
   3.5. **Add a riser** pipe for the spare inlet shown as a spare inlet/outlet.

4. CRD to provide at commissioning or in the first three months of operation, a Reservoir Section View sketch or equivalent as a **Plan of Record** showing:
   4.1. The base tank elevation (metric) and the top TWL elevation (metric)
   4.2. To show the various alarm/floats and the their relative elevations
   4.3. The bottom elevation of the domestic storage c/w text on its volume listed in cu.m. and (Igal.)
   4.4. The bottom of the fire storage c/w text on its volume listed in cu.m. and (Igal.)
   4.5. The bottom of the emergency storage c/w text on its volume listed in cu.m. and (Igal.)
   4.6. The dead space storage below the outlet rim elevation listed in cu.m. and (Igal.)
   4.7. The total storage in cu.m. and (I. gal.)
   4.8. The gauge/thickness of the panels supplied at the various ring levels.
   4.9. The paint specifications and the steel finishing specifications.

Standard VIHA Construction Permit Conditions:

Design Deviations: This permit applies exclusively to the works as approved. Any subsequent design modifications will require the submission of amended drawings to the Issuing Official or Drinking Water Officer and approval obtained before installation of the amended works.

Disinfection: It is the responsibility of the water distribution system owner (CRD ES) to ensure that, following the completion of construction, repair, or draining and refilling of any portion of the system affected, and prior to the delivery of water to customers served by these works, all waterworks affected by this permit are disinfected in accordance with the appropriate American Water Works Association (AWWA) standard or equivalent. Chlorinated water used for disinfection of all waterworks shall not be directly discharged into the environment without the permission of the Ministry of Environment, and/or Fisheries and Oceans Canada.

.../3

The water supplier (CRD ES) shall maintain records of the completion date of the permitted work, and the results of the bacteriological testing conducted as part of the disinfection protocol. The water supplier shall notify the Vancouver Island Health Authority if bacteriological tests are unacceptable. These records shall be made available for inspection by the public health engineer or Vancouver Island Health Authority personnel, if requested.

Sewers: It is the responsibility of the water distribution system owner (CRD ES) to ensure that mains under construction or repair are not contaminated by seepage or effluent from sewers or storm drains.

Additional VIHA comments for future discussions, and consideration at that time:

1. **A Wellhead Protection Plan** may be required for the two production water wells and any other wells found on the property, and should consider the following well protection tools, or alternatives, used as minimum standards by other Regional Districts:
   - 1.1. 6.0 meter wide access rights-of-ways to the wellheads and treatment building to meet RD requirements.
   - 1.2. 15 m. radius, or equivalent rectangle; No-Build Covenant Area around each wellhead to meet RD requirements.
   - 1.3. A blanket covenant regulating "Hazardous Goods Storage" and/ or "Sanitary Control Area" over the affected and adjacent properties, at least a 30 m. radius, or equivalent rectangle to the satisfaction of the RD.
   - 1.4. Site security fencing or protective landscaping may be required by the RD or VIHA.
   - 1.5. Wellhead Surface & Site Improvements to protect the well from contamination.
   - 1.6. Wellhead Down-Hole Protection improvements to isolate fractures or poor water quality down-hole sources or to complete a seal into a confining layer.
   - 1.7. Protection of the aquifer(s) and recharge areas.
   - 1.8. Decommissioning or capping of the abandoned wells to meet the ultimate well configuration for the site under the supervision of a hydrogeologist.

2. **A Well Action Plan** would initially locate and label all aquifer penetrations on-site upon a Site Plan sketch. The provision of an Action Plan to register or decommission all test or abandoned wells under the supervision of a hydrogeologist. The Action Plan will also ensure all the permanent test wells and production wells are properly labeled, completed and registered to MoE standards. The Action Plan may also include a Time-Line Schedule of when various works are proposed for implementation.

3. **Water Treatment Planning.** The combined well water quality water is highly mineralized and approaches or exceeds the Aesthetic Objectives of: TDS, Conductivity, Hardness, Manganese, Chloride and TOC. (The CRD has indicated to VIHA that they plan to begin addressing these issues in 2010.)

.../4

4. **THM Potential Monitoring,** (or WTP pilot testing) were requested by VIHA in 2010 in permit W-S-1176. This is a requirement for more rigorous sampling and testing to assess the associated risk there. The high organic loading is a concern given the current chlorination system that will produce disinfection by-products having the potential to incur negative health & safety impacts over a life-time of consumption.

This document grants authorization under Section 7 of the **Drinking Water Protection Act** only, and does not constitute permission or consent under any other Act or authority.

Please contact Public Health Engineering through the Vancouver Island Health Authority in Nanaimo, should there be any questions concerning the above.

Yours truly,

John L. Spencer, P. Eng.
Public Health Engineer
Vancouver Island Health Authority

ec: Chris Laughlin, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office
H. Labridis, P.Eng., Western Tank and Lining,
Scott Mason, Manager, Supply Engineering, Integrated Water Services, CRD
Robert Gutierrez., Chief Building Inspector, CRD Building Dept., Victoria

Enclosures: Permit + Location Plan and Site Plan sketches

VANCOUVER ISLAND health authority

HEALTH PROTECTION

Water Supply System Construction Permit
NO. W-S-1230

To: Capital Regional District Environmental Services **Cedar Lane Reservoir Replacement**

This is to certify that drawings numbered 44-001 (Rev. 0) and 44-002 (Rev. 0) dated January 2010, prepared, signed & sealed January 20, 2010 by H. Labridis, P. Eng. of Western Tank and Lining, and shop drawings: 918T020 -095511A, 918T020 -095511B and 918T020-095511C dated December 15, 2009 provided for Record Purposes Only, all submitted February 18, 2010 by R. H. Edwards, P. Eng. of the CRD Environmental Services, portraying a proposed storage reservoir replacement comprising of *a 30,000 Imperial Gallon tank, and other related appurtenances* to serve the existing development on Saltspring Island, BC, and submitted in accordance with Section 7 of the **Drinking Water Protection Act** have been reviewed and proposed construction, alteration or extension may be commenced in accordance with the approved plans and the terms and conditions contained in the letter of transmittal.

This document certifies that the plans and specifications for the proposed works have been reviewed pursuant to the current "Guidelines for the Approval of Waterworks" issued by the Vancouver Island Health Authority and that the plans and specifications meet the protection requirements outlined in the Guidelines.

The standards of structural integrity and safety of the works have not been considered and are not the subject of this Permit. This document grants authorization under Section 7 of the ***Drinking Water Protection Act*** *only, and does not constitute permission or consent under any other Act or authority.*

Mar. 11, 2010
Date Issued

John L. Spencer, P. Eng.
Public Health Engineer

cc: Chris Laughlin, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office
H. Labridis, P.Eng., Western tank and Lining,
Scott Mason, Manager, Supply Engineering, Integrated Water Services, CRD
Robert Gutierrez., Chief Building Inspector, CRD Building Dept., Victoria

VANCOUVER ISLAND health authority

March 5, 2012

File: W-S, Cedar Lane WWD
Your File: 5600-20.04

Capital Regional District Integrated Water Services
479 Island Highway
VICTORIA BC V9B 1H7

Attention: Richard Edwards, P.Eng., Infrastructure Engineering

Dear Sir:

Re: Water Supply System Construction Permit No. W-S-1415 – Cedar Lane Water System

Please find enclosed **Water Supply System Construction Permit No. W-S-1415**, issued under Section 7 of the **Drinking Water Protection Act**, authorizing construction of a proposed watermain extension for a supply line from Well #1 to the existing Cedar Reservoir along Cedar Lane and Mansell Road to serve existing and future development in the Cedar Lane Water System on Saltspring Island, BC.

This permit is valid for one year and is not transferable unless the Issuing Official or the Drinking Water Officer approves the transfer. This permit is subject to the following terms:

Design Amendments and Conditions: The submitted design must be amended to address the following item(s), or during construction the following item(s) must be attended to, as a condition of this permit:

1. Upon completion of the work, the water system owner (CRD) shall provide one set of signed and sealed "as-constructed" drawings to this office.
2. The proposed 150 mm diameter "jumper" watermain bypassing the existing water treatment plant shall be provided with a small diameter water line, installed just downstream of the isolation valve to allow water to flow into the bypass line. This is to ensure the bypass line does not contain stagnant water. Alternatively, a second isolation valve and drain port (to create a "block and bleed" set-up) can be installed on the bypass line to isolate the line.

Design Deviations: This permit applies exclusively to the works as approved. Any subsequent design modifications will require the submission of amended drawings to the

.../2

Health Protection & Environmental Services
3rd Floor, 6475 Metral Drive
Nanaimo BC V9T 2L9

Public Health Engineering
Ph: 250-755-6299
Fax: 250-755-3372

Issuing Official or Drinking Water Officer and approval obtained before installation of the amended works.

Disinfection: It is the responsibility of the water distribution system owner (CRD-IWS) to ensure that, following the completion of construction, repair, or draining and refilling of any portion of the system affected, and prior to the delivery of water to customers served by these works, all waterworks affected by this permit are disinfected in accordance with the appropriate American Water Works Association (AWWA) standard or equivalent.

Chlorinated water used for disinfection of all waterworks shall not be directly discharged into the environment without the permission of the Ministry of Environment, and/or Fisheries and Oceans Canada.

The water supplier (CRD-IWS) shall maintain records of the completion date of the permitted work, and the results of the bacteriological testing conducted as part of the disinfection protocol. The water supplier shall notify the Vancouver Island Health Authority if bacteriological tests are unacceptable. These records shall be made available to the public health engineer or Vancouver Island Health Authority personnel for inspection, if requested.

Sewers: It is the responsibility of the water distribution system owner (CRD-IWS) to ensure that mains under construction or repair are not contaminated by seepage or effluent from sewers or storm drains.

Subsequent Permit Amendments: This permit supersedes W-S-1324 issued March 7, 2011 which approved a separate watermain and fire hydrant from the reservoir to Cedar Lane.

This document grants authorization under Section 7 of the **Drinking Water Protection Act** only, and does not constitute permission or consent under any other Act or authority.

Please contact Public Health Engineering through the Vancouver Island Health Authority in Nanaimo, should there be any questions concerning the above.

Yours truly,

Murray M. Sexton, P. Eng.
Public Health Engineer

ec: Erwin Dyck, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office

Enc.

VANCOUVER ISLAND health authority

HEALTH PROTECTION

W-S, Cedar Lane

Water Supply System Construction Permit
NO. W-S-1415

To: Capital Regional District Integrated Water Services **Cedar Lane, Saltspring Island**

This is to certify that a drawing numbered 5188-1 (Iss. A) dated January 2012 and submitted January 27, 2012, and a sketch entitled "Cedar Lane Water System Saltspring Island Proposed Hydrant/Standpipe" dated March 2011 with design amendments prepared and submitted February 9, 2012 by R.H. Edwards, P. Eng. of Capital Regional District, portraying a proposed watermain extension comprising of *approximately 270 meters of 50mm diameter Series 160 polyethylene pipe and other related appurtenances* to serve existing and future development in the Cedar Lane Local Service Area on Saltspring Island, BC, and submitted in accordance with Section 7 of the **Drinking Water Protection Act** have been reviewed and proposed construction, alteration or extension may be commenced in accordance with the approved plans and the terms and conditions contained in the letter of transmittal.

This document certifies that the plans and specifications for the proposed works have been reviewed pursuant to the current "Guidelines for the Approval of Water Supply Systems" issued by the Vancouver Island Health Authority and that the plans and specifications meet the protection requirements outlined in the Guidelines.

*The standards of structural integrity and safety of the works have not been considered and are not the subject of this Permit. This document grants authorization under Section 7 of the **Drinking Water Protection Act** only, and does not constitute permission or consent under any other Act or authority.*

MAR - 1 2012

Date Issued

Murray M. Sexton, P. Eng.
Public Health Engineer

cc: Erwin Dyck, Environmental Health Officer, Vancouver Island Health Authority, Gateway Office

VANCOUVER ISLAND health authority

HEALTH PROTECTION

PERMIT

to OPERATE

A WATER SUPPLY SYSTEM

Water System Name:	**CEDAR LANE WATER SYSTEM**
Premises Number:	6040948
Premises Address:	Mansell Road Salt Spring Island, BC V0S 1E0
Water System Owner:	Capital Regional District

Capital Regional District is hereby permitted to operate the above potable water supply system and is required to operate this system in accordance with the Drinking Water Protection Act and in accordance with the conditions set out in this operating permit and conditions established as part of any construction permit.

The water supply system for which this operating permit applies is generally described as:

Service Delivery Area:	Cedar Lane Waterworks District
Source Water:	Well #1 - West of 145 Mansell Road & Well #5 - 400 Feet North of 141 Cedar Lane Road
Water Treatment methods are:	UV & Chlorination
Water Disinfection methods are:	UV & Chlorination
Number of Connections	15-300 Connections - DWC

Christopher Laughlin, C.P.H.I. (C)
Registered Environmental Health Officer

Date: June 10, 2010

Issued By: _____
Environmental Health Officer

This permit must be displayed in a conspicuous place and is not transferable

Place Decal Here

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Facility Classification

This is to certify that

Cedar Lane Water System

has been classified by the Environmental Operators Certification Program in accordance with the guidelines established with the Association of Boards of Certification as a

Small Water System

Dated at Burnaby, BC on February 7, 2012

Secretary - Certification Board

President - Certification Board

Facility No. 1380

eocp

This certificate must hold the EOCP embossed seal.
Member of the Association of Boards of Certification
A society incorporated under the Society Act, S.B.C. S-28724


Water Treatment &
Distribution Upgrade
Cedar Lane Water, Salt Spring Island
The upgrade of the Cedar Lane Water System was funded through contributions from the BC Community Water Improvement Program.
BRITISH COLUMBIA
The Best Place on Earth
CRD
Making a difference...together

Making a difference...together

Environmental Services
625 Fisgard Street, PO Box 1000
Victoria, BC, Canada V8W 2S6

T: 250.360.3078
F: 250.360.3079
www.crd.bc.ca

FILE COPY

August 18, 2009

File:

Mr. John Spencer, PEng
Health Protection and Environmental Services
Vancouver Island Health Authority
3rd floor, 6475 Metral Drive
Nanaimo, BC V9T 2L9

Dear Mr. Spencer:

RE: SALT SPRING ISLAND – CEDARLANE WATER SYSTEM
REQUEST FOR LIFTING OF "BOIL WATER" ADVISORY

Please find enclosed two sets of drawings, 26-D206-1 to 3, relating to the Cedarlane water utility on Salt Spring Island, which became a Capital Regional District (CRD) owned and operated utility in 2007, as well as water quality data relating to the utility, subsequent to the 2008/2009 improvements to the treatment processes.

The following is a brief description of the Cedarlane water system, its improvements and operation subsequent to these improvements.

The source of water for the utility is groundwater; there are two wells that presently supply the utility. These wells have seasonal fluctuation in their capacities and are under the influence of adjacent development. The utility is a 37-lot subdivision that uses the two sources of wells #1 and #5, plus a 12,000 gallon balancing storage reservoir to provide domestic water to its users. Due to periodic coliform counts being recorded in the distribution system, the Cedarlane water system has been under a long standing Vancouver Island Health Authority (VIHA) "Boil Water" advisory. In 2005, the Province approved a Community Water Improvement Grant to upgrade the water treatment and distribution partners of the Cedarlane system. The CRD has undertaken some of these system upgrades in order to safeguard the system against the water quality issues that had resulted in the "Boil Water" advisory being issued.

In 2008 and 2009, the CRD constructed new water treatment and distribution facilities associated with wells #1 and #5.

Well #1 supplies water directly to the distribution system; metered water is pumped from source through a filter before undergoing primary disinfection via ultraviolet (UV) disinfection. The water subsequently receives a metered application of chlorine, as secondary disinfection, to produce a measurable residual within the distribution system. The treated water is discharged into the distribution system at a rate of 1-3 lgpm, when available and required. The water will meet demand in the immediate vicinity of well #1 unless system demand is low, in which case the flow can go to the 12,000 gallon balancing storage reservoir to assist in its recharge. If demand is high then make-up water is supplied from reservoir storage.

Drawing 26-D206-3 has a site plan layout of well #1 and its associated treatment facility, as well as showing sections within the treatment facility and highlighting the major components.

Well #5 is the major source of water for the utility, with a seasonal capacity of up to 3-5 lpgm. The water is pumped from source through the new treatment facility adjacent to the 12,000 gallon balancing storage reservoir. Similar to the setup at well #1, well #5's flow is metered and filtered before receiving primary disinfection through UV, as well as a metered application of chlorine to achieve a measurable residual, the water is then fed into the top of the 12,000 gallon balancing storage reservoir.

The two well pumps operate based upon level probes in the 12,000 gallon balancing storage reservoir, which start and stop operation at the well head; both wells have low level shut-off switches to prevent over-pumping of the limited groundwater resources.

The primary source of water for the utility under normal/high demand conditions is the balancing storage reservoir, which is the source of water for the pitless pump (a type of in-line booster pump) and constant pressure system that boost the pressure from the balancing storage reservoir to meet the varying system demands. The system can maintain a constant discharge pressure at the facility of 40-45 psi with flows that range from less than 1 to greater than 60 lgpm, thus providing adequate flows and pressures throughout the utility under varying conditions.

There is a recirculating pump and online chlorine analyzer in the treatment building to constantly monitor and adjust, if required, the chlorine level in water coming from the 12,000 balancing storage reservoir. The relief return valve located in the building allows for surplus capacity from well #1 to help recharge the balancing storage reservoir under conditions of very low system demand.

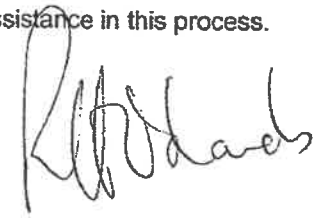
The upgrades completed at wells #1 and #5 with their associated treatment facilities have significantly improved the water quality within the Cedarlane utility. Attached are records from 2009, of water quality monitoring since completion of these upgrades.

Please review the enclosed attachments, the water quality records and drawings 26-D206-1 to 3 in conjunction with the system operation explanation. If you have any questions or issues please contact the writer at 250-360-3098 or via email at redwards@crd.bc.ca.

Upon review of this documentation, if satisfactory to VIHA, please advise if the "Boil Water" advisory can be lifted for the Cedarlane water system.

Thank you for your assistance in this process.

Yours very truly,



R.H. Edwards, PEng
Design Engineer
Engineering Services Division
Environmental Services Department

RHE/jt
Enclosures

cc: Ted Robbins, Acting Senior Manager, Operations and Local Services, CRD
Colwyn Sunderland, Local Services Engineering Coordinator, CRD
Mark Harper, Manager, Saanich Peninsula and Gulf Islands Operations, CRD
Denis Perreault, Wastewater Treatment Supervisor, CRD
Ron Stepaniuk, NSSWWD

C.R.D. Cedar Lane 04Aug09 1:59p
W84957
c/o CRD SPWWTP FWS
9055 Mainwaring Rd. water
North Saanich, BC 1
V8L 5Z1
TEL: Arrival temp.: 12.0C
FAX: attn:
D.Perreault/L.Hutcheson
group

WATER DISTRICT SCREEN

Sample	Date	Time	lactose fermentors TPC*	Coliforms Total	Fecal	E.coli	Total Aeromonas	Sulfur Reducing/ Iron Bacteria	Yeast/Fungi
Kangro Rd.	04Aug09	08:45a	ND	ND	ND	ND	ND	ND / ND	ND / ND
			1.69						

* all counts are colony forming units per milli-litre

ND = none detected
TPC = total plate count- spread plate method - 35C/48hr TGEA
FDA/BAM 8th ed, 1995 + Revision A, 1998
E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984;
J.Clin.Micro.,
J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr.
Microbiologist

SAMPLE	DATE	TIME	Turbidity (NTU)
Kangro Rd.	04Aug09	08:45a	0.820
Lab Blank			ND
So			0.015
REF. VALUE			0.500
STD ñ 2SD			0.506 ñ 0.051

SD = standard deviation
STD = secondary standard calibrated to primary standard reference material
So = standard deviation at żero analyte concentration; method detection limit
is generally considered to be 3x So value
ND = none detected n/a = not applicable

R. Bilodeau
Analytical Chemist

H. Hartmann
Sr.Analytical

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 20Jul09 1:39p No. W84751
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 14.0C
attn: D.Perreault/L.Hutcheson

Site Code	Date	Time	CFU/100 mL TC	NC	CFU/100 mL FC	NC	CFU/100 mL E.coli
East End	20Jul09	09:30a	0	0	0	0	0
East End	DUP	09:30a	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** July 20 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir			
7	Distribution – Cedar Lane water main east end	✓	0.28	0.26
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Grant Tambaline

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 15Jul09 2:04p No. W84487
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 15.0C
ATTN: D. Perreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
Cedar Lane East S.P.	15Jul09	08:35a	0	118	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

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Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 23Jun09 12:35p No. W8431a
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 5.0C
Attn: D. Perreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
East S.P.	23Jun09	08:30a	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
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CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** June 24 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir			
7	Distribution – Cedar Lane water main east end	✓	0.20	0.17
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Ryan Wellington

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** June 8 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir			
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd	✓	0.42	0.39

COMMENTS:

Re-Sample. Code #1

SAMPLED BY: Grant Tamboline.

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code
C.R.D. Cedar Lane
C/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 04Jun09 12:14p No. W84006
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 11.0C
Attn: D. Perreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 ml E.coli
Well #5 Treated	04Jun09	08:50a	0	0	0	0	0

TC = total colifora bacteria
FC = fecal colifora bacteria
NC = non-colifora bacteria

WATER DISTRICT SCREEN

Sample	Date	Time	lactose fermentors	Coliforms Total	Fecal	E.coli	Total Aeromonas	Sulfur Reducing/ Iron Bacteria	Yeast/Fungi	TPC†
Well #5 Treated	04Jun09	08:50a	ND	ND	ND	ND	ND	ND / ND	ND / ND	0.20

† all counts are colony forming units per milli-litre

ND = none detected
TPC = total plate count- spread plate method - 35C/48hr TGEA
FDA/BAM 8th ed, 1995 + Revision A, 1998
E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Syste.Bact.

- see following page for chemistry results -

D. Ashton
Microbiologist

K. Riggs
Sr. Microbiologist

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9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 04Jun09 12:14p No. W84006 pg2
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 11.0C
Attn: D.Perreault/L.Hutcheson

SAMPLE	DATE	TIME	Cl⁻ (mg/L)	E.C. (uS/cm)	F⁻ (ug/L)	Na (mg/L)	TDS (mg/L)
Well #5 Treated	04Jun09	08:50a	39.9	540	99.0	29.8	313
Lab Blank			ND	ND	ND	ND	ND
S_o			0.015	0.300	7.00	0.300	0.700
REF. VALUE			10.0	1410	100	10.0	200
STD ± 2SD			9.86 ± 0.960	1400 ± 92.7	101 ± 7.54	10.0 ± 0.954	201 ± 15.7

SAMPLE	DATE	TIME	Turbidity (NTU)
Well #5 Treated	04Jun09	08:50a	0.081
Lab Blank			ND
S_o			0.015
REF. VALUE			0.500
STD ± 2SD			0.505 ± 0.051

SD = standard deviation
STD = secondary standard calibrated to primary standard reference material
S_o = standard deviation at zero analyte concentration; method detection limit is generally considered to be 3x S_o value
ND = none detected n/a = not applicable

R. Bilodeau
Analytical Chemist

H. Hartmann
Sr.Analytical Chemist

CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** June 4 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir	✓	0.53	0.51
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Grant Tambolino.

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
Email: group

Date 21May09 9:16a No. W83747 pg2
Source FWS
Type of Sample water
No. of Samples 1
Comments Arrival temp.: 7.0C
attn: D.Perreault/L.Hutcheson

Sample: #5 Well Treated 20May09 08:45a

ELEMENTS		SAMPLE	UNITS	Maximum Limits Permissible In Drinking Water*
1) Aluminium	Al	<0.065	mg/L	no limit listed
2) Antimony	Sb	<0.500	ug/L	6.00 ug/L
3) Arsenic	As	<0.500	ug/L	10.0 ug/L
4) Barium	Ba	0.009	mg/L	1.00 mg/L
5) Beryllium	Be	<0.003	mg/L	no limit listed
6) Boron	B	0.365	mg/L	5.00 mg/L
7) Cadmium	Cd	<0.100	ug/L	5.00 ug/L
8) Calcium	Ca	53.1	mg/L	200 mg/L
9) Chromium	Cr	<0.010	mg/L	0.050 mg/L
10) Cobalt	Co	<0.020	mg/L	no limit listed
11) Copper	Cu	0.012	mg/L	1.00 mg/L
12) Gold	Au	<0.040	mg/L	no limit listed
13) Iron	Fe	0.092	mg/L	0.300 mg/L
14) Lanthanum	La	<0.020	mg/L	no limit listed
15) Lead	Pb	<0.500	ug/L	10.0 ug/L
16) Magnesium	Mg	10.0	mg/L	50.0 mg/L
17) Manganese	Mn	0.243	mg/L	0.050 mg/L
18) Mercury	Hg	<0.100	ug/L	1.00 ug/L
19) Molybdenum	Mo	<0.020	mg/L	no limit listed
20) Nickel	Ni	<0.050	mg/L	no limit listed
21) Phosphorus	P	<0.065	mg/L	no limit listed
22) Potassium	K	0.465	mg/L	no limit listed
23) Scandium	Sc	<0.050	mg/L	no limit listed
24) Selenium	Se	<0.500	ug/L	10.0 ug/L
25) Silicon	Si	5.42	mg/L	no limit listed
26) Silver	Ag	<0.010	mg/L	0.050 mg/L
27) Sodium	Na	155	mg/L	200 mg/L
28) Strontium	Sr	0.466	mg/L	no limit listed
29) Tin	Sn	<0.020	mg/L	no limit listed
30) Titanium	Ti	<0.010	mg/L	no limit listed
31) Tungsten	W	<0.050	mg/L	no limit listed
32) Vanadium	V	<0.010	mg/L	no limit listed
33) Zinc	Zn	0.029	mg/L	5.00 mg/L
Hardness (mg/L $CaCO_3$)		174	mg/L	150-300 mg/L = hard
pH		7.80	units	6.5 to 8.5

* As per Canadian or B.C. Health Act Safe Drinking Water Regulation BC Reg 230/92, & 390 Sch 120, 2001. Task Force of Canadian Council of Resource & Envir. Ministers Guidelines for Canadian Drinking Water Quality, 1996. Ammend. Health Canada (2006).

Comments:
Manganese: not considered to be toxic; high amounts of Manganese can cause staining of laundry, porcelain and plumbing fixtures; may produce an undesirable taste.

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R. Bilodeau
Analytical Chemist

H. Hartmann
Sr. Analytical Chemist

Clle. /Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
Email: group

Date 21May09 9:16a No. WB3747
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 7.0C
attn: D.Perreault/L.Hutcheson

SAMPLE	DATE	TIME	Alkalinity (mg/L)	NH_3-N (ug/L)	Cl^- (mg/L)	Colour (TCU)	E.C. (uS/cm)
#5 Well Treated	20May09	08:45a	196	ND	213	1.60	1190
Lab Blank			ND	ND	ND	ND	ND
S_o			0.100	0.254	0.015		0.300
REF. VALUE			20.0	100	100	5.00	1410
STD ± 2SD			20.3 ± 2.12	99.5 ± 7.50	101 ± 7.73	5.00 ± 0.532	1390 ± 96.2

SAMPLE	DATE	TIME	CORROSIVITY (I, @20C)	D.O.C. (mg/L)	F^- (ug/L)	NO_3-N (ug/L)	NO_2-N (ug/L)
#5 Well Treated	20May09	08:45a	0.430	15.1	213	70.7	ND
Lab Blank			ND	ND	ND	ND	ND
S_o				0.300	7.00	0.160	0.300
REF. VALUE				10.0	100	100	10.0
STD ± 2SD				9.94 ± 0.877	101 ± 7.62	99.3 ± 8.67	9.88 ± 0.901

SAMPLE	DATE	TIME	SO_4^{2-} (mg/L)	T.D.C. (mg/L)	TDS (mg/L)	Turbidity (NTU)	UVT (%)
#5 Well Treated	20May09	08:45a	18.1	17.1	688	ND	88.3
Lab Blank			ND	ND	ND	ND	ND
S_o			0.075	0.300	0.700	0.010	0.005
REF. VALUE			10.0	10.0	200	5.00	90.0
STD ± 2SD			10.2 ± 1.00	9.94 ± 0.776	202 ± 15.7	4.99 ± 0.382	89.0 ± 2.07

SD = standard deviation
STD = secondary standard calibrated to primary standard reference material
S_o = standard deviation at zero analyte concentration; method detection limit is generally considered to be 3x S_o value
ND = none detected n/a = not applicable

R. Bilodeau
Analytical Chemist

H. Hartmann
Sr.Analytical Chemist

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CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** May 20 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source – Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir	✓	0.53	0.44
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Grant Tamboline.

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** May 7 20 09

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1	✓	0.60	0.57
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir			
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Brent Sandberg

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 16Apr09 2:12p No. WB7226
Source FNS
Type of Sample water
No. of Samples 4

Comments Arrival temp.: 10.0C
Attn: D. Ferreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
1 Well #1 Source	16Apr09	08:47	0	0	0	0	0
2 Well #1 Fully Treat	16Apr09	08:47	0	0	0	0	0
3 Well #5 Source	16Apr09	09:05	0	2	0	0	0
4 Well #5 Fully Treat	16Apr09	09:07	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

WATER DISTRICT SCREEN

Sample	Date	Time	lactose fermentors	Coliforms Total	Fecal	E.coli	Total Aeromonas	Sulfur Reducing/ Iron Bacteria	Yeast/Funoi	TPC*
3 Well #5 Source	16Apr09	09:05	ND	ND	ND	ND	ND	ND / ND	ND / ND	12.0
4 Well #5 Fully Treat	16Apr09	09:07	0.02	ND	ND	ND	ND	ND / ND	ND / ND	10.0

* all counts are colony forming units per milli-litre

ND = none detected
TPC = total plate count-.spread plate method - 35C/48hr TGEA
FDA/BAM 8th ed, 1995 + Revision A, 1998
E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Syste.Bact.

- see following page for chemistry results -

D. Ashton
Microbiologist

M. Riggs
Sr. Microbiologist

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Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Y1

TEL:
FAX:
group

Date 16Apr09 2:12p
Source FWS
Type of Sample water
No. of Samples 4

No. W83226 pg?

Comments Arrival temp.: 10.0C
Attn: D. Perreault/L. Hutcheson

SAMPLE	DATE	TIME	Turbidity (NTU)
Well 85 Source	16Apr09	09:05	1.40
Well 85 Fully Treat	16Apr09	09:07	0.850
Lab Blank			ND
S_o			0.015
RTF. VALUE			5.00
STD ± 2SD			5.00 ± 0.327

SD = standard deviation
STD = secondary standard calibrated to primary standard reference material
S_o = standard deviation at zero analyte concentration; method detection limit is generally considered to be 3x S_o value
ND = none detected n/a = not applicable

R. Bilodeau
Analytical Chemist

H. Hartmann
Sr.Analytical Chemist

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CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** APRIL 16 2009

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source - Well #1	✓		
2	UV Treated – Well #1			
3	Fully Treated – Well #1	✓	0.30	0.22
4	Source – Well #5	✓		
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir	✓	0.68	0.59
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Bob Hewitt

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 01Apr09 1:23p No. W83019
Source FWS
Type of Sample water
No. of Samples 1
Comments Arrival temp.: 7.0C

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
Kangro Rd	01Apr09	09:30A	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich. BC
V8L 5Z1

TEL:
FAX:
group

Date 25Mar09 1:27p No. 002881
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 10.0C
Attn: D. Perreault / L.Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
Reservoir Treated	25Mar09	08:40A	0	.0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

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E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Syst.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

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CAPITAL REGIONAL DISTRICT
Environmental Services

RECORD OF WATER SAMPLING AND TESTING

UTILITY: Cedar Lane Water System **DATE:** Mar. 25 20 09

No.	Location Identifications	Sample to MB Research	Total Chlorine	Free Chlorine
1	Source – Well #1			
2	UV Treated – Well #1			
3	Fully Treated – Well #1			
4	Source – Well #5			
5	UV Treated – Well #5			
6	Fully Treated – Well #5 – at Reservoir	✓	0.66	0.62
7	Distribution – Cedar Lane water main east end			
8	Distribution – Kangro Rd			

COMMENTS:

SAMPLED BY: Ryan Wellington N.S.S. Waterworks

Copy to Operations Manager within 24 hours of completion of testing.

Denis Perreault

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 04Mar09 2:01p No. WB2578
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 13.0C
Attn: D.Perreault/L.Hutchesson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC
Kangru Rd	04Mar09	08:50A	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

D. Ashton
Microbiologist

W. Kwan
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code
S.R.D. Cedar Lane
c/o CRD SPWWTP
9059 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 24Feb09 12:59p No. W8244?
Source FWS
Type of Sample water
No. of Samples 1

Comments Arrival temp.: 3.0C
Attn: D. Perreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E coli
Well #5 (Treated)	24Feb09	08:30	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed. 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, 608E 1984; J.Clin.Micro. J.Intern.Syste.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 18Feb09 1:05p No. 002365
Source FWS
Type of Sample water
No. of Samples 7

Comments Arrival temp.: 8.0C
Attn: D. Perreault/L. Hutcheson

	Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 mL E.coli
1	Well #1 Raw	18Feb09	08:30a	0	0	0	0	0
	Well #1 Raw	DUP	08:30a	0	0	0	0	0
2	Well #1 Treated	18Feb09	08:30a	0	0	0	0	0
3	Well #1 Post UV	18Feb09	08:30a	0	0	0	0	0
4	Well #5 Raw	18Feb09	08:50a	0	18	0	0	0
5	Well #5 Treated	18Feb09	08:50a	0	0	0	0	0
6	Well #5 Post UV	18Feb09	08:50a	0	0	0	0	0
7	Main Pumphse Outlet	18Feb09	08:50a	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Syste.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code

C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
groue

Date 11Feb09 12:39p No. HB2745
Source FWS
Type of Sample water
No. of Samples 9

Comments Arrival temp.: 5.0C
Attn: D. Perreault/L. Hutchesor

Site Code	Date	Time	CFU/100 ml TC	NC	CFU/100 ml FC	NC	CFU/100 ml. E.coli
1 Well #1 Raw	11Feb09	09:20a	0	2	0	0	0
Well #1 Raw	DUP	09:20a	0	2	0	0	0
2 Well #1 Treated	11Feb09	09:10a	0	0	0	0	0
3 Well #1 Post UV	11Feb09	09:15a	0	0	0	0	0
4 Well #5 Raw	11Feb09	09:45a	0	36	0	0	0
5 Well #5 Treated	11Feb09	09:55a	0	0	0	0	0
6 Well #5 Post UV	11Feb09	09:50a	0	0	0	0	0
7 Reservoir Treated	11Feb09	10:00a	0	0	0	0	0
8 211 Cedar Lane Hydrn	11Feb09	10:50a	0	0	0	0	0
9 Kangro Rd.	11Feb09	11:05a	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

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Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1994; J.Clin.Micro , J.Intern.Systm.Bact.

D. Ashton
Microbiologist

W. Riggs
Sr. Microbiologist

MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 04Feb09 1:05p No. W0217
Source FWS
Type of Sample water
No. of Samples 7

Comments Arrival temp.: 5.0C
Attn: D. Perreault/L. Hutcheson

Site Code	Date	Time	CFU/100 ml TC	CFU/100 ml NC	CFU/100 ml FC	CFU/100 ml NC	CFU/100 mL E.coli
1 Main Pumphse Outlet	04Feb09	08:45A	0	0	0	0	0
2 Well #1 RAW	04Feb09	08:20A	0	0	0	0	0
3 Well #1 Treated	04Feb09	08:20A	0	0	0	0	0
Well #1 Treated	DUP	08:20A	0	0	0	0	0
4 Well #1 Post UV	04Feb09	08:20A	0	0	0	0	0
5 Well #5 RAW	04Feb09	08:45A	0	0	0	0	0
6 Well #5 Treated	04Feb09	08:45A	0	0	0	0	0
7 Well #5 Post UV	04Feb09	08:45A	0	0	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

Results may be adversely affected if samples are submitted to the laboratory more than 24 to 30 hours after collection.

E. coli = Escherichia coli, FDA/BAM 8th ed. 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro.,
J.Intern.Syst.Bact.

D. Ashton
Microbiologist

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MB LABS LTD.
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443

Client/Code
C.R.D. Cedar Lane
c/o CRD SPWWTP
9055 Mainwaring Rd.
North Saanich, BC
V8L 5Z1

TEL:
FAX:
group

Date 29Jan09 2:13p No. W82086
Source FWS
Type of Sample water
No. of Samples 7
Comments Arrival temp.: 9.0C
Attn: D.Perreault/L.Hutcheson

	Site Code	Date	Time	CFU/100 ml TC	CFU/100 ml NC	CFU/100 ml FC	CFU/100 ml NC	CFU/100 mL E.coli
1	Well #1 Raw	29Jan09	08:50a	22	168	0	0	0
2	Well #1 Treated	29Jan09	08:55a	0	0	0	0	0
3	Well #1 Post UV	29Jan09	08:55a	0	0	0	0	0
4	Well #5 Raw	29Jan09	09:15a	0	12	0	0	0
5	Well #5 Treated	29Jan09	09:15a	0	0	0	0	0
6	Well #5 Post UV	29Jan09	09:15a	0	?	0	0	0
7	Main Pumphse Outlet	29Jan09	09:15a	0	6	0	0	0
	Main Pumphse Outlet	DUP	09:15a	0	8	0	0	0

TC = total coliform bacteria
FC = fecal coliform bacteria
NC = non-coliform bacteria

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E. coli = Escherichia coli, FDA/BAM 8th ed, 1995 + Revision A, 1998
Bergy's Manual of Systematic Bacteriology vol 1, AOAC 1984; J.Clin.Micro., J.Intern.Systm.Bact.

D. Ashton
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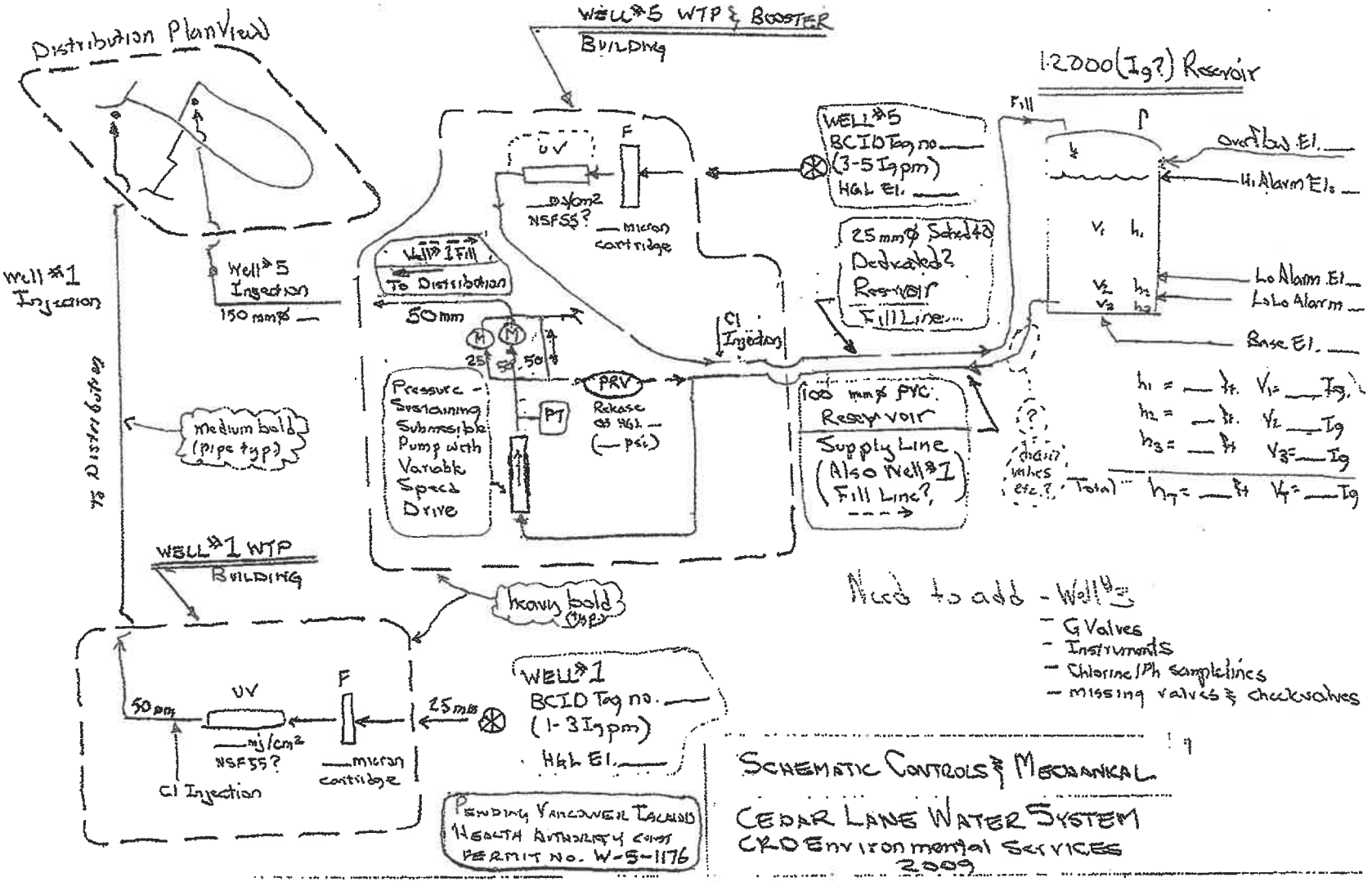
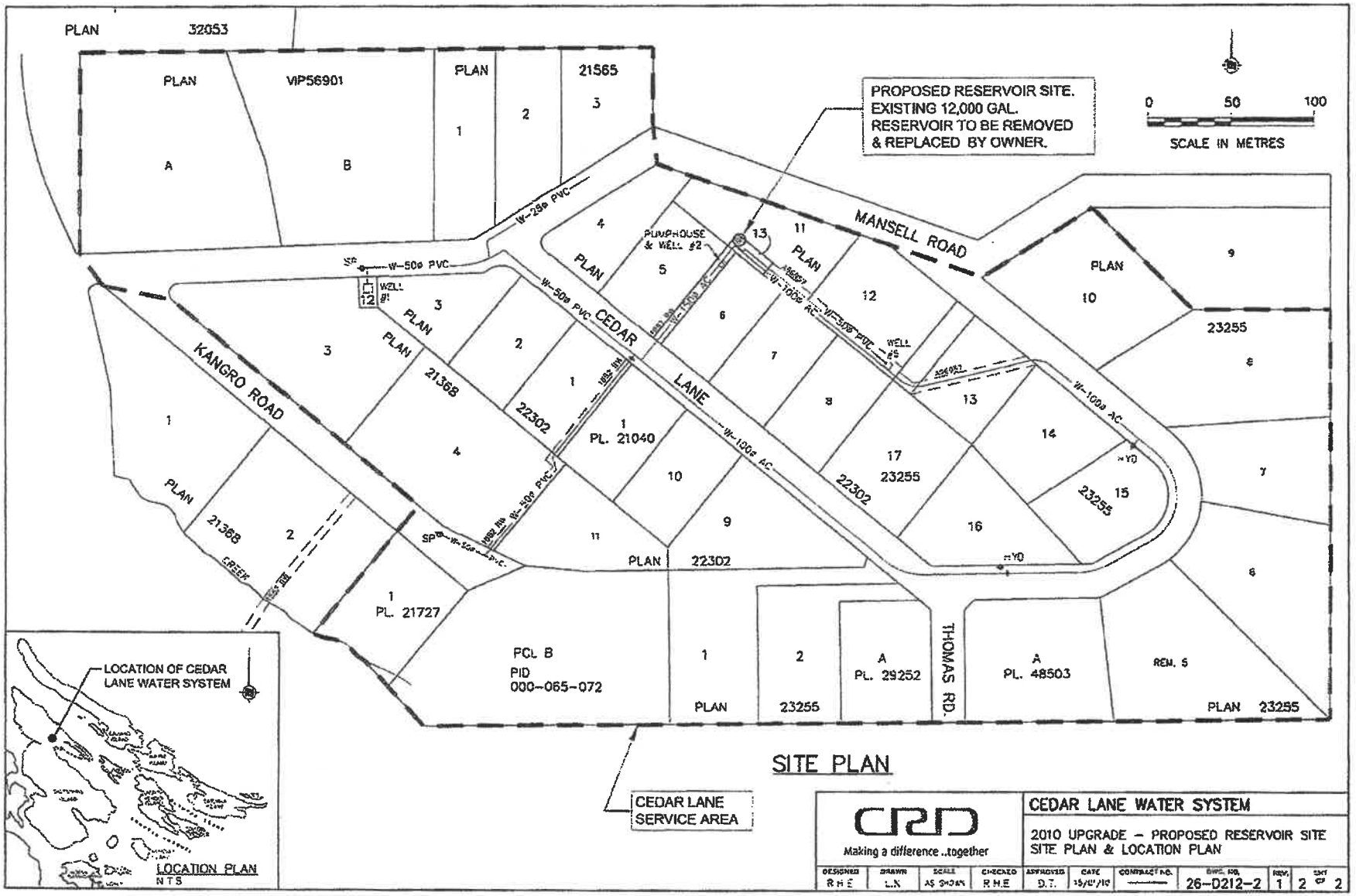
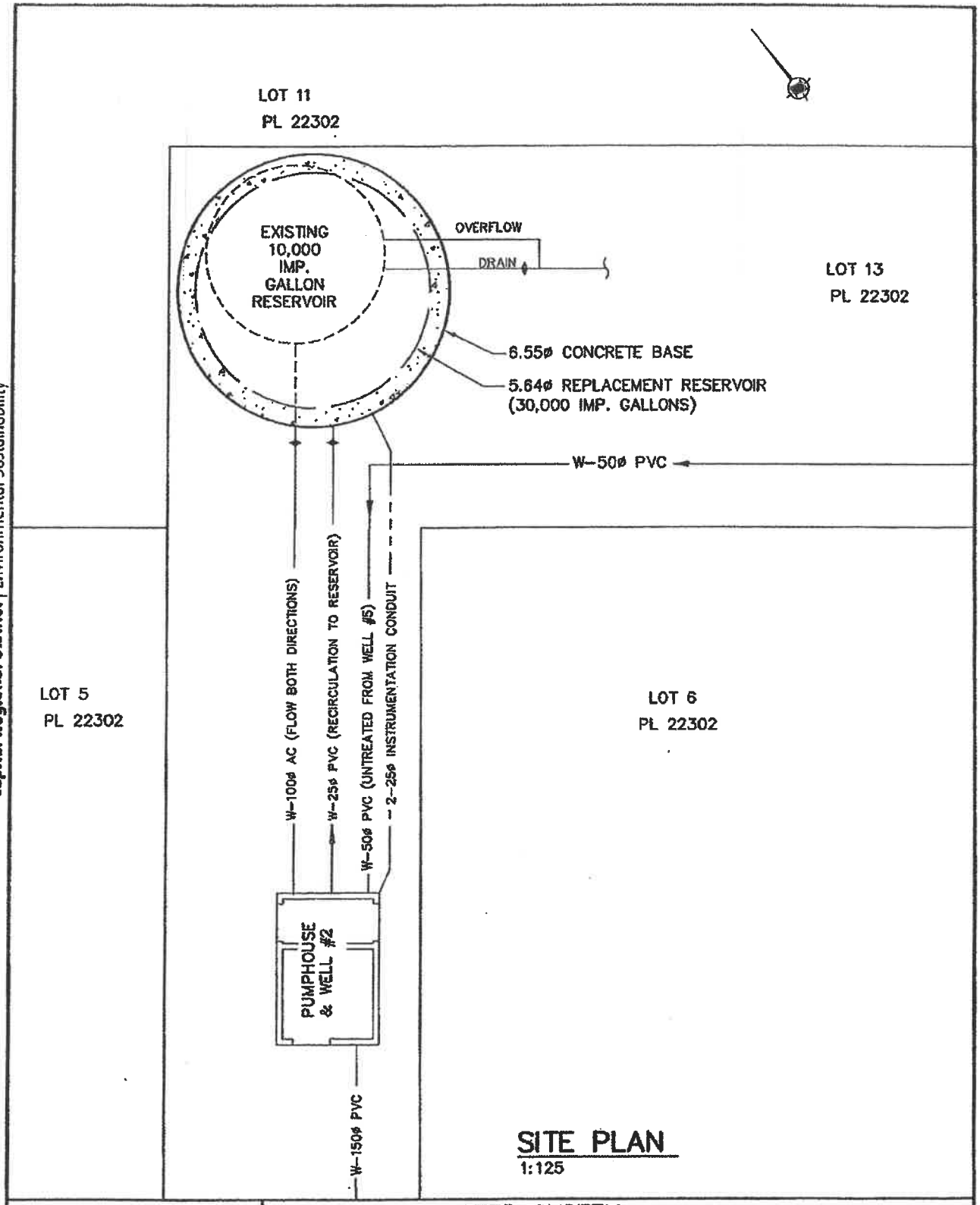
ANALYTICAL & TESTING SERVICES P.O. BOX 2103, SIDNEY, B.C. V8L 3X6 TEL: (250) 656-1334 FAX: 656-0443


Distribution Plan View
WELL #5 WTP & BOOSTER BUILDING
1-2000 (Ig?) Reservoir
WELL #5 BCID Tag no.
(3-5 Igpm)
HGL El.
UV
F
mJ/cm2
NSF55?
micron cartridge
25 mm Ø Schedule 40 Dedicated Reservoir Fill Line...
Well #5 Ingestion
150 mm Ø
Well #1 Fill
To Distribution
50 mm
Cl Injection
Pressure Sustaining Submersible Pump with Variable Speed Drive
PRV
Release at HGL
(— psi)
PT
100 mm Ø PVC Reservoir Supply Line (Also Well #1 Fill Line?)
drain valves etc.?
Fill
overflow El.
Hi Alarm El.
Lo Alarm El.
LoLo Alarm
Base El.
Total
medium bold (pipe typ.)
to Distribution
heavy bold (typ.)
WELL #1 WTP BUILDING
WELL #1 BCID Tag no.
(1-3 Igpm)
HGL El.
50 mm
25 mm
Cl Injection
PENDING VANCOUVER COASTAL HEALTH AUTHORITY CONST. PERMIT NO. W-5-1176
Need to add - Well #s
- G Valves
- Instruments
- Chlorine/Ph sampletines
- missing valves & checkvalves
SCHEMATIC CONTROLS & MECHANICAL
CEDAR LANE WATER SYSTEM
CRO Environmental Services
2009


PLAN 32053
PLAN A
PLAN VIP56901 B
PLAN 1
2
21565 3
PROPOSED RESERVOIR SITE.
EXISTING 12,000 GAL.
RESERVOIR TO BE REMOVED
& REPLACED BY OWNER.
0 50 100
SCALE IN METRES
MANSELL ROAD
W-25ø PVC
W-50ø PVC
PUMPHOUSE & WELL #2
WELL #1
WELL #3
CEDAR LANE
W-100ø AC
KANGRO ROAD
PLAN 21368
PLAN 22302
PL. 21040
PLAN 23255
PLAN 21727
PCL B
PID 000-065-072
PL. 29252
PL. 48503
THOMAS RD.
REM. 5
CREEK
LOCATION OF CEDAR LANE WATER SYSTEM
LOCATION PLAN
NTS
SITE PLAN
CEDAR LANE SERVICE AREA
Making a difference ..together
CEDAR LANE WATER SYSTEM
2010 UPGRADE – PROPOSED RESERVOIR SITE
SITE PLAN & LOCATION PLAN
DESIGNED R.H.E
DRAWN L.N.
CHECKED R.H.E
APPROVED D.T.
26-D212-2
REV. 1
SHT 2 OF 2



Capital Regional District | Environmental Sustainability

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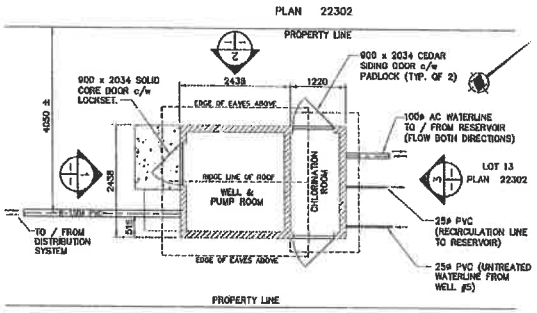
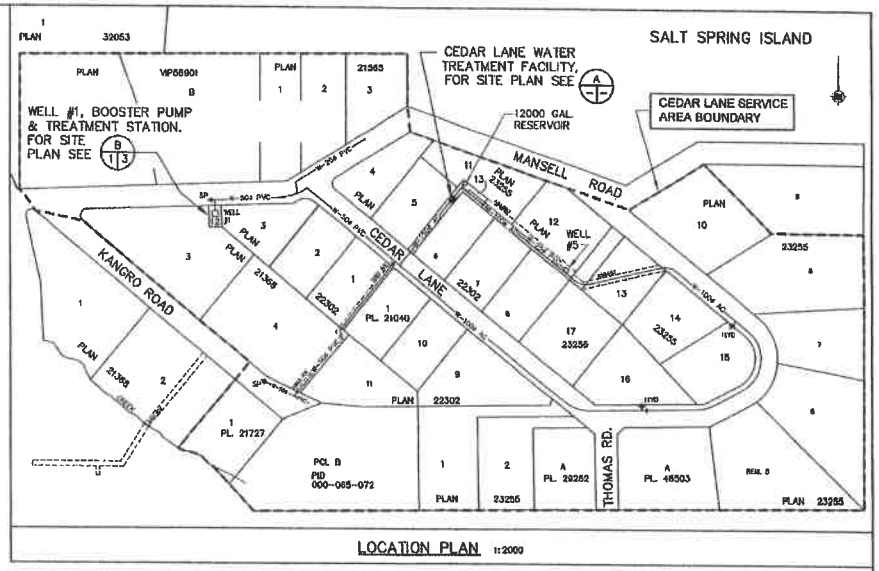
CEDAR LANE WATER SYSTEM

PROPOSED RESERVOIR UPGRADE
SITE PLAN

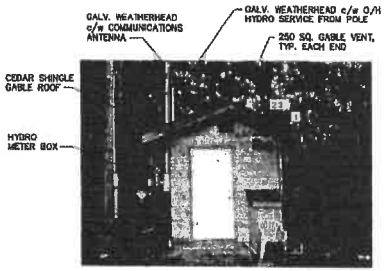
DESIGNED	DRAWN	SCALE	CHECKED	APPROVED	DATE	DWG. NO.	REV.	SHT OF
R.H.E.	L.N.	AS SHOWN	R.H.E.	R.H.E.	18/02/10	26-D220-1		1 OF 1



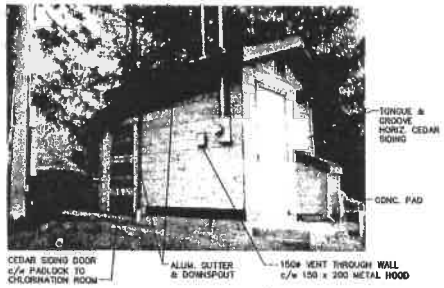
TREATMENT FACILITY SITE PLAN (A)
1:50



LOCATION PLAN 1:2000



SOUTH ELEVATION (1)
APPROX. 1:50



WEST ELEVATION (2)
APPROX. 1:50

NORTH ELEVATION (3)
APPROX. 1:50

SEAL	BY	DATE	No.	REVISION	ENG.	No.	DATE	ISSUE
						1	10/08/09	AS CONSTRUCTED - RECORD DRAWING

CRD
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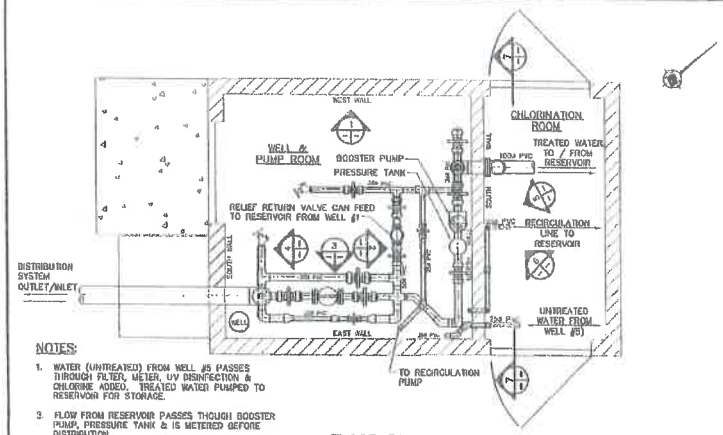
Capital Regional District Environmental Services

DESIGNED	R.H.E.	SURVEYED	
DRAWN	L.H./M.M.	DATE	20/03/09
SCALE HORIZONTAL	AS SHOWN	CHECKED	R.H.E.
SCALE VERTICAL	AS SHOWN	APPROVED	D.T.

CEDAR LANE WATER SYSTEM

WATER TREATMENT PLANT
LOCATION PLAN, SITE PLAN & BUILDING ELEVATIONS

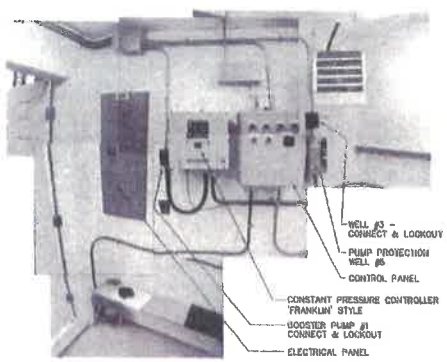
CONTRACT NUMBER _____ DRAWING NUMBER 26-D206-1 ISSUE 1 SHT. No. 1 OF 3



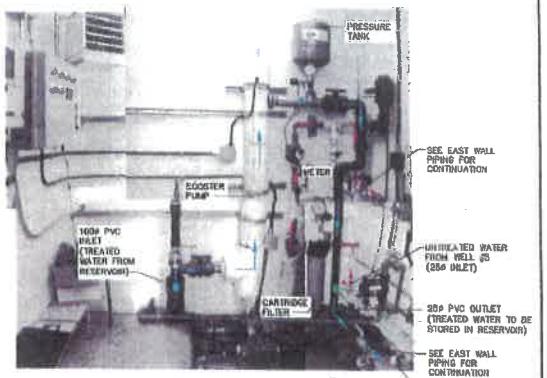
NOTES:

1. WATER (UNTREATED) FROM WELL #5 PASSES THROUGH FILTER, METER, UV DISINFECTION & CHLORINE ADDED. TREATED WATER PUMPED TO RESERVOIR FOR STORAGE.
3. FLOW FROM RESERVOIR PASSES THOUGH BOOSTER PUMP, PRESSURE TANK & IS METERED BEFORE DISTRIBUTION.

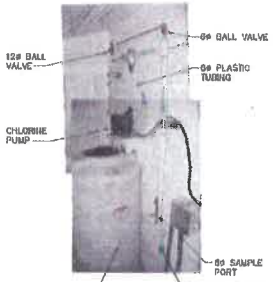
FLOOR PLAN
1:20



WEST WALL PIPING ELEVATION (1)
APPROX. 1:20

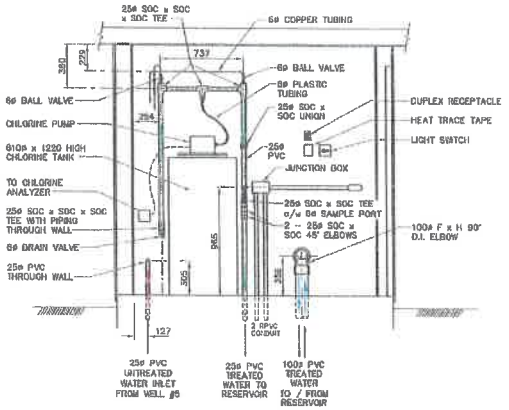


NORTH WALL PIPING ELEVATION (2)
APPROX. 1:20

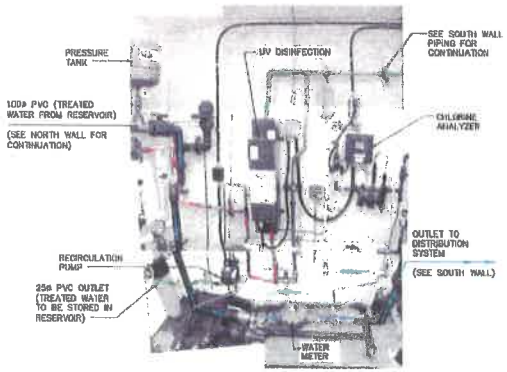


SOUTH WALL PIPING ELEVATION (5)
N.T.S.

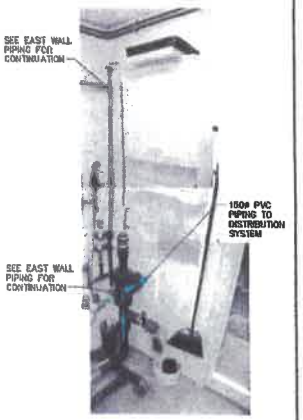
SOUTH WALL ELECTRICAL ELEV. (6)
N.T.S.



SOUTH WALL ELEVATION (7)
1:20



EAST WALL PIPING ELEVATION (3)
APPROX. 1:20



SOUTH WALL PIPING ELEVATION (PARTIAL DOOR SHOWN) (4)
APPROX. 1:20

WELL & PUMP ROOM WALL ELEVATION PHOTOS

CHLORINATION ROOM WALL ELEVATION PHOTOS & DRAWING

LEGEND

- UNTREATED WATER FLOW (FROM WELL #5)
- TREATED WATER FLOW TO RECIRCULATION RESERVOIR FOR STORAGE
- TREATED WATER FLOW FROM RESERVOIR, THROUGH WATER METER AND THEN TO DISTRIBUTION SYSTEM

SEAL	BY	DATE	No	REVISION	Rev.	No.	DATE	ISSUE
						1	10/08/09	AS CONSTRUCTED - RECORD DRAWING

CRD
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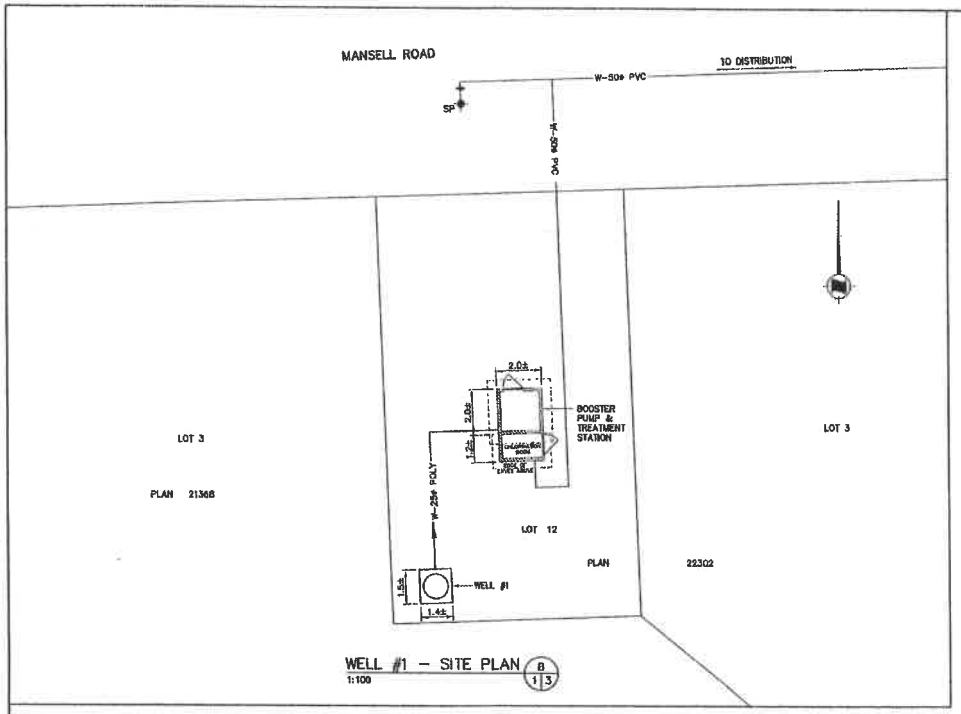
Capital Regional District Environmental Services

DESIGNED	R.H.E.	SURVEYED	
DRAWN	L.H./M.M.	DATE	20/03/09
SCALE HORIZONTAL	AS SHOWN	CHECKED	R.H.E.
SCALE VERTICAL	AS SHOWN	APPROVED	D.T.

CEDAR LANE WATER SYSTEM

WATER TREATMENT PLANT
FLOOR PLAN & WALL PIPING ELEVATIONS

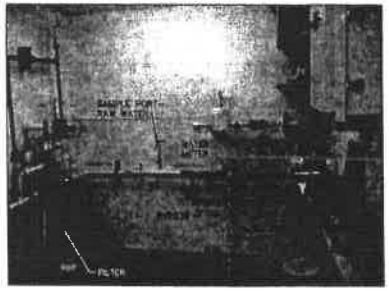
CONTRACT NUMBER | DRAWING NUMBER 26-0206-2 | SHEET No. 1 | SUPP. No. OF 2 | 3



WELL #1 – SITE PLAN (B 1|3)
1:100

EAST ELEVATION
APPROX. 1:50

NORTH ELEVATION
N.T.S.



SOUTH ELEVATION
APPROX. 1:50

LEGEND
- UNTREATED WATER FLOW
- TREATED WATER FLOW

	BY	DATE	No.	REVISION	ENG.	No.	DATE	ISSUE
SEAL						1	10/08/09	AS CONSTRUCTED – RECORD DRAWING

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Capital Regional District | Environmental Services

DESIGNED	R.H.E.	SURVEYED	———
DRAWN	L.N.	DATE	28/07/09
SCALE HORIZONTAL	AS SHOWN	CHECKED	R.H.E.
SCALE VERTICAL	AS SHOWN	APPROVED	D.T.

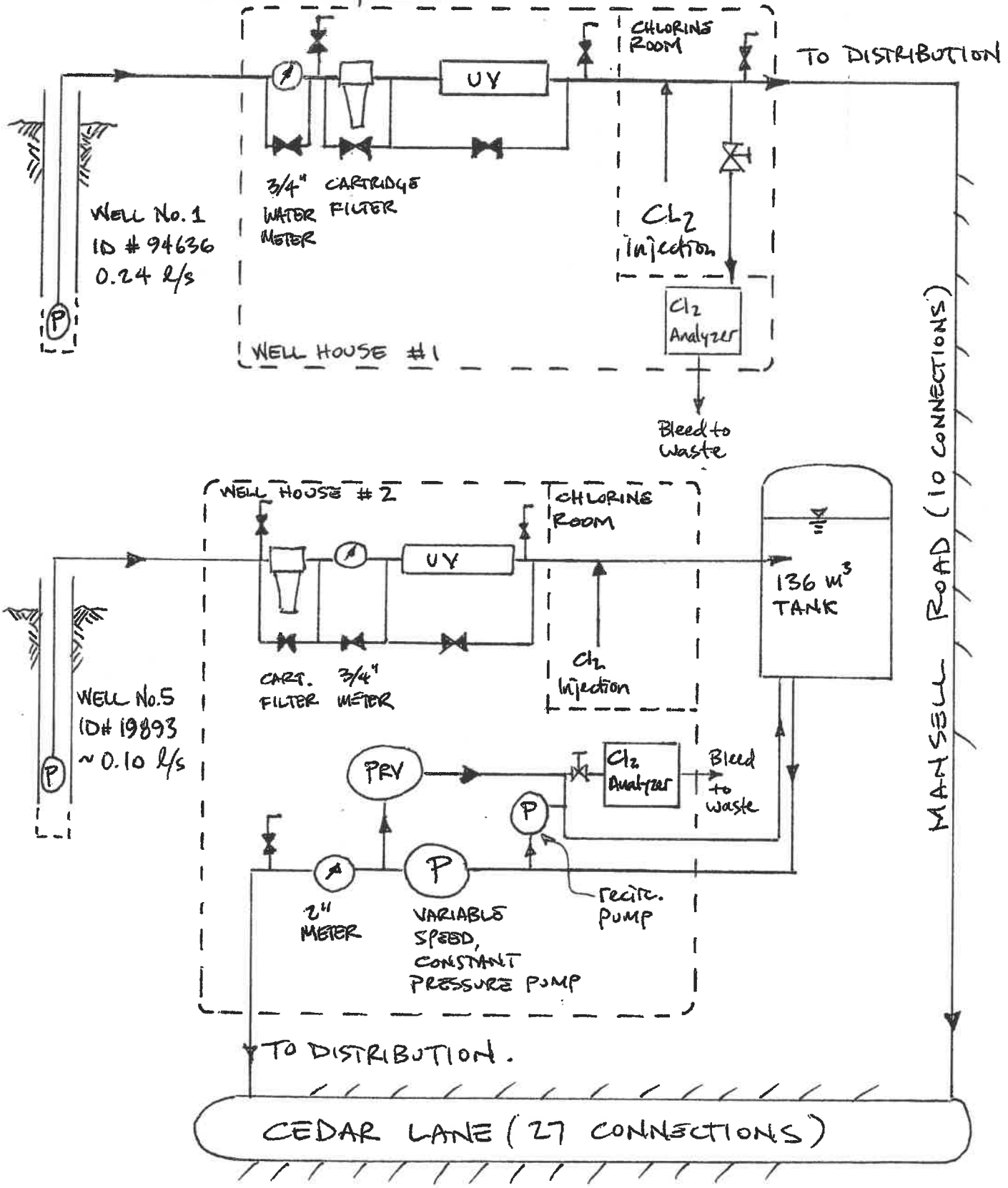
CEDAR LANE WATER SYSTEM

WELL #1
LOCATION PLAN, SITE PLAN & BUILDING ELEVATIONS

CONTRACT NUMBER ——— DRAWING NUMBER 26-0208-3 ISSUE 1 3 REVT. No. OF 3

CEDAR LANE WATER SYSTEM
SCHEMATIC DIAGRAM

DEC 2011



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CRD Home > Water > Conservation > Water Conservation

Water Conservation

CRD Parks & Environmental Services encourages the wise and efficient use of water through education, water saving technologies, policy measures and research.

Greater Victoria enjoys some of the best quality drinking water in the world at a reasonable cost, but maintaining this critical resource requires each of us to use water with care.

Update on Rebate Programs

The rebates ended December 31, 2009.
But the savings go on forever.

Over the past fifteen years the CRD has introduced water conservation rebates to encourage the purchase of appliances and fixtures that use innovative water-saving technology.

These days, the use of such fixtures and appliances has become standard. Provincial codes now require all toilet installations in new residential buidlings and renovation projects to use 4.8 litres of water or less per flush and most appliance stores now feature high efficiency washing machines as industry standard. Clearly, incentives are no longer necessary and the rebate programs for irrigation systems, low-flow toilets and high efficiency washing machines have ended, effective December 31, 2009.

Thank you for participating in the program and making it a success.

Benefits of Water Conservation

- Lower water and energy bills by reducing your metered usage.
- Enhanced drinking water quality by maintaining higher levels in Sooke Lake.
- Less environmental impact by deferring the need to supply water from new sources and by reducing the energy and materials required to treat and deliver water.

Top 5 Ways to Save Water at Home

1. Replace your old bathroom fixtures to more efficient models.
2. Regularly check your home for **leaks.**
3. Replace your old clothes washing machine for a high-efficiency model.
4. Let your lawn go golden and be **water wise outside.**
5. Never run a dishwasher without a full load. **Read more water saving tips.**

Watering Schedule

Stage 1 of the Water Conservation Bylaw Use Schedule is in effect May 1 through September 30 each and every year. The CRD appreciates your water saving efforts and would like to thank all residents in the CRD for your continued support.

Community Events

Please check back for updates on community events.

Learn More

- **Workshops**
- **Fact Sheets**

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Welcome to Cedar Lane Drinking Water

The Cedar Lane Water System provides drinking water to a small Water Service Area on Salt Spring Island. CRD Integrated Water Services is responsible for the overall operation of the water system. The design and construction of water system facilities is overseen by the CRD Infrastructure Engineering Division. This system is operated by North Salt Spring Waterworks staff under contract to the CRD Water Management Division. The quality of drinking water provided to customers in the Cedar Lane Water System is overseen by the CRD Water Quality Division.

- **Cedar Lane Water System Description**

Water Accounts

- **Account Balance and Payments**
- **Leak Adjustment Terms and Conditions**
- **Temporary Disconnections**

Service connections (new applications or changes): **1.250.474.9607**

Water Conservation

- **Water Conservation on Salt Spring Island**
- **Household water saving tips**

Cedar Lane Water Service Commission

- **Agendas**
- **Minutes**
- **Reports**

Drinking Water Emergencies / Leaks

Call CRD: **1.250.474.9630**

General Inquiries

- Toll Free: **1.800.663.4425**

SSI Administration

- Kees Ruurs, Sr. Administrator
  250.537.4448 email
- Ralf Waters, Eng. Manager
  250.537.4448 email

Water System Operations

- Dan Robson, Ops. Manager

- Cam Preece, Sr. Manager
  1.250.474.9617 **email**

Water Quality

- Stewart Irwin, Sr. Manager
  1.250.474.9603 **email**
- Jennifer Blaney , Lab Manager
  1.250.474.9680 **email**

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DRAFT FOR COMMISSION REVIEW

Cedar Lane Water Service
WATER CONSERVATION PLAN

C. Sunderland
December 2011

As a condition of the British Columbia Community Water Improvement Program grant awarded for upgrades to the Cedar Lane water system, this Water Conservation Plan identifies targets and opportunities for sustainable water use in the Cedar Lane community.

Population and Potential Growth

The Cedar Lane Service Area includes 37 taxable folios, all of which are connected to the water system. Most connections serve single-family dwellings, although six connections are reported to serve two dwellings each, and one connection serves three dwelling units (approximately 45 dwellings total). There is reportedly relatively little seasonal variation in occupancy. For the purpose of this analysis, the population is assumed to average 100 residents (based on average household size of 2.2 for Salt Spring Island, 2006 census).

There is limited potential for population growth in the Cedar Lane Water Service Area. There are no undeveloped folios in the area, and based on the relatively small lot sizes and lack of a sewer system, subdivision is extremely unlikely. Secondary dwellings are allowed on residential parcels on Salt Spring Island; however, the Islands Trust (which has jurisdiction for land use) restricts the approval of secondary dwellings where drinking water supply capacity or wastewater facilities are constrained. Thus it is estimated that the area has already achieved its maximum number of households.

Expansion of the service area is subject to the approval of the Capital Regional District Board (normally following a recommendation by the local service commission). There are several dwellings in immediate proximity to the Cedar Lane water system, served by individual private wells. It is possible that the owners of some of those dwellings may seek inclusion in the Cedar Lane water service area in the future. Inclusion of additional properties in the service area would be contingent upon sufficient water supply capacity, which does not currently exist.

There is potential for an increase in average household size, although there are no apparent drivers for such an increase in order to predict a significant change. For the purpose of this study, it is assumed that the maximum population of the service area is equal to the current estimated population of 100.

Current Water Demand

Water treated and supplied to the distribution system is measured monthly. Total annual water production and water production per capita for the years 2009 and 2010 is shown in Figure 1, and monthly production is shown in Figure 2. Seasonal variation in water demand is likely the result of changes in occupancy of part-time dwellings, and irrigation.

Customer water meters are read quarterly for billing. The difference between water production (flow through treatment plants into the distribution system) and end user consumption (flow measured through all customer meters) is known as non-revenue water. Non-revenue water in the Cedar Lane system in 2009 and 2010 was negligible, indicating no measurable leakage losses in the system during that time. The annual average retail water demand in the Cedar Lane Water Service Area in 2010 was 126 lpcd based on estimated population.

Figure 1. Total Annual Water Production

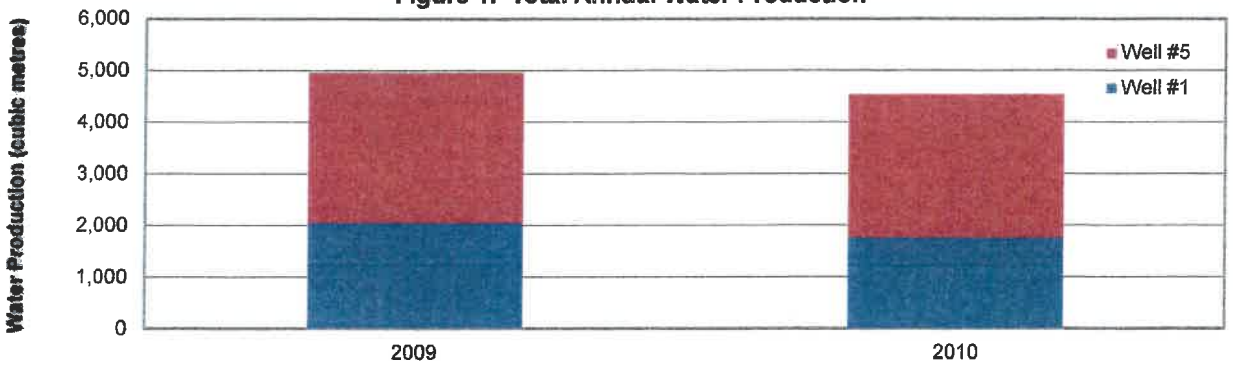
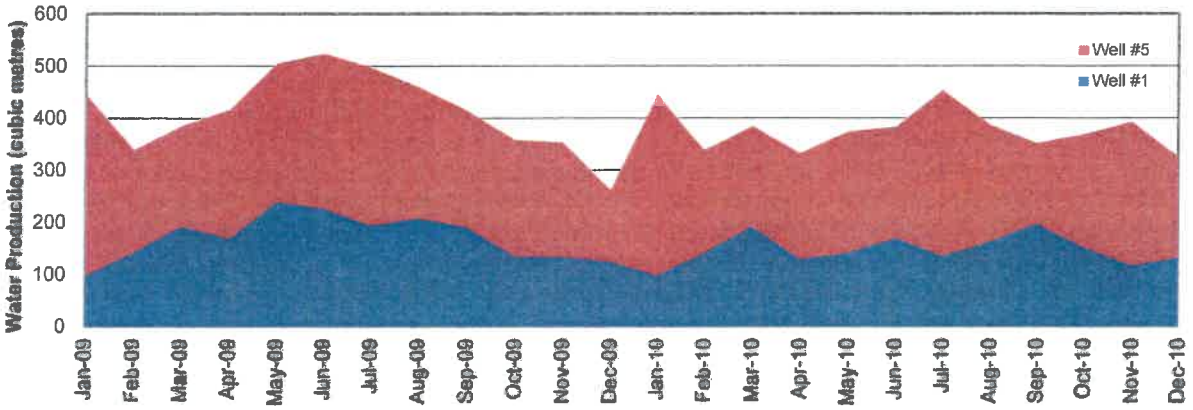


Figure 2. Water Production by Month



Water Supply Capacity

The water source for the Cedar Lane water system consists of two active wells known as No. 1 and No. 5 (provincial Well ID 94636 and 19893, respectively). Well No. 1 was drilled to 62.5m in 1968. Based on initial bail testing by the drilling contractor, the well capacity was estimated to be 0.25 l/s (4 USgpm). Based on drawdown tests conducted between 1968 and 1970, the well was rated at 0.30 l/s (4.8 USgpm). Thurber Engineering Ltd. (TEL) reviewed the original drawdown test data in 1980. Given that the testing had been conducted in winter using unconventional procedures, TEL recommended that the theoretical safe yield for Well No. 1 be reduced to 0.24 l/s (3.8 USgpm).

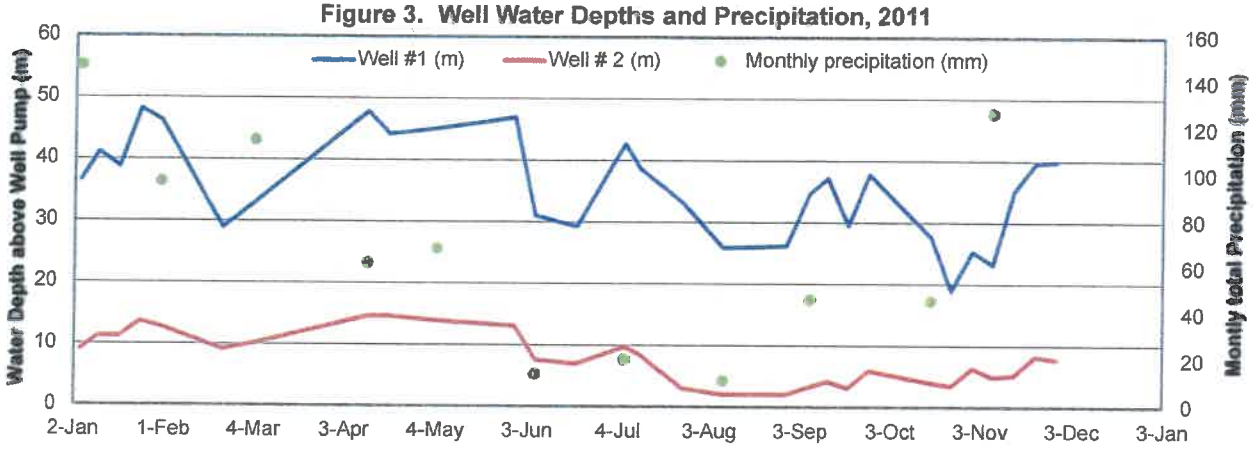
Well No. 5 was drilled to 41.1m in March 1970, and was bail tested by the driller and initially rated at 1.26 l/s (20 USgpm). However, a 76 –hour drawdown test conducted in October 1971 resulted in a reduced rating of 0.44 l/s (7 USgpm). Upon review of the drawdown test data in 1980, TEL recommended a theoretical safe yield of 0.30 l/s (4.8 USgpm) for Well No. 5.

The CRD has measured groundwater levels in Wells No. 1 and 5 since January 2011 (Figure 3). The water level in Well No. 1 varies by about 20m from day to day, but on average drew down only about 25% seasonally (from 40m average in spring to about 30m in fall). The average flow rate from Well No. 1 between June and October, when seasonal drawdown occurs, is about 0.06 l/s. The well levels suggest that this flow rate is likely sustainable; however, actual usage of Well No. 1 is only about 25% of the theoretical safe yield estimated by Thurber in 1980.

For Well No. 5, the groundwater level decreased from a seasonal peak of 14.6m above the pump elevation in April to a seasonal minimum of about 2.1m above the pump elevation in August (85%

drawdown) under normal usage averaging about 0.095 l/s in the same time period. On this basis, the maximum safe yield for Well No. 5 in 2011 was about 0.1 l/s in 2011.

Figure 3. Well Water Depths and Precipitation, 2011



It is unknown whether groundwater levels recharge completely every winter in the Cedar Lane area at the current withdrawal rates. Thurber (1980) advised that aquifers in the area are recharged by seasonal precipitation, and estimated that roughly 5% of annual precipitation infiltrates into the aquifers (of 33 inches of annual precipitation, 16 inches is lost to evapotranspiration and about 10% of the remaining runoff is estimated to infiltrate into the rock). Therefore the ability of the Cedar Lane aquifers to recharge seasonally depends on the tributary area to the aquifer(s), and on other groundwater demands. Thurber (1980) characterizes the bedrock of the area to be sedimentary sandstone of low porosity and permeability. There are approximately 12 wells in the immediate vicinity of Cedar Lane Wells No. 1 and 5, suggesting there is a significant risk that groundwater levels will not recover fully in an average year.

Precipitation between October 2010 and September 2011 was about 7% higher than the average for 1941-2011 at Victoria Airport. Precipitation data for 1941-2011 indicate that annual total precipitation in a drought cycle is 65-75% of average. Assuming well yield is proportional to annual precipitation, the well yield in a drought cycle may be as low as 60-70% of the 2011 yield.

Based on the foregoing, it is estimated that the sustainable combined yield of the two operating Cedar Lane wells is roughly 0.34 l/s (10,700 m^3) in an average year, and may be as low as 0.2 l/s (6,300 m^3) in a drought cycle (about 70% from Well No. 1, and 30% from Well No. 5).

The CRD has considered several alternatives for increasing water supply capacity to Cedar Lane. A desktop feasibility study of water supply expansion alternatives for Cedar Lane was prepared for the CRD by TEL in 2011. The study concluded that there is a low probability of finding a suitable groundwater source in or near the water service area, and that the nearest fault zone likely to yield a suitable quantity of groundwater is at least 5km away. Connection to the much larger North Salt Spring Waterworks District system, which has St. Mary Lake and Maxwell Lake as water sources, is likely the lowest-cost alternative for expanding water supply. Interconnecting the systems would require about 1.5 km of new watermain, at an estimated bare construction cost of $750,000.

Climate Change Adaptation and Mitigation

Precipitation patterns are expected to change in coming decades. For the CRD region, by the 2050s annual precipitation is likely to increase, but probable scenarios based on Global Climate Model projections range from a decrease of 3 percent to an increase of 12 percent (Pacific Climate Impacts Consortium). For the purpose of this analysis, it is assumed that the worst case annual precipitation would be 3% less than the driest year on historical record. Again, assuming well yield is proportional to annual precipitation, climate change within the next 50 years may further reduce the annual total yield in a drought year to 6,100 m^3.

The Cedar Lane water system has a relatively low carbon footprint due to its low water use per capita. Conserving water benefits the community and the environment by:

- reducing the costs and carbon emissions of expanding the infrastructure to accommodate growth (e.g. manufacturing, transporting and installing larger watermains).
- reducing the carbon emissions associated with trucking in water to overcome supply shortfalls in drought years.
- maintaining more water storage in reserve for emergencies such as wildfires or extreme drought, which may increase due to climate change.

Water Demand Target

Assuming the sustainable combined well yield under drought and worst-case climate change conditions is 6,100m^3/year, maintaining the current (2009-2010) overall water consumption rate of about 5,000 m^3/year is recommended as an overall target. Based on the assumption that the population of the Cedar Lane community will remain close to 100, this equates to an annual average usage of 137 lpcd. In order to allow about 10% of total supply for non-revenue water (modest leakage losses as infrastructure ages, and system maintenance tasks such as flushing), a target of 125 lpcd for household usage is recommended.

These targets can be maintained if:

- Residents and homeowners maintain household water systems in good working order to prevent leaks
- Any increases in consumption (e.g. opening a guest cottage or starting a vegetable garden) are offset by equivalent decreases (e.g. replacement of old, inefficient fixtures and appliances with new, more efficient models)
- Newcomers to the community are educated about the water supply constraints and the need to conserve
- Rainwater is harvested and stored by customers for non-potable uses, including all irrigation uses.
- Watermains are replaced before significant leaks develop, or breaks become frequent.

Current and Planned Water Conservation Measures

A planned adaptive strategy for water conservation is proposed for Cedar Lane, enabling conservation measures to be tailored to meet the changing needs of the community over time. This approach has proven successful for the CRD Greater Victoria water system. The following conservation measures are proposed as elements of a water conservation plan for Cedar Lane:

1. **Universal metering** (current) – Each customer connection to the water system is fitted with a water meter, which is read quarterly.

   The meters were replaced in 2010. The ongoing annual cost to read the meters and to replace them every 15 years is estimated to be $1,000, of which $500 (meter reading cost) is currently budgeted. Recovery of the replacement cost is expected to be addressed as an outcome of a Strategic Asset Management Plan for the service, scheduled to be completed in 2011.

2. **Reporting usage and water budgets on water bills** (current) – Information about water use has been displayed on water bills since January 2011, raising customer awareness about their water use. Further information is presented at annual general meetings and in community newsletters, enabling customers to compare their own usage with the range and average in their community and others. A quarterly household water budget target of 25 m^3 (based on 45 dwellings) should be prominently displayed on water bills. The cost of reporting usage and providing conservation messages on the water bills is currently budgeted.

3. **Consumption based water billing** (current) – Water is billed using a three-tier inclining block structure. Water for basic household needs (up to 37.5 m^3 every three months) is billed at \$2.25/m^3, the next 67.5 m^3 is billed at \$8.00/m^3, and water use in excess of 105 m^3 every three months is billed at \$25.00/m^3. The top tier rate is approximately equivalent to the cost of trucking in water, ensuring that the cost of very high usage is not passed on to careful water users. Few customers use more than the quarterly water budget of 37.5 m^3. The consumption charges recover about 16% of the cost of water service, and the remaining 84% is recovered through a fixed annual charge and a parcel tax.

   This structure maintains stable revenue for fixed costs (almost all costs unless trucked water is required), provides a sufficient quantity of water at an affordable cost for essential customer needs, and provides a strong price signal to reduce excessive usage in any of the four billing cycles. This structure has proven well suited to Gulf Island communities with a large proportion of seasonal or occasional users.

   To align the rate structure with the recommended water usage target, it is recommended to reduce the threshold for Tier 2 from 37.5m^3 per quarter to 25m^3 per quarter. The cost of consumption based billing is currently budgeted.

4. **Community Awareness and Education** (current; expand as needed to maintain target) – Information about water use and conservation is provided in community newsletters and at typically well attended annual general meetings.

   A more formal conservation awareness program may be implemented by linking information presented by mail and at the AGM with a community homepage on the CRD website that includes:
   a. water use statistics, and comparison with other areas and benchmarks/targets
   b. best practice guides (e.g. fixture and appliance standards, rainwater harvesting, leak prevention)
   c. links to CRD regional water conservation resources
   d. links to other organizations that provide water conservation resources tailored to the Gulf Islands (e.g. Mayne Island Integrated Water Systems Society, Salt Spring Island Water Council).

   The cost of a modest community awareness program including the AGM, newsletters and website content, is currently budgeted.

5. **Water Conservation Plan Renewal** (2017, and every five years thereafter) – A review of this plan will be conducted approximately every five years to update forecasts and targets, consider new information, and adjust program activities as required to meet targets.

   The cost to review and update this conservation plan is anticipated to be roughly \$1,000 every five years, which could be funded through a new annual contribution of \$200 to the capital reserve fund.

Program Implementation Responsibility, Cost and Schedule

This Water Conservation Plan will be implemented by CRD staff, under the authority of the Cedar Lane Service Commission. The Commission has administrative authority delegated by the CRD Board under CRD Bylaw No. 3693, "Salt Spring Island Water, Sewer and Liquid Waste Disposal Commissions Bylaw No. 1, 2010" for provision of the water service.

The following implementation schedule is proposed:

Item No.	Implementation Year	New Budget Requirement	Note
1	(completed)	$ 500	Estimated annual cost of asset maintenance and renewal
2	(completed)	$ 0	Included in current budget
3	(completed)	$ 0	Included in current budget
4	(completed)	$ 0	Included in current budget
5	2017	$ 200	Annual contribution to reserve for plan renewal

Linkages to Other Plans and Policies

Water Conservation Plans for CRD electoral area water services will adhere to a common format. Targets, program measures and knowledge will be shared between these service areas. Where the CRD provides sewer services, the benefits of water conservation for these services will be taken into account. Water Conservation Plans will be linked to Strategic Plans for the services. Where practicable, planning and program implementation will also be linked with the Greater Victoria water conservation and climate action services delivered by the CRD. Knowledge will be shared, and policies and programs will be coordinated, with other stakeholders such as improvement districts, other regional districts, the Islands Trust and the Mayne Island Integrated Water Systems Society and the Salt Spring Island Water Council.

References

1. Hendren, G. and R.H. Edwards. Cedar Lane Water System Feasibility Study, Salt Spring Island, BC. Capital Regional District. October 2006.

2. McRae, A.M. Report on Water Supply and Distribution System to Serve the Scotton Subdivision at Robinson and Mansell Roads, Saltspring Island, B.C. (including addendum dated March 12, 1970). Associated Engineering Services Ltd. December 1968.

3. Nasmith, H.W. and B.I. Ingimundson. Cedar Lane Water System, Salt Spring Island, B.C.Report on Review of Existing Well & Groundwater Information. Thurber Engineering Ltd. December 1980.

4. Sterne, K.B. and B.I. Ingimundson. Cedar Lane Water System, Salt Spring Island Groundwater Study. Thurber Engineering Ltd. March 23, 2011.

5. Summers, A.W. and P. Barchyn. Capital Regional District Takeover Study of Cedar Lane Water System, Salt Spring Island. Capital Regional District. December 1980.

6. Walker, D. and C. Sunderland. Water Use and Conservation Update 2008. Capital Regional District. 2008.

7. Intramap 2.0. Capital Regional District. Accessed December 7, 2011.

8. Wells Database. Province of British Columbia. 2008.

9. www.plan2adapt.ca website. "Summary of Climate Variables – Climate Change for CRD Region in 2050s Period". Pacific Climate Impacts Consortium. Accessed June 24, 2011.