AGLG
AUDIT REPORT
MAY 29, 2017

AUDITOR GENERAL FOR LOCAL GOVERNMENT

ACCESSIBILITY • INDEPENDENCE • TRANSPARENCY • PERFORMANCE

LOCAL GOVERNMENT'S ROLE IN ENSURING CLEAN DRINKING WATER

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

A Performance Audit Carried out by the
Auditor General for Local Government of British Columbia

MESSAGE FROM THE AUDITOR GENERAL FOR LOCAL GOVERNMENT

To the Chair and Board of the Regional District of Okanagan-Similkameen:

I am pleased to present this performance audit report on the management of drinking water services by the Regional District of Okanagan-Similkameen.

Our performance audits are independent, unbiased assessments, carried out in accordance with professional standards. They aim to determine the extent to which the area being examined has been managed with due regard to economy, efficiency and effectiveness.

We conducted this audit in accordance with the standards for assurance engagements set by the Auditing and Assurance Standards Board of the Chartered Professional Accountants of Canada, and under the authority of the *Auditor General for Local Government Act*.

Providing safe drinking water is important to any community, so I hope this report is also of value to many local governments in the work that they do.

This document reflects the size and complexity of an audit that – in some ways – was three audits combined into one. It reviewed three different drinking water systems operated by the Regional District as well as the Regional District's overall governance and practices relating to drinking water. This audit explored three significant and distinct objectives, which were interconnected but each requiring detailed examination by the performance audit team and a great deal of cooperation by the Regional District and its staff.

This report describes the complexity of managing drinking water delivery in British Columbia, focusing on how the Regional District operated the three audited systems during the period covered by the audit, from source to tap.

We found that the Regional District of Okanagan-Similkameen met some of our core expectations: its governance structure supported the provision of clean drinking water, it implemented water conservation and demand management initiatives and it operated infrastructure that was adequate to ensure that drinking water could meet the Guidelines for Canadian Drinking Water Quality in two of the three systems we examined.

However, the Regional District did not take a systematic, proactive approach in several key areas that would help ensure successful drinking water management into the future.

The result of our performance audit process is this substantial document, which I urge you to read in full, as it identifies strong practices in some areas as well as other areas where the Regional District could strengthen its management of water services. I believe there is a great deal of information here that is relevant to the many other local governments across the province that also manage water services.

I want to thank the Regional District of Okanagan-Similkameen for your cooperation during the performance audit process and your action plan in response to our findings and recommendations.

Gordon Ruth, FCPA, FCGA
Auditor General for Local Government
Surrey, BC

TABLE OF CONTENTS

LIST OF EXHIBITS

EXECUTIVE SUMMARY

1. The well-being of every British Columbian—and every BC community—depends on access to clean drinking water. For many of us, that water is provided by our local government and the job that it does in planning for, sourcing, where necessary treating and delivering that water to us is one of its most critical functions.

2. Because of this, we would expect a local government to effectively manage the water systems for which it is responsible to ensure drinking water safety and reliability over the long term.

WHAT WE EXAMINED

3. The overall purpose of this audit was to provide an objective independent examination of the Regional District of Okanagan-Similkameen's drinking water services. Specifically, we set out to answer three questions, which reflect our audit objectives:

- Did the Regional District's governance structure and activities support the provision of clean and safe drinking water where and when needed?
- Did the Regional District manage its drinking water supplies to meet current and expected future demand?
- Did the Regional District ensure the safety and reliability of drinking water provided through its treatment and distribution systems?

4. We examined relevant documentation and data and we held discussions with key management and staff, elected officials and a range of other stakeholders. We also made observational visits to the three water utilities on which the audit focused: Naramata, Faulder and Olalla.

WHAT WE FOUND

5. The Regional District was successful in meeting some of the core expectations included in each of these objectives; however, it lacked processes and had not completed some initiatives that would help ensure successful drinking water management into the future.

GOVERNANCE AND REGIONAL DISTRICT-WIDE ACTIVITIES

6. The Regional District had a governance structure that supported the provision of clean and safe drinking water, but it lacked a systematic, proactive approach to providing drinking water and—in several key areas—was operating with outdated guidance.

7. For example:

- The Regional District's policy covering the potential acquisition of existing water systems was outdated and did not provide sufficient guidance to the transfer process
- The Regional District lacked several important plans and policies to guide long-term water-related capital project decision-making
- It did not use full cost recovery in determining the price of water in any of the three water systems we audited and had not reviewed their cost effectiveness
- It did not publically report on drinking water related performance indicators and lacked a formal continual improvement management framework
- It lacked organization-wide or water system level business continuity plans

MANAGEMENT TO MEET DEMAND

8. The Regional District collaborated with stakeholders to assess its water supplies for the three water systems and chose sustainable primary water sources for each. It had numerous conservation and demand management-related initiatives and had begun work on drought and flood management, as well as leak detection. The Regional District had promoted public awareness related to source water protection and conservation.

9. However, the Regional District was not fully prepared to meet future demand or respond to potential crisis situations. For example:

- The Regional District's choices of secondary or backup drinking water sources were lacking or not practical
- While it took steps to protect groundwater wells, it did not have a strong focus on source water protection or bylaws in place to support it
- Bylaws relating to water conservation were outdated and not enforced
- It did not follow a comprehensive preventative maintenance schedule

ENSURING SAFETY AND RELIABILITY

10. The Regional District's infrastructure for two of the three audited systems was adequate to provide drinking water meeting the Guidelines for Canadian Drinking Water Quality. It implemented several aspects of the provincial government's multi-barrier approach and was committed to having trained and credentialed utility operators in place. The Regional District provided relevant educational materials to water users and communicated with them about the quality, safety and reliability of water from the three audited systems.

11. However, there were also some gaps in this area, including:

- The Regional District did not take a systematic approach to managing the three water systems' operations
- Its long-term asset management was lacking and its planning, tracking and reporting of maintenance on the three systems was incomplete
- It managed infrastructure-related risks informally, based on experience rather than on planning
- While it had emergency response plans, they were not tested, practised or consistently implemented

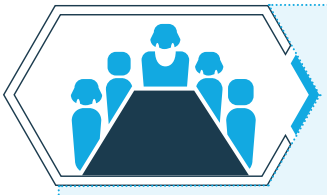
LOOKING AHEAD

12. To more effectively manage its water services and be better prepared for the future, the Regional District needs to be more proactive, considering best practices and applying them, as appropriate, across the organization's water systems.

13. The Regional District has many plans and initiatives related to drinking water and would benefit from a more strategic and cohesive approach that brings together areas such as source protection, demand management, emergency management and business continuity. It should ensure that its plans are up-to-date, relevant and include action plans that are actually implemented.

SUMMARY OF RECOMMENDATIONS

Exhibit 1 - RECOMMENDATIONS



GOVERNANCE STRUCTURE AND ACTIVITIES SUPPORTING DRINKING WATER SERVICES

1. The Regional District of Okanagan-Similkameen should continue moving forward with those water-related initiatives identified in its regional growth strategy that are within its mandate and develop performance measures to assess its progress. These should be reported to the Board and the public on a regular basis.

2. The Regional District of Okanagan-Similkameen should update its water system governance transfer policy and identify actions and timelines for processes that take place following an acquisition, such as updating legacy bylaws, reviewing existing governance and advisory structures and others.

3. The Regional District of Okanagan-Similkameen should continue developing an asset management framework to enable it to make informed, cost-effective asset investment decisions – including decisions related to water systems – based on known asset conditions, risk analysis, full lifecycle costing and potential sources of revenue.

4. The Regional District of Okanagan-Similkameen should consider a full cost recovery approach as part of its water service planning that:

- Ensures that funding for water systems is sufficient to sustain them indefinitely and that funds are appropriately spent
- Promotes more efficient use of water, allowing the deferral of capacity expansions and the reduction of costs

5. The Regional District of Okanagan-Similkameen should improve data collection, analysis, monitoring and reporting on its water services as part of a continual improvement process. This should include:

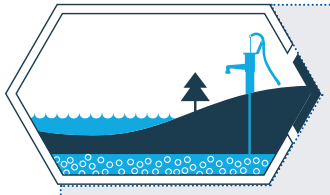
- A performance measurement system for its water services
- Monitoring of progress
- Regular reporting to the Board, senior management and public on results

6. The Regional District of Okanagan-Similkameen should implement information technology (IT) general controls over its SCADA system and other related systems and treat them as part of its IT infrastructure, subject to organization-wide IT policies and procedures.

7. The Regional District of Okanagan-Similkameen should complete business continuity planning for its critical services – including drinking water – to ensure the continuation of service and sustainable infrastructure throughout potential disruptions.

8. The Regional District of Okanagan-Similkameen should enhance its emergency and contingency planning by:

- Ensuring that emergency response plans are regularly updated, tested, made accessible and familiar to all staff
- Ensuring that backup power is available for all water systems
- Providing backup pumps and motors onsite at the Faulder water facility



SOURCE WATER PROTECTION

9. The Regional District of Okanagan-Similkameen should develop a source water protection plan for Naramata that identifies risks and addresses the Regional District's contributions to source water protection. It should consider enhancing the existing plans for Faulder and Olalla.

10. The Regional District of Okanagan-Similkameen should take steps to mitigate risks identified in the Olalla Groundwater Protection plan to the 60-day well capture zone.

11. The Regional District of Okanagan-Similkameen should consider the addition of source water protection regulations to relevant bylaws, where appropriate, as they are reviewed and updated and as new bylaws are developed.

12. The Regional District of Okanagan-Similkameen should engage with relevant stakeholders and other water systems in the region to:

- Understand regional risks related to source water
- Improve regional conservation strategies, drought and climate change responses
- Improve planning of drinking water supply
- Build community support for source water protection

13. The Regional District of Okanagan-Similkameen should ensure that it has feasible plans for the implementation of backup options for drinking water supplies in the case of primary water supply service disruption.

14. The Regional District of Okanagan-Similkameen should develop a regional district-wide water conservation and demand management strategy that:

- Implements water accounting or similar analysis to determine the operational efficiency of its water systems
- Identifies innovative water conservation activities targeted at areas likely to bring the greatest benefits and meet projected future needs
- Takes into account drought management plans already identified
- Includes an action plan, implementation schedule and performance measures for each water system
- Aligns with updated water-related bylaws and an updated strategy to maximize bylaw compliance

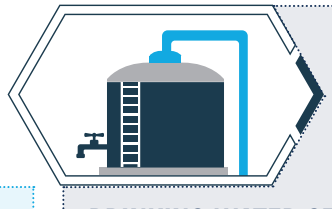
15. The Regional District of Okanagan-Similkameen should consider implementing a structured and results-based approach to water accounting to manage drinking water consumption and losses.

DRINKING WATER TREATMENT AND QUALITY MANAGEMENT

16. The Regional District of Okanagan-Similkameen should resolve issues that prevent it from operating the Faulder Water System's newly-installed uranium treatment plant and well in order to meet the Guidelines for Canadian Drinking Water Quality.

17. The Regional District of Okanagan-Similkameen should consider improving its quality control processes over water quality reports.

18. The Regional District of Okanagan-Similkameen should implement a formal routine maintenance and inspection program for all of its water treatment facilities, including schedules and monitoring of task completion.



DRINKING WATER STORAGE AND DISTRIBUTION

19. The Regional District of Okanagan-Similkameen should review its water storage and distribution operating standards and formalize and document its procedures, including inspection, testing and operational oversight.

20. The Regional District of Okanagan-Similkameen should ensure that each of its water systems has a working backup power system available to pump water at the required flow and pressure.

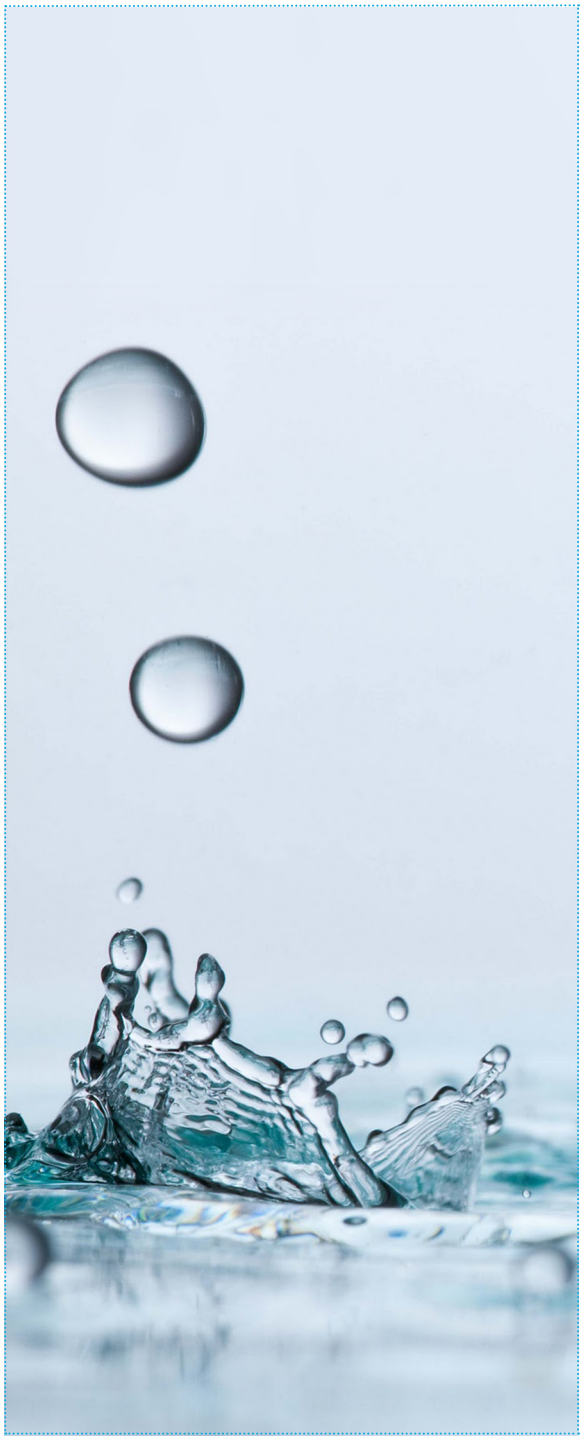
21. The Regional District of Okanagan-Similkameen should implement a formal cross connection control program and evaluate it as necessary to prevent drinking water contamination.

22. The Regional District of Okanagan-Similkameen should implement controls for its automated monitoring systems to ensure security is maintained and communication of system error or failure is investigated as soon as possible.

COMMUNICATION AND PUBLIC AWARENESS

23. The Regional District of Okanagan-Similkameen should build on its communications and public information foundation by ensuring its communications tools are fully utilized and that drinking water-related information is consolidated, complete and up-to-date.

24. The Regional District of Okanagan-Similkameen should implement a mechanism to track and report on complaints and enquiries from the public relating to its water systems.



INTRODUCTION

14. This report presents the results of a performance audit conducted by the Auditor General for Local Government of British Columbia (AGLG) under the authority of the *Auditor General for Local Government Act*.

15. We conducted this audit under the audit theme "Environmental Programs and Services." Sound environmental management is of interest to all local governments and the public at large. How local governments use and manage resources for this is a growing area of challenge that affects public health and safety.

16. We selected the Regional District of Okanagan-Similkameen and the City of Kelowna to be included in this set of audits. These two auditees represent different forms of local government (the former a regional district and the latter a municipality), located in a semi-arid, drought-affected region. The Regional District relies on both groundwater and surface water sources, while the municipality relies on surface water. Both operate water systems.

17. We may conduct more audits on drinking water services in the future, as this is a major area of local government activity.

18. The overall purpose of this performance audit was to provide an objective independent examination of the Regional District's drinking water services to determine if the local government provides clean and safe drinking water where and when needed. This audit focused on three separate but connected objectives. We set out to answer the following questions:

- Did the Regional District's governance structure and activities support the provision of clean and safe drinking water where and when needed?
- Did the Regional District manage its drinking water supplies to meet current and expected future demand?
- Did the Regional District ensure the safety and reliability of drinking water provided through its treatment and distribution systems?

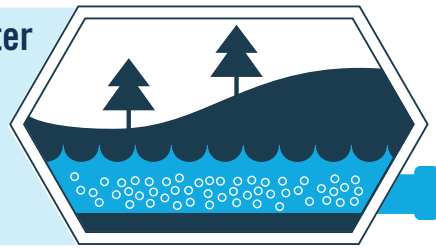
19. To answer these questions, we examined a range of different factors related to the Regional District's governance, planning and operation of drinking water services (see the About the Audit section for detailed information on the audit criteria). We examined relevant documentation and data and we held discussions with key management and staff, elected officials and a range of other stakeholders. We also made observational visits to the three water utilities that were within the scope of the audit: Naramata, Faulder and Olalla.

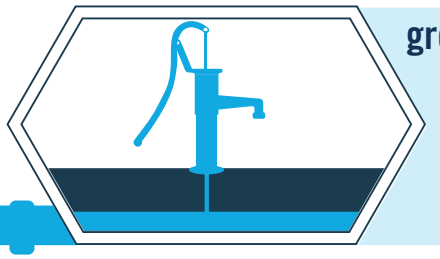
20. For our first objective on governance structure and activities we looked at the Regional District as a whole. For the second and third objectives, we focused our examination on the three selected water utilities. *Exhibit 3* describes these three systems.

21. The period covered by the audit is January 1, 2014 through June 30, 2016.

WHY CLEAN DRINKING WATER IS IMPORTANT

surface water
Drinking water can come from reservoirs, lakes, rivers & streams





groundwater
Drinking water can also come from aquifers

20 to 50 liters
clean water
per day per person

- **DRINKING**
- **COOKING**
- **PERSONAL CARE**

Local services, agriculture and other businesses and industry that employ British Columbians also need a dependable supply of clean water to operate.

- **AGRICULTURE**
- **BUSINESS/INDUSTRY**
- **LOCAL SERVICES**

900

Estimated **900 million** people globally face serious health consequences due to polluted drinking water

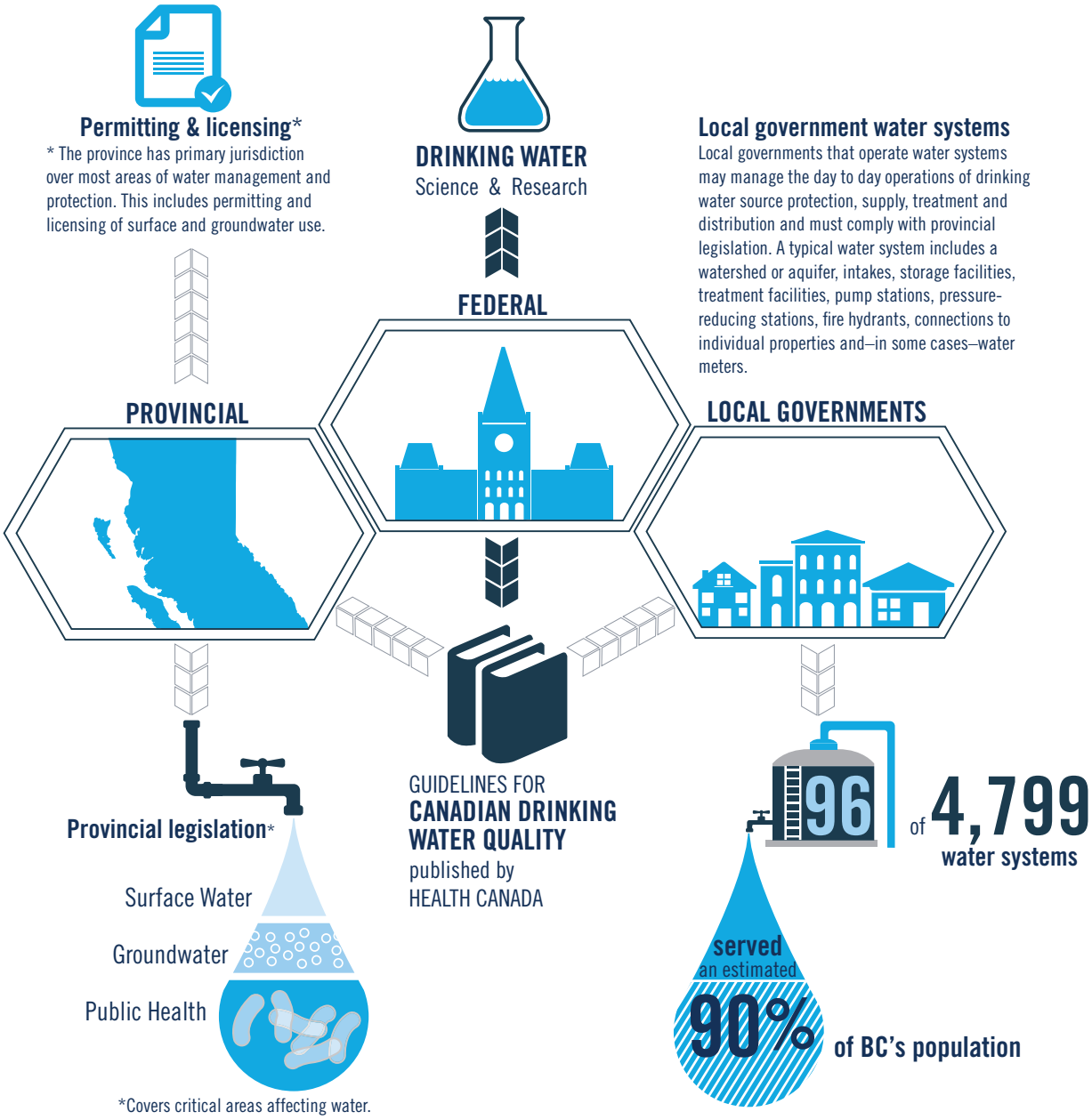
599
BOIL WATER

599 notices were in effect across the province as of March 31, 2012

Access to clean drinking water depends on water providers acting appropriately at each stage of the process.

- **source water protection**
- **drinking water systems**
- **drinking water quality management**

RESPONSIBILITY FOR CLEAN DRINKING WATER



In addition to the BC regional districts and municipalities that are responsible for water systems to provide water for domestic, commercial, agricultural and industrial use, water services are also provided by:

- IRRIGATION AND IMPROVEMENT DISTRICTS
- PRIVATE UTILITIES
- FIRST NATIONS
- WATER USERS' COMMUNITIES
- GOOD NEIGHBOUR SYSTEMS

In 2015, the Provincial Health Officer highlighted particular challenges faced by suppliers of drinking water to small or remote communities in BC. These included inadequate treatment, difficulty attracting and retaining qualified operators, difficulty getting access to lab services in a timely way and inadequate financial resources to upgrade their systems.

REGULATION OF DRINKING WATER IN BRITISH COLUMBIA

British Columbia's Ministry of Health is the lead agency responsible for the Provincial Drinking Water Program. In this role, the Ministry works with the Ministry of Environment, Ministry of Forests, Lands and Natural Resource Operations, other ministries, the province's regional health authorities and water system providers across the province, including many local governments.

The Province also deals with drinking water through the regional health authorities that cover the entire province. The health authorities administer regulations by issuing permits and inspecting water systems, including those operated by local governments. The health authorities have drinking water officers and environmental health officers who inspect water systems and track compliance with provincial legislation. Health authorities also track and request publication of water quality advisories, boil water notices and 'do not use' water notices.

DRINKING WATER PROTECTION ACT

APPOINTMENT OF DRINKING WATER OFFICER

HEALTH HAZARDS

MONITORING WATER QUALITY

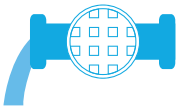
EMERGENCY RESPONSE

CONTINGENCY PLANS

PUBLIC HEALTH ACT

APPOINTMENT OF PROVINCIAL HEALTH OFFICER

COMMUNICABLE DISEASE REGULATION



SEWERAGE SYSTEM REGULATION

HEALTH HAZARDS REGULATION

WATER SUSTAINABILITY ACT

Since February 2016

BC's *Water Sustainability Act* came into effect in February 2016, focusing on water use and extending the licensing of surface water to include groundwater (wells). It recognizes the importance of environmental flows to fish and incorporates the idea of water objectives. When the BC Government establishes water objectives for a body of water, local governments must take them into account when planning for regional growth or land use.

OTHER ACTS AND REGULATIONS

There are other Acts and regulations that may apply to drinking water. For example, the *Forest and Range Practices Act* and *Oil and Gas Activities Act* and their regulations protect drinking water from the activities of those industries.

OUR EXPECTATIONS

22. We would expect a local government to effectively manage the water systems for which it is responsible to ensure drinking water safety and reliability over the long term. To achieve this, we would expect a local government to have an appropriate governance structure and overall organizational activities, including:

- A robust governance structure, organizational structure, leadership and culture that support its water systems
- A long-term drinking water strategy that considers affordability and cost effectiveness in decisions
- Adequate controls to ensure proper operation of systems and to protect access and physical security of operations

23. We would also expect a local government to manage its drinking water supplies to meet current and expected future demand through:

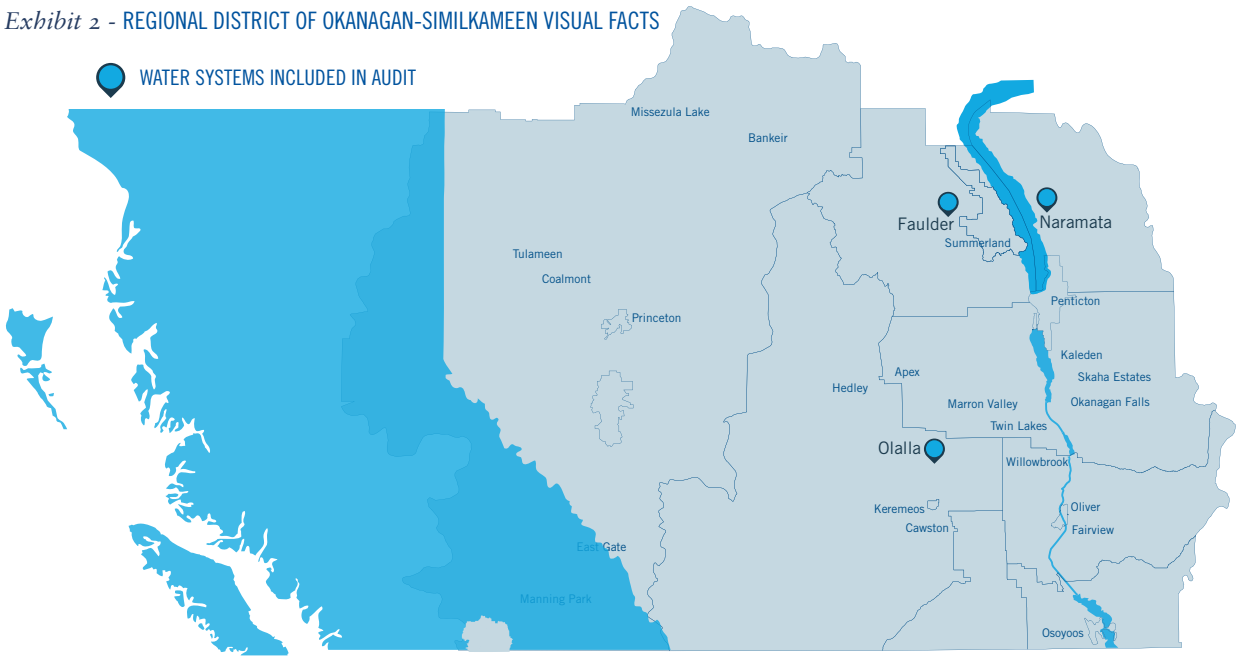
- Adequate infrastructure to meet all requirements
- Business continuity plans that focus on returning water services to full operation during disruptions
- Effective source water protection plans and bylaws, collaborating where appropriate with other organizations and stakeholders
- Rigorous assessment of available water sources, including alternative sources in case of a primary supply interruption
- Sound water conservation strategies, including demand management measures, targets and evaluation of effectiveness
- Drought management plans for all water systems
- The promotion of public awareness and transparency in all aspects of drinking water services

24. We would expect a local government to ensure the safety and reliability of drinking water provided by its treatment and distribution systems through:

- Meeting all permitting and health authority requirements
- Maintaining adequate infrastructure to meet the Drinking Water Treatment Objective, or having plans to achieve this
- Sufficiently trained operators to meet all requirements, including ongoing training requirements

CONTEXT

Exhibit 2 - REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN VISUAL FACTS



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

OVERVIEW

25. The Regional District of Okanagan-Similkameen is one of 27 regional districts in BC. The Regional District is located in the south-central part of the province and has its administrative office in the City of Penticton.

26. The Regional District covers 10,413 square kilometers, from the District of Summerland in the north to the Town of Osoyoos and the US border in the south, east to Anarchist Mountain and west to Tulameen Mountain. The Regional District includes six municipalities (Village of Keremeos, Town of Oliver, Town of Osoyoos, City of Penticton, Town of Princeton and District of Summerland) as well as eight unincorporated electoral areas (Cawston, Kaleden/Okanagan Falls, Keremeos Rural/Hedley, Naramata, Okanagan Lake West/West Bench, Rural Oliver, Rural Osoyoos and Rural Princeton).

27. The Okanagan-Similkameen is a mountainous, semi-arid region with intensive agricultural land use in the valley bottom and rangeland in the grasslands above, extending to the tree line. The region includes several major lakes (the southern portion of Okanagan Lake, Skaha Lake, Vaseux Lake and the northern part of Osoyoos Lake) and a significant portion of the Similkameen River.

28. Agriculture is a major contributor to the region's economy, as the semi-arid climate offers exceptional growing conditions, with hot summers, relatively mild winters, fertile soil and the availability of water for irrigation. Tree fruits and grapes are two major crops in the region, with major tree fruit processing facilities and dozens of vineyards, including numerous notable wineries. These contribute to another major industry in the region—tourism—which attracts a significant number of visitors, mostly during the summer months.

29. Drought and climate change are significant considerations in the region, affecting the availability of surface and groundwater. The region experienced the highest level of drought—"Extremely Dry"—during the summer of 2015.

30. As of the 2011 census, the Regional District's population was 80,742.

THE REGIONAL DISTRICT'S ROLE WITH DRINKING WATER

31. During the period covered by the audit, the Regional District of Okanagan-Similkameen was responsible for seven out of a total of 27 known water systems operating within its boundaries. These seven were: Naramata, West Bench, Faulder, Olalla, Sage Mesa, Loose Bay and Gallagher Lake.

32. The number of water systems operated by the Regional District has varied over time. In some cases (the Apex Circle Water System, for example), another operator has taken over a system previously managed by the Regional District. In other cases, an operator has asked the Regional District to take over its system (for example, the West Bench system, which the Regional District acquired in 2011). The Regional District does not control other operators in the region, so has limited ability to predict whether it will become responsible for additional systems in the future.

33. Of the seven water systems operated by the Regional District, two (Naramata and West Bench) were relatively large, with 1,102 and 352 connections respectively. The other five systems were much smaller, with between 67 and 235 connections each.

34. The Regional District owned and managed six of these seven systems. One small system—Sage Mesa—was operated by the Regional District on a contract, although it was privately owned and was managed by the provincial government.

35. Three of the Regional District's water systems (West Bench, Loose Bay and Gallagher Lake) redistributed water that came from other water supply systems, so did not involve additional treatment by the Regional District.

36. The water systems we reviewed in this audit were Naramata, Faulder and Olalla. *Exhibit 3* describes the characteristics of each of these systems.

Exhibit 3 - DESCRIPTION OF AUDITED WATER SYSTEMS

	NARAMATA WATER SYSTEM	FAULDER WATER SYSTEM	OLALLA WATER SYSTEM
Number of customers (as of 2015)	835 RESIDENTIAL, 249 AGRICULTURAL, 18 OTHER, 1,102 TOTAL	76 Residential	235 Residential
Main types of customers	Residential, agricultural	Residential	Residential
Water source	Surface water (Okanagan Lake)	Groundwater	Groundwater
Water Treatment	Ultraviolet, chlorination	No treatment. Installation of a uranium treatment plant is in progress.	No treatment
Annual total usage m3	1,737,846	37,176	233,154
Annual usage, residential	801,061	37,176	233,154
Annual usage, agricultural	936,785	-	-
Number of wells or intakes	3*	2**	1
Km of mains	54.18	3.85	5.47
Distribution system	Pumped to reservoirs then gravity fed distribution	Pumped to system, reservoirs and booster station	Pumped to reservoir and distribution system

** Includes Okanagan Lake and two creek intakes ** As of June 2016, work on one of these was still in progress*
Source: Regional District of Okanagan-Similkameen

37. *Exhibit 4* shows revenue and expenditure information for the three audited water systems in 2014 and 2015.

Exhibit 4 - AUDITED WATER SYSTEMS REVENUE AND EXPENDITURES

	2014 REVENUE	2014 EXPENSES	2015 REVENUE	2015 EXPENSES
NARAMATA	$2,098,647 (including $610,000 transferred from reserves)	$2,313,325 (including $910,000 in capital expenditures)	$1,433,254	$1,325,194
FAULDER	$211,766 (including $72,000 transfer of previous year surplus)	$210,701 (including $120,000 transferred to operating reserve)	$138,667	$109,128
OLALLA	$135,340	$121,911	$174,363 (including $43,000 in gas tax funding)	$134,287

Source: Regional District of Okanagan-Similkameen financial records

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY OF FINDINGS

38. We set out to determine whether—during the period covered by the audit—the Regional District of Okanagan-Similkameen:

- Had a governance structure and activities that supported the provision of clean and safe drinking water where and when needed
- Managed its drinking water supplies to meet current and expected future demand
- Ensured the safety and reliability of drinking water provided through its treatment and distribution systems

39. The Regional District was successful in meeting some of the core expectations included in each of these objectives; however, it lacked processes and had not completed some initiatives that would help ensure successful drinking water management into the future.

GOVERNANCE

40. The Regional District had a governance structure that supported the provision of clean and safe drinking water.

41. However, it lacked a systematic, proactive approach to providing drinking water. This was demonstrated by the Regional District's lack of an asset management framework, full cost recovery of its water services and performance measurement framework.

42. During the period covered by the audit, the Regional District was in the process of updating many of its bylaws, plans and policies related to drinking water and – in several key areas – was operating with outdated guidance.

MANAGEMENT TO MEET DEMAND

43. The Regional District collaborated with stakeholders in the southern Okanagan and Similkameen to assess its water supplies for the three water systems we focused on in this audit (Naramata, Olalla and Faulder) and chose sustainable primary water sources for each. It had numerous conservation and demand management-related initiatives and had begun work on drought and flood management, as well as leak detection. The Regional District had promoted public awareness related to conservation.

44. However, the Regional District was not fully prepared to meet future demand or respond to potential crisis situations. Its choices of secondary or backup drinking water sources for the three audited systems were lacking or not practical. While the Regional District took steps to protect groundwater, it did not have a strong focus on source water protection and having relevant bylaws in place to support it.

45. Additionally, the Regional District's bylaws relating to water conservation were outdated and not enforced. It did not track the lifecycle of its water supply infrastructure assets and did not follow a comprehensive preventative maintenance schedule.

ENSURING SAFETY AND RELIABILITY

46. The Regional District's drinking water infrastructure for two of the three audited systems was adequate to ensure that drinking water could meet the Guidelines for Canadian Drinking Water Quality. It implemented several aspects of the multi-barrier approach and was committed to having trained and credentialed operators in place.

47. The Regional District provided relevant educational materials to water users and communicated with them about the quality, safety and reliability of water from the three audited systems.

48. However, the Regional District did not take a systematic approach to managing the three systems' operations. Its long-term asset management and comprehensive preventative maintenance scheduling was lacking, even though it followed the necessary steps to keep the three systems operating in the short term.

49. The Regional District's planning, tracking and reporting of maintenance for the three systems was incomplete. Business continuity planning for drinking water services was also lacking. The Regional District managed risks informally, based on experience rather than on planning. While it had emergency response plans in place for the three systems, they were not tested, practised or consistently implemented.

LOOKING AHEAD

50. To more effectively manage its water services and be better prepared for the future, the Regional District needs to take a more proactive approach by considering best practices and applying them, when appropriate, on a Regional District-wide scale.

51. The Regional District has many plans and initiatives related to drinking water and would benefit from developing a more strategic and cohesive approach that brings together areas such as source protection, demand management, emergency management and business continuity. It should ensure that its plans are up-to-date, relevant and include action plans that are actually implemented.

52. The development of a performance management and continuous improvement process would provide the Regional District with a better understanding of how well its water services are operating. This should include key performance indicators aligned with its strategies and plans.

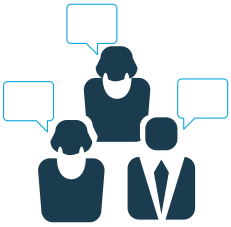
53. In addition, the Regional District would benefit from formalizing many of its current practices and improving its documentation and record management related to providing water services. These formalized processes would help ensure consistency among staff, transparency and accountability.

54. To promote public awareness more effectively, the Regional District should build on its communications and public information foundation by presenting information that is easily accessible, complete and up-to-date.

GOVERNANCE STRUCTURE AND ACTIVITIES SUPPORTING DRINKING WATER SERVICES

WHAT IS GOVERNANCE

Governance refers to the structures and processes by which an organization is directed, controlled and held to account.



GOOD GOVERNANCE

5 CORE PRINCIPLES:

- ACCOUNTABILITY
- STRONG LEADERSHIP
- INTEGRITY
- STEWARDSHIP
- TRANSPARENCY

Source: OAG BC, Public Sector Governance: A Guide to the Principles of Good Practice

GOVERNANCE STRUCTURE

55. We would expect the Regional District of Okanagan-Similkameen to have a robust governance structure, organizational structure and leadership, as well as a culture that supports its water systems, service area and customers. We would expect all of this to help the Regional District achieve its drinking water priorities and objectives.

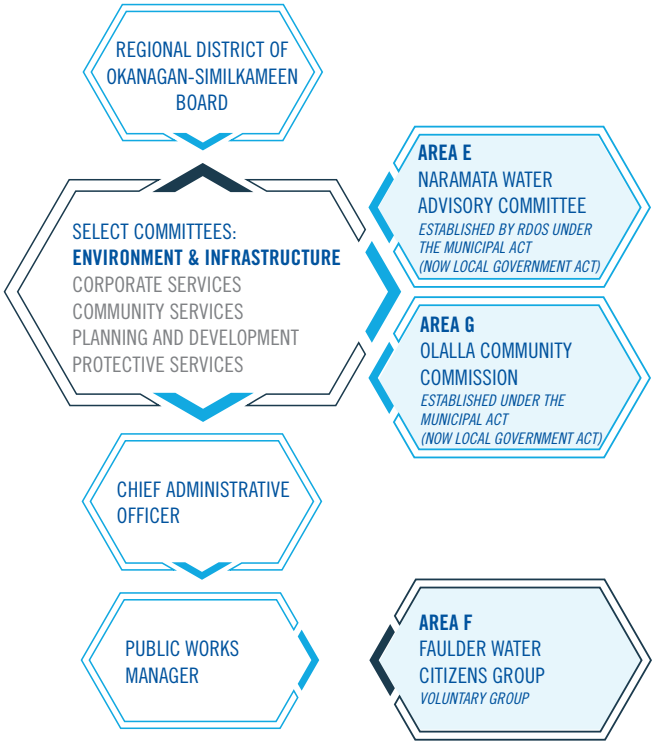
56. The Regional District used a select committee system to enable discussion in all areas among elected officials, administrative staff and the public. This was an important element of the Regional District's informed decision-making model.

57. Each of the Regional District's five select committees was a committee of the whole with its membership including all 18 Regional District Board members. The committees did not include external subject matter experts or members of the public, but were free to consult with both at their own discretion.

58. The Regional District dealt with all environmental-related issues, including water services, through its Environmental and Infrastructure Committee.

59. The Regional District conducted an internal legislative structure review in 2015, which concluded that this governance system was achieving what it was intended to accomplish for the Board.

60. In addition to oversight by the Environmental and Infrastructure Committee, two out of the Regional District's seven water systems also had formally-established advisory commissions or committees. The Olalla system had a Local Community Commission, regulated by the *Local Government Act*, and the Naramata system had a Water Advisory Committee established by the Regional District under the *Municipal Act* (now *Local Government Act*). The Faulder system had an informal community group, though interactions were infrequent during the period covered by the audit.



61. Although each of these three community groups had a unique structure, all three aimed to engage local community members in decisions regarding their water systems. Two followed written terms of reference, one of which had been recently reviewed and revised, while the Faulder group was more informal. Community groups communicated with the Regional District via their elected area director or directly with Regional District staff.

62. The Regional District dealt with issues relating to the community groups—such as clarity of roles and membership—as they arose and endeavored to work with the communities to support their water systems and customers.

63. Overall, the Regional District's governance structure supported the provision of clean and safe drinking water. We did not examine the merits of the Regional District's priorities for drinking water, as doing so would be outside our office's mandate.

DUTIES AND RESPONSIBILITIES AS OF 2016 INCLUDED:

AREA E
NARAMATA WATER ADVISORY COMMITTEE - 7 VOTING MEMBERS PLUS AREA DIRECTOR
The Committee is advisory to the Board and provides recommendations on all matters referred by the Board relating to the Naramata Water System Local Service.
The Committee considers and forms recommendations to the Board regarding proposed capital upgrades, watershed management issues, and potential boundary expansions.
The Committee reviews annual budgets, water rates and fees and charges.
The Manager of Public Works is the administrative contact to the Committee and provides quarterly operational status reports.

AREA G
OLALLA COMMUNITY COMMISSION - 4 ELECTED COMMISSIONERS PLUS AREA DIRECTOR
The Commission was delegated administrative powers by the Regional District with respect to the supply, treatment, conveyance, storage and distribution of water.
The Commission prepares a proposed provisional budget for the Olalla Water System Local Service and submits this budget to the Board.
The Commission approves payment of all current accounts for the Olalla Water System Local Service within the constraints of the provisional and final budget and submits for payment.

AREA F
FAULDER WATER CITIZENS GROUP - 3 MEMBERS
The Group provides information to the community on the Faulder water system issues and projects.

STRATEGIC PLANNING AND DECISION-MAKING

64. We would expect the Regional District to develop a long-term strategy for its drinking water services and to consider affordability and cost effectiveness in its decisions related to drinking water.

GROWTH STRATEGY

65. In 2010, the Regional District adopted a regional growth strategy, a regional vision guiding how the areas the strategy covered would grow, change and develop over a 20-year period.

66. Those areas included the southern portion of the Okanagan Valley, including Electoral Areas A, C, D, E and F as well as Osoyoos, Oliver, Penticton and Summerland. The strategy required that each official community plan in the area include a description of how it would further the strategy's overall long-term vision for the south Okanagan.

67. During the period covered by the audit, the Regional District did not have a regional growth strategy for the Similkameen area, which includes Electoral Areas B, G and H, Keremeos and Princeton. Implementation of a growth strategy in the Similkameen area would have been challenging due to the lack of official community plans and zoning bylaws in the unincorporated Areas B and G.

68. The Regional District incorporated strategic considerations related to drinking water into the regional growth strategy by including an overarching policy framework related to water service. Three out of the document's six strategic goals related to water in some way. This is summarized in *Exhibit 5*.

69. Since adopting the strategy, the Regional District undertook some initiatives related to water that aligned with the growth strategy and were within the Regional District's mandate, but did not report on its progress and more remained to be done.

RECOMMENDATION 1

The Regional District of Okanagan-Similkameen should continue moving forward with those water-related initiatives identified in its regional growth strategy that are within its mandate and develop performance measures to assess its progress. These should be reported to the Board and the public on a regular basis.

Exhibit 5 - SELECTED SECTIONS OF SOUTH OKANAGAN REGIONAL GROWTH STRATEGY RELATING TO DRINKING WATER

GOALS RELATED TO WATER SERVICES	SELECTED POLICY FRAMEWORK RELATED TO WATER SERVICES	SELECTED POLICY ACTIONS RELATED TO WATER SERVICES
ECONOMIC GOAL	Support agriculture that contributes to the local economy Enhance the diversity of the labour force	Promote the right to farm and protect the agriculture industry, including its water allocation. Support and encourage research and development initiatives and programs, including water management.
INFRASTRUCTURE GOAL	Recognize the critical link between water resource management, human settlement and effective growth management Apply innovative and best management practices to increase efficiencies and reduce environmental impacts of infrastructure	Integrate stormwater management with provincially-mandated watercourse protection strategies. Support projects to improve resource management, including water conservation and reuse, and groundwater management.
ENVIRONMENT GOAL	Support environmental stewardship strategies Reduce contribution to and increase adaptation to climate change Promote water sustainability through conservation and related best practices	Promote conservation and sustainability of watersheds, wetlands and riparian areas. Consider rebate programs for high-efficiency fixtures, appliances and water efficiency. Manage the water resource capacity and efficiency, support the development of an inter-regional Water Plan, collaborate on management, outreach and education, conservation, provision of adequate water resources, protection of access to adequate water, cut back water use in times of drought, promote the implementation of universal metering for water service, create partnerships.

Source: South Okanagan Regional Growth Strategy 2010

STRATEGIC PLANNING PROCESSES

70. The Regional District had a well-developed annual corporate strategic planning process. This included annual updates to its Five-Year Strategic Plan, which established the Regional District's direction. In addition, the Regional District developed an annual corporate business plan describing corporate objectives in pursuit of the strategic plan's goals. The Regional District measured its success in achieving these corporate objectives on a quarterly basis.

71. The Regional District supported its annual corporate business plan through individual departmental business plans. The Public Works Department's plan was aligned with organizational key success drivers and listed specific actions and deliverables for the year, including those relating to the Regional District's individual water systems.

Interdependency Workshops

After the period covered by the audit, the Regional District conducted a corporate interdependency workshop as part of its annual strategic planning cycle.

The purpose of these workshops was to break functional silos, minimize cross-functional conflicts, effort duplication and miscommunication and promote information sharing.

The Regional District's intent was to encourage departments to work harmoniously to complement each other's strengths and to ensure that middle management can deal with the realities of cross-functional interdependence.

72. The Regional District also developed an Enterprise Risk Management Plan, which complemented and expanded upon its strategic plan. This plan's risk register identified the following risks relating to water services:

- Inability to provide safe water (quantity and quality)
- Failure of system
- Power failure, sabotage
- Taking on new water systems
- Asset age/maintenance

73. The Regional District ranked each of these risks as a "low or moderate threat" that did not require a risk mitigation strategy. Risks related to water services remained stable over the period covered by the audit, except for two risks:

- Taking on new water systems – The risk rating doubled in 2016 due to potential future acquisitions and/or management of aging/deteriorating water systems currently operated by other water providers
- Asset age/maintenance – The risk rating decreased by one-third over the period covered by the audit due to continuous efforts to replace aging infrastructure

74. The first of these risks relates to the Regional District's history of taking over responsibility for water systems when existing water providers have been unable or unwilling to continue operating them. These have been typically older systems in need of significant capital investments. Since 2011, the Regional District has taken on two such water utilities: West Bench (2011) and Willowbrook (2016, immediately following the period covered by the audit).

Taking Over a Water System

All drinking water systems must comply with the *Drinking Water Protection Act* and regulations. In some cases, compliance requires significant capital investments that the users of small water systems may be unable to afford.

While infrastructure funding from provincial and federal governments may be available for some projects, it limits this funding to regional districts and municipalities. Local governments, upon agreement, might also apply on behalf of improvement districts for funding required to rehabilitate their water systems infrastructure.

As a result of lack of access to grant funding and other factors, some water utilities owned by others have considered turning over ownership of their systems to local governments.

The Ministry of Community, Sport and Cultural Development states that each service provided by a regional district has its own operating and capital budgets, the costs of which are recovered only from the area that benefits from the service.

A regional district's decision to take over a water system is made by the regional board, although the electors or representatives of the affected areas must agree, as they will pay for the service.

The Regional District of Okanagan-Similkameen reserves the right to refuse acquiring a water utility for reasons such as undue risk or legal liability, capacity constraints, failure to meet required standards, lack of a valid water licence and others.

Once a regional district establishes a water supply service, the regional district board continues to be involved in certain instances, but decisions specific to a particular utility are the responsibility of the board members representing the areas receiving the service. In this way, the representatives of those who receive the service decide how it will be run.

75. Because the Regional District's acquisition of water systems tends to be at the initiative of the previous system operator, it is difficult for the Regional District to plan for them. The Regional District has had little control over the timing of these acquisitions and each time has inherited the system's condition and governance structure.

76. On July 1, 2016, immediately after the period covered by the audit, the Regional District took over the Willowbrook water system, which was established in 1972. Work on completing this acquisition was underway during the period covered by the audit.

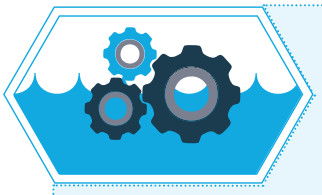
77. The Regional District was guided through this process by its Governance Transfer Policy - Improvement District/Private Water Utility. This policy was established in 1999 and most recently amended in 2002.

78. The policy outlined several factors the Regional District should consider in assessing a water system it is considering for acquisition. These considerations include legal, financial and engineering aspects. However, the policy did not provide sufficient guidance to the overall transfer process. For example, it did not guide the scope of the water utility transfer, which parties should be involved and their roles and responsibilities throughout the process and others.

79. Regional District was in the process of updating this policy and staff told us that a new policy would be in place in 2017.

RECOMMENDATION 2

The Regional District of Okanagan-Similkameen should update its water system governance transfer policy and identify actions and timelines for processes that take place following an acquisition, such as updating legacy bylaws, reviewing existing governance and advisory structures and others.



Investments in Water Infrastructure

Infrastructure renewal and expansion is fundamental to providing British Columbians with a dependable supply of safe drinking water.

Unlike in their management of some other services, local governments must (with a few exceptions) get electoral approval (through referendum or alternative approval process) each time they plan for a water infrastructure requiring long-term borrowing.

Local governments may face challenges if they cannot obtain electors' approval to borrow for needed water services capital projects. In certain situations, this could result in difficulty maintaining compliance with regulations, deferred maintenance of water infrastructure, degradation of water system infrastructure and long-term water service sustainability issues.

Source: Information from Ministry of Community, Sport and Cultural Development

CAPITAL PLANNING AND RESERVES

80. In British Columbia, the Community Charter and the *Local Government Act* require every local government to annually approve a financial plan covering at least a five-year period. Among other things, this plan must set out the funds required for capital purposes.

81. The Regional District updated its Five-Year Financial Plan each year as required, including plans for individual water services. However, its long-term planning did not extend beyond the minimum required timeframe. In fact, Regional District staff told us that the only certainty in its planning horizon for water systems capital works and investments was in the immediate 12-month timeframe.

82. In addition, the Regional District lacked several important plans and policies to guide long-term water-related capital project decision-making. For example, it lacked:

- A capital asset management plan, including a long-term capital investment strategy detailing the timing of anticipated future water system capital infrastructure projects
- A funding strategy or options for funding future capital investments, including a clear statement of the key assumptions on which it is based
- A policy on the establishment and use of capital reserves, including reserves to cover unplanned maintenance and repairs

83. Regional District staff told us that the Board's philosophy had consistently been to keep reserve levels low and rely on infrastructure grants and/or borrowing instead. We noted that for two of the three water systems we reviewed, capital reserve balances were low or non-existent. This is shown in *Exhibit 6*.

Exhibit 6 - RESTRICTED RESERVES FOR THE AUDITED WATER SYSTEMS - *IN THOUSANDS*

WATER SYSTEMS	2015 OPENING BALANCE	CONTRIBUTIONS	INVESTMENT GAINS	TRANSFERS	2015 CLOSING BALANCE
Naramata	$1,852	$212	$41	-	$2,104
Faulder	-	-	-	-	-
Olalla	$167	-	$4	-	$171

Source: Regional District of Okanagan-Similkameen Audited Financial Statements as of December 31, 2015

84. After the period covered by the audit, the Regional District approved an Asset Management Investment Plan, a first foundational step toward developing an overall asset management framework.

RECOMMENDATION 3

The Regional District of Okanagan-Similkameen should continue developing an asset management framework to enable it to make informed, cost-effective asset investment decisions—including decisions related to water systems—based on known asset conditions, risk analysis, full lifecycle costing and potential sources of revenue.

WATER RATES

85. The *Local Government Act* gives the Regional District Board the power to establish fees and charges for various services, including water supply service. The Ministry of Community, Sport and Cultural Development states that the amount of a fee or charge is chosen to provide enough money to recover costs and ensure service will continue in the future. Fees are generally applied on a user-pay basis so that only those who benefit from a particular service bear the cost of it.

86. During the period covered by the audit, the Regional District provided water supply service to seven water systems. As required by the *Local Government Act*, the management of these utilities was guided by their service establishment bylaws. Each service had its own operating and capital budgets with the costs recovered only from the area that benefited from the service. The Regional District adopted annually a Fee and Charges By-law that included individual water services.

87. In determining the price of water in the three systems we audited, the Regional District did not use full cost recovery as a means to help ensure that funding for water systems would be sufficient in the long term, and did not set water rates based on individual customer usage.

88. While the Official Community Plan for Area E (Naramata) recognized the importance of full cost pricing of water and called for this approach to be taken, no process had ever been initiated to implement this policy direction.

89. Generally, the Regional District based budgets and water rates for the three audited systems on covering the short-term costs of operating each water system. Rate-setting was based on historical trends, with inflationary and/or service-level adjustments, plus adjustments to cover debt financing or other costs expected over the next 12 months.

Full Cost Recovery Full Cost Pricing

Full Cost Recovery—generates sufficient revenues through user rates and charges to cover the full cost of water services. These include operations, maintenance and administration, research and development, financial, capital works (for expansion, upgrade, rehabilitation and renewal including planning, pilot testing, pre-design, design and land acquisition), decommissioning of disused works and source protection.

An asset management plan should be developed in order to project the costs for renewal of systems over both the short term and the long term. An asset management plan requires an inventory of assets, condition assessments and an evaluation of alternatives that is based on life cycle costs.

Full Cost Pricing—achieves cost recovery through the use of user rates and charges, without reliance on grants and/or general tax revenues. Full cost pricing:

- Generates enough revenue for water service providers to cover the full costs of services, including infrastructure maintenance and replacement
- Signals the actual costs of supplying water and provides a financial incentive for customers to use it more efficiently
- Promotes innovation by encouraging engineers, inventors and investors to develop more water-efficient practices and technologies

Source: Federation of Canadian Municipalities and National Research Council, Water and Sewer Rates: Full Cost Recovery

Water Price Restructuring

In Canada, a number of local governments have started water price restructuring with good success, including Toronto, Guelph and Halifax.

Information on how these adjustments were implemented is readily available to assist others interested in working toward long-term sustainability of their water systems.

Source: University of Victoria's POLIS Water Sustainability Project: Worth every Penny: A Primer on Conservation-oriented Water

90. The Regional District sought to keep water rates relatively low by subsidizing infrastructure costs through sources such as infrastructure grants from provincial and federal governments. Staff told us that the Regional District relied on grants because most of its water systems had small tax bases and limited ability to fund large capital projects without additional funding.

91. The Regional District had not reviewed the cost effectiveness of its individual water systems since acquiring them. The only exception to this was the West Bench water system, which—after installing water meters—hired a consultant in 2016 to review water meter data and develop rate options with a volume-based component.

92. Adopting a full cost accounting approach would enable the Regional District to consider the complete life cycle of each asset when setting rates. The Regional District's success in developing its Asset Management Framework plays a significant role in the process.

RECOMMENDATION 4

The Regional District of Okanagan-Similkameen should consider a full cost recovery approach as part of its water service planning that:

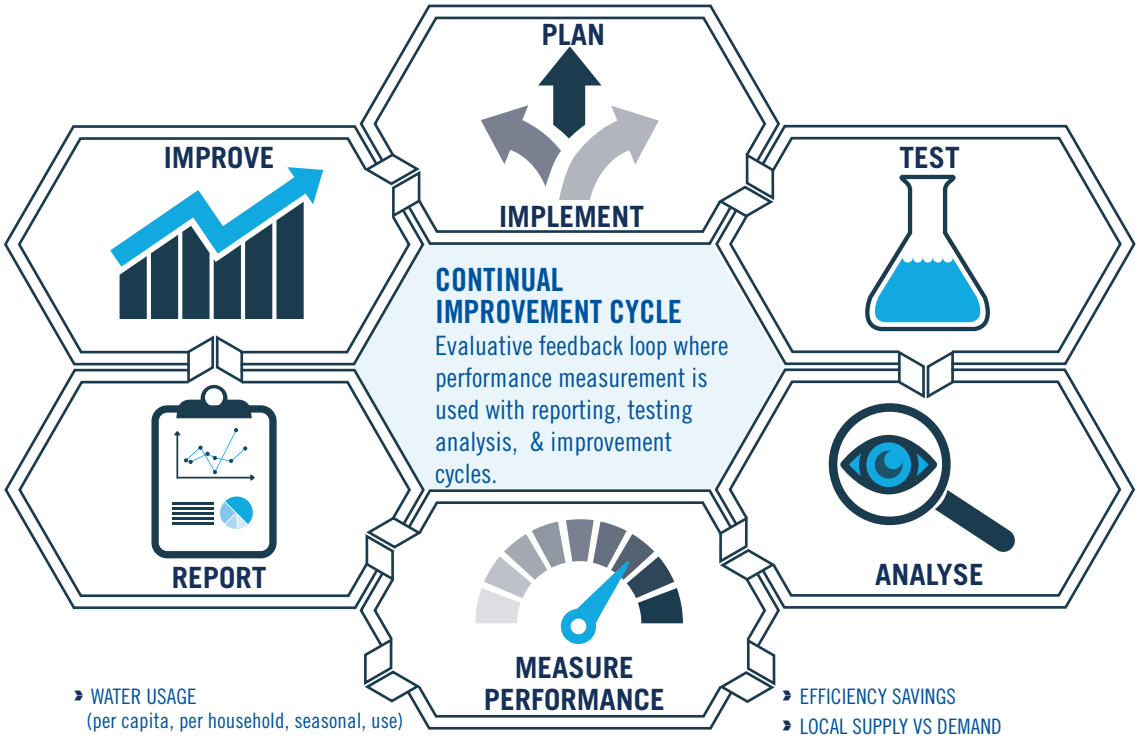
- Ensures that funding for water systems is sufficient to sustain them indefinitely and that funds are appropriately spent
- Promotes more efficient use of water, allowing the deferral of capacity expansions and the reduction of costs

PERFORMANCE MEASUREMENT AND CONTINUOUS IMPROVEMENT

93. Water suppliers can face significant challenges in trying to maintain or improve the quality of water while maintaining reasonable prices. These challenges may include:

- Customer demand for increased levels of service
- Financial constraints
- Aging infrastructure
- Security and emergency response concerns
- Population growth
- Climate change and pressure to reduce environmental impacts
- Stricter regulatory requirements

94. By measuring its progress toward meeting these challenges, a local government can take on a more strategic approach and focus on continually improving its processes. Performance measurement supports planning, informs decision-making and helps demonstrate accountability. It makes it possible for a board and senior management to take oversight of water services beyond budgeting and reviewing reports describing accomplishments.



- WATER USAGE (per capita, per household, seasonal, use)
- WATER SERVICE DISRUPTION
- SUPPLY DISRUPTION
- OPERATING AND MAINTENANCE COST PER WATER VOLUME TREATED OR DELIVERED
- NUMBER OF WATER LEAKS REPAIRED
- WATER NOT ACCOUNTED FOR
- EFFICIENCY SAVINGS
- LOCAL SUPPLY VS DEMAND
- BILLING ERRORS PER NUMBER OF ACCOUNTS
- RATIO OF PLANNED MAINTENANCE TO TOTAL MAINTENANCE
- EMPLOYEE TRAINING MEASURES
- COMMUNITY ENGAGEMENT DAYS
- CUSTOMER COMPLAINTS

95. During the period covered by the audit, Regional District staff reported formally and in writing to the Board quarterly. This reporting focused on the status of progress toward the goals and objectives stated in the Regional District's strategic plan and corporate business plan. Reports also listed activities that each department undertook during the quarter and planned to do during the next quarter.

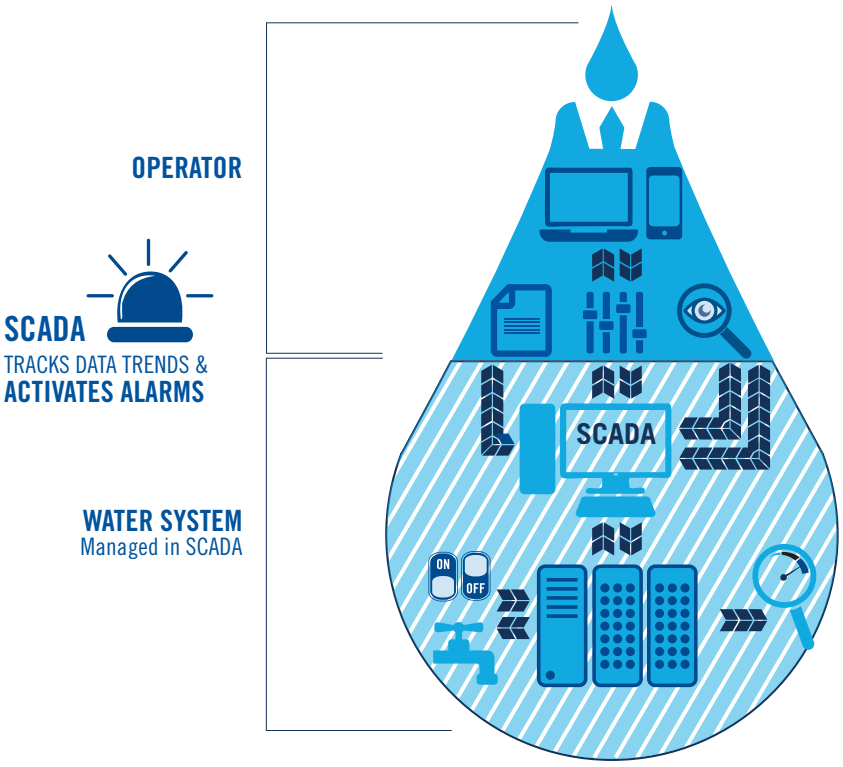
96. However, the Regional District lacked a mechanism to measure water service performance and trends in a consistent manner, so was not able to regularly report relevant trend information. In addition, the Regional District did not have a formal continual improvement management framework related to drinking water to help it improve its processes.

97. The Regional District's 2010 South Okanagan Regional Growth Strategy did include three key performance indicators relating to water services:

- Water consumption per day (per capita residential, total agricultural, total other sectors)
- Percentage of water distribution system samples with a positive bacterial detection
- Percentage of water distribution system samples test results exceeding selected drinking water quality guidelines

98. The Regional District implemented a monitoring program for the strategy that included a selection of performance indicators to measure progress. An important component of this was an annual report (the "Regional Snapshot Report") that the Regional District published on its website.

99. However, out of the three key performance indicators related to water that the Regional District identified in the regional growth strategy, it only reported on one indicator: "Water Consumption in Litres per Capita". Moreover, the Regional District did not publish any results on this key performance indicator after 2014.



WHAT IS SCADA

SCADA is an acronym for "Supervisory Control And Data Acquisition."

It is a control system that uses computers and networked data communications to supervise processes at a high level. It also uses devices such as Programmable Logic Controllers (PLC) to connect with and control machinery.

SCADA can remotely turn devices on or off, display real-time operational data, provide equipment-wide and system-wide views of an operation, track data trends and activate alarms.

RECOMMENDATION 5

The Regional District of Okanagan-Similkameen should improve data collection, analysis, monitoring and reporting on its water services as part of a continual improvement process. This should include:

- A performance measurement system for its water services
- Monitoring of progress
- Regular reporting to the Board, senior management and public on results

INFORMATION TECHNOLOGY CONTROLS

100. Information technology (IT) general controls are policies and procedures designed to ensure the continued proper operation of information systems by controlling access and protecting the physical security of operations, among other things.

101. IT general controls are important to a local government's management of its water systems because information technology systems are vital to safe and dependable operations, as well as to tracking of performance over time.

102. We would expect the Regional District to have robust IT general controls in place across the organization and have water utility-specific systems and infrastructure that comply with organization-wide IT policies and procedures.

103. During the period covered by the audit, only two out of the Regional District's seven water systems (Naramata and West Bench) were set up in its Supervisory Control and Data Acquisition (SCADA) system, covering water treatment and distribution (see the box for a definition of SCADA). The Faulder and Olalla water systems were in the process of transitioning to SCADA.

104. For the water systems that were managed in SCADA, the Regional District lacked basic IT general controls. Regional District staff told us that, while the organization had organization-wide IT policies and procedures, the SCADA system did not comply with them.

105. For example, the Regional District did not properly restrict access to SCADA and did not have a formal process for SCADA system access.

106. In addition, the Regional District did not review segregation of duties, lacked process or controls for change management and did not have a formal process to identify, escalate, resolve and document problems that may occur related to SCADA. In addition, the Regional District did not back up data on a regular basis and it lacked a business continuity plan for its SCADA system.

RECOMMENDATION 6

The Regional District of Okanagan-Similkameen should implement information technology (IT) general controls over its SCADA system and other related systems and treat them as part of its IT infrastructure, subject to organization-wide IT policies and procedures.

BUSINESS CONTINUITY PLANNING

107. All local governments are at risk from service disruptions due to disasters or accidents, sabotage, power or energy outages, communications, transportation, safety or service sector issues as well as pollution, hazardous materials spills or cyberattacks and hacker activity.

108. Business continuity planning is a proactive, overarching process aimed at ensuring all critical services are delivered during any disruptions. It takes an organization beyond focusing only on recovering after a disaster.

109. Business continuity plans are strategic in nature and concerned with returning critical services to full operation as soon as possible. They address any productivity loss and physical damage resulting from disruptions while normal services and operations are being restored. By creating and maintaining a business continuity plan, a local government can help ensure it has the resources and information it needs to deal with an emergency and sustain long-term recovery.

110. We would expect the Regional District to ensure continuity of drinking water services and have the business continuity plans necessary to maintain water services, data and infrastructure through any disruptions.

111. During the period covered by the audit, the Regional District lacked organization-wide or system level business continuity plans. Staff told us they were working on a business continuity plan for the Regional District and expected it to be complete by early 2018.

RECOMMENDATION 7

The Regional District of Okanagan-Similkameen should complete business continuity planning for its critical services – including drinking water – to ensure the continuation of service and sustainable infrastructure throughout potential disruptions.

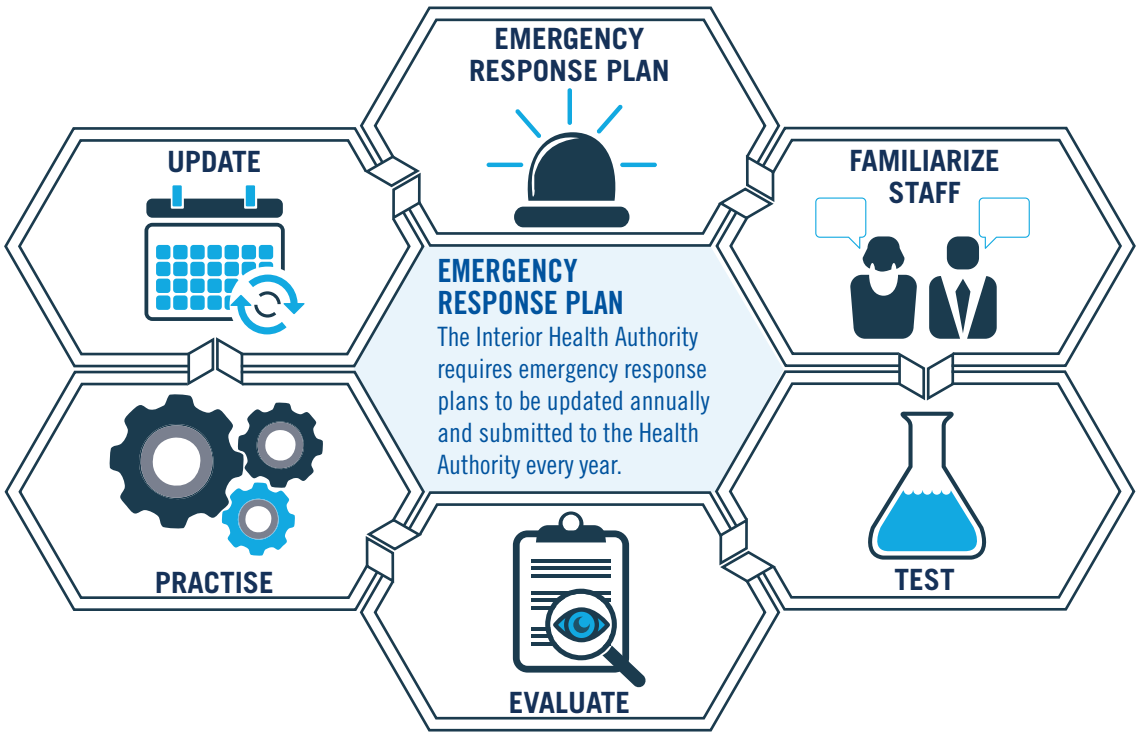
EMERGENCY RESPONSE AND CONTINGENCY PLANNING

112. Emergency response plans are intended to protect consumers from harm in the event of an emergency and to reduce costs by preventing further complications. These plans address the incident and the time period immediately following in order to return operations to a minimum service level. In BC, they are required by the Drinking Water Protection Regulation.

113. We would expect the Regional District to have plans to manage, eliminate, or reduce to an acceptable level water operation risks resulting from an emergency. We would also expect Regional District operations staff to be familiar with these plans, to test them on a regular basis and be ready to respond in the event of an emergency. In addition, we would expect the Regional District to have contingency plans in place to mitigate other significant potential water-related risks.

114. Emergency response plans should address all possible situations that can pose a risk to drinking water and outline specific steps to be followed when an incident occurs. An effective plan must be up-to-date, with any changes that have been made to water systems reflected in each update. Protocols should be regularly exercised and templates for public notice of emergencies should be included.

115. The Regional District had emergency response plans in place for all three water systems during the period covered by the audit. However, the Olalla plan had not been updated since 2012 and lacked key information such as all the



required appendices, which should have included public notification procedures, maps, emergency contacts and a water quality monitoring program. The plans for Faulder and Naramata had not been updated since 2013, although both included all of the required appendices.

116. The Regional District did not test any of these emergency response plans, which placed it at risk of staff not being familiar with the procedures to follow during an emergency.

117. Staff told us that, following the period covered by the audit, the Regional District was in the process of finalizing revised emergency response plans for Faulder and Olalla.

118. In addition to emergency response plans, contingency planning mitigates other significant water-related risks and typically should include provisions for:

- Keeping backup equipment (such as a chlorinator or pump) or parts on hand in the event of a breakdown
- Establishing an alternative water source in the event of contamination or water shortages
- Providing an alternative electricity source (such as a generator) in the event of a power failure

119. We would expect the Regional District to have contingency backup treatment (temporary disinfection) available for all water systems, particularly where no barriers (chlorination or ultra violet light {UV} treatment) were routine. In addition, we would expect the Regional District to have backup power, pumps and motors available for all water systems to ensure they continue to function during emergencies.

120. At Naramata, the Regional District had backup chlorine treatment, in the form of manual mixing and dosing of sodium hypochlorite, available. The Naramata system routinely used UV and sodium hypochlorite treatment.

121. Staff told us that a portable chlorination treatment system was available for Olalla and Faulder in the event of emergency due to water contamination.

122. The Olalla system had a backup pump and motor onsite and staff told us that the Regional District had ordered a backup pump for Faulder. Naramata had three pumps at their booster station, however, all three pumps required electrical service to function.

123. All three water systems lacked comprehensive backup power (functional generators) during the period covered by the audit. Staff told us that the Regional District was working to have active generators in place for all three systems by mid-2017.

RECOMMENDATION 8

The Regional District of Okanagan-Similkameen should enhance its emergency and contingency planning by:

- Ensuring that emergency response plans are regularly updated, tested, made accessible and familiar to all staff
- Ensuring that backup power is available for all water systems
- Providing backup pumps and motors onsite at the Faulder water facility

SOURCE WATER PROTECTION

124. It is important to protect water sources to ensure that water of sufficient quality and quantity will be available for communities, including in the future. Source water protection strategies enable a local government to identify, plan for and mitigate water supply-related issues. Source water protection involves a coordinated approach among stakeholders to develop short and long-term plans to prevent, minimize, or control potential sources of pollution or enhance water quality where necessary.

125. This audit included water systems in two watersheds: the Okanagan watershed (Faulder and Naramata systems) and the Similkameen watershed (Olalla system).

Drinking Water Protection Plans

One tool that may be useful for the protection of source water in multi-jurisdictional environments is a regulatory drinking water protection plan.

This is a specific and comprehensive drinking water protection tool that can be considered when other plans fail to address threats to drinking water. It is:

- **Used when no other practical measures available under the *Drinking Water Protection Act* are sufficient**
- **Specific to one source**
- **Relevant to area-based planning for both surface water and aquifers**
- **Authorized under Part 5 of the *Drinking Water Protection Act***
- **Initiated by the Minister at the recommendation of the Provincial Health Officer**

SOURCE WATER PROTECTION PLANS

126. Source water protection plans identify actions to eliminate, reduce or manage risks to water sources. Source water protection planning is an evolving process where plans should be reviewed periodically to ensure that the most effective solutions are being applied and that the experiences of other groups working towards similar goals are acknowledged and incorporated where appropriate.

127. We would expect the Regional District of Okanagan-Similkameen to have source water protection plans for all of its water systems.

128. The Regional District has implemented some good practices related to water source protection such as commissioning watershed plans and implementing groundwater protection and testing regimes. The Regional District has also done a good job of fencing and securing the wells supplying the Faulder and Olalla water systems.

129. During the period covered by the audit, the Regional District initiated some protection strategies by launching educational campaigns that raise awareness about the importance of riparian habitats and the need to protect against invasive species like zebra and quagga mussels.

130. The Regional District, in collaboration with the Similkameen Valley Planning Society and other stakeholders, commissioned two phases of the Similkameen Watershed Plan. This plan flowed from a broader strategic priority of the Sustainable Similkameen Project. It aimed to significantly improve water management, integrate management into valley-specific climate change adaptations, assess governance structure with water providers and inventory valley water quality and quantity. Phase three of the plan is scheduled to be completed in 2017.

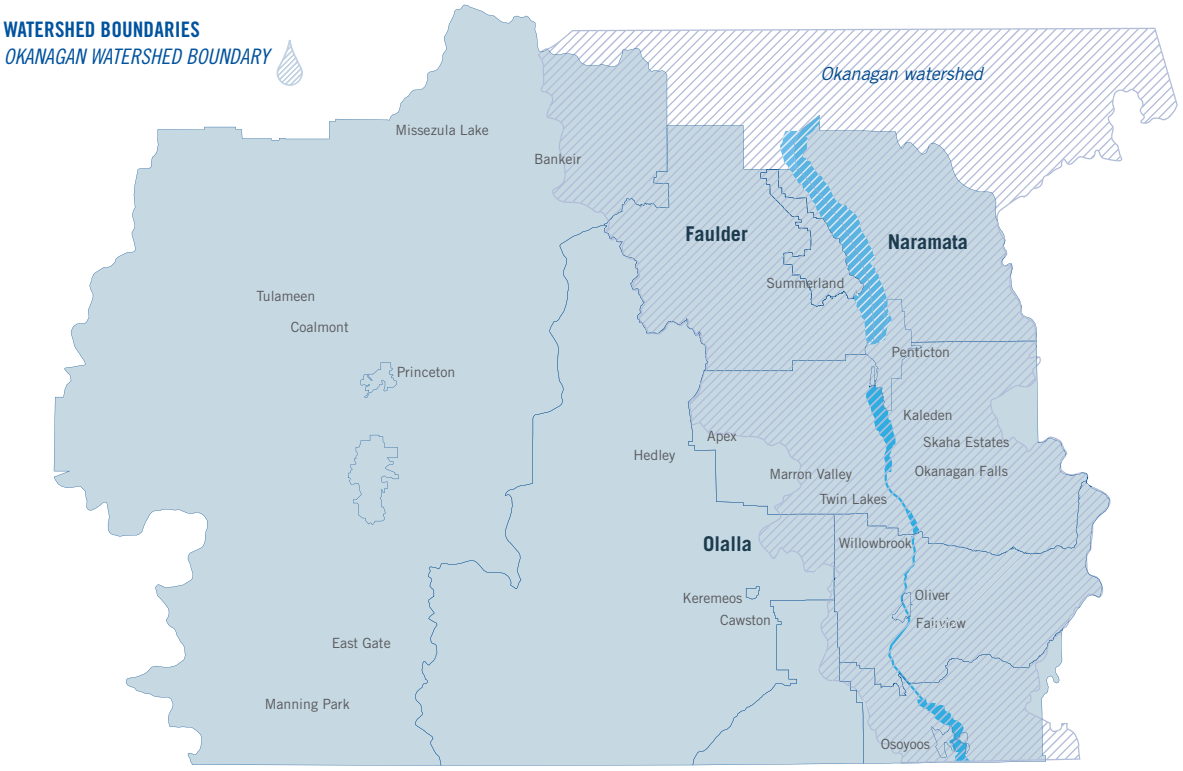
131. The Regional District had several protection plans in place, including:

- An outdated watershed protection plan for Naramata (1993)
- A well protection plan for Faulder (2016)
- A groundwater protection plan for Olalla (2005/2006)
- A watershed protection plan for Olalla (in development, with phase 1 and 2 completed in 2014 and 2015 respectively)

Source Water Protection Plan

- Delineation of a source water protection area surrounding a public water supply
- Identification of vulnerabilities and assessment of threats within the area
- Measures to address the identified vulnerabilities and threats

Source: Water Policy and Governance Group, Tools and Approaches for Source Water Protection in Canada: Governance for Source Water Protection in Canada, Report No. 1



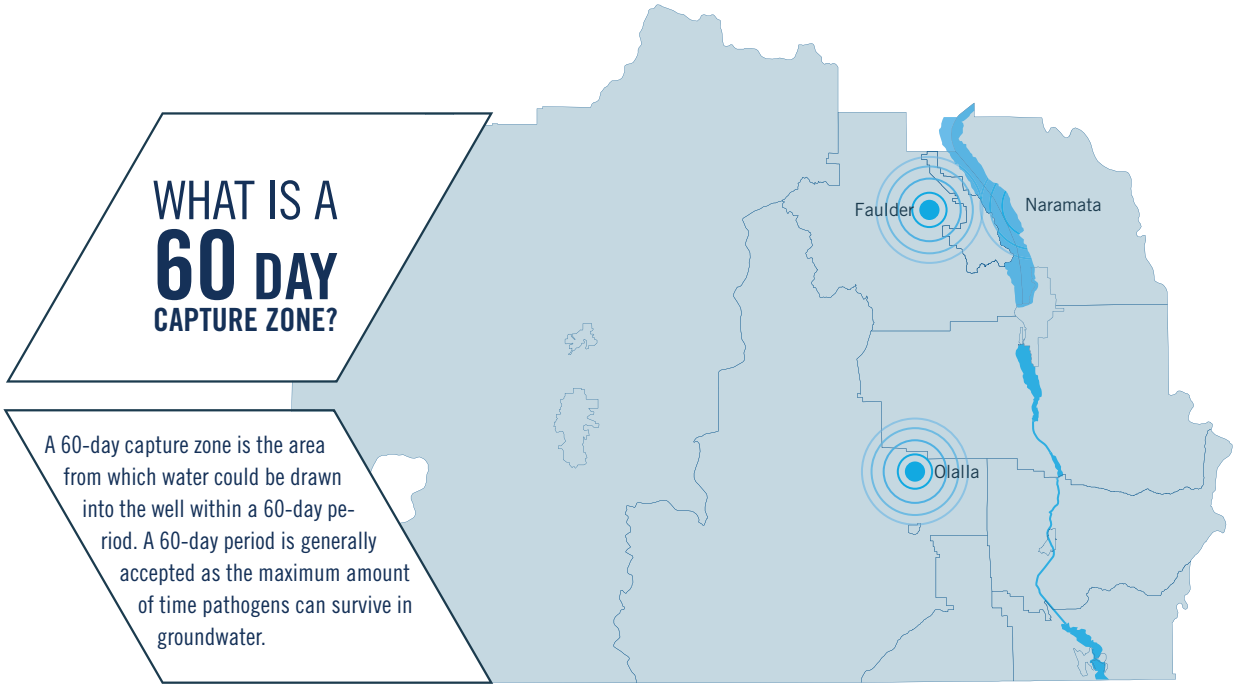
The Okanagan Basin Water Board

The Okanagan Basin Water Board is a water governance body responsible for identifying and resolving critical water issues in the Okanagan watershed. This includes maintaining awareness of research and development occurring nationally and internationally.

The Board shares information with agencies in the Okanagan that deal with water, allowing each to make its own decisions on how to use it.

WHAT IS A 60 DAY CAPTURE ZONE?

A 60-day capture zone is the area from which water could be drawn into the well within a 60-day period. A 60-day period is generally accepted as the maximum amount of time pathogens can survive in groundwater.



132. While there is no source water protection plan for Okanagan Lake, Regional District staff told us that one will be completed within the next two years, in conjunction with the Okanagan Basin Water Board. In the absence of a larger regional watershed plan, it is still important for the Regional District to identify and assess the risks to its water source and have a current set of strategies to contribute toward protecting the Naramata drinking water source.

133. None of the plans we reviewed for this audit included tangible steps the Regional District could take in the short term. They did not include timelines for action, performance indicators or implementation schedules.

134. The plans for Faulder and Olalla did not fully cover drought or climate change. For example, while the Faulder Well Protection Plan considered potential water quality impacts, these did not cover all source water users and did not include an action or implementation plan to reduce risks.

RECOMMENDATION 9

The Regional District of Okanagan-Similkameen should develop a source water protection plan for Naramata that identifies risks and addresses the Regional District's contributions to source water protection. It should consider enhancing the existing plans for Faulder and Olalla.

135. The Olalla groundwater protection plan called for a range of groundwater protection measures. Though the plan identified risks within the 60-day capture zone of the well, the Regional District lacked zoning and other related bylaws to address these risks.

RECOMMENDATION 10

The Regional District of Okanagan-Similkameen should take steps to mitigate risks identified in the Olalla Groundwater Protection plan to the 60-day well capture zone.

SOURCE WATER PROTECTION IN BYLAWS

136. Bylaws and zoning can be valuable tools for source water protection. These could protect water supplies by focusing development away from drinking water sources. Zoning and development bylaws can be useful because they focus on tangible steps that can be taken with new developments to protect water in the future rather than changes to development that have already occurred, which can be difficult and expensive to implement.

137. We would expect the Regional District to incorporate source water protection considerations, where relevant, into land use, development and other bylaws.

138. The Regional District lacked source water protection bylaws, although a new water regulation bylaw was under development. The Regional District's bylaws relating to land use and development did not include provisions relating to source water protection and no such provisions were under development.

RECOMMENDATION 11

The Regional District of Okanagan-Similkameen should consider the addition of source water protection regulations to relevant bylaws, where appropriate, as they are reviewed and updated and as new bylaws are developed.

COLLABORATION WITH STAKEHOLDERS

139. Successful collaboration with stakeholders on source water protection can help a local government understand the bigger picture and make better decisions. In the case of multi-use watersheds such as Okanagan Lake, coordination and collaboration is particularly important because of the division of responsibilities between the provincial and local governments and the complex mix of recreational, agricultural and residential water users.

140. We would expect the Regional District to collaborate with a range of stakeholders on source water protection.

141. For the most part, the Regional District effectively managed its approach to stakeholder collaboration during the period covered by the audit.

142. The Regional District collaborated with various stakeholders to manage drinking water resources. It had representation on the Okanagan Basin Water Board and the Okanagan Water Stewardship Council. It engaged with various stakeholder groups on the management of Okanagan Lake and its watershed. The Okanagan Basin Water Board, the Okanagan and Similkameen Invasive Species Society and water community commissions were some of the groups the Regional District consulted during its source water protection process. It collaborated with other local governments and the provincial and federal governments as necessary.

143. One area where the Regional District may be able to do more in dealing with stakeholders is in Meadow Valley, where there were concerns over the potential impact of water use on the aquifer supplying the Faulder Water System. The Regional District may benefit from working more closely with local residents and other stakeholders to ensure that these concerns are resolved. We also believe that the Regional District could do more to collaborate or engage with other water systems in the region.

RECOMMENDATION 12

The Regional District of Okanagan-Similkameen should engage with relevant stakeholders and other water systems in the region to:

- Understand regional risks related to source water
- Improve regional conservation strategies, drought and climate change responses
- Improve planning of drinking water supply
- Build community support for source water protection

ASSESSMENT AND SELECTION OF AVAILABLE WATER SOURCES

144. It is critically important for a water provider to make the right choice of water supply, as this may determine whether there will be sufficient quality and quantity of water available to customers over the long-term.

145. We would expect the Regional District to rigorously assess the suitability of available water sources and choose the best available source for each system.

146. The choice of a primary water source for each of the three systems we audited was made prior to the period covered by the audit. However, we did review documentation relating to these decisions.

147. For the systems we reviewed, the Regional District used a rigorous approach in selecting each water source. In Naramata, the Regional District, with the help of stakeholders, commissioned engineering studies and supply and demand studies. Based on these studies, the Regional District ranked available water sources before choosing Okanagan Lake as the water source. In Faulder, the Regional District followed a similar methodical process in selecting a water source for that system's second well.

148. The Regional District's analysis indicated that the water sources chosen for Olalla, Naramata and Faulder were the best available.

149. In the event of contamination of a water source or other emergency, it is important for a water provider to have a source of backup water available to ensure uninterrupted service and prevent contamination.

150. We would expect the Regional District to develop comprehensive contingency plans that identify alternate water sources or treatment scenarios for use in case of a primary supply interruption.

151. In each of the three water systems, the Regional District's emergency plans identified potential alternative sources of water. However, none of the alternative sources could be implemented without significant challenges relating to water quality and/or distribution.

152. The Regional District's revised 2016 emergency plan for Olalla and Faulder acknowledged potential issues with the identified secondary water sources and identified an alternative: trucking-in drinking water. Additionally, for Olalla, the Groundwater Protection Plan recommended that a backup well location be selected, but the Regional District did not implement the recommended well location. In Naramata, the system's backup creek intake and infrastructure had not been maintained since 2014, so may not be a reliable backup source.

153. Overall, while the Regional District considered its options for source water and identified various redundancy/ backup options, implementing some of the backup options may not be practical.

RECOMMENDATION 13

The Regional District of Okanagan-Similkameen should ensure that it has feasible plans for the implementation of backup options for drinking water supplies in the case of primary water supply service disruption.

Water Conservation Plans and Capital Funding

The Province now requires local governments to have a water conservation plan in order to receive capital grant funds for drinking water infrastructure.

For local governments that do not currently have such a plan, the Province has created a water conservation guide to assist and has made available grant funding to help develop water conservation plans.

This funding is available through the Infrastructure Planning Grant Program through the Ministry of Community, Sport and Cultural Development.

WATER CONSERVATION AND DEMAND MANAGEMENT STRATEGIES

154. The Regional District of Okanagan-Similkameen's Regional Growth Strategy Toolkit estimated that all available water in the Okanagan basin will be allocated within the next ten to 15 years. In this context, it is particularly relevant to note that sound water conservation strategies can lead to cost savings, environmental benefits, usage efficiency and the preservation of supply.

155. Water demand management is a set of activities aimed at increased water use efficiency, and is related to water conservation. Effective demand management reduces the quantity of water that customers demand for a given use, increases the ability of a system to withstand drought and reduces losses throughout the system.

156. We would expect the Regional District to have sound water conservation strategies for each of its water systems, including demand management measures and targets, and to evaluate the effectiveness of these strategies.

157. The Regional District did not have an overall water demand management plan. It did employ a part-time public works coordinator tasked with water-related drought and conservation issues. The coordinator used grant funds to contract professionals to assist with outreach programs.

158. Of the three water systems we reviewed, only Faulder and Naramata had water conservation plans available during the period covered by the audit and both had gaps. Neither plan included implementation procedures and only some of the recommendations were implemented. In Naramata, key elements of the plan, such as water meters, were not in place.

159. Olalla did not have any conservation plans in place, however, some conservation activities had been undertaken.

PUBLIC OUTREACH

160. Overall, the Regional District was doing a good job of public outreach on its conservation strategies.

161. In the absence of an overall conservation plan, region-wide initiatives focused on public information and promotion. For example, the Regional District had promoted some innovative water conservation methods such as rainwater harvesting and creatively landscaped (xeriscaped) gardens.

162. The Regional District had lawn watering restrictions throughout the region during the spring and summer months and held information sessions and workshops and presented water conservation materials to water system users.

163. At a system-specific level, Naramata's conservation plan distinguished between agricultural and domestic users and included various water conservation methods.

164. The Regional District was doing a good job of delivering information and tools to help manage agricultural and domestic water demand. For example, in Naramata, the Regional District aligned their online tools with a weather station to assist with the scheduling of irrigation.

INNOVATION AND WATER CONSERVATION

3 FOUNDATIONAL PRINCIPALS TO A RAINWATER FRIENDLY APPROACH

REDUCE THE AMOUNT OF IMPERMEABLE SURFACES

CONSIDER RAIN TO BE A RESOURCE

THINK WATERSHED-WIDE

INNOVATIONS INCLUDE:

- Conservation planning
- Reduction of impervious surfaces
- Creation of infiltration basins
- Rain gardens
- Rain capture & storage
- Low impact landscaping
- Roof capture
- Runoff management & flow paths
- Slowing runoff
- Improving soil permeability
- Reforestation

Source: University of Victoria's POLIS Water Sustainability Project: Peeling Back the Pavement: A Blueprint for Reinventing Rainwater Management in Canada's Communities

WATER CONSERVATION BYLAWS

165. It is important for a local government to have up-to-date, relevant bylaws related to water conservation. Outdated bylaws have the risk of no longer complying with legal requirements, may be vague and unclear or out of step with measures being taken by other local governments and difficult to enforce.

166. The Regional District had water service bylaws in place for all three audited water systems that included clauses relating to water restrictions. However, these were old, dated 1976 for Olalla and 1993 for Naramata and Faulder. The Regional District told us that it recognized weaknesses in these bylaws and began in 2015 to develop a new region-wide conservation and drought bylaw. As of the writing of this report, the new bylaw was still under development.

167. The Regional District did not actively enforce its existing water conservation bylaws, as water service staff responded to reports of excessive usage and complaints through education rather than enforcement action. Staff undertook periodic water sweeps of its systems, providing heavy users with educational materials designed to encourage reduced water use. We were told that those not in compliance with sprinkling requirements were provided with verbal or hang-tag warnings.

DROUGHT MANAGEMENT

168. The BC Ministry of Forests, Lands and Natural Resource Operations has summarized climate models and projected that warming levels for the Okanagan will average between two and five degrees by the 2080's. The associated increased frequency of drought stress and potential lower average rainfall suggests that significantly increased seasonal drinking water supply pressures could occur.

169. We would expect the Regional District to have drought management plans in place for all of its water systems.

170. The Regional District demonstrated good practice in 2006 by proactively generating a drought management plan that covered the Naramata, Faulder and Olalla water systems. However, the Regional District was not acting on this plan during the period covered by the audit. Staff told us that the Regional District was working on a new regional drought plan.

171. The extent to which the 2006 plan had been implemented varied by system. Key portions of the plan for Naramata (meter installation and usage-based billing) had not been implemented. The Faulder system has a history of unpredictable aquifer recharge, yet the demand management section of the plan had not been implemented. In Olalla, the demand management portions of the plan also had not been implemented.

WATER CONSUMPTION TARGETS

172. We would expect the Regional District to track water consumption and manage leakage to reduce water loss and maintain long-term cost efficiencies.

173. Both the Naramata and Faulder systems had stated objectives to reduce water consumption by 30 per cent by 2025. Since the Naramata water metering program was not implemented, the Regional District was only able to measure total system use. This made it difficult to track the success of specific conservation initiatives related to consumption. The Regional District did not set water consumption targets or goals for Olalla.

174. High leakage levels in water distribution networks indicate inefficiency and may add costs such as additional power required to maintain pressure. Applying proactive and long-term strategies like system leak detection and repair will not only conserve water supplies, they can also help maintain water quality by removing points of contamination and enable the Regional District to be environmentally and economically sustainable over the long run.

175. The Regional District detected significant water loss in the Olalla water system, which led it to replace much of the distribution system after the period covered by the audit. Staff told us that – following completion of this work – water consumption in Olalla dropped by 50 per cent.

176. The Regional District lacked a formal, structured leak management program, a documented list of required interventions or progress tracking indicators. Instead, staff told us that it had an informal leak detection process that included:

- Tracking how much water was pumped in each water system and judging whether it was a reasonable amount
- Installing water meters in one of its water systems (West Bench) and reviewing water usage in the early morning hours
- Watching for low pressure or high pump hours during certain times of day in various systems

177. The Regional District did not have documentation indicating that its informal approach to leakage was more or less cost-effective than a more structured leak management program. It also had not conducted a water audit to determine the operational efficiency of its water systems and identify any significant sources of water loss and resulting revenue loss.

WATER RATES AND METERING

178. Water rates can be an effective demand management tool as price increases tend to be followed by decreased water usage. Within the Regional District, water rates varied widely and were not adjusted to manage demand. Water rates were cut in Olalla during the period covered by the audit, at a time when capital costs were increasing.

179. Water meters are an effective tool to implement price-based demand management and to detect leaks. Although the Naramata Water Conservation Plan (2010) called for metering of all customers, only 11 per cent had meters during the period covered by the audit. Olalla and Faulder did not have meters installed. Regional District staff told us that one of its other water systems (West Bench) was moving to consumption-based billing using meters.

180. During the period covered by the audit, all new construction in Naramata included the installation of a meter pit, but staff told us that the Regional District did not plan to expand the number of meters in any of the three water systems.

RECOMMENDATION 14

The Regional District of Okanagan-Similkameen should develop a regional district-wide water conservation and demand management strategy that:

- Implements water accounting or similar analysis to determine the operational efficiency of its water systems
- Identifies innovative water conservation activities targeted at areas likely to bring the greatest benefits and meet projected future needs
- Takes into account drought management plans already identified
- Includes an action plan, implementation schedule and performance measures for each water system
- Aligns with updated water-related bylaws and an updated strategy to maximize bylaw compliance

RECOMMENDATION 15

The Regional District of Okanagan-Similkameen should consider implementing a structured and results-based approach to water accounting to manage drinking water consumption and losses.

DRINKING WATER TREATMENT AND QUALITY MANAGEMENT

181. Managing water quality is complex. In its natural state, water may contain hundreds of organic and inorganic components. Some can be easily seen or tasted, but many are colourless, tasteless, odourless and impossible to detect without specialized equipment.

182. Human activity can easily – often inadvertently – contaminate water sources. Most contaminants are harmless but a few are dangerous, including enteric viruses such as influenza, protozoa such as cryptosporidium and coliforms such as E. coli. There are also a host of possible commercial, industrial and agricultural contaminants. Pathogens can contaminate water sources as a result of rainfall, floods, surface water movement, backflow, water main breakage or other causes.

183. Piped water for human consumption—generally referred to as drinking water—is usually not delivered separately from water intended for other purposes. As a result, 100 per cent of water in the system must be sourced, treated and managed as drinkable regardless of how it will be used.

184. To meet the Guidelines for Canadian Drinking Water Quality, water providers must manage water quality within strict limitations and have emergency response plans in place to respond to any events that could result in contamination.

185. Two of the three Regional District of Okanagan-Similkameen water systems we audited required water quality notifications in 2014, 2015 and 2016. A notification is not cause to revoke an operating permit, but the Drinking Water Officer may respond to a water notice by issuing an order or adding conditions to a permit if the reasons for the water quality advisory are not addressed.

PERMITS TO OPERATE

186. Each of the Regional District's water systems is required to obtain, pay for and annually renew a Permit to Operate, a certificate issued by the Drinking Water Officer. The permit specifies the system size, date of expiry and certification level required to run each system. The Drinking Water Officer may attach conditions to a permit, such as specifying the type of treatment, staffing, monitoring or reporting that is required.

187. We would expect the Regional District's water systems to have Permits to Operate.

188. All three water systems had up-to-date Permits to Operate, renewed to 2017 and posted at the water facilities. Only one of the three systems (Naramata) had conditions attached to its permit. We found that, of the nine conditions on the Naramata permit, the Regional District had met five. The other four, which it did not fully meet, were requirements to:

- Have a source protection plan
- Operate according to a cross connection control program
- Annually review and update an Emergency Response Plan
- Provide monthly water quality reports and an annual summary

189. Findings and recommendations relating to each of these unmet conditions are included elsewhere in the relevant sections of this report. The implications of not fully meeting permit conditions, if any, were outside the scope of this audit.

Exhibit 7 - WATER NOTICES IN THE AUDITED WATER SYSTEMS

	NARAMATA	FAULDER	OLALLA
2014	-	1	-
2015	1	2	-
2016 Jan-Jun	-	2	-

	NARAMATA	FAULDER	OLALLA
2014	1	-	-
2015	1	-	-
2016 Jan-Jun	1	-	-

	NARAMATA	FAULDER	OLALLA
2014	-	-	-
2015	-	-	-
2016 Jan-Jun	-	-	-

Source: Regional District of Okanagan-Similkameen Annual Water Quality Monitoring Reports

Eco-Assets Strategy

There is growing interest among communities in an innovative program that recognizes the role of nature as a fundamental component of municipal infrastructure. This can lead to a greater understanding of the value of ecosystems and improved financial and operational management of a community's natural assets.

The Town of Gibsons is one the first Canadian municipalities to explore managing its natural capital, using infrastructure and financial management concepts that are systematically applied to managing engineered assets. Their rationale is that the natural services provided by these systems, in the form of rainwater management, flood control and water purification, have tangible value to the community.

The strategy focuses on identifying existing natural assets such as green space, forests, topsoil, aquifers and creeks that provide municipal services such as stormwater management, measuring the value of these services and making this information operational by integrating it into municipal asset management.

Other municipalities may benefit from mapping out their natural assets and the services they provide and determine whether these assets can be restored, managed, or managed differently to provide vital municipal services.

Source: Towards an Eco-Assets Strategy in the Town of Gibsons

ALIGNMENT WITH DRINKING WATER GUIDELINES

190. We would expect drinking water delivered by the Regional District to fully meet Interior Health Authority requirements, which are based on the Guidelines for Canadian Drinking Water Quality.

191. During the period covered by the audit, the Naramata and Olalla systems fully met the guidelines. The Faulder system did not meet the guidelines due to a higher than allowable concentration of uranium in its water, as demonstrated by the water testing results.

192. The Regional District issued a Water Quality Advisory for Faulder in order to be allowed to operate despite this issue. To correct it, the Regional District built a uranium treatment plant, which was not operational during the period covered by the audit. Regional District staff expects this plant to be in operation following the period covered by the audit.

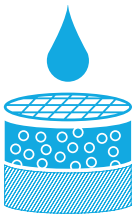
RECOMMENDATION 16

The Regional District of Okanagan-Similkameen should resolve issues that prevent it from operating the Faulder Water System's newly-installed uranium treatment plant and well in order to meet the Guidelines for Canadian Drinking Water Quality.

MULTI-BARRIER APPROACH

193. Groundwater is often a better, higher quality, source than surface water. Groundwater must be tested when the well is drilled and—following testing that does not raise any issues—may be used without treatment with the approval of Interior Health Authority's Drinking Water Officer.

194. However, some groundwater is at risk of pathogens because it may be affected by runoff (surface) water. When this is the case, it must comply with the same requirements as surface water.



BC'S MULTI-BARRIER APPROACH

- SOURCE PROTECTION
- TREATMENT
- WATER SYSTEM MAINTENANCE
- WATER QUALITY MONITORING
- OPERATOR TRAINING
- EMERGENCY RESPONSE TRAINING

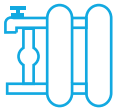
Source: BC Government, Resources for Drinking Water Operators, Comprehensive Drinking Water Source-To-Tap Assessment Guideline

4-3-2-1-0 DRINKING WATER TREATMENT OBJECTIVE

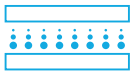
IS A B.C. GOVERNMENT PERFORMANCE TARGET FOR WATER SUPPLIERS TO ENSURE DELIVERY OF MICROBIOLOGICALLY SAFE WATER. IT IS ENDORSED BY INTERIOR HEALTH AND SPECIFIES:

4 LOG (.9999) REMOVAL OF VIRUSES

3 LOG (.999) REMOVAL OR INACTIVATION OF PROTOZOA



2 TREATMENT PROCESSES FOR ALL SURFACE WATER



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Source: BC Government, , Drinking Water Officer's Guide Part B: Best Practices and Technical Assistance

195. Surface water is prone to pathogens and seasonal contamination. As a result, the Province has adopted the multi-barrier approach, which is an optimal standard requiring—among other things—at least two types of treatment for pathogens (filtration, disinfection and/or ultraviolet deactivation). None of the Permits to Operate of the systems we examined for this audit required filtration.

196. The multi-barrier approach to treatment aligns with the 4-3-2-1-0 Drinking Water Treatment Objective. This Objective includes the microbiological limits set out in the Guidelines, plus a limit on turbidity (clarity) and dual treatment for surface water systems.

197. The Drinking Water Treatment Objective is mainly aimed at large and new water systems, however smaller and existing surface water systems are also encouraged to have an implementation plan to meet this.

198. We would expect the Regional District's water system infrastructure to be sufficient to meet the Drinking Water Treatment Objective or have implementation plans to achieve it.

199. The Naramata water system achieved the Drinking Water Treatment Objective through the use of UV deactivation and sodium hypochlorite (chlorine bleach) disinfection. While the system did not have filtration, Regional District staff told us they were prepared to apply for filtration deferral if required by Interior Health.

200. Neither of the smaller systems included in this audit (Faulder and Olalla) were required by Interior Health to treat their drinking water in order to achieve the Drinking Water Treatment Objective, as they both drew from groundwater and test results of untreated water showed very few or no micro biological contaminants.

CERTIFIED OPERATORS

201. Each water system in BC requires operators certified by the Environmental Operators Certification Program (EOCP) to operate the particular type of system. Smaller water systems such as Olalla and Faulder required at least an Operator in Training, while the operators of larger systems may require different levels of certification for treatment and distribution. The lead operator of the Naramata Water System required level II treatment certification (WT-II) and level IV distribution certification (WD-IV).

202. We would expect the Regional District to have sufficient trained operators of the appropriate skill levels on site to meet the certification requirements, regulations and conditions on each system's permit. We also would expect the Regional District to ensure that appropriate operator training is scheduled and tracked.

203. In all three of the water systems we audited, the Regional District had EOCP-certified operators available or on call as required. In addition, the Regional District tracked training and certification. Staff told us that training opportunities were discussed and allocated to meet the requirements.

WATER QUALITY MONITORING PROGRAM

204. Interior Health required the Regional District to produce a Water Quality Monitoring Program detailing how each water system was monitored. It required the Regional District to collect and report specific data for source and treated water and required both continuous monitoring and lab testing.

205. Regional District staff prepared monthly and annual reports for each water system and sent them to the Health Authority's Drinking Water Officer. These were not always submitted within the timeframe required by the Health Authority and the *Drinking Water Protection Act* and Regulation.

206. Water quality reports prepared by the Regional District that we reviewed included some data transcription errors. Most of these were minor and inconsequential, but some were substantive. Comparisons of field log data transferred to spreadsheets showed three substantive errors out of the 202 entry dates we reviewed (a 1.49 per cent error rate). Water testing laboratory results, which were manually entered into spreadsheets, had one substantive error in 52 entry dates (a two per cent error rate).

RECOMMENDATION 17

The Regional District of Okanagan-Similkameen should consider improving its quality control processes over water quality reports.

WATER TREATMENT ROUTINE MAINTENANCE

207. We would expect the Regional District to have a program for routine water treatment infrastructure maintenance, inspection and monitoring that is up-to-date and consistently followed.

208. Regional District staff told us that system operators performed maintenance and repairs to treatment facilities following an informal process as past experience suggested and time permitted. The Regional District's maintenance schedule was not specific, contained no dates and did not indicate if a particular maintenance task was completed.

RECOMMENDATION 18

The Regional District of Okanagan-Similkameen should implement a formal routine maintenance and inspection program for all of its water treatment facilities, including schedules and monitoring of task completion.

PHYSICAL SECURITY OF FACILITIES

209. Water treatment, distribution and storage facilities must be secure from outside threats, including human threats in the form of unauthorized access, forcible intrusion, vandalism, tampering, or sabotage. We would expect the Regional District to have in place appropriate security protection of key water system facilities.

210. Pump houses, booster stations and storage reservoirs at all three water systems had keyed entry. The Naramata water treatment facility was secured with keyed locks and numeric alarms.

DRINKING WATER STORAGE AND DISTRIBUTION

211. Water storage and distribution infrastructure are critical to ensuring the safe delivery of drinking water.

212. We would expect the Regional District to ensure its water infrastructure is adequate to meet drinking water regulations, does not adversely affect water quality and ensures the safety and reliability of drinking water through established standards of construction, maintenance and operations.

213. The Olalla and Naramata water system facilities were constructed before the period covered by the audit, as was Faulder's first well.

214. The Faulder system developed a new well during the period covered by the audit. We reviewed Regional District documentation that indicated this work was planned and signed off by qualified engineers. We did not audit the accuracy of these records or any documentation related to construction prior to the period covered by the audit.

215. The Regional District's water quality data showed very few instances of drinking water contamination in the three systems that were caused by water storage and distribution infrastructure, maintenance or operations. However, as follows, there were some areas that placed the Regional District at risk of future problems.

WATER STORAGE AND DISTRIBUTION INFRASTRUCTURE MAINTENANCE

216. Operation and maintenance procedures for water supply systems help ensure that equipment is working effectively. These procedures include inspections and maintenance, system monitoring, testing, calibrating and repairing backup components and implementing and evaluating cross-connection control features. Operational guides, checklists and appropriate record-keeping help ensure that water operations management is consistent, information is available to staff and the risk of human error is minimized.

217. We would expect the Regional District to compare its operations with the requirements in its operating permits and review the adequacy and appropriateness of its operating standards and procedures. We would also expect the Regional District to have clear operational guides and checklists.

218. The Regional District did not have formal procedures or documents that guided its monitoring and inspection of intakes, wells, pumps and other water storage and distribution infrastructure. Instead, it relied on the knowledge and experience of water system operators to carry out procedures and make system recommendations.

WATER CONSUMERS TYPICALLY EXPECT THAT **DRINKING WATER:**

Source: CCME, From Source to Tap: Guidance on the multi-barrier approach to Safe Drinking Water

219. During the period covered by the audit, the Regional District lacked an up-to-date maintenance schedule showing significant details such as a calendar of activities or record of actions. Staff recorded some operational activities and measurements in hardcopy logs located at water system facilities, however, there was no way to verify the regularity with which staff inspected pumps, motors and valves.

220. Staff told us that pump inspection procedures varied from one water system to another, and pumps from all systems were sent out for inspection whenever staff heard unusual sounds.

221. The Regional District expected staff in Naramata to take apart pumps, motors, valves and pressure-reducing valves annually for inspection and divers examined the water intake pipe every three to five years. Records did indicate that the Naramata intake pipe was last examined in December 2015.

222. Staff told us that the Olalla system's pump was not inspected during the period covered by the audit and that they relied on a rapid replacement system in the event of an emergency. This involved using a backup pump and motor assembly, both of which the Regional District kept on hand at the facility.

223. Staff also told us that regular well inspections did not take place at Faulder and that wells would only be inspected if there was specific reason to do so. This was because inspections required shutting down the entire system and—if this occurred—the community would require an alternate water source. During the period covered by the audit, although the Faulder system had two wells, the second well was not being used because its pump lacked a reliable supply of power and its uranium treatment plant media was contaminated.

RECOMMENDATION 19

The Regional District of Okanagan-Similkameen should review its water storage and distribution operating standards and formalize and document its procedures, including inspection, testing and operational oversight.

POWER OUTAGES AND WATER SERVICE DELIVERY

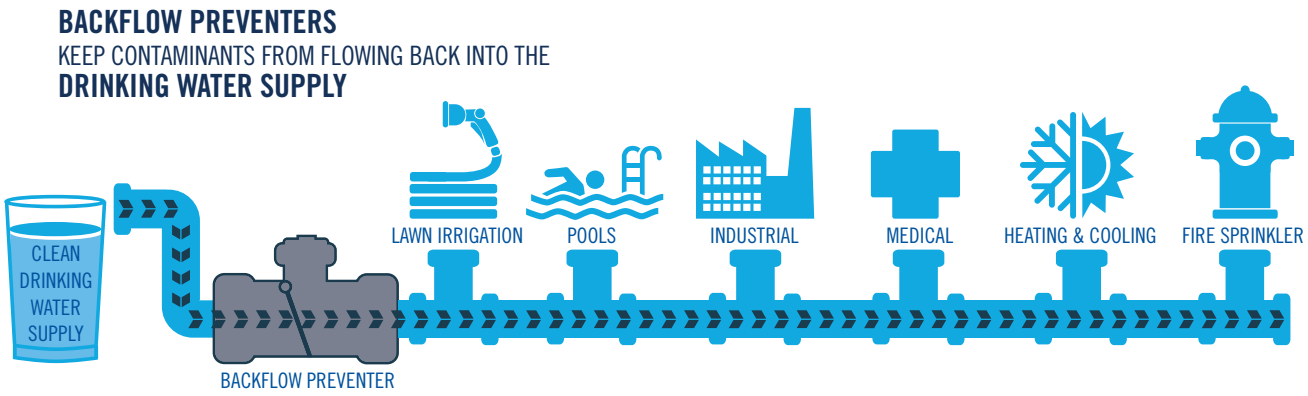
224. The Regional District relied on electricity to pump water from its water sources to reservoirs or storage tanks and then on to individual consumers. Water pumping distribution systems should be designed with at least two pumps so that—in the event one pump goes out of service—an alternative pump is available to deliver the maximum hourly design flow at the minimum required operating pressure.

225. Power outages can affect a water system's ability to pump water from its storage area, treat it and deliver it to users. They can also affect water pressure. Systems need standby electricity or an auxiliary gas-powered pump to supply water during power outages or other emergencies.

226. We would expect the Regional District to have backup power and pumps in place where necessary to ensure water delivery to its users at the required flow and pressure.

227. During the period covered by the audit, the Olalla system experienced power-related issues that caused its pumps to fail. In addition, a lightning strike blew a fuse in the system's Programmable Logic Controller (PLC), which also affected water services. To address these problems, staff manually ran the pumps to refill the system's reservoir.

228. In addition, repeated power outages in Faulder over several days in 2014 affected that system's pumps and water supply. Staff told us that they did not have any record of emergency or power-related incidents that affected water supply during this time period.



229. The Regional District lacked backup power for all three water systems during the period covered by the audit. However, staff informed us that they expect to have backup power generators functioning for all three water systems in the near future.

RECOMMENDATION 20

The Regional District of Okanagan-Similkameen should ensure that each of its water systems has a working backup power system available to pump water at the required flow pressure.

WATER PRESSURE AND FLOW

230. Loss or reduction of pressure in a water main can cause backflow (back-siphonage) and affect the flow required for firefighting. Excess pressure in a user's pipes can push contaminants through the cross-connection, resulting in distribution system contamination.

231. We would expect the Regional District to ensure that water pressure is maintained to minimize cross contamination and reliably meet user demands.

232. Staff told us that the three audited water systems had some locations that consistently experienced low pressure—for example, an area in Faulder near the reservoir and at Naramata at its uppermost pressure zone—but that staff adjusted pressure reduction valves as necessary to ensure sufficient pressure to supply customers and prevent backflow.

233. Low pressure can become an issue in the Regional District's water systems if pumps fail, but even though there were instances where reservoirs ran low—including in Faulder during 2014 and in Olalla during 2016—staff told us that none of these situations presented a risk of backflow.

234. The Regional District lacked a formal cross connection control program. It had bylaws covering all three audited systems requiring customers to have backflow prevention devices installed. Staff tested these devices during the period covered by the audit to ensure they were functioning as intended. Furthermore, they told us that a new cross connection control bylaw would be implemented following the period covered by the audit, as part of a new Water Regulation Bylaw.

RECOMMENDATION 21

The Regional District of Okanagan-Similkameen should implement a formal cross connection control program and evaluate it as necessary to prevent drinking water contamination.

AUTOMATED MONITORING OF DISTRIBUTION SYSTEMS

235. Documentation and reporting are critical to proper management and operation of water systems. Documentation should include records of activities, operational procedures, process control, preventative strategies, monitoring, maintenance and corrective actions.

COMMUNICATIONS AND PUBLIC AWARENESS

236. We would expect the Regional District to monitor, record and document its operation of water distribution systems and implement corrective actions where necessary to ensure reporting systems are functioning adequately.

237. The Regional District relied on automated systems such as Programmable Logic Controller (PLC) and Supervisory Control and Data Acquisition (SCADA) to report, record, and log water system data. If the PLC system stopped functioning, an alarm would inform staff.

238. The Regional District lacked a formal maintenance log or process for checking its equipment regularly and ensuring that equipment and automated dialing devices were functioning as intended. On one occasion during the period covered by the audit, the Olalla system ran out of water due to a malfunctioning automated system.

RECOMMENDATION 22

The Regional District of Okanagan-Similkameen should implement controls for its automated monitoring systems to ensure security is maintained and communication of system error or failure is investigated as soon as possible.

COMMUNICATIONS AND PUBLIC AWARENESS

239. We would expect the Regional District of Okanagan-Similkameen to promote public awareness of various aspects of drinking water service and to be appropriately transparent by engaging the public and providing information about drinking water systems on infrastructure, costs, quality, water conservation and demand management, improvements and others.

240. During the period covered by the audit, the Regional District sought feedback from local residents on various aspects of its operation through a 2014 citizen survey and changes to how it communicated with local residents. These steps—which related to the Regional District's overall operations, including drinking water provision—are summarized in the box on page 51.

241. The Regional District sought to be transparent by engaging the public and providing drinking water-related information on infrastructure, costs, quality, water restrictions and conservation and demand management.

242. For example, during the period covered by the audit, the Regional District initiated and promoted various water conservation programs through workshops, such as "rain barrel" and "rain harvesting." It also promoted water source protection in some of its water systems and provided educational materials to the public, for example, on how treatment guidelines were developed and how to prevent deterioration of water quality.

243. Also, the Regional District presented various options to the community on water systems' improvements and asked residents for their input prior to making decisions that could affect water rates.

244. Over the period covered by the audit, the Regional District used various ways to communicate information related to water:

- Articles in local newspapers
- A Facebook page
- An average of nine web-newsletters per year called RDOS Regional Connections. Sixty-eight per cent of these included content relating to water services
- Water-related information on individual water systems' web pages

245. While the Regional District disseminated a significant amount of water-related information over the period covered by the audit, this information was fragmented and scattered across many different documents, making it difficult for water users to find comprehensive information.

246. In some situations, information that should be public was not available. For example, statutory public notices such as water quality advisories of the various water systems—which are ordered by the Drinking Water Officer or issued as a result of regulatory requirements—were not readily available on the webpage, annual water quality reports for 2014 were only available for some water systems and reports for 2015 were not available at all.

247. Users would benefit from information presenting a holistic and complete view of individual water systems, including:

- Water quality
- Water use calculator
- Water rates and billing
- Water-related bylaws
- Type of management
- Condition of systems
- Activities/projects and their justification, costs and achievements
- Financial status
- Performance prospects
- Approach to watershed protection
- Stewardship activities

RECOMMENDATION 23

The Regional District of Okanagan-Similkameen should build on its communications and public information foundation by ensuring its communications tools are fully utilized and that drinking water-related information is consolidated, complete and up-to-date.

248. Public feedback can provide important information to a local government. This comes in many forms, including complaints and inquiries and summaries of this feedback can be a valuable tool for decision makers.

249. Staff told us that the Regional District received and responded to complaints about its water systems and also received enquiries regarding water-related issues outside of its jurisdiction. The Regional District lacked a consistent or formalized way of tracking these complaints and enquiries.

RECOMMENDATION 24

The Regional District of Okanagan-Similkameen should implement a mechanism to track and report on complaints and enquiries from the public relating to its water systems.

Enhancing Communications

In 2014, the Regional District of Okanagan-Similkameen undertook a citizen survey and followed up with changes aimed at improving its communications and decision-making. Based on the survey results, the changes included:

- **Creating a sustainable interdepartmental communication committee**
- **Developing a communication policy**
- **Developing and implementing the communication plan**

The Regional District's 2015 Corporate Action Plan included a corporate objective for its Communication Committee to "Increase Awareness of RDOS to citizens."

During 2016, the Regional District set out to implement the next phase of its communication plan by planning at least one open house, public meeting or tour in each electoral area and by seeking interaction opportunities at home shows and other events.

ABOUT THE AUDIT

OBJECTIVE

250. The overall objective of this performance audit was to provide an objective, independent examination of the local government's drinking water services to determine if the local government provides clean and safe drinking water where and when needed.

PERIOD COVERED BY THE AUDIT

251. The audit covered the period of January 1, 2014 through June 30, 2016. Where relevant materials were developed or events occurred prior to this date, we also took them into consideration. We completed our examination work in December 2016.

AUDIT SCOPE AND APPROACH

252. The audit included a review of the Regional District of Okanagan-Similkameen's governance of its drinking water operations. The audit also included a review of the Regional District's management of its drinking water-related infrastructure and operations and its supply and demand management activities focusing on three water systems: Naramata, Faulder and Olalla. In addition, the audit examined the Regional District's preparedness for future drinking water requirements.

253. The audit did not include the assessment of drinking water services in the region that were provided by irrigation or improvement districts or private water purveyors. The audit also did not include other uses of water services that include fire flows.

AUDIT CRITERIA

254. Performance audit criteria define the expectations against which we assessed the local government's performance. We identify our criteria before we begin assessing a local government. We intend them to be reasonable expectations for the local government's management of the area being audited in order to achieve expected results and outcomes.

255. Below are the criteria we used to assess the local government:

AUDIT OBJECTIVES		LINES OF ENQUIRY AND AUDIT CRITERIA
AUDIT OBJECTIVE 1	The local government's governance structure and activities supported the provision of clean and safe drinking water where and when needed.	1. Governance and organizational structure 1.1. The local government's governance structure supported its water system(s), service area and customers 1.2. The local government's leadership and organizational culture supported the achievement of drinking water priorities and objectives 1.3. The local government's organizational structure supported communication between water system operators and management for informed decision-making and continuous improvement 2. Strategic planning and decision-making 2.1. The local government developed a long-term strategy related to its drinking water services 2.2. The local government considered affordability and cost effectiveness in its decisions related to drinking water 3. Information and decision support 3.1. The local government's information management processes supported staff in meeting drinking water service objectives and accountabilities 4. Public Reporting 4.1. The local government has been appropriately transparent by engaging the public and providing information about drinking water systems related to infrastructure, costs, quality, conservation and improvements 4.2. The local government developed and reported on key performance indicators related to its drinking water services

AUDIT OBJECTIVES		LINES OF ENQUIRY AND AUDIT CRITERIA
AUDIT OBJECTIVE 2	The local government managed its drinking water supplies to meet current and expected future demand.	1. Assessment of drinking water sources 1.1. The local government assessed available drinking water sources for supply over time 1.2. The local government assessed available drinking water sources for redundancy 2. Source water protection 2.1. The local government contributed to the development of source water protection management plans 2.2. The local government incorporated source water protection considerations, where relevant, into land use, development and other bylaws 2.3. The local government collaborated with others to protect or enhance source water quality 3. Water supply infrastructure 3.1. The local government developed a long-term asset management plan for its water supply infrastructure 3.2. The local government maintained its water supply infrastructure (natural and engineered) or developed new infrastructure as required 4. Demand management strategies 4.1. The local government developed a demand management or water conservation plan or strategies 4.2. The local government developed bylaws to support demand management 4.3. The local government adjusted its pricing strategy when needed to manage demand 4.4. The local government developed a drought management plan 5. Water usage 5.1. The local government implemented actions identified in its demand management or water conservation plan 5.2. The local government enforced its water related bylaws 5.3. The local government implemented actions identified in its drought management plan 5.4. The local government managed and operated water conservation infrastructure 5.5. The local government contributed to positive results in water conservation 6. Public awareness 6.1. The local government promoted public awareness of source water protection 6.2. The local government promoted public awareness of water conservation and demand management
AUDIT OBJECTIVE 3	The local government ensured the safety and reliability of drinking water provided through its treatment and distribution systems	1. Water infrastructure 1.1. The local government's water infrastructure was sufficient to meet drinking water regulations and a multi-barrier approach 1.2. The local government minimized the costs of water infrastructure while meeting regulations and water quality guidelines 1.3. The local government staff kept aware of innovation and research related to water infrastructure 1.4. The local government developed a long-term asset management plan for its water facilities 2. Water operations 2.1. The local government had sufficient human resources capacity with the right skill level to meet regulations and carry out its multi-barrier approach 2.2. Local government staff completed operational duties as their positions required 2.3. The local government ensured business continuity related to drinking water 2.4. The local government developed and effectively utilized mitigation plans to manage, eliminate, or reduce water operation risks to an acceptable level 2.5. The local government is prepared to respond to water related emergencies and responded effectively to emergencies in the past 3. Public awareness of water quality 3.1. The local government communicated to its water systems' customers essential information about drinking water safety and reliability

GLOSSARY

Aquifer: Geological formation of permeable rock, sand, or gravel that conducts groundwater and yields significant quantities of water to springs and wells.

Backflow: The flow of water in a direction opposite to normal flow. Backflow refers to water that is returned into the system by backflow, Backflow can introduce contaminants into the purified water.

Business continuity planning: A documented strategy that identifies the threats and risks facing an organization. A business continuity plan defines actions to protect the organization enabling it to continue functioning in adverse circumstances.

Catchment: A surface from which draining water is collected.

Chlorination: The process of adding chlorine to drinking water to disinfect it and kill pathogens.

Coliform bacteria: A group of related bacteria whose presence in drinking water may indicate contamination by disease-causing microorganisms.

Contaminant: Anything found in water that might be harmful to human health.

Continual improvement: An ongoing systematic effort to seek incremental improvements through an evaluative feedback process that includes: planning, implementation, recording, evaluation and revision.

Cryptosporidium: A protozoa commonly found in lakes and rivers, which is highly resistant to disinfection. May cause gastrointestinal illness.

Demand management: A set of strategies by a water utility or consumer to conserve water by influencing demand.

Disinfection: A chemical or physical process that kills microorganisms.

Environmental Operators Certification Program (EOCP): A certification and education program for water operators that focuses on training and standards.

Eschericha coli (E. coli): Coliform bacterium that is often associated with human and animal waste and is found in the intestinal tract.

Emergency response plan: A planned set of procedures designed to mitigate the damage of possible emergency events.

Groundwater: The water found in underground aquifers which supplies wells and springs.

Hazard: A source of danger or harm to the drinking water consumer.

Influenza: Commonly known as “the flu”, is an infectious disease caused by an influenza virus

Irrigation: The artificial supply and application of water to the soil to maintain moisture in crop fields.

Low flow fixtures: Faucets, shower heads, and toilets that use less water per minute than older, traditional models.

Microorganisms: Living organisms that can be seen only with the aid of a microscope.

Multi-barrier approach: An integrated system of procedures that reduce contamination of drinking water from source to tap. Includes source water protection, treatment, supply network, monitoring and preparation for emergencies.

Pathogen: A disease-causing organism.

Private water system: Individual domestic drinking water system used for personal or family needs only.

Programmable Logic Controller (PLC): A rugged industrial computer that has been customized to control processes.

Protozoa: Single-celled organisms. More complex physiology than viruses and bacteria. Average size of 1/100 mm diameter.

Raw water: Water in its natural state, prior to any treatment for drinking.

Reservoir: A pond, lake, or basin, either natural or artificial, for the storage, regulation, and control of water.

SCADA: is an acronym for Supervisory Control and Data Acquisition. A computer system that monitors and controls a process.

Septic system: A small-scale sewage treatment system common in areas that lack connection to main sewage pipes provided by local governments.

Source water: Water in its natural or raw state, prior to being withdrawn for treatment and distribution as a drinking water supply.

Surface water: Water that is on the Earth's surface, such as in a stream, river, lake, or reservoir

Stakeholder: Person or group of people affected by, or who can influence, a decision or action.

Turbidity: The cloudy appearance of water caused by the presence of tiny organic or inorganic particles.

Ultraviolet treatment: System that uses lamps that emit UV light to kill microorganisms.

Uranium treatment plant media: Uranium treatment uses specialized anion exchange resin as a media to exchange and remove undesirable ions.

Water accounting: measures and determines a water balance within a basin by estimating the effects of water usage, storage, environmental flows, and water withdrawals on natural stream flows, groundwater, and lake levels. It can show how water management decisions positively or negatively affect areas of a basin.

Water conservation: Activities designed to increase efficiency of use, decrease demand, and reduce waste of water.

Water quality notification: May be put on a water system by the operator or the Drinking Water Officer and range from least to most serious:

1. Water quality advisory—Some level of threat but not significant enough to require a boil water or do not use advisory

2. Boil water notice—Potential microbial threat to drinking water. The risk can be adequately addressed by boiling the water as a short-term form of treatment.

3. Do not use water notice—Water is not safe for domestic use.

Water system: Water provided to more than one single-family residence.

Waterborne viruses: Pathogenic microorganisms that can cause illness or disease.

Watershed: The area draining naturally from a system of watercourses and leading to one body of water.

Wellhead: The structure built over a well to maintain water protection. The land area surrounding a drinking water well or well field.

Xeriscaping: a method of landscaping that uses plants that are well adapted to the local area and are drought-resistant. Xeriscaping is becoming more popular as a way of saving water at home.

SUMMARY OF LOCAL GOVERNMENT COMMENTS

19 April 2017

Mr. Gordon Ruth
Auditor General for Local Government
Province of British Columbia
201-10470 152nd St.
Surrey, BC
V3R 0Y3

Dear Mr. Ruth

RE: 2016 Environmental Programs and Services Audit

The Regional District of Okanagan Similkameen was advised that the Auditor General for Local Government (AGLG) proposed to provide an objective independent examination of the Regional District's drinking water systems in 2016 to determine if the local government provides clean and safe drinking water where and when needed. Three objectives were identified:

1. Did the governance structure and activities support the provision of clean and safe drinking water?
2. Did we manage our drinking water supplies to meet current and expected demand?
3. Did we ensure the safety and reliability of drinking water provided through our treatment and distribution systems?

The AGLG selected three of the Regional District water systems and provided a full report to the Board on February 20, 2017, including 24 recommendations. On behalf of the Board of Directors for the Regional District, please accept this expression of our appreciation for the diligence and professionalism with which your staff carried out this audit, for the thought put into the recommendations on how we could make our systems more robust and the suggestions on how we could strive to bring our water systems to a higher standard in the future.

Our Board and Management Team at the Regional District believe this to have been a worthwhile endeavor and have provided a response as to how we will address each of the 24 recommendations. We assure the AGLG that we will work with purpose on implementation.

Sincerely,

Karla Kozakevich
Chair

Find us on
REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
101 Martin Street, Penticton, BC V2A 5J9 | 250-492-0237 | www.rdos.bc.ca | info@rdos.bc.ca
Serving the citizens of the Okanagan-Similkameen since 1966.

ACTION PLAN

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
GOVERNANCE STRUCTURE AND ACTIVITIES SUPPORTING DRINKING WATER SERVICES				
1. The Regional District of Okanagan-Similkameen should continue moving forward with those water-related initiatives identified in its regional growth strategy that are within its mandate and develop performance measures to assess its progress. These should be reported to the Board and the public on a regular basis.	• Review initiatives with new Regional Water Use Regulation and Conservation Bylaw under development • Continue development of a Water Acquisition Policy for taking on private or irrigation district systems • Incorporate the metering initiatives into the regulation bylaw and system upgrade projects • Present all information to the Board of Directors and public • Implement prioritization by Board • Complete the RDOS Flood and Drought Gap Analysis • Continue working with the Okanagan Basin Water Board to develop a Watershed Management Plan for the South Okanagan	• Consultant • Staff time	• Public Works	2018
2. The Regional District of Okanagan-Similkameen should update its water system governance transfer policy and identify actions and timelines for processes that take place following an acquisition, such as updating legacy bylaws, reviewing existing governance and advisory structures and others.	• Water Acquisition Policy is currently under review.	• Staff time	• Public Works • Legislative Services	End of 2017
3. The Regional District of Okanagan-Similkameen should continue developing an asset management framework to enable it to make informed, cost-effective asset investment decisions—including decisions related to water systems—based on known asset conditions, risk analysis, full lifecycle costing and potential sources of revenue.	• AMIP is completed • Next steps towards creating framework is underway	• Consultant • Staff time • Available funds/grants	• Public Works • Finance • Information Services	Underway, Completion depends on available funding

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
GOVERNANCE STRUCTURE AND ACTIVITIES SUPPORTING DRINKING WATER SERVICES				
4. The Regional District of Okanagan-Similkameen should consider a full cost recovery approach as part of its water service planning that: • Ensures that funding for water systems is sufficient to sustain them indefinitely and that funds are appropriately spent • Promotes more efficient use of water, allowing the deferral of capacity expansions and the reduction of costs	• Asset Management Plan underway • Lifecycle costs will be developed • Determine appropriate rates for each community based on lifecycle costs developed and the specific needs of each • Continue efforts with leak detection, capital replacement of aging water infrastructure and conservation	• Consultants • Staff time • Available funds from each water system budget	• Public Works • Finance	Underway, Completion depends on available funding
5. The Regional District of Okanagan-Similkameen should improve data collection, analysis, monitoring and reporting on its water services as part of a continual improvement process. This should include: • A performance measurement system for its water services • Monitoring of progress • Regular reporting to the Board, senior management and public on results	• Database creation for all water data is being set up to allow direct download of lab results • Quality reports from database can be easily customized for specific audience • Updates to the Board are anticipated in the quarterly reports on specific operations and unusual activities in the water systems • Develop a template for the public reports and post annually • For each system, evaluate the value of implementing meters and usage based bills and implement phased approach where directed • Benchmark performance metrics used in other local governments and discuss with the Board.	• Database consultant • Staff time • Available funds	• Public Works	Completion of templates by 2018

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
GOVERNANCE STRUCTURE AND ACTIVITIES SUPPORTING DRINKING WATER SERVICES				
6. The Regional District of Okanagan-Similkameen should implement information technology (IT) general controls over its SCADA system and other related systems and treat them as part of its IT infrastructure, subject to organization-wide IT policies and procedures.	• Implement existing policy on password changes to software for utility systems • Maintenance package for software purchased for ongoing updates • Backup system of critical data and programs will be instituted by IS • Finish project to get remote sites synced to central server • Continue to improve SCADA on systems not currently included on network	• Staff time • Additional staff member will be required for Instrumentation and Electrical specific work	• Public Works • Information Services	October 2017
7. The Regional District of Okanagan-Similkameen should complete business continuity planning for its critical services—including drinking water—to ensure the continuation of service and sustainable infrastructure throughout potential disruptions.	• Objective for 2017 is development of corporate continuity/resumption plan Process underway Water systems included as part of next phase in 2018 work plan Emergency Response Plans (ERP's) will continue to be updated for changing contact and emergency number information on an as needed basis	• Staff time	• Legislative Services	2019
8. The Regional District of Okanagan-Similkameen should enhance its emergency and contingency planning by: • Ensuring that emergency response plans are regularly updated, tested, made accessible and familiar to all staff • Ensuring that backup power is available for all water systems • Providing backup pumps and motors onsite at the Faulder water facility	• Emergency Response Plans will be reviewed and updated in procedures • Operations staff will prepare a schedule for conducting training and exercising the plans • Backup power is discussed in AGLG Recommendation 20 • Backup pumps/motors • Redundancy built into installed systems with extra pump/motor available inline • Inventory of extra pumps & motors to be completed • Extra pumps and motors needed will be assessed and procured	• Consultants—for design • Contractors—for installation • Staff time • Capital funding	• Public Works	Backup power—April 2017 for 2 systems Remainder will be as funding is available

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
SOURCE WATER PROTECTION				
9. The Regional District of Okanagan-Similkameen should develop a source water protection plan for Naramata that identifies risks and addresses the Regional District's contributions to source water protection. It should consider enhancing the existing plans for Faulder and Olalla.	• Inventory existing source protection plans from other water purveyors in area on same sources • Determine requirements for each system and retain consultant to prepare new or updated plans • Okanagan Basin Water Board (OBWB) may be working on main plan for main-stem lakes in Okanagan valley bottom • Aquifer mapping project underway with OBWB collaboration	• Staff time • Consultant • Funds from each water system involved	• Public Works	Naramata planned for 2018 Ongoing
10. The Regional District of Okanagan-Similkameen should take steps to mitigate risks identified in the Olalla Groundwater Protection plan to the 60-day well capture zone.	• Review first two stages completed for recent regulatory or legislative changes • Prepare an implementation work plan for moving project forward • Review potential of introducing Official Community Plan or Zoning Bylaw for Area G, which includes Olalla	• Staff time • Funds for implementation	• Public Works • Planning	Estimated 2019
11. The Regional District of Okanagan-Similkameen should consider the addition of source water protection regulations to relevant bylaws, where appropriate, as they are reviewed and updated and as new bylaws are developed.	• After completion of source water protection plans (as discussed in Recommendation 9), determine relevant bylaws to include information in • Prepare amendments to bylaws such as the Water Regulatory Bylaw, Zoning Bylaws, Conservation bylaws.	• Staff time • Consultants—potentially for updates • Funds for implementation	• Public Works • Planning	2018 or 2019
12. The Regional District of Okanagan-Similkameen should engage with relevant stakeholders and other water systems in the region to: • Understand regional risks related to source water • Improve regional conservation strategies, drought and climate change responses • Improve planning of drinking water supply • Build community support for source water protection	• Regional drought and flood strategy started in 2016 and is currently underway • Regional Conservation Bylaw currently under development • Implementation recommendations will be developed and sent forward to the Board to prioritize and receive funding • Continue newsletters for educating public and updating on upcoming events • Engage other water purveyors in the RDOS to determine interest in meeting to discuss mutual interests	• Staff time—significant amount would be required for implementation of all recommendations	• Public Works	Ongoing

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
SOURCE WATER PROTECTION				
13. The Regional District of Okanagan-Similkameen should ensure that it has feasible plans for the implementation of backup options for drinking water supplies in the case of primary water supply service disruption.	• Options provided in Emergency Response Plans • Further investigation into potential options will likely be completed as part of future strategies and analysis of each water system	• Staff time	• Public Works	Ongoing
14. The Regional District of Okanagan-Similkameen should develop a regional district-wide water conservation and demand management strategy that: • Implements water accounting or similar analysis to determine the operational efficiency of its water systems • Identifies innovative water conservation activities targeted at areas likely to bring the greatest benefits and meet projected future needs • Takes into account drought management plans already identified • Includes an action plan, implementation schedule and performance measures for each water system • Aligns with updated water-related bylaws and an updated strategy to maximize bylaw compliance	• Drought and Flood Risk Management and Mitigation Plan is currently underway Stage 1—gap analysis to assess existing information and identify next steps in process Action plan development Proposed implementation plan will be brought forward for prioritization by Board of Directors • Regional Water Use Regulation and Conservation Bylaw is currently underway Aligns regulations and management of all water systems under one bylaw Phased metering implementation plan will be brought forward for prioritization and consideration by the Board of Directors	• Staff time—additional staff member needed as significant time to implement all AGLG recommendations	• Public Works	Ongoing
15. The Regional District of Okanagan-Similkameen should consider implementing a structured and results-based approach to water accounting to manage drinking water consumption and losses.	• Encourage universal metering program for some or all water systems • Continue with leak detection procedures and investigations • Examine currently collected data and collate into a central recording process to improve the long term information storage and analysis of various activities	• Staff time	• Public Works	Ongoing

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
DRINKING WATER TREATMENT AND QUALITY MANAGEMENT				
16. The Regional District of Okanagan-Similkameen should resolve issues that prevent it from operating the Faulder Water System's newly-installed uranium treatment plant and well in order to meet the Guidelines for Canadian Drinking Water Quality.	• Electrical any hydraulic issues addressed • New well with pump brought online in February 2017 • Media to be brought fully online in April 2017 after initial testing completed	• Staff time • Correct equipment	• Public Works	June 2017
17. The Regional District of Okanagan-Similkameen should consider improving its quality control processes over water quality reports.	• Continue practice of ongoing training for EOCP certified operators • Continue to meet Interior Health Authority requirements for water quality monitoring • Database developer/provider retained to collect all data directly from the laboratories and prepare required reporting tools • Preparation of Standards of Practice for collecting and reporting of information will be completed and updated as required	• Staff time—significant amount required to prepare the Standards of Practice and formalize all reporting templates	• Public Works	2018
18. The Regional District of Okanagan-Similkameen should implement a formal routine maintenance and inspection program for all of its water treatment facilities, including schedules and monitoring of task completion.	• Utilize the knowledge and expertise of our operators to prepare Standards of Practice (SOP's) for passing on the information for future operators • Part of the Asset Management Plan implementation will include a tracking program that will include a full maintenance recording system for each piece of equipment or water pipe Program will notify when inspection or work is due and record what was done and when the work was completed Record all pertinent information in the field during the work All information would flow into the central Asset Management Software	• Staff time—significant amount to get system populated with the information • Potential grant funding	• Public Works	Ongoing Dependent on available budget

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
DRINKING WATER STORAGE AND DISTRIBUTION				
19. The Regional District of Okanagan-Similkameen should review its water storage and distribution operating standards and formalize and document its procedures, including inspection, testing and operational oversight.	• Verified that the current procedures are in accordance with AWWA standards and all information is recorded in logbooks • Compile all procedures in a central location and add additional Standards of Practice documents as developed • Asset Management Plan implementation will include a component that will include a full maintenance recording system as discussed in AGLG Recommendation 17	• Staff time—significant amount required to develop and formalize all procedures	• Public Works	Ongoing
20. The Regional District of Okanagan-Similkameen should ensure that each of its water systems has a working backup power system available to pump water at the required flow and pressure.	• Backup power West Bench—currently installed Faulder—installed by April 2017 Naramata—installed by April 2017 Olalla – automatic transfer switch installed; generator options under consideration • Other systems do not yet have back up power capabilities but will be considered as part of upgrade plans Explore opportunities for portable or permanent generators Prepare recommendations for the Board's decision on each system	• Staff time • Consultant for design • Contractor for construction	• Public Works	Ongoing
21. The Regional District of Okanagan-Similkameen should implement a formal cross connection control program and evaluate it as necessary to prevent drinking water contamination.	• Cross Connection Control (CCC) Bylaw is currently under development with plans to bring it forward for approval prior to the end of 2017 • Plan for moving forward with a CCC program will be developed and implemented with direction from the Board of Directors	• Additional staff member to execute the CCC plan	• Public Works	Bylaw in 2017 Plan in 2018
22. The Regional District of Okanagan-Similkameen should implement controls for its automated monitoring systems to ensure security is maintained and communication of system error or failure is investigated as soon as possible.	• All water buildings and reservoirs have updated alarming systems installed	• Staff time • Additional staff member will be required for Instrumentation and Electrical specific work	• Public Works	Ongoing

AGLG RECOMMENDATIONS	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBLE	TARGET DATE
COMMUNICATION AND PUBLIC AWARENESS				
23. The Regional District of Okanagan-Similkameen should build on its communications and public information foundation by ensuring its communications tools are fully utilized and that drinking water-related information is consolidated, complete and up-to-date.	• Continue to use and enhance current communication methods that include: Newsletters Press releases Newspaper ads Door to door flyers Sign boards and permanent signage Email lists System websites • Consider additional communication methods that could be added • Revise report structure for the public on overall water use and quality results • Update websites to improve ease of use	• Staff time • Templates for all media types	• Public Works	Ongoing
24. The Regional District of Okanagan-Similkameen should implement a mechanism to track and report on complaints and enquiries from the public relating to its water systems.	• Event log is in development for staff to enter information from the public • Daily logging will be required to keep the list up to date	• Staff time—additional time needed to keep log up to date as information will be coming from operators and internal staff	• Public Works	Ongoing

AGLG CONTACT INFORMATION

The AGLG welcomes your feedback and comments. Contact us electronically using our website at *www.aglg.ca* or email *info@aglg.ca* to share your questions or comments.

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