Comox Valley
REGIONAL DISTRICT

Royston Water Local Service Area Emergency Response Plan

Updated: November 2023

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1. E. Coli contamination of the Distribution System

If there is notification from the Vancouver Island Health Authority lab (VIHA) or the Village of Cumberland of E. Coli detected in any of the samples, proceed as follows:

1.1 Issue a boil water notice to the Royston water LSA customers (see Appendix A).

1.2 Develop a communications plan with CVRD communications staff.

1.3 It may be necessary to notify specific sites by hand delivering or faxing notices (i.e. hospitals, long-term care facilities and schools etc.).

1.4 Contact VIHA to advise them that a Boil Water Notice (BWN) has been issued.

1.5 Develop a sampling plan with VIHA to determine when to lift the BWN.

1.6 Re-sample the site that had the presence of E. Coli as well as locations determined in consultation with VIHA.

1.7 Investigate the water facilities to determine the source of the contamination. Reservoirs are potential sites for contamination. All hatches and vents must be checked for signs of compromise.

1.8 Determine if the distribution system requires flushing to remove any contaminated water.

1.9 Confirm that adequate chlorine levels exist in the distribution system.

1.10 To remove the BWN will require three (3) samples (as a minimum) taken 24 hours apart that show no presence of E. Coli. VIHA may require further samples.

1.11 When VIHA determines that the BWN may be removed, consult with CVRD communications staff to advise customers of the Royston Water LSA.

2. High Turbidity Levels

2.1 Turbidity is monitored continuously by instruments at the Royston reservoir site.

2.2 If the turbidity value exceeds 1 NTU, check the calibration of the turbidity monitor.

2.3 If the monitor is reading an accurate value, consult with the manger of water services. It may be advisable to stop the filling of the Royston reservoir to prevent turbid water from entering the distribution system.

2.4 Consult the Vancouver Island Health Authority (VIHA) turbidity decision tree (Schedule C) to determine if a boil water notice (BWN) is needed.

2.5 If a BWN is needed, develop a communications plan with CVRD communications staff.

2.6 It may be necessary to notify specific sites by hand delivering or faxing notices (i.e. hospitals, long-term care facilities and schools etc.).

2.7 Confirm that adequate chlorine levels exist throughout the distribution system.

2.8 Test turbidity levels throughout the distribution system. If levels are above 1 NTU, it may be necessary to flush until they are below.

2.9 Determine the area affected and flush the system until acceptable chlorine and turbidity levels are found.

2.10 When turbidity levels in the distribution system have been reduced to less than 1NTU, the BWN may be rescinded. Consult with CVRD communications to develop a plan to notify users of the Royston water LSA.

3. Contamination of the Water Supply

In the event that the contamination or suspected contamination of the water system is in a localized area, notify customers affected, determine the source of contamination and isolate the contaminated area. Consult with VIHA to develop a plan to sample the distribution system.

3.1 Contact the manager of water services or other supervisor and advise them that contamination has occurred. At this time Vancouver Island Health Authority should be notified of the contamination of the water supply. It may also be necessary to issue a boil water notice (Appendix A) or water use restrictions to the users of the water system. Consult with CVRD communications staff to develop a plan to notify customers.

3.2 Assess the source of contamination and determine the potential threat to the water system.

3.3 Depending on the nature of the contamination, it may be necessary to contact the **Provincial Emergency Plan (PEP) Phone 1-800-663-3456.**

Confirm that adequate chlorine levels exist throughout the distribution system

3.4 Sampling of the water may be needed to determine the extent of the contamination.

3.5 It may also be necessary to flush the system if it is determined that there is contamination of the water supply.

3.6 After flushing, resample and determine that there is no contaminated water in the system. When the Vancouver Island Health Authority is satisfied that the water meets the drinking water standards, the system can be put back into normal operation.

3.7 Consult with CVRD communications to develop a plan to notify users of the Royston water LSA (Appendix B).

3.8 Clean up equipment and restock any supplies used.

3.9 Meet with all agencies involved to ensure that proper controls are in place to prevent future events and that the procedures for controlling contamination are adequate.

4. Loss of Water Supply

The following assumes the loss of water supply is due to source failure, drought, and/or considerable component/equipment failure that disrupts service to a large portion of the distribution area, effecting numerous customers, for an extended period of time. Regular work procedures are to be followed for loss of supply due to minor main breaks, equipment failures, or other brief service disruptions. Specific circumstances contributing to the loss of water supply (cause, extent of damage, areas affected, etc.) will dictate the appropriate response and may result in associated alarms and involvement from the alarm monitoring system.

4.1 Loss of a supply main

4.1.1 Isolate the affected area.

4.1.2 Contact the manager or supervisor and advise them of the nature of the emergency, depending on the system demand.

4.1.3 Water use restrictions may need to be implemented. Develop a communications plan with CVRD communications staff.

4.1.4 Arrange to make the necessary repairs to the system.

4.1.5 Flush the system after repairs.

4.1.6 Ensure that there are adequate chlorine levels in the water prior to putting the supply main into service.

4.1.7 Develop a communications plan to rescind water use restrictions (Appendix B).

4.1.8 Replace materials used for the repair.

4.2 Earthquake

The response to emergencies created by an earthquake would be dependent on the severity. It would be necessary to assess the nature of the damage to the water system. For this scenario it is assumed that this is a severe earthquake. The actions required in this case would be scaled down to suit the extent of damage to the water system.

4.2.1 Contact the manager of water services or other supervisor and co-ordinate a response plan. Utilize available staff to perform the assessment of the infrastructure. Prioritize the work needed, based on damage to the system and supply options that may still be intact.

4.2.2 Develop a communications plan with CVRD communications staff. Notify any customers that would be affected by disruption of service. A boil water notice or change in water use restrictions may need to be issued through the media (Appendix A).

4.2.3 The priority for repairs would be to first establish the supply system. Water hauling and bottled water may be needed to meet the domestic water requirements of the water system.

4.2.4 As repairs are made to the infrastructure, areas that had been out of water would be put back into service through the standard testing and bacterial certification process.

4.2.5 As water supply and quality are assured, boil water notices and water use restrictions would be removed.

4.2.6 Any materials that were used for repair would need to be restocked.

4.3 Drought

Drought is seasonal and predictable. Constant monitoring of the Provincial Drought Rating, local snowpack and groundwater table levels and local conditions and forecasts are essential to be able to plan and prepare for seasonal drought. Operators are to monitor groundwater well and lake levels using on-line telemetry that is connected to the automation and controls system (SCADA) that is monitored continuously.

The Royston water system receives water from the Village of Cumberland and redistributes it to its residents. Water restrictions are outlined in the Royston Water Conservation Bylaw and is tied to following the water restriction level that the Village of Cumberland goes on. Constant communication with Village of Cumberland staff is essential to early planning and action.

4.3.1 Manager of water services or designate will work to implement Royston Water Conservation Bylaw No. 535 and recommend moving through the effective water restriction stages to achieve water use reduction- WILL ESCALATE BASED ON DROUGHT SEVERITY, SYSTEM NEEDS AND PUBLIC RESPONSE

4.3.2 Manager of water services or designate will work with communications team to effectively notify the public of the situation - WILL ESCALATE BASED ON DROUGHT SEVERITY, SYSTEM NEEDS AND PUBLIC RESPONSE

4.3.3 Water Operations staff can monitor individual users consumption and start to communicate to those users if further conservation measures are needed

4.3.4 If situation becomes critical and ALTERNATIVE SOURCE is required, then Manager of Water Services or designate will work with Island Health and the City of Courtenay to access standpipe at North end of system and tie into the Comox Valley system through the City of Courtenay.

4.3.5 Water Operations staff to monitor and notify Manager of water services or designate, who will contact and work with Island Health officials if drought conditions could result in any concern with raw water quality or the ability to disinfect.

Appendix A – Waterworks Station List

WATERWORKS STATION LIST

BC HYDRO POWER OUTAGE 1-888-769-3766

STATION	ADDRESS	PHONE	HYDRO ID#
Chlorination Station	2550 Powerhouse Rd	Redacted	Redacted
Puntledge River Standby	2452 Powerhouse Rd	Redacted	Redacted
Old Chlorination	35 Powerhouse Rd	Redacted	Redacted
Old West	610 Powerhouse Rd	Redacted	Redacted
West Courtenay	3619 Lake Trail Rd	Redacted	Redacted
Courtenay Station	299 Puntledge Rd	Redacted	Redacted
Dingwall Pump Station	828 Dingwall Rd	Redacted	Redacted
Comox Reservoir	2440 Tudor Dr	Redacted	Redacted
Comox Reservoir Meter	2439 Tudor Dr	Redacted	Redacted
Crown Isle Reservoir	2149 Atlas Rd	Redacted	Redacted
East Courtenay	110 Waters Plc	Redacted	Redacted
Ryan Road Pump	1790 Ryan Rd	Redacted	Redacted
Oyster Bay Treatment	4840 Regent Rd	Redacted	Redacted
Oyster River Well 2A 2B	4878 Regent Rd	Redacted	Redacted
Macaulay Reservoir	2531 Macaulay Rd	Redacted	Redacted
Black Creek Booster	8527 Island Hwy N	Redacted	Redacted
Kelland Reservoir	7726 Island Hwy N	Redacted	Redacted
Royston Reservoir	3200 Royston Rd	Redacted	Redacted
Herondale Reservoir	327 Herondale Rd	Redacted	Redacted

Appendix B – Post incident report - Incident Form

600 Comox Road, Courtenay, BC V9N 3P6
Tel: 250-334-6000 Fax: 250-334-4358
Toll free: 1-800-331-6007
www.comoxvalleyrd.ca

Comox Valley REGIONAL DISTRICT

Property Services
Waterworks Department Callout Report

Employee **Date of call** **Time called out**

☐ Priority Security ☐ AnswerPlus **Time call completed**

Location of call
Address or station
Customer name
Phone#

Reason for call out

Employee actions

Alarms - *Do not reset alarms until the cause is determined.*
Alarms received

What operational conditions caused this alarm?

Alarm status at station – list alarms in memory (*3)

(For all callouts) Are there any follow-up actions required? If so list actions;

Appendix C - Communication Procedures

The Manager of Water Services will alert the Communications Department about any water emergencies. A decision on the level of response will be made in conjunction with the department and the GM of Engineering and/or the Senior Manager of Water and Wastewater.

Communications Contacts:

Christianne Wile, Senior Manager of Strategic Initiatives	250-334-6066
Jennifer Steel, Manager of Communications & Engagement	250-334-6063
James Warren, Deputy CAO	250-334-6007

The Crisis Communications Plan applies to incidents that occur within the CVRD and for which the CVRD has direct jurisdictional authority. The CVRD will assume lead responsibility for all emergency communications in those jurisdictional areas, and for those components of infrastructure and services for which the CVRD has direct accountability. This could include some or all of the following actions:

- Sending out an emergency message via the Connect Rocket emergency management system
- Posting an emergency banner on the website
- Advising Water Committee and CVRD Board Chair
- Advising CVRD staff
- Preparing a press release and distributing to Comox Valley Media
- Posting updates to social media
- Posting updates to the website
- Drafting FAQs and Key Messages
- Responding to social media inquiries

Schedule A
Emergency Contact List

Agencies	Emergency Numbers
Comox Fire Department	911
Courtenay Fire Department	911
Black Creek/Oyster Bay Fire Department	911
Courtenay Fire Department	911
R.C.M.P.	911
Brenntag Canada Emergency (Office 1-800-661-1830)	1-604-685-5036
North Island Hospital Comox Valley	250-331-5900
Campbell River Hospital	1-250-287-7111
Vancouver Island Health Authority	
Environmental Health Officer: Ella Derby ella.derby@islandhealth.ca	Office: 250-331-8607 Fax: 250-331-8596
Environmental Health Officer: Nancy Clements nancy.clements@islandhealth.ca	Office: 250-923-1343 Fax: 250-850-2110
Public Health Engineer: Darrell Belanger	Office: 250-331-8518 Fax: 250-331-8596
Medical Health Officer (MHO): Dr. Charmaine Enns	Office: 250-331-8591 Fax: 250-331-8513
After Hour Vancouver Island Health Authority MHO Emergency Contact	1-800-204-6166
Emergency Management BC (EMBC) 24/7 Emergency Coordination Centre (ECC)	1-800-663-3456
Ministry of Environment (MOE)	1-800-663-3456
Center for Disease Control (CDC)	1-604-661-7033
Bureau Veritas – Analytical Services	250-338-7786
BC Hydro Vancouver Island Control	1-250-701-4611
BC Hydro Report and Outage	1-888-769-3766
WorkSafe BC - Worksite Emergency	1-888-621-7233
Prices Alarms – Emergency Response Centre	1-888-817-8415
CVRD - Manager Emergency Programs – Howie Siemens	Office: 250-334-2002 Cell: Redacted
CVRD Emergency Planning Coordinator – Cari McIntyre	Office: 250-334-6096 Cell: Redacted
City of Courtenay	250-334-4441

City of Courtenay Public Works Yard	250-338-1525
Town of Comox	250-339-2202
Town of Comox Public Works Yard	250-339-2485
K'ómoks First Nation	250-339-4545
CVRD Staff Contacts:	Cell
Mike Herschmiller, Manager of Water Services	Redacted
Steve Prunkle, Senior Operator–Transmission and Distribution (T&D)	Redacted
Steve Russell, Waterworks Operator-T&D	Redacted
Gavin Waterfield, Leadhand-T&D	Redacted
Eric Cox, Waterworks Operator-T&D	Redacted
Kerry Bird, Waterworks Operator-T&D	Redacted
Paul Turney, Waterworks Operator-T&D	Redacted
Kaleb Leskiw, Waterworks Operator-T&D	Redacted
Dan Fredlund, Water Utilities Technician	Redacted
Patrick Roesch, Waterworks Operator-T&D	Redacted
Jarrett Morka, Senior Operator - Water Treatment (WT)	Redacted
Kate Norkum, Waterworks Operator-WT	Redacted
Tyler Robertson, Leadhand-WT	Redacted
Dan McGill, Waterworks Operator-T&D	Redacted
Keith McKay, Waterworks Operator-T&D	Redacted
Sonya Jenssen, Waterworks Operator-WT	Redacted

SEE NEXT PAGE FOR DETAILED INFORMATION CONTACT NUMBERS

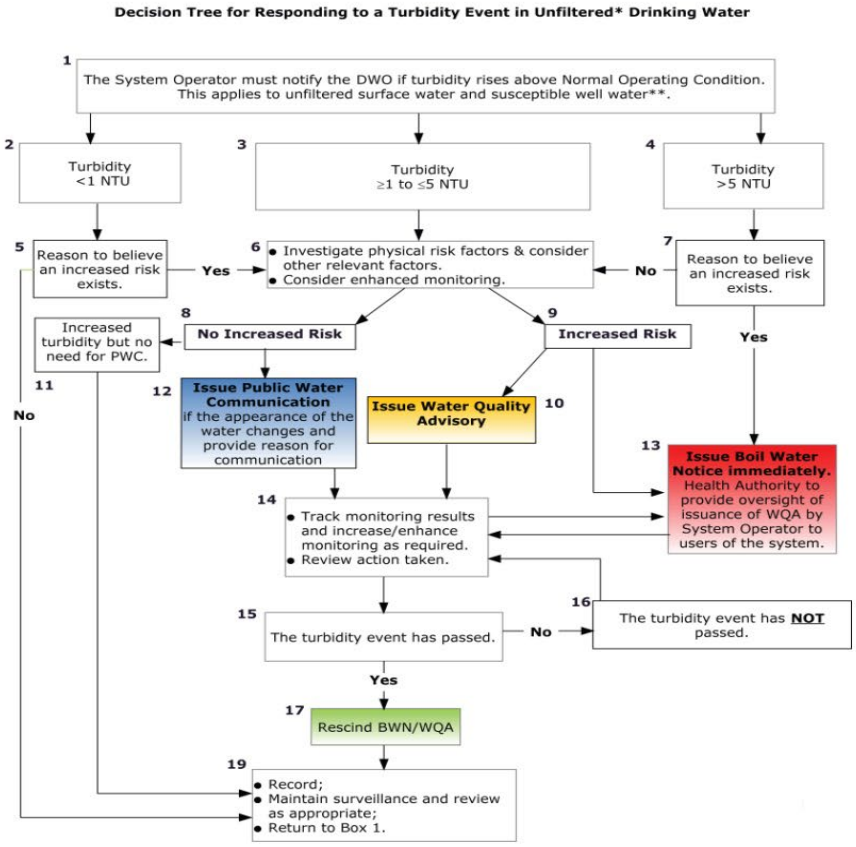
Schedule B
Emergency Notification Procedure

In the event of an emergency the following persons shall be contacted and advised immediately of the situation:

City of Courtenay	
CAO	Geoff Garbutt: 250-334-4441 ext. 7240
Director	Kate O'Connell 250-334-4441 ext. 7238 cell: Redacted
Director of Public Works Services	Kyle Shaw: 250-338-1525 cell: Redacted
Waterworks Foreman	Burton Brand: 250-338-1525 cell: Redacted
After hours & holidays	Protect Answering Service: 250-334-2947
Town of Comox	
CAO	Jordan Wall: 250-331-6469 cell: Redacted
Public Works Superintendent	Craig Perry: 250-331-6412 cell: Redacted
Municipal Engineer	Shelly Ashfield: 250-331-6409 cell: Redacted
Chief Water Operator	Joel Louke 250-339-5410 works yard cell: Redacted
After hours & holidays	250-218-5959
Comox Valley Regional District	
Chief Administrative Officer	Russell Dyson: 250-334- 6055 / cell: Redacted
Deputy CAO	James Warren: 250-334-6007 / cell: Redacted
GM of Engineering Services	Marc Rutten: 250-334-6080 / cell: Redacted
Sr. Manager Water/Waste Water Services	Kris La Rose: 250-334-6083 / cell: Redacted
Manager of Water Services	Mike Herschmiller: 250-334-6023 / cell: Redacted
After hours & holidays	1-877-999-2285 answering service
K'ómoks First Nation	
Band Emergency Liaison	Jenny Millar: 250-339-4545 x105 / cell: Redacted
Comox Valley Water Committee	
Chair	Director Wendy Morin 250-338-1385 / cell: Redacted
Puntledge Hatchery	
Hatchery On-call person	250-703-0907
Prices Alarm	1-888-817-8417
BC Hydro	
Vancouver Island Control	BC Hydro Emergency: 250-850-0540
Fraser Valley Office	1-604-455-1715
Vancouver Island Health Authority	
Health Officer	See previous pages

An emergency is defined as anything that would/could cause illness to any resident within the Comox Valley Water System supply area, a malfunction of a major component that would/could interrupt water service or contamination/disruption of the source supply.

Schedule C
Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water



***In filtered Drinking Water Systems, a spike in post filtration turbidity, not attributable to an instrument malfunction, may indicate a failure in primary treatment. In such cases, a risk assessment should be conducted as outlined in the DWO Guide. For definition of filtration, see Appendix A.**

*****Susceptible well* refers to ground water that, in the opinion of a drinking water officer, is at risk of containing pathogens [as per Drinking Water Protection Regulation s.5(2)(b)].**

Schedule C
Appendix A: Explanatory Notes to the Decision Tree for Turbidity

This Decision Tree lays out the basic process that should be followed by the local Health Authority [Drinking Water Officer (DWO), Medical Health Officer (MHO)], and System Operators when assessing turbidity events and issuing Advisories or Notices related to those events. The following notes provide an expanded explanation for each of the boxes in the *Decision Tree for Responding to a Turbidity Event in Unfiltered Disinfected Drinking Water*. The numbering below corresponds to the numbering of the decision tree boxes.

Dialogue needs to occur between the DWO and water supplier on the appropriate communication and monitoring with the goal of reaching consensus on the degree of increased health risk associated with the change in turbidity and related considerations as set out in Appendix B. In the absence of consensus the decision rests with the DWO. In an emergency situation, a water supplier may issue a BWN without prior dialogue with the DWO.

Communication with the public is not dependent on the state of the scientific evidence, i.e., communication to users should be occurring under normal circumstances, and not just during water advisories and notices. When advisories or notices are issued, the risk event(s) underlying the turbidity should be communicated and the strength of the scientific evidence presented. In particular, with boil water notices (BWN), the notice should indicate whether sampling evidence indicates the presence of potential pathogens or other evidence relied upon. This may change over the course of an event. A turbidity event indicates a possible threat to drinking water. The onus for providing scientific evidence of the safety of drinking water to human health lies with the water supplier. Failure of the water supplier to provide information to assess the health risk posed by the turbid drinking water may result in the issuance of a water quality advisory (WQA) or BWN at the discretion of a DWO.

Definitions:

- **Boil Water Notice (BWN)** – *Notice provided to water users to boil their water before any use that may involve ingestion of the water.* A BWN infers that an adverse microbiological health risk exists if the water is ingested. A BWN is issued by the system operator on request or order by the Local Health Authority (DWO. The Local Health Authority (DWO) should verify that the BWN has been issued to users of the system.

- **Public Water Communication (PWC)** – *A communication to water users that explains a notable change in the water characteristics.* A PWC usually applies to a change in appearance of the water but does not involve a health risk. The Local Health Authority (DWO) should verify that the PWC has been issued to users of the system.

- **Water Quality Advisory (WQA)** – A water quality advisory should be used where a DWO determines there is some level of risk associated with water use, but the circumstances do not warrant a "Boil Water Notice"; the WQA should specify the nature of the risk, steps that the water supplier is taking and steps that water users may take.. A WQA is issued by the system operator on request or order by the Local Health Authority (DWO). The Local Health Authority (DWO) should verify that the WQA has been issued to users of the system.

- **Filtration** – *A treatment process approved by the Issuing Official (i.e., Health Authority, MHO, DWO, PHE, or EHO) for the removal of particulate matter,* has been granted removal credits for pathogens and is operating as expected.

Box 1. **Decision:** This box represents a situation where the turbidity rises above the Normal Operating Condition for that particular DW system has been noted by the system operator and relayed to the DWO. This box also identifies the type of treatment to which this overall decision process applies – namely unfiltered drinking water. The process to be followed for filtered water is described in the footnote to the decision tree. Three options are available depending upon the measured turbidity, i.e., <1 NTU; 1 to :5 NTU; and >5 NTU. In addition, ***susceptible well*** refers to ground water that, in the opinion of a drinking water officer, is at risk of containing pathogens. [as per DW Regulation s.5(2)(b)].

Box 2. This box applies when the turbidity level are <1 NTU. In most cases this would likely encompass normal operating levels and no further action would be taken other than maintaining regular surveillance as per Box 18. However, if for some reason the small increase generates some concern to the DWO, Box 2 provides the option to investigate further by initiating some additional monitoring as shown in the decision tree by following the arrows from Box 2 Box 5 Box 6.

Box 3. This box applies when turbidity levels fall in the range of 1 to :5 NTU. Increases in turbidity that fall in this range need to be investigated further because of the greater potential for adverse health effects.

Box 4. This box applies when turbidity levels are >5 NTU. 5 NTU is typically the approximate level of turbidity that would become visibly noticeable. The actual health risk may depend on a number of factors. For example, one primary factor that needs to be considered is the past history of similar increases for that system and if any adverse health effects have occurred under similar circumstances. Box 4 logically leads to Box 7 where a decision is needed to either assess further or go straight to a BWN.

Box 5. **Decision:** This box needs a decision to determine if there reason to believe an adverse health risk exists even though the turbidity increase is small. This step is necessary to provide the option to investigate further if necessary which leads to Box 6. If there is no reason to believe an adverse health risk exists then the situation goes to situation normal and System Operator maintains surveillance, etc. as per Box 18.

Box 6. **Decision:** This box is eventually fed from all 3 turbidity streams and is the crux where there is a need for further investigation and monitoring regardless of the 3 range options (Boxes 2,3,4). The assessment involves reviewing the physical basis of the increased turbidity and judging if an increased risk (Box 9) is apparent and of sufficient magnitude to justify a Boil Water Notice. Physical and other risk factors are listed in Appendix B to assess risk associated with increased turbidity.

Box 7. **Decision:** This box provides the option to go directly to a Boil Water Notice based on the experience and judgment of the system operator/DWO and to also initiate some additional monitoring (such as for raw water, post-treatment bacteriological testing, distribution system bacteriological testing, operational parameters, disinfectant residuals, illness among users and possibly other parameters). This direct route to a BWN is provided to try to catch an adverse health event before it happens. If there is no past history of adverse health effects with the system, even when the increased turbidity is high and has reached similar magnitudes, the option is provided to bypass the direct route to a BWN via Box 6 that involves a more in-depth assessment that may or may not result in a BWN being issued. In other words the choice keeps all options open. An example of such a situation could be where a landslide of primarily inert non-organic material in the watershed has significantly increased the turbidity in the past but no adverse health effects have been noted or are anticipated.

Box 8. **No Increased Risk** applies to a situation where the DWO has determined there is no increased risk of adverse health effects for users of the system even though there may be detectable changes in water quality with respect to turbidity.

Box9. .**Increased Risk** applies to a situation where the DWO has determined that there is an increased risk of adverse health effects for users of the system . When risk factors of concern are identified during a turbidity event then a BWN should be issued as per Box 13.

As per Appendix B, an increased risk may also result when the water purveyor does not provide information on the nature of the turbidity event. The assessment of increased risk is at the discretion of the DWO (box 6).

Box 10. . **Issue Water Quality Advisory** if there is uncertainty in the degree of the increased risk to users of the system, i.e., not enough evidence to substantiate that a BWN should be issued and clearly not a situation of 'no increased risk; provide an explanation of the uncertainty.

Box11. This option of not issuing a Public Water Communication may apply for some situations where turbidity has increased, and the DWO has determined there is no increased risk of adverse health effects nor any change in appearance.

Box 12. **Issue Public Water Communication:** A PWC should be issued and system users advised of the reason for the communication when the appearance of the water changes, even if the assessment reveals that there is no increased risk to consumers. A PWC should inform individuals with weakened immune systems of their additional risk and advise them to boil their drinking water.

Box 13. **Issue Boil Water Notice:** This action is fed via three decision routes. Directly via Boxes 4 7 13 based on the reason to believe a health risk exists; by performing a risk assessment and identifying risk drivers of concern (Boxes 6 9 13); and via Box 14 where an increased sampling regime has identified a concern such that a Water Quality Advisory or Public Water Communication needs to be upgraded to a Boil Water Notice. The BWN should be issued by the water supplier and if not the DWO should request or order the water supplier to immediately issue the Boil Water Notice and to verify that it has been issued to users of the system.

Box 14. **Decision:** When a Boil Water Notice, a Water Quality Advisory, or a Public Water Communication has been issued, it is important to track the monitoring results and increase/enhance monitoring as required to determine when the event of concern has passed. It is also important to review decisions on an ongoing basis to ensure that the water supplier has taken appropriate action. It also provides the opportunity to continue monitoring when the turbidity event has not returned to normal via Box 16. Box 14 also provides the option to upgrade from a WQA/PWC to a BWN via the arrow to Box 13 if sampling has shown that the water quality has deteriorated.

Box 15. **Decision:** This box provides two options; (i) to initiate the return to normal operating conditions after monitoring has revealed that the turbidity event has passed; (ii) to continue monitoring as per Box 16.

Box 16. This box feeds back to Box 14 to provide the opportunity to continue monitoring when the turbidity event has not passed. This would keep the WQA/BWN/PWC in effect.

Box 17. When conditions have returned to normal the BWN, PWC or WQA can be rescinded. The Health Authority should provide oversight over the process of rescinding the BWN/WQA/PWN by the System Operator to ensure that users of the system are notified.

Box 18. Turbidity events, causes, and actions taken should be recorded so that they can be reviewed if another event occurs. At this stage, the system should be back to normal operating conditions.

Schedule C
Appendix B: Factors That May Increase the Risk of Human Disease with Rising Turbidity

Physical Risk Factors Associated with Turbidity

1 Turbidity increasing above normal operating condition;

2 Spills (e.g. sewage, agricultural, chemical);

3 Sources of fecal material likely to contain human pathogens, e.g., humans, wild or domestic animals;

4 Changes in hydrological characteristics, e.g., human development, mountain pine beetle, etc.;

5 Organic vs. inorganic source event;

6 Precipitation intensity and anomalies, e.g., the amount and timing of rain, snow, or snowmelt;

7 Treatment risk factors associated with turbidity:

i. Existing treatment outcomes cannot be maintained e.g., loss of chlorine residual, if chemically disinfected; a decrease in UV dose or lamp failure when disinfected by UV, or a decrease in transmittance;

ii. A Single disinfection method (e.g., chlorination only) is less effective and may result in higher risk than multiple treatments (e.g., UV + chlorination);

Other Risk Factors That Should be Considered

1 Evidence of illness, or lack of evidence to the contrary
2 Evidence of pathogens in the distribution system, or lack of evidence to the contrary
3 Past history of health concerns.

Absence of Information

1. An increased risk may also result when the water purveyor does not provide information on the nature of the turbidity event. The assessment of increased risk is at the discretion of the DWO (Box 6).