



EMERGENCY RESPONSE PLAN

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Table of Contents

1 THE PLAN	4
1.1 PURPOSE	4
1.2 OBJECTIVES	4
1.3 SCOPE	4
1.4 HOW TO USE THE PLAN.....	4
1.5 SUPPORTING DOCUMENTS.....	4
1.6 DEFINING TYPES OF EMERGENCIES	4
2 COMMAND AND COMMUNICATION	6
2.1 INCIDENT COMMAND SYSTEM	6
2.2 LINE OF COMMUNICATION.....	7
3 INFRASTRUCTURE FAILURE	8
SOG 3.1 LOSS OF NORTH SAANICH SUPPLY	8
SOG 3.2 SINGLE UNDERSEA WATER LINE FAILURE	9
SOG 3.3 BOTH UNDER SEA WATER LINE FAILURE.....	10
SOG 3.4 WATERMAIN FAILURE	11
SOG 3.5 STAND PIPE OR CORPORATE VALVE FAILURE	12
SOG 3.6 LOW WATER TANK LEVEL.....	13
SOG 3.7 TOTAL LOSS OF WATER SYSTEM (NATURAL DISASTER).....	14
SPECIAL OPERATIONS	15
SOG 4.1 CHLORINATION SYSTEM FAILURE	15
SOG 4.2 SOLENOID FAILURE PH1	16
SOG 4.3 PRESSURE REDUCING VALVE FAILURE	17
SOG 4.4 AIR VALVE FAILURE	18
SOG 4.5 POWER OUTAGE PH1	19
SOG 4.6 POWER OUTAGE PH2	20
SOG 4.7 COLD WEATHER PH1	22
SOG 4.8 COLD WEATHER PH2	23
SOG 4.9 ISLAND FIRE.....	24
5 CONTAMINATION RESPONSE	25
SOG 5.1 CONTAMINATION RESPONSE.....	25
APPENDIX A	27
WATER SYSTEM EMERGENCY CONTACT LIST	27

APPENDIX B	29
ALTERNATE DRINKING WATER SOURCES	29
APPENDIX C	30
DROUGHT ADDENDUM per VIHA INSTRUCTIONS	30
APPENDIX D	31
PROCEDURES REQUIRED TO SUPPORT SOGs	31

1 THE PLAN

1.1 PURPOSE

This Piers Island Water System Emergency Response Plan (the Plan) has been prepared to guide the Water Department Team when responding to emergency incidents and is an internal document for Water Team implementation and use only.

1.2 OBJECTIVES

The objectives of the Plan are to:

- Provide the earliest response to an emergency condition.
- Ensure that water quality and public health are not compromised.
- Provide potable water for sanitation and other domestic purposes.
- Provide a limited supply for fire suppression.
- Prevent unnecessary loss of stored water.
- Restore the integrity of the entire water system as soon as possible after an emergency.
- Protect the natural environment from impacts associated with the system operation in the event of an emergency.

1.3 SCOPE

This Plan provides guidelines when responding to a Piers Island Water System emergency incident. The Water System includes Water System Infrastructure and Components, Special Operations required for the Chlorination System, Power Outages, Cold Weather or Island Fire. The Plan serves as informational purposes only to islanders and external stakeholders.

1.4 HOW TO USE THE PLAN

The Plan is meant to act as a guide in the event of a water system emergency and is written to act as a reference rather than an explicit set of instructions. The more familiar everyone is with the format and information within the Plan the more helpful it will be in the event of a real emergency.

1.5 SUPPORTING DOCUMENTS

The Plan must be used in conjunction with the following Piers Island Water System documents:

- **System Details** document - contains an overview of the complete water system as well as pictures and detailed drawings of the main water system components with valves, connections and key parts labeled for identification and reference in the procedures.
- **Operational Procedures** document - provides the supporting operational detail for the Next Steps of the Emergency Response Plan.
- **Disinfecting the Water Distribution System** - document contains the guidelines for disinfecting all components of the Water Distribution System.
- **Emergency Contact List** - provides on-island and off-island contacts for the water system. It can be found in [Appendix A](#) of the Emergency Response Plan and is provided to Water Operators, Trustees and PIID Secretary.

Documents are all posted in PH1, PH2, and the Firehall.

1.6 DEFINING TYPES OF EMERGENCIES

This section defines many of the potential problems that could affect water quality or quantity in the water supply and distribution system. Each type of event can cause different types of damage to the water systems' components and may require a specific solution. Emergency incidents usually have a wide range of severity.

In this plan, categories of severity are defined as Alert Condition, Emergency Condition, Potential Disaster Condition and Disaster Condition, each of which aides in determining appropriate response actions. Examples of each condition are as follows:

- **Alert Condition:** are considered to be routine emergencies. For example: a leaking stand pipe,

curb stop, corporate valve, or short power outage. These types of issues normally do not require any notifications.

- **Emergency Condition:** are considered to be more significant emergencies. For example: disruption of the main water supply from North Saanich; complete loss or partial loss of chlorination system; water quality degradation due to things like high turbidity or a positive E-coli detection. These types of issues usually require a Boil Water Advisory or Water Use Restriction Notice to protect the islanders.
- **Potential Disaster Condition:** are emergency situations. For example: break in the watermain, break of the undersea water lines or an Island Fire. Appropriate precautions must be taken to mitigate loss of the water supply, notify and protect the islanders and require immediate notification to the DWO and islanders. These events often take anywhere from several days to months to resolve before the system returns to normal operation.
- **Disaster Condition:** are emergency situations. For example: North Saanich water contamination due to acts of terrorism or hazardous chemical spill in the CRD watershed or a natural disaster such as an earthquake. These types of emergencies constitute a catastrophic disaster/major emergency which requires immediate notification to the DWO and Islanders. These events often take anywhere from several days to months to resolve before the system returns to normal operation.

In the event of a potable water emergency, it is the responsibility of the Water Trustee to take action immediately if the Drinking Water Officer at VIHA cannot be reached.

2 COMMAND AND COMMUNICATION

2.1 INCIDENT COMMAND SYSTEM

ICS is a proven management system built on best practices and is the result of decades of lessons learned in the organization and management of emergency incidents and planned events. ICS has been tested through more than 30 years of application, by all levels of Government and in the private sector. It represents organization “best practices” and is becoming the standard command and control structure for emergency management across Canada and internationally. Through the use of best practices ICS helps to provide:

- The safety of responders and others.
- The achievement of tactical objectives.
- The efficient use of resources.

Upon notification of a Water System emergency incident the Water System manager or the first on scene, until the Water System Manager or designate is available, will assume the position of Incident Commander. The Incident Commander will be responsible for contacting and assembling the water team members (operators and associates) as required. The primary responsibility of the Incident Commander is to ensure effective overall management of the incident. This involves ensuring incident safety for all of those involved, providing information services to external and internal stakeholders, and maintaining liaison with other agencies involved with the incident.

The Incident Command function may be carried out in two ways:

- As a single command in which the Incident Commander will have complete responsibility for incident management. A single Command may be simple involving an Incident Commander and single resources, or it may be a complex organizational structure with an Incident Management Team.
- As a Unified Command in which responding agencies and/or jurisdictions with responsibility for the incident share incident management. Unified Command may be needed for incidents involving:
 - Multiple jurisdictions.
 - A single jurisdiction with multiple agencies sharing responsibility.

The Incident Command System facilitates the completion of Tactical Priorities at an incident where possible with the following being executed:

- Analyze the type and severity of the emergency.
- Communicate with Piers Island resources with direction and support from the Piers Island EP Duty Officer:
 - Ongoing communication with the Water Trustee or other Trustee as required.
 - Ongoing contact with the Fire Chief.
 - Contact and take direction from our DWO and other regulatory authorities as required.
- Identify overall strategy.
 - Develop an Incident Action Plan following the direction of applicable regulatory and governing agencies, PIID and with the help of contracted or expert services if required, that:
 - Assign personnel.
 - Mitigate additional damage to the infrastructure.
 - Perform emergency repairs on priority demand.
 - Return system to normal operational levels as quickly as possible.
- When water service interruption will be of an unreasonable duration, work the EP Duty Officer and with other local agencies to establish an alternate drinking water supply may be available. Refer to [Appendix B](#).
- Review, evaluate response and Incident Plan and revise as needed.

Detail information on the Incident Command System can be found at:

<https://www.pivfd.ca/uploads/1/5/6/2/15620810/icselfpacedstudentwork75230.pdf>

2.2 LINE OF COMMUNICATION

The Water System Incident Commander will establish direct, open, and timely communications following the applicable lines of communication to help ensure that:

- The health and safety of Islanders are preserved throughout water emergency incidents,
- Effective action is taken to resolve problems,
- There is quick response minimizing any harm resulting from the emergency,

Communications to the public must be approved through the applicable authority for the incident. Incidents above Alert Condition will be the applicable governing agency (PIID Board, Drinking Water Officer, or Health Authority). In these emergency scenarios, the distribution of information to the community will be coordinated through the Piers Island Emergency Program Duty Officer. For “Alert Conditions”, the public message should be approved through the PIID Water Trustee and distributed through the PIID Corporate Secretary.

Depending on the urgency and severity of the situation the following means of communication are applicable: Email, Slack, Other social media.

Provide written notices for public notice boards at the fire halls, government dock kiosk, parking compound, and water tank.

SAMPLE ADVISORIES TO ISLANDERS

Do Not Draw Water Until Further Notice:

This is (your name), we have a water emergency, and you must stop drawing water until further notice. If possible, please leave the island to reduce the demand for potable water. You will be contacted again to advise when it is safe to draw water. Until such time, consider the water unsafe to drink.

Boil Water Advisory Notice:

This is (your name), you may again draw water but there is a BOIL WATER ADVISORY in effect until further notice. Boil all water to be consumed for no less than 1 minutes.

Boil Water Advisory with Limited Service Notice:

This is (your name), you may again draw water but there is a BOIL WATER ADVISORY in effect until further notice. Boil all water to be consumed for no less than 1 minutes. Also, we are operating on reduced service. There is an outside burning ban in effect until further notice. (If need to limit use add ...) Please limit unnecessary use of drinking water. Use seawater for flushing toilets and it can also be used for cooking such items as pasta, potatoes, or any dish where salted water is used, and the food item is boiled.

Limited Service Available:

This is (your name), you may again draw water and it is safe to drink. However, we are operating on reduced service. There is an outside burning ban in effect until further notice. (If need to limit use add ...) Please limit unnecessary use of drinking water. Use seawater for flushing toilets and it can also be used for cooking such items as pasta, potatoes, or any dish where salted water is used, and the food item is boiled.

Normal Usage can be Resumed:

This is (your name), all systems are now fine, and you may now resume normal usage. (If burning ban can be lifted) The outside burning ban has been lifted.

Written Notices:

Notices should also be posted at PH1, PH2, Firehall Notice Board, Government Dock Notice Board.

Notices are available:

- Pre-printed copies of the Do Not Draw Water Notice and Boil Advisory Notice available in PH1, PH2 and the Fire Hall.
- Electronic copies of the Do Not Draw Water Notice and Boil Advisory Notice are available from Emergency Coordinator, Water Operators, PIID Water Trustee and PIID Secretary.

3 INFRASTRUCTURE FAILURE

SOG 3.1 LOSS OF NORTH SAANICH SUPPLY

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Disaster Condition

PURPOSE: To address guidelines for the loss of North Saanich supply at PH1.

GUIDELINE: **Detection:**

- **Received Notice from North Saanich:**
 - The water supply has been turned off, possible due to major CRD or NS infrastructure failure, contamination, or drought conditions.
- **Piers Road Water Line to Beach Vault or Beach Vault Valves:**
 - Water constantly flows through the meter in the Piers Road vault when PH1 solenoid has been switched off.
 - Water meter reading is zero for two consecutive days and Solenoid in Auto and Water Tower level is below the fill position.

This is unrelated to loss of under water sea lines.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Lead.
- Implement SOG 5.1 - Contamination Response.
- Loss of North Saanich supply will cause a lengthy water service interruption:
 - Notify the Water Trustee to facilitate communications (EP Duty Officer) to ask residents to leave island (if possible) as water will be unavailable for an extended period.
 - An alternate drinking water supply will need to be established. See [Appendix B](#)
- Shut off water supply from North Saanich:
 - Dispatch a team member to turn off North Saanich water supply at the Piers Road vault – Close V1.
 - Decommission North Saanich water supply in PH1:
 - Turn the solenoid switch off.
 - Close both floor valves.

Next Steps:

- Continue close communication with North Saanich and our DWO.
- If contamination was detected Continue close communication with DWO as SOG 5.1 – Contamination Response is being completed.
- When the North Saanich supply is established and, if required, when Contamination Response is completed:
 - Turn on the valve at the Piers Road vault Open V1.
 - Turn on both floor valves at PH1.
 - Turn the solenoid switch to Auto.
- Notify PIID and the Fire Chief.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SOG 3.2 SINGLE UNDERSEA WATER LINE FAILURE

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Potential Disaster Condition

PURPOSE: To address guidelines for the failure of a single under sea water line.

GUIDELINE: Detection at PH1:

- A fill cycle sounds erratic, and the meter is turning slower than usual.
- Discrepancies are measured between the Piers Road vault meter and the PH1 meter.
- Water flows through the meter in the Piers Road vault while the solenoid is turned off in PH1.
- Physical damage observed and reported or if Saltwater is detected.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Determine if Water System is contaminated:
 - Take Coliforms and Trihalomethanes (THMs) samples and deliver to MBLabs immediately stating this is an emergency.
- Increase DACb chlorine level to 1.0 ppm at PH2.
- Determine which supply line is damaged PH1:
 - Dispatch a water team member to the Piers Road beach vault.
 - Turn the solenoid switch off.
 - Turn off corporate valves at road and attach hose to the roadside standpipe.
 - Determine which supply line is damaged by trial & error:
 - Engage the floor valves one at a time, monitoring the water flow through the meter with the solenoid switch turned on.
 - Turn off the damaged supply line in PH1 and in the beach vault.
 - Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
- If contamination is detected through testing for Coliforms and Trihalomethanes (THMs) samples, implement SOG 5.1 - Contamination Response.
- Loss of an undersea line will cause a lengthy water service interruption:
 - Water will continue to flow to the Water Tank through the undamaged line but with less volume.
 - Notify the Water Trustee to facilitate communications (EP Duty Officer) to ask residents to reduce the demand for potable water.
 - Prepare an alternate drinking water supply as required. See [Appendix B](#)

Next Steps:

- If contamination was detected Continue close communication with DWO as SOG 5.1 – Contamination Response is being completed.
- Complete all necessary repairs.
- When the damaged water supply line has been restored and, if required, when Contamination Response is completed:
 - Turn on the repaired supply line at the beach vault.
 - Turn on the floor valve for the repaired supply line at PH1.
 - Turn the solenoid switch back to Auto.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SOG 3.3 BOTH UNDER SEA WATER LINE FAILURE

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Potential Disaster Condition

PURPOSE: To address guidelines for the failure of both under sea water lines.

GUIDELINE: Detection PH1:

- Water constantly flows through the meter in the Piers Road vault. North Saanich staff may notify us if they notice this.
- Water meter reading is zero for two consecutive days and solenoid switch in Auto and Water Tower level is below the fill position.
- Physical damage is observed and reported.
- Saltwater is detected in main supply.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Implement SOG 5.1 - Contamination Response.
- Determine if Water System is contaminated:
 - Take Coliforms and Trihalomethanes (THMs) samples and deliver to MBLabs immediately stating this is an emergency.
- Shut off water supply from North Saanich:
 - Dispatch team member to shut off North Saanich supply at Piers Road vault – Close V1.
 - At PH1 turn the solenoid off and close both floor valves.
- Close the two corporate valves at 68E.
- Check the level of water in the water tank.
- Loss of both undersea lines will cause a lengthy water service interruption:
 - Notify the Water Trustee to facilitate communications (EP Duty Officer) to ask residents to leave island (if possible) as water will be unavailable.
 - An alternate drinking water supply will need to be established. See [Appendix B](#)
- Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
- If contamination is detected through testing for Coliforms and Trihalomethanes (THMs) samples implement SOG 5.1 - Contamination Response as appropriate.
 - Notify DWO of the incident and take direction regarding restoring service to residents in affected area.

Next Steps:

- If contamination was detected Continue close communication with DWO as SOG 5.1 – Contamination Response is being completed.
- Complete all necessary repairs.
- When water supply lines have been restored and, if required, when Contamination Response is completed:
 - Open North Saanich supply line at the Piers Road vault.
 - Open both floor valves in PH1.
 - Turn the solenoid switch back to Auto.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SOG 3.4 WATERMAIN FAILURE

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Potential Disaster Condition

PURPOSE: To address guidelines for Watermain failure.

GUIDELINE:

Detection:

- Water pressure is significantly reduced in one or more quadrants.
- Water is pooling or noticeable below or around the Watermain.
- Water demand is greater than normal for the time of year.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Implement SOG 5.1 - Contamination Response.
- Increase DACb chlorine level to 1.0 ppm at PH2.
- Determine if Water System is contaminated:
 - Take Coliforms and Trihalomethanes (THMs) samples.
 - If contamination is detected through testing for Coliforms and Trihalomethanes (THMs) samples implement SOG 5.1 - Contamination Response.
 - Notify DWO of the incident and take direction regarding restoring service to residents in affected area.
- Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
- Isolate the section of the Watermain where the leak exists by shutting the corporate valves on each side of break. Corporate valves are located at PH1, 68E, 121, and 67.
- Loss of the Watermain will cause a lengthy water service interruption:
 - Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

Next Steps:

- If contamination was detected Continue close communication with DWO as SOG 5.1 – Contamination Response is completed.
- Undertake repairs.
 - While positive pressure exists from both ends of pipe, elevate pipe ends if possible and place tarps to create clean work space.
 - Flush the affected area of the Watermain.
- When positive results have been determined:
 - Bleed/Operate the air valves in the affected area of the break.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

Definition: Breaks in the Watermain could be presented as:

- Cracks or small punctures, compression damage, or complete pipe separation where continuing positive pressure prevents any backflow into the lines should be repaired as soon as possible but may not constitute an emergency, depending on the severity of the water loss.
- Large splits, compression or complete separation of the piping require an emergency response to prevent loss of supply, flooding, and any risk to public health and safety that could result from back flow contamination.

SOG 3.5 STAND PIPE OR CORPORATE VALVE FAILURE

Effective Date: Last Rev: : Water Trustee

TYPE OF EMERGENCY: Emergency Condition

PURPOSE: To address guidelines for the failure of a stand pipe or a corporate valve.

GUIDELINE: **Detection:**

- Water pressure is significantly reduced in one or more quadrants.
- Water is pooling or noticeable below or around the stand pipe or corporate valve.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Implement SOG 5.1 - Contamination Response.
- Isolate the quadrant(s) where the leak exists by shutting the corporate valves on each side of the stand pipe. Corporate valves are located at Ph1, 68E, 121, and 67.
- Deploy personnel with maps to shut off water services and report back to Incident Command.
- Increase DACb chlorine level to 1.0 ppm at PH2.
- Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

Next Steps:

- Undertake repairs.
 - Flush the affected area of the Watermain.
- If contamination was not determined while implementing SOG 5.1:
 - Take coliform samples from affected area.
 - Notify Drinking Water Officer of the incident and take direction regarding restoring service to residents in affected area.
- When positive results have been determined:
 - Bleed/Operate the air valves in the affected area of the break.
 - Notify residents water restrictions have been removed.
 - Reset DACb chlorination to normal range.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

Definition: Valve failure could be presented as:

- Minor valve leaks or valve locked open where continuing positive pressure prevents any backflow into the lines should be repaired as soon as possible but may not constitute an emergency, depending on the severity of the water loss.
- Major valve leaks or complete valve separation from the piping require an emergency response to prevent loss of supply, flooding, and any risk to public health and safety that could result from back flow contamination.

SOG 3.6 LOW WATER TANK LEVEL

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Emergency Condition

PURPOSE: To address guidelines when a low water tank level has been detected.

GUIDELINE: **Detection:**

Daily water flow meter in PH1 has not recorded water flowing since the last reading. The cause may be attributed to a power outage in PH2, and the float switch did not reset correctly, failed solenoid in PH1, faulty solenoid switch in PH1.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- If solenoid failure is determined refer to SOG 4.2 Solenoid Failure PH1.
- Take Free and Total chlorine samples to establish a base line.
- Increase DACb chlorine level to 1.0 ppm at PH2.
- Start filling the Water Tank manually in increments so as not to exceed the above chlorine level:
 - Incremental filling can be controlled with the float switch in PH2.
 - Switch set to ON for filling and set to OFF to stop filling (do not set the switch to auto until incremental filling is not required).
- Continually monitor free and total chlorine.
- If Free chlorine falls below 0.2 and Total falls below 0.48:
 - Increase DACb chlorine level to 1.0 ppm at PH2.
 - Adjust incremental filling range.
 - Contact the EP Duty Officer to Notify Residents, advise of failure and while manually chlorinating may taste or smell chlorine.

Next Steps:

- If incremental tank filling, continue this procedure as required until chlorination levels can be properly maintained by the chlorination system.
- If the DACb was adjusted continue at this setting until chlorination levels can be maintained by the chlorination system.
- When the chlorination system is stable controls can be set back to normal operations:
 - Float switch set back to Auto.
 - Adjust DACb set point back to operating level.
 - Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

References: SOG 4.2 Solenoid Failure PH1.

SOG 3.7 TOTAL LOSS OF WATER SYSTEM (NATURAL DISASTER)

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Disaster Condition

PURPOSE: To address guidelines for a total loss of the water system.

GUIDELINE: **Detection:**

In the event of an earthquake or other natural disaster, it is possible that power is out and there is a complete loss of the water system infrastructure.

The entire Water System infrastructure should have it's condition assessed as soon as possible after the event to determine extent of damage and assess available resources. Because many other agencies will be involved it will be essential to coordinate all efforts to deal with the situation most effectively.

Worst case scenario would be that the water tank depletes completely before the damage is discovered, and household taps do not produce water. This could result in back flow into the Watermain which could require disinfection the entire distribution system before restoring water tank supply.

Initial Response:

- Communicate with PIID, Emergency Response Duty Officer, and Fire Chief. Develop an Incident Plan together and Prioritize activities. Prepare proper communication advisories to Islanders.
- Organize an Emergency Water Supply System. See [Appendix B](#) – Alternate Drinking Water Sources.
- Under direction from Incident Command dispatch team members to survey the entire Water System infrastructure (Water Tank, PH2, PH1, Under Sea Water Lines, Watermain, stand pipes, Piers Road vault, and beach vault) to determine extent of damage. Extreme caution should be exercised for safety reasons.

Next Steps:

- Assess the extent of each damaged section and record findings.
- Make a damage assessment, prepare a plan to begin repairs and identify a schedule to resume normal operation.
- If some of the water system components can be repaired to provide full or partial service, then initiate repair and commission as appropriate and implement and complete SOG 51. – Contamination Response.
- Work with Emergency and Government agencies to development and implement plan to restore water service on island.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SPECIAL OPERATIONS

SOG 4.1 CHLORINATION SYSTEM FAILURE

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: **Emergency Condition**

PURPOSE: To address guidelines for Chlorination System failure.

GUIDELINE: **Detection:**

- **DACb Analyzer or Sensor Probes:** Chlorination testing has identified either too much or too little chlorine in the system. DACb will display a red screen and produce an error code if the sensor probes have failed.
- **Chlorination Injection Pump:** Injection pump is either not pumping or pumping very fast.
- **Recirculating Pump:** If the pump is not working chlorinated water is not being circulated into the water tank. The DACb float sensor is too low and the DCAb will display a red screen and error code.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Decommission Chlorination System:
 - Chlorination Room: shut off Injection Pump by unplugging.
 - Analyzer Room:
 - Shut off Recirculating Pump using breaker in breaker panel.
 - Close Chlorine System Input Valve (V8)
 - Unplug the DACb Analyzer.
 - Isolate Chlorine Sensor by closing valves in line to trap water (Valves V1 and V2)
- Test chlorine in tank.
- If Free chlorine falls below 0.2 and Total Chlorine falls below 0.48:
 - Implement SOG 5.1 - Contamination Response.
 - Implement Manual Chlorination procedure.
 - Turn solenoid off in PH1.
 - Fill tank in increments through the bypass valve.
 - Continually monitor free chloring and total.
 - Notify the EP Duty Officer to Notify Residents, advise of failure and while manually chlorinating may taste or smell chlorine.
 - Notify Drinking Water Officer - Advise of failure and manually chlorinating and take direction for testing.

Next Steps:

- If manual chlorination was implemented continue manual chlorination as required.
- If controlling tank filling in increments through the bypass continue this procedure as required.
- Replace damaged equipment.
- In PH1 turn Solenoid Switch to AUTO.
- If Chlorine Sensors were decommissioned, recommission Sensors.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SOG 4.2 SOLENOID FAILURE PH1

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Alert Condition

PURPOSE: To address guidelines for solenoid failure in PH1.

GUIDELINE:

Detection:

Daily flow reading indicates unexpected reduction in usage. Can be confirmed by:

- Checking the water tank level, if reading is below 5.8 there is a problem.
- Turning the Solenoid Switch to ON position and check water flow. If water does not flow with the solenoid turned on the solenoid is faulty.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Turn solenoid to Off.
- Monitor Water Tank level and use bypass valve to fill tank, as needed (about 69 minutes per 5000 gallons); tank level should be kept above 24,000 gallons to support Fire Fighting
- Notify PIVFD: Open bypass valve in the event of fire.

Next Steps:

- Initiate Solenoid replacement.
- Continue to monitor Water Tank level and manually fill as required.
- Replace Solenoid.
- Solenoid operational, turn Solenoid Switch to Auto.

SOG 4.3 PRESSURE REDUCING VALVE FAILURE

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Alert Condition

PURPOSE: To address guidelines for pressure reducing valve failure in PH1.

GUIDELINE: **Detection:**
If the Pressure Reducing Valve (PRV) fails, the follow may be detected:

- High water pressure.
- Low or fluctuating water pressure.
- No water pressure.
- Hammering or vibrating noises.
- PRV leaking.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Bypass the PRV by closing valves V4 and V5 (located before and after the PRV).
- Manage water pressure by opening the bypass valve.
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

Next Steps:

- Repair or replace PVR as required.
- PRV back in service:
 - Open ball valves (V4 and V5) located before and after the PRV.
 - Close bypass valve
 - Test the PRV
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

SOG 4.4 AIR VALVE FAILURE

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: **Alert Condition**

PURPOSE: To address guidelines for the failure of an air valve.

GUIDELINE: **Detection:**
Through annual testing of the Air Valves, it was determined that the valve could not be bleed or operated manually.

Initial Response:
• Make a damage assessment and prepare a plan to begin repairs and identify a schedule to resume normal operations.

Next Steps:
• Repair or replace air valve.
• Bleed and operate the air valve.

SOG 4.5 POWER OUTAGE PH1

Effective Date: Last Rev: Responsible: Water Trustee

TYPE OF EMERGENCY: Alert Condition

PURPOSE: To address guidelines in the event of a power failure at PH1

GUIDELINE: **Detection:**
Power failure in the East Zone will affect PH1. The solenoid will not operate so there will be no supply from North Saanich.

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Monitor Water Tank level and use bypass valve to fill tank, as needed (about 69 minutes per 5000 gallons); water tank level should be kept at normal operational water levels.
- If freezing temperatures: Implement SOG 4.9 – Cold Weather PH1.
- Until power is restored, monitor Water Tank level, manually fill with bypass valve as needed.

Next Steps:

- When power is restored:
 - If open, close bypass valve.
- Notify PIID and Fire Chief of back to normal service.

SOG 4.6 POWER OUTAGE PH2

Effective Date: Last Rev: Responsible: *Water Trustee*

TYPE OF EMERGENCY: **Alert Condition**

PURPOSE: To address guidelines for power outage at PH2

GUIDELINE: **Detection:**
This procedure is to be used during the event of an extended power failure.

Definition:
An emergency power supply is required to provide uninterrupted operation of the chlorination system and water supply including the circulating pump, flow meter, flow sensor, analyzer probes, the console and injection pump system. (Disinfection treatment is especially critical during extended hot weather power outages when bacterial growth typically increases)

Initial Response:

- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
- Start the Generator – refer to the Operations Manual
- Switching power from Main power to Generator power:
 - As you enter the analyzer room, on the right wall you will see the 911 control cupboard, the main circuit breaker panel and then the transfer switch breaker panel. (NB: you do not need to do anything in the main circuit breaker panel box.)
 - Open the transfer switch panel box and notice there is a metal restrictor that joins two breakers marked "Generator" and "Main". This bracket ensures that only one power source at a time can be engaged.
 - Switch off the power from the Main by flipping the breaker marked "Main" down to "OFF": only after you turn off the Main breaker will the restrictor bracket allow you to then flip the generator breaker switch up to "ON" to engage the generator.
 - Once the generator is engaged, carefully monitor water flow through the orange flow meter and the flow sensor (the orange flow meter is marked for normal operation and the black plunger in the flow sensor cylinder should ride at the black mark). Why? We have found that the Wilo circulating pump operates at a higher flow under generator power than under normal main power and because the analyzer sensor is very sensitive to over or under pressurization or flow, we must adjust the flow during generator use.
 - To adjust/lower the flow to normal operating level, carefully close the red ball valve (V8) on the intake side of the Wilo circulating pump **only until** the normal flow level is achieved; this will take a moment or two to settle.
- Lighting:
 - The motion sensor lights are battery operated however if the trouble light is to be used, as mentioned above, connect it and the heater to the single available wall outlet using the extension cord.
 - The trouble light can be hung from the ceiling hook provided for this purpose.
- Returning to Normal Operation:
 - Shut down the generator.
 - Disconnect the twist lock plug from the generator.
 - Turn off the ignition switch and the fuel switch.
- Switching power from the Generator back to Main power:

- In the transfer panel box, flip the generator breaker switch down (OFF) and then flip the Main circuit breaker switch up (ON).
- Again, monitor and slowly adjust water flow using the red ball valve (V8) so that the orange flow meter is at the normal flow mark and the black plunger in the flow sensor cylinder is also at the marked position.
- Reset tank float switch (switch to on and then back to auto)

Next Steps:

- Check for other noises or leaks and check the chlorinator and injection pump every few hours until normal operation is confirmed.
- Store lights, cords, and heater per normal on shelves.
- Replace supplies as appropriate: (i.e. Fill propane and or gas tanks)
- Notify the Emergency Program Coordinator to determine the message(s), when and by whom communication to the community will happen.

DEFINITION:

Equipment Needed – for generator, lighting, and heating:

- 220 volt generator
- Sufficient propane
- Bungee cord for securing the generator shelter door
- 110 volt space heater
- LED motion sensor lights for both rooms of the Pump House and the generator shelter, or optionally, a caged trouble light and 25 foot extension cord.
- 10 foot extension cord (needed if a trouble light is to be used at the same time as the heater as both devices will need to connect to the single available powered outlet).
- Switching Power Items (reference the diagram on wall):
 - Main Circuit Breaker Panel, Transfer Switch Breaker Panel
 - Metal Restrictor, UPS or Battery backup, Generator Breaker
 - Flow Sensor, Main Power Breaker j) DACb Analyzer Console
 - Wilo Pump Breaker k) Chlorine Probe, Orange Flow Meter.

SOG 4.7 COLD WEATHER PH1

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: **Alert Condition**

PURPOSE: To address guidelines in the event of temperatures below zero at PH1

GUIDELINE: **Detection:**
The weather forecast is for temperatures to fall below zero, this will put at risk the control valves freezing at the Piers Road beach vault.

- Initial Response:**
- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
 - If windchill temperatures are zero and below turn on bypass valve enough to allow small amount of water to flow
 - If below zero temperatures are forecast for a sustained period turn on base board heater.

- Next Steps:**
- When temperatures are above zero close the bypass valve.
 - Turn off baseboard heater.
 - Notify PIID and Fire Chief of back to normal service.

SOG 4.8 COLD WEATHER PH2

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: **Alert Condition**

PURPOSE: To address guidelines in the event of temperatures below zero at PH2

GUIDELINE: **Detection:**
The weather forecast is for the temperatures to fall below zero for a sustained period, this will put at risk the temperature inside the pump house, chlorination room and the shed.

- Initial Response:**
- Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
 - If below zero temperatures are forecast for a sustained period turn on base board heat.

 - When temperatures are above zero turn off base board heat.
 - Notify PIID and Fire Chief of back to normal service.

SOG 4.9 ISLAND FIRE

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: **Potential Disaster Condition**

PURPOSE: To address guidelines to support PIVFD in the event of a fire on the Island.

SCOPE: All personnel in the Piers Island WATER Department.

GUIDELINE: **Initial Response:**

- Inform PIID and the Fire Chief Name of Contact information for Water Incident Lead, inform the Water Team is available to assist and address water concerns as required.
- Notify the EP Duty Officer the Water Team is standing by.
- If requested by Incident Command:
 - Provide continuous water flow to the water system (override the tank float switch) if requested by PIVFD:
 - PH1 turn off the solenoid.
 - PH1 open bypass valve.

Next Steps:

- Return system to normal operation when advised by PIVFD:
 - PH1 Close bypass valve.
 - PH1 turn on solenoid.

5 CONTAMINATION RESPONSE

SOG 5.1 CONTAMINATION RESPONSE

Effective Date: *Last Rev:* *Responsible: Water Trustee*

TYPE OF EMERGENCY: Disaster Condition

PURPOSE: To address guidelines when a response to contamination in the water system is required.

GUIDELINE: Detection:
An emergency incident has occurred resulting in confirmation of contamination in the water system.

Initial Communications Response:

- The Water Incident Command will immediately:
 - Contact our Drinking Water Officer (DWO)
 - Inform of how detection was determined.
 - Inform testing that has been done.
 - Request direction for additional testing and initial advisory communication.
 - Notify PIID and Fire Chief of the incident identifying Type and Severity and Name and Contact information for Water Incident Command.
 - Contact the EP Duty Officer to issue an advisory as directed by the DWO.

Initial Incident Response:

- Some or all of the following guidelines may be required depending on the type of emergency incident.
- Check for the extent of contamination in the Distribution System:
 - Take samples as directed by the DWO, these may include:
 - Water samples for Coliform, Free and Total from Water Tank and at Residents: 68E, 89, 109, and 139).
 - Contact our Drinking Water Officer (DWO) when testing results received:
 - Request direction for advisory communication to islanders.
 - Request the EP Duty Officer to issue an advisory as directed by the DWO.
- If required, shut off water to individual properties:
 - Depending on the scope and severity residents and water team members may be required shut off water by quadrant or entire island.
- Advise PIVFD the state of water availability.
- If water supply can be used with Boil Water Advisory check the water tank level:
 - If water level sufficient to supply island, notify residents of a Boil Advisory and limit water use.
 - If the water level is below 24000 gallons, notify PIVFD.
 - If the water level is below 5000 gallons (not sufficient), Develop an Emergency Water Supply System. Refer to [Appendix B](#) - Alternate Drinking Water Sources
- If water supply can not be used with Boil Water Advisory:
 - Develop an Emergency Water Supply System. Refer to [Appendix B](#) - Alternate Drinking Water Sources

- Request the EP Duty Officer to issue communications to islanders.

Next Steps:

- Maintain close communications with the DWO and the Water Trustee.
- When the initiating incident and all associated repairs have been completed some or all the following guidelines may be required:
 - Disinfect Water Distribution System:
 - Implement Undersea Waterline flushing guidelines.
 - Implement Watermain flushing guidelines.
 - Implement home water line flushing guidelines.
 - Implement Water Tank Cleaning guidelines.
 - Leave high level of chlorine in Water Distribution System for 24 hours.
 - At every disinfectant stage continue taking water samples.
 - When positive test results received:
 - Notify DWO to obtain approval to lift all Advisories.
 - If approved, Request the EP Duty Officer to issue communications to residents that Advisory has been lifted.

Implement Next Steps of the initiating SOG.

APPENDIX A
WATER SYSTEM EMERGENCY CONTACT LIST

The Emergency Contact List provides a list of on-island and off-island contacts for the Water System.

<i>Piers Island Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
<i>Piers Island Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
PIID Trustee (Water)	John de Jong	604-740-1812	604-740-1812
Water Systems Manager	Gary Cooney	778-677-6061	778-677-6061
Water Operator	Philippa White	250-656-0568	250-415-9060
Water Operator	Velvet Warrior	250-655-1101	250-514-8318
Water Operator	Katie Steenman	778-350-9247	778-350-9247
Piers Island Fire Chief	John Hall	250-654-0753	250-654-0753
Emergency Program Coordinator	Velvet Warrior	250-655-1101	250-514-8318
PIID Trustee (Chair, BL&I)	Dennett Woodland	250-812-1482	250-812-1482
PIID Trustee (Fire)	Steve Chang	250-858-8980	250-858-8980
PIID Secretary	Velvet Warrior	250-655-1101	250-514-8318
<i>Island Health Authority Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
Public Health Engineer	Morgan Martin	1-250-731-1355	
Medical Health Officer, Van Isl.	Dr. Reka Gustafson	250-519-3406	
Environmental Health Officer	Janek Kobylarz		
IHA After Hrs. Emergency	IHA, South Island		1-800-204-6166
<i>Water Ops Services Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
Lab Services	MB Labs	250-656-1334	250-656-0470
Chlorination System Servicing	TBD		
<i>Capital Regional Distr. (CRD)</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
CRD Mgr. Water Quality Operations	Christoph Moch	250-474-9603	
CRD Mgr. Lab Services	Jennifer Blaney	250-216-9185	
CRD Water Quality Officer	Jessica Dupuis	250-474-9643	
<i>Ministry of Municipal Affairs</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
Infrastructure and Finance	Joshua Craig	250-387-4060	
Governance and Structure	Braden O'Neill	250 387-4020	
<i>North Saanich Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
Superintendent Public Works	Andy Duff	250-655-5481	250-360-8285
Utilities Foreman	Andy Neulette	250-418-5693	250-360-8285
Utilities Operator	Dino Sartori	250-686-5062	250-360-8285
<i>Piers Island Contacts</i>	<i>Name</i>	<i>Phone</i>	<i>Cell/Emergency</i>
Fresh Water Contamination	Environ. Protection	1-800-663-3456	
Ocean Contamination	Coast Guard	1-800-889-8852	
Department of Fisheries	24 Hour Emergency	1-800-465-4336	1-800-465-5336
Hospital	Saanich Peninsula	250-544-7676	
Radio Station, News line	CFAX 1070	250-381-6397	
TV Station, News line	CHEK TV	250-480-3700	
Newspaper	Times Columnist	250-380-5211	

PIWD Emergency Response Plan – March 2025

BC Hydro Outage	Emergency Line	1-888-769-3766	1-888-769-3766
Excavation Services	Steve Thorton		
Bottled Water Supplier	Thrifty Foods	250-656-0946	
Bulk Water Supplier	South Island Water Ltd	250-516-5066	250-664-6264
Underwater Line Work	Cold Water Divers	250-888-2601	250-888-2601

APPENDIX B

ALTERNATE DRINKING WATER SOURCES

This could include arranging (see Appendix A for contact information):

- bottled water delivery from Emergency Response Coordinator or Thrifty Foods in Sidney.
- bulk water delivery from South Island Water Ltd.

Water from the lower reservoir could be provided for non-potable use or potable use through the certified water purification container.

Work closely with the Piers Island Emergency Response Coordinator.

APPENDIX C

DROUGHT ADDENDUM per VIHA INSTRUCTIONS

We follow CRD direction and if our supply is contaminated, reduced by drought, or completely lost. The Piers Island Emergency Program encourages residents to have 14 days water supply for themselves. If additional supply of bottled water to our community was required, The Piers Island Emergency Program Coordinator would contact the Area Emergency Program Coordinator to help us secure water (part of the normal procedure for the Southern Gulf Islands Area), or in the worst case, the Piers Island Emergency Program has filters that could make the reservoir water drinkable.

- Piers Island priority users of the water supply:
 - 139 residential connections, approximately 50 full-time residents.
 - Piers Island Volunteer Fire Department
 - Industry is not present on Piers Island

- Acceptable uses of the water supply
 - During drought conditions non-full-time residents will be asked to leave the island and full-time residents will be asked to secure their own bottled water, if possible, (as per recommendations of the Piers Island Emergency Program).
 - Water supply use will be limited or shut off for human consumption.

APPENDIX D

PROCEDURES REQUIRED TO SUPPORT SOGs

SOG 1.5 – Update Procedure: Disinfecting the Water Distribution System.

SOG 2.1 - Develop Template: Water Incident Action Plan.

SOG 3.7, 4.1 –Update Procedure: Water Tank Manual Chlorination.

SOG 5.1 - Develop Procedure: Home Water Line Flushing.

- Update Procedure: Water Tank Cleaning.