REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

Thursday, March 19, 2020
RDOS Boardroom – 101 Martin Street, Penticton

SCHEDULE OF MEETINGS

9:00 am	-	9:45 am	Corporate Services Committee
9:45 am	-	10:15 am	OSRHD Board
10:30 am	-	11:30 am	RDOS Board

"Karla Kozakevich"

Karla Kozakevich
RDOS Board Chair

2020 Notice of Meetings			
April 2	**RDOS Board**		**Committee Meetings**
April 16	**RDOS Board**	**OSRHD Board**	**Committee Meetings**
May 7	**RDOS Board**		**Committee Meetings**
May 21	**RDOS Board**	**OSRHD Board**	**Committee Meetings**
June 4	**RDOS Board**		**Committee Meetings**
June 18	**RDOS Board**	**OSRHD Board**	**Committee Meetings**

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
Corporate Services Committee

Thursday, March 19, 2020
9: 00 am

REGULAR AGENDA

A. **APPROVAL OF AGENDA**

RECOMMENDATION 1

THAT the Agenda for the Corporate Services Committee Meeting of March 19, 2020 be adopted.

B. **COMMUNITY FOUNDATION** – Neighbourhood Small Grants Presentation

Kim English, Regional Community Development Officer/Neighbourhood Small Grant Coordinator

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C. **2020 BUSINESS PLAN**

RECOMMENDATION 2

THAT the 2020 Business Plan be sent to the Board for discussion.

D. **ADJOURNMENT**

COMMUNITY FOUNDATION

south okanagan | similkameen

Building Smart & Caring Communities

Community Funds

SUMMERLAND COMMUNITY FUND

OLIVER COMMUNITY FUND

OSOYOOS COMMUNITY FUND

PRINCETON COMMUNITY FUND

LOWER SIMILKAMEEN COMMUNITY FUND

COMMUNITY FOUNDATION
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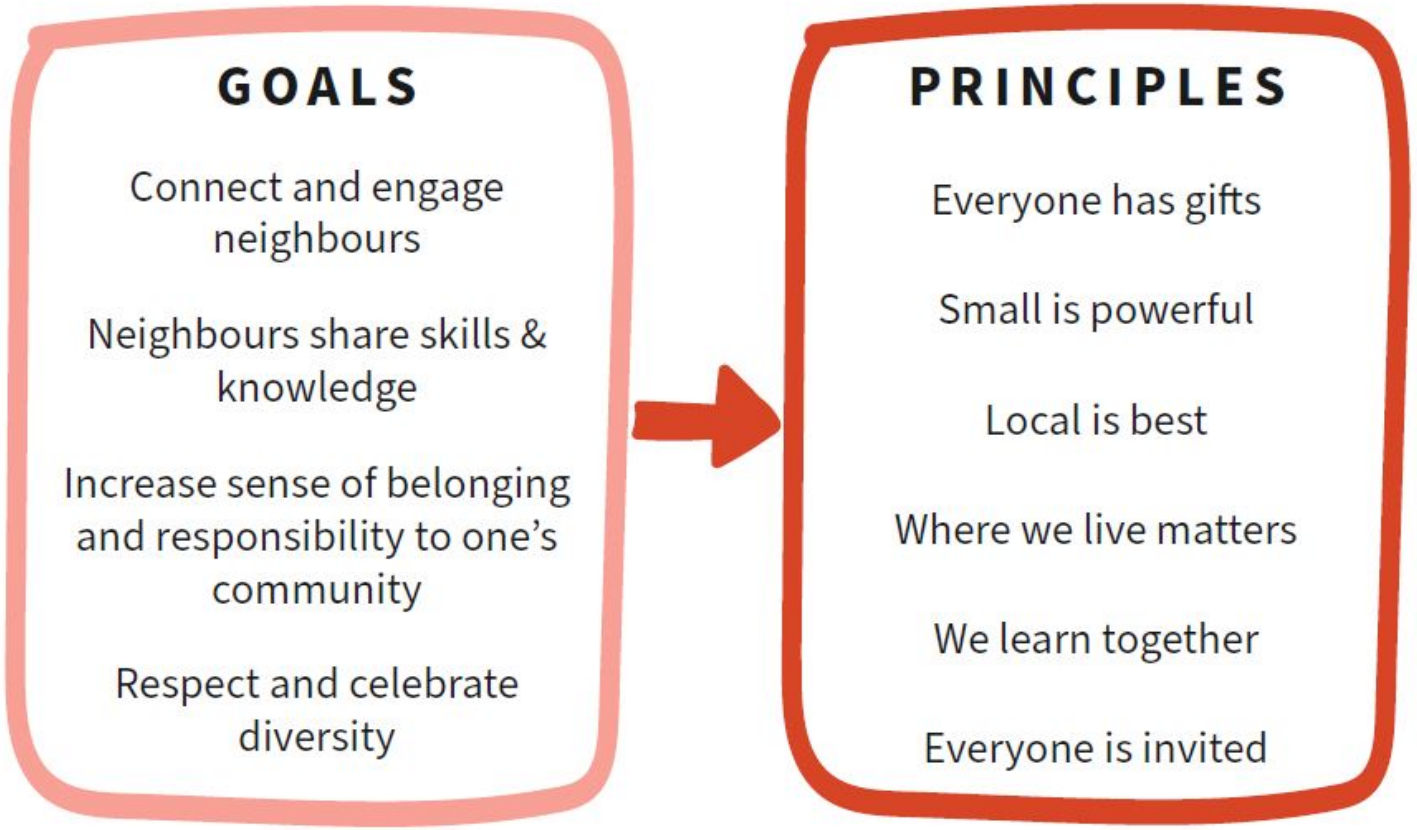
vancouver foundation

Neighbourhood Small Grants South Okanagan Similkameen

Neighbourhood Small Grants



Regional Participation

116

Neighbourhood Small Grants awarded since 2016

Neighbourhood Small Grants South Okanagan Similkameen

NSG Builds Community and Social Capital

- Neighbourhood resilience
- Health and wellbeing
- Safety and security
- Civic engagement and collective action

Neighbourhood Small Grants South Okanagan Similkameen

Applying for a NSG

- Online application closes April 20
- Multiple languages supported
- 2 co-applicants not living together
- $500 max. award
- Free, inclusive, and accessible
- Budget may include: decorations, food, craft and art supplies, honorariums, permit costs and liability insurance

Neighbourhood Small Grants
South Okanagan Similkameen

REGIONAL DISTRICT RDOS OKANAGAN-SIMILKAMEEN

CITY OF Penticton

Oliver CANADA'S WINE CAPITAL

Thank You

Osoyoos Canada's warmest welcome

DISTRICT OF SUMMERLAND

Village of Keremeos

Town of PRINCETON

COMMUNITY FOUNDATION south okanagan | similkameen

Neighbourhood Small Grants South Okanagan Similkameen

Do you have an idea to bring people in your community together?

Small grants. Beautiful ideas to bring people together.
Apply for up to $500 grant to bring your project to life.

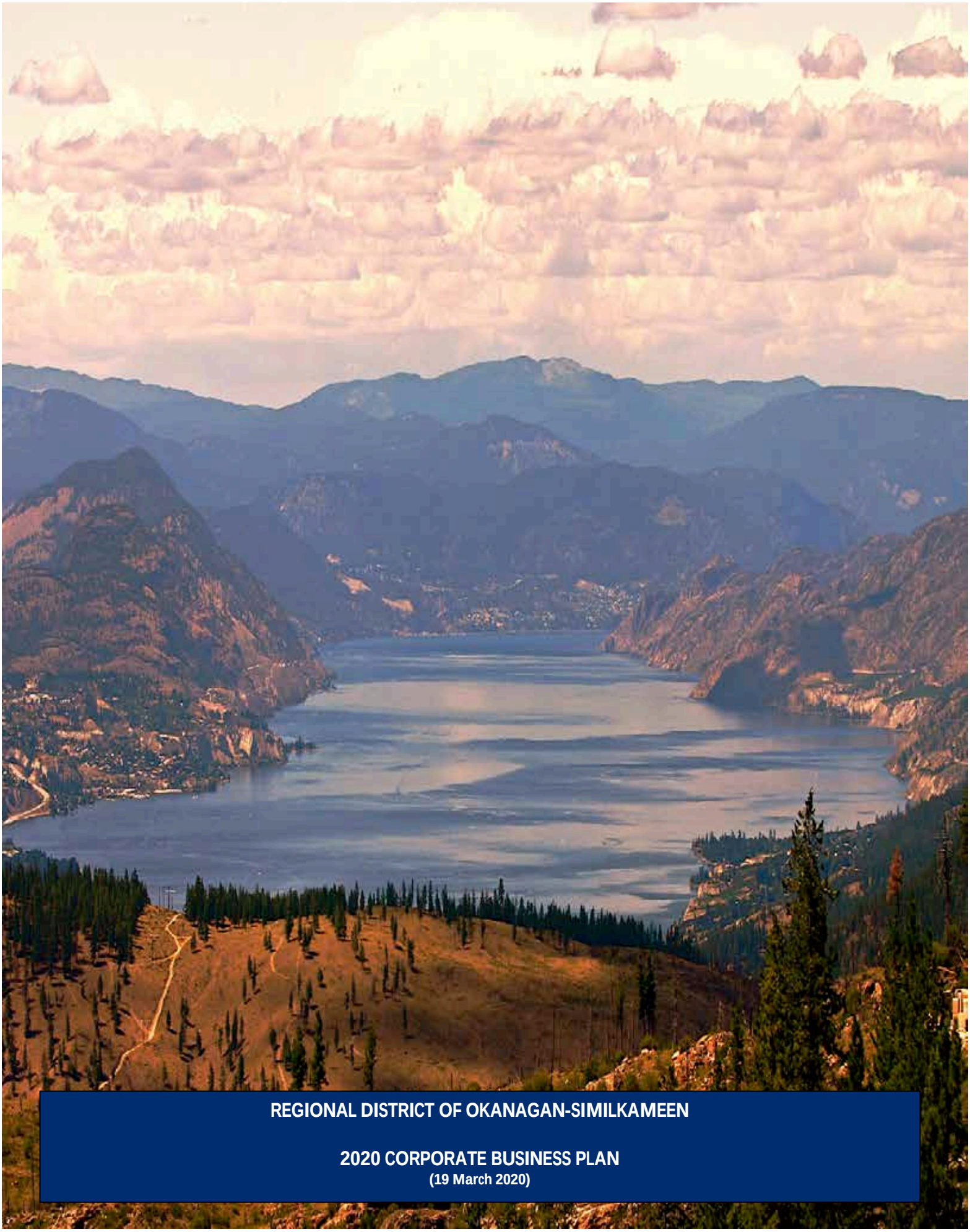
DEADLINE TO APPLY IS APRIL 20, 2020

For more information or help applying contact
Neighbourhood Small Grants Coordinator Kim English
Email kimenglish@cfso.net **Online application** www.cfso.net

COMMUNITY FOUNDATION south okanagan | similkameen

IN PARTNERSHIP WITH vancouver foundation

#NSGBC



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

2020 CORPORATE BUSINESS PLAN

(19 March 2020)

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INTRODUCTION

Local governments are facing significant challenges that impact their ability to satisfactorily fulfill their purpose and serve those citizens within their geographic boundaries, as stipulated in the enabling legislation under which they were created.

These challenges occur as a result of several factors resulting from both internal and external conditions. Demographic changes, revenue funding structures, provincial unfunded mandates, technological changes, public scrutiny, a growing demand for service, aging and inadequate infrastructure systems, healthcare and cost containment to name a few.

The Board of Directors and the Senior Management Team of the Regional District of Okanagan Similkameen meet each autumn and, amongst other processes, consider the internal and external environments that they needed to work in as a basis for planning.

The lack of stability in the global and local economy now seems constant, but local governments knowing that, must adapt. We carefully monitor the assumptions upon which our Business Plan is based in a true effort to represent our citizenry. The typical local government preoccupation with solid waste, water treatment and distribution, wastewater collection and treatment, land-based planning, parks maintenance and other typical duties continues. Recent times have made us aware that climate change, emergency preparedness, crime prevention, physician recruitment, affordable housing, child care and other social programs are important, too. Trends, demographics and citizen feedback figure prominently in our decision-making.

With the 19 Members of our 2018 – 2022 Board of Directors now entering the 2nd year of their term of office, the experience and growing confidence around the Board Table is obvious and both our elected officials and our staff look forward to moving forward with our 2020 objectives and the achievement of the 4-year goals in the strategic plan.

While contemplating the future of our regional district, the Board of Directors represents 15 different jurisdictions that share our environment and they come together to ensure that we take a regional perspective on important issues, that we develop partnerships to achieve economies of scale and that we serve all citizens of the regional district.

STRATEGIC OVERVIEW

Vision

People, both those choosing to live and those just to visit our valley's, come to our regional district for the climate, the lakes & rivers, the mountains, our wines and tree fruits and many other reasons. The vision acknowledges that we wish to provide a high quality of life for our citizens, but to do so in a sustainable manner where none our decisions today impact adversely on future generations. Our future actions will move us incrementally towards this vision.

Vision

We envision the Regional District of Okanagan-Similkameen as a steward of our environment, sustaining a diverse and livable region that offers a high quality of life through good governance.

Mission

Along with the vision, the mission statement helps us establish the priorities of the RDOS. The key concepts within the mission will guide the way we do business. We will continue to strive to:

- Exceed customer and community expectations; and,
- Manage the regional district in the best interests of all of our constituents;

Mission

To initiate and implement policies which preserve and enhance the quality of life and serve the broader public interest in an effective, equitable, environmental and fiscally responsible manner.

Values

The core values are the foundation of our vision and mission and integral to the way we do business. These values reflect our beliefs, define who we are and what we stand for.

Honesty, Integrity, Ethical and Respectful Behaviour

We are honest, ethical, and fair in all of our activities, using consistent and sound judgment to build trust in our working relationships.

Accountability

We take responsibility for our actions by embracing common goals through teamwork and collaborative decision-making while putting the interest of the community first. We dedicate ourselves to maintaining professionalism in our work using our guidelines and standards that enable us all to be answerable for our choices and achieve results stated in our organizations goals and objectives.

Leadership/ Transparency

We value “leadership with integrity” and are committed to open, accessible and transparent local government.

Consistent Focus on the Customer Experience

We provide courteous, responsive, high-quality service by fostering a respectful, positive and welcoming environment for our customers. We provide consistency through sound business practices and professional standards.

Environmental Responsibility

We believe that a healthy environment promotes healthy living in our communities. We have a responsibility to maintain, enhance and protect the environment through the consideration of environmental impacts in our decision-making process.

Corporate Assumptions

The following assumptions were generated at the 2019 Management and Board Strategic Plan Workshops and used as the foundation for our 2020 Goals:

External

- That we prioritize our citizens' input and citizen engagement.
- That trust in government is enhanced by communications and citizen engagement
- That there is value in increasing the role technology will play in Regional District business.
- That by measuring staff and customer perception of service we can develop a plan to improve service.
- That an aging demographic will impact the fiscal climate of the region and impact fiscal decisions
- That infrastructure grant opportunities will continue in the foreseeable future.
- Aging infrastructure will continue to deteriorate
- That technology will impact infrastructure planning and investment for programs such as planning for electric charging stations
- That impacts of sustainability decisions are important to citizens
- That citizens may be willing to pay for improvement of some services
- That senior government expectations of local government and downloading will continue to increase
- That public scrutiny of local government decisions will increase.
- That there is a public acceptance for more of our business to be conducted on-line.
- That climate change will affect core services, infrastructure and the frequency of environmental emergencies.
- That water shortages will affect core services
- That high-density communities in rural areas will expect municipal services similar to incorporated communities.
- That our communications will be more effective tailored to specific electoral areas or issues
- That development and building permit applications are expected to rise
- That the Province will encourage local governments to expand into the provision of social services
- That intergovernmental relations will impact on our business processes
- That citizens needs are becoming more diverse according to age
- That access to high speed internet is a vital infrastructure requirement for new resident attraction
- That strengthened relationships created by city to city collaboration will identify and foster opportunities

Internal

- That the Board wants to be an employer of choice
- That new technologies will facilitate our business processes
- That we must build relationships to be successful
- That government effectiveness is enhanced by good communication
- That measurement is essential to good management

- That the Regional District will receive increased pressure to assume ownership of more utilities
- That there will be financial and environmental benefit for the Regional District to explore alternative energy sources

KEY SUCCESS DRIVERS

The Key Success Drivers focus our energies and resources on those activities that help us to advance towards and ultimately achieve our vision. RDOS has identified four Key Success Drivers under which we build the 5-year goals that support our vision.

Key Success Driver 1.0: High Performing Organizing

Goals

1.1 To be an effective, fiscally responsible organization.
1.2 To be a healthy and safe organization.
1.3 To cultivate a high-performing organizational culture.

Key Success Driver 2.0: Optimize the Customer Experience

Goals

2.1 To provide a high level of customer service
2.2 To meet public needs through the continuous improvement of key services

Key Success Driver 3.0: Build a Sustainable Region

Goals

3.1 To develop a socially sustainable region
3.2 To develop an economically sustainable region
3.3 To develop an environmentally sustainable region

Key Success Driver 4.0: Governance & Oversight in a Representative Democracy

Goals

4.1 To execute a well-defined strategic planning cycle.
4.2 To promote Board and Chair effectiveness.

LOCAL GOVERNMENT OVERVIEW

Overview

The Constitution Act of 1867[1] identifies the specific services the Canadian Parliament administers and delegates the specific authorities belonging to the provinces[2], one of which is the creation of Local Governments. Consequently, the Regional District of Okanagan Similkameen is a corporation officially established on March 4th, 1966 by Letters Patent issued by the Executive Council of British Columbia pursuant to Section 766 of the Municipal Act of British Columbia. As a creation of the Province, the Regional District relies on Provincial Legislation to provide the authority necessary for it to fulfil its mandate of providing services to the citizens within its corporate boundaries.

Mandate and Authority

Section 185 of the Local Government Act (LGA) provides that regional districts are an independent, responsible and accountable order of government within their jurisdiction. The purposes of a regional district include:

(a) providing good government for its community,
(b) providing the services and other things that the board considers are necessary or desirable for all or part of its community,
(c) providing for stewardship of the public assets of its community, and
(d) fostering the current and future economic, social and environmental well-being of its community.

Letters Patent

The Regional District is led by a Board of nineteen Directors, nine rural and ten urban. The nine current electoral areas each have one elected director and of the six municipal members, Penticton appoints four Directors, Summerland appoints two Directors and Osoyoos, Oliver, Keremeos and Princeton each appoint one. The rural Directors are elected to a four-year term[3] while the urban members are appointed by their councils annually. The Act also provides that the authority and power to govern the municipality is vested in the Board as a whole[4].

Establishment Bylaws

Where authority to provide a service was initially established in the Letters Patent, changes to the Municipal Act in 1989 made it possible for Regional Districts to provide services with the adoption of a service establishment bylaw. The service can be for all or part of the Region, but only the people receiving the service contribute to its cost.

1 The Constitution Act 1867 to 1982, Section 91, Part VI, Department of Justice Canada, (Ottawa, Ontario: Minister of Supply and Services Canada, 1983).

2 Ibid, Section 92(8) of Part VI

3 Municipal Act, Chapter 19, Revised Statutes of British Columbia, 1998

4 Ibid, Section 167

Vote Allocation

To fairly represent the population that makes up the Regional District at the Board, the Supplementary Letters Patent have identified that 1 voting unit = 1800 people. I director may carry a maximum of 5 votes.

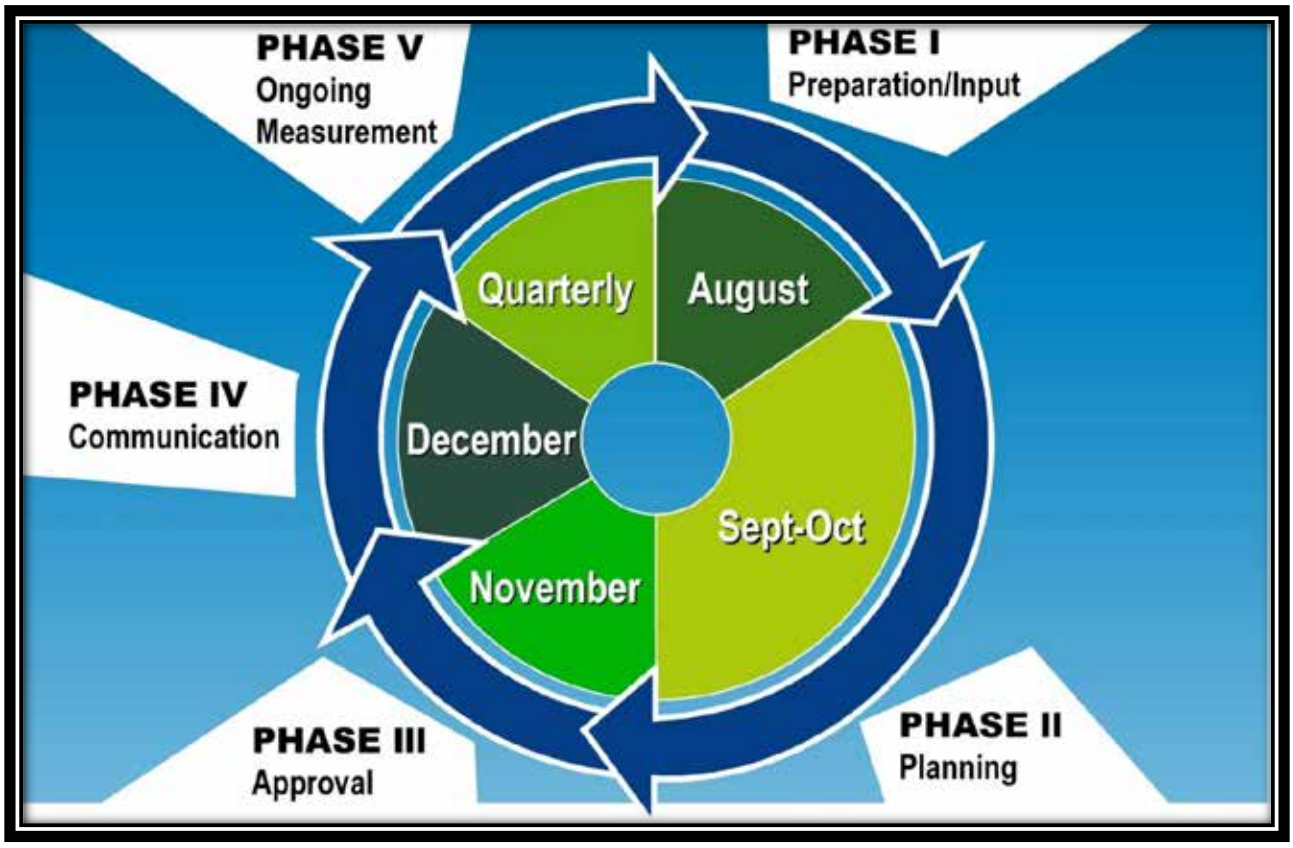
# of Members/ Representing	Weighted Votes
Electoral Area "A"	2
Electoral Area "B"	1
Electoral Area "C"	3
Electoral Area "D"	3
Electoral Area "E"	2
Electoral Area "F"	2
Electoral Area "G"	2
Electoral Area "H"	2
Electoral Area "I"	2
Town of Osoyoos	3
Town of Oliver	3
City of Penticton	19
District of Summerland	7
Village of Keremeos	1
Town of Princeton	2
Total Votes Allocated	**54**

Jurisdiction	Unweighted Votes	Weighted Votes
Similkameen Valley	5	8
Okanagan Valley	14	46
Municipal Votes	10	35
Rural Votes	9	19

The RDOS subscribes to a corporate culture and operating philosophy where measurable results against specific objectives that support the mission and vision are important. In these tight economic times, it becomes a matter of clearly identifying what it is we intend to do so we can focus our resources, both human and financial, on those issues most important to our success.

RDOS ANNUAL PLANNING CYCLE

The RDOS relies on a structured business planning framework to set the overall direction for the regional district and to guide its operation. Fundamental elements for guiding our strategic development are the RDOS's Vision, Mission, Values and Key Success Drivers. The Corporate Business Plan delineates what we plan to work on in that given year and outlines how we intend to proceed to achieve our goals through the 2018 – 2022 term of office.



2020 Corporate Objectives

Summary of Key Success Drivers (KSDs), 4-Year Goals, 2020 Corporate Objectives and Performance Indicators.

KSD #1 – HIGH PERFORMING ORGANIZATION (3 Goals; 4 Objectives)	
2020 Objectives	**Performance Indicator**
Goal 1.1 To Be an Effective, fiscally Responsible Organization	
2020 Objectives	**Performance Indicator**
1.1.1 By achieving a high standard of financial management and reporting	Receipt of an unqualified audit for the 2019 calendar year
	Adoption of an informed 2020 – 2024 Financial Plan
	Successfully meet budget in 95% of established services
	Enhance the strength of performance indicators in the MD&A
	Review each program to determine if reserves are required and, if so, at what level.
	Develop a Fees and Charges Policy to provide a decision-making directive for the pricing of services;
1.1.2 By being an effective local government	Develop a workspace plan
	Complete negotiations for a revised collective agreement
	Conduct Process Reviews on: · Invoicing · All external facility cash management · Landfill processes (entry to billing)
	Complete external IT assessment to better use technology at the RDOS.
	Conduct cyber security training for all staff and Rural Directors
	Implement leadership training initiatives (Administrative Fairness, Transparency, FOI

Goal 1.2 To Be a Healthy and Safe Organization	
2020 Objectives	**Performance Indicator**
1.2.1 By Implementing the 2020 joint occupational health and safety program	Identify areas of regulatory non-compliance and develop a plan to close the gap
	Keep the RDOS injury rate below the average for our WorkSafe BC classification unit
	Implement an ergonomics program review throughout the organization

Goal 1.3 To Cultivate a High Performing Organizational Culture	
2020 Objectives	**Performance Indicator**
1.3.1 By implementing an Organizational Development Program	Develop and support an employee organizational development committee
	Create a 2020 organizational development action plan
	Provide 360 evaluations for all supervisory staff
	Conduct a 2020 Staff Perception Survey
	Show improved results on the 2020 Staff Perception Survey over 2019 Survey

KSD #2 OPTIMIZE THE CUSTOMER EXPERIENCE	
(2 Goals; 4 Objectives)	
2020 Objectives	**Performance Indicator**
Goal 2.1 To provide a high level of customer service	
2.1.1 By promoting regional district facilities and services	Develop a marketing program to promote understanding of RDOS Facilities and Services
	Implement a rigorous program for the Physical Activity Trailer in 2020
	Evaluate our current regional recreation program initiative and submit an opportunities report
2.1.2 By engaging our citizens in the development and improvement of our programs	Conduct 4 service-related quality assurance surveys
	Initiate a 2020 Communication/Public Engagement Plan
	Develop a schedule and attend community events throughout the Regional District
	Investigate the cost of technology to provide publicly accessible Board meetings
	To investigate the establishment of a cemetery service for Electoral Area G

Goal 2.2 To meet public needs through the continuous improvement of key services	
2.2.1 By improving bylaws, policy and process within the organization	Bring 20 policies to Committee in 2020 for review
	Bring 8 Regulatory Bylaws forward to the Board for discussion and updating;
	Update Invasive weeds and pest bylaws into a single Invasive Species Bylaw
	Adoption of an Okanagan Valley Consolidated Zoning Bylaw
	Adoption of a Works and Servicing Bylaw
	Implementation of new Development Services software
	To design and conduct a citizen survey in the regional district electoral areas
2.2.2 By implementing the 2020 phase of the regional transit future plan	Implement the 2020 phase of the Penticton – Kelowna Regional Transit Service
	Initiate the West Bench Transit Service

KSD #3 – BUILD A SUSTAINABLE REGION (3 Goals; 9 Objectives)	
2020 Objectives	**Performance Indicator**
3.1 To develop a socially sustainable region	
3.1.1 By reviewing and updating the emergency management program	Review and update the emergency program bylaw
	Review and update the emergency response plan
	Develop an emergency response plan exercise program and implement the 2020 phase
	Upgrade the Kaleden E911 infrastructure
	Explore the development of an Area “A” Wildfire Permit Area
	Commence the process to initiate a flood management service for Electoral Areas C and I
	To investigate the conversion of the Lower Nipit Improvement District Letters Patent to the RDOS
	To investigate the development of the Old Kaleden Road as an emergency egress

3.1.2 **By implementing the regional trails program**	Apply for tenure on the Okanagan River Trail between Road 9 to 18
	Apply for tenure on the Okanagan Channel between Road 22 and the McAlpine Bridge
	Upon successful acquisition, cost the paving of the Canal trail between Road 22 and Road 9
	Commence planning for a hike and bike link over Fairview Rd. into the Similkameen
3.1.3 By implementing the 2020 Phase of the Parks Program	Implement the 2020 phase of the Heritage Hills Park development plan
	Implement the 2020 phase of the Coalmont park development plan
	Implement the 2020 phase of the Wharf Park development plan
	Implement the 2020 phase of the Manitou Park development plan
	Implement the land acquisition process for a portion of West Bench Elementary School for public purposes
	Develop a Regional Parks and Trails Master Plan
	Work with the Apex Community Association to establish a Parks and Recreation Service
	To determine the status of the 1912 Hotel and respond on the grant request for the stabilization project
3.1.4 By providing public recreational opportunities	Devise a plan to renovate the Similkameen Swimming Pool

2020 Objectives	Performance Indicator
Goal 3.2 To develop an economically sustainable region	
3.2.1 By implementing the Asset Management Plan	Commence implementation of the Asset Management Plan
	Introduce an asset/supply chain management program
3.2.2: By Initiating the Economic Development program of Electoral Area	Development of an Area “D” Economic Development Strategic Plan

3.2.3 By Reviewing Long-Range Planning Documents	Initiate the development of an Area "G" Official Community Plan
	Complete the finalized draft of Electoral Area "A" Official Community Plan
	Initiate review of the South Okanagan Regional Growth Strategy
	Initiate a collaborative Regional Housing Needs Report
	Initiate a Kaleden Area Development Plan upon successful creation of a Kaleden sewerage project
	Review the Area I Zoning Bylaw to establish controls for tiny homes, shipping containers and B&B at Apex Mountain Resort.
	Explore alternative energy sources to determine financial and environmental benefit

2020 Objectives	Performance Indicator
Goal 3.3 To develop an environmentally sustainable region	
3.3.1 By implementing the 2020 Phase of the Solid Waste Management Plan	Acquire a north regional organics facility site
	Commence development of the Oliver Organics Facility
	Work with the City of Penticton to create a plan to relocate the Penticton Compost Facility at CMLF
	Complete a waste composition study
3.3.2 By implementing the Campbell Mountain Landfill infrastructure upgrades and requirements	Complete the leachate treatment system review for design and implementation in 2021
	Submit the revised Substituted Requirement application to MOE for the BioCover Project and proceed with landfill gas management system design
	Submit leachate test results for the Keremeos landfill closure plan to MOE for approval
	Complete the detailed design of a revised entrance/exit for CML · Obtain any Land required for the access · Commence construction and scale purchase
3.3.3 By enhancing RDOS Waste Water Treatment Systems	Complete the Okanagan Falls Wetland Project and commence the commissioning process with seeding of vegetation
	Present preliminary costs for the design and construction of the Kaleden Sewer Collection Project
	Complete construction of a solids dewatering works at the Okanagan Falls WWTP
	Replacement of aging pumps and mechanical system at Liftstation #3
	Commence a Liquid Waste Management Plan for Naramata for implementation in 2021

3.3.4 By enhancing Regional District water system delivery	Develop a Source Water Protection Plan for the Naramata Water System
	Completion of Olalla Water System Generator construction and commissioning
	Installation of SCADA system in the Missezula Lake Water System
	Initiate 2020 Phase of SCADA Master Plan for all water systems
	Complete design of high priority water main replacements in Naramata water system
	Complete design of remaining water main replacements in Olalla water system
	Retain Consultant to Complete Dam Safety Evaluation of Naramata Dams.

KSD #4 – GOVERNANCE and OVERSIGHT in a REPRESENTATIVE DEMOCRACY	
(2 Goals; 2 Objectives)	
2017 Objectives	**Performance Indicator**
Goal 4.1 To execute a Well-Defined Strategic Planning Cycle	
4.1.1 By executing the Strategic Planning and Enterprise Risk Management Programs.	Adoption of the 2020 Corporate Business Plan
	Update the Enterprise Risk Management Register and present to 2018-2022 Board of Directors
	Initiate the 2021 Corporate Business Plan Cycle

Goal 4.2 To Promote Board and Chair Effectiveness	
4.2.2: By Improving Regional District/ Municipal Relations	Identify relationship success factors
	Open discussions with the City of Penticton for a co-located headquarters
	Plan and implement an annual Board/member municipal council training program
	Open discussions with the City of Penticton about a Penticton/Peripheral Recreation Facilities Service

2019 CORPORATE OBJECTIVES - WORKSHEETS

KEY SUCCESS DRIVER 1 – HIGH PERFORMING ORGANIZATION

Goal 1.1 **To be an effective, fiscally responsible organization**

Objective 1.1.1: **By achieving a high standard of financial management and reporting**

Description

The citizens of the Regional District of Okanagan Similkameen expect their elected officials and staff to provide leadership for the efficient and effective fiscal planning and operation of the 155 services provided by the corporation. The services offered by the regional district are diverse, ranging through regional, sub-regional, inter-jurisdictional and local. By law, only those citizens receiving a service, pay for it.

Ownership

- Office of Prime Interest (OPI): Manager of Financial Services
- Offices of Collateral Interest (OCI): Senior Management Team; Finance Department

The Activity

The Regional District has a legislative requirement to develop and submit a rolling Five-Year financial plan (the "Plan") each year. Staff submits the Plan to Budget Committee each November for the subsequent calendar year, with projections rolling forward for the next four-year period. The Board of Directors is obligated to adopt a budget by March 31st of each year. The Public has full access to budget meetings and a wide citizen engagement process is offered each year prior to adoption of the budget. The Board provides oversight on the budget against actuals on a quarterly basis throughout the year.

Typically, administration provides a Management Discussion and Analysis (MD&A) Report to the Corporate Services Committee each quarter to assist the Board with their financial oversight responsibility. In 2020, the intent is to improve upon our MD&A to provide the Board better oversight of our performance against indicators for each Department that the Board may use to review trendlines on performance and benchmark against other local governments.

Measurements

The Regional District of Okanagan Similkameen has a sound financial management system and has established rigorous controls to ensure Administration provides exemplary financial oversight, fulfills the fiduciary trust the Board places on them to use taxpayer dollars wisely; and, that the Board receives the information they need to provide financial direction.

Department Managers review financial statements monthly and employ a Time Tracker data base to ensure labour expenses are applied to the right Service to ensure we maintain a fair balance between urban and rural participants in regional services.

Performance Indicators

- RDOS will achieve an unqualified audit from an independent auditor for the 2019 calendar year.
- The Board will agree on a 5-year Financial Plan in accordance with regulatory timelines.
- Administration will successfully achieve the 2020 budget targets for 95% of our services.
- Administration will present performance metrics for each department to measure our progress.
- Administration will present a report to Corporate Services Committee to advise on our Reserve levels and to set targets for each account a Reserve is in play.
- Administration will review our Fees & Charges Bylaw format in 2020 and bring it to Committee to ensure it meets our needs.

Goal 1.1: **To be an effective, fiscally responsible organization**

Objective 1.1.2: **By being an effective local government**

Description

The Regional District of Okanagan Similkameen understands that the success of our organization depends on all Board and staff members working together to achieve our goals; all with the intent of providing effective service to our citizens. To do this, we need to keep a lean, flat organizational structure. The Management Team meets weekly to discuss corporate and interdepartmental issues and we have our business planning process, budget process, performance management system and interdependency workshops to ensure our front-line staff has the information necessary to keep citizens informed.

Ownership

- Office of Prime Interest (OPI): Office of the CAO
- Offices of Collateral Interest (OCI); Manager of Legislative Services

The Activity:

While we cover a large geographical area, the hub of our operation is at 101 Martin Street. Increased development activity, transfer of water systems, increased downloading of services to local government, increasing standards and complexity of our work all lead to a growth environment for the Regional District and, as our staff increases, so does our need for adequate space. We need to develop a space plan in 2020 that will allow us to be ready to meet expectations in future years.

Further, we understand that we have an opportunity to make better use of the internet to communicate with our citizens. We intend to engage an external expert to review our systems in 2020 so we can make the highest and best use of the internet in the future.

Measurement

Success on this activity will be based the review of our processes to look for efficiencies, test our use of technology and develop a space plan for all RDOS needs to meet expectations.

Performance Indicators

- Completion of a Workspace Plan
- Reach mutually agreeable terms of employment with our Collective Bargaining Unit
- Conduct an external IT assessment

Goal 1.2: To be a healthy and safe organization

Objective 1.2.1: By implementing the 2020 joint occupational health and safety program

Description

The Regional District of Okanagan Similkameen takes its responsibility for the safety of its employees very seriously. We have always complied with provincial legislation, but in 2009, RDOS aspired to achieve the standard set by the BC Municipal Safety Association and applied under the Certificate of Recognition (CoR) Program. In fact, we applied under two programs; one for their Health and Safety Program and one for their Return to Work Program. In 2010, 2011 and 2012 we were awarded both. In 2013, our Joint Health and Safety Committee determined to continue in-house due to the cost and onerous reporting requirements for the provincial certification. Our JH&S Committee forms the basis for our Safety Action Plan and the ongoing development of our worksafe procedures.

Ownership

- Office of Prime Interest (OPI): Manager of Human Resources
- Offices of Collateral Interest (OCI): Workplace Health & Safety Committee; Department Managers

The Activity

The Regional District Joint Health and Safety Committee annually audits the Regional District work places and they'll be implementing the actions identified in the Workplan for 2020. WorkSafe BC has also increased the requirement for written workplace safety procedures and the RDOS will work towards compliance on those new standards in 2020.

Measurement

The RDOS has used "Total Recorded Incident Ratio" as a measurement in the past, but in 2017 we moved to benchmarking on the injury rate identified by WorkSafe BC for our classification unit. We passed with flying colours in 2018 and 2019 and we'll attempt to have the same success in 2020.

Performance Metrics

- Complete the 2020 phase of safe work procedures for all departments within the organization
- Keep the RDOS injury rate below the average for our WorkSafe BC classification unit.
- Implement an ergonomics review

Goal 1.3: To cultivate a high-performing organizational culture

Objective 1.3.1 By Implementing an Organizational Development Program

Description

The Regional District of Okanagan Similkameen has a recognized cultural change program. We identified eight characteristics of high performing organizations that we want our organization to resemble and we steadfastly measure our progress against those characteristics by an annual staff perception survey. Each year, when we produce the results from our survey we create an employee committee to develop a plan to make some sort of intervention into the organization. We didn't do that in 2018 or 2019 as we worked through an internal organizational review and subsequent implementation, but we intend to get back at it in 2020.

Ownership

- Office of Prime Interest (OPI): Manager of Human Resources
- Offices of Collateral Interest (OCI): Senior Management Team

The Activity

The field of Organizational Development is huge and so important to the success of an organization. In addition to the support we offer to our own employees, we also offer HR support to our smaller member municipalities

Many organizations will identify their employees as their most important resource, their competitive advantage, yet few are able to identify and implement the programs necessary to treat employees well and leverage their expertise. The Regional District firmly believes in the Customer Service Linkage Model, which purports that the most effective methodology to improve customer service is to increase the climate strength of the organization.

Local governments need productive, engaged, knowledgeable employees to be successful; but they also need to provide them with the tools. We believe we've adjusted our organizational structure, capacity and space to create an environment for success and in 2020 we'll get back to asking our employees what we can do better.

Measurement

The High Performance and Innovation Committee promotes the eight characteristics of high-performing organizations and has an annual cycle they follow to entrench this cultural change. The eight characteristics are presented to each Board and Staff member in November, at which time we also conduct our staff perception survey to measure our organization against these characteristics. The survey results produce quantitative and qualitative data upon which we can measure our progress. Measurement tools also include the development of the Organizational Development Plan.

Performance Indicators

- Create an employee organizational development committee to develop an action plan
- Implement the Plan
- Achieve improved results on the 2020 Survey over the 2019 Survey

KEY SUCCESS DRIVER 2 – OPTIMIZE THE CUSTOMER EXPERIENCE

Goal 2.1 **To provide a high level of customer service**

Objective 2.1.1: **By promoting regional district facilities and services**

Description

Our citizen surveys clearly indicate that the majority of our citizens don't have a good idea of what services we offer, so it's no wonder that they're unsure if they're getting good value for their taxes. The Regional District of Okanagan Similkameen believes strongly that we need to consult with our citizens to determine if we're meeting their expectations with regard to services, but we also need to keep them informed about the services we offer.

Ownership

- Office of Prime Interest (OPI): Manager of Legislative Services
- Offices of Collateral Interest (OCI): Senior Management Team

The Activity

The Regional District already devotes a significant effort to customer service and improving the customer experience. Over the past few years we commenced our signage program to properly brand our facilities. We intend to host open houses in a number of Electoral Areas during local government week, leverage partnerships with some of our member municipalities and conduct a citizen survey in 2020 to measure how we're doing. The results of our biennial survey always provides us with a good idea of where we need to improve and what we need to do better.

Measurement

This is an activity-based objective, but administration will report on our progress to the Board with our quarterly activity reports and our quarterly report on the Business Plan.

Performance Indicators

- Participate in Local Government Awareness Week
- Develop a marketing program and host electoral area "Town Halls" to help citizens understand what we do.

Objective 2.1.2: By engaging our citizens in the development and improvement of our programs

Description

With the large geographic area encompassing the Regional District of Okanagan Similkameen, we need an outreach program to interact with our citizens and make it easy for them to engage with us.

Ownership

- Office of Prime Interest (OPI): Manager of legislative Services
- Offices of Collateral Interest (OCI): Senior Management Team

The Activity

If our citizens don't come to us, we need to develop a strategy to go to them. We have a great opportunity to leverage the internet to engage our citizens and, even if we trend to a higher than average seniors' population, social media presents an interesting option. We need to investigate what's working for other local governments using social media and how they're engaging.

Measurement

The measurement of success of this objective will be based on the following:

Performance Indicators

- Conduct 4 service-related quality assurance surveys
- Initiate a 2020 Communication/Public Engagement Plan
- Develop a schedule and attend community events throughout the Regional District
- Investigate the cost of technology to provide publicly accessible Board meetings
- Investigate the establishment of a cemetery service for Electoral Area G

Goal 2.2 To meet public needs through the continuous improvement of key services

Objective 2.2.1: By improving bylaws, policy and process within the organization

Description

The Regional District of Okanagan Similkameen is always interested in improving the customer experience. As a law-making organization, it's important that the Regional District maintain an up-to-date inventory of Bylaws and Policies to ensure we're compliant with provincial legislation and that we have the right tools in place to accomplish that.

Ownership

- Office of Prime Interest (OPI): Manager of Legislative Services
- Offices of Collateral Interest (OCI): Manager of Financial Services

The Activity

The 2020 focus will be to complete the review of our bylaws and bring those in the "Bylaw Hospital" forward for update. In 2020 it is our intent to complete the consolidation of our

Measurement

The measurement will be based on the following milestones:

Performance Indicators

- Review 8 Regulatory Bylaws to ensure compliance
- Review 20 policies to ensure they are current and reflect the priorities of the 2018 – 2022 Board of Directors
- Update and consolidate the invasive species bylaws
- Adopt an updated Works and Servicing Bylaw and Okanagan Valley Consolidated Zoning Bylaw.

Objective 2.2.2: By implementing the 2020 Phase of the Regional Transit Future Plan

Description:

BC Transit, in collaboration with the Regional District of Okanagan Similkameen, completed a 25-year Transit Future Plan for the region in 2015. The Transit Future Plan envisions what the transit network should look like 25 years from now and describes what services, infrastructure and investments are needed to get there. The plan is designed to support local community goals and objectives, such as strengthening the link between transportation and land use in order to support sustainable growth. It also describes the transit service, fleet and facility changes required to transition existing transit systems to the proposed vision, including identifying improvements that provide an immediate, positive impact, and providing recommendations on priorities and phasing. BC Transit is planning an update to the Transit Future Plan in 2020.

Ownership

- Office of Prime Interest (OPI): General Manager of Community Services
- Offices of Collateral Interest (OCI): Parks/Transit Planner

The Activity

The Regional Transit Future Plan includes some exciting projects for our Transit Service in 2020, not the least of which is to double the Service established in 2018 to move people from Penticton to Kelowna and, eventually, up to the North Okanagan. Results from 2019 were very positive and increasing the frequency of trips/day will enhance that success. Following a review of the West Bench Service to determine interest in feeding into the Penticton system was successful in 2019 and implementation will occur in 2020.

Measurement

This objective will be activity based and progress will be measured continuous progress against the Transit Future Plan.

Performance Indicators

- Increased frequency of the Penticton - Kelowna Multi-Regional shared transit service
- Initiation of the West Bench Transit Service

KEY SUCCESS DRIVER 3 – BUILDING A SUSTAINABLE REGION

There are three recognized pillars of community sustainability; being social, economic and environmental.

Goal 3.1: **To develop a socially sustainable region**

Objective 3.1.1 **By reviewing and updating the emergency management program**

Description:

The Regional District has successfully operated a regional emergency management program for several years. Extended flooding in 2017 and 2018 were especially onerous from a response and recovery platform, while wildfire response and mitigation are annual events. In 2019, we found out that we needed to initiate a governance review on the program and that will extend into 2020.

Ownership:

- Office of Prime Interest (OPI): General Manager of Community Services
- Offices of Collateral Interest (OCI): Emergency Services Manager

Activity:

We'll start 2020 by reviewing our legislation and emergency response plan. A really ambitious flood response plan has been developed for implementation and we want to get underway early with rigorous communications to our citizens. At the same time, we'll continue to update our Wildfire Master Plan and initiate a mitigation program throughout the Regional District on a prioritized basis.

We have an opportunity to work more closely with our Member Municipalities and other Regional Districts in the Valley. By the end of the year we want to be into full-out training and exercising our Plan

Measurement:
We are well documented and we'll have lots of milestones to display as we work through a review of our documents, get out to meet with our colleagues and offer our training programs and exercises.

Performance Indicators:

- Review and update the emergency program bylaw
- Review and update the emergency response plan
- Develop an emergency response plan exercise program and implement the 2020 phase
- Plan and organize the 2020 emergency response and recovery
- Initiate development of an "All Risk" or "Flood Management" Service in Areas C and I.
- Upgrade the Kaleden E911 Infrastructure
- Explore the development of an Area "A" Wildfire Permit Area
- Investigate the conversion of the Lower Nipit Improvement District Letters Patent to the RDOS
- Investigate the development of the Old Kaleden Road as an emergency egress

Objective 3.1.2: By implementing the Regional Trails Program

Description

The Regional District of Okanagan Similkameen developed a robust Trails Master Plan in 2012 and is continually striving to enhance both the quality and quantity of developed trail.

Ownership

- Office of Prime Interest (OPI): General Manager of Community Services
- Offices of Collateral Interest (OCI): Parks/Trails Manager

Activity

In addition to continuing our work to improve our KVR trails in the south Okanagan and Similkameen, the Regional District will plan to acquire tenure, design and construct additional trail in the south Okanagan and Similkameen Valleys. To do this we need to work with senior levels of government and our First nation governments to move our projects forward.

Measurement

This is an activity-based objective and progress will be measured against trail constructed.

Performance Indicators:

- Apply for tenure on the Okanagan River trail between Road 9 to 18
- Apply for tenure on the Okanagan Channel between Road 22 and the McAlpine Bridge
- Upon successful acquisition, cost the paving of the Canal trail between Road 22 and Road 9
- Commence planning for a hike and bike link over Fairview Rd. into the Similkameen

Goal 3.1: To develop a socially sustainable region

Objective 3.1.3: By implementing the 2020 Phase of the Parks Program

Description

The Regional District of Okanagan Similkameen has a Regional Parks & Trails Service, but the majority of work done in parks is through local service areas. Greenways and blueways play a significant role in a high quality of life for our citizens and we're continually upgrading our inventory of parkland and the quality of parks on an annual basis.

Ownership

- Office of Prime Interest (OPI): General Manager of Community Services
- Offices of Collateral Interest (OCI): Parks/Trails Manager

The Activity

In 2020, the Regional District will continue with their park improvement program and to implement the recommendations from the Parks Master Plan.

Measurement

This objective will be measured by the successful completion of the Plans.

Performance Indicators:

- Implement the 2020 phase of the Heritage Hills Park development plan
- Implement the 2020 phase of the Coalmont Park development plan
- Implement the 2020 phase of the Wharf Park development plan
- Implement the 2020 phase of the Manitou Park development plan
- Implement the land acquisition process for West Bench Elementary School
- Develop a Regional Parks and Trails Master Plan
- Work with the Apex Community Association to establish a Parks and Recreation Service
- To determine the status of the 1912 Hotel and respond on the grant request for the stabilization project.

Goal 3.1: To develop a socially sustainable region

Objective 3.1.4 By providing public recreational opportunities

Description:
The Regional District of Okanagan Similkameen realizes that recreation is a foundation for quality of life in our rural areas. We have been actively growing our recreation programming opportunities throughout the regional district and look forward to enhancing those programs in 2020.

Ownership

- Office of Prime Interest (OPI): General Manager of Community Services
- Offices of Collateral Interest (OCI): Recreation Manager

Activity

The Regional District was awarded a Plan H Grant in 2017 to implement a regional approach to recreation and we leveraged that in 2018 to expand our service to all of our citizens. In addition, we'll work with our recreation commissions to provide a better service and look at the feasibility for some exciting new facilities.

Measurement

We'll measure our progress against adding resources for recreation programming into the Similkameen, progress on our regional recreation approach project and working with partners to study the feasibility or new aquatic facilities.

Performance Indicators:

- Redevelopment of the Similkameen Swimming Pool

Goal 3.2: To develop an Economically Sustainable Region

The second pillar of community sustainability is to develop an economically sustainable region. This pillar focusses on economic development in the Region, but also includes being fiscally responsible as an organization and by ensuring that we are good stewards of the assets of the Regional District.

Objective 3.2.1: By implementing the asset management plan

Description

The Regional District, as have all public agencies, has complied with the Public Service Accounting Board and produced a Tangible Capital Assets Register. The Province of British Columbia has determined that it would be beneficial for all local governments to go one step further and develop an Asset Management Plan, with the intent to deliver sustainable services by extending and deepening asset management practices. Asset Management is defined as an integrated process bringing together planning, finance, engineering and operations to effectively manage existing and new infrastructure to maximize benefits, reduce risks and provide satisfactory levels of service to community users in a socially, environmentally and economically sustainable manner.

The Regional District initiated investigation into the development of an asset management plan in 2016 with the assistance of a grant made available through UBCM and FCM. Our Phase I, II and Phase III Asset Management Plans are complete and we will now choose and implement the right software program and start data entry in 2020.

Ownership

§ Office of Prime Interest (OPI): Manager of Financial Services

§ Offices of Collateral Interest (OCI): Senior Management Team

The Activity

We will select an asset management system appropriate for the Regional District and commence data entry.

Measurement

Success on this objective will be measured by the purchase of an asset management software program.

Performance Indicators:

- Implement the asset management plan.
- Introduce an asset/supply chain management program

Goal 3.2: To develop an Economically Sustainable Region

Objective 3.2.2: By Initiating the Economic Development program for Electoral Area D

Description:

While the majority of our electoral areas have an economic development program, they are mostly implemented through a contribution to, or a shared service with an adjacent incorporated

community. Electoral Area D established a formal program in 2019 and set up an office to implement their program, mostly focused on Okanagan Falls.

Ownership:

- Office of Prime Interest (OPI): General Manager of Development Services
- Office of Collateral Interest (OCI): Area D Economic Development Coordinator

Activity:

The proposed work for 2020 will include the development of an Economic Development Strategic Plan and getting to know the community.

Measurement:

Completion of the Strategic Plan.

Goal 3.2: To develop an Economically Sustainable Region

Objective 3.2.3: By Reviewing Long-Range Planning Documents

Description

An Official Community Plan (OCP) is the vision a community has for its future. It contains goals and policies that will shape future land use in a way that reflects the community's vision. These goals and policies form a framework used by the Regional District staff, other agencies and the community to guide their decisions about future land use.

Under the Local Government Act, an OCP must include certain information, such as:
1. Residential development;
2. Commercial, industrial, and industrial land uses;
3. Land subject to hazardous conditions or environmentally sensitive to development;
4. Major road, sewer and water systems;
5. Housing policies related to affordable housing, rental housing, and special needs housing;
6. Public facilities, including schools, parks, and waste treatment and disposal sites; and
7. Greenhouse gas emission policies, targets, and actions.

Beyond this, an OCP may also consider other community priorities such as heritage protection, food security, water quality, economic development or transportation and mobility.

Ownership

- Office of Prime Interest (OPI): General Manager of Development Services
- Offices of Collateral Interest (OCI): Planning Manager

Activity

The 2020 activity will allow us to continue the robust public engagement process we invoke when contemplating the development of long-range planning documents. Engagement of citizens within Electoral Area “G” will provide a forum to introduce planning concepts to that jurisdiction and also allow feedback before a decision will be made to proceed. On the other hand, we should finish the OCP review in Area A and initiate a number of other exciting planning programs.

Measurement

This will be an activity-based objective for 2020 based on the achievement of the following performance indicators.

Performance Indicators:

- Initiate the development of an Area "G" Official Community Plan
- Complete the finalized draft of Electoral Area "A" Official Community Plan
- Initiate review of the South Okanagan Regional Growth Strategy
- Initiate a collaborative Regional Housing Needs Report
- Initiate a Kaleden Area Development Plan upon successful creation of a Kaleden sewerage project
- Review the Area I Zoning Bylaw to establish controls for tiny homes, shipping containers and B&B at Apex Mountain Resort.
- Explore alternative energy sources to determine financial and environmental benefit

Goal 3.3: To develop an environmentally sustainable region

The third pillar of community sustainability is to develop an environmentally sustainable Regional District.

Objective 3.3.1 and 3.3.2: By implementing the 2020 phase of the Solid Waste Management Plan

Description

Guiding Principles for Development of Solid Waste Management Plan (SWMP)

- Reduce the amount of waste requiring disposal to the greatest extent possible;
- Be cost effective, considering both short- and long-term cost implications; establish objectives and targets that are clear and measurable;
- Engage and involve all sectors of the community;
- Reduce environmental impacts of solid waste management to air, water and land;
- Establish programs, policies and objectives that are efficient, flexible and simple;
- Encourage and support options that develop local socio-economic opportunities, such as the development of new businesses, and the creation or expansion of employment through waste management activities;
- Develop and deliver services through effective partnerships with member municipalities, private and non-profit agencies, neighbouring regional districts, other levels of government and First Nations; and
- Plan for and secure future disposal capacity for the region, recognizing the capacity limits of the current disposal system.

The SWMP is a regulatory document approved by province and is a Regional Service.

Ownership

- Office of Prime Interest (OPI): General Manager of Public Works
- Offices of Collateral Interest (OCI): Operations Manager

Activity

An updated RDOS Solid Waste Management Plan was adopted by the Board in September 2012. Based on the Guiding Principles stipulated above, the Plan calls for the implementation of over 80 projects and directives over a 5-year period. Unfortunately, we're behind on several key projects and we're into catch-up mode. We've also had significant projects imposed by regulation that we didn't initially have in the SWMP that have huge implications we're trying to conclude as well. The SWMP will be reviewed and updated as we make progress against the projects already identified.

We're having difficulty siting the proposed regional organics facility. The 2020 activity will include siting of a norther organics facility, we hope to receive a positive outcome on our application to resolve active gas capture issues at Campbell Mountain Landfill, implement the leachate collection and retention system at CMLF and start implementation on the Keremeos Landfill closure plan.

Measurement

This objective will be measured by completion of the identified plans and compliance with the SWMP Checklist.

Performance Indictors:

- Acquire a north regional organics facility site
- Commence development of the Oliver Organics Facility
- Work with the City of Penticton to create a plan to relocate the Penticton Compost Facility at CMLF
- Complete a waste composition study
- Complete the leachate treatment system review for design and implementation in 2021
- Submit the revised Substituted Requirement application to MOE for the BioCover Project and proceed with landfill gas management system design
- Submit leachate test results for the Keremeos landfill closure plan to MOE for approval
- Complete the detailed design of a revised entrance/exit for CML
- Obtain any Land required for the access
- Commence construction and scale purchase

Objective 3.3.3: By enhancing the Okanagan Falls Waste Water Treatment System

Description

The Electoral Area "D" Liquid Waste Management Plan was developed in 2008 as we commenced the construction of the new plant. The Plant has been in operation since 2012 and its time to do some of the collateral projects, such as complete the wetlands filtration project and construct the Solids Dewatering Facility. The Okanagan Falls Waste Water Treatment Plant was oversized to accommodate effluent from these areas and the Regional District was awarded a Building Canada II Grant in 2017 to commence Phase I, being Kaleden.

Ownership:

- Office of Prime Interest (OPI): General Manager of Public Works
- Offices of Collateral Interest (OCI): Manager of Engineering

Activity:

The 2020 activity will include the Wetlands and the detailed design and costing for the Collection System extension in Kaleden; and if assent is achieved, creation of a Service.

Performance Indicators:

§ Complete the Okanagan Falls Wetland Project and commence the commissioning process with seeding

§ Present costs for the design and construction of the Kaleden Sewer Collection Project

§ Complete construction of a solids dewatering works at the Okanagan Falls WWTP

§ Replacement of aging pumps and mechanical system at Liftstation #3

§ Commence a Liquid Waste Management Plan for Naramata for implementation in 2021

Objective 3.3.4: By enhancing Regional District Water System Delivery

Description

The Regional District owns or operates nine water systems over five electoral areas. As infrastructure ages and volunteers or owners of private and public systems change, there is more interest in divesting systems to the Regional District. Also, the Auditor General for Local Government audited three of the Regional District Water Systems in 2017 and provided a number of recommendations that the Regional District needs to work away at.

Ownership:

- Office of Prime Interest (OPI): General Manager of Public Works
- Offices of Collateral Interest (OCI): Engineering Manager

Activity:

In 2020, the Regional District will continue implementation of recommendations from the AGLG Audit and respond appropriately to acquisition of new systems.

Measurement

This objective will be measured by progress against the following performance indicators.

Performance Indicators:

· Develop a Source Water Protection Plan for the Naramata Water System
· Completion of Olalla Water System Generator construction and commissioning
· Installation of SCADA system in the Missezula Lake Water System
· Initiate 2020 Phase of SCADA Master Plan for all water systems
· Complete design of high priority water main replacements in Naramata water system
· Complete design of remaining water main replacements in Olalla water system
· Retain Consultant to Complete Dam Safety Evaluation of Naramata Dams.

KEY SUCCESS DRIVER 4 – TO PROVIDE GOVERNANCE & OVERSIGHT IN A REPRESENTATIVE DEMOCRACY

Goal 4.1 **To execute a well-defined strategic planning cycle**

Objective 4.1.1: **By executing the Strategic Planning and Enterprise Risk Management Programs.**

Description

The Regional District has developed a robust strategic planning cycle and process. While we have well developed guiding principles composed of Vision, Mission, Values, Key Success Drivers and 5-year Goals, we focus mostly on the development of our Corporate Business Plan.

The Regional District has developed an Enterprise Risk Management Program that supports our Strategic Plan and we want to maintain that and build on it as well.

Ownership

- Office of Prime Interest (OPI): CAO
- Offices of Collateral Interest (OCI): Senior Management Team

The Activity

This is a forward-looking Objective, anticipating that we will rigorously follow our Strategic Planning Cycle and Process. Regional District staff will commence the SWOT exercise for the update of the 2020 Business Plan in July of 2020, including a full review of our Enterprise Risk Management Plan. 2018 was an election year and flexibility was required in the development of the 2019 Business Plan and Budget. With one year under their belt, the Board adjustment is complete and full participation was received for the development of the 2020 Business Plan and planning for 2021 is anticipated to proceed smoothly.

Measurement

Compliance with the Strategic Planning Cycle and Process adopted by the Board.

Performance Indictors:

- Adoption of the 2020 Corporate Business Plan
- Presentation of the Enterprise Risk Management Register to 2018-2022 Board of Directors
- Initiate the 2021 Corporate Business Plan Cycle

Objective 4.2.1: **By improving regional district/ municipal relations**

Description:

A regional district is really a federation of different jurisdictions within a confined geographic area. With 9 electoral areas and 6 incorporated communities in the Regional District of Okanagan Similkameen, it's important that we keep focused on big-picture issues that benefit the whole constituency, and sometimes there are competing interests. Our Board of Directors is always interested in partnerships and economies of scale that we can pursue with our members.

Ownership:

- Office of Primary Interest: Chief Administrative Officer

· Office of Secondary Interest: Senior Management Team

Activity:
We'll work with our colleagues in the member municipalities to identify opportunities and look where we can open or improve communications. It's in all of our best interests to work together and, while we do this well already, we can always do better.

Performance Indicators:

§ Identify relationship success factors

§ Open discussions with the City of Penticton for a co-located headquarters

§ Plan and implement an annual Board/member municipal council training program

§ Open discussions with the City of Penticton about a Penticton/Peripheral Recreation Facilities Service

2020 - 2024 FINANCIAL PLAN

The 2020 - 2024 Financial Plan for the RDOS was adopted by the Board of Directors at their regular meeting of 5 March 2020. It will appear as a collateral document to the 2020 Business Plan on the RDOS website for viewing.

RISKS AND MITIGATIONS

Risk Identification and Mitigation

The Regional District of Okanagan Similkameen 2020 Business Plan includes assessments and assumptions for the next year. The following represents the top risks to the Regional District in achieving its business plan and maintaining its operations.

The purpose of Enterprise Risk Management (ERM) is to ensure that risk identification, assessment and prevention are incorporated into the management oversight and processes of the Regional District and to assist in identifying priorities set forth in RDOS's business plan. The intent being to manage the uncertainties we incur in our current operations and our future plans.

The 2020 Risk Register identifies many threats, but only four make our top risk standard based on our pre and post mitigation rating:

- **Man-made or Natural Disaster** – RDOS implements its Emergency Plan and opens the Emergency Operations Centre numerous times each year. We have a significant organization that manages our response, with the support of the Province, and we continually train our people. Nevertheless, we're in a region that is susceptible to natural and man-made threats, identified in our Hazard Risk and Vulnerability Plan.

- **Organizational Impact of Extended Emergency Operation Centre (EOC)** – A Level 3 EOC was activated continually for the Regional District for five months in 2017 and 7 months in 2018. Climate Change and other factors lead some to believe this is now the norm. We fully expect a similar situation in 2020. RDOS employees form the majority of the Response Team and this impacts our ability to perform our normal duties. The risk can be somewhat mitigated by training and good planning, but the 2020 risk is high that our staff will be fully occupied with emergency response in 2020 adversely impacting our ability to carry out normal duties, not only from a natural event but from the looming Covid-19 Pandemic.

- **Landfill Gas Regulation Contravention** – The RDOS is currently in contravention with the BC Landfill Gas Regulation regarding methane off-gassing at the Campbell Mountain Landfill. An application is being prepared for the Ministry of Environment to propose a substituted alternative to meet the regulation for gas capture; being a biocover methodology. A one-year pilot program has just concluded with positive results and the final application is being prepared. If the pilot project does not work, the RDOS may have to implement an active gas capture system at a great expense.

- **Not able to find suitable Organics Site** – The RDOS has conducted a study to find a suitable site for an organic's facility. The two highest ranking sites have been dropped for various reasons. The threat is a suitable site will not be found leading to a shorter life for our landfills and the requirement to proceed with active gas capture at the Campbell Mountain Landfill.

OKANAGAN – SIMILKAMEEN

REGIONAL HOSPITAL DISTRICT

BOARD OF DIRECTORS MEETING

Thursday, March 19, 2020
9:45 am

BOARD MEETING AGENDA

A. ADOPTION OF AGENDA

RECOMMENDATION 1 (Unweighted Corporate Vote – Simple Majority)
THAT the Agenda for the Okanagan-Similkameen Regional Hospital District Board meeting of March 19, 2020 be adopted.

B. MINUTES

1. **OSRHD Board Meeting –** March 5, 2020
   RECOMMENDATION 2 (Unweighted Corporate Vote – Simple Majority)
   THAT the Minutes of the March 5, 2020 Okanagan-Similkameen Regional Hospital District Board meeting be adopted.

C. PRIMARY CARE NETWORKS – Information Report

D. ADJOURNMENT

OKANAGAN – SIMILKAMEEN

REGIONAL HOSPITAL DISTRICT

BOARD MEETING MINUTES

Minutes of the Board Meeting of the Okanagan-Similkameen Regional Hospital Board (OSRHD) of Directors held at 10:35 a.m. on Thursday, March 5, 2020, in the Boardroom, 101 Martin Street, Penticton, British Columbia.

MEMBERS PRESENT:

Chair P. Veintimilla, Town of Oliver
Vice Chair T. Boot, District of Summerland
Director M. Bauer, Village of Keremeos
Director J. Bloomfield, City of Penticton
Director G. Bush, Electoral Area "B"
Director B. Coyne, Electoral Area "H"
Director S. Coyne, Town of Princeton
Director R. Gettens, Electoral Area "F"
Director D. Holmes, District of Summerland
Director J. Kimberley, City of Penticton
Director R. Knodel, Electoral Area "C"
Director K. Kozakevich, Electoral Area "E"
Director C. Rhodes, Town of Osoyoos, Alternate
Director S. Monteith, Electoral Area "I"
Director R. Obirek, Electoral Area "D"
Director M. Pendergraft, Electoral Area "A"
Director F. Regehr, City of Penticton
Director T. Roberts, Electoral Area "G"
Director J. Vassilaki, City of Penticton

MEMBERS ABSENT:

Director S. McKortoff, Town of Osoyoos

STAFF PRESENT:

B. Newell, Chief Administrative Officer
G. Cramm, Legislative Services Coordinator
J. Kurvink, Manager of Finance

A. ADOPTION OF AGENDA

RECOMMENDATION 1 (Unweighted Corporate Vote – Simple Majority)

It was MOVED and SECONDED

THAT the Agenda for the Okanagan-Similkameen Regional Hospital District Board meeting of March 5, 2020 be adopted. - **CARRIED**

B. MINUTES

1. OSRHD Board Meeting – February 20, 2020

RECOMMENDATION 2 (Unweighted Corporate Vote – Simple Majority)

It was MOVED and SECONDED

THAT the Minutes of the February 20, 2020 Okanagan-Similkameen Regional Hospital District Board meeting be adopted. - **CARRIED**

C. OSRHD FIVE YEAR PLAN

1. Bylaw No. 167, 2020

2. Schedule A

RECOMMENDATION 3 (Weighted Corporate Vote – 2/3 Majority)

It was MOVED and SECONDED

THAT Bylaw No. 167, 2020, being a bylaw of the Okanagan Similkameen Regional Hospital District to approve the 2020-2024 Five Year Financial Plan, be read a third time and adopted. - **CARRIED**

D. ADJOURNMENT

By consensus, the meeting adjourned at 10:40 a.m.

APPROVED:

P. Veintimilla
OSRHD Board Chair

CERTIFIED CORRECT:

B. Newell
Corporate Officer

ADMINISTRATIVE REPORT

TO: Okanagan-Similkameen Regional Hospital Board

FROM: B. Newell, Chief Administrative Officer

DATE: March 19, 2020

RE: Primary Care Networks

ISSUE:

Should the Regional Hospital District broaden their mandate to include funding the primary care network program?

HISTORY:

During discussions around the 2019 Business Plan, the Board indicated they would like to explore Regional District participation in physician recruitment.

The South Okanagan Similkameen Division of Family Practice (SOSDFP) is a membership corporation for primary care providers. SOSDFP represents primary care providers throughout the regional district and supports a full-service physician network, team-based care, long term care, maternity care and many more healthcare improvements. They are also very involved in physician recruitment.

Through many discussions throughout 2019, SOSDFP investigated motivating factors for physicians to choose a location to practice and found that, among other variables, professional support was a key factor. If a young doctor can locate in a community that has clinic space available that doesn't require a capital investment, if there are other providers in the clinic to assist with advice and patient support and if they can focus on being a physician rather than a business owner, they may prefer that solution. Through the Ministry of Health and Health Authorities, the establishment of Primary Care Networks is being initiated throughout the province and urgent care and primary care clinics are being created. Different operating mechanisms are being piloted.

The Board of Directors has received a presentation from SOSDFP whereby opportunities for financial participation in future primary care clinics may enable a quicker implementation. A facility in Princeton was identified as a priority.

Should the Board be interested in participating the following process might be feasible:

1. Development of a Business Plan for Princeton
2. Board resolution of support
3. A letter to IHA requesting IHA support and for them to put it on their capital project list
4. IHA decision to support the clinic and an application to the Ministry to have the clinic designated under the Hospital Act.
5. Approval from the Ministry
6. Project Plan developed

IHA advises that there is a well-established process for Hospital Districts to participate financially in the development of Primary Care Clinics. IHA has used this process to have IHA Corporate HQ designated, a clinic in Kelowna designated and a clinic in Vernon designated, in which both the Central Okanagan Regional Hospital District and North Okanagan Regional Hospital District have signed on. IHA currently follows the same 40%/ 60% split for clinics as they do for other hospital capital expenses.

There are different operating models for existing Urgent Care or Primary Care Clinics already being practiced. Some managed by physicians directly, some through IHA and the Ponderosa Clinic through SOSDFP. An operating mechanism would need to be discussed in future.

NEXT STEPS:

1. IHA has volunteered to set up a meeting for more specific discussions; but,
2. The Hospital District must decide if they wish to pass a motion requesting IHA to pursue designation of the clinic under the Hospital Act.

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

Thursday, March 19, 2020
10:30 am

REGULAR AGENDA

A. APPROVAL OF AGENDA

RECOMMENDATION 1 (Unweighted Corporate Vote – Simple Majority)
THAT the Agenda for the RDOS Board Meeting of March 19, 2020 be adopted.

1. Consent Agenda – Corporate Issues

a. Okanagan Falls Parks & Recreation Commission – February 13, 2020
THAT the Minutes of the February 13, 2020 Okanagan Falls Parks & Recreation Commission meeting be received.

b. Naramata Parks & Recreation Commission – February 24, 2020
THAT the Minutes of the February 24, 2020 Naramata Parks & Recreation Commission meeting be received.

THAT Heather Lemieux apply for the Co-op Community Spaces Funding grant application on behalf of the Naramata Watercraft Society in partnership with the RDOS for the boat storage at Manitou Park.

THAT the request from the Naramata Citizens Association for the removal of an invasive Siberian Elm and replacement with a memorial tree to Georgeen Janzen be approved.

THAT the RDOS include in planning, one of the new washroom stalls at Manitou Park to be in operation year-round.

THAT a natural barrier be installed on the perimeter of Spirit Park.

c. Electoral Area "C" Advisory Planning Commission – February 18, 2020
THAT the Minutes of the February 18, 2020 Electoral Area "C" Advisory Planning Commission meeting be received.

d. Electoral Area "H" Advisory Planning Commission – February 18, 2020
THAT the Minutes of the February 18, 2020 Electoral Area "H" Advisory Planning Commission meeting be received.

e. Corporate Services Committee – March 5, 2020
THAT the Minutes of the March 5, 2020 Corporate Services Committee meeting be received.

f. Planning and Development Committee – March 5, 2020
THAT the Minutes of the March 5, 2020 Planning and Development Committee meeting be received.

THAT the Board of Directors initiate Amendment Bylaw No. 2895.

g. RDOS Regular Board Meeting – March 5, 2020
THAT the minutes of the March 5, 2020 RDOS Regular Board meeting be adopted.

RECOMMENDATION 2 (Unweighted Corporate Vote – Simple Majority)
THAT the Consent Agenda – Corporate Issues be adopted.

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2. Consent Agenda – Development Services
a. Development Variance Permit Application — 2636 Forsyth Drive, Electoral Area "F"
i. Permit
ii. Representation
THAT the Board of Directors approve Development Variance Permit No. F2019.037-DVP; and,

THAT prior to the issuance of Development Variance Permit No. F2019.037-DVP, statutory covenant No. S33329, which is registered on title, be amended to reduce the side parcel line setback restrictions contained therein.

RECOMMENDATION 3 (Unweighted Rural Vote – Simple Majority)
THAT the Consent Agenda – Development Services be adopted.

B. DEVELOPMENT SERVICES – Rural Land Use Matters

1. OCP Bylaw Amendments - Electoral Areas "A", "C", "D", "E", "F", "G", "H" & "I"
Micro Cannabis Production Facilities
a. Bylaw No. 2858
b. Representation

RECOMMENDATION 4 (Unweighted Rural Vote – Simple Majority)
THAT Bylaw No. 2858, 2020, Electoral Area Official Community Plan Amendment Bylaw be read a first and second time and proceed to public hearing; and,

THAT the Board of Directors considers the process, as outlined in this report from the Chief Administrative Officer dated March 19, 2020, to be appropriate consultation for the purpose of Section 475 of the *Local Government Act*; and,

THAT, in accordance with Section 477 of the *Local Government Act*, the Board of Directors has considered Amendment Bylaw No. 2858, 2020, in conjunction with its Financial and applicable Waste Management Plans; and,

THAT the holding of a public hearing be scheduled for the Regional District Board meeting of April 16, 2020; and,

THAT staff give notice of the public hearing in accordance with the requirements of the *Local Government Act*.

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2. Development Variance Permit Application — 2970 Allison Lake Road, Electoral Area "H"

a. Permit
b. Representation

RECOMMENDATION 5 (Unweighted Rural Vote – Simple Majority)
THAT the Board of Directors approve Development Variance Permit No. H2019.038–DVP.

C. PUBLIC WORKS

1. Substituted Requirements Application under the Landfill Gas Management Regulation

a. Application
b. Technical Report

RECOMMENDATION 6 (Unweighted Corporate Vote – Simple Majority)
THAT the Regional District submit a Substituted Requirements Application under the Landfill Gas Management Regulation to the Ministry of Environment and Climate Change Strategy to permit the use of Biocover at the Campbell Mountain Landfill.

D. COMMUNITY SERVICES

1. Community Emergency Preparedness Fund – Emergency Operations Center

a. EOC Grant Budget

RECOMMENDATION 7 (Unweighted Corporate Vote – Simple Majority)
THAT the Regional District apply to the UBCM Community Emergency Preparedness Fund (CEPF) for an Emergency Operations Center & Training Grant.

E. LEGISLATIVE SERVICES

1. Naramata Fire Service Area Petition

a. Bylaw 2893

RECOMMENDATION 8 (Unweighted Corporate Vote – Simple Majority)
THAT Bylaw No. 2893, 2020 Naramata Fire Prevention and Suppression Local Service Establishment Amendment Bylaw be adopted.

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2. Waste Management Service Regulatory Amendment Bylaw No. 2796.01, 2020

a. Bylaw 2796
b. Summary of Changes

RECOMMENDATION 9 (Unweighted Corporate Vote – 2/3 Majority)
THAT Bylaw 2796.01, Waste Management Service Regulatory Amendment Bylaw, be read a first, second and third time, and be adopted.

F. CAO REPORTS

1. Verbal Update

G. OTHER BUSINESS

1. Chair's Report

2. Board Representation

a. BC Grape Growers Association and Starling Control – *Bush, Monteith (Alternate)*
b. Municipal Finance Authority – *Kozakevich (Chair), Holmes (Vice Chair, Alternate)*
c. Municipal Insurance Association – *Kozakevich (Chair), Holmes (Vice Chair, Alternate)*
d. Okanagan Basin Water Board - *McKortoff, Boot, Knodel, Pendergraft (Alternate to McKortoff), Holmes (Alternate to Boot), Monteith (Alternate to Knodel)*
   i. **OBWB March Minutes**
e. Okanagan Film Commission – *Gettens, Holmes (Alternate)*
f. Okanagan Regional Library – *Kozakevich, Roberts (Alternate)*
g. Okanagan-Kootenay Sterile Insect Release Board – *Bush, Knodel (Alternate)*
h. South Okanagan Similkameen Fire Chief Association – *Pendergraft, Knodel, Monteith, Obirek, Roberts*
i. South Okanagan Similkameen Rural Healthcare Community Coalition (formerly Developing Sustainable Rural Practice Communities) – *McKortoff, Bauer (Alternate)*
j. Southern Interior Municipal Employers Association – *Knodel, Kozakevich (Alternate)*

3. Directors Motions

4. Board Members Verbal Update

H. ADJOURNMENT

MINUTES
Regular Meeting
Okanagan Falls Parks & Recreation Commission

Thursday, February 13, 2020
Okanagan Falls Community Centre

Members Present:	Kelvin Hall, Chair, Doug Lychak, Daniela Fehr, Matt Taylor, Jillian Johnston, Shari Rowland, Joanne Kleb
Absent:	Alf Hartviksen, Barbara Shanks
Area Director:	Ron Obirek
Staff:	Doug Reeve, Augusto Romero
Recording Secretary:	Sue Gibbons

Call TO ORDER:

The Meeting was called to order at 6:30 p.m.

1. ADOPTION OF AGENDA

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the Agenda for the Okanagan Falls Parks and Recreation Meeting of February 13, 2020 be adopted.

CARRIED

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2. APPROVAL OF MINUTES FROM LAST MEETING

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the Minutes for the Okanagan Falls Parks & Recreation Meeting of January 9, 2020 be approved.

CARRIED

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3. CORRESPONDENCE / DELEGATIONS

None
As there are a few new members, a roundtable of introductions took place.

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4. RDOS STAFF REPORTS

4.1 Recreation Report – Augusto Romero, Recreation Manager
A. Romero gave an update on Recreation and going forward, Recreation will provide quarterly recreation reports to the Commission via a 1-page template. A regional program guide is also targeted for Fall/Winter 2020.

MINUTES
Regular Meeting
Okanagan Falls Parks & Recreation Commission
Thursday, February 13, 2020
Okanagan Falls Community Centre

4.2 Parks Report – Project Updates, Doug Reeve, Project Coordinator ll
D. Reeve gave an update on Projects

- projects active right now are Heritage Hills, boat launch, Lions Park pond and the trestle
- Heritage hills – foundation of park now complete, 71 loads of fill brought in, now adding bells and whistles, playground installed, looking at benches, pond aeration, washroom is on hold right now, slab is in for the pavilion, building designed
- Lions Park pond – odor being looked after, aeration of water, aeration kit and fountain was purchased last year
- Boat launch – update provided
- Diving platform for trestle

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the Okanagan Falls Parks and Recreation Commission support further development of the concept of a diving platform for the trestle.

CARRIED

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5. COMMISSION REPORTS
   Chairs report
   Aster committee report
   Treasurer report
   Heritage Hills Committee report

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6. RDOS DIRECTOR REPORT
   - Thank you and welcome to new members
   - A special thank you to D. Reeve for the boat launch development, Lions Park and the trestle
   - Heritage Hills Park very exciting and positive
   - Master plan and Economic Development part of parks – I think this commission should invite Brad Dollevoet, Mark Woods, Justin Shuttleworth and Augusto Romero to the commission – a way within our budget to help with the master plan.

MINUTES
Regular Meeting
Okanagan Falls Parks & Recreation Commission
Thursday, February 13, 2020
Okanagan Falls Community Centre

- Director Obirek is requesting a smart board – wants to be able to give the commission the tools they need
- Re the Aster – It's time for us to put the aster garden in Kenyon Park
- Our new Economic Development staff and Community Group are engaged and will have some planning and priorities by June
- Gas tax – a few hundred thousand in the bank – Director Obirek wants this commission to start looking at projects

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7. NEW BUSINESS ARISING FROM THIS MEETING

- D. Lychak spoke to recommendations for proposed changes to the Parks Donation Policy, OK Falls
- Director Obirek – we can invite someone from Willowbrook to share how they do things

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8. ADJOURNMENT

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the meeting be adjourned at 8:32 pm.

CARRIED

NEXT REGULAR MEETING: Thursday, March 12, 2020
Community Room, Okanagan Falls

Chair, Parks and Recreation Commission – Electoral Area "D"

Recording Secretary

MINUTES

Naramata Parks & Recreation Commission

Monday February 24, 2020 at 6:30 p.m.
Naramata Fire Hall

Members Present:	Dennis Smith (Chair), Jeff Gagnon, Maureen Balcaen, Ashley Selwood, Tom Hoenisch, Richard Roskell, Nicole Verpaelst, Jacqueline Duncan
Absent:	Lyle Resh, Doug Reeve (RDOS, Projects Coordinator II)
Area 'E' Director:	Karla Kozakevich (RDOS Area 'E' Director)
Staff & Contractors:	Heather Lemieux (Recording Secretary)
Guests:	None
Delegations:	None

1. Approval of Agenda

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the Agenda for the Naramata Parks & Recreation Meeting of February 24, 2020 be adopted and all presentations and reports be received.

CARRIED

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2. Approval of Last Meeting Minutes — January 27, 2020 — Corrected NPR Member last name Tom Hoenisch under Members Present and 4.1 New Members.

RECOMMENDATION
IT WAS MOVED AND SECONDED
That the minutes for the Naramata Parks & Recreation Meeting of January 27, 2020 be adopted as amended.

CARRIED

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3. Correspondence/Delegations

3.1. Naramata Citizens Association — Letter received. Discussed memorial tree removal and replacement, potted plant irrigation and planter around community sign at Spirit Park.

ACTION — Dennis Smith to ask Cittaslow regarding planter around the community sign at Spirit Park.

4. RDOS Director Report — Karla Kozakevich (RDOS Area 'E' Director), reported:

   4.1. 2020 Budget — The 2020 budget has been adopted by the RDOS Board. Discussed project scenarios, timelines and budget considerations. The Parks and Recreation budget has been reduced by $25,000 due to grants.

   4.2. Manitou Park Project Update — All necessary permits are in place. Discussed year-round access to washroom facilities. ONGOING

   ACTION — Dennis Smith to follow up with Doug Reeve (RDOS, Projects Coordinator II) regarding year-round washroom at Manitou Park.

   4.3. Spirit Park Planning — Discussed fence options.

   4.4. Park Maintenance Contract — Jetco Lawncare Services contract has been renewed for 2020 and approved by the RDOS Board.

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5. RDOS Staff Reports — Staff absent.

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6. Recreation Coordinator Report — Adrienne Fedrigo (Recreation Coordinator) absent.

   6.1. Sailing Camp — A revised application has been submitted to run the Sailing Camp for for two weeks in the summer.

   ACTION — Ashley Selwood to follow up with the Naramata Centre to inquire about accommodation for the instructors.

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7. Commission Member Reports

   7.1. Woodwackers Report — Lyle Resh absent.

   7.2. Goose Management — Discussed goose management and deterrents.

   ACTION — Maureen Balcaen to follow up with the biologist for information renewal.

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8. Business Arising

   8.1. Spirit Park Presentation — Nicole Verpaelst presented preliminary plans for tree, landscaping, recreation, parking and fencing for Spirit park. Discussed irrigation and fencing options.

   ACTION — Nicole Verpaelst to inquire with the Garden Club about assistance with Spirit Park planning, and/or designing.

8.2. Boat Storage - Grant Discussion — Discussed Naramata Watercraft Society's Co-op Community Spaces Funding grant application.

8.3. Three Blind Mice Trail - Statement of Interest discussion — Richard Roskell presented. Discussed the Official Community Plan and possible addition to planned revisions. Augusto Romano (RDOS, Regional Recreation Manager) has been contacted. Discussed Area 'E' access points and zoning.

ACTION — Karla Kozakevich to provide map that show parcels on and surrounding access points to the Three Blind Mice Trail.

RECOMMENDATION
IT WAS MOVED AND SECONDED
THAT Heather Lemieux apply for the Co-op Community Spaces Funding grant application on behalf of the Naramata Watercraft Society in partnership with the RDOS for the boat storage at Manitou Park.

CARRIED

RECOMMENDATION
IT WAS MOVED AND SECONDED
THAT the request from the Naramata Citizens Association for the removal of an invasive Siberian Elm and replacement with a memorial tree to Georgeen Janzen be approved.

CARRIED

RECOMMENDATION
IT WAS MOVED AND SECONDED
THAT the RDOS include in planning, one of the new washroom stalls at Manitou Park to be in operation year-round.

CARRIED

RECOMMENDATION
IT WAS MOVED AND SECONDED
THAT a natural barrier be installed on the perimeter of Spirit Park.

CARRIED

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9. Adjournment — 8:09 p.m.

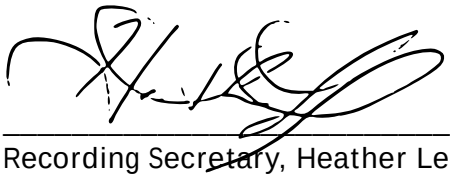
MINUTES

Naramata Parks & Recreation Commission

Monday February 24, 2020 at 6:30 p.m.
Naramata Fire Hall

NEXT MEETING: TBD - Spring Break
March 23, 2020 at 6:30 p.m. at the Naramata Fire Hall

Recreation Commission, Dennis Smith



Recording Secretary, Heather Lemieux

Minutes

Electoral Area 'C' Advisory Planning Commission

Meeting of: *Tuesday, February 18, 2020*

Community Centre, Oliver BC

Present: Rick Knodel, Director, Electoral Area 'C'

Members: Sara Bunge, Chair
Beantjit Chahal
Jack Bennest
Jessica Murphy

Absent: Louise Conant
David Janzen
Ed Machial, Vice-Chair
Terry Schafer, Alternate Director, Electoral Area "C"

Staff: JoAnn Peachey, Planner
Rushi Gadoya, Planning Technician
Sofia Cerqueira, Recording Secretary

Delegation: Patricia Leslie and Val Wisher

1.	**CALL TO ORDER**
	The meeting was called to order at 7:00p.m. **ADOPTION OF AGENDA** **MOTION** It was Moved and Seconded that the Agenda be adopted. **CARRIED**
2.	**DELEGATIONS**
	2.1 Andrew Peller Ltd. For Temporary Use Permit Application Agent: Leslie, Patricia C06577.460 (C2019.015.TUP) 2.2 Andrew Peller Ltd. For Temporary Use Permit Application Agent: Leslie, Patricia C06519.200 (C2019.015-TUP)

3.	**DEVELOPMENT APPLICATION**
	3.1 C06577.460 (C2019.014-TUP) – Temporary Use Permit Application Administrative Report submitted by JoAnn Peachey, Planner **MOTION** That the APC recommends to the RDOS Board that the proposed temporary use be approved. **CARRIED** 3.2 C06519.200 (C2019.15.TUP) – Temporary Use Permit Application Administrative Report submitted by JoAnn Peachey, Planner **MOTION** That the APC recommends to the RDOS Board that the proposed temporary use be approved. **CARRIED**
4.	**OTHER**
	4.1 APC Bylaw No. 2339 5.1 – Chair of the Commission Election of the Chair, Vice-Chair and Secretary (to be performed at the first meeting of each new year – Section 5.1: *Bylaw No. 2339*) Election of the Chair – Sara Bunge Election of the Vice Chair – Ed Machial (by acclamation) **CARRIED**
5.	**ADJOURNMENT**
	MOTION It was Moved and Seconded that the meeting be adjourned at 7:18pm. **CARRIED**

Sara Bunge

Advisory Planning Commission Chair

Sofia Cergueira

Recording Secretary

Minutes

Area H Advisory Planning Commission
Meeting of 2020 February 18, Tuesday
Riverside Centre – 148 Old Hedley Road, Princeton, BC

Present: Bob Coyne, Cory Labrecque (Planner), Delegation for Arrow Transportation Systems
Members: Ole Juul (Chair), Rob Miller, Marg Reichert, Tom Rushworth, Gail Smart
Absent: Lynne Smyth, Dixon (Mark and Susan)
Recording Secretary: Tom Rushworth

1 - Call to order

The meeting was called to order Tue 18 February 2019 19:30 PST.

2 - Development Applications

Details of process, history, and other relevant information regarding H2019.020-ZONE zoning bylaw amendment application presented by Cory Labrecque.

3 - Approval of Agenda (out of sequence)

The meeting agenda as emailed to commission members was approved.

4 - Approval of minutes (out of sequence)

Motion: It was moved and seconded that the minutes of the previous meeting (November 19, 2019) be approved.
CARRIED.

5 - Development Application H2019.020-ZONE

Motion: It was moved and seconded that the APC recommends to the RDOS Board of Directors that the subject development application be approved.
CARRIED.

6 - Development Application H2019.038-DVP

As Mark and Susan Dixon were not present, details of the application were presented by Cory Labrecque.

Motion: It was moved and seconded that the APC recommends to the RDOS Board of Directors that the subject development application be approved.
CARRIED.

7 - Election

Ole Juul was elected as Chair, Rob Miller was elected as Vice-Chair, and Tom Rushworth was elected as the Secretary.

8 - Adjournment

Motion: It was moved and seconded that the meeting be adjourned at Tue 18 February 2020, 20:15 PST.
CARRIED.

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
Corporate Services Committee
Thursday, March 5, 2020
9:22 a.m.

MINUTES

MEMBERS PRESENT:

Chair K. Kozakevich, Electoral Area "E"
Vice Chair D. Holmes, District of Summerland
Director M. Bauer, Village of Keremeos
Director J. Bloomfield, City of Penticton
Director T. Boot, District of Summerland
Director G. Bush, Electoral Area "B"
Director B. Coyne, Electoral Area "H"
Director S. Coyne, Town of Princeton
Director R. Gettens, Electoral Area "F"
Director J. Kimberley, City of Penticton
Director R. Knodel, Electoral Area "C"
Director C. Rhodes, Town of Osoyoos Alternate
Director S. Monteith, Electoral Area "I"
Director R. Obirek, Electoral Area "D"
Director M. Pendergraft, Electoral Area "A"
Director F. Regehr, City of Penticton
Director T. Roberts, Electoral Area "G"
Director J. Vassilaki, City of Penticton
Director P. Veintimilla, Town of Oliver

MEMBERS ABSENT:

Director S. McKortoff, Town of Osoyoos

STAFF PRESENT:

B. Newell, Chief Administrative Officer
G. Cramm, Legislative Services Coordinator

A. APPROVAL OF AGENDA

RECOMMENDATION 1
It was MOVED and SECONDED
THAT the Agenda for the Corporate Services Meeting of March 5, 2020 be adopted. - **CARRIED**

B. CLOSED SESSION

RECOMMENDATION 2 **(Unweighted Corporate Vote – Simple Majority)**
It was MOVED and SECONDED
THAT in accordance with Section 90(1)(c) and (g) of the Community Charter, the Committee close the meeting to the public on the basis of labour relations or other employee relations and litigation or potential litigation affecting the municipality. - **CARRIED**

The meeting closed to the public at 9:23 a.m.

The meeting opened to the public at 10:10 a.m.

C. PROTOCOL/PROCEDURE DISCUSSION – For Information Only

a. Agenda Preparation
b. Email Procedure
c. Other Issues?

D. ADJOURNMENT

By consensus, the meeting adjourned at 10:24 a.m.

APPROVED:

K. Kozakevich
RDOS Board Chair

CERTIFIED CORRECT:

B. Newell
Corporate Officer

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

Planning and Development Committee

Thursday, March 5, 2020
9:00 a.m.

MINUTES

MEMBERS PRESENT:

Chair M. Pendergraft, Electoral Area "A"
Vice Chair R. Knodel, Electoral Area "C"
Director M. Bauer, Village of Keremeos
Director J. Bloomfield, City of Penticton
Director T. Boot, District of Summerland
Director G. Bush, Electoral Area "B"
Director B. Coyne, Electoral Area "H"
Director S. Coyne, Town of Princeton
Director R. Gettens, Electoral Area "F
Director D. Holmes, District of Summerland
Director J. Kimberley, City of Penticton
Director. K. Kozakevich, Electoral Area "E"
Director C. Rhodes, Town of Osoyoos, Alternate
Director S. Monteith, Electoral Area "I"
Director R. Obirek, Electoral Area "D"
Director F. Regehr, City of Penticton
Director T. Roberts, Electoral Area "G"
Director J. Vassilaki, City of Penticton
Director P. Veintimilla, Town of Oliver

MEMBERS ABSENT:

Director S. McKortoff, Town of Osoyoos

STAFF PRESENT:

B. Newell, Chief Administrative Officer
G. Cramm, Legislative Services Coordinator
B. Dollevoet, Gen. Manager Development Services
C. Garrish, Planning Manager

A. APPROVAL OF AGENDA

RECOMMENDATION 1
It was MOVED and SECONDED
THAT the Agenda for the Planning and Development Committee Meeting of March 5, 2020 be adopted.
CARRIED

B. ZONING BYLAW AMENDMENT – ELECTORAL AREAS "A", "C", "D", "E", "F" & "I" REGULATION OF METAL STORAGE ("SHIPPING") CONTAINERS

1. Bylaw No. 2895

RECOMMENDATION 2
It was MOVED and SECONDED
THAT the Board of Directors initiate Amendment Bylaw No. 2895. - **CARRIED**

C. ADJOURNMENT

By consensus, the Planning and Development Committee meeting adjourned at 9:22 a.m.

APPROVED:

M. Pendergraft
Committee Chair

CERTIFIED CORRECT:

B. Newell
Chief Administrative Officer

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
BOARD OF DIRECTORS MEETING

Minutes of the Regular Board Meeting of the Regional District of Okanagan-Similkameen (RDOS) Board of Directors held at 10:45 am on Thursday, March 5, 2020 in the Boardroom, 101 Martin Street, Penticton, British Columbia.

MEMBERS PRESENT:

Chair K. Kozakevich, Electoral Area "E"
Vice Chair D. Holmes, District of Summerland
Director M. Bauer, Village of Keremeos
Director J. Bloomfield, City of Penticton
Director T. Boot, District of Summerland
Director G. Bush, Electoral Area "B"
Director B. Coyne, Electoral Area "H"
Director S. Coyne, Town of Princeton
Director R. Gettens, Electoral Area "F"
Director J. Kimberley, City of Penticton
Director R. Knodel, Electoral Area "C"
Director C. Rhodes, Town of Osoyoos, Alternate
Director S. Monteith, Electoral Area "I"
Director R. Obirek, Electoral Area "D"
Director M. Pendergraft, Electoral Area "A"
Director F. Regehr, City of Penticton
Director T. Roberts, Electoral Area "G"
Director J. Vassilaki, City of Penticton
Director P. Veintimilla, Town of Oliver

MEMBERS ABSENT:

Director S. McKortoff, Town of Osoyoos

STAFF PRESENT:

B. Newell, Chief Administrative Officer
G. Cramm, Legislative Services Coordinator
J. Kurvink, Manager of Finance
B. Dollevoet, Gen. Mgr. of Development Services

A. APPROVAL OF AGENDA

RECOMMENDATION 1 **(Unweighted Corporate Vote – Simple Majority)**
It was MOVED and SECONDED
THAT the Agenda for the RDOS Board Meeting of March 5, 2020 be adopted as amended by moving Items A2a and b to B5. – **CARRIED**

1. Consent Agenda – Corporate Issues

a. Similkameen Parks & Recreation Commission – February 4, 2020
THAT the Minutes of the February 4, 2020 Similkameen Parks & Recreation Commission meeting be received.

b. Advisory Planning Commission Electoral Area "D" – February 11, 2020
THAT the Minutes of the February 11, 2020 Advisory Planning Commission Electoral Area "D" meeting be received.

c. Electoral Area "F" Parks and Recreation Commission Annual General Meeting – February 11, 2020
THAT the Minutes of the February 11, 2020 Electoral Area "F" Parks and Recreation Commission Annual General Meeting be received.

d. Electoral Area "F" Parks and Recreation Commission – February 11, 2020
THAT the Minutes of the February 11, 2020 Electoral Area "F" Parks and Recreation Commission meeting be received.

e. Corporate Services Committee – February 20, 2020
THAT the Minutes of the February 20, 2020 Corporate Services Committee meeting be received.

THAT a letter be sent to MP Richard Canning and MP Dan Albas requesting that they advise the RDOS on any steps which the Federal Government may be taking with respect to the implementation of 5G Wireless and if so, what course of action is the Federal Government planning to research and prevent the possible damage to human health and the environment.

THAT the current Regional Grant in Aid Policy be upheld in current state.

THAT the Board undertake a review of the Overhead Policy and the Time Tracker Principles and Guidelines.

f. Environment and Infrastructure Committee – February 20, 2020
THAT the Minutes of the February 20, 2020 Environment and Infrastructure Committee meeting be received.

g. RDOS Regular Board Meeting – February 20, 2020
THAT the minutes of the February 20, 2020 RDOS Regular Board meeting be adopted.

RECOMMENDATION 2 (Unweighted Corporate Vote – Simple Majority)
It was MOVED and SECONDED
THAT the Consent Agenda – Corporate Issues be adopted. - **CARRIED**

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2. Consent Agenda – Development Services

a. Temporary Use Permit Application — 553 Tinhorn Creek Road, Electoral Area "C"
   i. Permit
   ii. Representation

b. Temporary Use Permit Application — 4320 Black Sage Road, Electoral Area "C"
   i. Permit
   ii. Representation

These items were moved to B5 Items Removed from Consent Agenda.

B. DEVELOPMENT SERVICES – Rural Land Use Matters

1. Granite Creek – Heritage Services Agreement and Licence of Occupation
a. Heritage Services Agreement
b. License of Occupation

RECOMMENDATION 3 (Unweighted Corporate Vote – Simple Majority)
It was MOVED and SECONDED
THAT the Licence of Occupation for the Granite Creek site be cancelled. - **CARRIED**

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2. OCP & Zoning Bylaw Amendment – Composting Operation, Electoral Area "H"
a. Bylaw No. 2498.20
b. Representation

RECOMMENDATION 4 (Unweighted Rural Vote – Simple Majority)
It was MOVED and SECONDED
THAT Bylaw No. 2498.20, 2020, Electoral Area "H" Zoning Amendment Bylaw be read a first and second time and proceed to a public hearing; and,

THAT the holding of a public hearing be scheduled for the Regional District Board meeting of April 2, 2020; and,

THAT staff give notice of the public hearing in accordance with the requirements of the *Local Government Act*.
CARRIED

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3. Official Community Plan (OCP) & Zoning Bylaw Amendment – Electoral Area "I" Apex Mountain Zone Review
a. Bylaw No. 2603.03
b. Bylaw No. 2457.26
c. Representation

RECOMMENDATION 5 (Unweighted Rural Vote – Simple Majority)
It was MOVED and SECONDED
THAT Bylaw No. 2603.03, 2020, Electoral Area "I" Official Community Plan Amendment Bylaw and Bylaw No. 2457.26, 2020, Electoral Area "I" Zoning Amendment Bylaw be read a first and second time and proceed to public hearing; and,

THAT the Board of Directors considers the process, as outlined in this report from the Chief Administrative Officer dated March 5, 2020, to be appropriate consultation for the purpose of Section 475 of the *Local Government Act*; and,

THAT, in accordance with Section 477 of the *Local Government Act*, the Board of Directors has considered Amendment Bylaw No. 2603.03, 2020, in conjunction with its Financial and applicable Waste Management Plans; and,

THAT the holding of a public hearing be scheduled for the Regional District Board meeting of April 2, 2020; and,

THAT staff give notice of the public hearing in accordance with the requirements of the *Local Government Act*.
CARRIED

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4. Zoning Bylaw Amendment – Duplex Zone Review (Residential Zone Update – Phase 2)
Electoral Areas "A", "C", "D" & "E"
a. Bylaw No. 2886
b. Representation

RECOMMENDATION 6 (Unweighted Rural Vote – Simple Majority)
It was MOVED and SECONDED
THAT Bylaw No. 2886, 2020, Regional District of Okanagan-Similkameen Duplex Zone Update Amendment Bylaw be read a first and second time and proceed to public hearing; and,

THAT the holding of a public hearing be scheduled for the Regional District Board meeting of April 2, 2020; and,

THAT staff give notice of the public hearing in accordance with the requirements of the *Local Government Act*.
CARRIED

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5. Items Removed from Consent Agenda – Development Services

a. Temporary Use Permit Application — 553 Tinhorn Creek Road, Electoral Area "C"
   i. Permit
   ii. Representation

It was MOVED and SECONDED
THAT the Board of Directors approve Temporary Use Permit No. C2019.014-TUP, subject to the following condition:

- That all deficiencies identified in the health and safety inspection are corrected by the applicant and inspected by an RDOS Building Official, prior to issuance.

CARRIED

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b. Temporary Use Permit Application — 4320 Black Sage Road, Electoral Area "C"
   i. Permit
   ii. Representation

It was MOVED and SECONDED
THAT the Board of Directors approve Temporary Use Permit No. C2019.015-TUP, subject to the following condition:

- That all deficiencies identified in the health and safety inspection be corrected by the applicant and inspected by an RDOS Building Official, prior to issuance.

CARRIED

C. FINANCE

1. Purchase of snowmobile for China Ridge Trail Association – Electoral Area "H"
a. Bylaw No. 2894

RECOMMENDATION 7 (Weighted Corporate Vote – 2/3 Majority)
It was MOVED and SECONDED
THAT Bylaw No. 2894, 2020, Electoral Area "H" Community Facilities Capital Reserve Fund Expenditure Bylaw authorizing the expenditure of $18,000 towards the purchase of a snowmobile by the China Ridge Trail Association be read a first, second and third time and be adopted.
CARRIED

D. LEGISLATIVE SERVICES

1. Naramata Fire Service Area Petition
a. Bylaw No. 2893

RECOMMENDATION 8 (Unweighted Corporate Vote – Simple Majority)
It was MOVED and SECONDED
THAT Bylaw No. 2893, 2020 Naramata Fire Prevention and Suppression Local Service Establishment Amendment Bylaw be read a first, second and third time. - **CARRIED**

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2. RDOS Fees and Charges Bylaw No. 2877, 2020
a. Bylaw No. 2877 - mark up
b. Bylaw No. 2877 - clean

RECOMMENDATION 9 (Weighted Corporate Vote – 2/3 Majority)
It was MOVED and SECONDED
THAT Regional District of Okanagan-Similkameen Fees and Charges Bylaw No. 2877, 2020 be read a second and third time, and adopted. - **CARRIED**

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3. Council of Forest Industries

RECOMMENDATION 10 (Unweighted Corporate Vote – Simple Majority)
It was MOVED and SECONDED
THAT the Regional District appoint Director Bob Coyne as the Regional District of Okanagan-Similkameen representative to the BC Council of Forest Industries 2020 convention. - **CARRIED**

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4. Water Use Regulation
a. Bylaw No. 2824.01

RECOMMENDATION 11 (Unweighted Corporate Vote – 2/3 Majority)
It was MOVED and SECONDED
THAT Bylaw 2824.01, Water Use Regulation Amendment Bylaw, be read a first, second and third time, and adopted. - **CARRIED**

E. CAO REPORTS

1. Verbal Update

F. ITEMS COMING OUT OF CLOSED SESSION – Corporate Services Committee, March 5, 2020

IT WAS MOVED AND SECONDED
THAT the Board of Directors ratify the Memorandum of Settlement for a 2020-2023 Collective Agreement between the BC Government Employees Union and the Regional District of Okanagan Similkameen. - **CARRIED**

G. OTHER BUSINESS

1. Chair's Report

2. Directors Motions

3. Board Members Verbal Update

H. ADJOURNMENT
By consensus, the meeting adjourned at 11:20 a.m.

APPROVED:

K. Kozakevich
RDOS Board Chair

CERTIFIED CORRECT:

B. Newell
Corporate Officer

ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 19, 2020

RE: Development Variance Permit Application — Electoral Area "F"

Administrative Recommendation:

THAT the Board of Directors approve Development Variance Permit No. F2019.037-DVP;

AND THAT prior to the issuance of Development Variance Permit No. F2019.037-DVP, statutory covenant No. S33329, which is registered on title, be amended to reduce the side parcel line setback restrictions contained therein.

Purpose: To reduce the interior side parcel line setback for a detached garage/workshop

Owners: M. & L. Lepke, J. Doell & J. Deering Applicant: Martin Lepke Folio: F-07298.205

Civic: 2636 Forsyth Drive Legal: Lot 1, Plan 31947, District Lot 4947, ODYD

OCP: Small Holdings (SH) Zone: Small Holdings Four Zone (SH4)

Variance Request: To reduce the interior side parcel line setback for an accessory building from 4.5 m to 0.43 m

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Proposal:

This application seeks a development variance permit to reduce the minimum interior side parcel line setback for an accessory building to accommodate a 145 m^2 two-storey detached garage and workshop with an attached deck.

Specifically, it is proposed to reduce the interior side parcel line setback for an accessory building in the SH4 zone from 4.5 metres to 0.43 metres.

The applicants have stated that "the request for the variance is due to the flow for the parking area and access to the existing carport. There are rock outcroppings and severe slope to the property which makes this site the only reasonable option. The new garage will replace two existing sheds and the garage will not affect the neighbour's usage or site lines."

Site Context:

The subject parcel is approximately 7,154 m^2 in area, located on the north side of Forsyth Drive. The surrounding pattern of development is characterised by rural residential.

Background:

The subject property was created by a subdivision plan deposited in the Land Title Office in Kamloops on May 20, 1981, while available Regional District records indicate that a Building Permit was issued for a single family dwelling (1981).

Under the Electoral Area "F" Official Community Plan (OCP) Bylaw No. 2790, 2018, the property is designated Small Holdings (SH), and is shown on Schedule 'H' (ESDP Areas) as comprising Important Ecosystem Areas (IEA), but has not been designated as an Environmentally Sensitive Development Permit (ESDP) Area.

Under the Electoral Area "F" Zoning Bylaw No. 2461, 2008, the property is currently zoned Small Holdings Four Zone (SH4) which allows for single detached dwellings as a principal use and accessory buildings, among other uses, as a secondary use.

The subject property has been assessed as "Residential" (Class 01) and is rated High in the Community Wildfire Protection Plan, with a small portion in the northeast corner rated as Moderate.

There is a covenant registered on title (S33329) that limits, among other things, the location of buildings. This covenant requires "not less than fifteen (15) feet from an interior or exterior side lot line" (15 feet is 4.572 metres) and would need to be discharged or amended to allow for the proposal to proceed.

Public Process:

Adjacent property owners will have received notification of this application with written comments regarding the proposal being accepted until the commencement of the regular Board meeting. Any comments will be on the agenda as separate item.

This proposal has been referred to the Penticton Fire Department. Comments received from this referral are included as a separate item on the Board's Agenda.

This item was referred to the Electoral Area "F" Advisory Planning Commission (APC) in the February 24 meeting agenda; however, the meeting was cancelled due to lack of quorum.

Analysis:

There are several purposes of interior parcel line setbacks, which act to maintain separation between buildings and neighbouring properties, establish the rhythm of the streetscape, and promote orderly development within a parcel. Interior parcel line setbacks aim to mitigate overshadowing and loss of privacy as well as promote fire separation and opportunities for open space and landscaping.

The proposed building is located behind the principal dwelling and will not be visible from Forsyth Drive. The topography immediately rises at the edge of the eastern property line, which mitigates potential impacts to privacy or overshadowing of the neighbouring parcel.

In this instance, although there are severe slopes in some locations, Administration notes that there are reasonable alternative locations to site an accessory building that would comply with the setback regulation and the covenant registered on title.

However, the Penticton Fire Department have advised that the proposed location is the best location for an accessory building from a fire prevention and protection perspective. For this reason, it is seen as a preferred location.

It should be noted that this variance request contravenes a covenant registered on title. Although the applicant has expressed interest in discharging the covenant, there are several restrictions within this covenant that pertain to broader issues than the interior side setback, including density, fire protection and water restrictions. It is recommended that the covenant remain in place, with exception of the side yard setback to facilitate this variance request.

For the reasons listed above, Administration supports the variance request to reduce the minimum interior side parcel line setback, upon condition that the covenant be amended only to remove the side yard setback restrictions.

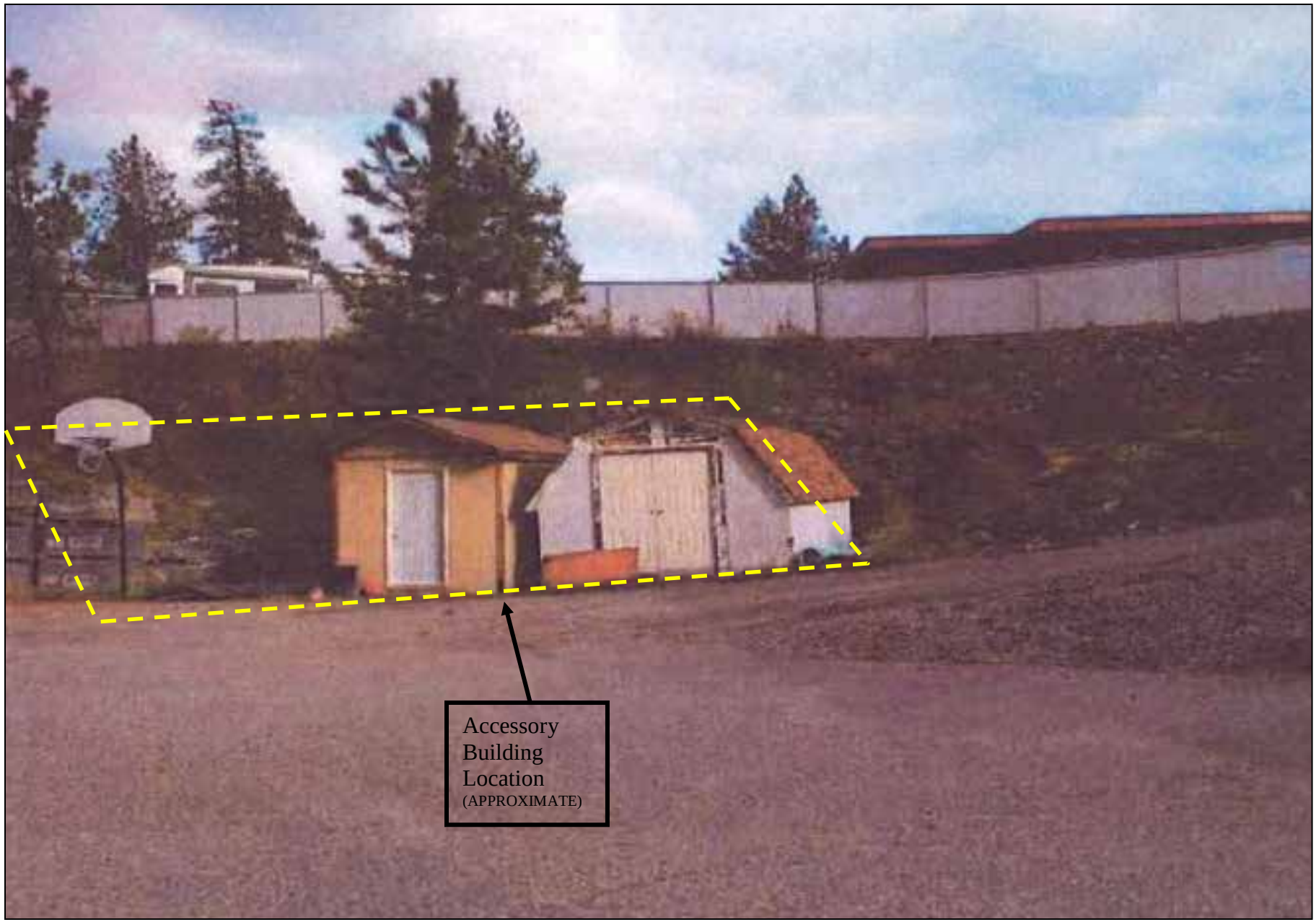
Alternatives:

1. That the Board approve Development Variance Permit No. F2019.037-DVP.
2. That the Board deny Development Variance Permit No. F2019.037-DVP.

Respectfully submitted	**Endorsed by**:	**Endorsed by**:
JoAnn Peachey, Planner I	C. Garrish, Planning Manager	B. Dollevoet, G.M. of Dev. Services

Attachments: No. 1 – Applicant's Site Photo

Attachment No. 1 – Applicant's Site Photo



Development Variance Permit

FILE NO.: F2019.037-DVP

Owners: Martin & Lisa Lepke
2633 Forsythe Drive
Penticton, BC, V2A 8Y9

Jason Doell & Jennifer Deering
306 Newton Drive
Penticton, BC, V2A 8Z5

Agent: Martin & Lisa Lepke
2633 Forsythe Drive
Penticton, BC, V2A 8Y9

GENERAL CONDITIONS

1. This Development Variance Permit is issued subject to compliance with all of the bylaws of the Regional District of Okanagan-Similkameen applicable thereto, except as specifically varied or supplemented by this Permit.

2. The land described shall be developed strictly in accordance with the terms and conditions and provisions of this Permit, and any plans and specifications attached to this Permit that shall form a part thereof.

3. Where there is a conflict between the text of the permit and permit drawings or figures, the drawings or figures shall govern the matter.

4. This Development Variance Permit is not a Building Permit.

APPLICABILITY

5. This Development Variance Permit is substantially in accordance with Schedules 'A', 'B', 'C', 'D', and 'E' applies to and only to those lands within the Regional District described below, and any and all buildings, structures and other development thereon:

Legal Description:	Lot 1, Plan 31947, District Lot 4947, ODYD	
Civic Address:	2636 Forsyth Drive	
Parcel Identifier (PID):	003-564-053	Folio: F-07298.205

CONDITIONS OF DEVELOPMENT

6. The land specified in Section 5 may be developed in accordance with the following variances to the Electoral Area "F" Zoning Bylaw No. 2461, 2008, in the Regional District of Okanagan-Similkameen:

a) the minimum interior side parcel line setback for an accessory building in the Small Holdings Four (SH4) Zone, as prescribed in Section 10.7.7(b)(iii), is varied:

i) from: 4.5 metres

to: 0.43 metres to the outermost projection as shown on Schedule 'B'.

COVENANT REQUIREMENTS

7. Not Applicable

SECURITY REQUIREMENTS

8. Not applicable

EXPIRY OF PERMIT

9. The development shall be carried out according to the following schedule:

a) In accordance with Section 504 of the *Local Government Act* and subject to the terms of the permit, if the holder of this permit does not substantially start any construction with respect to which the permit was issued within two (2) years after the date it was issued, the permit lapses.

b) Lapsed permits cannot be renewed; however, an application for a new development permit can be submitted.

Authorising resolution passed by the Regional Board on _____, 2020.

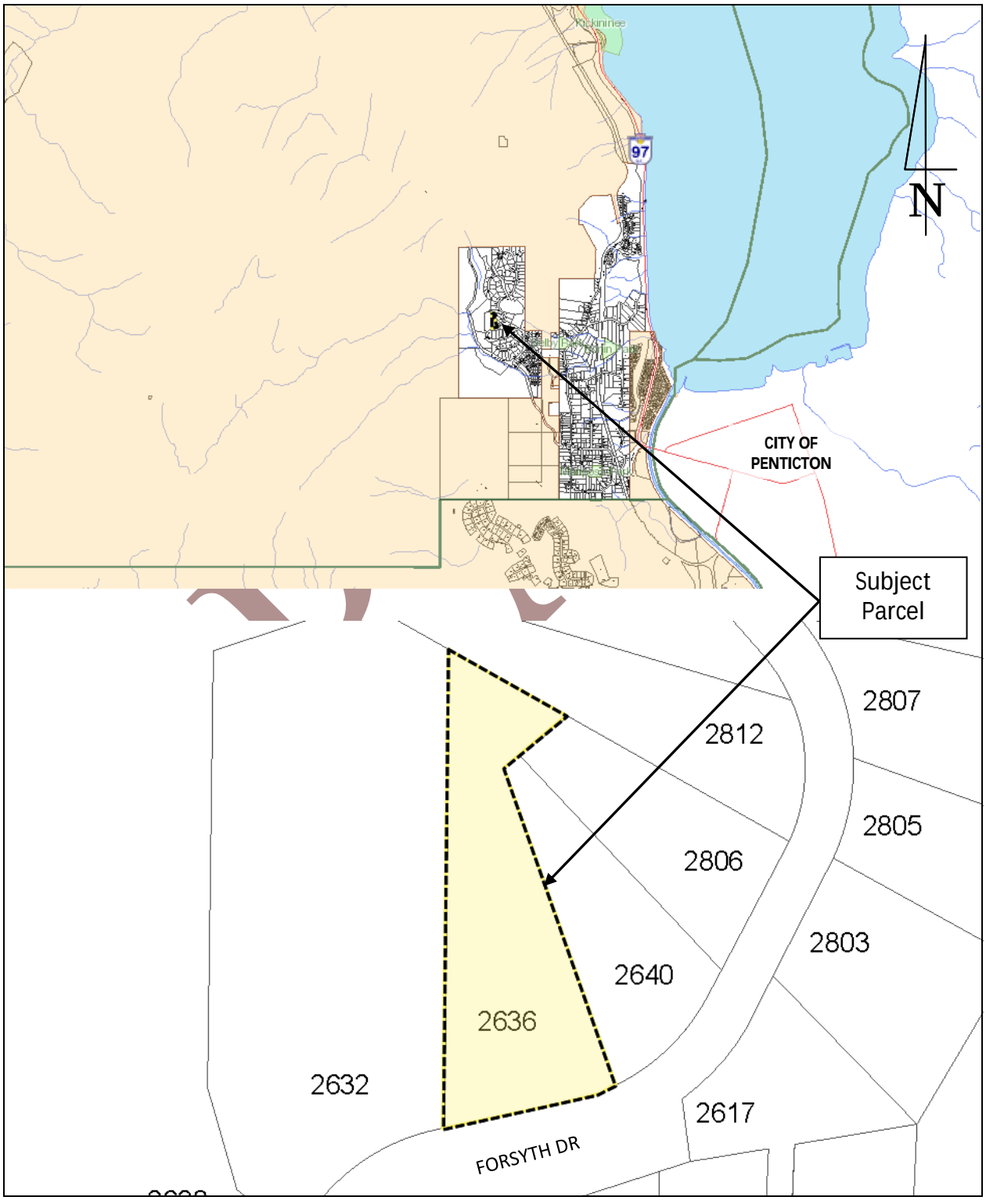
_____

B. Newell, Chief Administrative Officer

Regional District of Okanagan-Similkameen
101 Martin St, Penticton, BC, V2A-5J9
Tel: 250-492-0237 Email: planning@rdos.bc.ca

Development Variance Permit File No. F2019.037-DVP

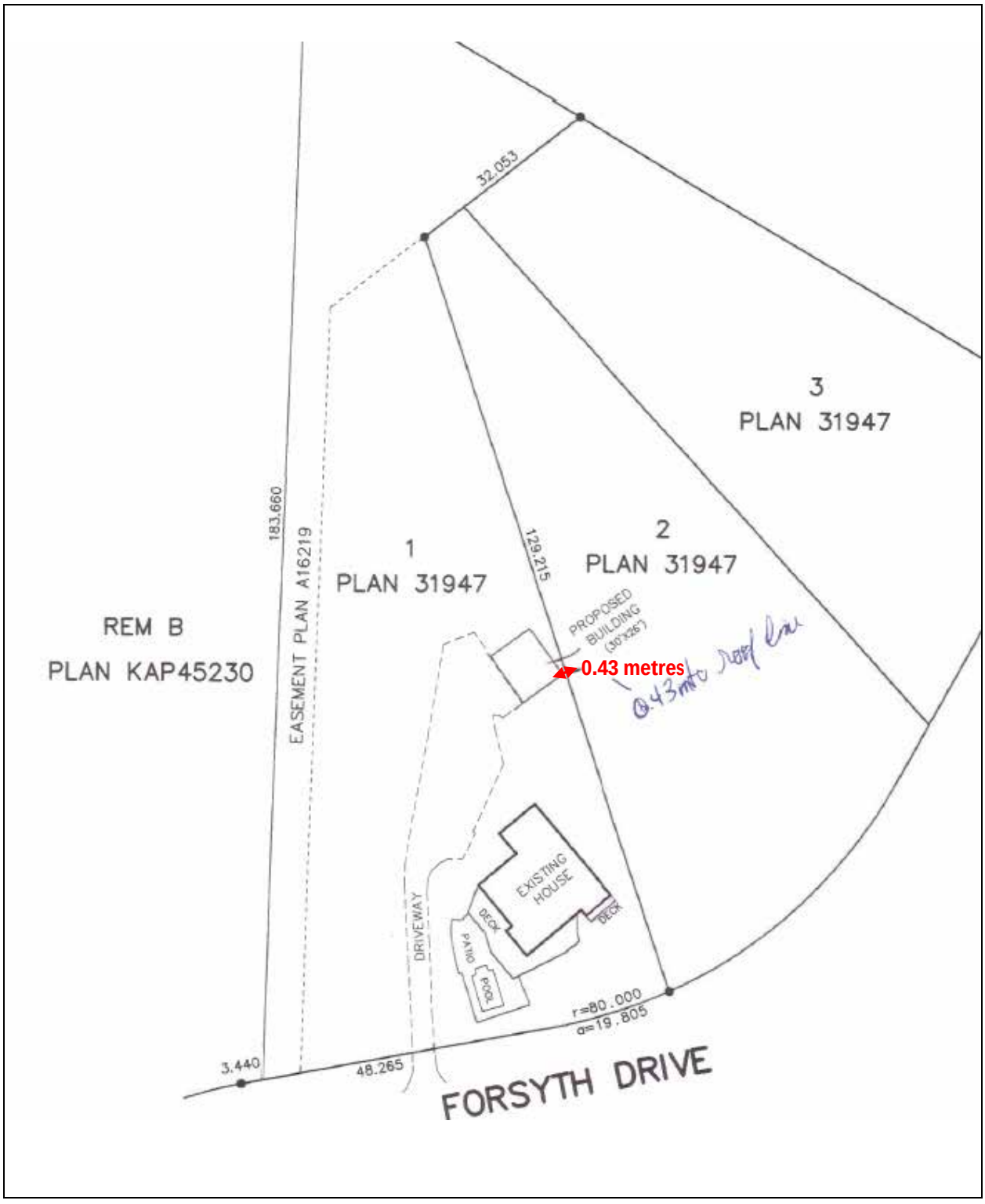
Schedule 'A'



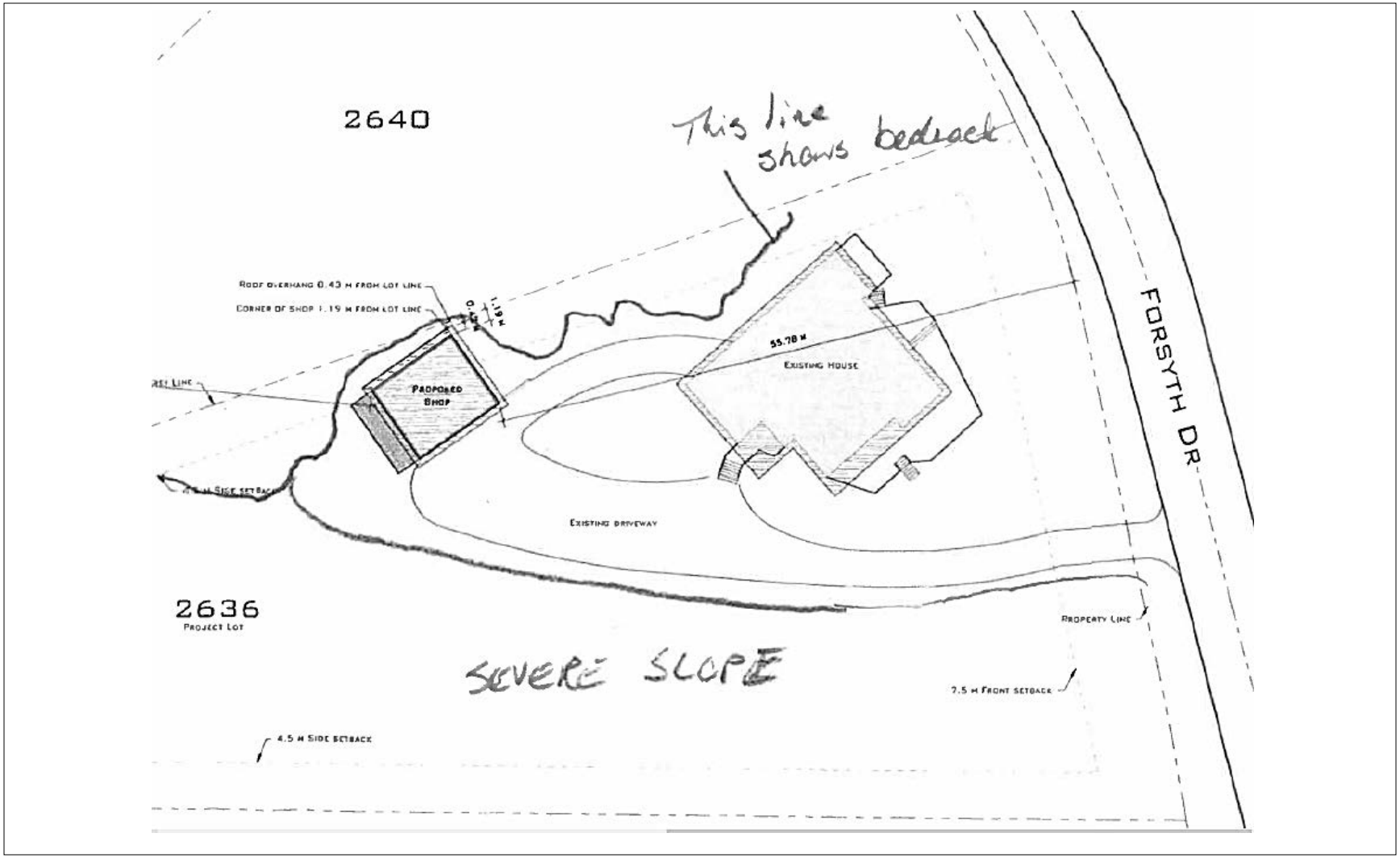
Regional District of Okanagan-Similkameen
101 Martin St, Penticton, BC, V2A-5J9
Tel: 250-492-0237 Email: planning@rdos.bc.ca

Development Variance Permit File No. F2019.037-DVP

Schedule 'B'

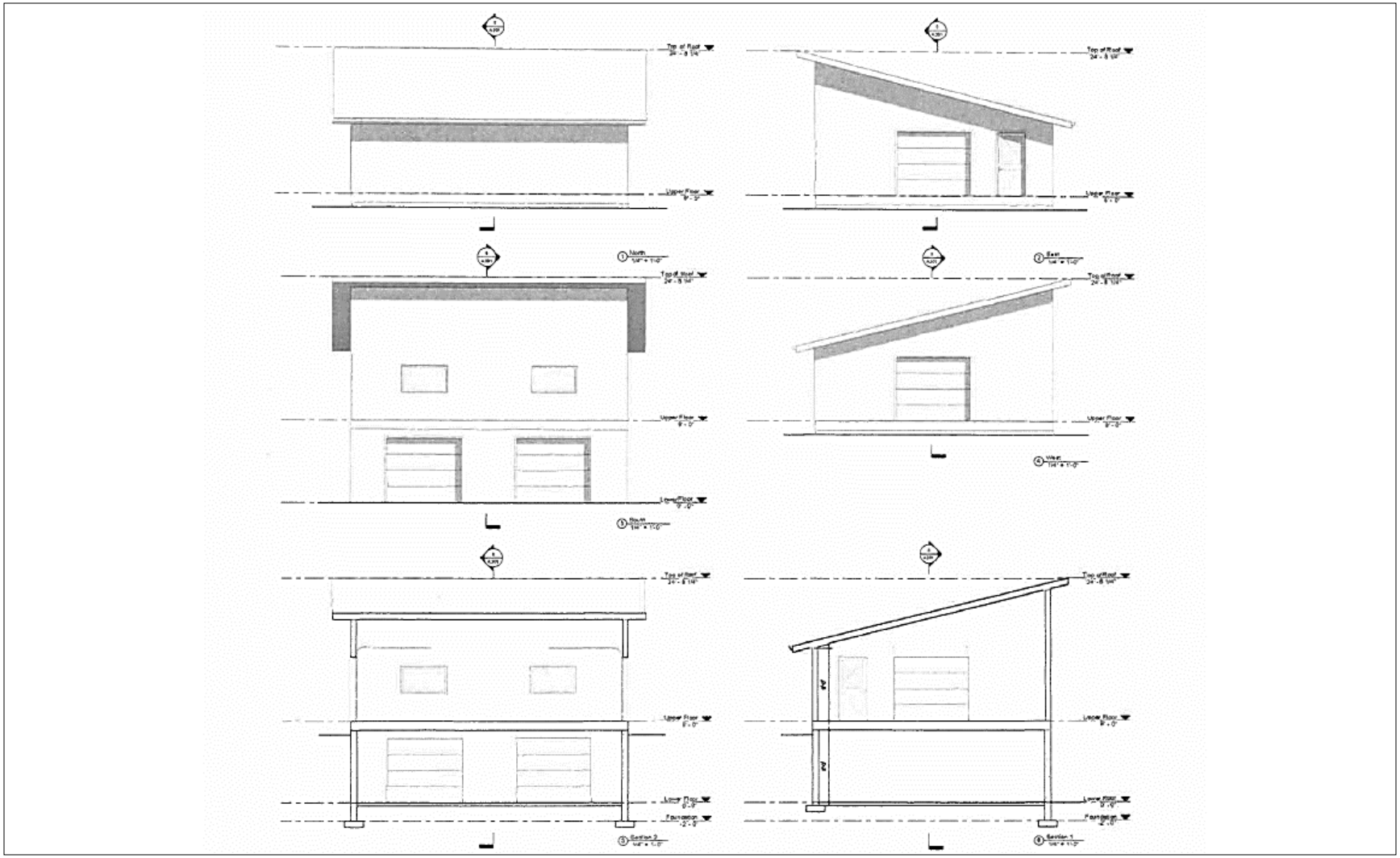


Schedule 'C'


2640
This line shows bedrock
ROOF OVERHANG 0.43 M FROM LOT LINE
CORNER OF SHOP 1.19 M FROM LOT LINE
0.43 M
1.19 M
PROPOSED SHOP
55.78 M
EXISTING HOUSE
FORSYTH DR
EXISTING DRIVEWAY
2636
PROJECT LOT
PROPERTY LINE
SEVERE SLOPE
7.5 M FRONT SETBACK
4.5 M SIDE SETBACK

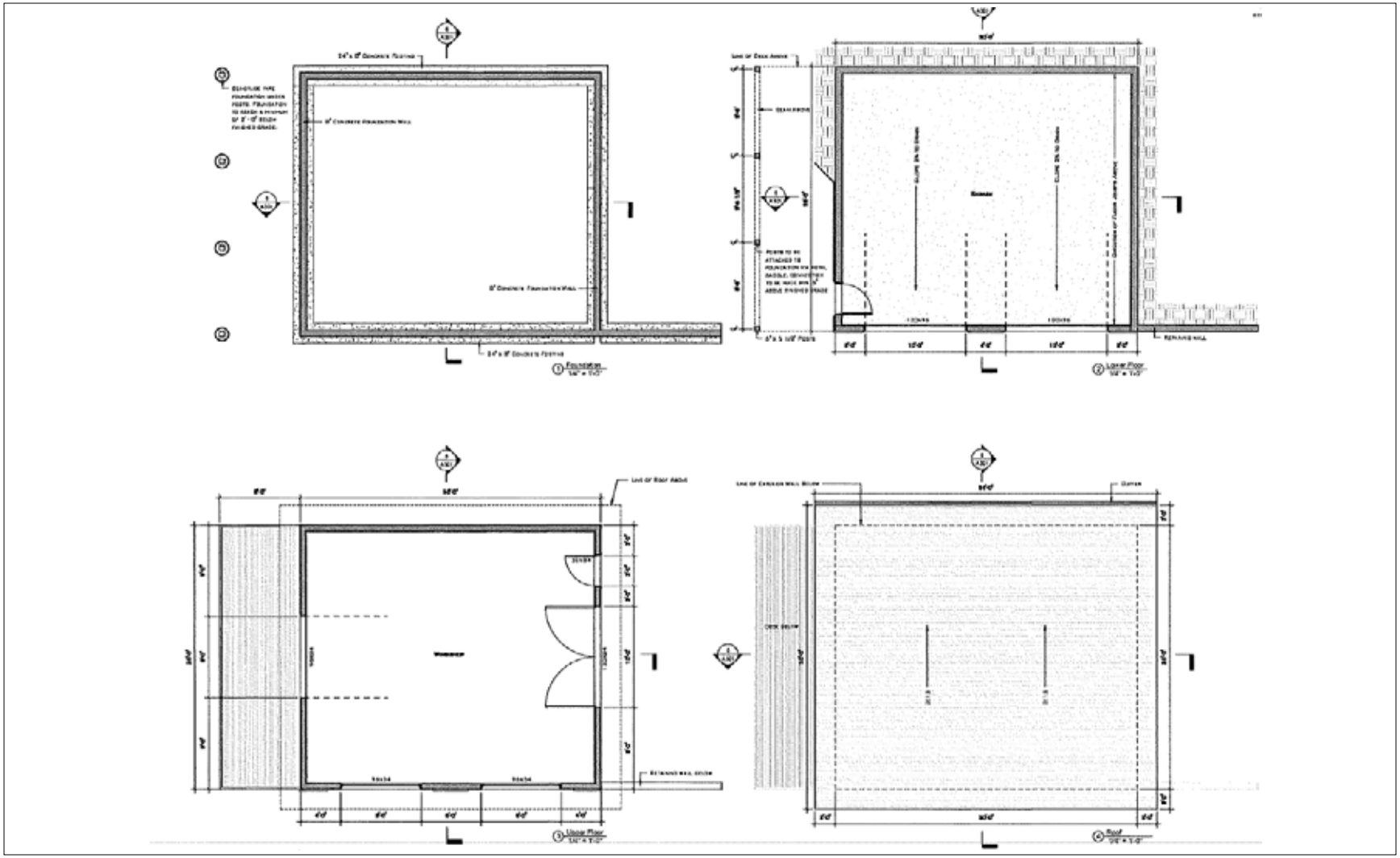
Development Variance Permit File No. F2019.037-DVP

Schedule 'D'



Regional District of Okanagan-Similkameen
101 Martin St, Penticton, BC, V2A-5J9
Telephone: 250-492-0237 Email: info@rdos.bc.ca

Schedule 'E'



JoAnn Peachey

From: Mike Richards <mike.richards@penticton.ca>
Sent: January 28, 2020 2:56 PM
To: JoAnn Peachey
Cc: Rob Trousdell
Subject: RE: Site Visit Requested - DVP (Lepke, Doell,Deering) - Interior side parcel line setback reduction

Follow Up Flag: Follow up
Flag Status: Flagged

Hi JoAnne, nice to meet you today. In reviewing the Covenant on the property located at 2636 Forsyth Dr. I note that there are 3 clauses under the article titled "Fire Protection". Both Deputy Trousdell and I agree that the best location for the proposed structure is where the owner is requesting. We do note that the property could use some level of wildfire risk reduction cleanup and would recommend that the owner obtain a Fire Smart Home Assessment by a certified Local Fire Smart Representative. From this assessment there should be an action plan developed and maintained to remain consistent with Clause "c" of the Covenant.

This subdivision is already a Recognized Fire Smart Community registered with Fire Smart Canada so asking this does not stray with the intent of the covenant or their Fire Smart Commitment. Our cursory view today revealed collections of ground and ladder fuels. It would also be recommended that the construction materials be consistent with noncombustible wildfire risk reduction construction. As this covenant review request was for this specific property our opinions and recommendations are specific to this property and not other properties within the subdivision.

I hope this helps.

Regards,

Mike Richards,
Captain/Fire Prevention Officer,
LAFC #1949

Penticton Fire Department
250 Nanaimo Ave W
Penticton, B.C.
V2A 1N5

Phone 250-490-2312
Fax 250-490-2302

From: JoAnn Peachey [mailto:jpeachey@rdos.bc.ca]
Sent: Wednesday, January 22, 2020 8:34 AM
To: Mike Richards
Cc: Rob Trousdell
Subject: RE: Site Visit Requested - DVP (Lepke, Doell,Deering) - Interior side parcel line setback reduction

Hi Mike,
I haven't heard back from Rob yet but Tuesday at 2pm works for everyone else. I'll send an invite once I hear confirmation from Rob.

Lauri Feindell

Subject: FW: Referral Comments Requested - DVP (Lepke, Doell,Deering) - Interior side parcel line setback reduction

Attachments: APP - Site Plan.pdf; APP - Elevation Drawings.pdf; APP - Parcel Map.pdf; 20191216111805830.pdf

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From: Chris Forster <Chris.Forster@penticton.ca>
Sent: December 18, 2019 9:43 AM
To: JoAnn Peachey <jpeachey@rdos.bc.ca>
Cc: Mike Richards <mike.richards@penticton.ca>
Subject: FW: Referral Comments Requested - DVP (Lepke, Doell,Deering) - Interior side parcel line setback reduction

Joann,

I forwarded this to our Captain of Fire Prevention and he advises as follows:

The covenant is there for a reason so in relation to that I would not support any change to it.

Mike Richards,
Captain/Fire Prevention Officer,
LAFC #1949

If you require anything further, please contact Captain Riichards or myself.

Thank you

Chris Forster, Deputy Fire Chief
Emergency Planning Coordinator
City of Penticton | 250 Nanaimo Ave. West | Penticton, BC | V2A 1N5
p: 250.490.2310 | f: 250.490.2302 | e: chris.forster@penticton.ca

.05

ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 19, 2020

RE: OCP Bylaw Amendments - Electoral Areas "A", "C", "D", "E", "F", "G", "H" & "I"
Micro Cannabis Production Facilities

Administrative Recommendation:

THAT Bylaw No. 2858, 2019, Electoral Area Official Community Plan Amendment Bylaw be read a first and second time and proceed to public hearing;

AND THAT the Board of Directors considers the process, as outlined in this report from the Chief Administrative Officer dated March 19, 2020, to be appropriate consultation for the purpose of Section 475 of the *Local Government Act*;

AND THAT, in accordance with Section 477 of the *Local Government Act*, the Board of Directors has considered Amendment Bylaw No. 2858, 2020, in conjunction with its Financial and applicable Waste Management Plans;

AND THAT the holding of a public hearing be scheduled for the Regional District Board meeting of April 16, 2020;

AND THAT staff give notice of the public hearing in accordance with the requirements of the *Local Government Act*.

Purpose:

The purpose of the proposed amendments to the Electoral Area Official Community Plan (OCP) Bylaws is to introduce policy statements that indicate the criteria against which the Regional District Board *may* choose to evaluate an amendment bylaw application for a "micro cannabis production facility".

Background:

At its meeting of May 23, 2019, the Planning and Development (P&D) Committee resolved to direct staff to separate Amendment Bylaw 2849 into two separate bylaws to deal with the following issues:

1) the prohibition of cannabis production facilities in all non-Industrial zones (Bylaw No. 2849); and
2) the introduction of micro cannabis production facilities as a permitted use in specified zones as well as new general regulations governing the use (Bylaw No. 2858).

At its meeting of June 6, 2019, P&D Committee resolved that prior to consideration of first reading of Bylaw No. 2858, public information meetings regarding the proposed amendments be held in Oliver, Naramata, Kaleden and Princeton.

At its meeting of October 17, 2019, the P&D Committee considered all representations received in relation to this consultation process and resolved that "more information is required."

At its meeting of December 5, 2019, the Board adopted Amendment Bylaw No. 2849, which, amongst other things, restricted indoor cannabis production facilities as a permitted use to the General Industrial (I1) and Heavy Industrial (I2) zones, unless a parcel is situated in the ALR and the structure comprises a soil-based floor system.

At its meeting of January 23, 2020, the P&D Committee of the Board further considered Bylaw No. 2858 and resolved that "staff be instructed to explore separate setbacks for agricultural properties abutting agricultural and residential land and come back with recommendations as to reasonable setbacks for intensive farming operations."

At its meeting of February 6, 2020, the P&D Committee of the Board resolved that Bylaw No. 2858 be amended prior to proceeding to first reading so that:

- *all amendments to the Electoral Area zoning bylaws be removed; and*
- *new policy statements regarding the criteria against which a bylaw amendment application proposing a micro cannabis production facility in a Rural zone will be assessed against be introduced into the Electoral Area Official Community Plan Bylaws.*

Referrals:

Approval from the Ministry of Transportation and Infrastructure (MoTI) is not required prior to adoption as Bylaw No. 2858 only affects Official Community Plan (OCP) Bylaws.

Pursuant to Section 477 of the *Local Government Act*, after first reading the Regional Board must consider the proposed OCP amendment in conjunction with Regional District's current financial and waste management plans. The proposed OCP amendment has been reviewed by the Public Works Department and Finance Department, and it has been determined that the proposed bylaw is consistent with RDOS's current waste management plan and financial plan.

Pursuant to Section 476 of the *Local Government Act*, the Regional District must consult with the relevant School District when proposing to amend an OCP for an area that includes the whole or any part of that School District. In this instance, School District Nos. 53, 58 & 67 have been made aware of the proposed amendment bylaw.

Pursuant to Section 475 of the *Local Government Act*, the Regional District must consult with the Agricultural land Commission (ALC) when proposing to amend an OCP which might affect agricultural. Both the ALC and the Ministry of Agriculture have been made aware of the proposed amendment bylaw.

Public Process:

Public information meetings were held on July 31, 2019 (Kaleden), August 1, 2019 (Princeton), August 19, 2019 (Oliver) and August 21, 2019 (Naramata). Attendance at these meetings consisted of four (4) persons in Kaleden, two (2) persons in Princeton, four (4) persons in Oliver and approximately 37 persons in Naramata.

All representations received to date that are seen to be related to Bylaw No. 2858, including those from external agencies, are included as a separate item on the Board agenda.

Administration recommends that the public information meetings as well as formal referral to the agencies listed at Attachment No.1, should be considered appropriate consultation for the purpose of

Section 475 of the *Local Government Act*. As such, this process is seen to be sufficiently early and does not need to further ongoing consultation.

Analysis:

Further to the direction provided by the P&D Committee of the Board at its meeting of February 6, 2020, Bylaw No. 2858 is proposing to introduce OCP policies that speak to the criteria the Board would use when considering rezoning applications proposing to allow micro cannabis production facility. Specifically:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

Administration supports these amendments as they will provide direction to the public, property owners and staff on basic parameters a rezoning application to allow for a micro cannabis production facility should be addressing.

Alternatives:

.1 THAT first reading of OCP Amendment Bylaw No. 2858, 2019, be deferred.

.2 THAT first reading of OCP Amendment Bylaw No. 2858, 2019, be denied.

Respectfully submitted:

C. Garrish, Planning Manager

Endorsed by:

B. Dollevoet, General Manager of Dev. Services

Attachments: No. 1 — Agency Referral List

Attachment No. 1 – Agency Referral List

Referrals have been sent to the following agencies as highlighted with a þ, regarding Amendment Bylaws No. 2858:

þ	Agricultural Land Commission (ALC)	o	Fortis
þ	Interior Health Authority (IHA)	o	City of Penticton
þ	Ministry of Agriculture	o	District of Summerland
o	Ministry of Energy, Mines & Petroleum Resoruces	o	Town of Oliver
o	Ministry of Municipal Affairs & Housing	o	Town of Osoyoos
o	Ministry of Environment & Climate Change Strategy	o	Town of Princeton
o	Ministry of Forest, Lands, Natural Resource Operations & Rural Development	o	Village of Keremeos
o	Ministry of Tourism, Arts & Culture	o	Okanagan Nation Alliance (ONA)
þ	Ministry of Transportation and Infrastructure	þ	Penticton Indian Band (PIB)
o	Integrated Land Management Bureau	þ	Osoyoos Indian Band (OIB)
o	BC Parks	þ	Upper Similkameen Indian Bands (USIB)
þ	School District #53 (Okanagan Similkameen)	þ	Lower Similkameen Indian Bands (LSIB)
þ	School District #58 (Nicola Similkameen)	o	Environment Canada
þ	School District #67 (Okanagan Skaha)	o	Fisheries and Oceans Canada
o	Central Okanagan Regional District	o	Archaeology Branch
o	Kootenay Boundary Regional District	o	Dominion Radio Astrophysical Observatory
o	Thompson Nicola Regional District	o	Canadian Wildlife Services
o	Fraser Valley Regional District	þ	Tulameen Fire District
þ	Okanagan Falls Irrigation District	þ	Anarchist Mountain Volunteer Fire Dept
þ	Kaleden Irrigation District	þ	Kaleden Volunteer Fire Dept
þ	Naramata Volunteer Fire Dept	þ	OK Falls Volunteer Fire Dept
þ	Willowbrook Volunteer Fire Dept		

BYLAW NO. 2858

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

BYLAW NO. 2858, 2020

A Bylaw to amend the Electoral Areas "A", "C", "D", "E", "F", "H" and "I" Regional District of Okanagan-Similkameen Official Community Plan Bylaws

The REGIONAL BOARD of the Regional District of Okanagan-Similkameen in open meeting assembled, ENACTS as follows:

1. This Bylaw may be cited for all purposes as the "Regional District of Okanagan-Similkameen Micro Cannabis Production Facilities Amendment Bylaw No. 2858, 2020."

Electoral Area "A"

2. The "Regional District of Okanagan-Similkameen, Electoral Area "A" Official Community Plan Bylaw No. 2450, 2008" is amended by:

   i) adding a new Section 5.3.10 (Policies) under Section 5.0 (Resource Area) to read as follows:

      .10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

         i) the parcel under application has an area not less than 2.0 hectares;

         ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

         iii) confirmation is provided that adequate water and servicing is available to the site; and

         iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

   ii) adding a new Section 6.3.19 (Policies) under Section 6.0 (Agriculture) to read as follows and renumbering all subsequent sections:

.19 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 7.3.10 (Policies) under Section 7.0 (Rural Holdings) to read as follows:

.10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 8.3.13 (Policies - General) under Section 8.0 (Residential) to read as follows:

.13 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "C"

3. The "Regional District of Okanagan-Similkameen, Electoral Area "C" Official Community Plan Bylaw No. 2452, 2008" is amended by:

i) adding a new Section 8.3.10 (Policies) under Section 8.0 (Resource Area) to read as follows:

.10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 9.3.27 (Policies) under Section 9.0 (Agriculture) to read as follows:

.27 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 10.3.10 (Policies) under Section 10.0 (Rural Holdings) to read as follows:

.10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 11.3.13 (Policies - General) under Section 11.0 (Residential) to read as follows:

.13 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "D"

4. The "Regional District of Okanagan-Similkameen, Electoral Area "D" Official Community Plan Bylaw No. 2603, 2013" is amended by:

i) adding a new Section 8.2.8 (Policies) under Section 8.0 (Resource Area) to read as follows and renumbering all subsequent sections:

.8 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 9.2.26 (Policies) under Section 9.0 (Agriculture) to read as follows and renumbering all subsequent sections:

.26 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 10.3.12 (Policies) under Section 10.0 (Rural Holdings) to read as follows:

.12 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 11.2.21 (Policies - General) under Section 11.0 (Residential) to read as follows:

.21 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "E"

5. The "Regional District of Okanagan-Similkameen, Electoral Area "E" Official Community Plan Bylaw No. 2458, 2008" is amended by:

i) adding a new Section 8.3.12 (Policies) under Section 8.0 (Resource Area) to read as follows:

.12 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 9.3.19 (Policies) under Section 9.0 (Agriculture) to read as follows:

.19 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 10.3.11 (Policies - General) under Section 10.0 (Rural Holdings) to read as follows:

.11 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 8.3.13 (Policies - General) under Section 8.0 (Residential) to read as follows:

.10 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "F"

6. The "Regional District of Okanagan-Similkameen, Electoral Area "F" Official Community Plan Bylaw No. 2790, 2018" is amended by:

i) adding a new Section 8.3.16 (Policies) under Section 8.0 (Resource Area) to read as follows:

.16 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 9.3.20 (Policies) under Section 9.0 (Agriculture) to read as follows:

.20 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 10.3.10 (Policies - General) under Section 10.0 (Rural Holdings) to read as follows:

.10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 11.3.13 (Policies – General Residential) under Section 11.0 (Residential) to read as follows:

.13 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "H"

7. The "Regional District of Okanagan-Similkameen, Electoral Area "H" Official Community Plan Bylaw No. 2497, 2012" is amended by:

i) adding a new Section 9.3.13 (Policies) under Section 9.0 (Resource Area) to read as follows and renumber all subsequent sections:

.13 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 10.3.19 (Policies) under Section 10.0 (Agriculture) to read as follows:

.19 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 11.3.11 (Policies) under Section 11.0 (Rural Holdings) to read as follows:

.11 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 12.3.9 (General Residential Policies) under Section 12.0 (Residential) to read as follows:

.9 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

Electoral Area "I"

8. The "Regional District of Okanagan-Similkameen, Electoral Area "I" Official Community Plan Bylaw No. 2683, 2016" is amended by:

i) adding a new Section 8.3.10 (Policies) under Section 8.0 (Resource Area) to read as follows:

.10 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

ii) adding a new Section 9.3.17 (Policies) under Section 9.0 (Agriculture) to read as follows and renumbering all subsequent sections:

.17 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iii) adding a new Section 10.3.12 (Policies - General) under Section 10.0 (Rural Holdings) to read as follows:

.12 Will consider "micro cannabis production facility" proposals on a case-by-case basis through a site specific zoning amendment process, and may use the following criteria to assess an application:

i) the parcel under application has an area not less than 2.0 hectares;

ii) the maximum size of the plant surface cultivation area is 200.0 m^2;

iii) confirmation is provided that adequate water and servicing is available to the site; and

iv) if the parcel of land that is the subject of an application adjoins a Low or Medium Density Residential zone, the micro cannabis production facility will be setback 60.0 metres from that zone boundary.

iv) adding a new Section 11.3.13 (Policies - General) under Section 11.0 (Residential) to read as follows:

.13 Does not support the development of "micro cannabis production facilities" on land designated Low Density Residential (LR) or Medium Density Residential (MR).

READ A FIRST AND SECOND TIME this _____ day of _____, 2020.

PUBLIC HEARING held on this _____ day of _____, 2020.

READ A THIRD TIME this _____ day of _____, 2020.

ADOPTED this __ day of ___, 2020.

_____ _____

Board Chair Corporate Officer

February 18, 2020

File No: X2019.005-ZONE

Regional District of Okanagan-Similkameen
101 Martin Street
Penticton, B.C. V2A 5J9
Via E-mail: **planning@rdos.bc.ca**

Re: Bylaw Referral – File No. X2019.005-ZONE (Cannabis)

Dear Christopher Garrish,

Thank you for providing the B.C. Ministry of Agriculture the opportunity to comment on the OCP bylaw amendment No.2858. We have reviewed the documentation you have provided. From an agricultural perspective we can offer the following comments:

- Ministry staff note that with this proposal:
  - a required site-specific rezoning for a micro cannabis production facility may place an additional burden on a potential agricultural operator, unlike for other agricultural sectors;
  - if any proposed micro processing cannabis facilities in the ALR through site-specific rezoning procedures as described are not approved by the Board, this may lead to a potential inconsistency with ALR Use Regulation section 8, which identifies certain conditions of cannabis production as a farm use in which local governments can not prohibit, and any accompanying issues.
- RDOS may wish to further consider allowing micro processing cannabis facilities on the ALR, through their zoning bylaw, and consistent with the *ALC Act*, to provide a lesser burden for the interested ALR agricultural operator.

If you have any questions, please contact me directly at christina.forbes@gov.bc.ca or (250) 861-7201.

Sincerely,

Christina Forbes, P.Ag
Regional Agrologist
B.C. Ministry of Agriculture – Kelowna
Office: (250) 861-7201
E-mail: christina.forbes@gov.bc.ca

Gregory Bartle
Land Use Planner
B.C. Ministry of Agriculture
Phone: (778) 974-3836
Email: Gregory.Bartle@gov.bc.ca

Email copy: Sara Huber, ALC Regional Planner, Sara.Huber@gov.bc.ca

Interior Health
Every person matters

Feburary 28, 2020

Regional District of Okanagan-Similkameen
101 Martin Street,
Penticton, BC, V2A-5J9

RE: File No. X2019.005-ZONE; Bylaw: 2858

Thank you for the opportunity to provide a health perspective regarding the above referenced application. It is our understanding that the proposed OCP amendments identify site specific rezoning criteria for micro cannabis production facilities. We have reviewed the application with a Healthy Communities Development lens. The following comments are noted and should be given consideration regarding the amendments:

Drinking Water Supply:
The water supply system that services the facility may be subject to the approval and permitting requirements of the BC Drinking Water Protection Act and Regulation.

Waste Water Disposal:
Domestic Sewage includes washroom, food preparation, dishwashing and showering waste. This falls under the BC Sewerage System Regulation and is enforced by Interior Health. Waste water generated by these facilities may not be considered "domestic sewage." Industrial Waste is managed by the Ministry of Environment, under the Environmental Waste Management Act, Municipal Sewage Regulation.

Location:
Industrial operations are expected to follow best practices for protecting the environment and public health. Best practices, however, may not be adequate to contain all odors from the operation. As such, proximity and impact on adjacent land uses need to be considered:

- proximity to residences and schools;
- the size and configuration of the property, including access to the property;
- proposed scale of the production facility and accessory usage;
- potential noise, glare and vibration issues;
- air quality – prevailing winds, ventilation, odors.

Agricultural Land:
Consider food security when cannabis production is a proposed use for agricultural land. Cannabis production does not support food security. While soil based cannabis production does not contribute to food security, the land is available for when food production will be needed in the future (should the cannabis production not render the land incapable of food production). Construction of indoor cannabis growing facilities contributes to the loss of agriculture land for future food production.

Farmland preservation helps to maintain a level of food production that contributes to food self-sufficiency, and food self-sufficiency supports healthy eating.

Bus: 250-469-7070 x12287
tanya.osborne@interiorhealth.ca
www.interiorhealth.ca

POPULATION HEALTH
505 Doyle Avenue
Kelowna BC V1Y 0C5

Food self-sufficiency in BC is increasingly important as extreme weather will affect production in California, which is currently where 40%–50% of BC's supply of fruits and vegetables comes from.

The legalization of cannabis presents both an opportunity and challenge for local governments in the development of healthy, vibrant communities. Interior Health – Healthy Communities welcomes the opportunity to collaborate with the Regional District of Okanagan-Similkameen around education and awareness efforts.

Thank you for the opportunity to comment on this application. If you have any questions or concerns, please feel free to contact me at 250-469-7070 x12287.

Sincerely,

Tanya Osborne, BAHS
Community Health Facilitator
Healthy Communities
Interior Health Authority

Feedback Form

Regional District of Okanagan Similkameen
101 Martin Street, Penticton, BC, V2A-5J9
Tel: 250-492-0237 / Email: planning@rdos.bc.ca

TO: Regional District of Okanagan Similkameen **FILE NO.:** X2019.005-ZONE

FROM: Name: Adam Sexsmith
(please print)

Street Address: [redacted]

RE: **Proposed Electoral Area Official Community Plan Amendment Bylaw No. 2858**
Micro Cannabis Production Facility Policies

My comments / concerns are:

- [x] I do support the proposed textual amendments to the OCP bylaws.
- [x] I do support the proposed textual amendments to the OCP bylaws, subject to the comments listed below.
- [ ] I do not support the proposed textual amendments to the OCP bylaws.

Written submissions received from this information meeting will be considered by the Regional District Board prior to 1st reading of Amendment Bylaw No. 2858.

I support the amendments for micro cultivation and processing for ALR land. Although I agree that post-harvest activities like Drying, curing, Storage, packaging, and extraction be inside a building or structure, I would respectfully like to strongly suggest that outdoor cultivation or temporary structures be used for cultivation ie: hoop houses(in a secured area)to be able to utilize the natural sun and be able to keep costs of operations down. The LPs are making deals at 50cent per gram and micro cultivatorsust be able to produce for approximately 10cents per gram to be able to compete.

To combat imminent commoditization of raw product materials, please strongly consider not forcing these into bunkers or warehouse type operations.
Thank you very much for your time and consideration moving forward to help ensure a successful model.

Feedback Forms must be completed and returned to the Regional District no later than **March 6, 2020**

ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 5, 2020

RE: Development Variance Permit Application — Electoral Area "H"

Administrative Recommendation:

THAT the Board of Directors approve Development Variance Permit No. H2019.038–DVP.

Purpose:	To formalise an existing carport.		
Owners:	Mark & Susan Dixon	Agent: N/A	Folio: H-01216.000
Civic:	2970 Allison Lake Road	Legal: Lot 14, Plan KAP11484, District Lot 2697, KDYD	
OCP:	Low Density Residential (LR)	Zone: Residential Single Family One Zone (RS1)	
Variance Request:	to reduce the front parcel line from 7.5 metres to 4.22 metres; and to reduce the interior side parcel line from 1.0 metres to 0.63 metres.		

Proposed Development:

This application is seeking a variance to reduce the front parcel line setback and interior side parcel line setback, in order to formalize an existing carport affixed to a detached garage.

Specifically, it is proposed to reduce the front parcel line setback from 7.5 metres to 4.22 metres and to reduce the interior side parcel line setback from 1.0 metres to 0.63 metres.

In support of this request, the applicant has stated, amongst other things, that the variance is an "efficient solution to our concerns about directing water runoff, safety, maximum use of space and appearance from the road …"

Site Context:

The subject property is approximately 1,695 m^2 in area and is situated on the west side of Alison Lake Road. The property is currently developed and contains a cabin, a detached garage and the subject carport.

The surrounding pattern of development is characterised by low density rural residential properties and is bounded to the west by Alison Lake.

Background:

The subject property was created by a plan of subdivision that was deposited with the Land Registry office at Kamloops on May 18, 1961. Available Regional District records indicate that building permits have been issued for additions to a cabin and construction of a detached garage. Enforcement records indicate that a stop work order has been issued for the carport.

Under Electoral Area "H" Official Community Plan No. 2497, 2012, the subject property is designated as Low Density Residential (LR) and a portion of the property is the subject of a Watercourse Development Permit (WDP) Area designation.

Under the Electoral Area "H" Zoning Bylaw No. 2498, 2012, the property is zoned as Residential Single Family One (RS1), which allows for accessory buildings and structures as a secondary use.

Accessory buildings and structures are subject to regulations in Section 7.12 of the Electoral "H" Zoning Bylaw. Specifically, accessory buildings and structures are required to have a minimum front parcel line setback of 7.5 meters, and a minimum interior side parcel line setback of 1.0 meters. The existing carport has been constructed 4.22 metres from the front parcel line, and 0.63 metres from the interior side parcel line.

The subject property has been assessed as "Residential" (Class 01).

Public Process:

Adjacent property owners will have received notification of this application with written comments regarding the proposal being accepted until the commencement of the regular Board meeting. Any comments will be on the agenda as separate item.

At its meeting of February 18, 2020, the Electoral Area "H" Advisory Planning Commission (APC) resolved to recommend to the RDOS Board that the requested variance be approved.

Analysis:

The purpose of minimum setbacks is to provide a physical separation between the road and a building to manage traffic and pedestrian safety, maintain an attractive streetscape, mitigate overshadowing or loss of privacy of neighbouring properties, encourage open and landscaped areas along roadways, and contain development impacts on the property.

In considering this proposal, Administration notes the site's topography, namely a steep downward slope from Alison Lake Road. The visual impact of the carport from the roadway has been largely mitigated by this significant grade separation. In addition, the existing setback area still provides sufficient room for gardening/landscaping, which has been installed between the carport and roadway. As such, the frontyard setback variance is not seen to have any demonstratable negative impacts on the streetscape, on traffic and pedestrian safety, nor does it lead to any loss of privacy for neighbouring properties.

The proposed side yard setback represents a 0.37 metre variance to the neighbouring property. The impact of this the interior side yard setback variance does not appear to have any demonstrable negative impacts on the neighbouring property, such as overshadowing another building or loss of privacy.

Conversely, the proposed variance appears to unneccessarily encroach into the side yard setback area. While the adjacent garage and it's length appear to meet the Zoning Bylaw's 1.0 meter setback requirement for accessory structures, the carport extends an additional 2.1 meters further toward the neighbouring property than the garage, calling into question that particular design choice.

However, for the reasons stated above, Administration supports the variance request.

Alternatives:

.1 THAT the Board of Directors deny Development Variance Permit No. H2019.038–DVP; or

.2 THAT the Board of Directors defers making a decision and directs that the proposal be considered by the Electoral Area "H" Advisory Planning Commission (APC).

Respectfully submitted	**Endorsed by**:	**Endorsed by**:
Cory Labrecque		
C. Labrecque, Planner II	C. Garrish, Planning Manager	B. Dollevoet, G.M. of Dev. Services

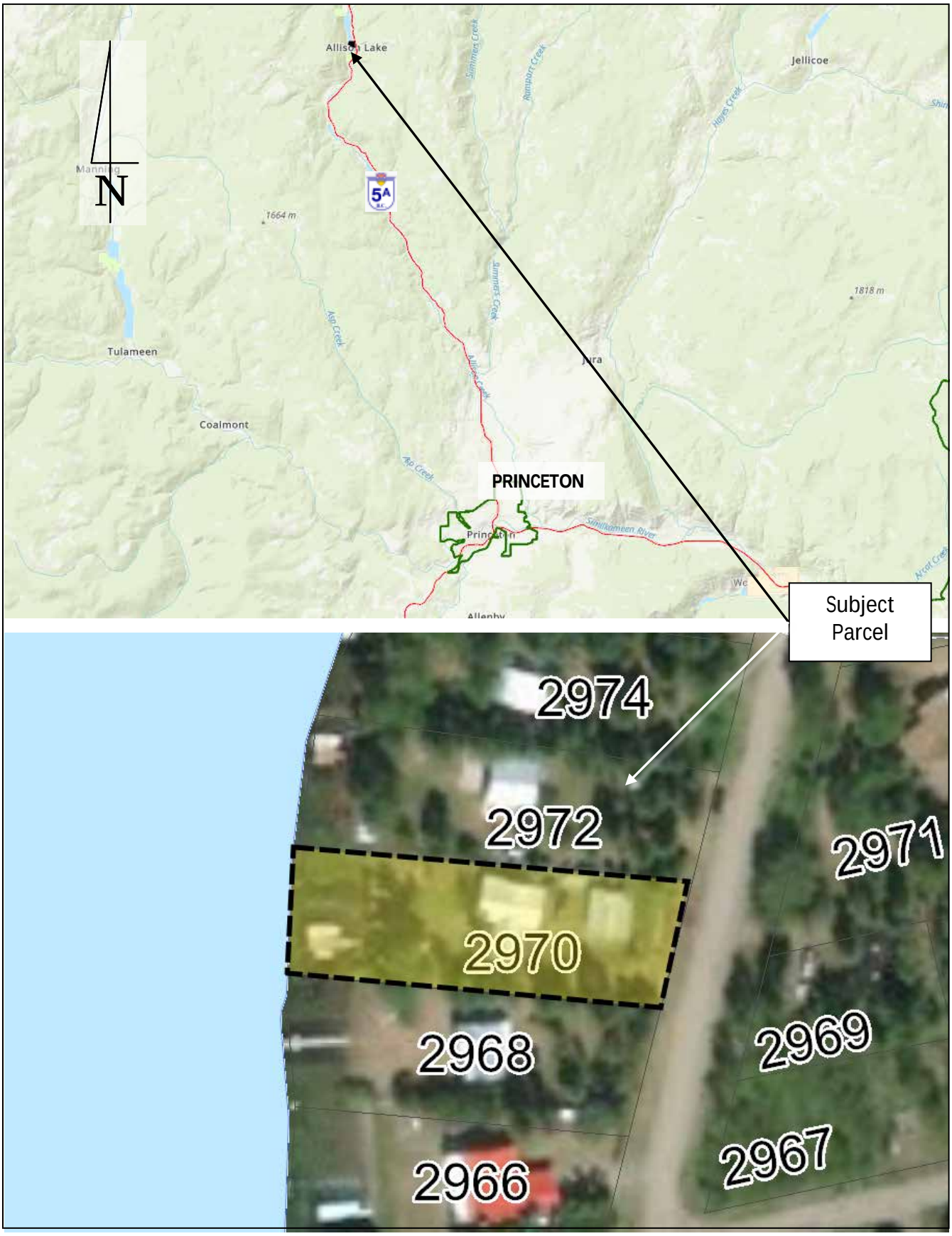
Attachments: No. 1 – Context Map

No. 2 – Applicant's Site Plan

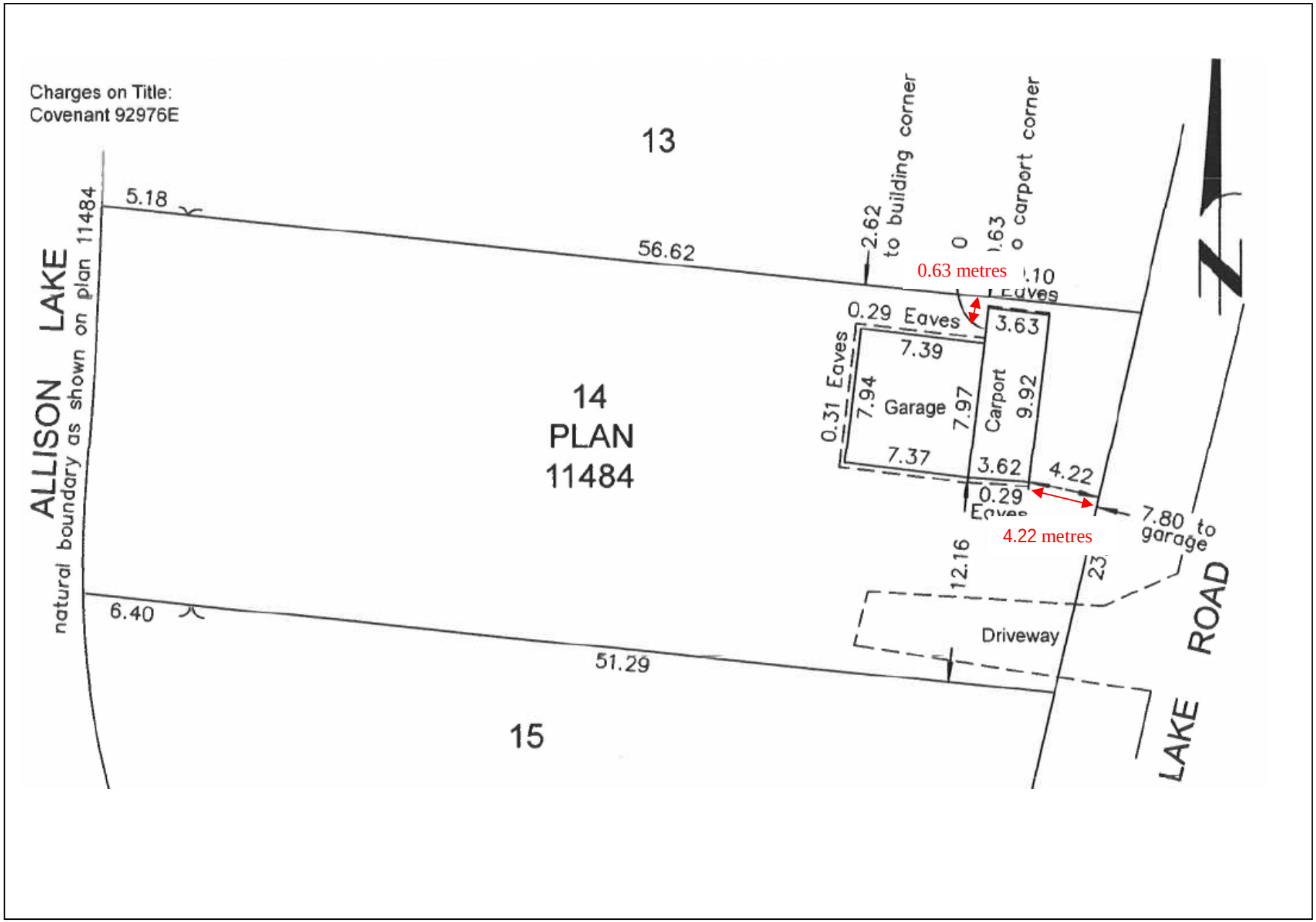
No. 3 – Applicant's Building Elevation (West)

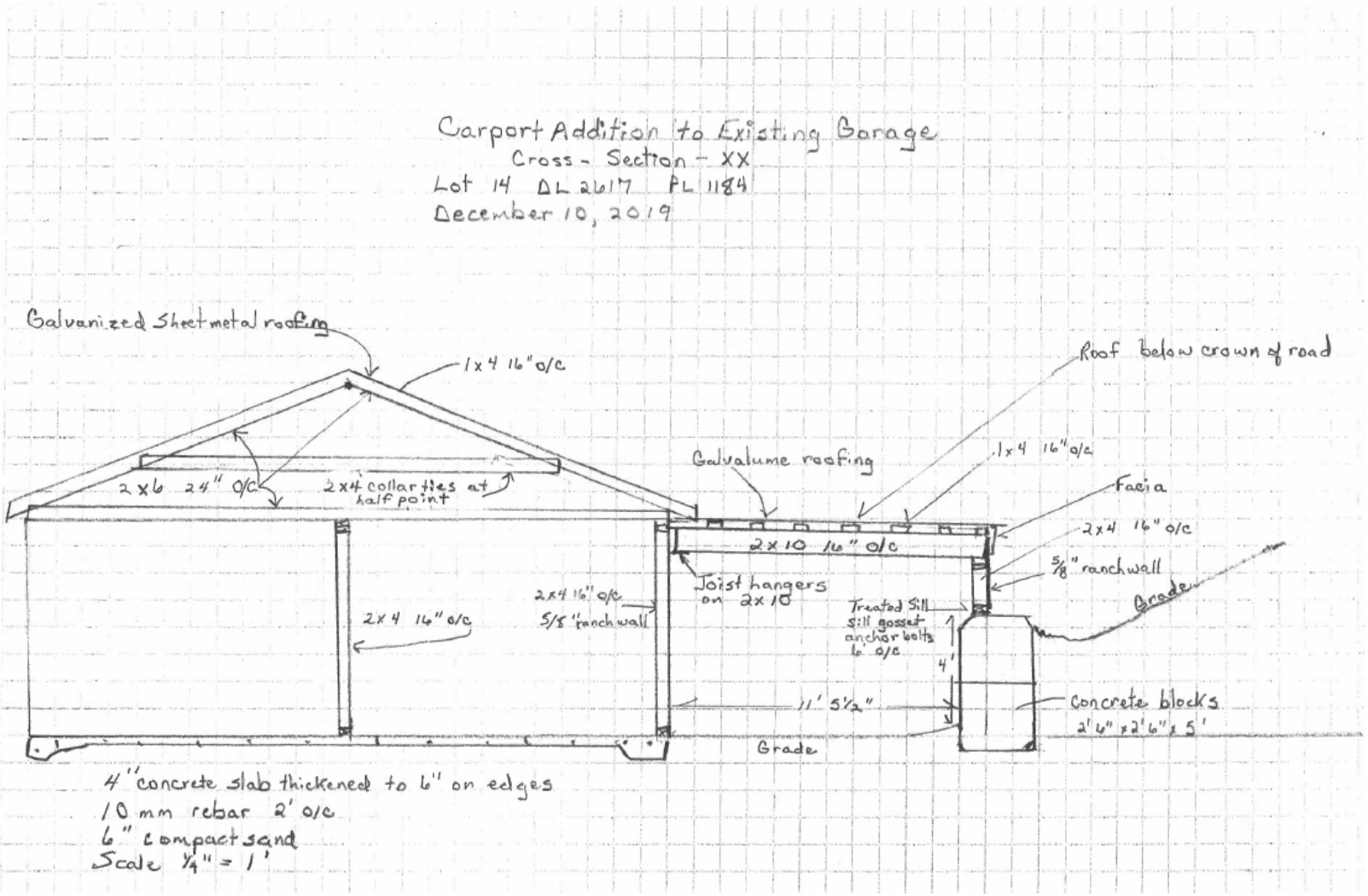
No. 4 – Photo of Carport

Attachment No. 1 – Context Maps



Attachment No. 2 – Applicant's Site Plan (1)




Carport Addition to Existing Garage
Cross - Section - XX
Lot 14 DL 2617 PL 1184
December 10, 2019
Galvanized Sheetmetal roofing
1x4 16" o/c
Roof below crown of road
Galvalume roofing
1x4 16" o/c
2x6 24" o/c
2x4 collar ties at half point
Facia
2x4 16" o/c
2x10 16" o/c
5/8" ranch wall
Joist hangers on 2x10
2x4 16" o/c
5/8" ranch wall
2x4 16" o/c
Treated Sill
Sill gasset anchor bolts 6' o/c
Grade
4'
11' 5½"
Concrete blocks
2'6" x 2'6" x 5'
Grade
4" concrete slab thickened to 6" on edges
10 mm rebar 2' o/c
6" compact sand
Scale ¼" = 1'

Attachment No. 4 – Photo of Carport

Development Variance Permit

FILE NO.: H2019.038-DVP

Owner: Mark & Susan Dixon
1120 Burgess Way
Kamloops, BC, V15 1S9

Agent: N/A

GENERAL CONDITIONS

1. This Development Variance Permit is issued subject to compliance with all of the bylaws of the Regional District of Okanagan-Similkameen applicable thereto, except as specifically varied or supplemented by this Permit.
2. The land described shall be developed strictly in accordance with the terms and conditions and provisions of this Permit, and any plans and specifications attached to this Permit that shall form a part thereof.
3. Where there is a conflict between the text of the permit and permit drawings or figures, the drawings or figures shall govern the matter.
4. This Development Variance Permit is not a Building Permit.

APPLICABILITY

5. This Development Variance Permit is substantially in accordance with Schedules 'A', 'B', and 'C', and applies to and only to those lands within the Regional District described below, and any and all buildings, structures and other development thereon:

   Legal Description: Lot 14, Plan KAP11484, District Lot 2697, KDYD

   Civic Address: 2970 Allison Lake Road

   Parcel Identifier (PID): 009-513-965 Folio: H-01216.000

CONDITIONS OF DEVELOPMENT

6. The land specified in Section 5 may be developed in accordance with the following variances to the Electoral Area "H" Zoning Bylaw No. 2498, 2012, in the Regional District of Okanagan-Similkameen:

   a) the front parcel line, as prescribed in Section 12.1.5 b) i), is varied:

      i) from: 7.5 metres

         to: 4.22 metres

b) the interior side parcel line, as prescribed in Section 12.1.5 b) iii), is varied:

i) from: 1.0 metres

to: 0.63 metres

COVENANT REQUIREMENTS

7. Not Applicable

SECURITY REQUIREMENTS

8. Not applicable

EXPIRY OF PERMIT

9. The development shall be carried out according to the following schedule:

a) In accordance with Section 504 of the *Local Government Act* and subject to the terms of the permit, if the holder of this permit does not substantially start any construction with respect to which the permit was issued within two (2) years after the date it was issued, the permit lapses.

b) Lapsed permits cannot be renewed; however, an application for a new development permit can be submitted.

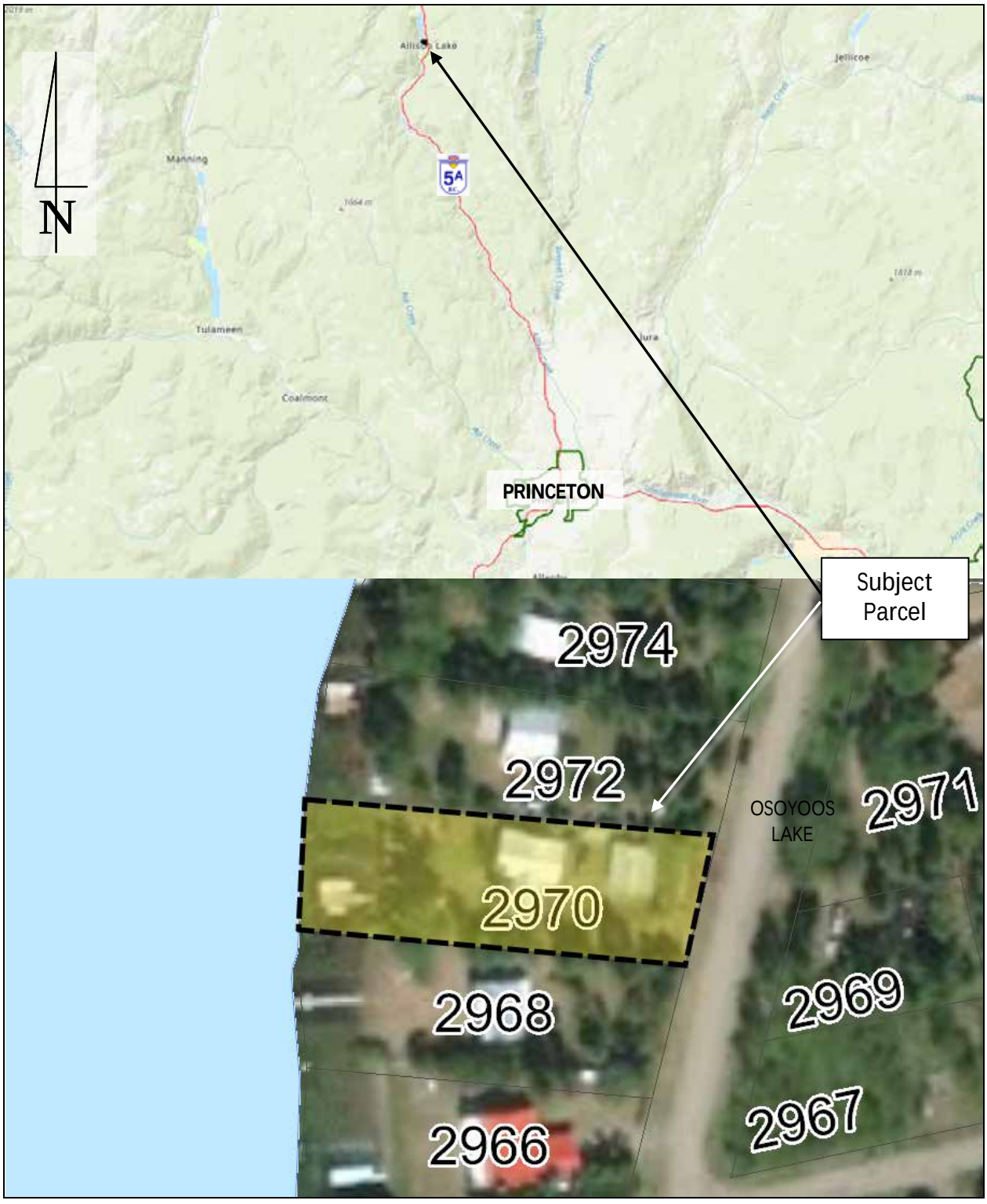
Authorising resolution passed by the Regional Board on _____, 20XX.

_____

B. Newell, Chief Administrative Officer

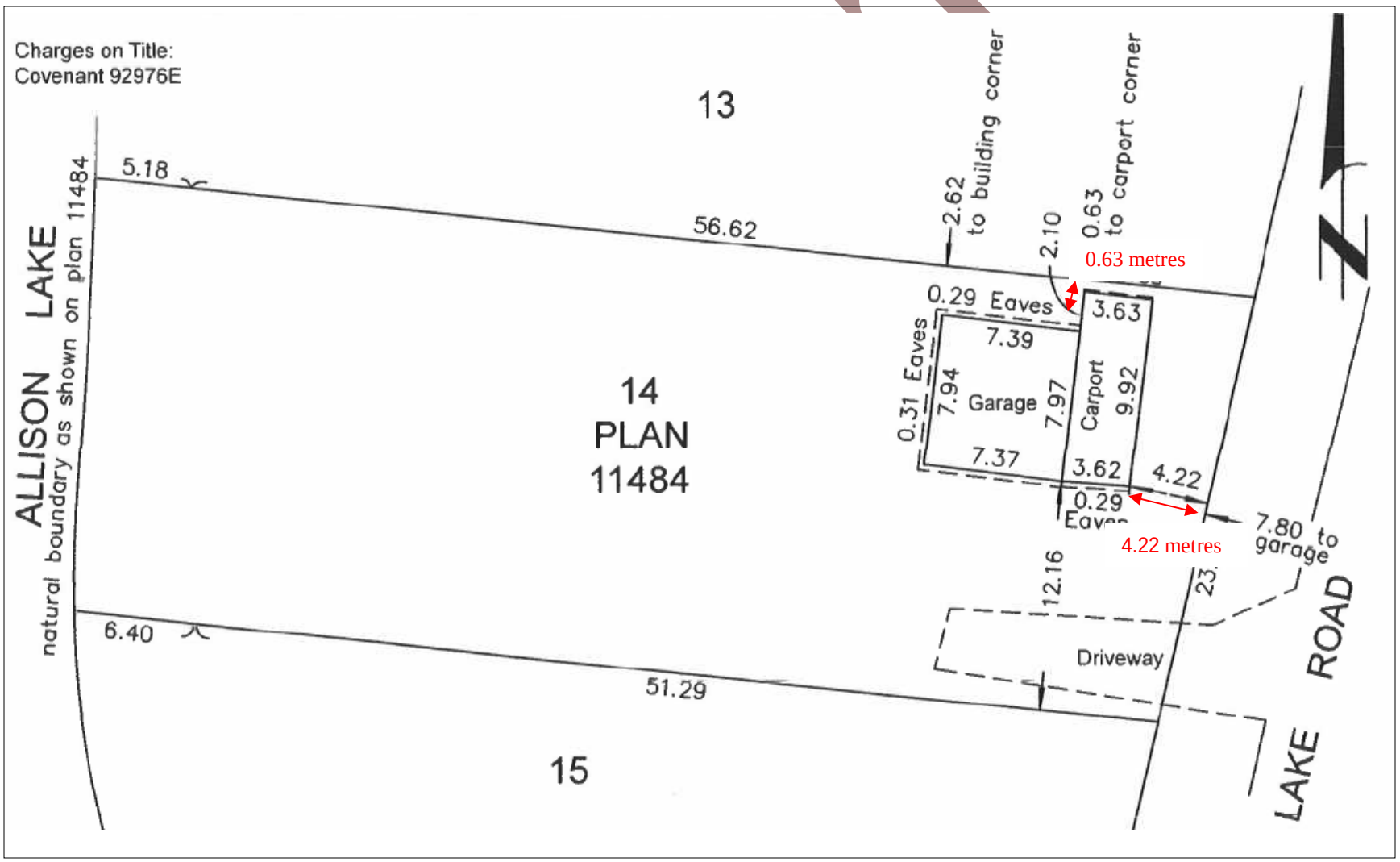
Regional District of Okanagan-Similkameen
101 Martin St, Penticton, BC, V2A-5J9
Tel: 250-492-0237 Email: planning@rdos.bc.ca

Schedule 'A'



Development Variace Permit File No. H2019.038-DVP

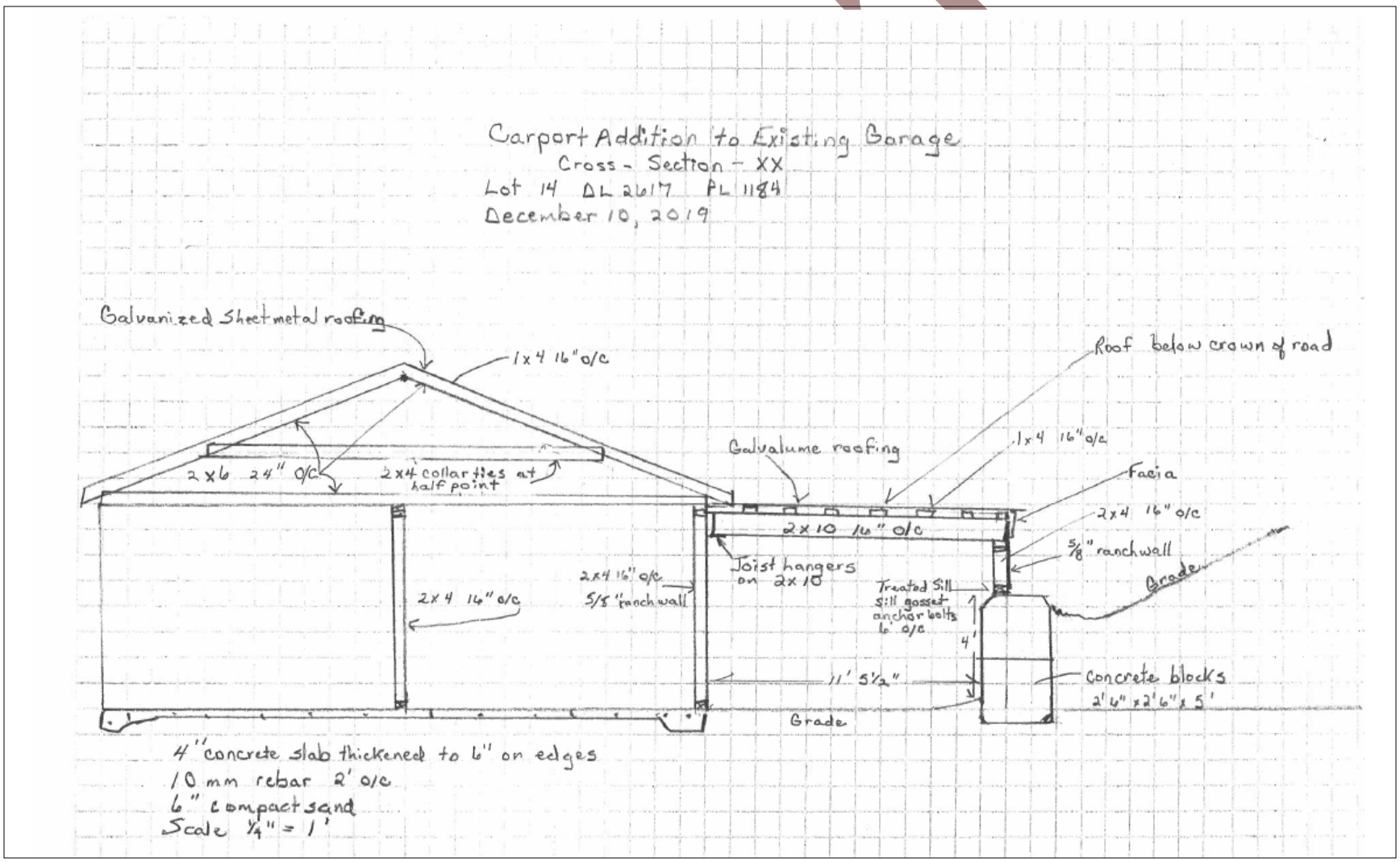
Schedule 'B'



Development Variace Permit

File No. H2019.038-DVP

Schedule 'C'



Marty Vanderhelm
18229 21a Ave.
Surrey V3Z 9W2

February 27 2020

The Board of Directors
Regional District of Okanagan/Similkameen

Re RDOS File: H2019.038-dvp

Directors,

I support the Variance request put forward by this land owner. And encourage the board to approve the application.

Further to this variance application and given the number of similar variances that have been granted over the years. I would encourage the board to initiate a review of the current property setbacks with the view to setting the setbacks so as to be in line with numerous already granted variances. Thus, negating the need for this unnecessary and expensive bureaucratic variance process.

Marty Vanderhelm
Chairman
Allison Lake Improvement District

March 10th, 2020

Attention: RDOS Board of Directors, Cory Labrecque Planner II

Re: Development Variance Permit (DVP) Application No. H2019.038-DVP
2970 Allison Lake Road (Lot 14, Plan KAP11484, District Lot 2697 DKYD)

We are submitting this representation in order to state that we do not support the application regarding this development variance permit for the following reasons:

1) Following careful research consideration and review of existing setback parameters as stated in RDOS documents we are of the opinion that existing requirements are indeed fair and reasonable and should not be altered nor changed in any manner as they safeguard and protect the integrity of our rural/recreational properties.
2) In the RDOS letter dated February 7th, 2020 it states that these variances are being sought in order to formalize an existing carport. In fact, this addition was planned and constructed very recently in what would appear to be a full violation of existing setback bylaws and was constructed to the best of our knowledge without the issuance of a proper permit.
3) To state our point more clearly, this development variance permit is being sought after and requested after the fact and should not be granted on this basis alone.
4) The granting of such a variance potentially will establish a dangerous precedent, therefore compromising the integrity and intent of existing bylaws. Such actions may potentially negatively affect other land owners, future development potential and overall financial investment.
5) From our observation, in the last number of years there appears to be an increasing willingness and intent among certain owners/residents to proceed with their own development agenda with little or no consideration of the existing rural character and existing guidelines.

In conclusion, we are not opposed to the improvement of properties within the Allison Lake Community such as cabin maintenance and updating of existing structures and outbuildings providing that such development proceeds in a consistent and equitable manner, protecting the rights and interests of all residents.

Respectfully,

Richard and Debbie Coulombe
2971 Allison Lake Road

ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 19, 2020

RE: Request for resolution of support for Substituted Requirements Application under the Landfill Gas Management Regulation

Administrative Recommendation:
THAT the Regional District submit a Substituted Requirements Application under the Landfill Gas Management Regulation to the Ministry of Environment and Climate Change Strategy to permit the use of Biocover at the Campbell Mountain Landfill.

Purpose:
To obtain a formal Board Resolution supporting the Substituted Requirements Application under the Landfill Gas Management Regulation for the use of biocover as a methane mitigation strategy instead of the installation of an active gas capture system.

Reference:
Landfill Gas Management Regulation, December 2008
Attachments to this report:

- **Substituted Requirements Application**
- **Campbell Mountain Landfill Biocover Pilot Study (Final Report – Rev.03)**, August 2019 by Sperling Hansen Associates

Background:

The BC Landfill Gas Management Regulation (LGMR) requires that all regulated landfill sites conduct a landfill gas assessment. The assessments for the Campbell Mountain Landfill (CML), indicated the landfill was above the regulated threshold for annual methane production. As CML exceeds the threshold, the LGMR requires that the landfill implement a landfill gas capture system or alternatively, apply to Ministry of Environment and Climate Change Strategy (MOE) under Substituted Requirements for using biocover.

In July 2014 the RDOS commissioned Sperling Hansen Associates (SHA) to physically measure actual methane emissions at the CML using surface scanning and measuring techniques. SHA concluded that the total methane emissions from the landfill are estimated to be well below the threshold level calculated by the LGMR model. The RDOS investigated options for installing an active gas system or using biocover to manage the methane emissions from CML. SHA determined that a landfill biocover, along with organics diversion, would be more cost effective and ultimately reduce total methane generated in the buried waste.

In late 2016, the MOE advised the Regional District could proceed with a biocover pilot study however they would be expecting results to show significant methane reductions. Plans were immediately developed and implemented in the spring of 2017 by the installation of four test plots. Three of the test plots had a different mix of biosolids, wood chips and sand, while the fourth was the empty control plot. Biosolids were used from the City of Penticton's facility as well as the MetroVancouver's Iona Island facility. Measurements were taken of the methane emissions along the surface of the test plots six times between April 2017, when the plots were installed, and May 2018.

Analysis:
The Sperling Hansen Associates Final report details all the methods and procedures used in the pilot project. The report details the methane removal efficiencies from each of the measuring events at the CML biocover plots. In general, the results indicate that the use of biocover is significantly more effective at eliminating methane emissions than an active gas collection system would be at CML. The biocover was shown to have average removal efficiencies values as high as 77-83%, while the active gas collection system used as a comparison achieved just over 60% removal.

At this time, the final report and outstanding questions from the MOE have been addressed, so the substituted requirements application is ready to move forward into the formal application process. The application process requires the formal approval of the Regional District Board.

Alternative:
The Board may choose to not provide support for the substituted requirements application.

Respectfully submitted:

Liisa Bloomfield

_____

L.Bloomfield, Manager of Engineering

ENVIRONMENTAL PROTECTION NOTICE

Application to Substitute a Requirement in the Landfill Gas Management Regulation under the *Environmental Management Act*

Waste Discharge Authorization for Campbell Mountain Landfill: Operating Certificate 15274

Regional District of Okanagan-Similkameen (RDOS) of 101 Martin Street, Penticton, British Columbia V2A5J9, is applying to the Director, *Environmental Management Act* to substitute a requirement in the Landfill Gas Management Regulation (Regulation) as it applies to a landfill site located at 1765 Reservoir Rd, Penticton, British Columbia V2A 8T3.

This application asks the Director to make the following substitution(s):

Section of the Regulation	**Current Requirement in the Regulation**	**Requested substitution**
Section 9(1) of the Landfill Gas Management Regulation	*The owner or operator of a landfill site must ensure that landfill gas collected at the landfill site is flared in accordance with the guidelines unless the landfill gas is used for a purpose and in a manner that reduces emissions of methane to the atmosphere in an amount equivalent to the reduction that would be achieved by flaring the landfill gas*	RDOS proposes to install an engineered Biocover system as an alternative approach for reducing emissions of methane to the atmosphere in an amount equivalent to or exceeding the reduction that would be achieved by active landfill gas collection and flaring

The intent of the Regulation will be met by:

An engineered Biocover system using an optimized blend of materials, as determined during the 1.5 year pilot study, is a viable option for significantly mitigating methane emissions from Campbell Mountain Landfill. The pilot study completed at the landfill showed removal efficiencies as high as 97% with averages for the optimized blend design ranging from 77% to 83% removal efficiencies. Additionally, taking into account that the Campbell Mountain Landfill is situated over a highly fractured metamorphic bedrock, installation of an active landfill gas collection system would increase the risk of creating negative air pressures within the landfill thereby drawing air into the buried refuse which could lead to initiation of a deep-seated landfill fire.

A copy of the substitution application may be viewed during normal business hours at the Regional District office located at 101 Martin Street in Penticton. Hours: 8:30 AM to 4:30 PM

Any person who may be adversely affected by the proposed substitution and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the Regional District by the Contact Person listed below, with a copy to the Director, Environmental Protection at Authorization.South@gov.bc.ca

The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Date: March 20, 2020.

Signature _____

Contact Person Liisa Bloomfield, Manager of Engineering

Email: LBloomfield@rdos.bc.ca

Additional Information for an Application to Substitute a Requirement in the Regulation

Until such time as the Director has made a decision on this application, full compliance with any current authorizations and all the requirements of the Regulation is required.

1.	Applicant Information	
a.	Name (registered company name, partnership or individual)	Regional District of Okanagan-Similkameen
b.	Registered Address, City and Postal Code	101 Martin Street, Penticton BC, V2A 5J9
c.	Phone number	250-492-0237

2.	Contact Person	
a.	Name	Liisa Bloomfield
b.	Title/Position	Manager of Engineering
c.	Mailing Address	101 Martin Street, Penticton BC V2A 5J9
d.	Email Address	Lbloomfield@rdos.bc.ca
e.	Telephone number	250-490-4229
f.	Fax number	250-492-0063

3.	Background Information	
	Current registration number	Operational Certificate 15274
	Type of waste	Municipal solid waste and recyclable materials
	Location of facility	1765 Reservoir Rd, Penticton, BC V2A 8T3 (approximate 5 km northeast of Penticton)

4.	Substitution Request
	RDOS would like to utilize an engineered Biocover system for reducing methane emissions from Campbell Mountain Landfill. Regular monitoring of the Biocover system's effectiveness and annual reporting of the system performance is proposed and detailed out in provided supporting documents.

5.	Rationale for substitution
a.	In summary, the reasons for the application for the substitution are (list all): · Campbell Mountain Landfill has historically experienced landfill fires caused by air intrusion through the naturally existing underlying fractured bedrock. An active

	landfill gas collection system would create negative air pressure within the landfill which could lead to reoccurring of a deep-seated landfill fire at this site causing concerns about safety of RDOS staff and public, putting the surrounding environment at risk and impacting landfill's operations. · Biological oxidation of methane is a risk-free and viable option for mitigation of methane emissions from Campbell Mountain Landfill. · A comprehensive field study at the Campbell Mountain Landfill concluded average methane emissions reduction of 77% to 83% can be achieved by an engineered Biocover system. These GHG reductions exceed efficiencies of an active landfill gas collection and flaring system. · Significant advances in landfill emissions monitoring allow for precise monitoring of Biocover systems effectiveness, quantification and reporting of methane emissions reduction. · Lessons learnt from the implementation of a full scale Biocover pilot project at the Campbell Mountain Landfill conclusively demonstrated that biocover is effective at controlling fugitive methane emissions. After demonstrating its effectiveness long term at RDOS, the methodology could be applied at smaller landfill sites across the province to significantly reduce the levels of GHG emissions from these facilities and B.C.'s Carbon footprint.
b.	Then intent of the Regulation will be met with the proposed change(s) because: · Significant and quantifiable GHG emissions reductions meeting provincial targets will be achieved by the proposed Biocover system.
c.	The public and the environment will be protected with the proposed substitution to the Regulation because: · The use of a Biocover system is an effective natural biological solution to removing methane from entering the atmosphere from the landfilled surface. · Risk of a reoccurring landfill fire at Campbell Mountain Landfill caused by an active landfill gas collection system will be eliminated by the proposed substitution
d.	Additional information supporting the substitution is attached separately. This may include: · Sperling Hansen Associates (SHA) Report Dated August 2019 *"Campbell Mountain Landfill Biocover Pilot Study (Final Report – Rev.03)"*, · Third Party Qualified Professional Opinion on SHA's Pilot Study Report Dated July 2019, · Follow up SHA communications dated November 08, 2019 as complementary to SHA's final report, *"Campbell Mountain Landfill Biocover Pilot Study (Final Report – Rev.03)*,

6.	Publication and Notification	
a.	Date application was posted at all main entrances to the site	
b.	Date and name of newspapers where notice of application was published	

c.	If the Director required you to serve a copy of the application on individual(s) potentially impacted by the substitution application, please list the names, mailing addresses and the dates that they were served. Attach separate page if necessary.	
d.	If the Director required you to post a copy of the application at a branch post office of Canada Post Corporation, please indicate the date and location this posting occurred.	
e.	If additional consultation for the proposed substitution occurred, list dates and events. Summarize concerns and resolutions if applicable. Attach separate page if necessary.	

Form completed by:

Signature _____ Print Name: Liisa Bloomfield

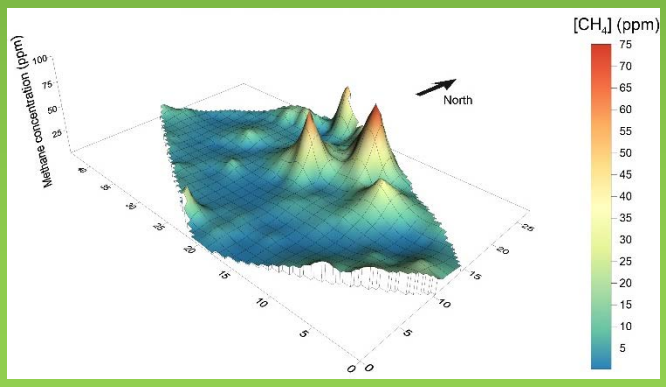
Title Manager of Engineering Dated: April 2020

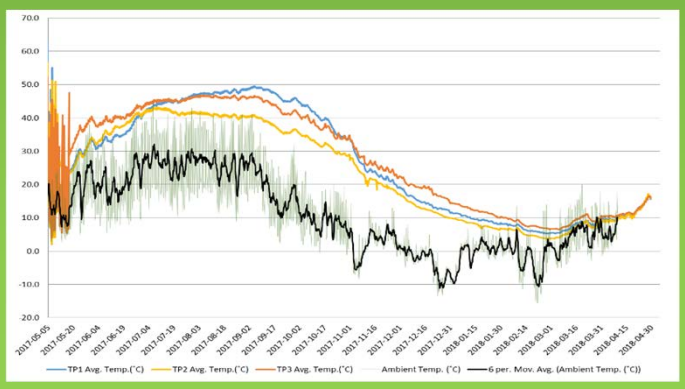
Email this application form to:

Director, Environmental Management Act

Authorization.South@gov.bc.ca

Campbell Mountain Landfill
Biocover Pilot Study
(Final Report – Rev.03)





PREPARED FOR: REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

PREPARED BY: SPERLING HANSEN ASSOCIATES

PRJ19024

August 2019

The preparation of this report was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

SPERLING
HANSEN
ASSOCIATES

• Landfill Engineering
• Solid Waste Planning
• Environmental Monitoring
• Landfill Fire Control

August 23, 2019 PRJ19024

Ms. Liisa Bloomfield, P.Eng.
Manager of Engineering
Regional District of Okanagan-Similkameen
101 Martin Street, Penticton
BC, V2A 5J9

Dear Ms. Bloomfield,

Re: Campbell Mountain Landfill Biocover Pilot Study – Final Report Rev.03

Sperling Hansen Associates (SHA) is pleased to submit the final report for the *Campbell Mountain Landfill Biocover Pilot Study*. This revision of the report includes additional information that were requested by the ENV, RDOS and 3rd party reviewer.

Our investigations and analyses showed that for the relatively arid climate in Penticton, managing fugitive methane emissions by a well-designed biocover system is much more efficient, cost effective and a safer approach in comparison to an active LFG management system. Results of this pilot study and analyses showed that focusing RDOS's available solid waste management budgets on organics diversion initiatives would result in reduced overall GHG impacts when considering the resulting methane generation avoidance. Diverting organics away from the landfill in addition to progressive implementation of a biocover system would further reduce the potential GHG generation from the Campbell Mountain Landfill, exceeding the GHG emissions reduction goals of the ENV LFG regulation.

Please find It has been a real pleasure working with you on this project. Should you have any questions or concerns, please don't hesitate to contact us.

Yours truly,

SPERLING HANSEN ASSOCIATES

Dr. Ali R. Abedini
Senior Environmental Consultant
Landfill Gas Specialist

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1. INTRODUCTION

1.1 Background

The Regional District of Okanagan-Similkameen (RDOS) is committed to develop a landfill gas (LFG) management strategy for Campbell Mountain Landfill (CML). Based on estimations using the British Columbia (BC) Ministry of Environment (ENV) LFG generation model (ENV Model, a.k.s. MOE Tool), methane (CH_4) generation rate at this landfill is higher than the ENV LFG regulatory threshold of 1,000 of CH_4 per year. Therefore, the fundamental basis for developing an LFG management strategy for CML is to achieve effective control of the fugitive CH_4 emissions from CML that would result in a minimum of 75% reduction in potential greenhouse gas (GHG) emissions from this site. Two technically feasible options for the CML site are:

(i) progressive installation of a geo-membrane cap and an active LFG collection and flare system,
(ii) progressive placement of a soil barrier along with an engineered biocover system.

Use of engineered biocover systems to reduce fugitive CH_4 emissions from landfills is an emerging GHG mitigation technology. Biocover systems, fabricated using organic residuals such as bio-solids and compost, can have ideal physicochemical properties that stimulate the growth of methanotrophic bacteria that consume CH_4 and produce carbon dioxide; a less potent GHG. Reduction of CH_4 emissions in landfill systems using biocover initiatives provides direct benefits including:

- reducing the landfill carbon footprint by application of biocover as intermediate and final closure systems,
- providing an opportunity to recycle organic residuals and inert materials (e.g. construction and demolition wood waste, organic wastes and bio-solids).

In order to reduce the GHG emissions from CML, the RDOS is investigating options for implementing an organic waste diversion program as initially discussed in their 2010 Solid Waste Management Plan. The idea is to focus their resources on waste reduction and diversion efforts and would prefer to use a fabricated biocover at CML to oxidize any residual CH_4 emitting to the atmosphere.

RDOS, in collaboration with Metro Vancouver (MV) and SHA conducted this pilot study. The results and findings of this pilot program will be presented to the ENV in support of this alternative approach to implementing an active LFG collection system at CML. Specific scope of this pilot study was to evaluate the effectiveness of a fabricated biocover system throughout the year in comparison with performance of an active gas collection system in a landfill site with similar conditions.

1.2 Biocover Systems

A landfill biocover is a porous medium in which biological activity is significant enough to reduce CH_4 concentrations appreciably before LFG reaches the atmosphere.

Research on the oxidation of CH_4 in landfill cover soils including compost materials has been conducted for more than 15 years. There have been numerous laboratory and field studies quantifying processes controlling CH_4 oxidation, and these are well understood. Several studies have been completed and some still ongoing to address questions such as:

- What is the long-term performance of biocover systems in terms of reducing fugitive CH_4 emission?
- What are the key design parameters and how can they be determined for specific landfill condition?
- What are the desirable geotechnical properties of a biocover system regarding its erosion, infiltration of atmospheric precipitation and performance when subject to freeze and thaw cycles and other environmental conditions?
- What are the specific methods for monitoring biocover performance in terms of reducing fugitive CH_4?

Naturally occurring biocovers have been around for a long time. Whalen, et al., (1990) was arguably the first study to acknowledge CH_4 oxidation in soils covering landfills. By definition, biocover medium should support and maintain meaningful methanotrophic microbial populations that convert CH_4 to CO_2 while LFG diffuses or is advected through the cover. Materials rich in organic matter, e.g. compost and compost/woodchips mixtures, might enhance CH_4 oxidation when compared to traditional clay soil covers (Barlaz, et al., 2004; Abichou, et al., 2006; Stern, et al., 2007).

Furthermore, unlike other commonly used GHG emissions control systems for municipal solid waste (MSW) landfills (i.e. active gas collection and flaring systems), biocover systems have low operation and maintenance (O&M) costs and pose no risk of creating sub-surface fire at landfills.

1.3 Risk of Landfill Fire at CML

SHA have seen many landfills sites where application of vacuum to the field have resulted in air intruding to the waste mass and caused spontaneous combustion and landfill fire. Considering the low precipitation levels in Penticton and the historical fires that have occurred at this site in 1998, SHA is of the opinion that there is a high risk of reoccurring fires at the CML due to an active LFG system overpulling, causing air intrusion issues. Therefore, besides economic advantages of a biocover that would allow promotion of waste reduction and organic diversion initiatives, an engineered biocover that can effectively control the fugitive CH_4 emissions from the CML is the preferred option from a safety, risks and liabilities perspective. Landfill fire risks are further discussed in Section 9.2.

2. LITERATURE REVIEW ON BIOLOGICAL OXIDATION OF METHANE

According to Environment and Climate Change Canada, emissions from Canadian landfills account for 20% of national CH_4 emissions. Estimates have shown that approximately 27 Mt of carbon dioxide equivalent (CO_2-e) are generated annually from Canadian landfills. Based on the recent results published by EPA on the US record of GHG emissions in 2010, landfills are the third main source of anthropogenic CH_4 emission. This is roughly 16.2% of the anthropogenic CH_4 emissions throughout the US (USEPA, 2012). Therefore, over the recent decades, the mitigation of LFG from landfill sites via efficacious gas management systems has received utmost attention. Typical current approaches include the application of an LFG collection system and a landfill cover technology or an integration of both (Majdinasab and Yuan 2017).

Methane oxidation in landfill cover soil reduces GHG emissions from landfills. There are a number of published and peer reviewed scientific research papers that have reported CH_4 oxidation rates of 22% to 55% through operational soil cover (Whalen et al., 1990; Chanton et al., 2009; Chanton et al., 2011, Abedini et al. 2016). The U.S. Environmental Protection Agency (USEPA, 2004) also reported an average CH4 oxidation rate of 10-25% with lower rates for clay cover soil and higher rates for topsoil.

The biological CH_4 oxidation can be enhanced using biocover systems fabricated with bio-solids and other organic residuals. In a column experiment, Kettunen et al. (2006) used bio-solids compost in combination with other organic residuals and sand to fabricate biocover systems. Through optimization of biocover physicochemical properties, biocover CH_4 removal rates as high as 97% were achieved. Barlaz et al. (2004) compared the CH_4 oxidation rates of an engineered biocover and a standard soil cover. The engineered biocover, fabricated with yard waste compost, displayed a greater rate of CH_4 oxidation than the conventional soil cover system.

The ability of the biocover to oxidize CH_4 was most apparent when the two soil systems were compared in an intermediate cover scenario in the absence of a gas collection system. In this scenario, CH_4 fluxes from the conventional soil cover were significantly higher than those from the biocover soil, indicating less CH_4 oxidation in the soil cover. Berger et al. (2005) successfully demonstrated the use of compost in a biocover system provided an oxidation rate of between 80-95%. Similarly, Humer and Lechner (1999) reported CH_4 oxidation rates of between 90-100% using a number of different municipal solid waste and bio-solid based composts as the primary biocover component.

A variety of cover systems comprised of layers of soil and geosynthetic materials are used in landfill cover applications. The main function of soil covers is to cap landfills to reduce GHG emissions and manage leachate generation. To achieve this goal, soil covers stimulate biological CH_4 oxidation while the generated LFG is being transported through the soil layers (Majdinasab and Yuan 2017).

In recent years, more efforts have been made to increase the efficiency of landfill covers in CH_4 oxidation. (Bajar et al. 2016) published a comprehensive overview to efficiently design a landfill cover soil system to obtain maximum biotic oxidation of CH_4 through laboratory-scale and field-scale data. (Nikiema, Brzezinski, and Heitz 2007) have also summarized different laboratory-scale

results conducted on CH_4 oxidation and listed various environmental parameters that affect the performance of microbial activity through soil covers. In another study, (Huber-Humer, Röder, and Lechner 2009) reviewed the design and application of biocover systems based on field-scale performances.

Biocover media are mainly a mixture of soil and organic matter such as mature compost, mechanically biologically treated (MBT) waste, yard waste, and other materials of similar nature. Mature compost, however, has been more frequently employed as the main component of engineered biocovers. The compost material has more oxidation potential in comparison to any other material due to its high porosity, organic content, free flux for gases, and water holding capacity (Safari, Al-Suwaidi, and Rayhani 2017). While effectiveness of biocovers in reducing fugitive CH_4 emissions from landfills is well researched and proved, long-term comparison between effectiveness of these systems and the typical active LFG management systems has never been done. Similar to an active LFG collection system that has to be designed to accommodate factors such as settlement, condensate management, freezing, mechanical equipment breakdown, etc. biocover systems should also be properly designed to account for factors such as heavy rainfalls, maximum CH_4 emissions rates (CH_4 loading rates), organic mater depletion, etc.

In BC, SHA is the leading engineering firm in application of biological oxidation technology to reduce the fugitive CH_4 emissions from various landfills. Currently, there are no regulations in place in Canada that would encourage application of biological methods to reduce the provincial or federal GHG emissions footprint form landfills, nor are there approved methodologies for assessment of these systems efficiencies. SHA has been using best engineering practices in application of small scale biocover systems in numerous landfills in BC. We believe that larger scale applications and collecting monitoring data from these projects for an extended period of time will help the provincial government to develop design guidelines taking into account important design factors ensuring long lasting effective biocover systems.

Factors that can significantly affect the biocover performance include thermal, hydraulic, biochemical, and mechanical properties in terms of CH_4 oxidation potential as well as structural stability (Safari, Al-Suwaidi, and Rayhani 2017).

(Majdinasab and Yuan 2017) presented a comparative analysis of a comprehensive list of biological systems including landfill biocover systems based on information retrieved from (Scheutz et al. 2009) , (Streese and Stegmann 2003) and (Huber-Humer, Röder, and Lechner 2009). This comprehensive list is presented below in Table 1.

Table 1 - Field application, pros and cons of different methane biological oxidation systems

Biotic Processes	Advantages	Disadvantages	Field of Application	Utilized Substances
Bio-filters (Passively vented)	Less costly than the actively vented system In comparison to other biotic systems, operational factors are more controllable Less operating costs as compared to actively vented system along with no electricity and maintenance requirements	Compared to actively vented system, exopolymeric substances (EPS) formation is slower. Appropriate surrounding gas transportation may not be guaranteed	Placed within or under a landfill capping layer, adjacent to or within the landfilled waste Gas extraction system is not available, mainly used at small or old landfill sites	Organic and inorganic waste substances including water slurries, sewage sludge, brown and green waste, wood chips, peat, heather, pellets, engineered clay, and sand mixtures.
Bio-filters (Actively vented)	In comparison to other biotic system, operational factors are more controllable More potential for LFG treatment and consequently less GHG emissions	Rapid EPS formation Requirement of more maintenance and operational levels in comparison to passively vented system High operating costs	Placed adjacent to or within the landfilled waste Gas extraction system is available, mainly used in old landfill sites where gas pressure has reduced	
Bio-window	Gas extraction system is not necessary It is a cost-effective system Simple and easy installation	Methane overload and EPS formation is possible It is not applicable in aftercare and post closure periods of landfill sites	Mainly applicable as daily or intermediate covers Mainly used in hot spot regions where methane generation is considerable	
Bio-Covers	**Appropriate for post closure of landfill sites with long-term operation where low methane concentration is available** **Significant oxidation capacity due to high surface area** **Low EPS formation due to less methane overload** **Capable of supporting vegetation to enhance microbial activity**	**Restrictions due to requirement of materials** **Difficult to control operational parameters**	**It is applicable during the active phase of a landfill lifecycle, aftercare or remediation** **It could be implemented as a daily or final cover** **Mainly implemented over large regions, so it could be an efficient option for the entire landfill site**	
Bio-tarps	Capable of eliminating methane emissions during landfill operation Landfill storage potential could be preserved Reduces the space occupied by conventional daily covers and increases airspace	Field data is not available It is more costly compared to ADC Not applicable for post closure and aftercare periods in landfill sites	Utilized as a daily cover Mainly implemented during the active phase of a landfill lifespan	Mainly made of various types of polyethylene or polypropylene geotextiles
Source: Hilger et al. (2009), Streese and Stegman (2003) and Huber-Humer et al. (2008)				

2.1 Review of Lab Studies and Projects outside of BC

According to (Pedersen, Scheutz, and Kjeldsen 2011), composted organic wastes (composts) are very promising materials for use in biocover systems, in part because they have high gas-filled porosity, even at high water contents (Huber-Humer, Röder, and Lechner 2009). Compost also has a high specific surface area, which promotes bacterial growth and a low thermal conductivity, which provide good insulation (Huber-Humer, Röder, and Lechner 2009). In addition, compost is typically rich in methanotrophic bacteria, a property that ensures a shorter adaptation phase towards reaching maximum CH_4 oxidation rates compared to inorganic materials. Compost maturity can be a critical factor, as aerobic degradation of organic matter in the compost (respiration) will compete with the O_2 demand of CH_4 oxidation process. Immature composts can produce CH_4 under anaerobic and moist conditions. Another important factor is the availability of nutrients in the compost, especially nitrogen.

In another study, "green waste" aged 2 and 24 months, labeled ''fresh'' and ''aged'' green waste, respectively, were placed in biocover test cells and evaluated for their ability to oxidize CH_4 under high landfill gas loading over a 15-month testing period. Green Waste is typically referred to yard waste. Green Waste is most usually composed of refuse from gardens such as grass clippings or leaves, and domestic or industrial kitchen wastes. It is typically rich in nitrogen. These materials are less costly to produce than green waste compost, yet satisfied recommended respiration requirements for landfill compost covers (Mei et al. 2015). Alternative materials such as rice husk have also been tested at lab scale experiments (Bajar et al. 2016).

In a lab scale study by (E. Lee et al. 2014), a 50 cm thick biocover was examined in terms of its microbial population and CH_4 oxidation capacity at different depth of the profile. The results for the CH_4 oxidation potential, methanotrophic biomass, and community stability indices in the middle and bottom layer samples indicated that the deeper layer in the methanotrophic biocover serves as a bioresource reservoir for sustainable CH_4 mitigation. One of the key issues to be addressed regarding biocover systems is their performance in cold climate and particularly in freeze thaw cycles. In general, it can be concluded that cold climate and freeze/thaw cycles could potentially become less effective, in the deeper areas of the biocover. In other words, a sufficiently deep biocover can affect the performance of biocover, positively by providing a sustainable source of bioresource.

(Moghbel and Fall 2016) studied biocover performance in freeze and thaw cycles. They concluded that two freeze thaw cycles have effects on the CH_4 removal of compost biocover as well as influence on the evolution of the volumetric water content, temperature, settlement, gas composition and organic content of the biocover. However, these effects and influences are more significant in the upper layers ($\leq$15 cm) of the compost biocover column. This is in agreement with the concept provided by Lee et al. (2014) indicating that the thicker the biocover, the less significant the effect of cold climate and freeze/thaw cycles, as these processes impact the upper portion of the biocover.

(Maanoja and Rintala 2015) concluded in a study that biocovers designed for mitigating CH_4 emissions were shown to be the most efficient in oxidizing CH_4 with methane oxidation potential (MOP) of 72.8%. The materials from the other cover structures not merely designed for supporting CH_4 oxidation (final cover soil, gas well foundation sand) were also capable of oxidizing CH_4, but

at rates 10-fold lower. In their 2018 study, Maanoja and Rintala showed that addition of compost to the biocover media would increase the CH_4 elimination capacity to even higher numbers from 55 to 189 g m^{-2} d^{-1} (Maanoja and Rintala 2018).

(Lakhouit et al. 2014) studied a biocover constructed at the Saint-Nicéphore (Quebec, Canada) landfill site. The results obtained showed that the biocover effectiveness ranged from 67% to 100% and from 96% to 97% removal for BTEX (Benzene, Toluene, Ethylbenzene and Xylene) and other volatile organic compounds (VOCs), respectively. During the sampling period, the atmospheric temperature at the Saint-Nicéphore landfill site reported to vary from 13 to 28 ºC.

(E. Lee, Moon, and Cho 2017) operated two identical biocover systems to simulate engineered landfill cover soil to elucidate the removal performance of landfill gases. Using two identical systems was to verify the results. Malodorous gases were eliminated in the bottom layer (40–50 cm) of the biocover, while CH_4 was greatly removed in the top layer (0–10 cm). The top and bottom soil layers developed their own distinct bacterial and methanotrophic communities, which were differentiated from the original inoculum.

(Thomasen, Scheutz, and Kjeldsen 2019) in a lab scale study, concluded that biofilters supporting methanotrophic bacteria have a potential for treating diluted landfill gas with low CH_4 and high O_2 concentrations at relatively high flow rates and low retention times. Future studies should involve long term pilot scale tests fed with diluted landfill gas mixtures.

(Y. Lee et al. 2018) conducted a pilot-scale biocover, composed of a mixture of soil, perlite, earthworm cast, and compost 6:2:1:1, v/v), installed at a sanitary landfill in Korea. The biocover performance for simultaneous removal of odor and CH_4 was evaluated during different seasons. Compared with the CH_4 concentrations at the landfill soil cover surface where the biocover was not installed, the CH_4 removal efficiency by the biocover was increased from 35–43% in winter to 86–96% in summer. The ratio of methanotrophs to non-methanotrophs was increased as CH_4 removability increased from 5.4% in winter to 12.9–14.8% in summer.

2.2 Conclusive Remarks

Biocover systems have shown significant CH_4 oxidation capacity and are capable of supporting vegetation. SHA, as the leading engineering firm in BC in utilizing the bio-methanation technology, has designed and installed several biocovers and biofilters in a number of landfills in the province (e.g. Fernie Landfill, Skimikin Landfill, 7 Mile Landfill, Nanaimo Landfill, Central Subregion Landfill). In these projects SHA used a fabricated media appropriate for growth of methanotrophic bacteria and results showed 80 to 100% oxidation of the fugitive CH_4.

In designing a full scale biocover system, controlling the operational parameters could be difficult. (Majdinasab and Yuan 2017) in a comprehensive study concluded that:

- The cover soil features, as well as the environmental factors, are the most influential parameters that reduce CH_4 emissions in landfill sites.
- As best alternatives for controlling CH_4 emission levels, bio-based processes are considered as cost-effective systems for reducing CH_4 emissions.

- Field studies have been found as one of the most reliable methods to evaluate the performance of compost biocover systems.
- Design and construction of a pilot plant in the field, and extended periods of monitoring are highly recommended.
- Column experiments will provide additional data due to the significant expenditure in construction, operation, and monitoring of pilot plant in the field.
- Further exploration of the correspondence between soil gas diffusivity and various vegetation densities are recommended to provide a fruitful tool to estimate CH_4 oxidation and emissions from phytocaps.
- Further research should be conducted on the performance of biocovers in cold regions.
- Investigation of the presence of snow covers at various thicknesses during the implementation of freeze thaw conditions on compost biocovers is highly recommended.
- Diurnal and seasonal temperature changes along with wet-dry cycles could be considered to create similar conditions as field situations.
- Furthermore, it is important to investigate the impact of "heavy rainfalls" on the biocover performance due to its relevance on gas transport and saturation degree of the soil.
- The behavior of biocovers in cold regions can be assessed using other materials such as a mixture of sand and compost.

In general, it can be concluded that biocover systems can be considered as viable option in significantly mitigating fugitive CH_4 emission in landfills. However, an extensive review of the available literature and case examples throughout Canada and elsewhere, indicated that biocover application in real scale landfills is in progress and has only recently been particularly gaining interest for real scale applications. There seems to be a growing number of researches shifting gears from bench scale studies to field experiments and pilot projects.

Accordingly, there is a need for further field scale tests in form of pilot projects to evaluate biocover performance and the influencing factors. Amongst the critical factors affecting biocover performance are the impacts of:

- Cold climate and freeze/thaw cycles
- Type of material and mix design used as the biocover
- Nutrient requirements
- Physical stability and erosion

Furthermore, design guidelines and regulatory conformance need to be developed based on the results of pilot tests in various jurisdictions.

3. REGULATIONS AND DESIGN GUIDELINES IN DIFFERENT JURISDICTIONS

3.1 Canadian Regulations, Guidelines and Experiences

An extensive review of relevant regulatory requirements and guidelines was performed to identify regulations specifically addressing biocover application to landfills. Considering the fact that the use of biocover in landfills aimed at reducing fugitive CH_4 emission is a relatively new concept, it appears that no particular regulatory schemes have been developed in Canada. This applies to the province of British Columbia as well. Nevertheless, SHA as a leading landfill engineering firm in BC, has worked with multiple municipal governments and developed and implemented many landfill CH_4 bio-oxidation projects (biocover and biofilter systems) in the past 12 years. Example initiatives, that are all implemented on voluntary basis, include projects in Nanaimo Landfill, Salmon Arm Landfill, 7Mile Landfill, Central Subregion Landfill, Lower Nicola Landfill, Heffley Creek Landfill, Fernie Landfill, and Skimikin Landfill.

With biocover application in smaller landfills and landfills without active LFG collection systems (even in some cases with an active LFG system) gaining popularity within the context of tackling climate change, some provinces tend to be more prudent, recently having implemented pilot biocover projects. A few examples of these biocover pilot projects and initiatives in Alberta, Manitoba, and Ontario are described below.

3.2 Leduc Biocover Pilot Project, Alberta

In partnership with the Government of Alberta (providing $1.7 million funding support), the University of Calgary (UoC) and the Leduc and District Waste Management Authority, TetraTech developed a landfill biocover pilot project in 2018, at the Leduc Landfill, in Leduc Alberta. As a member of the methane biofiltration (MBF) steering committee for Alberta's Climate Change and Emissions Management Corporation (CCEMC), SHA's LFG specialist, Dr. Abedini, visited Leduc Landfill and supported UoC team during initiation of this pilot project.The initial results of this pilot show a 90% reduction in CH_4 emissions from Leduc Landfill. The criteria for biocover materials used in this project was that they had to be locally available, low cost, ensure sufficient water evaporation functionality and yield high CH_4 oxidation. In the end, the primary biocover systems chosen were topsoil and screened organic waste compost that would otherwise be landfilled. The final results concluded a win-win initiative as the biocover project (i) effectively diverted organic waste, (ii) created a use for a previously landfilled by-product, and (iii) reduced fugitive GHG emissions in a measurable way.

As part of this pilot, the project team is also in the process of developing a protocol to quantify emissions reductions and create carbon credits in Alberta from these types of caps. The expectation is that the Alberta Climate Change Office will announce sometime in 2019 that this protocol has been accepted for development. The landfill sites will then generate offset credits using the established protocol and sell them to industries that need to meet their GHG emissions compliance regulations. This protocol is yet to be finalized and released.

3.3 Bio-Window Pilot in Brady Road Resource Management Facility, Manitoba

A pilot biocover project was initiated in 2013 at Brady Road Landfill in Manitoba where a pilot compost-based bio-window was implemented to evaluate its performance. The project schedule was broken down to the following phases:

i. Proof of Concepts Summer 2014
ii. Engineering Testing 2015-2016
iii. Field-Scale Testing 2016-present

The first two phases included mainly bench scale laboratory tests of alternative materials where CH_4 oxidation was evaluated through batch and column tests. The third phase included a bio-window implemented over Brady Road Landfill which is still undergoing monitoring.

3.4 Regulatory scheme in Ontario

An extensive search aiming at identifying regulatory framework for design, implementation and monitoring biocover performance in Ontario revealed that no regulations and or design and operation guidelines have been developed. In Ontario any new method or technology in environmental applications needs to go through the New Environmental Technology Evaluation (NETE) program to acquire the Certificate of Technology Assessment from Standard Development Branch. One example in Trail Road Waste Facility in Ottawa, Ontario, where use of biocover as an alternative daily cover (ADC) was approved with a set of conditions that were set by the Ministry of the Environment including, but not limited to:

a. The alternative daily cover material will be expected to perform at least as well as soil in relation to the following functions:
    i. Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
    ii. Provision for an aesthetic condition of the landfill during the active life of the Site;
    iii. Compatibility with the design of the site for groundwater protection, leachate management and landfill gas management.
b. The Operator shall ensure that the material used as alternative daily cover, does not cause an adverse environmental effect. If any adverse effect is caused, the operator shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

There is no reference to CH_4 oxidation and GHG reduction benefits of use of biocover as ADC.

3.5 European Union Experience, Denmark

The adoption of the European Union (EU) landfill directive has led to improvements in waste management practices, along with a reduction in the amount of organic waste disposed at MSW landfills. Nevertheless, Europe's existing landfills continue to generate high quantities of CH_4, therefore the EU is looking into improved methods for reducing GHG emissions from landfills.

With EU financcial support (€256,311 out of total €512,622 project's cost), Technical University of Denmark initiated a bioocver study with cooperation of I/S Fasan, Danish Environmental Protection Agency, Reno-Sam Denmark, and Cowi Denmark in 2005. The project's objective was

to demonstrate an innovative technology for reducing CH_4 emissions from landfills by up to 90%. This would be achieved by building a "biocover" with "windows" on a landfill (i.e. bio-window), to increase the biological oxidation of CH_4 and consequently reduce greenhouse gas emissions. The approach was expected to be cheaper and more effective than existing methods such as active LFG collection and flaring systems. In addition, biocover systems could reduce emissions of nuisance odorous compounds.

This EU biocover project was the first of its kind to demonstrate the use of a biocover system for mitigating CH_4 emissions from a landfill by improving the existing soil cover. The adopted approach was to establish permeable regions (bio-windows) in locations of the landfill cover, using materials with higher permeability to enhance gas transport into the "window" area that has a high CH_4 oxidation potential. Therefore, unlike biocover, a relatively high CH_4 loading rate was introduced to the bio-window media, hence, lower oxidation efficiencies were achieved.

The project trialed the biocover approach at the Fakse Landfill site, located in the Southeastern part of Sealand (Denmark) and operated by BIOCOVER consortium member I/S Fasan. Works commenced with a landfill characterization, a baseline study of CH_4 emissions and the testing of improvement strategies (e.g. the testing of 7 covering compost materials). After establishing a full-scale bio-window system, the project evaluated its operating efficiency (e.g. CH_4 oxidation efficiency) and economic viability. The project identified particular 'hot spots' of CH_4 gas emissions and sealed those locations with impermeable clay, making certain that all generated CH_4 was advected through the selected zones (i.e. bio-windows).

The results indicated that the reduction of CH_4 emissions, due to the bio-window technology, was lower than anticipated. Methane emissions were reduced by approximately 30% instead of the expected 90%, due to the technical structure of the landfill enabling some uncontrolled leaks and other complex reasons related to the CH_4 gas flux (loading rates). However, the project created a range of knowledge and experience related to avoidance of "weaker" parts of the bio-window approach for future projects. The report recommended that ongoing and long-term monitoring and data collection from landfills covered by different types of bio-media should be completed to further develop and enhance the knowledge regarding this new approach for GHG emissions reduction from landfills.

It is worth mentioning that the EU Landfill Directive does not provide any regulatory or otherwise standards or guidance on the use of biocover in landfills as part of LFG management systems.

3.6 Conclusive Remarks

In conclusion, it can be stated that real scale application of biocover is a relatively new concept even though extensive research is available at bench and pilot scale. BC is in fact amongst the provinces with the largest number of past and ongoing pilot studies regarding application of biocover in landfills. At this stage, there are no federal or provincial regulations and guidelines available for biocover design, material properties, performance evaluation and construction codes. Such standards and regulatory frameworks are anticipated to be developed over the next few years as the significance of biocover use to mitigate fugitive CH_4 emissions from different types of landfills becomes more recognized.

4. METHODOLOGY

In order to evaluate the effectiveness of a biocover system in mitigation of fugitive CH_4 emission from CML and to compare with installation of an active gas collection system, the following tasks were performed in this pilot study.

i) Measurement of fugitive CH_4 emissions from selected areas (test areas) of the Campbell Mountain Landfill surface (Baseline CH_4 emission measurement at CML).

ii) Measurement of fugitive CH_4 emissions from a selected area at the Mission Flats Landfill (MFL) while the existing gas collection system is shut down (Baseline CH_4 emission measurement at MFL)

iii) Fabrication and construction of three different types of engineered biocover systems at the test areas at CML.

iv) Measurement of fugitive CH_4 emissions from the test area at MFL while the existing gas collection system is operational (Post construction CH_4 emissions measurement at MFL). This measurement was completed in 6 rounds, including 4 rounds in 2017 and 2 follow up rounds in 2018.

v) Measurement of fugitive CH_4 emissions from the test areas at CML after construction of the biocover test pads (Post construction CH_4 emissions measurement at CML). These measurements were completed in 6 rounds (Post 1 to Post 6), including 4 rounds in 2017 and 2 follow up rounds in 2018. Post construction emission measurements at the CML also included a control area (Control Pad) on which no biocover was constructed.

vi) Year-round measurements of temperature within biocover test pads and comparison with ambient temperature to indicate exothermic microbial activities.

vii) Completion of an advanced microbiology DNA extraction test and qPCR (quantitative polymerase chain reaction) to detect and quantify the total abundance of methanotrophic bacteria in samples collected from different biocover test pads.

Table 2 shows the project field measurement milestones and dates:

Table 2 - Pilot Study Field Measurement Milestones

Milestone	Date
Baseline Emissions Measurement	April 10 & 11, 2017
Biocover Blending & Construction	April & May, 2017
Post Construction Sampling Round 1 (Spring)	June 18 & 19, 2017
Post Construction Sampling Round 2 (Summer)	July 25 & 26, 2017
Post Construction Sampling Round 3 (Fall)	Sep. 11 & 13, 2017
Post Construction Sampling Round 4 (Winter)	Nov. 6 & 7, 2017
Post Construction Sampling Round 5 (Winter)	Feb. 12 & 13, 2018
Post Construction Sampling Round 6 (Spring)	May 22 & 23, 2018

Two hypotheses were the main drives in selection of scope and approach in this study. These hypotheses include:

1. Biocover application can lead to significant reduction of fugitive methane emissions through oxidation.
2. Biocover application under similar conditions can lead to significant reduction of fugitive methane emission rate through oxidation compared to an active landfill gas collection system.

4.1 Biocover Design

Biocover feedstocks may consist of compost, compost and sand or a combination of biosolids, wood chips and sand. The high initial ammonium nitrogen content of fresh biosolids has the potential to negatively impact methanotrophy; however, the effect is short lived and the biocover is designed to assimilate this form of nitrogen to facilitate optimum CH_4 consumption. Alternatively, an older source of biosolids or compost can be used. Another alternative is to apply the biocover and allow it to stabilize over time. Under this scenario the biocover will not function optimally until stabilization has occurred. Based on recent research this delay can range from two weeks to a month under laboratory conditions.

4.1.1 Favorable Conditions for Biocover Performance

Recently several approaches have been investigated in industry to exploit the powerful oxidising ability of methanotrophic bacteria (methanotrophs) and potential uses in industrial processes.

Methane reduction in biocover is also accomplished by methanotrophs that utilize methane monooxygenase (MMO) enzyme to oxidize CH_4 as a source of energy and carbon. Products of CH_4 oxidation are water, carbon dioxide, biomass and heat. Physical and chemical characteristics of the biocover influence the growth and performance of methanotrophs. These include temperature, moisture, organic matter content, carbon to nitrogen ratio (C:N), porosity, structure, and pH.

Temperature – The optimal temperature range for CH_4 oxidation by methanatrophic bacteria is 15 – 35 °C. Oxidation slows at cooler temperatures, although cold tolerant oxidizers show activity at temperatures as low as 2 – 5 °C (Abedini *et al.*, 2016) and above 40 °C. Oxidation stops at 50 °C (Chris A. Zeiss, 2006).

Moisture content – Moisture in the soil facilitates the transfer of gases allowing CH_4 and O_2 to reach the methanotrophic bacteria and CO_2 to diffuse away. The optimum soil moisture concentration varies for different soils but is in the range of 10 – 30 % although CH_4 oxidation can occur in a wider moisture range of 8 – 50 % (Chris A. Zeiss, 2006). Another work suggests that the moisture content should be at least 5 % (Hettiaratchi *et al.*, 2007).

Organic matter – In general an increase in CH_4 oxidation is directly related to an increase in soil organic matter content. Moderate oxidation rates have been demonstrated in soils with an organic matter content of 1 – 10%; soils with an organic matter content of up to 35% show an increased oxidation rate of 10 to 100 times more effective (Chris A. Zeiss, 2006).

It is also important to note that the optimum levels of organic matter and moisture content at which the maximum CH_4 oxidation rate (V_{max}) is expected are directly related. Figure 1 below illustrates relation of optimum moisture content to optimum organic matter (Pokhrel et al., 2016).

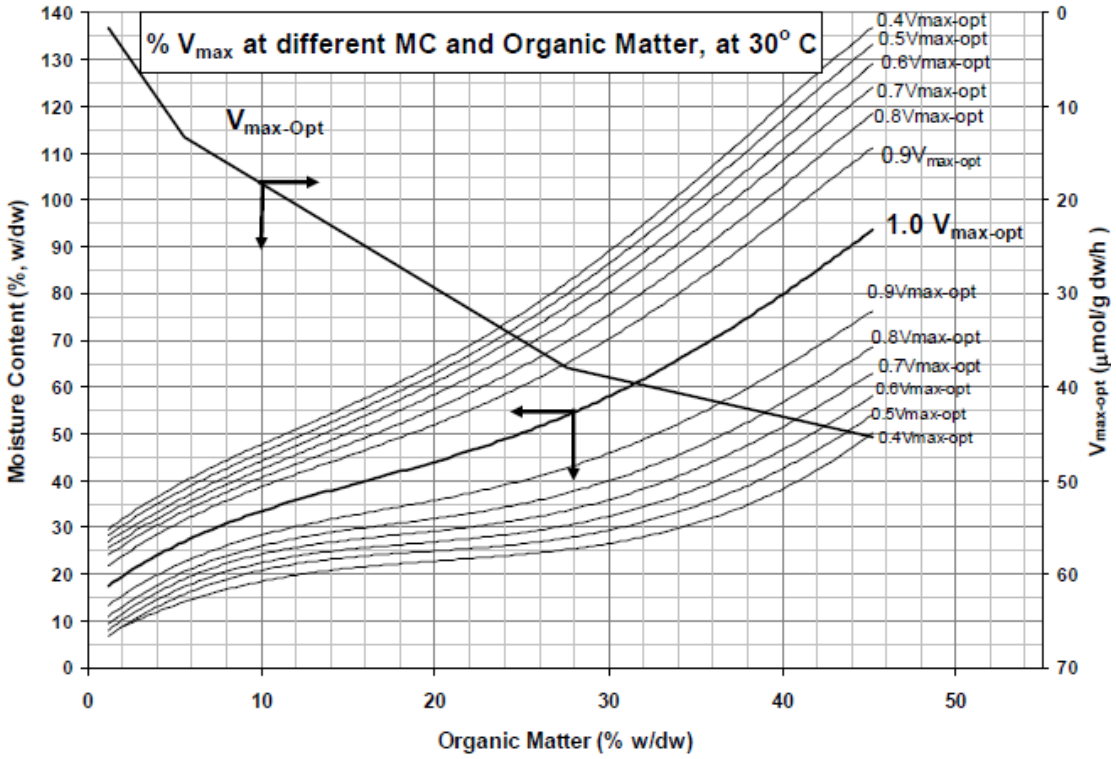


Figure 1 - Maximum methane oxidation (V_{max}) at different Moisture and Organic Content

Carbon to nitrogen ratio (C:N) – The C:N of the biocover is important as nitrogen, specifically ammonia, can inhibit performance. If the C:N ratio of the soil is lower than 12 the concentration of ammonia can inhibit CH_4 oxidation. At C:N ratios of 25 – 97 forms of nitrogen as ammonia are low (Chris A. Zeiss, 2006).

Porosity and structure – The ability of oxygen (O_2) to enter and move through the soil is vital for CH_4 oxidation thus a high porosity (the ratio of the volume of voids to the total volume of the media) is required in the biocover. Increases in bulk density of the medium lead to decreases in porosity and consequently might affect the gas permeability of the biocover. Additionally, the biocover should be structurally stable with minimal settling (Abichou *et a*l, 2004). On the other hand, too porous media allows free movement of gas, not allowing enough retention time for methane within the biocover media. Based on SHA's experience, optimum porosity for biocovers also depends on precipitation levels in the area. Porosities close to coarse sand is usually recommended as minimum value for biocover.

pH – Methanotrophs are neutrophilic with an optimal pH range of 6.5 to 8.0. Methane oxidation can occur to a maximum pH range of 8.5 – 9.0. Specific methanotroph species are tolerant of lower pH values down to a pH of 3.0 (Chris A. Zeiss, 2006).

The ideal biocover properties considered for this evaluation are:

- moisture: 10 – 30 %, not less than 5%
- organic matter: increasing concentrations up to 35%
- C:N: 25 – 97, not less than 12
- porosity: high (not less than coarse sand porosity)
- pH: 6.5 – 8.0

4.1.2 Biocover Blend Design

A full review of candidate biocover and fabricated topsoil feedstock materials was undertaken. Potential sources of biocover feedstock materials that could be used for the CML biocover included the following:

- City of Penticton Composted Biosolids (Penticton BS)
- Metro Vancouver (MV) Iona Biosolids (Iona BS)
- Penticton Ground White Wood Waste
- Penticton Clean Sand

A mixture of biosolids, sand and wood chips provides a desirable biocover media with appropriate structure and porosity optimum for landfill gas movement as well as O_2 penetration. Additionally, it is important to note that the management of biosolids, compost and wood waste are regulated by the Organic Matter Recycling Regulations & Guidelines (OMRR).

The identified feedstock characteristics were determined using laboratory analysis. The predicted characteristics of specific biocover mix ratios were then compared to the properties described above, as well as OMRR requirements (See table below). Optimum blends were then prepared and lab analysis (column tests) were completed at the environmental laboratory of University of Calgary (UoC).

Trace element predictions for Intermediate Biocover blend ratios

ratios are on a bulk volume basis

	Feedstock Quality Data			*biosolids:sand:wood*			OMRR
	Iona WWTP	KIB	Chipped	1 : 1.9 : 7.7	1 : 2 : 2	1 : 2 : 5	UPL
	BIOSOLIDS[a]	SAND[b]	WOOD[c]	Predicted soil	Predicted soil	Predicted soil	Standards
Parameter	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Arsenic	6.5	0.20	4.38	2.2	1.5	1.9	**20**
Cadmium	5.5	0.10	0.29	0.7	0.9	0.8	**35**
Chromium	58	12.3	8.0	16	18	17	**60**
Cobalt	5.7	4.4	1.09	3.5	4.2	3.8	**50**
Copper	896	9.9	27.8	110	136	122	**150**
Lead	128	1.8	31.8	25	23	23.9	**500**
Mercury	4.10	0.003	0.050	0.45	0.58	0.51	**15**
Molybdenum	8.3	0.05	0.41	1.0	1.2	1.1	**10**
Nickel	30.0	15.4	1.5	12.5	16.0	14.0	**100**
Selenium	4.9	0.3	0.20	0.8	0.9	0.8	**3**
Zinc	894	20.4	96.5	138	151	144	**450**

Following biocover design recommendations from the UoC research team and a Qualified Professional

Agrologist (P.Ag.), a conceptual plan for construction of biocover test pads at the CML was developed consisting of three (3) test pads (TPs) with dimensions of 25 m × 25 m × 0.35 m (area of 625 m^2 each) and one control pad (CP) on which no biocover was placed. The three selected blends for the biocover media were as follow:

TP1 - Iona BS: Sand: Wood = 1:2:2 (vol/vol/vol)
TP2 - Iona BS: Sand: Wood = 1:2:5 (vol/vol/vol)
TP3 - Penticton BS: Sand: Wood = 1:2:5 (vol/vol/vol)

Construction of test pads (described in Chapter 4) were completed in April and May 2017, after the baseline emission measurements were carried out on April 10th and 11th 2017 as previously shown in Table 1.

4.2 Active LFG Collection System, Mission Flats Landfill

As required by the ENV, an active LFG collection system has been constructed and is in operation at the Missions Flat Landfill (MFL). MFL, located approximately 8 km west of the downtown core of the City of Kamloops (CoK), has many similarities to the CML making this site a perfect fit for the aimed purpose. The size of the landfill, annual incoming waste tonnage, climatic conditions and precipitation levels are amongst the key similarities between these two sites. Summary of the important similarities between the two sites are provided below:

- Estimated methane generation using the ENV model (both estimated to generate marginally above the regulation threshold of 1,000 tonnes CH_4 per year),
- Dry and cold climate (level of annual precipitation, which is a key aspect in selection of ENV LFG Model). Annual Precipitation in Kamloops (MFL) is reported to be 278 mm/yr, vs. 346 mm/year in Penticton (CML). Mean annual temperatures in Kamloops and Penticton are reported to be 9.3 ˚C and 9.5 ˚C, respectively (ref. Canadian Climate Normals 1981-2010 Kamloops A and Penticton A Stations, respectively).
- Size of the operation: Both landfills with approximate footprint of 15-20 ha, receiving 30,000 to 50,000 tonnes/year of MSW,
- The tested areas selected in CML and CML both had intermediate cover system in place (approximately 300 mm to 600 mm of cover soil). It is worth noting that since a final cover system (i.e. 1 m of compacted clay) was installed on the side slopes of the MFL, the active gas well at this site was intentionally selected from the crest area with intermediate cover system in place.

As per the scope of this pilot study, the effectiveness of a biocover system was to be compared with an active LFG management system in terms of GHG emission mitigation. The CoK agreed to take part of this study and guaranteed site access to SHA staff for the duration of the works. For this purpose, the collection zone (zone of influence) of one of the active LFG wells at the MFL was selected where CH_4 emission levels would be measured every time a field measurement was

completed at the CML.

In order to develop the baseline emission data for the MFL (i.e. CH_4 emission levels without LFG collection system), the gas collection system was shut down 6 days prior to the scheduled emission measurements. Six days was considered sufficient based on approximated void space within the landfill and rate of gas generation that would fill the voids and create positive pressure within the landfill body. The LFG system shut down was scheduled around the required LFG blower flare system annual maintenance such that no unnecessary disruption in the MFL LFG system was caused.

The selected well at the MFL was tagged V102, the test area, herein called MFL-V102, is a circular shape area with a diameter of 30 m (Area = ~700 m^2).

4.3 LFG Emissions Measurement Technique

A number of methods can be used to measure the fugitive CH_4 or LFG emission rate from biocover systems. These methods are essentially similar to those used to measure fugitive CH_4 emission rates over a variety of landfill covers. To the extent the literature was reviewed, no particular method has been identified and recommended specifically for biocover systems.

A summary of the literature on measurement of fugitive CH_4 emission rates from landfill covers, which is an essential indicator of biocover performance, is provided in the following section.

4.3.1 Methods for Fugitive Methane Emission Measurement

Various measurement methods have been attempted by scientists and practitioners over the past few decades. The most widely attempted method, and seemingly more favorable for the purpose of regulatory compliance assessment, is the use of a flux chamber which directly measures CH_4 emission flux from the surface of landfills. In addition to flux chamber methods, other methods including but not limited to eddy covariance and co-advected proxy tracer plume measurements and methods relying on remote sensing and plume mapping have been used (Gardiner et al., 2017; Delre et al., 2018; Kormi et al., 2017; Goldsmith et al., 2012; Gollapalli et al., 2018; Monster et al., 2014; Innocenti et al., 2017; Delkash et al., 2016; Allen et al., 2018; Abedini et al., 2019).

Chamber Based Methods

Chamber-based measurements are relatively easy to conduct as emissions can be estimated from the rate of change of CH_4 concentration in a chamber, the footprint area of the chamber and volume of the chamber. However, the chamber method's practical drawback is due to the typically heterogeneous nature of the landfill contents (waste composition) resulting in high spatial variability of emissions (Riddick et al., 2018).

Eddy Covariance Method

Eddy Covariance (EC) methods have also been studied for CH_4 emissions estimation from landfills over longer periods of time, Xu et al. (2014). EC, which calculates a gas flux from the covariance between vertical wind speed and gas concentration at a high sampling rate, has the advantages of providing mean flux estimates over a larger area and automation capabilities. The drawbacks

however are that the emissions in the fetch need to be homogeneous and that the measurement needs to be carried out on a topographically flat surface to obtain meaningful results (Riddick et al., 2018).

Tracer Gas Method

Using acetylene as the tracer gas is the current state of the art tracer gas dispersion measurements for determining CH_4 emissions from landfills. Measurements of the tracer gas and CH_4 concentrations are made downwind of the source (Mønster et al. 2015). The tracer gas dispersion technique relies on the assumption that full mixing between the tracer and landfill plume has occurred at the point of monitoring (Rees-White et al., 2018). A key logistical limitation of the tracer release method is that it requires a mobile measurement team to coordinate with the person releasing the gas and then traverse an accessible road perpendicular to the landfill plume in the time it takes for the plume to travel from the location of release. Furthermore, it should be ensured that the tracer gas is well mixed with the landfill CH_4 emissions as insufficiently mixed plumes can invalidate the co-advection assumption, resulting in large uncertainties in the emission estimate (Riddick et al., 2018).

Additionally, the relationship between the emission rate and the gas concentration at a given location is dependent on the meteorological conditions and local topography, preventing accurate quantification of the emission rate.

Remote Sensing Methods

Remote sensing techniques represent a more integrated approach for quantification of CH_4 flux. These techniques have gained popularity in recent years. One of these techniques is the Radial Plume Mapping (RPM) methodology recognized by the US-EPA as "other test method 10 (OTM-10)" since July 2006 (USEPA, 2006). This technique uses optical remote sensing (ORS) instrumentation to characterize gas emissions from non-point sources. Some of these ORS instruments include; (i) Open-Path Fourier Transform Infrared (OP-FTIR) spectroscopy, (ii) Ultraviolet Differential Absorption Spectroscopy (UV-DOAS), and (iii) Open-Path Tunable Diode Laser Absorption Spectroscopy (OP-TDLAS) (USEPA, 2007).

The RPM techniques carry many advantages over the "close range measurement" methodologies, such as the flux chamber technique. However, the relatively high cost of the RPM method, as well as the uncertainties associated with the possible effect of the CH_4 plume buoyancy on the results reduces the applicability and reliability of this technique for certain projects.

It appears that many of these methods suffer considerable drawbacks in terms of associated costs, reliability, logistics and compatibility with the typically heterogeneity of landfills and fugitive CH_4 emissions. It can be concluded that no single method seems to provide the regulatory or other stakeholders with the acceptable level of uncertainty.

4.3.2 Adopted Technique for the Campbell Mountain Landfill

The technique adopted to quantify the fugitive CH_4 emissions at the Campbell Mountain and

Mission Flats Landfills is a patented methodology developed through the PhD research of Dr. Ali Abedini at the University of British Columbia (UBC) (Abedini, 2014, Abedini et al. 2019). Abedini's methodology was developed based on comprehensive field investigations completed at the Vancouver Landfill and involves measurement of surface methane concentrations (SMC) from the area of interest using a flame ionization detector (FID) device.

This method tackles the major drawbacks of the conventionally acceptable standalone flux chamber method in terms of cost and extensive time required to characterize fugitive emission at a given landfill. Even though, the cost of flux chamber seems to be lower than the above-mentioned methods, the method is quite labor intensive when considering entire landfill area coverage. Measurement of CH_4 concentration at the surface of a landfill is less demanding compared to the flux chamber method and is presumed to lead to more reliable results when the concentration of CH_4 at the surface of a landfill is low in cases where there is an active landfill gas collection system or where biocover systems are in place. A reliable correlation between surface concentration of CH_4, which can easily be measured, and CH_4 emission measured using flux chamber, which could be capable of generalizing to other landfills, was presumed to facilitate CH_4 emission rate characterization at a lower cost.

The techniques and procedures used for measuring SMC using a hand-held FID is an approved methodology used across the US, where it is required by the U.S. Environmental Protection Agency's (EPA) new source performance standard (NSPS) regulation. The NSPS requires that all regulated landfills in the US must measure and report CH_4 concentrations at the landfill's surface on a quarterly basis. Values registered above the NSPS threshold during the FID scan imply a malfunctioning LFG control system and the landfill owner is then required to implement control measures within a given period of time.

Abedini (2014) developed a correlation between qualitative SMC data and quantitative surface CH_4 emission rates (MER). This technique is especially very useful when MER levels are very low (e.g. in case of a biocover system surface) and other measurement techniques such as flux chamber cannot be applied.

Photo 1 - Surface Methane Concentration Scan Using a Portable FID Instrument

In this study, the SMC scan was conducted over the biocover test pad areas at CML (i.e. TP1, TP2, and TP3), the control pad at CML (CP), and at the MFL test area (MFL-V012). A *Thermo Scientific TVA 2020* FID instrument was used to measure and log CH_4 concentrations at the landfill and biocover surfaces. The scanned area was walked on approximately 1.5 to 2 m spaced pathways while logging CH_4 concentration every 3 seconds. The FID instrument was calibrated using calibration gas from a tank before conducting each set of measurements and tested using the same tank to detect any calibration drift during the field work.

Photo 1 shows Dr. Abedini conducting FID measurements at the CML.

5. FIELD WORK

As shown in Table 2, the field work was completed in eight different stages including; baseline data collection (CH_4 emission measuring), biocover fabrication and construction, and post-construction data collection (CH_4 emission measuring) rounds 1 through 6. The procedures are briefly described below.

5.1 Baseline Data Collection

Baseline CH_4 emissions measurement at MFL and CML was completed on April 10th and 11th, 2017, respectively.

Baseline measurement at MFL: The MFL LFG collection system was shut down starting Tuesday April 4th, 2017. MFL-V012 area was marked off such that no disturbance in this test area would occur during the course of the project. Photos 2 and 3 show the marked area and the V102 gas well at the MFL.

Photo 2 - MFL-V102 area marked for emission measurement

Photo 3 - SHA conducting baseline FID scan at the Mission Flats Landfill (MFL-V102)

Baseline measurement at CML: Similarly, baseline emission measurements were completed at the CML on Tuesday, April 11, 2017. During this initial visit, four (4) areas of 25m × 25m were selected for construction of the biocover test pads as well as the control pad. The three test pads and the control pad are labeled TP1, TP2, TP3, and CP. The test areas were marked, and baseline FID surface scan were completed in these areas. Photos 4 and 5 show the test area at CML.

Results of the baseline CH_4 emission measurements at MFL and CML are presented in Chapter 6.

Temperature Monitoring at CML: In order to study the effect of ambient temperature diurnal and seasonal fluctuations of the temperature underneath the biocover test pads, temperature sensors were placed underneath the biocover media. ACR Data Loggers (Smart Buttons) were used to log temperatures every 4 hours for a period of 1 year (data logger storage limitation) at various locations of each TP. In total, 45 Smart Buttons were placed in 15 locations beneath the three TPs.

Photo 4 - TP1, TP2 , and TP3 surveyed and marked ready for Biocover construction

5.2 Biocover Test Pad Construction

5.2.1 Biocover Blending

In preparation for Biocover Test Pad Construction at CML, the RDOS's Solid Waste Facilities Supervisor Don Hamilton initiated construction with the blending component of the project on April 12, 2017 with the aid of SHA's Scott Garthwaite. Prior to blending, feedstocks for the three (3) mix designs were sourced and delivered to the site. Feedstocks included:

- Clean Washed Bedding Sand
- Clean Chipped White Wood
- CoP Composted Biosolids Blend
- Metro Vancouver Biosolids – Iona

Blending and construction of the three test pads was completed over several weeks. In general, blending commenced on April 12, 2017 and test pad construction completed on May 10, 2017. In cases where two test pads were constructed side-by-side (i.e. TP1 and TP2), a perimeter containment soil berm was constructed between the two pads to avoid lateral gas migration between the pads. The containment berms were constructed using silty sand prior to placement of the biocover media.

The following photos illustrate the methodology of blending and construction work.

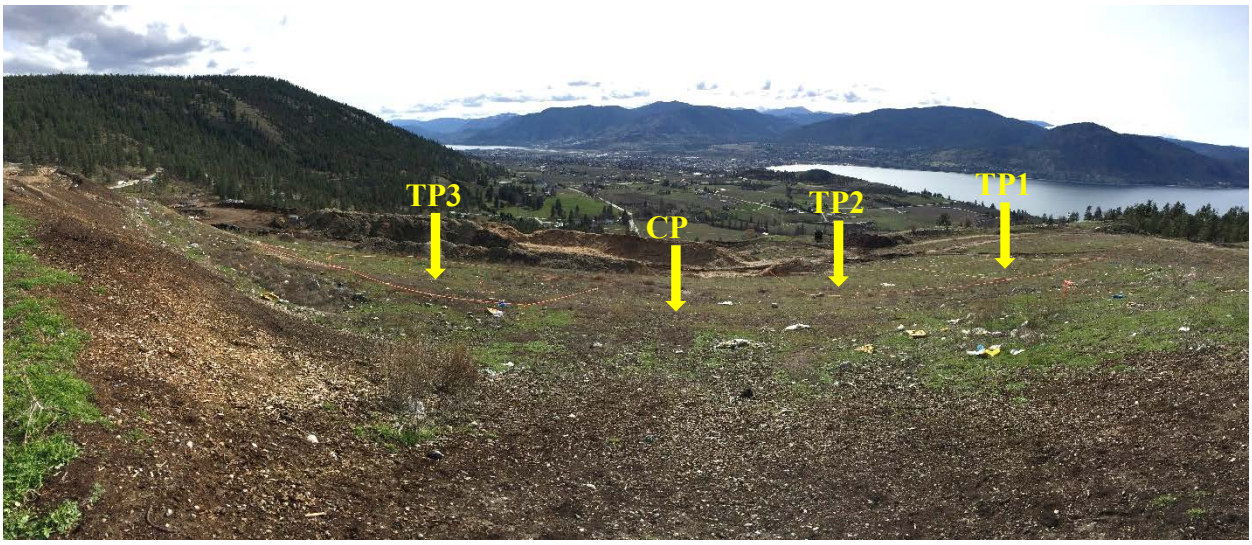


Photo 5 - Prior to blending SHA provided layout of the three (3) test pads on the western slopes of the landfill. Test pads were approximately 25m by 25m.

Photo 6 - The biocover blending area is shown in this photo. Note all feedstock material for the blending of the three (3) design mixes were sourced and delivered to site prior to blending.

The three blends that were used to construct the TPs are summarized below:

Blend 1:

	1:2:2 (Vol)	
	Blend 1	
	m3	tonne
Iona BS	48	34
Sand	96	135
Wood	96	27
Totals	**241**	**196**

Blend 2:

	1:2:5 (Vol)	
	Blend 2	
	m3	tonne
Iona BS	30	21
Sand	60	84
Wood	150	42
Totals	**241**	**148**

Blend 3:

	1:2:5 (Vol)	
	Blend 2	
	m3	tonne
Penticton BS	30	21
Sand	60	84
Wood	150	42
Totals	**241**	**148**

Blending of each mix design comprised of multiple tasks, as outlined below:

- Pre-mix: Correct amounts (by volume) of each feedstock were stockpiled using a front-end loader;
- Secondary-mix: Pre-mixed feedstocks of each design mix underwent further blending by relocating and creating a linear stockpile (approximately 1.5m in height) for final blending. This task was required to provide the correct stockpile for one final blend with the City of Penticton's 'Wildcat' Compost Turner; and
- Final-mix: The final mix included mechanical 'windrow blending' with the City's 'Wildcat' Compost Turner.

Photos 7 to 14 provide visual description of biocover media preparation and test pad construction fieldworks.

Photo 7 - 'Pre-mix' for each design mix. Correct quantities of each feedstock (by volume) were stockpiled by loading and high-stacking alternating materials to provide an initial rough mix.

Photo 8 - 'Secondary-mix' for each design mix. A linear stockpile was created to allow for one final blend with the City of Penticton's 'Wildcat' Compost Turner.

Photo 9 - 'Final-mix' being completed to the linear windrows with the 'Wildcat' Compost Turner.

Photo 10 shows a typical final product of the blending regime. As can be seen the blending was successful in creating a homogenous mix of all three feedstocks for each design blend.

Once all blending works were completed, the biocover material was hauled to the test pad locations using off-road haul trucks and spread out in one 300 to 350mm mono-lift, with an excavator, over the existing intermediate soil cover slopes. Finalization of each test pad included light compaction of the biocover material by track packing (1 track-pass only). The hauling and test pad construction is summarized in the photos below.

Photo 10 - Typical final product of the blending regime.

Photo 11 - Blended biocover material being loaded into off-road trucks from the blending site and hauled to the western slopes of the landfill.

Photo 12 - Biocover product being hauled and stockpiled at each designated test pad site for construction.

Photo 13 - The RDOS contractors spreading out biocover product in one mono lift ranging from 300-350mm in depth.

Photo 14 - Light compaction being completed on one of the three (3) test pads.

6. FIELD MEASUREMENTS RESULTS

6.1 FID Surface Emission Scan Data

Average SMC data in the selected test areas of the CML before construction of the biocover pads ranged between 3.6 and 29.6 volumetric parts per million (ppmv). These values for control pad (CP), test pad #1 (TP1), test pad #2 (TP2), and test pad #3 (TP3) translate to MER values of 10.7, 11.8, 3.4, and 12.6 $gCH_4/m^2/day$, respectively.

The baseline average CH_4 concentration at surface of MFL while the active LFG collection system was shut down, was measured to be 10.04 ppmv. This SMC value for the test area (LFG collection zone of LFG well V102) is equivalent to a MER of 5.7 $gCH_4/m^2/day$.

Table 3 summarizes the results of the baseline field measurements.

Table 3 - Baseline fugitive methane emission measurement results - (April 2017)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	24.03	27.15	3.58	29.64	10.04
Average Methane Emission Rate (MER):	**$g/m^2/day$**	**10.7**	**11.8**	**3.4**	**12.6**	**5.7**

Follow up field measurements were conducted after the installation of the biocover. Each of these measurements were completed in two separate rounds and results were adjusted for the effect of barometric pressure fluctuations during the field work. Results of follow-up field measurements are summarized in Table 4 through Table 9 below, respectively.

Table 4 - Post construction fugitive methane emission measurement results - 1 (June 2017)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	38.73	0.94	0.83	20.19	0.29
Average Methane Emission Rate (MER):	**$g/m^2/day$**	**15.9**	**2.5**	**2.4**	**9.3**	**2.2**

Table 5 - Post construction fugitive methane emission measurement results - 2 (July 2017)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	40.95	1.13	1.30	9.12	0.58
Average Methane Emission Rate (MER):	**$g/m^2/day$**	**16.6**	**2.5**	**2.6**	**5.4**	**2.4**

Table 6 - Post construction fugitive methane emission measurement results - 3 (Sep. 2017)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	15.51	0.83	0.44	9.86	0.94
Average Methane Emission Rate (MER):	**g/m^2/day**	**7.6**	**2.4**	**2.3**	**5.6**	**2.5**

Table 7 - Post construction fugitive methane emission measurement results - 4 (Nov. 2017)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	41.06	3.36	2.02	29.18	0.22
Average Methane Emission Rate (MER):	**g/m^2/day**	**16.7**	**3.3**	**2.9**	**12.5**	**2.2**

Table 8 - Post construction fugitive methane emission measurement results - 5 (Feb. 2018)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	41.87	1.84	3.37	4.82	6.24
Average Methane Emission Rate (MER):	**g/m^2/day**	**17.0**	**2.8**	**3.3**	**3.9**	**4.4**

Table 9 - Post construction fugitive methane emission measurement results - 6 (May 2018)

	Unit	CP	TP1	TP2	TP3	V102
Average Surface Methane Concentration (SMC):	ppmv	41.14	1.42	2.85	15.36	7.07
Average Methane Emission Rate (MER):	**g/m^2/day**	**16.7**	**2.6**	**3.2**	**7.6**	**4.6**

The level of emission from the control pad (CP) in post sampling events showed approximately 50% increase in comparison to the baseline measurements. SHA believes this was due to disturbance of the landfill surface with heavy equipment during construction of the test pads. Nevertheless, comparison of the post construction fugitive CH_4 emission measurement results with the baseline data was done following two approaches. The first approach was to assume that the measured baseline CH_4 emission rates at the location of each test pad was constant throughout the year and at MER values that were measured in April 2017 (presented in Table 3). The second approach based on an assumption that the baseline MER values have fluctuated throughout the year similar to the ones measured at the control pad. In this approach, the baseline MER values for each test pad was adjusted based on the variations that was observed in the control pad in each round of field work. The resulted MER in each round was then compared against the adjusted baseline values.

The results under the second approach showed higher methane removal efficiencies for all the test

pads. Therefore, the first approach with no adjustments made to the baseline MER values are marked as "conservative approach" in the following sections and used as the final conclusion of the study. Figures 2 to 4 illustrate CH_4 oxidation rates for TP1 to TP3 under this approach.

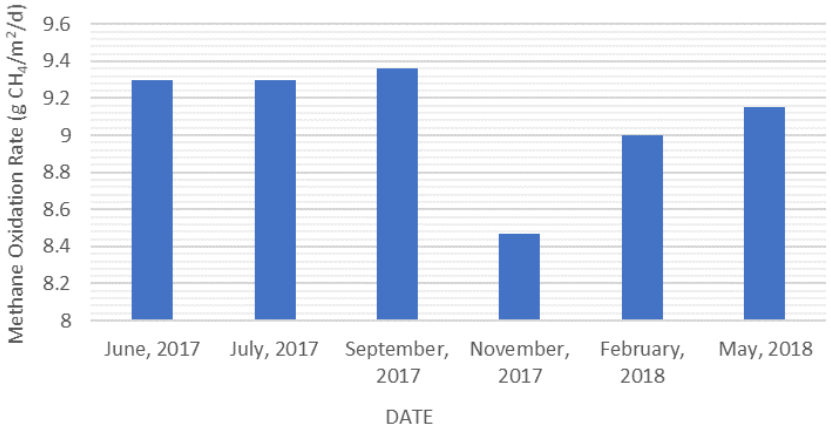


Figure 2 - Methane oxidation rates in TP1 (conservative approach)

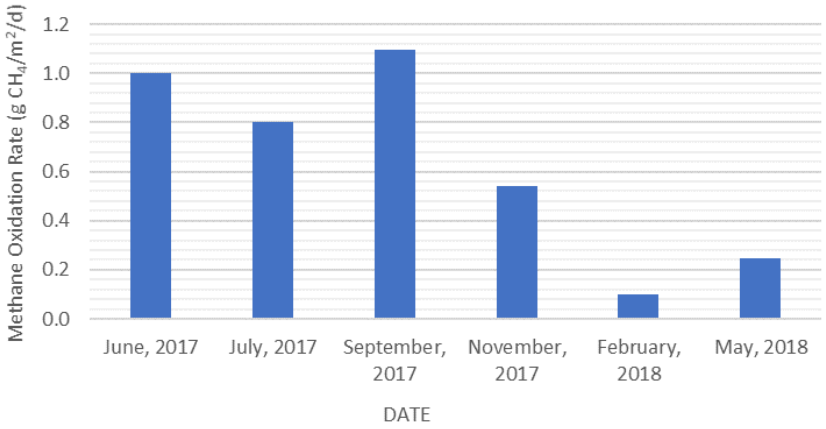


Figure 3 - Methane oxidation rates in TP2 (conservative approach)

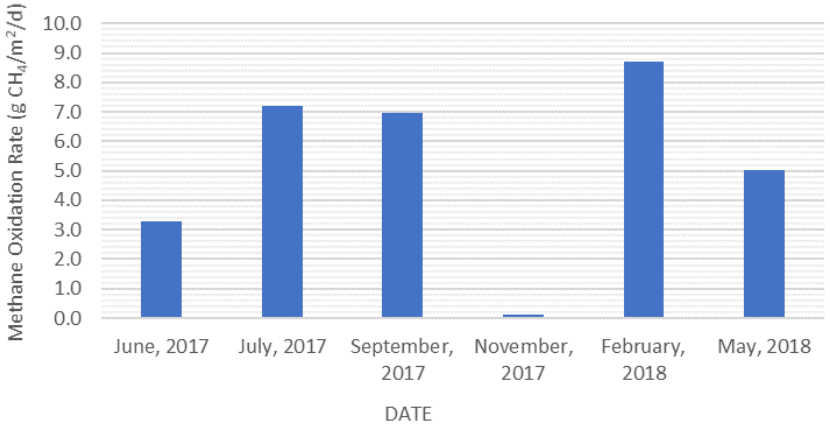


Figure 4 - Methane oxidation rates in TP3 (conservative approach)

Figures 5 to 7 below illustrates CH_4 removal efficiencies for TP1 to TP3 under the conservative approach.

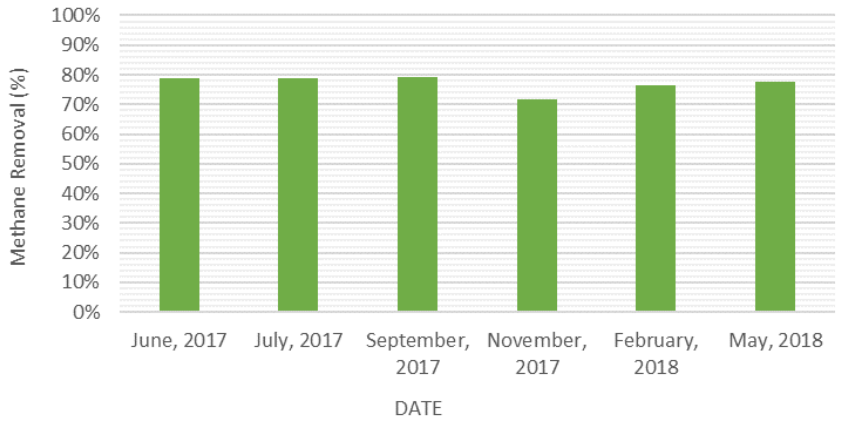


Figure 5 - Methane removal efficiency for TP1 (conservative approach)

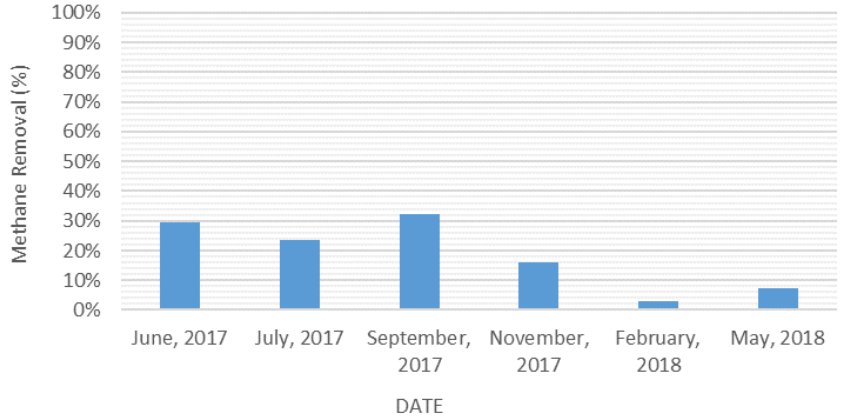


Figure 6 - Methane removal efficiency for TP2 (conservative approach)

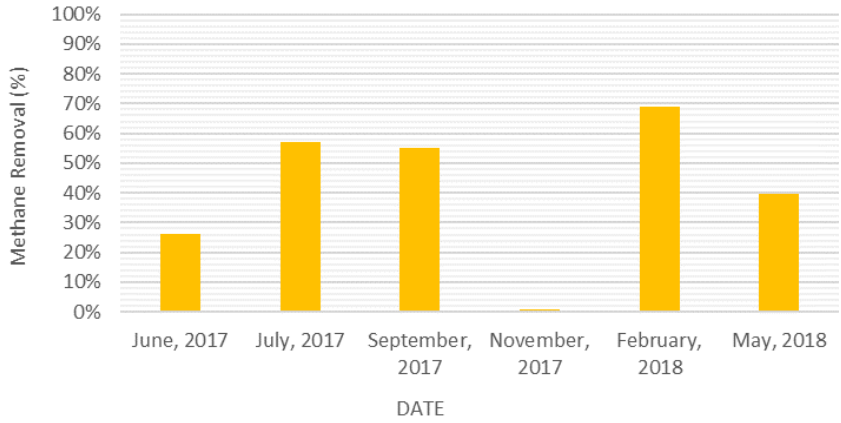


Figure 7 - Methane removal efficiency for TP3 (conservative approach)

As shown in the figures above, the "post construction" field measurements showed a significant reduction in MER values at the CML even under the conservative data analysis approach. This emission reduction rate ranged from 1% to 79% under the conservative approach and 5% to 85% when the baseline values were adjusted in the second approach. TP1 biocover consistently showed higher than 71% reduction in MER values in comparison to the baseline data. Under the conservative approach, TP2 area, even though had a much smaller baseline MER, showed 3% to 32% reduction in MER values with the lowest values observed in colder months and the highest reduction in Post 3 sampling event in September 2017. TP3 area had the highest baseline MER. This biocover pad had the highest fluctuation in CH_4 removal effectiveness when the baseline MER values were not adjusted, ranging between 1% and 69%. However, when the baseline MER was adjusted based on the MER values measure din CP, the removal efficiency for the TP3 ranged between 37% and 81%. Table 10 presents the average CH4 removal efficiencies concluded for each biocover test pads at the CML.

Table 10 - Average methane removal efficiencies at the CML biocover test pads

	Campbell Mountain Biocover Test Pads		
	TP1	TP2	TP3
Conservative Approach (no Baseline MER Adjustment)	77%	19%	41%
2nd Approach (Baseline MER adjusted)	83%	39%	56%

Similar analyses were completed for the test area at the MFL to assess CH_4 removal efficiency resulted from the active LFG management system under its regular operational status. Fugitive CH_4 emission from MFL dropped to 61% during post sampling events 1 through 4. During winter, the Mission Flats landfill active LFG system worked intermittently due to freezing issues. Furthermore, the system was shut down in May 2018 for implementation of LFG system upgrades and expansion. As a result, based on the post sampling event Post 5 and 6 completed in February and May 2018, SHA concluded removal efficiencies of 24% and 18% for these two sampling events, respectively. Figures 8 and 9 illustrate CH_4 emission reduction rate and CH_4 removal efficiency for the selected LFG well at the Mission Flats Landfill.

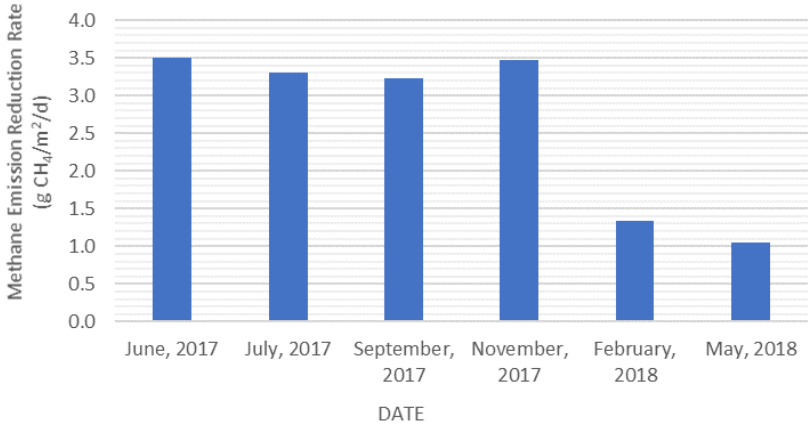


Figure 8 - Methane emission reduction rates in MFL V102

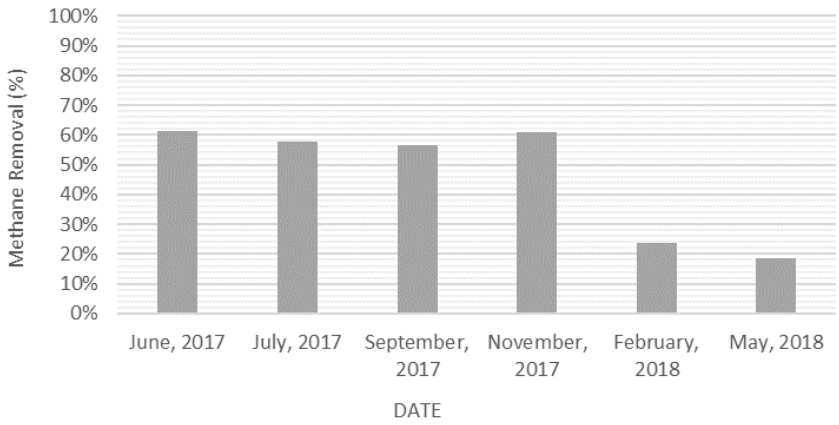


Figure 9 - Methane removal efficiency for MFL V102

In comparison of the three biocover test pads at the Campbell Mountain Landfill and the active vertical Well selected at the Mission Flats Landfill, it appears that test pad TP1 had the highest performance throughout the study period with 72% to 79% CH_4 removal efficiency. This test pad did not show signs of impact by cold winter conditions. The other two test pads initially showed lower effectiveness in comparison with TP1 and the active LFG well. While TP3 after stabilization reached an effectiveness of close to that of the vertical well (~60% removal efficiency), TP2 continued to show poor performance which was further reduced during winter. Performance of the active LFG well was also impacted by lower temperature in winter. Figure 10 below summarizes CH_4 removal efficiencies of all four test areas for the entire duration of the study.

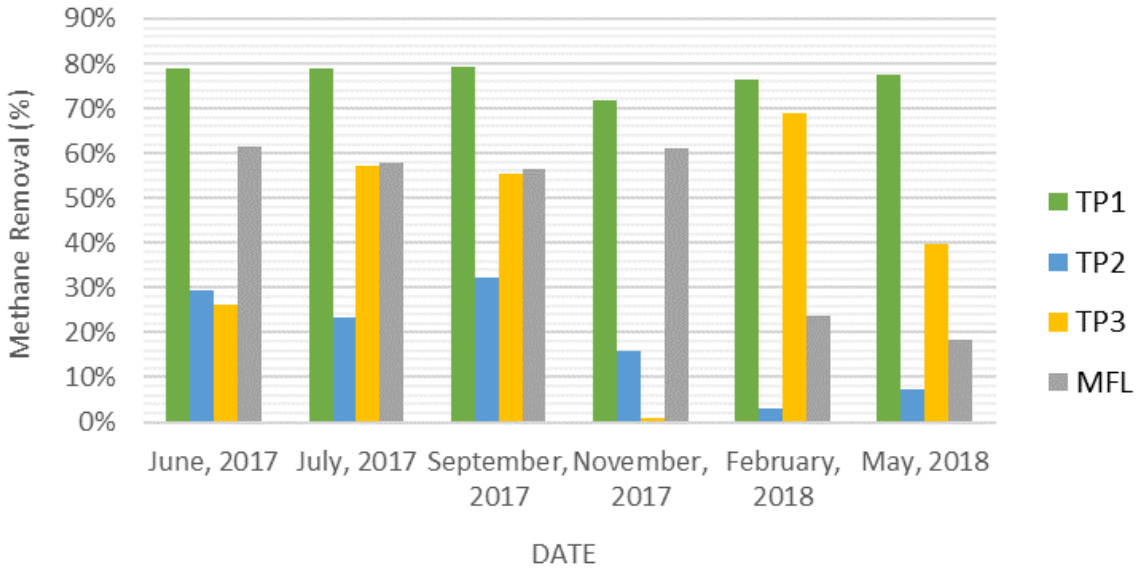


Figure 10 - Comparison of Methane Removal Efficiency in all test areas (conservative approach)

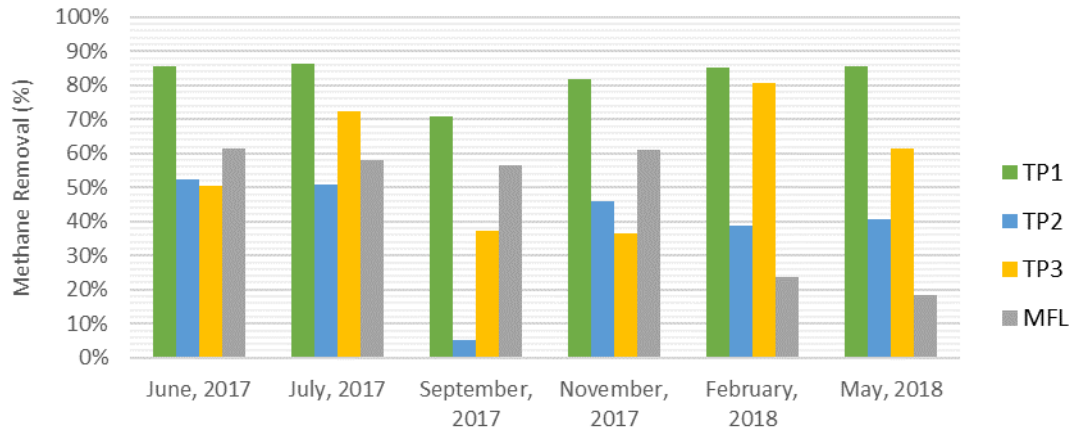


Figure 11 - Comparison of Methane Removal Efficiency in all test areas (2nd approach)

Summary of findings and MER reductions resulted from compilation of baseline and post sampling data for both approaches (without and with baseline MER adjustment) are also presented in Tables 11 and 12 below.

Table 11 - Summary of filed measurements comparison (conservative approach)

	Units	Campbell Mountain Biocover Test Pads				Mission Flats Active LFG System
		CP	TP1	TP2	TP3	GW - V102
Baseline MER (April 11, 2017)	$g/m^2/day$	10.7	11.8	3.4	12.6	5.7
Post 1 MER (June 19, 2017)	$g/m^2/day$	15.9	2.5	2.4	9.3	2.2
Emission Reduction (Post 1 vs. Baseline)	%	-49%	79%	29%	26%	61%
Post 2 MER (July 26, 2017)	$g/m^2/day$	16.6	2.5	2.6	5.4	2.4
Emission Reduction (Post 2 vs. Baseline)	%	-55%	79%	24%	57%	58%
Post 3 MER (September 13, 2017)	$g/m^2/day$	7.6	2.4	2.3	5.6	2.5
Emission Reduction (Post 3 vs. Baseline)	%	29%	79%	32%	55%	57%
Post 4 MER (November 7, 2017)	$g/m^2/day$	16.7	3.3	2.9	12.5	2.2
Emission Reduction (Post 4 vs. Baseline)	%	-56%	72%	16%	1%	61%
Post 5 MER (February 13, 2018)	$g/m^2/day$	17.0	2.8	3.3	3.9	4.4
Emission Reduction (Post 5 vs. Baseline)	%	-59%	76%	3%	69%	24%
Post 6 MER (May 23, 2018)	$g/m^2/day$	16.7	2.6	3.2	7.6	4.6
Emission Reduction (Post 6 vs. Baseline)	%	-56%	78%	7%	40%	18%

Table 12 - Summary of filed measurements comparison (2nd approach)

	Units	Campbell Mountain Biocover Test Pads				Mission Flats Active LFG System
		CP	TP1	TP2	TP3	GW - V102
Baseline MER (April 11, 2017)	g/m^2/day	10.7	11.8	3.4	12.6	5.7
Post 1 MER (June 19, 2017)	g/m^2/day	15.9	2.5	2.4	9.3	2.2
Emission Reduction (Post 1 vs. **Adjusted** Baseline)	%	-49%	86%	52%	50%	61%
Post 2 MER (July 26, 2017)	g/m^2/day	16.6	2.5	2.6	5.4	2.4
Emission Reduction (Post 2 vs. **Adjusted** Baseline)	%	-55%	86%	51%	72%	58%
Post 3 MER (September 13, 2017)	g/m^2/day	7.6	2.4	2.3	5.6	2.5
Emission Reduction (Post 3 vs. **Adjusted** Baseline)	%	29%	71%	5%	37%	57%
Post 4 MER (November 7, 2017)	g/m^2/day	16.7	3.3	2.9	12.5	2.2
Emission Reduction (Post 4 vs. **Adjusted** Baseline)	%	-56%	82%	46%	36%	61%
Post 5 MER (February 13, 2018)	g/m^2/day	17.0	2.8	3.3	3.9	4.4
Emission Reduction (Post 5 vs. **Adjusted** Baseline)	%	-59%	85%	39%	81%	24%
Post 6 MER (May 23, 2018)	g/m^2/day	16.7	2.6	3.2	7.6	4.6
Emission Reduction (Post 6 vs. **Adjusted** Baseline)	%	-56%	86%	41%	61%	18%

Illustrations of surface FID scan data, baseline and follow up post sampling data, for the five (5) sampling areas (i.e. CP, TP1, TP2, TP3, and V102) along with a summary of SMC and MER data are presented in Appendix A.

6.2 Other Supporting Field Data

6.2.1 Subsurface Temperature Data

During construction of the biocover test pad, SHA installed the temperature monitoring probes at design locations in each test pad. Fifteen (15) temperature probes were installed in five (5) locations of each test pad at the interface between landfill intermediate cover (top) and biocover test pad (bottom). Temperature data were logged throughout the year.

Photo 15 - Temperature probes (Smart Buttons), leashes and demarcation stakes installed in the biocover test pads.

Using the Smart Buttons, the biocover temperature was monitored and recorded in triplicate. Loggers were programmed to record TPs temperature every 4 hours throughout the year. The first and second replicates at every location (5 locations in each TP) recorded temperature from April 12th, 2017 to March 19th, 2018. While the 3rd replicate provided an extended coverage of temperature data until the end of April, 2018. Out of 45 installed probes, 6 showed malfunctioning or were found "burnt". The data from valid records were compiled at the end of the study.

Figure 12 below illustrates a summary of all valid recorded temperature data as well as the site ambient temperature for the duration of the study. A full graphical presentation of the recorded temperature is presented in Appendix B.

Temperature data showed that the biocover temperature was generally warmer than the ambient temperature. Figures 13, 14 and 15 plot more detailed data for the months of September 2017, December 2017, and February 2018, respectively. As shown in these figures, TP1 has been initially

the warmest biocover, making this an excellent match with the previously shown data from CH_4 removal efficiency of this test pad. While all three test pads showed temperatures higher than ambient at all times, TP1 and TP3 showed higher temperature values in comparison to TP2. These records also confirm higher bacterial activities and exothermic CH_4 oxidation occurring at higher rates in TP1 and TP3 in comparison to TP2.

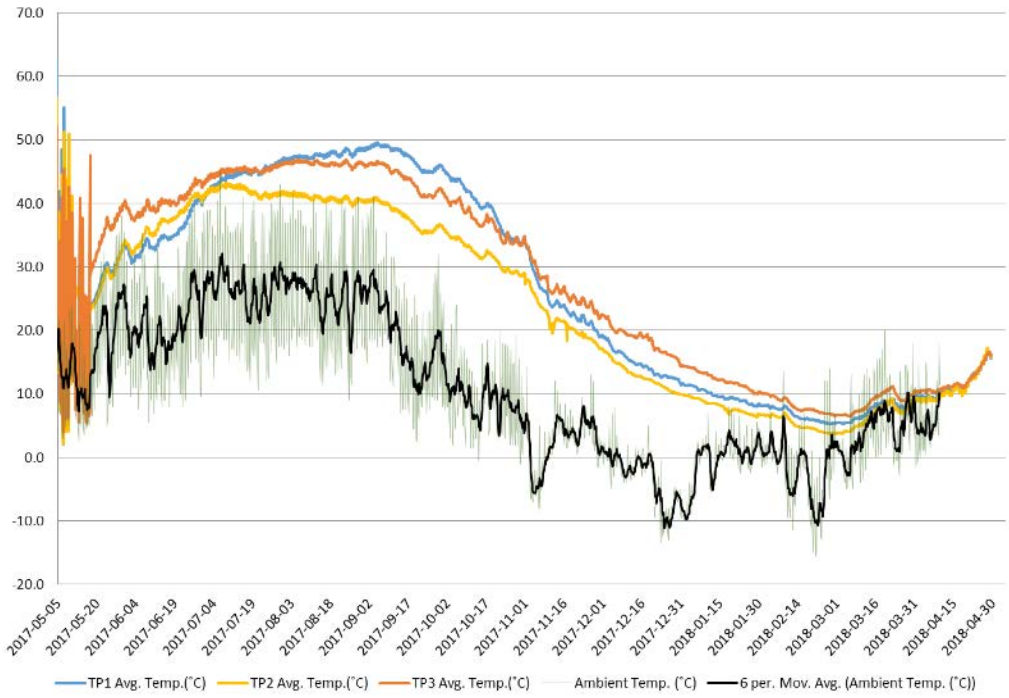


Figure 12 - Biocover Temperature Data vs. Ambient Temperature at CML

Figures 13 through 15 show the biocover temperature variation for months of September 2017, December 2017, and February 2018. As shown in these figures, in cases of sudden drop in ambient temperature, the biocover temperatures remained 10 ˚C to 30 ˚C above the ambient temperature. This showed that despite the cold ambient temperature, the methanotrophic bacteria activity resulted in maintaining the heat through the exothermic CH_4 oxidation process. The biocover temperatures were reduced towards February 2018 which we believe is due to snow melt and penetration of cold water through the biocover media. Nevertheless, TP1 and TP2 were maintained above 5 ˚C even when the ambient temperature was recorded as low as -15 ˚C.

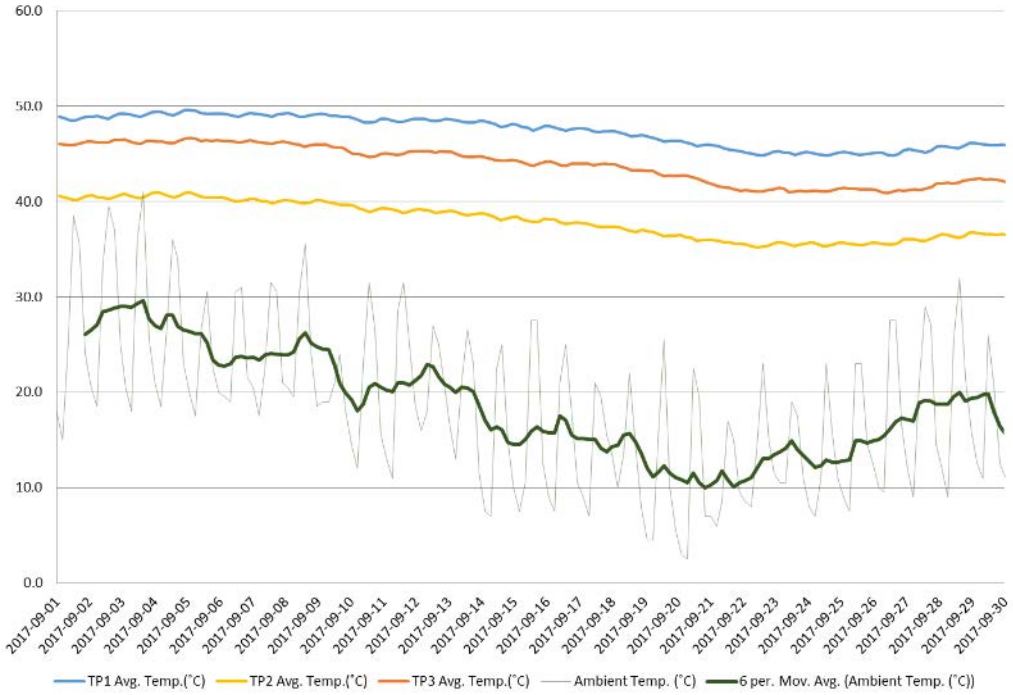


Figure 13 - Biocover Temperature Data vs. Ambient Temperature, September 2017

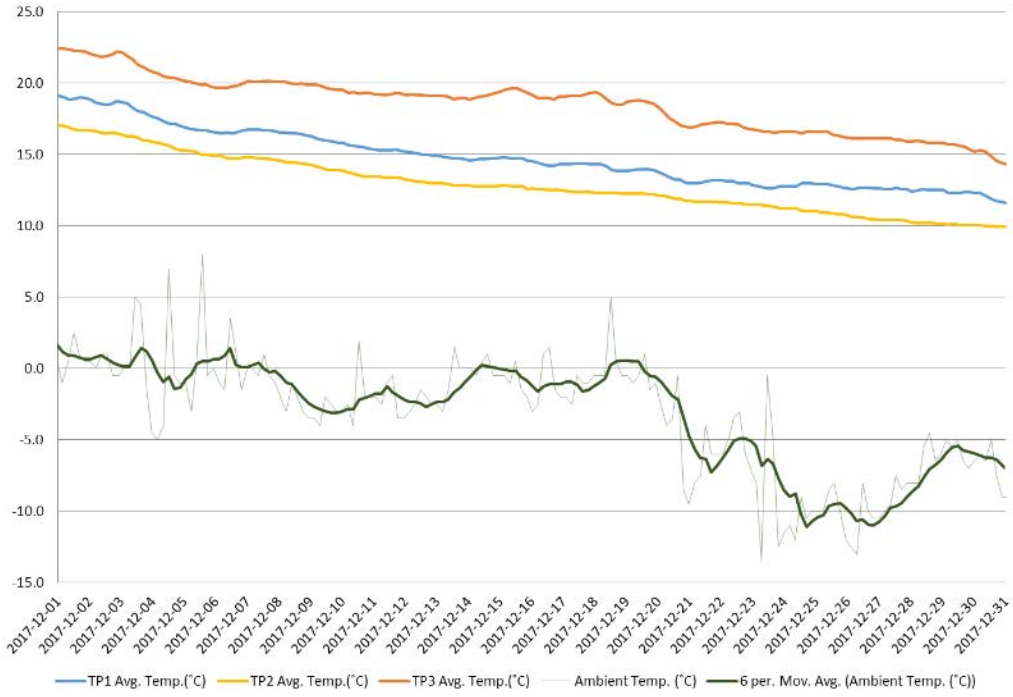


Figure 14 - Biocover Temperature Data vs. Ambient Temperature, December 2017

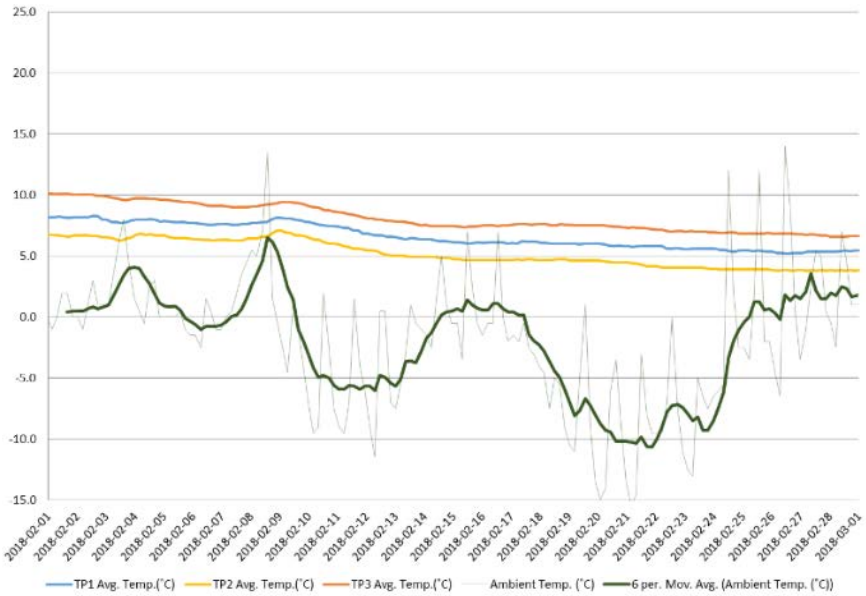


Figure 15 - Biocover Temperature Data vs. Ambient Temperature, February 2018

In order to provide a more in-depth basis for comparison of the ambient and biocover temperature, plots of temperature were generated for five post sampling event days (June 16th, July 26th, September 13th, November 7th, 2017 as well as February 13th, 2018) as shown in Figures 16 to 20 comparing the patterns of ambient vs biocover temperature from 8:00 am to 4:00 pm on the selected days.

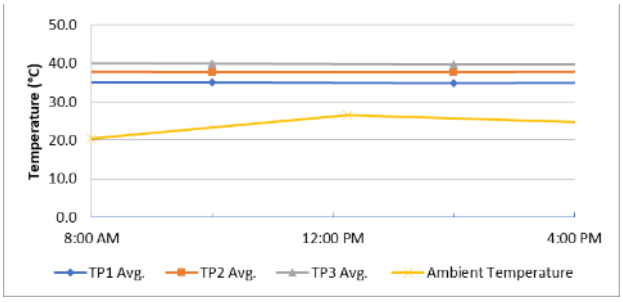


Figure 16 - Ambient vs. biocover temp. 2017.06.19

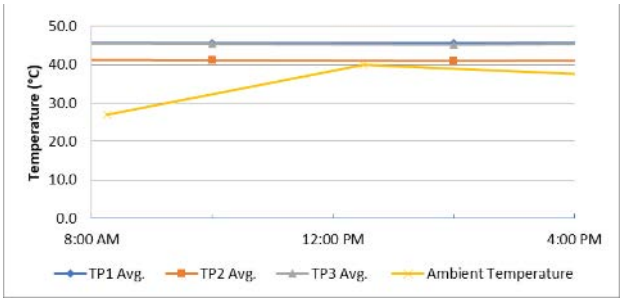


Figure 17 - Ambient vs. biocover temp. 2017.07.26

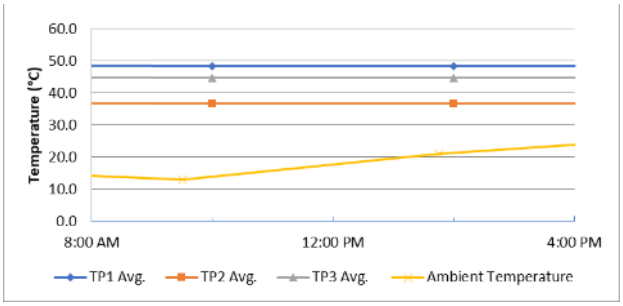


Figure 18 - Ambient vs. biocover temp. 2017.09.13

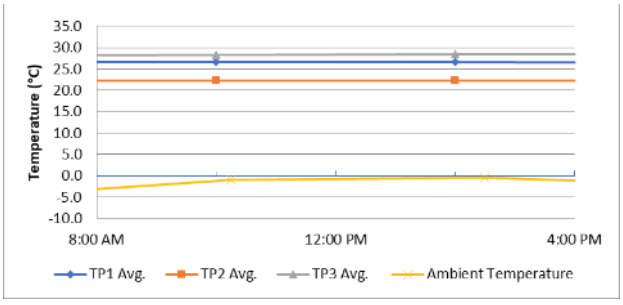


Figure 19 - Ambient vs. biocover temp. 2017.11.07

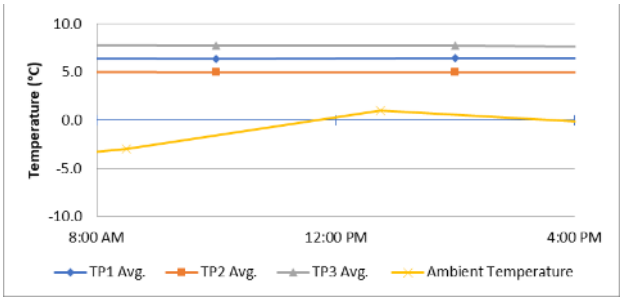


Figure 20 - Ambient vs. biocover temp. 2018.02.13

Thorough analysis of the temperature data showed that the biocover temperature was considerably higher than the ambient temperature, more distinctly observed during colder periods. Table 13 provides the records of the average ambient temperature as well as biocover temperature on a monthly basis.

Table 13 - Monthly Average Temperature

Date	Ambient Temperature (°C)	TP1 (°C)	TP2 (°C)	TP3 (°C)
04-2017	10.2	16.7	15.9	15.8
05-2017	16.1	26.3	25.6	26.7
06-2017	20.7	35.3	37.2	40.3
07-2017	26.6	44.7	42.0	45.2
08-2017	25.6	47.7	39.4	46.3
09-2017	18.6	47.3	36.0	43.8
10-2017	8.9	39.2	30.0	37.0
11-2017	2.4	24.2	20.2	26.4
12-2017	-3.4	14.6	12.4	18.4
01-2018	-0.3	9.7	8.0	12.2
02-2018	-1.9	6.6	5.2	8.1
03-2018	4.2	7.5	6.6	8.7
04-2018	5.7	11.4	11.2	11.9

As shown in Table 13 and illustrated in the figures above, TP2 temperature in comparison to TP1 and TP3 showed lower values from August to October 2017. We believe lower methanotrophy activities coupled with high porosity of the TP2 blend led to cold air penetration and a drop in temperature.

6.2.2 Biocover Media Properties and Methanotrophs DNA Extraction Test

Upon completion of 6 post sampling events during 1.5 years, samples from three test pad media were collected to test for the material properties as well as to assess methanotrophic bacterial population. The “soil test” properties included parameters such as organic matter content, C:N ratio, moisture, and density. The DNA tests included total bacterial count and abundance of methanotrophic bacteria. Photos 16 – 19 below show sample collection procedure completed in July 2018.

Photo 16 – Samples for soil tests

Photo 17 – Collecting Samples from TPs

Photo 18 – DNA Grab Sample

Photo 19 – Mixed Sample for DNA test QC

6.2.3 Biocover Media Soil Properties Test

Three grab samples from each TP were collected and immediately transported to the soil lab to complete typical properties tests normally completed for soil and compost samples (known as "compost analysis"). Summary of the results is presented in Table 14 below.

Table 14 - Summary of biocover media "compost analysis" results

Important Parameters	TP1	TP2	TP3
Bulk Density (kg/m^3)	879 - 987	607 - 866	807 - 866
Organic Matter (%)	8.16 - 18.91	11.73 - 18.76	12.64 - 22.12
Moisture (%)	7.36 - 9.69	5.37 - 6.59	6.30 - 7.19
C:N	15:1 - 16:1	14:1 - 16:1	11:1 - 15:1

As shown in the summary provided in Table 14, noticeable differences between TP1 properties and other two test pads include:

- Higher density (medium porosity that would allow proper LFG/ CH_4 retention time and more controlled air intrusion)
- Lower Organic matter (which would allow higher CH_4 removal efficiency at relatively low moisture content (see Figure 1)
- Higher moisture content (signs of higher methanotrophic activity)
- Higher C:N ratio

6.2.4 Microbiology DNA Test (Enumeration of Biocover Methanotrophs)

Suggested tests to study population and abundance of methanotrophic bacteria in the biocover test pads was a combination of 16S Bacterial Amplicon Sequencing and quantitative polymerase chain reaction (qPCR) Total Bacterial Quantification tests. As shown in the Photos, 1g to 3g of sieved samples were placed into cryo-vials and immediately transported to microbiology lab while samples were kept cool during transportation. Three samples from each TP were collected by SHA and analyzed by the UBC microbiology lab, Microbiome Insights Inc. Three samples from TP1 were labeled Group A, samples from TP2 labeled Group B, and Group C samples were collected from TP3. Group D was also collected from a combination of samples for quality control purposes.

Both taxonomic composition as well as the relative abundances of bacterial communities associated with methanotrophic activity in samples were determined through sequencing of the 16SrRNA gene. In order to profile the taxonomic composition of bacteria, the 16SrRNA gene V4 amplicons were sequenced, Miseq generated Fastq files were quality-filtered and finally clustered into %97 similarity operational taxonomic units (OTUs) by the Microbiome Insights Inc. (Vancouver, Canada). To estimate the total bacterial load, the levels of the 16SrRNA gene were quantified in samples by qPCR.

Therefore, total bacterial abundance was determined through amplification and quantification of the 16SrRNA gene marker using Applied Biosystems StepOne Plus instrument and the 16S gene copy numbers were normalized per mg of the collected sample. Assuming negligible variation in the number of copies of the 16SrRNA gene in different bacterial taxa, the higher the copies of the 16S per mg of sample, the higher the total bacterial abundance.

While Appendix C provides the full report of the microbiology lab, Figures 21 and 22 below summarizes the main findings of these tests.

Relative abundances of well-recognized bacterial groups with methanotrophic activity is provided in Figure 21. The results show that the second sample collected from TP1 (group A) exhibited the largest proportion of methanotrophs. These results also showed that bacteria affiliated with the genus Methylocaldum were the most abundant bacterial group with methanotrophic activity in these environments.

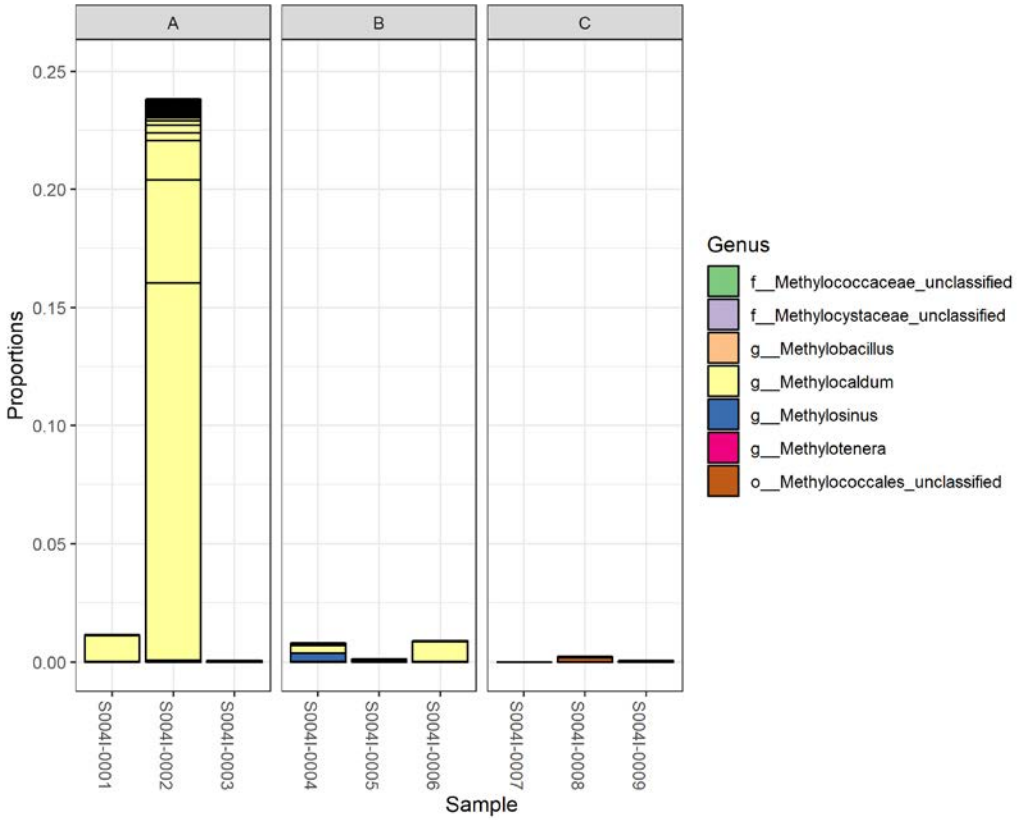


Figure 21 - Bacterial proportions in different biocover pads

Figure 22 illustrates qPCR results. estimated total bacterial load in different samples.

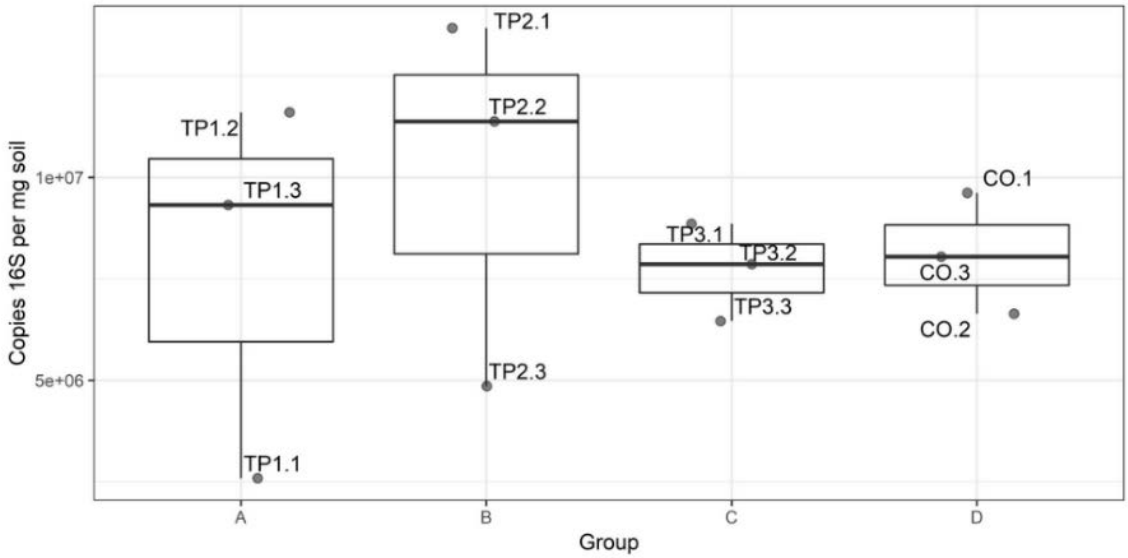


Figure 22 - Total Bacterial qPCR results (copies of 16S per mg of sample)

7. GHG CAPTURE EFFICIENCY

7.1 ENV LFG Regulation and Management Facilities Design Guideline

The ENV LFG regulation requires active LFG collection for landfills producing CH_4 at levels higher than the regulation threshold. According to the regulation, the collected CH_4 shall undergo thermal oxidation in an enclosed flare and/or an LFG utilization system.

ENV's LFG management facilities design guideline (the Guideline) requires the LFG management system be designed based on 10 design standards:

Design Standard 1 - *The results of the LFG generation assessment conducted in accordance with the Regulation will provide the basic inputs to design the LFG management system.*

Design Standard 2 - *It is expected that LFG management systems must be designed to maintain 75 percent collection efficiency.*

Design Standard 3 - *All regulated landfills are required to design and install active LFG collection systems to collect LFG as per the BC MOE Regulation requirements.*

Design Standard 4 - *LFG management systems will be designed to accommodate the maximum LFG generation expected, rather than the expected LFG collection.*

Design Standard 5 - *All LFG captured must undergo a reduction in global warming potential as it relates to the methane component of the gas (i.e. flaring, LFG utilization for electricity generation, fuel for vehicles, etc.)*

Design Standard 6 - *An active LFG collection system is required to include a complete LFG extraction control plant on-site with a LFG flare. If flaring will be the primary methane destruction device, an enclosed high-efficiency flare will be utilized. A candlestick flare may be utilized as the backup system to a LFG utilization system, or may be used when there is a surplus of LFG collected (above the capacity of the utilization system). However, where a utilization system is in place and a candlestick flare is used as backup, the candlestick flare will not be the primary combustion device.*

Design Standard 7 - *LFG flow rate (in m^3/hr or equivalent), methane composition (in percent by volume), oxygen content (in percent by volume) and flare stack temperature (in degrees Celsius) must be measured on a continuous basis with ongoing logging of all data on an aggregated period of not less than every five minutes. The LFG flow rate and composition (methane and oxygen content in percent volume) along with the flare stack temperature (in case of the enclosed flare) shall be continuously monitored and logged at least every 5 minutes.*

Design Standard 8 - *An enclosed flare must be designed to have a minimum retention time of 0.5 seconds and a minimum flare temperature of 875 degrees Celsius.*

Design Standard 9 - *Landfill owners and operators must develop an Operations and Maintenance Manual for the LFG management systems.*

Design Standard 10 - *All buildings on the landfill site must have continuous combustible gas measurement equipment.*

According to these design requirements, it can be concluded that GHG emissions reduction with target efficiency of 75% is intended.

7.2 Comparison of GHG Emissions Reduction for Various Options for CML

To summarize the results presented in Section 6.1, the pilot study concluded that the optimally designed biocover system (i.e. TP1) showed an average CH_4 removal efficiency of 77% in comparison with the example active LFG collection system that achieved an average of 47% collection efficiency within the 1.5-year period of the study. It is important to note that these efficiencies relate to CH_4 emission reduction levels in areas of landfill that have the gas management system (i.e. biocover or gas collection network) in place.

SHA's experience is that progressive installation of a biocover system can take place more frequently and much quicker in comparison with expansion of an active LFG collection system components (such as vertical wells and horizontal collectors). In case of horizontal collectors, the LFG system must remain off-line for a substantial period of time until one or two new lifts (2-3m) of waste (or final cover system) are in place. On the other hand, the horizontal collectors allow for collection of LFG in deeper layers beneath the active face of the landfill while in case of biocovers, CH_4 oxidation cannot be achieved within the active face footprint. In summary, assuming a well-designed landfilling sequence and operational procedures are in place for the landfill, we assumed that approximately 10% of the landfill footprint (active face and area scheduled to receive waste in near future) will remain without a LFG management system in place until the landfill airspace capacity is achieved, the landfill is not receiving any further waste deposits and the entire facility has undergone full closure capping construction.

Additionally, in the case of having an active collection system in place, the actual CH_4 emission reduction efficiency also depends on the destruction efficiency of the flare system that has to be multiplied to the capture efficiency of the system. We assumed a 98% overall CH_4 destruction efficiency for CML flare system. Therefore, biocover and active LFG systems have CH_4 emission reduction efficiencies of 77% and 46%, the overall GHG emissions reduction efficiencies from the CML is expected to be 69% and 41%, respectively. Table 15 presents a summary of the concluded efficiencies for each option.

Table 15 - Comparison of methane emissions reduction efficiencies

	Methane Reduction Efficiency		Phase 1 GHG Emissions Reduction Efficiency		Overall GHG Emissions Reduction Efficiency [1]	
	Biocover	Active Sys.*	Biocover	Active Sys.**	Biocover	Active Sys.
Round 1 measurement	79%	61%	79%	60%	71%	54%
Round 2 measurement	79%	58%	79%	57%	71%	51%
Round 3 measurement	79%	57%	79%	56%	71%	50%
Round 4 measurement	72%	61%	72%	60%	65%	54%
Round 5 measurement	76%	24%	76%	24%	68%	21%
Round 6 measurement	78%	18%	78%	18%	70%	16%
Average	**77%**	**47%**	**77%**	**46%**	**69%**	**41%**

* includes possible system shutdowns, includes 10% baseline methane oxidation

** assumed an overall 98% destruction efficiency

[1] Assumed 10% of the site without LFG management system in place

7.3 Additional GHG Emissions Reduction through Organic Diversion

As previously mentioned, the RDOS, in order to reduce the GHG emissions from the CML, is actively looking into potential initiatives such as organic waste diversion program and placement of a fabricated biocover system at the CML site.

An organic diversion program will reduce future CH_4 generation rates and the engineered biocover system will further reduce the regional district's GHG emissions footprint by oxidizing the remaining CH_4 that will be generated at the CML.

In 2012, SHA completed a landfill gas generation assessment and organic diversion analysis for the CML showing a 20% lifespan CH_4 generation avoidance that would be achieved by the RDOS's intended organic diversion program. Figure 23 illustrates the results of SHA's 2012 analysis for CH_4 generation rates as CML with and without organic diversion.

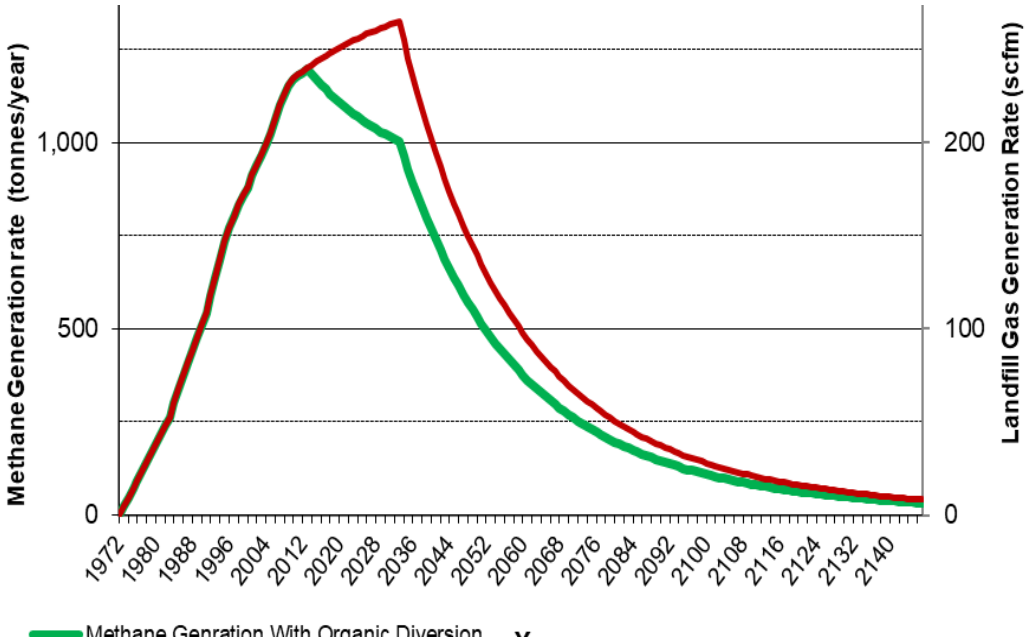


Figure 23 - Methane generation rates at CML, with and without organic diversion

Based on the results of this study and our previous LFG generation analyses, SHA believes that implementation of these initiatives will result in RDOS exceeding the ENV LFG regulation while avoiding the large costs and risks of an active LFG collection system at the CML.

A comparison of system costs and risks are discussed in the following sections. Nevertheless, the results of this study showed that for the relatively arid climate in Penticton, managing fugitive CH_4 emissions by an active LFG management system is less effective in comparison to a well-designed biocover system. Focusing available solid waste management budgets on organics diversion initiatives rather than having to incur huge capital costs of an active LFG management system would result in reduced overall GHG impacts when considering the CH_4 generation avoidance

outlined above. Diverting organics away from the landfill would further reduce the potential GHG generation and most likely result in the site exceeding the GHG emissions reduction goals of the ENV LFG regulation.

Figure 24 illustrates estimated GHG emissions rate from the CML when; (i) no LFG management system is in place, (ii) with an active LFG collection and flaring starting, (iii) with biocover system starting, (iv) with biocover system and organic diversion program both implemented, and (v) as per the LFG regulation and Guideline expectations. Values are based on:

- Modeled CH_4 generation rates,
- CH_4 global warming potential of 25 (in a 100-year timeframe)
- Measured CH_4 reduction efficiencies for biocover and active LFG systems.

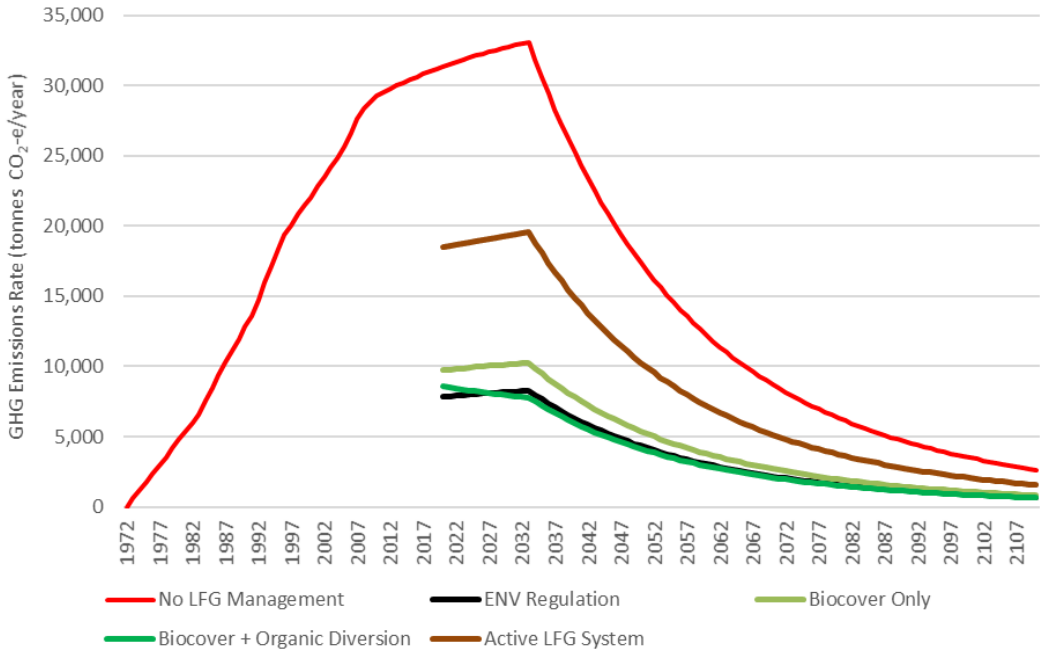


Figure 24 - GHG emissions analysis for various options at CML

8. MONITORING AND MAINTENANCE OF BIOCOVER

An extensive search within the available design and operation guidance documents, case examples and literature in general revealed the fact that to date no consistent set of guidelines or guidance documents have been published on monitoring and maintenance of biocover systems.

General monitoring and maintenance requirements were found in various publications. One document in particular provides more specific guidance on monitoring and maintenance of passive gas drainage and biofiltration in landfills. This document is published by the Department of Environment, Climate Change and Water NSW, Australia (Handbook for the design, construction, operation, monitoring and maintenance of a passive landfill gas drainage and biofiltration system, 2010).

Recommendations presented in this handbook are provided to assist landfill owners and operators with the operation, monitoring and maintenance of a passive gas drainage and biofiltration system. It should be recognised that passive landfill gas drainage and biofiltration systems are a new method for treating landfill gas and the information provided in this handbook is based on research undertaken overseas and the results of a number of trials undertaken in Sydney. Consequently, knowledge on the design, behaviour and performance of the systems is growing as the systems are implemented.

8.1 Monitoring Program

Once installed, operation and monitoring of a passive gas drainage and biofiltration system is relatively simple and primarily involves regular monitoring and occasional / irregular monitoring that may be undertaken to further evaluate a potential problem. These are described in the following sections.

8.1.1 Regular monitoring

Monitoring should initially occur more frequent; e.g. weekly / monthly, then quarterly, then bi-annually, plus after significant rainfall events e.g. > 20 mm of rainfall. Monitoring should also occur more regularly during periods of drought to check the moisture levels of the biocover media.

Regular monitoring should include:

- odours from the biocover,
- condition of the biocover media including settlement, formation of a surface crust, scouring, and / or desiccation of the media,
- moisture content of the upper layers of the biocover media,
- ponding of water on the surface of the biocover media,
- condition of vegetation growing on the biocover surface, including weeds / unwanted vegetation, and
- condition of surface water management measures.

Additional monitoring of the following:

- composition and flow of landfill gas from the passive drainage system(s) to the biocover,
- emissions / flux from the surface of the biocover (CH_4 and CO_2),
- moisture content of the upper layers of the biofilter media, particularly in a dry / hot climate / drought conditions, and
- depth of drainage water in the gas distribution layer.

8.1.2 Occasional (as required) monitoring

There may be a need to undertake additional monitoring of the system if regular monitoring identified a potential problem. This may include the following:

- full temperature profile of the biocover media,
- full moisture content profile of the biocover media,
- gas composition profile of the biocover,
- assessment of clogging, possibly involving excavation, sampling and visual inspection of the biocover media,
- quantification of settlement of the biocover media surface, and
- microbiological analysis of the biocover media.

8.2 Maintenance Requirements

Maintenance of a passive gas drainage and biocover system is dependent on the results of monitoring and may involve the following:

- drainage of water from the aggregate gas distribution layer if the bio-media is in box, above ground or lined,
- maintaining vegetation growth on the biocover media e.g. mowing, trimming, weed removal and disposal,
- topping up the media to overcome media settlement, if required,
- mix and turn upper layer of media, as required, if crust form,
- addition of a wetting agent to the biofilter media (upper layers), if found to not be holding water,
- replacement of the upper layers of the biocover media, if the crust is too hard to break up and a wetting agent does not work.

Replacement of the biocover media, if required, as determined by monitoring. Indicators may include:

- reduced biofilter performance i.e. CH_4 oxidation rate,
- large or excessive settlement, which may adversely affect media porosity and subsequently gas and water movement through the biofilter media,
- ponding of water on the surface of the biofilter, which may indicate clogging and
- clogging of the biofilter media, which may be due to settlement, microbial growth or EPS formation, and which may adversely affect media porosity and subsequently gas and water movement through the biofilter media.

8.3 Preventative Measures for Surface Erosion

Similar to other types of landfill covers, surface erosion is of particular importance when biocover systems are implemented. Typically, landfill covers are protected against surface erosion using a variety of methods including but not limited to application of geosynthetic materials such as erosion control blankets, loose broadcasted straw, silt fencing and straw wattles. However, given the operational objective of biocover systems being the reduction of fugitive CH_4 emission, an optimum level of moisture needs to be maintained within the biocover structure, while avoiding saturation is critically important. Therefore, it is necessary to implement an effective stormwater management system to minimize the surface erosion and potential loss of biocover material.

Photo 20 shows an example of a biocover system erosion caused by ineffective stormwater management.

Photo 20 - Erosion channel on a biocover surface in a landfill in BC

Given the location and specifics of each landfill, design of site-specific stormwater management and surface erosion control systems should be recommended.

Avoiding steep slopes is another important aspect that should be taken into account to prevent erosion and tension cracks in biocover systems. Typically slopes steeper than 3H:1V are recommended to be avoided at landfill surfaces.

9. COMPARISON OF LFG MANAGEMENT OPTIONS, COSTS AND RISKS

In this section a comparison between two LFG management options (Scenarios) with respect to costs, risks and liabilities are presented where;

(i) **Scenario 1** includes CH_4 oxidation through progressive installation of an engineered biocover system over top of a 600 mm compacted clay barrier layer (to meet the final closure requirements of the new landfill criteria), and

(iii) **Scenario 2** consists an active collection of LFG and thermal oxidation of CH_4 as per the requirements of the ENV LFG management facilities design guideline, and a geomembrane cap system.

A fundamental basis for developing these scenarios is to achieve effective control of the fugitive CH_4 emissions from the CML that will result in maximum reduction in potential GHG emissions from this site in a safe and environmentally friendly manner.

9.1 Capital, Operation, Maintenance and Monitoring Costs

In 2012, SHA prepared an active LFG management facilities design plan for the CML. Furthermore, a detailed filling and closure sequence along with a comprehensive cost analysis of closure options for the CML was prepared and presented in CML's design, operation and closure plan (DOCP) recently developed by SHA. We used these design plan documents to further develop the cost analysis and comparison of the LFG management options presented below.

SHA used the following assumptions for the two scenarios in completing this analysis for capital and operation & maintenance (O&M) costs:

Scenario 1 capital costs includes:

- Installation of a temporary biocover system on the surfaces that are not yet at final design grade but are temporarily closed and will not receive additional waste for a many year (3-10 years).
- The biocover will be constructed over a gas distribution layer and will include surface water management and erosion control components of a typical final closure system.
- Installation of a final closure system, including clay cap and biocover system, on surfaces that have reached the final design elevation as per the DOCP.

Scenario 1 O&M costs includes:

- Quarterly inspection and as-needed maintenance of the biocover system.
- Quarterly monitoring of GHG emissions from the biocover surfaces.
- CH_4 emissions quantification for annual reporting to the ENV.

Scenario 2 capital costs includes:

- Installation of an intermediate cap system in areas that are temporarily closed but are not at the final design grade and will not receive additional waste for a few years.

- Installation of an impermeable geomembrane cap in the areas that have reached the final design elevations as per the DOCP.
- Installation of an active LFG collection and flaring system as per CML's LFG management facilities design plan prepared by SHA in 2012 following the ENV's guideline requirements.

Scenario 2 O&M costs includes:

- Operation and maintenance cost for the active LFG collection and flare system.
- LFG system operation performance annual reporting to the ENV.

9.1.1 Capital Costs

Scenario 1 – Biocover: Calculating the capital cost for Scenario 1 (biocover system) we considered two types of biocover system; (i) temporary biocover (Type 1) (or operational biocover) that would include gas distribution layer, surface water management system, vegetation and erosion control features, (ii) final biocover system (Type 2) that would include a 600mm thick clay cap, gas distribution layer, surface water management system, hydroseeding and vegetation and erosion control features.

Type 1 biocover will be installed in the area that will receive additional waste in the future. This will allow maximum achievement of GHG reduction from the site. Based on the filling sequence and closure phases presented in CML DOCP, we estimated that an initial capital cost of approximately $1.4 million will be required to install a Type 1 biocover over an approximately 8 ha area. Installation of Type 1 biocover will continue until Phase 2 of the landfill reaches the designed final elevation and Type 2 biocover will be installed. The total lifespan capital cost estimate for this scenario is approximately $11.9 million (not accounting for inflation).

Scenario 2 – Active LFG System: According to the LFG management system design plan, Phase 1 of the LFG active system will include vertical wells, horizontal collectors, header and sub-header pipes, a condensate management system and the LFG extraction system (blower and flare). This initial construction phase will cost of approximately $4.8 million including placement of a 600 mm intermediate soil cover. Furthermore, in order to maximize the LFG collection efficiency, the LFG collection system will have to be expanded with periodic installation of the horizontal collectors between the final closure phases. Subsequently, when a new area of the landfill reaches the designed final elevation, that area will receive the final closure system (geomembrane cap) and new vertical wells will be installed. The total lifespan capital cost estimate for this scenario is approximately $25.3 million (not accounting for inflation).

Unit rates, areas and other assumptions are detailed in Table 16 and outline that the closure phases were adopted from the DOCP (presented as Figures 7-9 to 7-12 in Appendix D of this report).

Table 16 - Capital cost analysis for active LFG and biocover systems

Scenario 1 - Progressive BioCover System Installation with Clay Cap at Final Grades

	Existing North Slope Biocover	Phase 1 Interm. Biocover	Phase 2 Closure & Final Biocover	Phase 2 Interm. Biocover	Phase 3 Closure & Final Biocover	Phase 3 Interm. Biocover	Phase 4 Closure & Final Biocover	Phase 4 Interm. Biocover	Phase 5 Closure & Final Biocover	TOTAL
Biocover Area (m^2)	82,846	26,900		16,055		12,842		16,945		
1 Intermediate Biocover	$1,408,382	$ 457,300	$ -	$ 272,935	$ -	$ 218,314	$ -	$ 288,065	$ -	$ 2,644,996
Final Closure Area (m^2)			68,833		22,413		71,778		100,248	
2 Clay Cap System + Biocover	$ -	$ -	$2,409,155	$ -	$ 784,455	$ -	$2,512,230	$ -	$3,508,680	$ 9,214,520
Scdnario 1 Grand Total:	$1,408,382	$ 457,300	$2,409,155	$ 272,935	$ 784,455	$ 218,314	$2,512,230	$ 288,065	$3,508,680	$11,859,516

Senario 2 - Progressive Active LFG Collection System with Geomembrane Cap at Final Grades

	Phase 1 Ongoing	Phase 2 Ongoing	Phase 2 Closure	Phase 3 Ongoing	Phase 3 Closure	Phase 4 Ongoing	Phase 4 Closure	Phase 5 Ongoing	Phase 5 Closure	TOTAL
; Collection system Area (m^2)	82,846	20,000			22,413		70,815		100,248	
1 Active LFG Collection System	$2,319,688	$ 560,000	$ -	$ -	$ 627,564	$ -	$1,982,820	$ -	$2,806,944	$ 8,297,016
2 Blower/ Flare Skid	$ 800,000	$ -		$ -	$ 800,000	$ -	$ 800,000	$ -	$ 800,000	$ 3,200,000
	$3,119,688	$ 560,000	$ -	$ -	$ 1,427,564	$ -	$2,782,820	$ -	$3,606,944	$11,497,016
Final Closure Area (m^2)			68,833		22,413		71,778		100,248	
3 Geomembrane Cap System	$ -	$ -	$3,166,318	$ -	$ 1,030,998	$ -	$3,301,788	$ -	$4,611,408	$12,110,512
4 Intermediate Soil Cover	$1,656,920	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,656,920
	$1,656,920	$ -	$3,166,318	$ -	$ 1,030,998	$ -	$3,301,788	$ -	$4,611,408	$13,767,432
Scenario 2 Grand Total:	$4,776,608	$ 560,000	$3,166,318	$ -	$ 2,458,562	$ -	$6,084,608	$ -	$8,218,352	$25,264,448

*Cost Estimates DO NOT include inflation

LFG Collection System:	$ 28	$/$m^2$	
Geomembrane Cap:	$ 46	$/$m^2$	(Including full final closure system components)
Biocover:	$ 17	$/$m^2$	(Including Preparation, Grading, distribution/ drainage, ditching etc.)
Clay Cap + Biocover:	$ 35	$/$m^2$	(Including full final closure system components)
Intermediate Cap:	$ 20	$/$m^2$	(Including Preparation, Grading, Drainage, Ditching etc.)

9.1.2 Operation, Maintenance and Monitoring Costs

Scenario 1 – Biocover: In calculating the biocover system monitoring and maintenance costs, quarterly surface scans and GHG emissions measurement were considered. Additionally, costs of regular inspection and remediation of any possible erosion channels and cracks were taken into account. Our estimate for monitoring and maintenance of the biocover system is approximately $100,000/year including data collection, compilation as well as annual reporting. We assumed that maintenance and remediation measures will take place using the RDOS onsite resources with guidance of a qualified professional.

Scenario 2 – Active LFG System: Operation and maintenance costs for the active LFG system will increase as the system is expanded throughout the years. Due to the high risk of landfill fire that could be resulted by accidental application of excessive vacuum to the field, we expect a higher than usual field balancing (operation and monitoring) cost should be budgeted for the CML.

Assuming a 10 – 12 ha area, active LFG system annual O&M cost is estimated at approximately $225,000/year. This includes $75,000/year for operation and monitoring of the LFG collection,

extraction and flaring system, approximately $125,000/year for maintenance of the wellfield and the extraction facility, and $25,000 for data compilation and annual reporting.

9.2 Landfill Fires and Gas Collection Systems

Operation of active LFG Collection systems involves application of negative pressure (i.e. vacuum) in order to 'actively' collect the generated gas. Landfill fire can be caused by overpulling on the LFG collection system causing potential infiltration of air/ O_2 into the in-situ waste mass. Every landfill is different, in some landfills the fire may start from O_2 intrusion and in others, it may start with physical changes or chemical reactions that occur within the landfill. However, all fires require an O_2 source to endure. Recently, SHA has become aware of exothermic chemical reactions occurring at landfills that are not classic landfill fires, but rather reactions that produce significant heat, emissions and volume loss. It is suspected that these events are initiated by subsurface fires which impact sufficient heat in the subsurface to initiate the self-feeding reaction. Therefore, it is critical that any possible overdraw and air intrusion be avoided and immediately addressed if occurred.

9.2.1 SHA Experience in Other Sites

SHA and Landfill Fire Control Inc. (LFCI) have been involved in extinguishment of more than 30 fires in landfills across Canada and internationally. While most of the incidents were found to be initiated due to poor cover in place and/or steep side sloes leading to air intrusion and spontaneous combustion, we found over extraction of LFG as a major cause of many landfill fires. Examples include a few incidents in different years at the Vancouver Landfill where high carbon monoxide (CO) levels (i.e. indicator of subsurface spontaneous combustion and fire) were detected in the collected LFG. In most of these events we concluded that overpulling on the LFG collection system was the primary cause of localized subsurface fire.

In a similar incident in 2014, LFCI was retained by the City of Winnipeg to complete a landfill fire control and risk assessment at the Brady Road Landfill. Our conclusion in that project also was that over extraction of LFG from some of the wells at this site resulted in oxygen intrusion into the wellfield triggering spontaneous combustion fires in close proximity of these wells. Figure 25 shows a

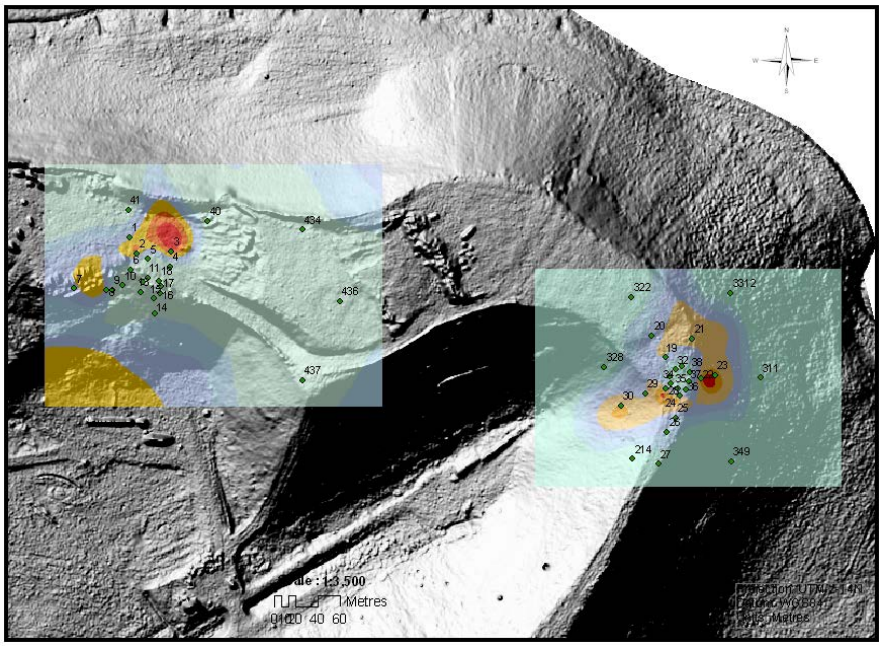


Figure 25 - Identified 2014 Hot Spots at the Brady Road Landfill

satellite image indicating the identified hot spots near the LFG extraction wells at the Brady Road Landfill.

9.2.2 Landfill Fire Risks at CML

The CML has experienced several subsurface fires Since 1998. SHA has been closely involved in the efforts to extinguish the fires, and to prevent any reoccurrence since. Several additional monitoring wells and thermistors have been installed throughout the site and have been monitored regularly by the RDOS. Additionally, installation of a soil cap and any other provisions to avoid intrusion of O_2 to the landfill has been the primary recommendation to avoid the formation of additional fires.

Considering the low precipitation levels in Penticton and the historical fires that have occurred at this site, SHA is of the opinion that **risk of reoccurring fires at the CML due to air intrusion is substantially higher than usual**. Therefore, installation of a well designed biocover system that can effectively control the fugitive CH_4 emissions from the CML is preferred over an active LFG management system from a health and safety and hazard / risk mitigation perspective.

Should the RDOS be mandated to install and operate an active gas management system at the CML we highly recommend that the LFG wellfield be balanced in a safe and effective manner to avoid any air intrusion and landfill fire potential. This will certainly increase the LFG management system operation costs above typical industry standards.

SHA has seen many landfills sites where application of excessive vacuum to the field have resulted in air intruding into the waste mass and caused spontaneous combustion and landfill fire. In addition to the serious health and safety hazards associated with landfill fires, a significant budget may be required for fire control response and its full mitigation measures. Typically, extinguishment costs depend on the size of the landfill and degree of the Landfill Fire. Expenses on Medium and Large landfill fires can add up rapidly and expenditures of $20,000 to $50,000 per day are not uncommon. **Our estimate for a landfill fire control, mitigation response and monitoring for the CML range from $200,000 to $2,000,000 per event.**

10. CONCLUSION AND RECOMMENDATIONS

SHA has completed a comprehensive assessment of a fabricated biocover pilot project through a 1.5-year study on the in collaboration with the RDOS and MV. The study included the design of different biocover blends and an assessment of the effectiveness of each blend in CH_4 removal. The study also compared effectiveness of the biocover system with an active LFG collection system installed in a BC landfill with similar climatic conditions as Penticton.

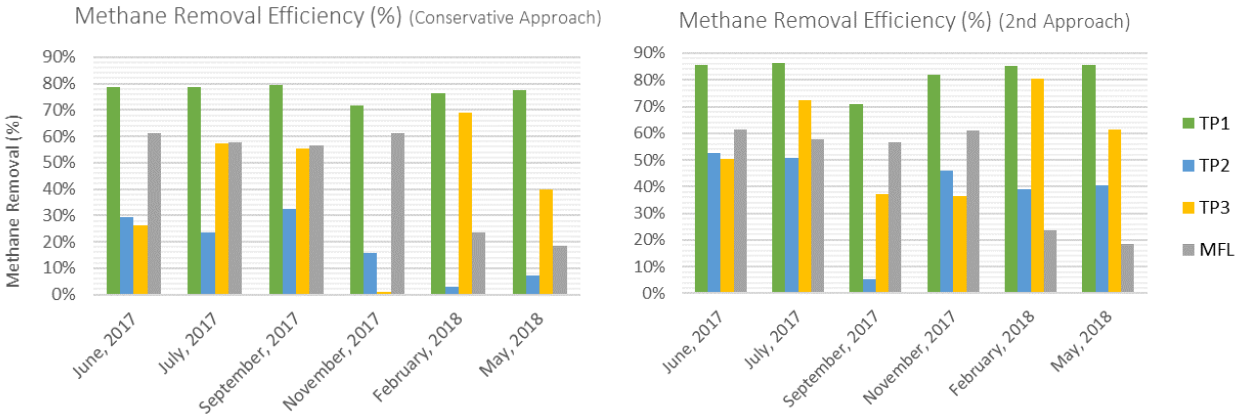
Through these investigations, we identified the best biocover blend with maximum CH_4 oxidation rate that could be achieved in the relatively arid climate in Penticton. Our investigations and analyses showed that GHG emissions reduction achieved by the biocover was considerably greater than the active gas collection system in this climate.

In summary:

- Significant reduction in fugitive CH_4 emissions from the Campbell Mountain Landfill was achieved by the biocover test pads with maximum average removal efficiency values as high as 77% to 83% (Summarized below for different test pads).

	Methane Removal Efficiencies at CML		
	TP1	TP2	TP3
Conservative Approach (no Baseline MER Adjustment)	77%	19%	41%
2nd Approach (Baseline MER adjusted)	83%	39%	56%

- TP1, the best performing biocover achieved reductions of CH_4 emissions between 72% and 79% (overall average of 77%) under conservative approach, with CH_4 emission rates of 2.2 to 3.3 $g/m^2/day$. This level of performance was better than that of the Mission Flats LFG extraction well which achieved CH_4 reductions of 18% to 61% (overall average of 46%) with CH_4 emission rates of 2.2 to 4.4 $g/m^2/day$.
- Results showed that the fabricated media used in TP1 (i.e. Iona BS: Sand: Wood with ratio of 1:2:2 volume based) had the highest and the most stable performance in CH_4 oxidation. This test pad sustained CH_4 removal efficiency of 72% to 79% between May 2017 and May 2018 with the lowest values in November 2017. The achieved CH_4 removal efficiency from the TP1 biocover at Campbell Mountain Landfill was even higher than the removal efficiency of the active gas collection well at Mission Flats Landfill. Under a second data analysis approach, where the baseline CH_4 emission rates were adjusted based on the observations at the control pad, the removal efficiency at TP1 ranged between 71% and 86% with an overall average efficiency of 83%.



- Comparison of the results between TP2 and TP3 with similar blends but biosolids sourced from different WWTPs (Iona and Penticton) showed that the mature composted biosolids from Iona WWTP resulted in better overall CH_4 removal efficiencies. Therefore, SHA believes a 1:2:2 blend ratio using Iona BS: Sand: Wood Chips would provide the best blend for biocover media to be used at the climatic conditions such as CML.
- Biocover temperature monitoring results proved that methanotrophic activities persist even when ambient temperature drops below freezing. Biocover temperature decreased only during the snow melt, however, it never dropped below 5˚C in TP1. Temperature data also showed prolonged winter conditions may result in reduced effectiveness of biocover systems. TP2 with more porous media was impacted the most with ambient temperature drops.
- Temperature data perfectly matched the biocover performance data, showing that the landfill biocover temperature was much higher than the ambient temperature. Warm temperatures of active biocover observed during winter months proved the presence of heat generating methanotrophic activity even during the winter. While the bacterial activities continued during cold months, the data showed that the methanotrophic activities in landfill biocover located in areas with long winters (perhaps longer than 3-4 months) will eventually slow down.
- qPCR DNA extraction test indicated highest methanotrophic population in TP1 which also had the highest performance in CH_4 oxidation based on the FID surface scan data.
- A strong correlation was observed between FID surface scan results, biocover temperature and moisture, as well as bacterial tests. SHA demonstrated that the surface CH_4 concentration scan provides an easy and practical technique to continuously assess the effectiveness of the biocover system in CH_4 emissions reduction applications.
- SHA recommends that the CH_4 generated at CML can be easily managed with a well-designed biocover system. However, we recommend that effectiveness of the biocover be monitored on a regular basis. Our experience based on several biocover projects implemented in BC landfills shows that biocover systems are very effective in CH_4 oxidation as long as they are properly maintained.
- We estimated that the maximum GHG emissions reduction at the CML can be achieved by application of engineered biocover system at this site. Furthermore, our assessment showed that implementation of a biocover system, coupled with an aggressive organic diversion

program could result in GHG emissions reductions exceeding the ENV regulation requirements.

- SHA estimates that lifespan capital cost required for an engineered biocover system for CML is approximately $11.9 million in comparison to an active LFG management system that would require $25.3 million capital investment. Annual operation, maintenance, monitoring and reporting costs for biocover and active LFG management systems are estimated at $100,000/year and $225,000/year, respectively. These cost estimates exclude any landfill fire control, mitigation response and monitoring costs.
- SHA recommends quarterly or at least semi-annual monitoring of surface emissions from the biocover area. We recommend site specific thresholds to be developed in consultation with ENV during an initial surface scan (baseline surface CH_4 concentration) and follow up monitoring event results to be compared against the SMC thresholds. If SMC higher than the threshold are observed during any monitoring event, the identified "hot spots" need to be reported to the ENV, mitigation actions need to be completed with two weeks and a subsequent scan in that area to be completed within four weeks of implementation of the mitigation measures. Mitigation actions may include repair/ maintenance of the biocover system, removed and replacement of the biocover media or investigating needs for installation of an active gas collection well in the area.
- In order to ensure proper installation of a porous biocover and preventing CH_4 advection through the biocover, we recommend offsite gas monitoring wells be installed prior to placement of a full scale biocover system. Gas pressure and composition in the monitoring wells shall be monitored on a quarterly basis and be compared to the background data. Any indication of high gas pressure and CH_4 concentration higher than 1% (i.e. 20% LEL) shall be reported and a qualified professional to assess the situation in more detail.

At the end, SHA concludes that RDOS's proposed strategy for managing CH_4 emissions at the Campbell Mountain Landfill through implementation of an engineered biocover system is a technically sound and economically wise approach in comparison to installation of an active gas collection system at this specific landfill. However, we also recommend that a post installation monitoring and reporting program should be implemented for assessment of long-term effectiveness of the biocover system and to ensure the biocover system is maintained.

11. LIMITATIONS

This report has been prepared by Sperling Hansen Associates (SHA) on behalf of the Regional District of Okanagan-Similkameen (RDOS) in accordance with generally accepted engineering practices to a level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions in British Columbia, subject to the time limits and financial and physical constraints applicable to the services.

The report, which specifically includes all tables and figures, is based on engineering analysis by SHA staff of data compiled during the course of the project. Except where specifically stated to the contrary, the information on which this study is based has been obtained from external sources.

This external information has not been independently verified or otherwise examined by SHA to determine its accuracy and completeness. SHA has relied in good faith on this information and does not accept responsibility of any deficiency, misstatements or inaccuracies contained in the reports as a result of omissions, misinterpretation and/or fraudulent acts of the persons interviewed or contacted, or errors or omissions in the reviewed documentation.

The report is intended solely for the use of the RDOS. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. SHA does not accept any responsibility for other uses of the material contained herein nor for damages, if any, suffered by any third party because of decisions made or actions based on this report. Copying of this intellectual property for other purposes is not permitted.

The findings and conclusions of this report are valid only as of the date of this report. The interpretations presented in this report and the conclusions and recommendations that are drawn are based on information that was made available to SHA during the course of this project. Should additional new data become available in the future, Sperling Hansen Associates should be requested to re-evaluate the findings of this report and modify the conclusions and recommendations drawn, as required.

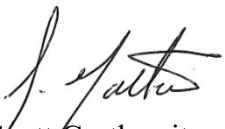
Sperling Hansen Associates would like to thank the RDOS, CoK, MV and the ENV for this collaborative project and for the opportunity to conduct this pilot project for the RDOS at the Campbell Mountain Landfill. We believe that the results of this pilot study will be a key to great opportunities for reduction of GHG emission from landfills in BC. Should you have any questions or comments about this preliminary report or require any further information, please do not hesitate to contact the undersigned.

Yours truly,

SPERLING HANSEN ASSOCIATES

Report Prepared by:

Dr. Ali R. Abedini,
Sr. Environmental Consultant
Landfill Gas Specialist



Scott Garthwaite
Engineering Technologist

Report reviewed by:

Dr. Tony Sperling, P.Eng.
President

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Appendix A

Graphical Illustration of Surface Scan Measurements at CML and MFL

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All Appendices are available in the Full Version of the Report at the following link until April 2020 when it will be posted on the RDOS website.

https://file.rdos.bc.ca/index.php/s/hBe6xomE3xB5GaG

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Appendix B

Graphical Illustration of Full set of Temperature Data

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Appendix B

Graphical Illustration of Full set of Temperature Data

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ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 19 2020

RE: Community Emergency Preparedness Fund – Emergency Operations Center

Administrative Recommendation:
THAT the Regional District apply to the UBCM Community Emergency Preparedness Fund (CEPF) for an Emergency Operations Center & Training Grant.

Purpose:
To secure Provincial funding for Emergency Operations Centre (EOC) to build local capacity through the purchase of equipment and supplies required to improve the RDOS EOC and enhance EOC capacity through training and exercises.

Business Plan Objective:
Key Success Driver 3.0: Build a Sustainable Community.
Objective 3.1.4 By reviewing and updating the emergency management program.

Background:
The RDOS EOC is responsible for carrying out the principles of emergency preparedness and emergency management at strategic and response levels during an emergency.

The UBCM CEPF Emergency Operations Centre & Training grant is intended to support the purchase of equipment and supplies required to maintain or improve the EOC and to enhance EOC capacity through training and exercises. Ongoing operational costs are not eligible.

The 2018 Emergency Response season and lessons identified drew attention to the need to build our resilience and capabilities within the RDOS Emergency Management Program. Staff have prepared the application to the UBCM CEPF Emergency Operations Centre & Training grant, requesting the amount of $24,950 to secure provincial funding for regional EOC information technology equipment, and training for the RDOS EOC, as well as promotion of the RDOS's Public Emergency Notification System Civic Ready. In 2017 and 2018 the RDOS was successfully awarded the UBCM CEPF Tools and Training Grant ($25,000) for two consecutive years. The combined funding of just under $50,000 supported the technology for the new RDOS EOC and funded the RDOS mobile EOC trailer.

Through the exercises in January and February of 2020, it was identified additional technology is required to support regional responses. The funds will also provide essential training for our staff, volunteers and community partners through joint training opportunities, to increase resilience and our preparedness throughout the Region.

Alternatives:
The Board of Directors could choose not to support the application towards the Community Emergency Preparedness Fund.

Communication Strategy: If the application is approved by the Board and is successful in obtaining funding, the news will be released via press release on the RDOS website and social media outlets.

Respectfully submitted:

"Anne Benn"

_____
A. Benn, Emergency Program Coordinator

RDOS EOC UBCM CEPF Grant Application Budget

	~ Cost	Number	Subtotal	In-Kind	Comments
Technology					
Desktop Computers for EOC	$750	2	$1,500	*IT Staff time	Currently the EOC at the RDOS has 2 desktop computers, they do not provide the functionality required based on training exercises in Jan/Feb 2020. IT has indicated the cost for these computers to be $750 each.
Lap Tops for EOC	$1,500	5	$7,500	*IT Staff time	Through exercises we have identified some sections would benefit from having additional computers.
Technology Accessories	$100	5	$500	*IT Staff time	For each computer, powerbar, mouse, USB key.
Software - not annual licensing	$350	7	$2,450	*IT Staff time	MS Standard includes, Word, Excell, and Outlook - The IT department has indicated MS Office may not be purchasable in the next 6 months and they maybe moving to a subscription based system.
Subtotal			**$11,950**		
EOC Training					
Large Scale Mock Exercise	$12,000	1	$12,000	* Training Space and Staff Time to attend exercise	We have surveyed our partners, and it has been indicated in order to get a good understanding of how we can work together across the region, we would like to run an exercise that builds within the regions and results in working together as a region. We would like to hire a contractor to complete this exercise in February/March 2021.
Subtotal			**$12,000**		
Promotion of Civic Ready					
Print promotion	$1,000		$1,000		Civic Ready is the RDOS Emergency Broadcasting system - individuals need to opt into the service. The RDOS would like to take out advertisement(s) in local media to help promote the uptake of this service, which provides individuals information to emergency alerts across the region. Any cost savings noted in the above two areas, we would like to use the savings to support promotion of Civic Ready.
Subtotal			**$1,000**	**$10,000**	
Total			**$24,950**		

ADMINISTRATIVE REPORT

TO: Board of Directors

FROM: B. Newell, Chief Administrative Officer

DATE: March 19, 2020

RE: Naramata Fire Service Area Petition

Administrative Recommendation:

THAT Bylaw No. 2893, 2020 Naramata Fire Prevention and Suppression Local Service Establishment Amendment Bylaw be adopted.

Purpose:
To bring four parcels into the Naramata Fire Prevention and Suppression Local Service Area

Reference:
Bylaw No. 1619, 1995

Background:
The owner of Lot 3, DL 3474, SDYD, Plan EPP60812; Lot 4, DL 2711, and 3474, SDYD, Plan EPP60812; Lot 5, DL 3474, SDYD, Plan EPP60812; and Lot A, DL 3474, SDYD, Plan KAP59640 has petitioned the Regional District to amend the Naramata Fire Prevention and Suppression Local Service Area to include these four parcels. The parcels are to the east of the existing Service Area.

Analysis:
Under Regional District Establishing Bylaw Approval Exemption Regulation 113/2007, the Board may adopt a bylaw without approval of the Inspector of Municipalities if a sufficient petition and consent from the Electoral Area Director is received. The regulation requires that a local government must allow one meeting between third reading and adoption. The bylaw received three readings at the March 5, 2020 Board Meeting.

The Naramata Fire Chief is supportive of the inclusion of the parcels. The Corporate Officer has certified the petition as sufficient and valid.

Alternatives:
1. Adopt Bylaw No. 2893, 2020 Naramata Fire Prevention and Suppression Local Service Establishment Amendment Bylaw.
2. Rescind three readings and abandon the bylaw.

Respectfully submitted:

"Gillian Cramm"

_____
G. Cramm, Legislative Services Coordinator

Endorsed by:

_____
C. Malden, Manager of Legislative Services

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
BYLAW NO. 2893, 2020

A bylaw to amend the Naramata Fire Prevention and Suppression Local Service Establishment Bylaw.

WHEREAS the Board of Directors of the Regional District of Okanagan-Similkameen wishes to proceed under the *Local Government Act*, to amend the boundaries of the service area of the Naramata Fire Prevention and Suppression Local Service Establishment Bylaw No. 1619, 1995;

AND WHEREAS the property owner of the following parcels has petitioned the Regional District to extend the boundaries of the Naramata Fire Prevention and Suppression Local Service area to include their properties legally describes as:

Lot 3, District Lot 3474, Similkameen Division of Yale District, Plan EPP60812;
Lot 4, District Lot 2711, and 3474, Similkameen Division of Yale District, Plan EPP60812;
Lot 5, District Lot 3474, Similkameen Division of Yale District, Plan EPP60812; and
Lot A, District Lot 3474, Similkameen Division of Yale District, Plan KAP59640;

AND WHEREAS the Director for Electoral Area "E" has consented to the amendment of the Naramata Fire Prevention and Suppression Local Service Establishment Bylaw No. 1619, 1995, pursuant to the *Local Government Act*;

NOW THEREFORE the Board of Directors of the Regional District of Okanagan-Similkameen in open meeting assembled ENACTS as follows:

1.0 CITATION

1.1 This bylaw may be cited for all purposes as the "Naramata Fire Prevention and Suppression Local Service Establishment Amendment Bylaw No. 2893, 2020".

2.0 AMENDMENT OF SERVICE

2.1 The service area established by "Naramata Fire Prevention and Suppression Local Service Establishment Bylaw No. 1619, 1995" is amended by adding the properties shown shaded on Schedule 'A' which is attached to and forms part of this Bylaw.

READ A FIRST, SECOND, AND THIRD TIME this 5th day of March, 2020.

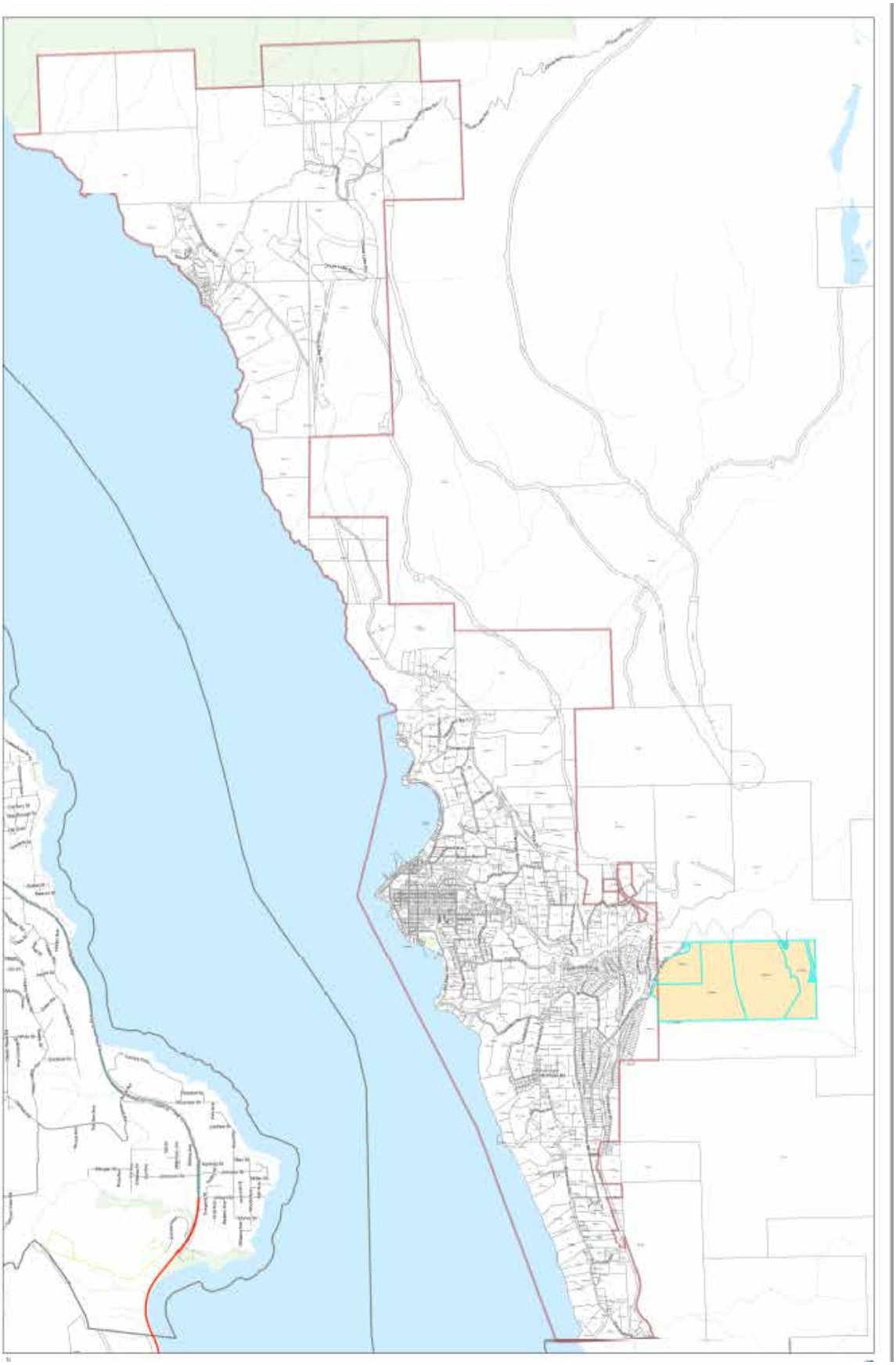
DIRECTOR CONSENT OBTAINED this ___day of ___, 2020.

ADOPTED this ___ day of ___, 2020.

_____ _____
Board Chair Corporate Officer

FILED WITH THE INSPECTOR OF MUNICIPALITIES this __ day of _____, 20__.

Schedule A



ADMINISTRATIVE REPORT

TO:	Board of Directors
FROM:	B. Newell, Chief Administrative Officer
DATE:	March 19, 2020
RE:	Waste Management Service Regulatory Amendment Bylaw No. 2796.01, 2020

Administrative Recommendation:

THAT Bylaw 2796.01, Waste Management Service Regulatory Amendment Bylaw, be read a first, second and third time, and be adopted.

Purpose:
To amend Bylaw 2796, 2018 Waste Management Service Regulatory Bylaw.

Reference:
Waste Management Service Regulatory Bylaw No. 2796, 2018.

Analysis:
Staff have prepared a new amendment Bylaw No. 2796.01, 2020 Waste Management Service Regulatory Amendment Bylaw to update the Waste Management Service Regulatory Bylaw adopted in 2018.

Rational for Amendments:
Refer to attached **Schedule A** of this report for rational for amendments to the Waste Management Service Regulatory Bylaw:

- Wording added or deleted for clarity purposes.
- New definitions added.
- Existing definitions removed.

Financial Implication:
There are no financial implications in relation to the adoption of the new bylaw.

Communication Strategy:
The Summary of Changes (Schedule A), along with the Consolidated version of Bylaw 2796, 2018 Waste Management Service Regulatory Bylaw will be emailed to the haulers and contractors on our email list.

Alternative:
That the Board not adopt Bylaw 2796.01, 2020.

Respectfully submitted:

"Christy Malden"

_____

C. Malden, Legislative Services Manager

REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN

BYLAW NO. 2796.01, 2020

A bylaw to amend the Regional District of Okanagan-Similkameen Waste Management Service Regulatory Bylaw No. 2796, 2018.

WHEREAS the Regional District of Okanagan-Similkameen has, by Bylaw No. 2796, 2018 established regulations for waste disposal at the Campbell Mountain, Okanagan Falls, Oliver and Keremeos Landfills;

AND WHEREAS the Regional District now deems it desirable to amend Bylaw No. 2796, 2018;

NOW THEREFORE, the Board of the Regional District of Okanagan Similkameen, in open meeting assembled, ENACTS AS FOLLOWS:

1.0 CITATION

1.1 This bylaw may be cited as the **"Waste Management Service Regulatory Amendment Bylaw No. 2796.01, 2020."**

2.0 AMENDMENTS

2.1 Under **Section 4. DEFINITIONS, subsection 4.1**, remove the following definitions in their entirety and replace with the following:

ASBESTOS CONTAINING MATERIAL (ACM) means a material as defined in the *OCCUPATIONAL HEALTH AND SAFETY REGULATION,* ENVIRONMENTAL *MANAGEMENT ACT, and HAZARDOUS WASTE REGULATION*, and suitably contained for disposal as per the Regulation, RDOS Bylaws and RDOS Guidelines (see CONTROLLED WASTE).

BURNED MATERIAL means materials damaged by fire, heat, electricity or a caustic agent that have been allowed to entirely cool for no less than a two-week period, and in a manner acceptable to the MANAGER, as per RDOS Guidelines (see CONTROLLED WASTE). BURNED MATERIALS that are hot or smoldering or not entirely cooled for more than a two week period is a PROHIBITED WASTE.

CARCASSES means dead animals, or portions thereof, that are not a PROHIBITED WASTE and in a manner acceptable to the MANAGER (see CONTROLLED WASTE and SPECIFIED RISK MATERIAL WASTE).

CONCRETE means a construction material that consists of cement, aggregate (generally gravel and sand) and water. CONCRETE must not contain ASBESTOS, large amounts of metal protruding (greater than 15 cm) nor measure greater than 1 m. in any dimension. CONCRETE also includes ASPHALT, CERAMICS, MASONRY and ROCKS not greater than 40 cm in any dimension (see RECYCLABLE).

CONCRETE BULKY means CONCRETE measuring greater than 1 m. in any dimension and/or where large amounts of metal are protruding greater than 15 cm, and including ROCKS greater than 40 cm in any dimension (see CONTROLLED WASTE).

CORRUGATED CARDBOARD - RESIDENTIAL means RESIDENTIALLY generated containers consisting of three or more layers of paper materials with a corrugated or rippled core, but excluding containers that are impregnated with blood, grease, oil, chemicals, rodent secretions, food residue, wax, or have polyethylene, polystyrene, foil or other non-paper liners, or are otherwise CONTAMINATED. Must be suitably prepared; clear of all contents, and flattened prior to placement in the RecycleBC container(s) (see RECYCLABLE).

LEAD-BASED PAINT means any coated or painted materials containing lead with a concentration of 90mg/kg (0.009%, 90ppm) or greater, and is not permitted for DISPOSAL to any SOLID WASTE DESIGNATED LOCATION that is to be chipped. (see CONTROLLED WASTE).

METAL means RECYCLABLE ferrous and non-ferrous metallic materials, containing more than 80% metal by volume, and under 2.4 meters (8 feet) in any dimension, including but not limited to, sheet metal, siding, roofing, rebar, flashings, pipes, window frames, doors, furnaces, duct work, wire, cable, fencing, metal furniture, bicycles, tire rims and metal appliances. METAL also includes REFRIDGERATION UNITS evacuated of ODS by a certified technician, suitably prepared METAL DRUMS and TANKS, barbeques, wood heating units, motorized equipment and VEHICLE parts, **that do not contain** fluids, filters, batteries, coal, bricks and rubber tires. METAL items must not contain mercury switches, PCB ballasts, or other HAZARDOUS WASTE. METAL does not include BULKY WASTE and PRESSURIZED TANKs.

PRODUCT STEWARDSHIP MATERIAL means suitable prepared residential quantities of materials that falls under a product category of the *Recycling Regulation*, *B.C. Reg. 449/2004* (see RECYCLABLE).

REFUSE means any SOLID WASTE that is designated for DISPOSAL in the ACTIVE FACE that does not constitute a RECYCLABLE, a HAZARDOUS WASTE, a CONTROLLED WASTE, or a PROHIBITED WASTE. Any SOLID WASTE materials over 8 feet will be charged as BULKY WASTE.

RESIDENTIAL SOLID WASTE means any REFUSE generated by a single family or multifamily unit residential premise as a result of residential activities. .

ROCKS means natural inorganic mineral matter of variable composition assembled by the action of heat or water.ROCKS 40 centimetres and not greater than 40 centimetres in any dimension see CONCRETE. ROCKS greater than 40 centimetres in any dimension see CONCRETE BULKY.

VEHICLE means, as per the *British Columbia Motor Vehicle Act*, a device in, on or by which a PERSON or thing is or may be transported or drawn on a highway, but does not include a device designed to be moved by human power, a device used exclusively on stationary rails or tracks, mobile equipment or a motor assisted cycle, such as a golf cart, or riding lawnmower.

WOOD-PRESERVED means wood products which have been treated with preservatives such as chromated copper arsenate (CCA), aromatic hydrocarbons (PAHs) and/or ammonium copper arsenate (ACA) to prevent rotting or wood containing LEAD-BASED PAINT or other paint containing HAZARDOUS substances and is no longer than 2.4 meters (8 feet) in length (see CONTROLLED WASTE).

YARD AND GARDEN WASTE means non-food vegetative matter free of CONTAMINANTS including prunings, branches and tree trunks maximum of 2.4 metres (8 feet) in length, hedge, shrub and tree clippings, flowers, vegetable stalks, woody or herbaceous waste (see RECYCLABLE). YARD AND GARDEN WASTE does not include FRUIT WASTE, vegetable waste, YARD WASTE SMALL DIMENSION, or WOOD WASTE-TREE STUMP.

YARD WASTE SMALL DIMENSION means chipped YARD AND GARDEN WASTE and WOOD WASTE-TREE STUMPs that is no greater than 4 cm. (1.5 inches) in diameter and no longer than 13 cm. (5 inches) in length. YARD WASTE SMALL DIMENSION also includes lawn clippings, conifer needles and leaves that is not CONTAMINATED with materials such as REFUSE, METAL and ROCKS (see RECYCLABLE).

2.2 Under **Section 4. DEFINITIONS, subsection 4.1**, amend the following definitions:

CONSTRUCTION MIXED LOAD is now called CONSTRUCTION NEW MIXED LOAD

Under PROHIBITED WASTE list: add Commercial Cooking oil

Under REFRIGERATION UNIT: add water coolers

2.3 Under **Section 4. DEFINITIONS, subsection 4.1** add the following definitions:

BURNED MATERIAL – ASBESTOS CONTAINING means BURNED MATERIAL that has been designated as ASBESTOS CONTAINING MATERIAL and DISPOSED as per the *OCCUPATIONAL HEALTH AND SAFETY REGULATION,* ENVIRONMENTAL *MANAGEMENT ACT, HAZARDOUS WASTE REGULATION*, RDOS Bylaws and RDOS Guidelines.(see BURNED MATERIAL, ASBESTOS CONTAINING MATERIAL, and CONTROLLED WASTE)

CONSTRUCTION – REFUSE means non-RECYCALBE SOLID WASTE building materials such as insulation, carpet, vinyl and non-RECYCLABLE packaging materials such as plastic wrap, and Styrofoam.

CORRUGATED CARDBOARD – ICI means ICI generated containers consisting of three or more layers of paper materials with a corrugated or rippled core, but excluding containers that are impregnated with blood, grease, oil, chemicals, rodent secretions, food residue, wax, or have polyethylene, polystyrene, foil or other non-paper liners, or are otherwise CONTAMINATED. Must be suitably prepared, cleared of all contents, and flattened prior to placement in the ICI commercial container(s) (see RECYCLABLE, see INDUSTRIAL COMMERCIAL INDUSTRIAL ICI).

GLASS SHEET means glass windows, mirrors, etc. with or without a frame, laminated glass, safety or tempered glass, automotive glass, Plexiglas, , but does not include light bulbs, fluorescent tubes, kitchen or GLASS CONTAINERS (see REFUSE).

INDUSTRIAL, COMMERCIAL, INSTITUTIONAL (ICI) means any operation or facility other than a RESIDENTIAL household, including but not limited to industrial, agricultural, and commercial operations of any size including small businesses with one or more employees retail stores, vacation facilities such as hotels, motels, cottages, accommodation associated with sports and leisure facilities and institutional operations of any size including churches, community buildings, local government buildings, libraries, fire and police stations, service organizations, hospitals, care facilities and hospices.

2.4 Under **Section 4. DEFINITIONS, Subsection 4.1** remove the following definitions in their entirety:

- RESIDENTIAL PACKAGING
- RESIDENTIAL POLYSTYRENE PACKING
- RESIDENTIAL PRINTED PAPER
- RESIDENTIAL RECYCLING UNSORTED

2.5 Under **Section 5.0-SITE REGULATIONS, Section 5.2**, remove clause 5.2.6 in its entirety, and replace with the following:

'The REGIONAL DISTRICT retains the right to deny acceptance or to limit the volume and frequency of any SOLID WASTE delivered to the SITE due to safety, operational, CONTAMINATION or other considerations.'

2.6 Under **Section 5.0-SITE REGULATIONS, Section 5.2**, remove clause 5.2.8 in its entirety, and replace with the following:

'The REGIONAL DISTRICT shall require the completion of any documents that may include, Manifests, Waivers, Applications and/or Declarations for VISITORS and for any SOLID WASTE, including but not limited to ASBESTOS CONTAINING MATERIAL, LEAD-BASED PAINT, ASSESSED DEMOLITION, AND RENOVATION MIXED LOAD, CONSTRUCTION MIXED LOAD, SOIL CLEAN, SOIL SMALL VOLUME CONTAMINATED, SOIL CONTAMINATED and ILLEGALLY DUMPED WASTE.'

READ A FIRST, SECOND AND THIRD TIME this ____ day of _____, 2020.

ADOPTED this ___ day of _____, 2020.

_____ _____

Chair Corporate Officer

SCHEDULE A

Waste Management Service Regulatory Bylaw No. 2018 Amendments

SECTION 4. DEFINITIONS - WORDING ADDED IN RED TO EXISTING DEFINITIONS TO CLARIFY:

ASBESTOS CONTAINING MATERIAL (ACM) means a material as defined in the *OCCUPATIONAL HEALTH AND SAFETY REGULATION,* ENVIRONMENTAL *MANAGEMENT ACT, and HAZARDOUS WASTE REGULATION*, and suitably contained for disposal as per the Regulation, RDOS Bylaws and RDOS Guidelines (see CONTROLLED WASTE).
Rationale: Guidelines refers to the Protocols the RDOS has developed for the Safe disposal of Asbestos Containing Materials.

BURNED MATERIAL means materials damaged by fire, heat, electricity or a caustic agent that have been allowed to entirely cool for no less than a two-week period, and in a manner acceptable to the MANAGER, as per RDOS Guidelines (see CONTROLLED WASTE). BURNED MATERIALS that are hot or smoldering or not entirely cooled for more than a two week period is a PROHIBITED WASTE.

CARCASSES means dead animals, or portions thereof, that are not a PROHIBITED WASTE and in a manner acceptable to the MANAGER (see CONTROLLED WASTE and SPECIFIED RISK MATERIAL WASTE).
Rationale: To follow Landfill OC, and the need to identify acceptable means of off loading..

CONCRETE means a construction material that consists of cement, aggregate (generally gravel and sand) and water. CONCRETE must not contain ASBESTOS, large amounts of metal protruding (greater than 15 cm) nor measure greater than 1 m. in any dimension CONCRETE also includes ASPHALT, CERAMICS, MASONRY and ROCKS not greater than 40 cm in any dimension (see RECYCLABLE).

CONCRETE BULKY means CONCRETE measuring greater than 1 m. in any dimension and/or where large amounts of metal are protruding greater than 15 cm, and including ROCKS greater than 40 cm in any dimension (see CONTROLLED WASTE).

CONSTRUCTION MIXED LOAD is now called CONSTUCTION NEW MIXED LOAD

CORRUGATED CARDBOARD - RESIDENTIAL means RESIDENTIALLY generated containers consisting of three or more layers of paper materials with a corrugated or rippled core, but excluding containers that are impregnated with blood, grease, oil, chemicals, rodent secretions, food residue, wax, or have polyethylene, polystyrene, foil or other non-paper liners, or are otherwise CONTAMINATED. Must be suitably prepared; clear of all contents, and flattened prior to placement in the RecycleBC container(s) (see RECYCLABLE).

LEAD-BASED PAINT is any coated or painted materials containing lead with a concentration of 90mg/kg (0.009%, 90ppm) or greater, and is not permitted for DISPOSAL to any SOLID WASTE DESIGNATED LOCATION that is to be chipped. (see CONTROLLED WASTE).

METAL means RECYCLABLE ferrous and non-ferrous metallic materials, containing more than 80% metal by volume, and under 2.4 meters (8 feet) in any dimension, including but not limited to, sheet metal, siding, roofing, rebar, flashings, pipes, window frames, doors, furnaces, duct work, wire, cable, fencing, metal furniture, bicycles, tire rims and metal appliances. METAL also includes REFRIDGERATION UNITS evacuated of ODS by a certified technician, suitably prepared METAL DRUMS and TANKS, barbeques,

wood heating units, motorized equipment and VEHICLE parts, **that do not contain** fluids, filters, batteries, coal, bricks and rubber tires. METAL items must not contain mercury switches, PCB ballasts, or other HAZARDOUS WASTE. METAL does not include BULKY WASTE and PRESSURIZED TANKs.

PRODUCT STEWARDSHIP MATERIAL means suitable prepared residential quantities of materials that falls under a product category of the *Recycling Regulation*, *B.C. Reg. 449/2004* (see RECYCLABLE).

Under PROHIBITED WASTE list: added Commercial Cooking oil

Under REFRIGERATION UNIT: added water coolers

REFUSE means any SOLID WASTE that is designated for DISPOSAL in the ACTIVE FACE that does not constitute a RECYCLABLE, a HAZARDOUS WASTE, a CONTROLLED WASTE, or a PROHIBITED WASTE. Any SOLID WASTE materials over 8 feet will be charged as BULKY WASTE.

RESIDENTIAL SOLID WASTE means any REFUSE generated by a single family or multifamily unit residential premise as a result of residential activities. .

ROCKS means natural inorganic mineral matter of variable composition assembled by the action of heat or water.ROCKS 40 centimetres and not greater than 40 centimetres in any dimension see CONCRETE. ROCKS greater than 40 centimetres in any dimension see CONCRETE BULKY.

VEHICLE means, as per the *British Columbia Motor Vehicle Act*, a device in, on or by which a PERSON or thing is or may be transported or drawn on a highway, but does not include a device designed to be moved by human power, a device used exclusively on stationary rails or tracks, mobile equipment or a motor assisted cycle, such as a golf cart, or riding lawnmower.

WOOD-PRESERVED means wood products which have been treated with preservatives such as chromated copper arsenate (CCA), aromatic hydrocarbons (PAHs) and/or ammonium copper arsenate (ACA) to prevent rotting or wood containing LEAD-BASED PAINT or other paint containing HAZARDOUS substances and is no longer than 2.4 meters (8 feet) in length (see CONTROLLED WASTE).

YARD WASTE SMALL DIMENSION means chipped YARD AND GARDEN WASTE and WOOD WASTE-TREE STUMPs that is no greater than 4 cm. (1.5 inches) in diameter and no longer than 13 cm. (5 inches) in length. YARD WASTE SMALL DIMENSION also includes lawn clippings, conifer needles and leaves that is not CONTAMINATED with materials such as REFUSE, METAL and ROCKS (see RECYCLABLE).

5.0 UNDER SITE REULATIONS – WORDING ADDED TO CLARIFY:

5.2.6 The REGIONAL DISTRICT retains the right to deny acceptance or to limit the volume and frequency of any SOLID WASTE delivered to the SITE due to safety, operational, CONTAMINATION or other considerations.

WORDING DELETED – HIGHLIGHTED IN YELLOW:

Under Definitions:

YARD AND GARDEN WASTE means non-food vegetative matter free of CONTAMINANTS including prunings, branches and tree trunks maximum of 2.4 metres (8 feet) in length, hedge, shrub and tree clippings, flowers, vegetable stalks, woody or herbaceous waste (see RECYCLABLE). YARD AND GARDEN

WASTE does not include FRUIT WASTE, vegetable waste, YARD WASTE SMALL DIMENSION, or WOOD WASTE-TREE STUMP. Wording deleted "and less than 20cm (8 inches) in diameter –
Rational for deletion: – diameter is not a limiting factor in our ability to manage this material.

Under 5.2.8 The REGIONAL DISTRICT shall require the completion of any documents that may include, Manifests, Waivers, Applications and/or Declarations for VISITORs or salvaging and for any SOLID WASTE including but not limited to ASBESTOS CONTAINING MATERIAL, LEAD-BASED PAINT, ASSESSED DEMOLITION, AND RENOVATION MIXED LOAD, CONSTRUCTION MIXED LOAD, SOIL CLEAN, SOIL SMALL VOLUME CONTAMINATED, SOIL CONTAMINATED and ILLEGALLY DUMPED WASTE.
Rational for deletion: Salvaging is no longer permitted for safety reasons.

DEFINITIONS REMOVED:

- RESIDENTIAL PACKAGING
- REGSIDETIAL POLYSTYRENE PACKING
- RESIDENTIAL PRINTED PAPER
- RESIDENTIAL RECYCLING UNSORTED

Rational for removing – rather than listing individually, these are defined in an existing definition RESIDENTIAL RECYCLING

NEW DEFINITIONS ADDED:

BURNED MATERIAL – ASBESTOS CONTAINING means BURNED MATERIAL that has been designated as ASBESTOS CONTAINING MATERIAL and DISPOSED as per the *OCCUPATIONAL HEALTH AND SAFETY REGULATION,* ENVIRONMENTAL *MANAGEMENT ACT, HAZARDOUS WASTE REGULATION*, RDOS Bylaws and RDOS Guidelines.(see BURNED MATERIAL, ASBESTOS CONTAINING MATERIAL, and CONTROLLED WASTE)

Rationale: A new waste type category and cost is required to differentiate and compensate for the operational and administrative expense to landfill. Asbestos Containing Burned Structures consume a significant amount of Air Space in the Landfill's specialized Controlled Waste Cell, which adversely impacts Landfill life span. Increased costs encourages Contractors to separate the burned portions from the non-burned portion of the structure.

CONSTRUCTION – REFUSE means non-RECYCALBE SOLID WASTE building materials such as insulation, carpet, vinyl and non-RECYCLABLE packaging materials such as plastic wrap, and Styrofoam.
Rationale: Statistically new category will provide data on construction generated waste previously categorized with Commercial Waste.

CORRUGATED CARDBOARD – ICI means ICI generated containers consisting of three or more layers of paper materials with a corrugated or rippled core, but excluding containers that are impregnated with blood, grease, oil, chemicals, rodent secretions, food residue, wax, or have polyethylene, polystyrene, foil or other non-paper liners, or are otherwise CONTAMINATED. Must be suitably prepared, cleared of all contents, and flattened prior to placement in the ICI commercial container(s) (see RECYCLABLE, see INDUSTRIAL COMMERCIAL INDUSTRIAL ICI).
Rationale: Required to define Cardboard generated by ICI Sector to differentiate from Cardboard generated by Residences.

GLASS SHEET means glass windows, mirrors, etc. with or without a frame, laminated glass, safety or tempered glass, automotive glass, Plexiglas, , but does not include light bulbs, fluorescent tubes, kitchen or GLASS CONTAINERS (see REFUSE).
Rationale: Required to differentiate Glass from windows etc. to allow disposal in a designated location at a different rate from Container Glass.

INDUSTRIAL, COMMERCIAL, INSTITUTIONAL (ICI) means any operation or facility other than a RESIDENTIAL household, including but not limited to industrial, agricultural, and commercial operations of any size including small businesses with one or more employees retail stores, vacation facilities such as hotels, motels, cottages, accommodation associated with sports and leisure facilities and institutional operations of any size including churches, community buildings, local government buildings, libraries, fire and police stations, service organizations, hospitals, care facilities and hospices.
Rationale: Required to define and differentiate, direct and charge if required for cardboard volumes generated by the ICI sector.

Okanagan Basin WATER BOARD

BOARD REPORT: March 5, 2020

1450 KLO Road, Kelowna, BC V1W 3Z4
P 250.469.6271 F 250.762.7011
www.obwb.ca

Okanagan Basin Water Board Meeting Highlights

Board receives update on 2019 mussel outreach partnership: Lisa Scott, of Okanagan and Similkameen Invasive Species Society (OASISS), reported on last year's invasive mussel prevention efforts. The OBWB provides funds to OASISS to extend the efforts of the board's "Don't Move A Mussel" campaign to water recreationists, retailers, yacht clubs and others. Outreach material was delivered to 389 locations and staff connected with about 7,000 people. They also collected water samples from 20 locations on five Okanagan lakes, and partnered with Osoyoos Lake Water Quality Society for additional sampling. The group also deployed substrate monitors at 16 locations in five lakes with marinas, yacht clubs and local governments, and another 13 off private docks. So far, testing has found no invasive zebra or quagga mussels in Okanagan lakes.

Source Water Protection Toolkit in the works: In response to a request from Okanagan water utilities, the OBWB will be developing a toolkit to help suppliers prevent contamination of their water sources, ensuring safe drinking water and healthy ecosystems. The toolkit will include sample bylaws and policies to regulate activities that impact water and source protection plan templates. The project is being funded by the Water Board, B.C. Ministry of Municipal Affairs and Housing, Interior Health, and the Cities of Kelowna and West Kelowna.

Grant applications pour into Water Board: The OBWB received 21 applications to its Water Conservation & Quality Improvement (WCQI) Grant Program with a total ask of $450,000. There is a total of $350,000 in funding available. Applications are being reviewed and funding recommendations will be provided to the board at the April 7 board meeting.

Canada Water Week festivities announced: OBWB-OkWaterWise is presenting a special screening of ***"Brave Blue World"*** and a water panel discussion on March 19 with UBC's Okanagan Institute for Biodiversity, Resilience, and Ecosystem Services. The film, narrated by Liam Neeson and featuring Matt Damon, tells the story of people and projects around the world, tackling various water challenges. The film aligns with the Water Board's hosting of the B.C. AquaHacking Challenge, which engages young professionals to develop new tech solutions to address local water issues. More info. and tickets are available at http://braveblueworld-okanagan.eventbrite.ca/. Also, on March 21, is the **AquaHacking Challenge BC 2020 Semi-final**. Some 26 teams from across Canada will present their tech solutions to Okanagan water issues in a science fair-style expo and five finalists will be announced. This is a free event. Tickets are at https://aquahacking-bc-2020-semifinal.eventbrite.ca

Rain Barrels make a splash: The OBWB's Okanagan WaterWise is selling rain barrels, partnering with Regional District of Central Okanagan's Waste Reduction Office and its composter sale. The online sale, at www.regionaldistrict.com/compostersale, is for Central Okanagan residents only. Those more DIY-inclined are invited to check out a popular build-your-own rain barrel video, created by Regional District of North Okanagan and funded with a WCQI grant, at http://youtu.be/K2qoLtvTYN0.

For more information, please visit: www.OBWB.ca

OBWB Directors

Sue McKortoff - Chair, Regional District of Okanagan-Similkameen

Cindy Fortin - Vice-Chair, Regional District of Central Okanagan

Victor Cumming, Regional District of North Okanagan

Rick Fairbairn, Regional District of North Okanagan

Bob Fleming, Regional District of North Okanagan

James Baker, Regional District of Central Okanagan

Colin Basran, Regional District of Central Okanagan

Toni Boot, Regional District of Okanagan-Similkameen

Rick Knodel, Regional District of Okanagan-Similkameen

Chris Derickson, Okanagan Nation Alliance

Bob Hrasko, Water Supply Association of B.C.

Denise Neilsen, Okanagan Water Stewardship Council

The next regular meeting of the OBWB will be 10 a.m. Tuesday, April 7, 2020 at the Regional District of North Okanagan in Coldstream.