DISTRICT OF LAKE COUNTRY

LIQUID WASTE MANAGEMENT PLAN

STAGE 3 REPORT

April 2, 2025

URBAN SYSTEMS

PREPARED FOR:

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EXECUTIVE SUMMARY

STAGE 3 REPORT CONTEXT

This Stage 3 Report, part of the District of Lake Country's (the District) Liquid Waste Management Plan (LWMP) process, is best read in conjunction with their Stage 1-2 Report. The 2022 Stage 1-2 Report details the District's preferred approach and priority projects for managing liquid waste. It received Council endorsement in September 2023, prompting the commissioning of the Stage 3 work (council endorsement expected in Spring 2025).

As per the Province, LWMPs have two objectives: (1) "protect public health and the environment", and (2) "adequately consult the public." The Stage 3 Report achieves those objectives by (1) including the District's 20-year plan to fund and implement the priority liquid waste management initiatives from the Stage 1-2 Report and (2) summarizing the District's consultation efforts.

Expanding the District's service with major collection system improvements, wastewater treatment plant upgrades, and development of reclaimed water services requires a financial plan with scheduled investments. Sections 2.2 and 2.3 detail the timing of such investments for the priority liquid waste management initiatives which also summarized below. Many of these initiatives exceed the LWMP requirements and demonstrate the District's leadership and participation in areas of resource recovery, asset management, water conservation, and watershed security.

The District is committed to the responsible disposal of liquid waste, prioritizing environmental protection and public health. The most pressing issue to the District is securing a long-term effluent disposal solution. To address this, the District is working to maximize its current surface-to-ground disposal capacity, develop a reclaimed water use strategy that is acceptable to the agricultural community, and establish a long-term agreement with the City of Kelowna to accommodate additional wastewater. Only if the Kelowna option becomes unviable would the District reconsider exploring its own outfall to Okanagan Lake. It should be noted that when this report discusses

discharging treated wastewater to Okanagan Lake, it may refer to City of Kelowna's discharge location.

MINISTRY RESPONSE TO STAGE 1-2 REPORT

The District's LWMP aims to exceed the objectives outlined in *the Interim Guidelines for Preparing Liquid Waste Management Plans* (Ministry of Environment and Parks, July 2011). Additionally, the BC Ministry of Environment and Parks (ENV) outlined further recommendations in its August 10, 2023, correspondence (see Appendix I), which the District has addressed in this Stage 3 report and its appended documents. The Summary Table below cross-references the numbered action items from ENV's correspondence and the location where this report addresses them.

Summary Table: ENV Correspondence Action Items

ENV Correspondence Action Item	Action Item Focus	Reference in Document
Item 1 (Bullet 1)	Groundwater galleries maintenance	Main Report Section 2.2, Appendix B
Item 1 (Bullet 2)	Reclaimed Water Strategy	Appendix A
Item 2	Watershed rehabilitation and limiting discharge to Okanagan Lake	Section 2.1, Section 2.2, Appendix F, Appendix H
Item 3	Retrofitting the collection system – cost and environmental benefit	Section 2.1, Section 2.2, Section 2.3, Appendix B
Item 4	S.M.A.R.T. goals related to non-point pollution plan	Section 2.0, Section 2.1
Item 5	Class C/B estimates, operation and maintenance costs, and cost consultation.	Section 2.2, Appendix C, Appendix G
Item 6	Engagement with Indigenous Nations	Appendix E
Item 7	Public Consultation	Section 2.4, Section 2.5, Appendix D

ENV sent subsequent correspondence (see Appendix I) on April 23, 2024, with further recommendations that the Stage 3 report include a comprehensive evaluation of reclaimed water use options with the expectation that such an evaluation would

- identify associated costs and timelines, potentially aligning with the development of the outfall conveyance route, and
- identify investments in retrofitting and expanding sewer service.

This Stage 3 report addresses this request, particularly in Appendix A.

STAGE 3 REPORT FORMAT

This Stage 3 Report is divided into two major sections:

Part One – Implementation Report

Includes investment guidelines, actionable steps, and metrics for measuring progress when implementing the District's priority initiatives:

- Biosolids Disposal – continued partnerships with OgoGrow and the Regional District of Central Okanagan – $0.2 M
- Stormwater Management – comprehensive district-wide approach with investments in localised, often nature-based treatment – $2.1 M
- Liquid Waste Collection – expand centralized collection, educational resources, and septic system management – $9.1 M
- Sewer Retrofit – connect new customers as per the Official Community Plan – $42.7 M
- Treatment Upgrades and Future Disposal Lines – maintain and maximize in-ground disposal and utilize an Okanagan Lake Outfall – $30.6 M
- Reuse Systems – phased development of system driven by customer potential and grant funding – $1.5 M
- Watershed Rehabilitation – focus source-water protection initiatives in vulnerable areas supported by wildfire resiliency and water conservation efforts – approximately $200k/year.

Part Two - Appendices

Include supporting documents further detailing the following subjects:

- A: Reclaimed Water Feasibility & Service Development
- B: Retrofit Sewer Expansion Areas
- C: Cost Estimate Classes
- D: Public Engagement Summary
- E: Indigenous Consultations Update
- F: Watershed Resiliency
- G: LWMP Financial Analysis
- H: Response to BC ENV Comments on the DLC Okanagan Lake Proposed Outfall EIS
- I: Ministry of Environment and Parks Responses to Stage 1-2 Report

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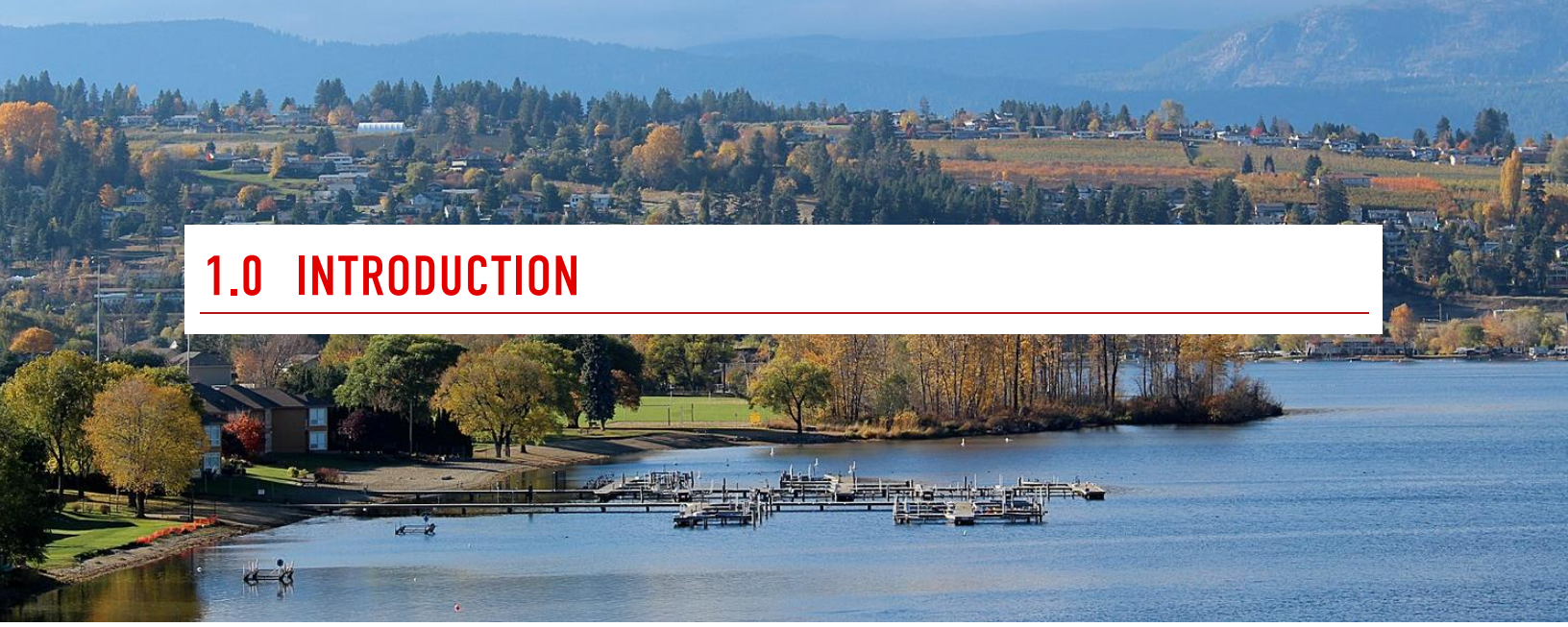


1.0 INTRODUCTION

Liquid Waste Management Plans (LWMPs) empower local governments, via Operational Certificates (OCs), to oversee the collection, treatment, and environmentally responsible return of wastewater. The overarching goal of an LWMP is to do so while navigating a complex landscape encompassing public, political, social, environmental, and financial considerations. The District of Lake Country (the District) is collaboratively engaging interest groups to craft a LWMP that identifies local challenges and devises well-considered solutions to enhance liquid waste management. While the existing infrastructure works efficiently at current flow rates, there is potential to improve local services by focusing on sustainability practices, adopting modern environmental management, meeting current and future customer needs, and implementing cost-effective, long-term solutions.

Every good management plan has a short-list of drivers: the prompts that initiated the planning process and culminated into a preferred direction. For the District, the three main drivers are:

- The existing wastewater treatment plant has reached its maximum capacity, necessitating upgrades to accommodate future growth, which requires authorization from BC ENV (the term often used for the operational and statutory staff of the BC Ministry of Environment and Parks).
- Plant flows are nearing capacity of in-ground disposal, mandating the exploration of safe and reliable alternatives for returning water to the environment.
- A periodic update, required approximately every 10 years, was requested by the Province.

The guiding aim of Lake Country's LWMP is to **borrow water wisely and return it safely**. This aim revolves around three key objectives:

Lake Country delivers on this aim and its objectives with sustained investments in high-quality return water, ongoing lake health monitoring, a commitment to water reclamation, advocacy for water conservation, and improved stormwater management to mitigate non-point source impacts on lake health. The 2025 LWMP will further deliver on this objective.

Lake Country's Council adopted Stage 1 – 2 Report for the current LWMP was approved by BC ENV and the District was directed to move to Stage 3 in October 2023. The Stage 3 Report positions the District to adopt the implementation plan herein, which includes programs, strategies, activities, projects and milestone-targets. Funding and timelines are fundamental to implementation.

The Stage 3 report includes two major sections: the Implementation Report and the supporting documents (appendices).

- The Stage 3 Implementation Report is designed for a public audience and provides clear guidelines to support staff. It consolidates the necessary actions and metrics for measuring progress in one comprehensive document.
- The supporting documents for the Stage 3 Report (appendices), mainly intended for BC ENV, other service partners, and providing background info for readers looking to familiarize themselves with core concepts. The Stage 3 report is best understood with the Stage 1-2 report at hand. The Appendices list includes:
    - A: Reclaimed Water Feasibility & Service Development
    - B: Retrofit Sewer Expansion Areas

- C: Cost Estimate Classes
- D: Public Engagement Summary
- E: Indigenous Consultations Update
- F: Watershed Resiliency
- G: LWMP Financial Analysis

Lake Country expects to receive Council endorsement for the implementation of this plan in 2025.

2.0 SUMMARY OF PREFERRED DIRECTION

The completed Stage 1 - 2 Report details the *preferred direction* which encompasses the path forward for managing liquid waste. Stage 3 transforms the preferred direction into concrete steps that are specific, measurable, fundable, relevant and timebound. This preferred direction provides concrete definitions for the fundamental investments in liquid waste management for the District over the next two decades. Funding generational projects like wastewater treatment plant upgrades, expanding services to include reclaimed water, and major collection system improvements requires a thorough financial plan, as outlined herein.

This LWMP is poised to continue the community's longstanding commitment to surpassing minimum requirements in the effective management of liquid waste, prioritizing public health, and environmental well-being. After thorough consideration of the feedback from committees and the public over the past three years, the approved and committed approach includes:

- Complete the Phase 4 (commissioned) and 5 upgrades to the wastewater treatment plant, ensuring its readiness for over two decades of growth and compliance with regulations regarding redundancy and the return of treated water to the environment.
- Create a flexible and adaptive cleaned water return program that includes disposal to-ground, an Okanagan Lake Outfall (as detailed in the Stage 1-2 Report and the supporting environmental impact study), continued partnership with City of Kelowna, better managing supply and demand via reclaimed water, and monitoring conditions at the preferred return point location. Specific to the possibility of a District-owned Okanagan Lake Outfall, Appendix H details the latest monitoring/modelling recommendations in response to the Province's response letter to the environmental impact study and Stage 1-2 Report. As recommended, additional sampling will be contingent on whether the District pursues their own outfall in the future.
- The District will place early emphasis on ensuring sustainable ground infiltration and building a reclaimed water program for customers within the District that can be accepted by customers that want to use this source. An Okanagan Lake outfall is included as part of the Phase 5 upgrades proposed at the WWTP, but may not be necessary if the District can reach an agreement with Kelowna for a long-term disposal option.
- Take preliminary, concrete steps to reclaim treated wastewater through stream flow augmentation in Middle Vernon Creek via a blending with groundwater. Thereafter, pursue irrigation on designated properties including parks and agricultural land where there will be no negative impact on product marketability or long-term negative effects on agricultural land. Appendix A includes figures illustrating the proposed areas..

Environmental impact studies and community buy-in for the reclaimed water sites will be required prior to implementation.

- Extend the centralized wastewater collection system, incrementally, to areas delineated within the urban containment boundary of the Official Community Plan and as illustrated in this report, involving necessary pipe and lift station upgrades to accommodate customers within that boundary.
- Continue the biosolids program, accompanied by a renewed regional agreement and a focus on collaboration to address the supply and demand imbalance for OgoGrow.
- Expand stormwater management and shift to *integrated* stormwater management: the emphasis on integrated features includes source control(s) and new infrastructure to enhance water quality before it reaches major streams, wetlands, and Wood, Kalamalka, or Okanagan Lakes.

Council's support has enabled financial planning and funding analysis over the last year to bring this plan to fruition. Principles for liquid waste funding are detailed in later sections of this report. With a set direction and funding framework, the focus now moves to the steps and milestones needed to implement the plan effectively.

2.1 LIQUID WASTE QUALITY SUMMARY OBJECTIVES

Liquid waste management has a primary environmental aim: to protect public health and the environment. The water quality objectives below provide an overview of the desired outcomes from implementing Lake Country's Stage 3 report.

1. Manage the collection system and treat wastewater as per the terms and stipulations of the Environmental Impact Study (EIS) results via the District's draft *Operational Certificate,* which includes Plant parameters. Resulting initiatives and environmental benefits are as follows:

    - Reduction of septic field failures and expanding the centralized wastewater system to replace septic fields prevents contaminants from seeping into groundwater and nearby water bodies, significantly improving water quality and reducing public health risks. While led by regional services, the District aims to complement these efforts with local programs.
    - Increased collection system capacity and modernization by way of expanding the system's capacity and upgrading lift stations ensures efficient wastewater collection and treatment, preventing system overflows and ensuring treated water meets environmental standards.
    - Phase 4 Upgrades are considered complete. Phase 5 Upgrades are substantial in their objective to safeguard water quality, by way of including the following treatment works:
        - Ultraviolet disinfection (water quality)
        - Primary clarifier 2 (redundancy and capacity)
        - Primary clarifier 3 (redundancy and capacity)

- Dissolved Air Flotation (capacity and water quality)
- Equalization storage (capacity)
- A pipeline outfall (capacity and water quality)
- Biological nutrient reactor 4 (redundancy, water quality, and capacity)

The Phase 5 Upgrades were outlined in greater detail in the approved Stage 1 – 2 Report. The status and scope of the phase 5 upgrades remain contingent on the negotiations with the City of Kelowna.

2. Return cleaned water to the environment:

- Strive to maximize the return via ground infiltration, up to 2,000 cubic meters per day, recognizing various indicators in and around the facility,
- Actively pursue water reuse strategies, targeting an increase in reused volumes over time to reduce the amount directed to Okanagan Lake. This initiative also aims to mitigate drought and flow risks associated with intensive summer irrigation in Lake Country. According to the reclaimed water estimates provided, the potential for reuse at various sites could range from 10% to 50% of plant flows during the summer months by 2040.
- To safely return all remaining flows up to 6,000 cubic meters per day to Okanagan Lake (although determinedly less than the maximum projected) as part of a robust water quality monitoring program that meets the OC objectives above and benefits from expanded parameters set out by the Okanagan Lake collaborative.
- Meeting the water quality parameters of the Operational Certificate as outlined in Table 3 in Appendix A among other standards submitted under separate cover.

3. Pursue water quality improvements via non-point sources to safeguard our lakes and streams:

- Building a non-point source plan to mitigate the effects of harmful runoff originating from fertilized landscaping especially along shoreline areas, high intensity agricultural properties, and failing septic systems, by restoring wetlands and better managing riparian areas, and by participating in lake-use and recreation programs to minimize the effects from wake erosion and other activities. There is no specific measure for this non-point source plan, but the District is implementing an integrated stormwater management plan for partial coverage of this aim. Other initiatives will require collaboration with various stakeholders.

2.2 EXPENDITURE SUMMARY: OVERALL PLAN INVESTMENTS

Table 1 details the preferred direction and outlines key activities, outcomes, and investment areas for each major topic. Most costs are stated in 2022 dollars (consistent with the Stage 1-2 report). District staff and Urban agreed that 2022 dollars remain suitable for financial planning purposes in 2025 due to the stabilizing of construction price escalation since the end of 2022. Price fluctuations due to inflation have been considered up to 2025 dollars, and

the financial analysis includes future assumed inflation amounts from 2025 to 2028 to calculate rate increases that maintain financial sustainability (see Financial Analysis in Appendix G) .

For projects beyond the short term, a Class C or D designation is more appropriate, as uncertainties in scope and future conditions necessitate larger contingencies of 35-50%. Professional engineers and expert cost estimators agree that larger contingencies are necessary for projects with scopes that are not yet final or fully complete (see breakdown of Cost Estimates in Appendix C).

The success of the plan will depend on staff and council annually evaluating and committing funds to deliver the components of the plan. Herein, the District has a robust financial implementation plan intended to adapt to changing cost estimates and inflation, over time. As with many master plans, the cost figures below will require regular updates to stay in line with actual price conditions.

Table 1 - Key Activities, Outcomes, and Investment Areas

PLAN COMPONENT	INVESTMENT DESCRIPTION	COST
Biosolids		
	• Create and sign a medium to long-term agreement with the owner-operators of the OgoGrow program for continued receipt of biosolids from Lake Country's plant; this agreement may be done concurrently to confirm Lake Country's continued receipt of regional trucked waste. Costs estimated at $0.1M over 20 years to support financial and operational analysis. • Continue to partner with RDCO on developing cost effective and environmentally friendly bio-solids solutions. Specifically, contribute a small share of the funds for this investment area into regular program updates (about every 5 years) that restore the balance of supply and demand for reuse of OgoGrow, including confirming the role of Lake Country and its lands or residents in making that so. Costs estimated at $0.1M over 20 years. This can take the form of land identification, marketing, and exploring alternative uses.	$0.2 M
Stormwater		
	• Phase 1 of the transition from drainage plans to the integrated stormwater management plan (ISMP) was completed in 2023. The ISMP Phase 1 work included a GIS dashboard to graphically organize many information types including flow paths, storm infrastructure, and water quality monitoring data at specialized locations throughout the District. Phase 2 of the ISMP work is expected to be finalized in 2025. • Develop a non-point source pollution plan and select source control programs for lake and stream health outside of what is not readily addressed in the integrated stormwater plan (above) $1.0M. • Invest in new stormwater treatment works including natural and engineered areas that enhance water quality at various streams and stormwater outfalls to safeguard lake health $1.0M. • Schedule M of Bylaw 1121 was updated in 2021 and adopted in 2024. No further updates are currently planned. Update education resources given the local interest by the public to do the right thing once it becomes known and clear to them. Costs estimated at $0.1M over 20 years.	$2.1 M
Collection System		
	• Continue with expansion of the centralized system as outlined in the Official Community Plan and the Sanitary Sewer Plan through upgrades at key utility works such as lift stations, force mains, and trunks (led by the District's utility).	$9.1 M

PLAN COMPONENT	INVESTMENT DESCRIPTION	COST
	• Offer education resources to residents and businesses that encourage proper disposal of emerging contaminants of concern, typically away from the sanitary sewer system (in-kind). • Continue to evolve septic system management practices and employ new tools to promote and/or warrant property owners to fulfill their responsibilities as owners and operators of their on-site wastewater treatment facilities. Costs estimated at $0.1M over 20 years.	
Sewer Retrofit		
	• Continue with expansion of the centralized system as outlined in the Official Community Plan through retrofit areas (led largely through specific area service charges and offset in part through grants, if successful) including the force main extension to the Oyama isthmus. • Continue planning to connect new customers from sewer retrofit areas upon successful commissioning of Phase 5 of the plant upgrade.	$42.7 M
Treatment Upgrades and Future Disposal Line(s)		
	• Phase 4 (completed mid-LWMP) and Phase 5 upgrades. Costs estimated at $20.1M (excluding an Okanagan Lake outfall or similar long-term effluent disposal option referenced below). • Initiate the permitting, design, and installation of a pipe that conveys highly treated return water from the wastewater treatment plant to an Okanagan Lake outfall for all flows not reclaimed by future reuse customers or not returned to ground. Costs projected at $9.8 M • Part of the project for an Okanagan Lake outfall line (or more generally a long-term effluent disposal option as mentioned in Appendix G) is to establish a monitoring program that meets and exceeds provincial requirements for water quality monitoring so that Lake Country has ample time and data to support for additional treatment upgrades in the future, if warranted. Costs estimated at $0.6M, likely spent in years 1-10. Refer to Appendix H for the latest monitoring/modelling recommendations. • Maintain the in-ground capacity at 2,000 m3/day so that returning clean water to ground remains a reliable method for returning cleaned water to the environment. The District allocates approximately $50,000 per year for maintenance (excluded from the cost column in this table). • Study the cost-benefit of a public sani-dump. Costs estimated at < $0.1M. • Continue with the regional septage receiving service and amend that service as needs arise through funding of that specific program. • Continue with annual financial contributions to the Okanagan, Kalamalka, and Wood Lake Collaborative Monitoring program and support future costs associated with studying emerging substances of concern.	$30.6 M

PLAN COMPONENT	INVESTMENT DESCRIPTION	COST
Reuse Systems (System Set Up and Feasibility)		
	• Initiate program design for a water reclamation system. Include EIS and surveys/engagement with potential customers. Three phases of system development to include preliminary design for future infrastructure to extend reclaimed water from groundwater wells adjacent to the plant and later, from the pressurized Middle Vernon Creek outfall line to select properties in Phases 1, 2 and possibly 3 (maps included later in the report). • Advance to preliminary and detailed design engineering for Phases 1 and 2 (perhaps parts of 3) including regulatory approvals, hydrogeological designs, and all other non-capital works outlined in the Reclaimed Water Implementation Plan (Appendix A). Though not listed here, capital works are expected at about $20M or more, however the District will be applying for grants to fund and construct the works. The District's capital share of any approved grants will come from either borrowing or utility reserves. We estimate that tie-ins to the groundwater system and release to Middle Vernon Creek is approximately $500,000 which relies on reuse of some existing infrastructure. This estimate should be redone through conceptual design. • The priority for water reuse and reclamation is to enhance stream flows in Middle Vernon Creek, thereby addressing some of the release orders from Beaver Lake imposed on the District. Later, expanding the reclaimed water supply to agricultural and park lands should not occur until there is a clear need for the reclaimed water source and a thorough understanding of its impacts on agricultural lands. Given the capital cost outlay for this plan over the first five years (up to 2029), District staff ought to tie feasibility of expanded systems to the award of senior government grants.	$1.5M
Watershed Rehabilitation		

	• In accordance with the Province's response to the Stage 1 and 2 report, the District is implementing watershed rehabilitation efforts in response to the EIS recommendations which included:
	  • Continuing to pursue water rehabilitation programs within the District and its upstream watershed,
	  • Working with other jurisdictions to:
	  • Improve watershed resilience,
	  • Map source water vulnerability through the watersheds to identify zones of high risk where conservation/rehabilitation provide the best protection,
	  • Reduce wildfire risk throughout the Okanagan watersheds particularly in riparian areas and around infrastructure,
	  • Increase climate change preparedness in urban areas, and
		$200k

PLAN COMPONENT	INVESTMENT DESCRIPTION	COST
	• Encourage water conservation. • The District is participating in, commissioning, and/or leading several initiatives, programs, studies, and plans that align with the EIS recommendations including the North Abeerdeen Watershed Resilience Plan, road rehabilitation efforts in the Beaver Lake and Oyama Lake watersheds, the Kalamalka and Wood Lake technical working group, the Foreshore Integrated Management Planning, the Okanagan Lake Responsibility Plan, the 2023 Wood Lake Condition Assessment study, the 2023 Zebra and Quagga Mussels Risk Assessment Mapping study, the Beaver Lake Chain & Vernon Creek Water Management Plan, a non-point source stormwater pollution plan, and a district-wide Water Conservation Plan. Refer to Appendix F for more.	
	Total	$86.4M

2.3 EXPENDITURE SCHEDULE: IMPLEMENTATION

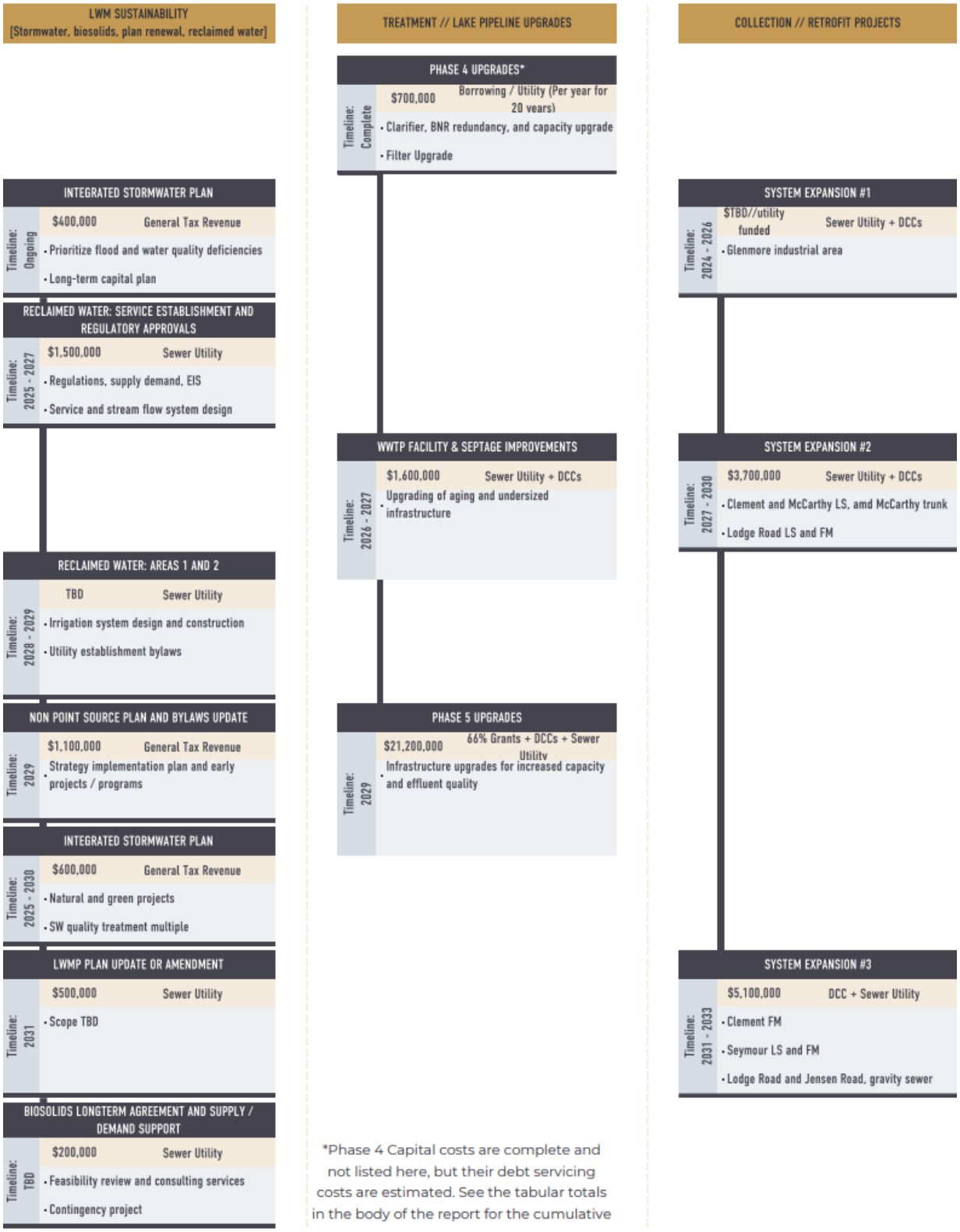
Investment areas outline the total spending projected over the 20-year horizon of the liquid waste management plan (see the Financial Analysis in Appendix G for more detailed information). The sequence and scheduling among the individual expenditures creates a more actionable plan for implementation.

In our experience supporting the implementation of other LWMPs in BC, detailed planning and measuring results as they transpire often leads to sustained effort over the long run.

The outline of this plan below will enable staff, stakeholders, regulators, and future leaders to participate in these initiatives even if they were not a part of the original (2021-2025) planning process.

Please see the Expenditure Schedule, **Figure 1** on the following page

Figure 1 Liquid Waste Management Expenditure Schedule



2.3.1 SCHEDULE: IMPLEMENTATION OF THE OPERATIONAL CERTIFICATE

It is important to note that the Operational Certificate (OC), which provides authority to handle, treat, and return wastewater at Lake Country's centralized plant is poised for submission to BC ENV after the submission of the LWMP Stage 3 Report, as discussed with BC ENV staff. The shared goal is to complete the requested additional work for the OC amendment in alignment with the Stage 3 Report approval. This work will be completed in 2025 and includes:

- Environment Impact Study for reclaimed water stream augmentation
- Clarification on the Environment Impact Study for an Okanagan Outfall
- Potential additional Effluent Characteristics Sampling

The OC may require updates in the interim prior to the next comprehensive LWMP update (approximately 10 years from now), based on the following two criteria:

- If the proposed works in this Plan, particularly at the wastewater treatment plant are changed, and
- If the proposed operation of the plant can not meet the objectives of the Plan and/or the target parameters set in the EIS

If changes to the OC are prepared or submitted, these should be assessed in part with the whole of the objectives outlined in this LWMP (Stage 1-2, and 3).

2.4 COST-RECOVERY OVERVIEW

Input and feedback received during the Stage 1-2 engagement with the public and stakeholders revealed local interest to advance water quality without significant impact to ratepayers. In particular, the commentary from the public centered on three financial aspects:

- Mixed views on whether to **pursue lowest cost capital plan** or to spend more to **create reuse systems,**
- A rising demand from property owners to **retrofit other neighbourhoods** and expand the core area further where funding for retrofits is to come exclusively from the benefitting properties and/or grants, and
- Some elevated concerns around **growth** and how developers will **share the costs** of new works and capacity.

Though less emphatic, there remains a strong local sentiment to ensure that regional septic receiving and treatment is to be funded by the regional users of that system. Lake Country's principles for cost-sharing in that program ought to remain through the life of the plan to ensure that local utility payers do not unduly fund a regional service.

In general, there was an understanding that the costs of liquid waste management were expected to rise incrementally as new works and upgraded facilities were constructed and operated. There were clear expectations that staff would revisit the methods for cost-recovery and propose a plan that would deliver on the LWMP and keep costs steady, rising incrementally as needed. Sudden, large-scale utility rate or tax changes across the community were not desired.

During Winter 2023/24 and Winter 2024/25, Staff and the consulting team engaged Lake Country Council to build on the Stage 1-2 input (above) and develop financial principles for implementation. Those principles brought to Council include:

Table 2 - Financial Principles for Implementation

PRINCIPLE	WHAT THIS MEANS
Sewer service is self funding.	• Sewer service should be self-funding, where it does not receive funding from other services. • Achieve full cost recovery by those directly benefiting from the service. • Paid by those predominantly benefiting from the community sewer system.
Growth pays for growth.	• Development pays for improvements and future works required to service development. • The portion of projects required for growth are allocated to growth. • Costs are generally recovered through Development Cost Charges, but infrastructure is also built by developers, or paid for directly up front by developers.
Sewer Retrofit through Local Service Areas & Grants	• Sewer retrofit of existing neighbourhoods will be considered through a Local Service Area process; areas include: • Oyama existing neighbourhoods (Cornwall, Isthmus area) • Winfield un-serviced areas (Bond, KelVern, Winview, Pretty, Mountview) • The area that benefits pays for the sewer extension. • Paid for through local service area process. • Sewer retrofit projects will depend on grants to proceed. • Timing for these Local Service Area projects is after the WWTP upgrades and a long-term effluent disposal option is secured.
Septage facility is funded as a regional service.	• Septage facility is self funded as a Regional service and is not subsidized by the Lake Country Sewer Utility. • Full cost recovery funded by the District of Lake Country charging the Regional District which covers costs by charging septage haulers, and haulers charge users to cover tipping charges.
Stormwater funded with mobility:	• Stormwater operations, maintenance and capital projects will not draw on sewer revenues.

PRINCIPLE	WHAT THIS MEANS
	• Most stormwater components are ditches along roadways and drainage associated with curb & gutter usually along sidewalks. • Stormwater is considered as part of the mobility (transportation) network. • Separate from the LWMP and sewer function. • Projects identified through Storm Water Master planning process are funded under General Revenue and Transportation Parcel Tax.

There is a strong link between the principles above and the feedback from stakeholders and the public. These principles were then applied to a financial model and long-term cash flow analysis, summarized in greater detail in Appendix G. The modelling considered several factors, many of which are common to all small-to-medium sized communities in BC who aim to build out their sanitary network, accommodate growth, meet regulatory expectations for redundancy, broaden their services and manage liquid waste and the environment. All these considerations are informing the cost-recovery strategy described below, which is followed by brief observations from the modelling and analysis, and then some summary conclusions.

COST RECOVERY STRATEGY FOR IMPLEMENTING THE LWMP

Effective implementation of the LWMP is contingent upon a feasible cost-recovery plan of which the initiatives will be subject to council approval via bylaw amendments. Lake Country's approach to funding the works include the following key concepts and requirements:

For Sewer Utility Customers

- Total fees increase slightly after replacing the revenues generated by the Sewer Parcel Tax and Environmental Levy with revenues generated by User Fees.
- The transition to rely less on parcel taxes and more so on user fees occurred at the start of 2025. After this shift, the District is generating revenue only through the User Fees.
- As a result of shifting from taxes to fees above, the total contributions from sewer utility customers is proposed to increase slightly:
    - Today: $600 including $250 fees and $350 in parcel taxes
    - In 2025, utility fees will rise to approximately $640, increasing to $720 by 2028. Alternatively, by 2027, utility fees may reach $700, with no additional parcel taxes. A reduced multifamily rate is also being considered, along with the potential for a future variable rate based on wastewater discharge, encouraging water conservation and environmental protection efforts.
- Subject to Council consideration and approval, those parcels connected to the three small, community wastewater systems (Amry, Nuyens, and Marshall) also owned and operated by Lake Country will be subject to cost-recovery charges specific to their utility.

- Rates will rise as necessary throughout the course of the 20-year implementation plan to address planned and unplanned occurrences such as further cost escalations, asset renewal, and staffing needs, among others.

Properties Not Connected to the Sewer Utility

- Overall, the general taxpayer will ultimately contribute less for broader liquid waste management needs and services so that Lake Country can fulfill its objective to fund sewer operations by those who benefit directly from the sewer utility i.e., utility ratepayers.
- Any developed property not on the sewer utility must remain responsible for their private, individual septic system maintenance.
- Any properties poised to connect to the utility will contribute towards the Local Service Area (LSA) charges, where applicable, as they are designed and implemented through construction. This only applies to retrofit properties within an LSA.

Other Core Funding and Cost-Recovery Methods

- Development Cost Charges will be reviewed and updated regularly and increases to sewer DCCs were proposed in 2024. The aim with this endeavour is to fund capacity increases to the system primarily – almost solely- through fees and charges paid for by developers at the time of development and any senior government grant funds that aim to support housing by mitigating cost impacts from system expansion. In order to address the costs allocated to new growth the Sewer DCC rates increase significantly.
- Senior Government Grants are a significant part of liquid waste management upgrades and core to the feasibility for any small to medium sized community in BC to achieve regulatory expectations placed on them. The level of grant funding incorporated into this cost-recovery plan include:

<u>Sewer Expansion Retrofits</u>

Senior Government Grants est. @ 66%	$ 20,950,710.00
Okanagan Basin Water Board est. @ 16% from the Sewage Facilities Assistance Grant	$ 5,078,960.00
	$ 26,029,670.00

<u>WWTP Upgrades</u>

Phase 5: Senior Government Grants est. @ 66%	$ 14,041,500.00

<u>Reclaimed Water System</u>

Grant Type TBD (for capital costs)	TBD ~ $20M+

The actual grant amount received is not known until any grant announcements (if, when) are confirmed at the time they are applied for. Please note that the total project costs are higher than the amounts listed above, which intend to show the grant portion only.

CASH FLOW ANALYSIS AND MODEL OBSERVATIONS

The financial analysis underscores the cost-recovery strategy with key points:

- There is no financial capacity to fund all works under the LWMP and certainly not at one time. Rather, major projects must be sequenced to optimize local funds and staff capacity. Timing of projects may need adjustments due to funding, grants, cost increases, or other issues.
- Shifting a significant portion of cost-recovery to the utility mitigates the risk of wastewater projects being deprioritized against other local priorities.
- Development cost charges (DCCs) must rise in line with benefits from expanding system capacity. Updates are ongoing.
- Sewer retrofits heavily rely on grants and should be financed collectively rather than on a neighborhood basis. Grants are essential for feasibility.
- Maintaining a reserve fund between $0 to $2M is achievable but challenging without extending upgrade timelines. Given the sewer utility's replacement value, the suggested reserve range is the lower end.
- Borrowing for Phase 4 upgrades to the WWTP received public support and continues to impact cash flow analysis. Debt servicing was factored into the financial models.

The cash flow observations underpin the following cost-recovery conclusions and recommendations.

COST RECOVERY AND LWMP IMPLEMENTATION PLAN - SUMMARY

The public and stakeholders in Lake Country expressed a desire to improve water quality while minimizing costs for ratepayers. Feedback highlighted debates over prioritizing lowest cost versus investing more in reuse systems, requests to expand retrofit programs funded by benefiting properties or grants, and concerns about growth and developer contributions. Principles were developed to ensure self-funding sewer services, growth funding development-related improvements, and regional funding for septage facilities. Stormwater management was separated from sewer funding and linked to mobility, while a financial model emphasized phased implementation and increased user fees. The cost-recovery plan aims for a feasible transition replacing parcel taxes with utility fees, equitable contributions from property owners, and reliance on development cost charges and government grants for expansion and upgrades. However, it also requires the District to lead the implementation effectively and achieve key milestones, namely:

- To be successful in securing grant monies for sewer retrofits, an Okanagan Lake outfall pipeline, and treatment upgrades

- To facilitate a successful process to establish local services area across the whole retrofit area
- To confirm customer willingness and service affordability for water reuse and reclamation
- To adapt to fluctuating costs of service delivery each year to keep the utilities capable of maintaining and tending to reserves and escalation
- To engage Council and the development community to allocate the costs of growth through updated DCCs in the short-term, and periodically throughout the 20-year plan implementation.

Overall, Lake Country's cost-recovery and financial plan is relatively robust and shows high potential for success. The key milestones above require dedicated effort and results and if effectively managed, will position Lake Country to implement the whole of the LWMP as intended.

2.5 PUBLIC ENGAGEMENT FINDINGS

The 2025 Lake Country LWMP was formulated based on extensive public engagement detailed in the Stage 1-2 Report. This process garnered recognition from the Union of BC Municipalities and other civic peers for its thoroughness and inclusivity, earning Lake Country an Honourable Mention in the 2022 Community Excellence Award. The feedback received from stakeholders has been constructive and supportive of the proposed direction. Yet, the public's support for the plan is partially contingent upon continued effort by Lake Country to realize successful outcomes in several key areas.

Firstly, there is a strong expectation from the public to ensure that the water returned to Okanagan Lake meets regulatory standards, emphasizing compliance and diligent monitoring. Secondly, there are varying community perspectives on whether to prioritize minimal expenditure on the entire plan or to invest more in establishing reuse systems. Thirdly, there's a growing demand, particularly from homeowners, to extend the sewer system to additional neighbourhoods and expand the core network further.

Moreover, there are sustained concerns from some residents and businesses regarding urban expansion and the equitable distribution of development costs among ratepayers. Additionally, there is a vocal desire among locals for improved stormwater management, especially to enhance the quality of water bodies like Wood, Okanagan, and Vernon Creek. Lastly, while there's some interest in exploring potential partnerships with public utilities to delegate treatment responsibilities, it's not a significant aspect of the overall sentiment.

Figure 2 Community Mail-Out

The implementation plan carefully considers this feedback and acknowledges the need for further study on key aspects such as water reuse and stormwater management. While expectations are high, there's a delicate balance to be struck between affordability, intention, and effectiveness.

Moving into Stage 3, the focus shifted towards gauging public support for the proposed plan and determining the desired level of involvement during implementation. To discern the public sentiment for these two topics, District Staff set out for a commensurate level of engagement with the public. To do so, activities in this stage included publishing reports, presenting financial principles to the Council, conducting mail-outs (e.g., community flyer in Figure 2) to households summarizing the plan and its cost implications, updating the district website with a page for public input, and presenting the final draft report to the Council.

Findings from Stage 3 activities include:

Public support and involvement are very important during the implementation phase. District staff commit to ongoing public engagement and reporting, ensuring that the community remains informed and involved throughout the process.

Efforts were made to reinforce public awareness of items that remain unchanged in the Stage 1–2 process through community mailouts, online platforms, and billing inserts. More recent engagement efforts focused on informing the public and gathering feedback on the District's reclaimed water reuse strategy.

While many community members recognized the value of implementing reclaimed water reuse, there was significant apprehension from the agricultural sector. There may be opportunities to service parkland and un-serviced properties that do not grow direct food to mouth crops. However, agricultural producers who currently receive irrigation water from the District and grow direct to mouth crops have indicated that using reclaimed water is not an option due to their vendor requirements.

Additionally, there was extensive discussion and feedback about the long-term impacts of reclaimed water use on agricultural land and the need for a better understanding of these effects before implementation. Refer to Appendix A for more information on the District's Reclaimed Water strategy and Appendix D for a summary of the public engagement sessions.

INDIGENOUS COMMUNITIES UPDATE

Lake Country's liquid waste management plan, outlined in the Stage 1-2 Report, emphasizes ongoing relationship building with the Okanagan Indian Band (OKIB) to

protect the watershed and explore partnership opportunities. The District and OKIB met on June 5, 2024, and February 25, 2025 and discussed the benefits of implementing reclaimed water uses, such as water supply protection and environmental conservation, and the challenges, such as public perception, crop value, and the potential presence of pharmaceuticals. Both parties agreed that changes in perception regarding reclaimed water use will be needed.

Efforts in Stage 3 and beyond focus on deepening this collaboration. Activities include formal communications, community engagements, and discussing shared interests such as wastewater servicing and water quality monitoring. Trust and respect are paramount, with a focus on initiatives like water reuse, monitoring, and stormwater quality. Lake Country commits to continued consultation with OKIB beyond Stage 3, aiming for a strong, long-term partnership. Gratitude is expressed for OKIB and Ministry participation in consultation efforts, highlighting the shared desire for collaboration. Refer to Appendix E for additional information.

2.6 PRIORITY STUDIES FOR THE 20-YEAR IMPLEMENTATION PLAN

While implementing the LWMP, the District plans to undertake additional studies to address management challenges related to biosolids, stormwater, collection, reuse, partnerships and finance, and treatment upgrades. Table 3 below summarizes the planned studies and initiatives as currently prioritized.

Table 3 - Priority Studies for 20 Year Implementation Plan

PLAN COMPONENT	INVESTMENT DESCRIPTION	PRIORITY
Biosolids		
	• Prepare for and negotiate to sign a long-term agreement for continued biosolids receipt and disposal//re-use services with the Kelowna-led partnership.	Medium
	• Explore alternate disposal locations with RDCO.	
Stormwater		
	• Given the one-Basin mentality and reality of the Okanagan, engage other local governments to explore a framework to contribute to and mitigate non-point source pollution planning and select source control programs especially through stormwater management.	High
	• Update stormwater education resources to support the public and property owners to do the right thing once it becomes known and clear to them. While this study may be part of the non-point source framework above, we expect and recommend that there be local customizations as needed. The	Medium

District's stormwater bylaw and stormwater design guidelines were updated in 2021 and adopted in 2024.	
Collection System	
• Engage with RDCO to identify local objectives for enhanced education resources to residents and businesses that encourage proper disposal of emerging contaminants of concern, typically away from the sanitary sewer system (in-kind). • Support local and regional programs to improve septic management and maintenance practices so that property owners fulfill their responsibilities as operators of their on-site wastewater treatment facilities. Costs estimated at $0.1M over 20 years, for education, regulations, regional contributions, etc.	Medium
• Complete a hydrogeological study (or similar) to evaluate and prioritize the expansion of the collection system (for sewer retrofits) for those areas beyond the ones already identified herein. A future phase of retrofits ought to be considered once demonstrable progress has been accomplished on the neighbourhoods already selected, or as part of the next OCP update, and certainly prior to the initiation of the next LWMP.	Low
Water Reuse (Program Design – Note Appendix E)	
• Initiate program design and service establishment for a water reclamation system. Include EIS and surveys plus engagement with potential customers regarding irrigation areas and groundwater withdrawal for stream flow augmentation in the EIS. Three areas of system development must include preliminary design for future infrastructure to extend reclaimed water from groundwater wells adjacent the plant for stream flow augmentation and later, from the pressurized Middle Vernon Creek outfall line to select farm or park-based properties.	High-Medium
• Study the hydrogeological and regulatory feasibility of groundwater extraction in the areas surrounding the in-ground infiltration facilities to act as interim storage for water reuse. This study is partially to verify water quality for the stream flow augmentation project, but more so, to assess the feasibility of a wellfield to offer in-ground reservoir capacity to meet seasonal irrigation demands. The impacts to groundwater-interflow and impacts to stream flows during critical spawning periods of Middle Vernon Creek is important.	High
Plan Implementation: Partnerships and Finance	
• While not a study per se, the District should optimize its resources and capacity to respond to senior government grant applications and/or negotiations with public funders to ensure that liquid waste initiatives are well supported in Lake Country. The reliance on public funds to deliver the LWMP are noteworthy and require direct efforts. Staff experience with recent	Medium

applications and the demands they place on already-tight internal capacity is part of the driver for this recommendation.	
• Continue to engage with OKIB and other indigenous communities in the area to explore partnerships to implement key services and works in the LWMP.	High
Treatment Upgrades	
• Study the cost-benefit of a public sani-dump and consider how to interconnect this facility with pending Phase 5 upgrades.	Low-Medium
• Review and amend the District's contributions and requirements of the Okanagan Lake Collaborative Monitoring program including consideration to assessing the trends of emerging substances of concern.	High

3.0 STAGE 3 CLOSURE AND PLAN CONCLUSIONS

Lake Country's Liquid Waste Management Plan (LWMP) outlines a strategic approach to managing wastewater and ensuring environmental sustainability over the next two decades. The plan is driven by three key prompts: the wastewater treatment plant has reached capacity, current water disposal methods are insufficient, and a provincial update is required. The overall goal is to "borrow water wisely and return it safely," emphasizing sustainable water reclamation, stormwater management, public health, and the protection of local water bodies.

Stages 1 and 2 of the plan have been completed, with Stage 3 focusing on implementation. This stage includes specific programs, projects, and funding strategies that align with the long-term vision for improved wastewater management. The plan emphasizes upgrading the existing wastewater treatment plant to accommodate future growth and comply with regulations. Additionally, it introduces a reclaimed water program, which involves the indirect reuse of treated water for irrigation and stream flow augmentation. The program will later expand to include farmlands and parks, pending further design, environmental studies, community acceptance, and approvals. This program will gradually reduce reliance on traditional disposal methods and enhance environmental conservation.

The plan also includes infrastructure upgrades, such as extending the centralized collection system to protect the environment and reduce reliance on septic, and enhancing stormwater management. These upgrades are essential to support Lake Country's growing population while safeguarding its natural water resources. The LWMP aims to manage liquid waste responsibly by using modern environmental practices and technology.

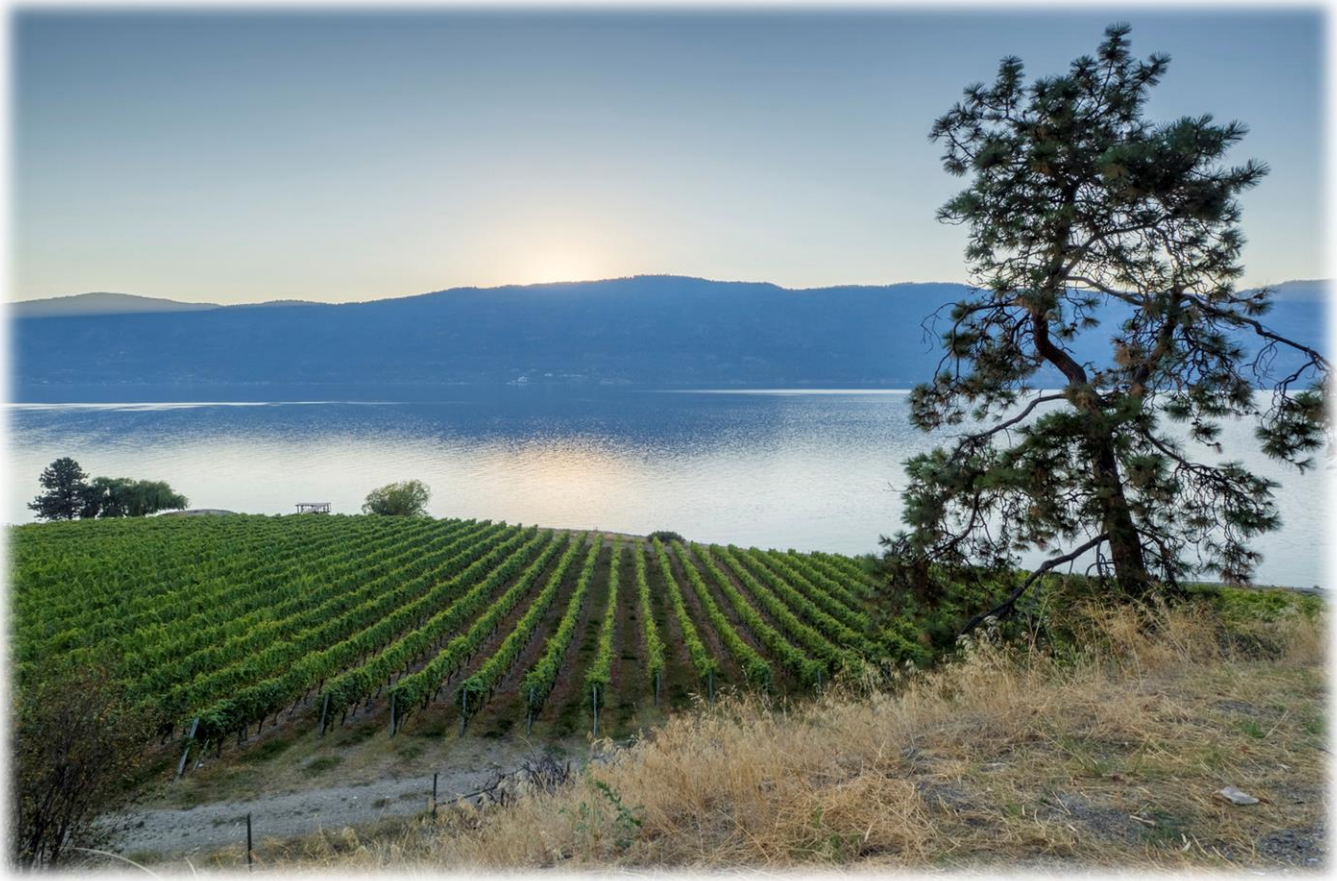
A significant aspect of the plan is its funding strategy. The plan recommends optimizing utility fees to cover the majority of the associated costs, ensuring that beneficiaries of the sewer system contribute proportionately. Development cost charges (DCCs) will be increased to fund system expansions, with a focus on minimizing the impact on the existing community. Furthermore, senior government grants will play a crucial role in financing large-scale projects, making the LWMP financially viable for a small community like Lake Country.

Council support and community feedback have been integral to shaping the plan. The sequencing of major projects, such as wastewater treatment upgrades and the reclaimed water system, will be carefully planned to optimize local funds and staff capacity. While

there may be adjustments due to funding availability and project costs, the plan prioritizes long-term environmental sustainability and resilient infrastructure.

Furthermore, the Stage 3 Report addresses the Province's feedback in their response letter to the Stage 1-2 Report and EIS dated August 10, 2023. As such, the LWMP is positioned to exceed regulatory requirements, address provincial recommendations, improve public health, and protect the environment. Particularly, this report aims to satisfy the provincial requirements of protecting public health and the environment and adequately consulting the public, along with the recommendations of advancing reconciliation by considering Indigenous interests and building relationships and leading and participating in connected one water initiatives of conservation, adaptation, mitigation, and asset management.

Overall, Lake Country's LWMP demonstrates a proactive and responsible approach to liquid waste management, focusing on innovation, sustainability, and community well-being. The plan's successful implementation will depend on careful financial planning, community involvement, and adherence to the outlined milestones.



APPENDIX A – RECLAIMED WATER FEASIBILITY & SERVICE DEVELOPMENT

LWMP STAGE 3 IMPLEMENTATION |

DATE: March 27, 2025 FILE: 1577.0110.01 PAGE:
SUBJECT: Watershed Resiliency

PURPOSE

Lake Country's *preferred direction* for liquid waste management includes a three-pronged approach to returning clean water to the environment. It comprises continuing ground discharge in accordance with the capacities of existing facilities and sites in operation. Next, it entails partial reuse for agricultural lands and flow augmentation in strategic areas, and then later, an outfall and return line to Okanagan Lake that makes up for what is not reused or returned via the ground.

This document identifies the approach, milestones, and desired outcomes for the major phases of a service development plan for reclaimed water. Today, there is no water reuse in Lake Country. Within five years of plan adoption, Lake Country aims for reclaimed water to become a partial and reliable fixture in Lake Country's water management services.

RECLAIMED WATER: BC CONTEXT

Reclaimed water use is an established practice in BC, with several communities, including Vernon and Penticton, using reclaimed water for irrigation, source replenishing, and some industrial applications. The Municipal Wastewater Regulation (MWR) and the supporting Reclaimed Water Guideline (RWG) stipulate the classifications, acceptable uses and requirements for reclaimed water. The following definitions are fundamental when discussing reclaimed water and its potential uses:

- Beneficial: "Advantageous or helpful in enhancing or protecting the environment, increasing conservation of natural resources, or improving biological or physical processes without any negative impact on human health or the environment." – Per the RWG.
- Reclaimed Water: "Municipal wastewater that is (a) treated by a wastewater facility, and (b) suitable for reuse in accordance with this regulation." – Per the MWR

Finding suitable uses for reclaimed water within Lake Country has the potential to create various environmental and economic benefits. Reclaimed water can be used for agricultural and landscape irrigation, offsetting the high volumes of potable water otherwise required for these applications, which could be advantageous during summer shortages. Reclaimed water can also replenish freshwater resources (e.g. via groundwater infiltration) or be used to supplement streams experiencing critically low flow volumes. Ultimately, reclaimed water use can bolster a community's sustainability practices, reducing the environmental impacts associated with extracting fresh water from natural sources.

RECLAIMED WATER USE CLASSIFICATIONS

To comply with the Environmental Management Act, any reclaimed water use in BC must be authorized under one of the following regulatory instruments:

- An approved LWMP;
- Registration under the MWR;
- A permit or;
- A temporary approval.

Written notice must be sent to the local health authority 60 days prior to registration. If reclaimed water use is authorized by an approved LWMP, notification may not be required but is still recommended.

The MWR defines four distinct reuse classifications for reclaimed water: indirect potable use, and greater, moderate and lower exposure potentials. Each classification has distinct treatment and monitoring requirements, as well as acceptable uses, which are summarized in Table 1 and

Table 2 below. The acceptable uses listed in Table 1 and Table 2 refer only to MWR standards and do not account for other standards, such as those set by grocers or by other provinces or countries where BC food products may be exported. Any standards that could negatively impact the marketability of a crop must be addressed before applying reclaimed water to food crops.

Table 1. Reclaimed Use Water Categories

	Indirect Potable Use	Greater Exposure Potential	Moderate Exposure Potential	Lower Exposure Potential
General Description	Most stringent classification and requires an enhanced EIS. Consultation with impacted parties is required (e.g. other ministries/agencies, local government, residents, landowners, businesses).	High level of treatment required. For uses where public exposure is likely and that could present a risk to the environment.	For uses where public contact is unlikely, there is no risk to the environment and users are notified of the associated risks.	For commercial, industrial and limited agricultural applications where public access is restricted and there is no risk to the environment.
Typical Applications	• Replenishment of potable water source • Food crops • Urban reuse	• Irrigation (certain food and forage crops, greenhouses, silviculture) • Toilet flushing, decorative water features • Landscape watering (golf courses, cemeteries, lawns, parks) • Frost protection and crop cooling	• Irrigation (certain commercially processed crops, pasture, nurseries, silviculture) • Certain construction and industrial applications • Orchard/vineyard drip irrigation where water does not directly contact the crop	• Industrial (process water, soil compaction, dust control, aggregate washing, concrete production) • Irrigation (pasture, fodder, nurseries, silviculture) • Orchard/vineyard drip irrigation where water does not directly contact the crop

			• Spring frost protection	• Spring Frost Protection
Prohibited Uses			• Landscape watering • Crop cooling • Autumn frost protection	• Landscape watering • Crop cooling • Autumn frost protection
Additional Requirements (Classification-Specific)		• One or more methods must be in place for virus removal (e.g. coagulation and filtration)	• Crops that come into contact with reclaimed water must undergo chemical or physical processing (e.g. canning, fermentation)	
Additional Requirements (General)	• Reclaimed water may not be used for irrigation or impounded within 30m of a well or in-ground reservoir for domestic supply. • Windblown spray must not leave the authorized property. • There must be no surface runoff. • Unless otherwise authorized, reclaimed water must be disinfected with a minimum total chlorine residual of 0.5 mg/L at point of use.			
Agriculture Requirements	• Irrigation cannot occur within 3 days of crop harvest. • Crop cooling cannot occur within 30 days of harvest for crops likely to be eaten raw. • Root crops may not be irrigated if they are likely to be eaten raw.			

	• Irrigation must not occur within 60m of where food is handled or consumed.
Livestock Requirements	• For irrigated livestock grazing fields: milking animals are not to graze within 6 days, other livestock is not to graze within 3 days (unless the meat is inspected).

Table 2. Municipal Effluent Quality and Monitoring Requirements for Reclaimed Water

Parameters		Indirect Potable Use	Greater Exposure Potential	Moderate Exposure Potential	Lower Exposure Potential
pH	Effluent Quality	Site Specific	6.5 to 9	6.5 to 9	6.5 to 9
	Monitoring Requirements	Site Specific	Weekly	Weekly	Weekly
BOD5, TSS	Effluent Quality	BOD_5 5 mg/L TSS < 5 mg/L	10 mg/L	25 mg/L	45 mg/L
	Monitoring Requirements	Weekly	Weekly	Weekly	Weekly
Turbidity	Effluent Quality	Maximum: 1 NTU	Average: 2 NTU Maximum: 5 NTU	n/a	n/a
	Monitoring Requirements	Continuous Monitoring	Continuous Monitoring	n/a	n/a
Fecal Coliform (/100mL)	Effluent Quality	Median < 1 CFU or < 2.2 MPN Maximum: 14 CFU	Median < 1 CFU or < 2.2 MPN Maximum: 14 CFU	Median: 100 CFU Maximum: 400 CFU	Median: 200 CFU Maximum: 1000 CFU *If worker contact is likely:* Maximum: 14 CFU
	Monitoring Requirements	Daily*	Daily*	Weekly	Weekly *If worker contact is likely:* Daily

*Discharger may switch to weekly testing after demonstrating 60 days of compliance with fecal coliform limits.

For reference and comparison, the current effluent quality criteria and future projected effluent quality parameters for the Lake Country WWTP as defined in the 2023 EIS are summarized in Table 3 below. The current effluent quality criteria apply to discharge to ground via infiltration basins, and the future criteria corresponds to the requirements to discharge to Okanagan Lake.

Table 3. Lake Country WWTP Effluent Quality Requirements

Effluent Quality Parameter	Current	Expected Future
CBOD5	≤ 10 mg/L	≤ 10 mg/L
TSS	≤ 20 mg/L	≤ 10 mg/L
Orthophosphate	≤ 1.5 mg/L (maximum daily) ≤ 0.15 mg/L (annual average)	N/A
Total Phosphorus	N/A	≤ 0.25 mg/L (annual average) ≤ 2.0 mg/L (daily maximum) Level to strive for: background Okanagan Lake
Soluble Nitrogen	≤ 10.0 mg/L (maximum daily concentration) and ≤ 6.0 mg/L (maximum annual average)	N/A
Total Nitrogen	N/A	≤ 6.0 (annual average) ≤ 10 (daily maximum)
Fecal Coliforms	No Requirement	≤ 50 counts/100 mL

The future effluent standards satisfy the MWR requirements for the moderate and low exposure potential classifications. To satisfy the requirements for the greater exposure potential classification, fecal coliforms must be reduced from 50 CFU to an average of 1 CFU per 100mL. It is unclear from either the MWR or RWG how the parameter requirements apply to reclaimed water collected from an aquifer hydrologically connected to infiltration basins.

RECLAIMED WATER SERVICE DEVELOPMENT: APPLICATIONS FOR THE DISTRICT

In BC, reclaimed water can become part of a community's plan to beneficially reuse the material produced through wastewater. The RWG includes reclaimed water use on forage crops, stream augmentation (more stringent than forage crops), and habitat development and enhancement (less stringent than stream augmentation). Following these guidelines, the District is planning a phased approach to reclaim water by (1) augmenting low flow

conditions in Middle Vernon Creek and working with ENV to explore habitat enhancement opportunities, (2) supplying irrigation demands, along Beaver Lake Road, and (3) supplying irrigation demands, among other uses, for forage crops and parks in the Winfield West Bench (refer to Error! Reference source not found.). Some of the lots outlined in Figure 1 are not currently serviced by the District's potable water system, which presents an opportunity to provide a reliable water supply and eventually support environmental flows through Middle Vernon Creek. Beyond farms, other lands may be considered, including parks and extensive publicly owned lands that draw from potable or groundwater supplies to irrigate.

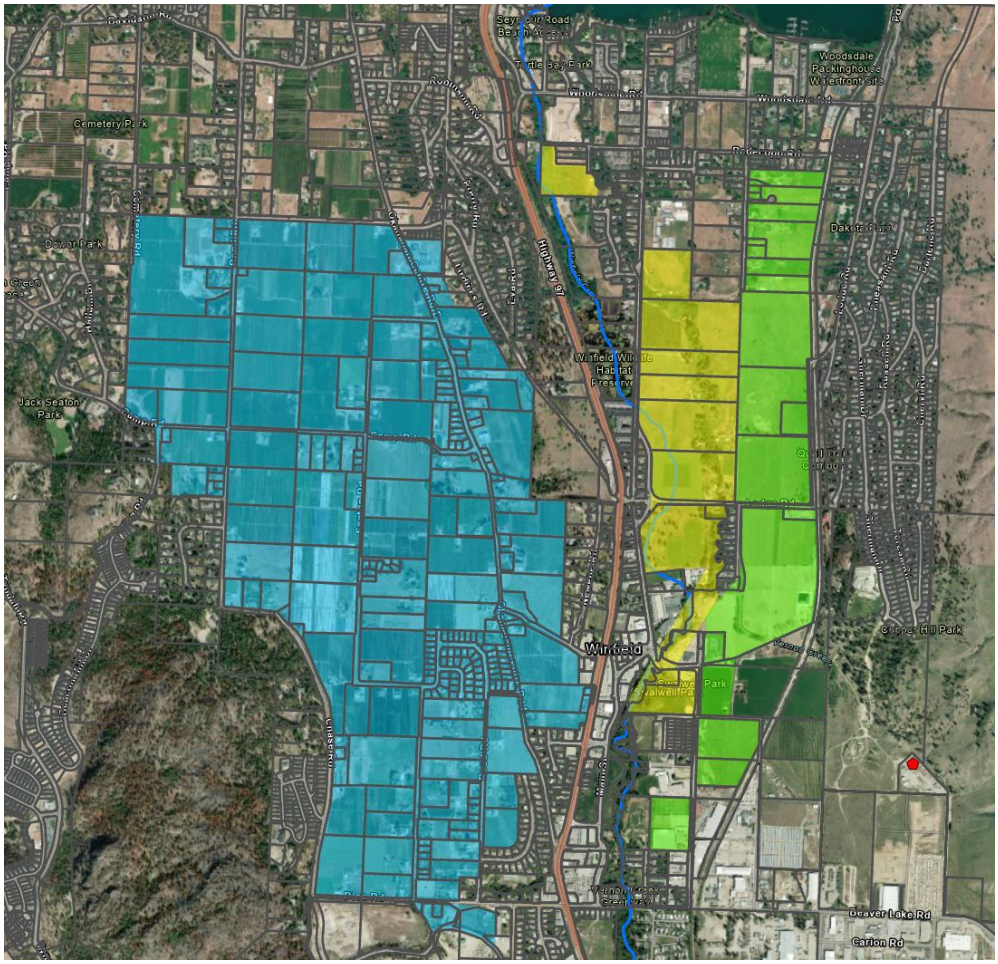


Figure 1: Phase 1 (MVC augmentation in dark blue, potential irrigation benefits for creek-adjacent properties in yellow), Phase 2 (green), Phase 3 (light blue), the Wastewater Treatment Plant (red dot)

Developing a reclaimed water service is not as simple as turning on the tap. An important step for any community in their journey to implement reclaimed water, is to want it. Therefore, engagement with the community to see where there is greatest interest to inform a reclaimed water service with customers and recurring demands is necessary. The variety

of crop types in Lake Country make it challenging to implement a community-wide plan supported by the public. The District's staff looked closely at land uses, potable water supplies, and high-potential stream flow opportunities to identify the three focus areas for further development in Figure 1.

Description of Irrigation Areas & Phases

The District is considering a phased approach to servicing three demand areas with reclaimed water. It should be noted that all three proposed phases rely on a groundwater extraction well located adjacent to the District's Wastewater Treatment Plant. This well would provide a blend of groundwater and treated effluent that has filtered through the ground. These phases are as follows:

1) Middle Vernon Creek flow augmentation, which may benefit adjacent agricultural land that relies on Middle Vernon Creek for irrigation. While the District is not supplying irrigation water directly to these properties, increased creek flows may support those with surface-influenced wells or private intakes. This phase also enhances environmental flow challenges in Middle Vernon Creek, as during the summer Middle Vernon Creek often runs dry. Hereafter referred to as Phase 1 (short-term timeframe).

2) Extension of the Bottom Wood Lake Road irrigation line through Konschuh Road, Meadow Road, Lodge Road, and Woodsdale Road via the Rail Trail. Properties adjacent to this infrastructure are not currently served by the District and those who opt in would benefit from a reliable pressurized irrigation water supply. There is also opportunity to provide this water to adjacent park, turf parks and playfields. Hereafter referred to as Phase 2 (5-10-year timeframe).

3) Twinning the Winfield West Bench's distribution system with a dedicated irrigation main. For operational efficiency and water conservation, the District's water master plan and water conservation plan includes implementing an irrigation system in select areas where practical and feasible. There may be an opportunity to pump water from the groundwater extraction well into this irrigation system. However, this aspect of the reclaimed water reuse strategy requires significant community engagement and careful consideration, as improper implementation could negatively impact the agricultural community. The current intent for this twinned main is to supply both potable flows from the water treatment plant (WTP), and irrigation water from separately installed watermains. Hereafter referred to as Phase 3 (10+ year timeframe).

These phases are preliminary and will change as needed to achieve regulatory approval, receive stakeholder support, and scale to match funding availability. Error! Reference source not found. depicts these phases and their areas in relation to the Wastewater Treatment Plant.

Selection Process: Three Phases for Reclaimed Water Service Development

The Liquid Waste Management Plan Stage 1 - 2 Report suggested that areas near the wastewater treatment plant, or near the return line discharging cleaned water to Okanagan Lake, are suitable candidates for the potential customer base for reclaimed water. The wastewater treatment plant is located to the southeast of Phase 2 and the proposed return line passes to the south along Beaver Lake Road. Farms situated near these areas provide an opportunity for reclamation so long as customers emerge who can accept the water.

The Stage 3 Report expanded on this concept and we expect that augmenting flows in Middle Vernon Creek could be a feasible and beneficial Phase 1 of reclaimed water use in the District. This is due to the District's increasing reliance on the community's freshwater supply to meet environmental flow requirements during summer's low-flow period. Additionally, the District has an existing, although never used, outfall from the WWTP well to MVC that could be utilized. Adjacent properties along MVC could consider using this additional supply to MVC as a source for irrigation, therefore these properties have been included in Phase 1. Phases 2 and 3 have significant irrigation demands for crops, nurseries, and recreational land uses. However, Phase 3 also faces considerable challenges regarding agricultural acceptance and will not be implemented until those hurdles are overcome.

Once a core infrastructure network is established, the District will work with Council to develop criteria and/or economic features to expand the system to service interested customers. Other communities who have reclaimed water systems caution that it is important to carefully weigh expansion areas given the cost – both capital and operational – to increase the extent of non-potable water.

PROJECTED MAGNITUDE OF IRRIGATION DEMANDS

Irrigation Water Demand Model

Urban worked with RHF Systems Ltd. (RHF) and the Okanagan Basin Water Board (OBWB) to assess current and future irrigation needs. Together, they created the "Irrigation Water Demand Model" to compile historic and current irrigation demands and forecast future demands. The historic demands were based on data from 1997 (cool/wet), 2003 (hot/dry), and 2017 (RHF's most recent data). RHF modelled the future demands in the three phases by selecting three climate scenarios from generation 5 of the Coupled Model Intercomparison Project (CMIP5).

1. ACCESS1-0 representative concentration pathway 8.5
2. CanESM2 rcp 8.5
3. CNRM-CM5 rcp 4.5

The number at the end of each scenario name refers to the representative concentration pathways (RCP) of the CMIP5 models. These refer to the expected radiative forcing and/or level of emissions over the course of the next century. CMIP5 considered four RCP scenarios: 2.6, 4.5, 6.0, and 8.5 which range from a future reduction in greenhouse gas emissions to an increase in greenhouse gas emissions by the century's end. RHF's irrigation demand projection included two scenarios with CMIP5's highest emissions scenario.

Demand Estimate Summary

Table 4 presents a summary of irrigation demand data by juxtaposing the 2017 values (the most recent of the three years considered by RHF), the average from three historical years, and the average from three projected future scenarios.

Table 4: Lake Country Irrigation Demands by Crop Type and Irrigation Area

	Tree Fruit	Vegetables & Other Fruit	Nursery	Forage	Recreational	Sum
Phase 1						
Area (ha)	2.5	1.3	0.2	11.9	2.3	18.1
2017 Demand (m^3/year)	17,600	5,002	1,854	108,779	22,849	156,084
Historical Demand (m^3/year)	15,006	3,994	1,609	94,531	20,630	135,770
2040 Demand (m^3/year)	15,046	3,870	1,640	96,575	21,070	138,202
Phase 2						
Area (ha)	3.2	1.7	0.3	15.2	2.9	23.2
2017 Demand (m^3/year)	22,493	6,392	2,370	139,025	29,202	199,483
Historical Demand (m^3/year)	19,179	5,105	2,056	120,816	26,366	173,521
2040 Demand (m^3/year)	19,229	4,947	2,097	123,428	26,929	176,629
Phase 3						
Area (ha)	123.9	15.7	0.0	56.2	1.7	197.5
2017 Demand (m^3/year)	1,027,700	91,324	0	561,604	14,224	1,694,851
Historical Demand (m^3/year)	893,229	76,901	0	497,283	12,957	1,480,369
2040 Demand (m^3/year)	936,479	78,842	0	525,292	13,545	1,554,159

** The estimates above include several assumptions regarding crop, soils, root depths, and irrigation types, all of which are subject to change and must be examined further as the system design enters more detailed phases.*

*** For the preliminary demand estimates, the analysis excluded the "Tree Fruit" and "Vegetables & Other Fruit" land-uses in keeping with the Stage 1 – 2 Report recommendation that non-food-to-mouth irrigation demands are more likely reclaimed water candidates, at least at the onset and while BC regulations and grocers' standards remain as they are.*

The demand estimates in Table 4 above are generally optimistic and reveal the high-end potential demand for reclaimed volumes. These values encompass all parcels in Phases 1, 2, and 3, though all parcels may not be equally suited or likely to use reclaimed flows. Urban excluded the "Tree Fruit" and "Vegetables & Other Fruit" land-uses in keeping with the Stage 1 – 2 Report recommendation that non-food-to-mouth irrigation demands are more likely reclaimed water candidates. The prevalence of food-to-mouth crops in the Phase 3 area limits the feasibility of delivering reclaimed water to the whole area. The District expects Phase 2, with a larger proportion of forage, may be more feasible, but there is also the challenge of understanding the long-terms impacts on agricultural land, and the need to understand this before implementation can occur.

The regulations of grocers limit the candidacy of reclaimed water on food-to-mouth crops. During engagement discussions in 2025, members of the agricultural community and Lake Country Farmers Institute (LCFI) emphasized the infeasibility of such uses of reclaimed water which was later affirmed in discussions with the Ministry of Agriculture and Food. From LCFI's perspective, even if the District can supply reclaimed water that meets future provincial and federal regulations, it is insufficient so long as the regulations of grocers prevent farmers from using reclaimed water (see the "Agriculture Requirements" in Table 1). The agricultural community also expressed concern over the impacts to soils receiving reclaimed water (heavy metals accumulation) and are concerned regulations may change without scientific support. Despite their concerns on food-to-mouth applications, there was expressed interest in working with the Province and the District to promote reclaimed uses in non-food-to-mouth applications that do not impact agriculture.

Where Table 4 summarizes the non-food-to-mouth irrigation demands, Table 5 below demonstrates the potential to service those demands with reclaimed water by summarized the treated effluent volumes for the whole year and the agricultural season (assumed May 1 – October 1). These treated volumes were adapted from Table 21 in the Stage 1-2 Report.

Table 5 also includes an estimate of the expected flow augmentation in MVC. Recently, the District was mandated by provincial authorities to supply at least 150 L/s to MVC during the 2023 spawning season. The flow rate needed for augmentation will be less than 150 L/s unless the creek is completely dry and the District decides against releasing water from the upper watershed that the community relies upon, in favour of withdrawing from the groundwater well. Use of the well is primarily to augment summer flows when the creek runs dry, and to augment flows during the Kokanee spawning season. As a preliminary estimate, Urban assumed continuous flow augmentation of 25 L/s for six weeks, which is roughly the current fish spawning window overlap with the agricultural season, and up to eight weeks in 2040. If spawning durations become longer than six weeks, or if the channel runs dry at other points in the summer, the reclaimed volume useful for augmentation could increase.

Table 5: Lake Country Treated Water Production vs Non-Food Irrigation Demand

	Treated Volume		Potential Irrigation Demand			
	Annual	During Irrigation Season	MVC Flow Augmentation in Phase 1	Non-Food Irrigation in Phase 1	Non-Food Irrigation in Phase 2	Non-Food Irrigation in Phase 3
Current (m^3)	*712,000*	*295,000*	*90,720*	*116,770*	*149,238*	*510,240*
2040 Production (m^3)	1,724,000	715,000	120,960	119,286	152,454	538,837

- *Initial estimates in the Stage 1-2 report probably overstated the land needed for a high reclaimed water usage ratio compared to plant production. The irrigation demand model has refined these preliminary estimates.*
- *2040 treated volumes available for reclaimed uses will be less than reported here if the District partners with the City of Kelowna.*
- *Annual Treated Volumes for current and 2040 based on "Maximum Month Flow" from Table 4 of Stage 1-2 Report.*

Although useful for preliminary estimates, meeting the non-food-to-mouth irrigation demands in

Table 5 is not currently feasible (e.g., turning on the whole proposed reclaimed water system in 2025). The Table 5 values simply convey a sense of scale for how reclaimed use fits into the three-part return water plan.

Next steps in realizing a reclaimed water system includes assessing the impacts of crop type, crop turnover, soil type, and slope among others including customer willingness and rate economics. That technical work ought to be initiated upon completion of the LWMP so that estimates, parcels, and irrigation types or levels become increasingly more reliable as data and design accuracy improves. These utility considerations should be paired with environmental studies to assess the regulatory feasibility and risk mitigation needs to achieve core aspects of the reclaimed water plan. Ultimately, the 2040 treated volume estimate exceeds all but the most optimistic of irrigation demand projections, meaning that in-ground disposal, an Okanagan Lake outfall, and/or inter-municipal agreements are essential. Additionally, there is no agricultural demand in winter that can use reclaimed water, so a separate year-round disposal option is essential.

Whereas there is regulatory feasibility and water sustainability needs to drive it, reclaimed water implementation will take significant effort and commensurate resources.

RECLAIMED WATER - IMPLEMENTATION

Engineering a New Service: Patience and Intention

Ten plus years may appear like a drawn-out timeline, but it is not when you consider how many tasks need to be completed in sequence with little schedule float to draw on. Realistically, accomplishing everything properly will require incremental efforts each year for several years. It is important to note several factors that substantially affect overall implementation timelines:

- Funding and construction timing for the Phase 4 (commissioned) and Phase 5 upgrades to the wastewater treatment plant, which ensures cleaned water meets requirements for both an Okanagan Lake outfall and crop reuse (groundwater withdrawal may not require Phase 5 upgrades to be complete, as determined in a pending EIS).
- The direction and support of Council and agricultural community to validate water reuse as part of the local integrated water strategy.
- Towards the end of ten years, the timing and completeness of retrofit and expansion initiatives to address underperforming septic fields, support growth and housing, and ensure reliable reclaimed water supplies for the long run.
- The instance of a water shortage or future government mandate for reuse which would accelerate local efforts to commission a fulsome reclaimed water system.

Implementation for reclaimed water will require appreciating the long game (patience) while showing urgency and commitment (intention) to the planning, design, approvals, and construction process.

RECLAIMED WATER – ACTION PLAN

A work plan outline offers the major categories or steps of implementation from start to finish. The quest to develop reclaimed water systems is complicated and requires adaptation along the way. The outline will help successfully position the District with an essential checklist for concluding studies. Given the sustainability of any service, particularly one with an atypical supply story, it is imperative to begin with market potential, then service design and governance. Until reclaimed water is obligatory, the system itself is an act of engineering but initiating the service is an economic one that is dependant on the regulations of grocers, and the provincial and federal governments.

Step 1: Service Establishment (Years 1-3)

This step will cover all the preparatory work, ensuring that the foundational studies, environmental impact analyses, and engineering evaluations are complete before moving into construction.

1. Pre-Service Establishment Assessments (Year 1-2)
    - Supply-Demand Projections and Stakeholder Consultation: Assess customer demands, refine potential reclaimed water use phases, and fine tune stream flow augmentation. Include economic viability studies and funding options within this. Engage indigenous communities, the local council, and potential reclaimed water users (e.g., farms and parks) to gather input and address concerns
    - Environmental Impact Studies (EIS) and Regulatory Screening: Conduct studies for both stream augmentation and irrigation, focusing on ecological impacts, risks, hydrogeological assessments, and mitigation strategies for reclaimed water use Phases 1 and 2. Develop a governance plan that covers local bylaws, service oversight, and regulatory pathways, ensuring alignment with District-specific criteria, while simultaneously implementing customer engagement, formal service planning, and drafting the Service Establishment Bylaw.
    - Engineering Assessments: Advance preliminary engineering designs, focusing on required upgrades to the wastewater treatment plant (WWTP), storage solutions, and distribution infrastructure. Completing a full fledge reclaimed water system is inherently tied to the design of the Phase 5 WWTP upgrades including an Okanagan Lake outfall line. The motive to reuse

cleaned water must be mirrored in motivation to complete plant upgrades. If the District is to add reclaimed water system to a single, grantable project, then these engineering assessments must also include conceptual designs for reclaimed water lines.

- Service Governance Plan: Develop a governance plan that covers local bylaws, service performance, and regulatory needs, ensuring alignment with District-specific criteria, while simultaneously clarifying District responsibilities and customer considerations, formal service planning, and drafting the Service Establishment Bylaw.

2. Preliminary Engineering Report (Year 2-3)

- System Design: Develop a conceptual design for the reclaimed water system for irrigation purposes, focusing on storage, conveyance, and pump stations. Begin planning irrigation systems for reclaimed water use Phases 1 and 2, or alternative areas based on the results of analysis above. Keep in mind that many of the routes identified for a reclaimed water system are likely to overlap with other infrastructure renewal needs in the District, whether roads, stormwater, or sanitary upgrades, which presents cost-synergies and design complications.

- Stream Flow Augmentation Plan (Year 2): Finalize the augmentation system for Middle Vernon Creek, including groundwater extraction and balancing seasonal demands, and linking this system to the Middle Vernon Creek augmentation options assessed under separate cover including a partial bypass and a control structure on Duck Lake.

Step 2: Detailed Design and Approvals (Years 3+)

During this step, detailed designs will be prepared, and construction activities can begin for both the reclaimed water system and stream flow augmentation works.

1. Engineering & Construction Plan (Year 3-4): Complete the detailed design for Phase 1 of the reclaimed water system including stream flow augmentation, if not already completed.

2. Financial Planning & Budgeting (Year 3-5): Secure financing through district budgets, government grants, and other inter-municipal funding opportunities if presented. Develop a pricing structure for reclaimed water irrigation that ensures long-term cost recovery while promoting the use of reclaimed water.

3. Permitting & Regulatory Approvals (Year 4-5): Secure final permits and develop construction plan.

Step 3: Construction & Operation (Year 5 to 10+)

With foundational work completed, initial construction can begin with the goal of having partial system operation by year five and incremental expansion beyond year eight when the plant upgrades are fully complete, an Okanagan Lake outfall line is selected or constructed if needed, and sufficient reclaimed water customers sign on to the service. The success of step 3 depends on agricultural acceptance and the regulations that influence that acceptance.

Operation of a reclaimed water system has many characteristics of a pressurized water distribution system, with several nuances. Though too many to list here, consider several operational factors that are sure to affect various practices and procedures of the district:

1. Continually test water quality throughout the reclaimed water system and engage with customers on the benefits and challenges for using the water.
2. Monitor and evaluate the performance against expected outcomes, ensuring compliance with all regulatory requirements.
3. Establish operational teams and finalize maintenance procedures, including winterization and backflow prevention among many other safety and performance standards for the system.

The schedule is not fixed but does benefit from early engagement activities and concept reviews. Water shortages, droughts, and environmental flow risks can emerge suddenly and are expected to become more frequent in the face of an uncertain climate future. Early planning to be ready to engage and act in preparation for such conditions is important. Prior to commissioning a reclaimed water system, the District needs to complete other major infrastructure projects which provides time to develop a sound plan before significant funding is dedicated or contracts are signed. Without the additional risks of climate uncertainty, the District already understands that projected treated volumes will require additional disposal infrastructure – of which reclaimed water, appropriately planned for and designed, provides a beneficial reuse response rather than strictly disposal.

Starting with confirming the extent of consumer interest, the environmental feasibility and preliminary engineering assessments will complete Step 1 of the District's reclaimed water implementation plan. Step 2 will transition to detailed engineering, budgeting, and securing regulatory approvals. Step 3 will transition to operations and maintenance activities including monitoring water quality and general performance against monitoring requirements, finalizing the O&M program, and preparing for long-term stewardship of the reclaimed water system asset. Given the significant challenges involved—including upgrading the treatment plant to meet higher reclaimed water quality standards, securing

community buy-in, and navigating complex regulatory requirements—a timeline of more than 10 years is a realistic expectation for implementing all three stages..

APPENDIX B – RETROFIT SEWER EXPANSION AREAS

LWMP STAGE 3 IMPLEMENTATION | DOLC

DATE: March 26, 2025 FILE: 1577.0110.01 PAGE: 1 of 8
SUBJECT: Retrofit Sewer Expansion Areas

PURPOSE

Lake Country's *preferred direction* for liquid waste management aligns with the Official Community Plan, which calls for implementing sewer retrofits in several distinct locations.

Though many favor rapid sanitary retrofits and immediate service commencement, extending sanitary sewers is both time-consuming and costly, and the Wastewater Treatment Plant must still maintain sufficient capacity for current and future customers. Treatment capacity expansion must also include constructing and commissioning a long-term effluent disposal option., as in-ground capacities are inadequate for the flows from these homes. The timing for sewer retrofit areas is a core component of the LWMP Implementation Plan.

This document revisits the background to the selection process of the identified neighbourhoods, discusses the financing approach, confirms the preferred schedule, and outlines the implementation steps to complete the work over the next decade.

A small section at the end of this memo outlines Lake Country's aim to support regional initiatives, educating property owners about in-ground, private septic systems. Continued participation in the program helps to reduce any environmental risks posed by homes not yet connected to the community sewer system.

BACKGROUND FOR SEWER RETROFITS AND COLLECTION SYSTEM EXPANSION

Since incorporation, Lake Country's sewer collection system has expanded to reduce the cumulative effects of potentially underperforming septic systems and safeguard lake health. The historic pattern of incrementally and strategically expanding the community system carries over into the LWMP. Where, when, and why to expand is a complicated topic. The Stage 1-2 report summarizes past studies and decisions by Lake Country about the approach and selected areas for retrofit.

Through two LWMP processes and multiple OCPs, Lake Country residents have expressed their opinions via surveys, public meetings, and write-in commentary. With public support mainly in favour, past reporting also employed a Kepner-Tregoe analysis to evaluate 11 neighbourhoods based on the following criteria:

- Proximity to existing sewer (indicating cost feasibility)
- Number of new connections (reflecting the pace of progress)
- Estimated cost (correlated with the number of connections, assessing cost feasibility)
- Environmental concerns (known, stated, or implied)
- Health concerns (known, stated, or implied)
- Desire by residents for service (indicating implementation and financing feasibility)
- Neighbourhood age (indicating risk to environmental and health concerns)
- Potential for developer cost-offsets (indicating cost feasibility)

- Alignment with the urban containment boundary and consideration to limits of expanding infrastructure into agricultural land conservation areas

The detailed deliberations resulted in the definition of sewer area boundaries and the adoption of several policies of the Official Community Plan. With formal Council approval, these policies collectively guided the expansion schedule outlined in Tables 3 and 4 of the Stage 1-2 LWMP Report. The neighbourhoods prioritized based on the criteria from past analyses include Mountain, Bond, Pretty Road North, Pretty Road South, KelVern, Winview, and parts of Oyama. There is some opportunity to expand from these areas as development brings sewer closer to un-serviced areas, but this report shall focus on the areas identified.

A historic study, which utilized a combination of hydrogeological modelling and surface water sampling, concluded that extending the wastewater system to these areas is imperative to reduce nutrient loading in downgradient surface waters, including Vernon Creek and Wood Lake, a fish-bearing stream. Excerpts from this study can be found in the Stage 1-2 LWMP Report.

Figure 1 illustrates the identified neighbourhoods' location and proximity to the core sanitary sewer system. It is important to note that the identified expansion areas are all included in Lake Country's Urban Containment Boundary, a specific zone that stems from the Official Community Plan. The next update to the OCP is an opportunity to consider other retrofit areas further. However, expanding beyond the proposed areas from the 2017 OCP and the LWMP should only be considered once the current slate is complete, or it makes sense to do so. The District of Lake Country should complete additional hydrogeological and prioritization-based studies before the next OCP update.

The total units from the eight prioritized neighbourhoods are estimated at 700 units, likely brought online to the system over several years. That number may rise based on the recent legislation of the Provincial Government to permit higher densities on single family lots through small unit housing in the same areas. As service becomes available to these areas, the District has the authority to require properties to connect under existing bylaws. The District would look to mandate connection once treatment capacity becomes available.

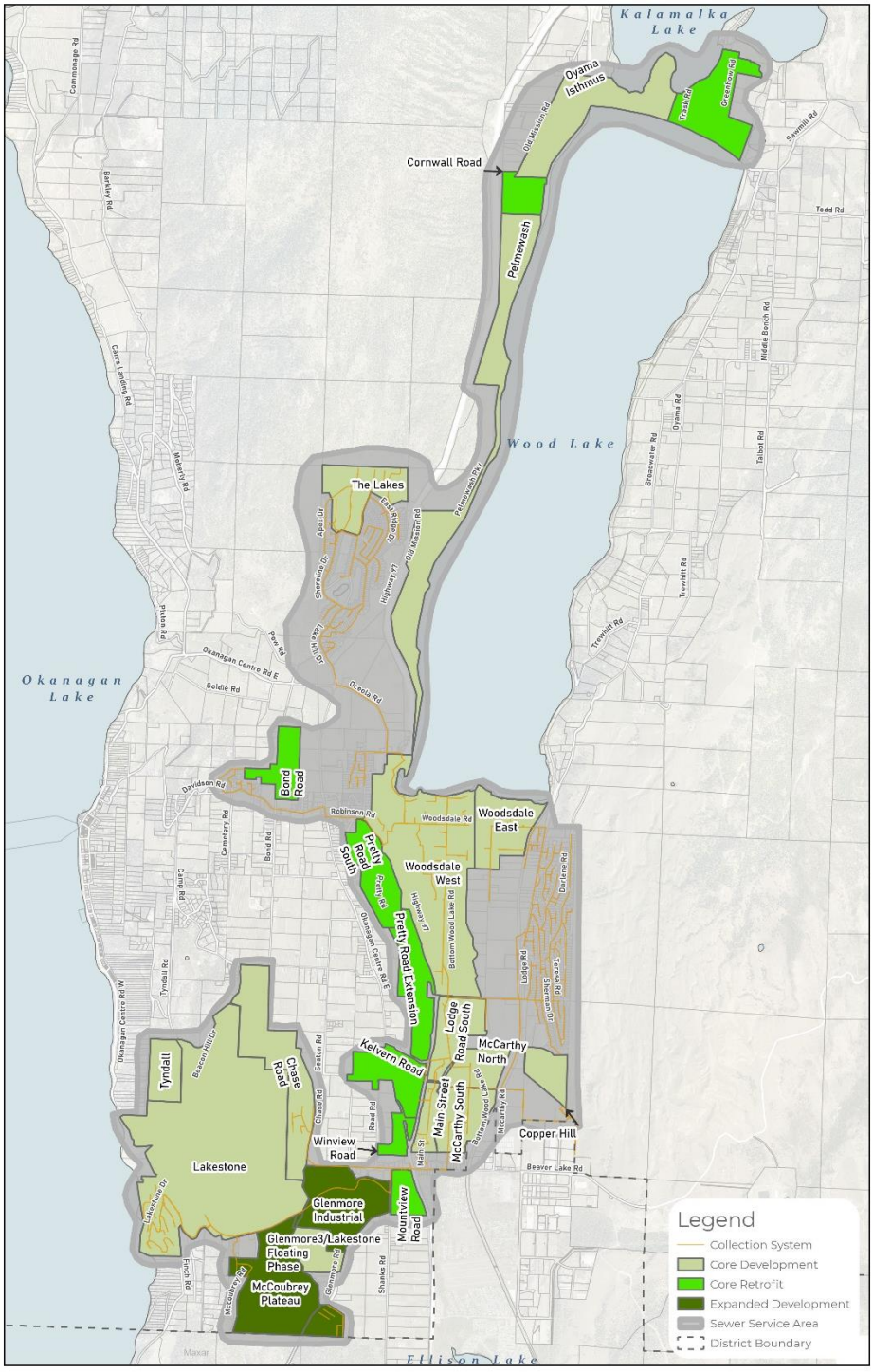


Figure 1: Retrofit Areas

The locations of the retrofit areas show strong visual alignment with the list of factors considered in the 2017 analysis.

LWMP IMPLEMENTATION PLAN – INFRASTRUCTURE PROJECTS

Several construction projects frame the effort to extend and connect the neighbourhoods mentioned above. The local service area (LSA) will fund the extension projects utilizing a taxation method whereby granted authorities enable the extension of sewer services. Table 1: Summary of Construction Projects provides a summary of the proposed LSA projects.

Table 1: Summary of Construction Projects

PROJECT NAME AND CLASS C COST ESTIMATE (2023 DOLLARS)	FUNDING SOURCE(S)
Mountain Road $1.992M	LSA amounts are grant eligible, by senior government (66%) and OBWB (16%) leaving ~18% for local taxation
Bond Road $4.651M	LSA amounts are grant eligible, by senior government (66%) and OBWB (16%) leaving ~18% for local taxation
Pretty Road North $2.873M	LSA amounts are grant eligible, by senior government (66%) and OBWB (16%) leaving ~18% for local taxation
Pretty Road South $5.769M	LSA amounts are grant eligible, by senior government (66%) and OBWB (16%) leaving ~18% for local taxation
KelVern and Winview $5.540M	LSA amounts are grant eligible, by senior government (66%) and OBWB (16%) leaving ~18% for local taxation
Trunk Sewer Extension to Oyama Isthmus $11.7M	50% DCC and 50% LSA, where 66% and 16% of the LSA amounts are grant eligible, by senior government and OBWB respectively
Oyama $10.152M	50% DCC and 50% LSA, where 66% and 16% of the LSA amounts are grant eligible, by senior government and OBWB respectively

Based on these projects and funding sources, the summary financial implementation plan for sewer retrofits includes two fundamentals that affect overall feasibility:

- All projects are grant eligible based on what is known today, with 66% and 16% covered by senior government and OBWB respectively.
- The two Oyama projects enable further growth and development already known and projected, meaning those two projects are DCC eligible. The remainder of the funds (50%) are to be funded by LSA.

The process and impacts to pay for LSA are outlined in the following section.

LWMP IMPLEMENTATION PLAN – LOCAL AREA RETROFITS

The LWMP implementation plan identifies the timing for the local service area for sewer retrofits. Initiating the service extension is not currently feasible given the Plant's capacity challenges.. For multiple reasons, the LSA approach is the appropriate method to enact the authority to levy the service and the appropriate cost-recovery method. This approach has been proposed in concept to the District Council several times with encouragement to keep moving forward. Lake Country's successful history with LSA furthers the basis for pursuing this method.

District staff would lead the process, including designing the infrastructure and coordinating the construction process. Before that begins, the District and its Council would support service establishment by following the general task list outlined below in

Table 2: Local Service Area Establishment Task List. It is important to note that District staff would also author grant applications on behalf of the benefitting residents. The service would not proceed without significant senior government grants as the cost to extend sewer retrofits is quite cost-prohibitive without grants. As noted above, the LWMP financial plan cites 66% senior government grant funding plus 16% grants from OBWB.

Table 2: Local Service Area Establishment Task List

TASK LISTING
1) **Identify Services and Define Boundaries:** Determine the District services to be provided per area and confirm the boundaries within electronic mapping software.
2) **Estimate Costs and Funding:** Provide an estimate of the service's costs, clarify if borrowing is required, and identify the form of local service tax and the portion covered by general property tax.
3) **Prepare and Circulate Petition:** Prepare a report to Council requesting authorization of the official petition, and if authorized, circulate the petition to the benefitting property owners.
4) **Determine Sufficiency of Petition:** Ensure at least 50% of the owners sign the petition and that the signatories represent at least 50% of the assessed value of land and improvements.
5) **Prepare and Adopt Bylaws:** Prepare bylaws to establish the new local service, authorize borrowing if needed, and amend the Financial Plan to include estimated costs.
6) **Public Consultation and Inspector Approval:** Conduct a public consultation process and obtain Inspector approval for the LSA establishment/borrowing bylaw.
7) **Finalize Borrowing Arrangements:** Finalize borrowing arrangements and adopt the Financial Plan amendment bylaw.
8) **Impose Parcel Tax and Operating Costs:** Prepare and authenticate the parcel tax roll, and impose the parcel tax and operating costs as a municipal fee.

The timeline for local service area implementation for sewer retrofits is to begin formal proceedings upon completion of a long-term effluent disposal option. Given the capacity constraints at the plant today, including the pending flows from already approved developments, the LSA process cannot proceed until the capacity has been constructed and commissioned.

Given the schedule, with adequate funding and support the design of sewer retrofits could start in 2032, with construction commencing in 2034.

LWMP IMPLEMENTATION PLAN – MUNICIPAL SUPPORT TO REGIONAL SEPTIC SYSTEM MANAGEMENT

Septic systems are generally found in rural areas and, therefore, are more often a function of the Regional District. In and around Lake Country, the Regional District of Central Okanagan provides education and awareness services in support of property owners, properly maintaining their systems. Part of those services include links and additional

materials that connect property owners with Interior Health, who has authority to administer septic system installations and tend to reported failures.

The District of Lake Country, by regional requisition to the Regional District, will continue to support the work of the regional service. In addition, Lake Country will update residents seeking more information via website updates, including additional resources and education materials. The updates to the website occurred in 2024 to include these resources. Staff will also continue to direct the public to contact registered onsite wastewater professionals and/or Interior Health when issues arise at private systems.

Similarly, the District will continue to modernize and enforce its local regulations to design and inspect septic systems properly during development. Significant planning and land use regulatory updates are occurring in Lake Country, similar to other municipalities in BC, and engineering staff will be opportunistic and reasonable as to how to introduce further measures to require property owners and developers to move forward responsibly with their septic systems. Lake Country is committed to ensuring that local regulations encourage homeowners to properly maintain their system and require them to update it if it fails to meet modern standards at the time of development, and thereby show Lake Country's commitment to borrow water wisely and return it safely.

APPENDIX C – COST ESTIMATE CLASSES

LWMP STAGE 3 IMPLEMENTATION | DOLC

DATE: April 2, 2025 FILE: 1577.0110.01 PAGE: 1 of 3
SUBJECT: Cost Estimating Fundamentals: Application to Stage 3 Report

PURPOSE

Lake Country's *preferred direction* for liquid waste management is detailed in the Stage 1-2 Report, which includes various projects and programs over a 20-year period, including any projectable cost estimates. BC ENV staff's letter accepting the Stage 1-2 Report and outlining guidance for Stage 3 reporting suggests that cost estimates should be more precise in Stage 3.

COST ESTIMATE SCIENCE BY ENGINEERS ON CONSTRUCTION PROJECTS

Lake Country's cost estimates in the Stage 1-2 report are appropriate for a planning-level assignment such as a liquid waste management plan. Factors that affect the degree of precision in a cost estimation relate to:

- The further along the design process is, the more reliable the cost estimates become, which often aligns with the proposed timing of the works. For example, a project scheduled for 2030 will not have detailed cost estimates in 2025 because the conditions for those projects are subject to some change over a five or more-year period, e.g., road widths, pipe locations, adjacent developments, and regulations.
- How complex the project is and the unknown or uncertain risks inherent in any project need further assessment that is too expensive to conduct across many projects. For some assignments, such as a professional service study or a simple pipe extension, the complexity is low, and forecasts for detailed cost estimates are relatively simple, assuming the project timing is not far off. However, new outfall lines, wastewater treatment plant expansions, and lift station upgrades represent advanced, complex projects. In these instances, the precision of cost estimates rises once the design has advanced enough to reduce unknowns. As a planning-level document, many uncertainties remain for significant capital projects in this LWMP and cost estimates at higher classes are warranted.
- Stable pricing in construction has become challenging due to recent inflation and cost increases from 2022 to 2025. Obtaining precise cost estimates for the next 20 years is impractical and increasingly inaccurate over time. Providing detailed cost estimates is hard to justify because they can quickly become outdated.

The less confirmed the project elements, the higher the contingency and the lower the cost estimate class. The accuracy of a cost estimate does not necessarily correlate with the local level of commitment. It is possible to provide a Class D cost estimate for a project planned 10+ years into the future, while still being sincere and fully delivering on that project.

Figure 1 below is a BC Ministry of Transportation and Transit (MOTT) cost estimate guide dated December 2020. Many of the projects listed in Lake Country's 20-year LWMP implementation plan remain in the preliminary or concept design stage (Class 4), warranting 30 to 50% contingencies.

Estimate Class	Purpose of Estimate	Project Phase/ Milestone	Accuracy Range Percentage
5	Option Screening	Planning Study	-50 to +100
4	**Treasury Board Stage 1 Submittal** Preliminary budget approval	Preliminary or Concept[1] Design	-30 to +50
3	**Treasury Board Stage 2 Submittal** Baseline budget approval	Detailed Design[2]	-20 to +30
2	Pre-tender Estimate – affordability check	Tender or RFP[3]	-15 to +20
1	Control Budget	Construction or Award[4]	-10 to +15

[1] Concept design applies to design-build procurement
[2] Includes completed functional design
[3] RFP applies to design-build procurement
[4] Control budget adjusted to reflect awarded contract value

Figure 1: BC MOTT Cost Estimate Class Breakdown, 2020

While the table in Figure 1 above uses Estimate Class 1 through 5, a common convention is Class A through D cost estimates as referenced in ENV's response letter dated August 10, 2023 (see Appendix I). Figure 2 below uses the latter and shows the cost estimate class recommendations in the Guide to Cost Probability by the Canadian Construction Association (CCA), dated November 2012. Though similar to the BC MOTT example, the CCA table highlights the role of complexity and degree of design completion in selecting the appropriate cost estimate. On the basis of project phase, Class A generally correlates to Estimate Class 1, Class B to Estimate Class 2-3, Class C to Estimate Class 3-4, and Class D to Estimate Class 4. Anything less exact than Class D (concept sketch design) would be a planning-level options screening exercise, as in Estimate Class 5 from BC MOTT.

COST ESTIMATE VARIANCE MATRIX ± %			
Class of Estimates	Based On	Project Complexity LOW	HIGH
D	Concept sketch design	20	30
C	33% Design development	15	20
B	66% Design development	10	15
A	100% complete tender documents	5	10
Unique Projects, Circumstances, or Risks		Varies	Add to Above %

Figure 2: Canadian Construction Association – Guide to Cost Probability, 2012

It is important to restate that the level of design – and their cost estimate - completed is not a proxy for the level of local commitment to the project. Most design assignments remain preliminary until they are proposed to start, even if there is the unwavering intention to complete the project. It is best to stay at the preliminary or concept design stage (with 20-30% contingencies) until construction is imminent, as early completed designs can become outdated and incur unnecessary costs due to changing conditions.

Lastly, it is our professional experience, too, that for LWMP purposes, most estimates should be Class D. While the District is committed to refining cost estimates as their projects progress, only projects near construction may warrant Class C or Class B. An increase in project cost in the 2025 Stage 3 Report does not mean the project becomes unfeasible. Like most other projects delivered by Lake Country, the project funding will align with the proposed schedule, where utility rates or taxes will fluctuate to cover the actual costs.

APPENDIX D – PUBLIC ENGAGEMENT SUMMARY

LWMP STAGE 3 IMPLEMENTATION | DOLC

DATE: April 2, 2025 FILE: 1577.0110.01 PAGE: 1 of 3
SUBJECT: Public Engagement Summary

PURPOSE AND PROCESS RECAP

Lake Country's *preferred direction* for liquid waste management is based primarily on the results from the first two stages of the project which involved significant public engagement as detailed in the Stage 1-2 Report. In fact, Lake Country was signalled out by the Union of BC Municipalities and many of its civic peers for the extensive efforts to invite, listen, inform, and engage with residents and won Honourable Mention, 2022 Community Excellence Award. We invite the reader to revisit the engagement summary from the Stage 1-2 Report at www.lakecountry.bc.ca, searching for *Let's Talk Poop* to scan the materials and activities completed so far.

Feedback from the process has been constructive and supportive towards the preferred direction, in that the path forward is duly framed by the input of many stakeholders to date. Public sentiments can be summarized into six key messages, which frame the implementation:

- Strong public expectations to ensure the return water to Okanagan Lake meets or exceeds regulatory standards, including compliance and diligent monitoring.
- Diverse community perspectives exist regarding whether to prioritize minimal expenditure on the whole plan or invest more in establishing reuse systems. If reuse systems were safe, supported by local farmers and grocers, and their costs were offset by grants, there would be even greater support for reclaimed water.
- Growing demand and consistent support from homeowners to extend the sewer system to additional neighbourhoods and further expand the core network.
- Sustained apprehensions by some residents and businesses regarding urban expansion and the equitable distribution of development costs among all rate payers.
- Vocal desire by many locals for improved stormwater management, particularly aimed at enhancing the quality of water bodies such as Wood, Okanagan, and Vernon Creek.
- Some interest, albeit not significant, in exploring potential partnerships with public utilities, where Lake Country delegates its treatment responsibilities to another agency or community. Service partnerships are generally supported so long as local control and autonomy for service levels and growth capacity remain secure.

The implementation plan respects the feedback to date and incorporates the need to continue to study key aspects like water reuse and stormwater management because although expectations were high, there is still a need to thread a needle and find just the right services to balance affordability, intention, and effectiveness.

With a strong engagement process behind us, the needs for Stage 3 really zeroed in on two key parts, framed into two questions:

- How supportive are you (the public) of the proposed plan to pay for the Liquid Waste Management Plan?

- What information or involvement would you like to have while the Plan is implemented?

The activities in Stage 3 are outlined below.

STAGE 3 LWMP PUBLIC ENGAGEMENT ACTIVITIES & INSIGHTS

Table 1 outlines the steps taken in Stage 3 to further engage with the public and finalize the LWMP for implementation.

Table 1: Engagement Process Table

ACTIVITY	TIMING	EFFORT AND OUTCOME
Publish Stage 1-2 Report to District Website	Fall 2023 (post Ministry acceptance)	Website traffic sustained levels similar to 2022 when reports were first published. Some minor follow up and commentary from the public was received and addressed.
Present to Council: LWMP Cost-Recovery and Financial Principles	November 2023	Urban Systems and District Staff presented the Stage 3 Process Update with financial principles for Council discussion and direction. Upon receiving the direction from Council, the project team continued to complete the financial plan.
LWMP Public Mail-Out/Flyer	February 2024	Summarize the LWMP process to date and outline the cost implications including impacts per property (on average) for public reception and commentary. Copies sent to every household in the District (excerpts enclosed).
Update District Website	February / March 2024	Invite for the public to offer public input based on the cost-recovery and financial plan as well as share their thoughts for the implementation needs and public involvement.
Evaluate Reclaimed Water Scenarios	Summer 2024	Develop opportunities across three phases of reclaimed water development, which are highly dependent support from the Province and local farmers.
Additional Public Engagement	Winter 2025	General updates, mailouts, and discussion with specific attention to phased reclaimed water reuse strategy.
Present Stage 3 Report and Financial Plan to Council	Spring 2025	Publish the Final Draft Stage 3 Report and prepare a summary presentation for Council. Prepare and implement financial plan to fund LWMP activities. (Spring 2025)
Update website to include Final Draft Stage 3 Report and submit to Ministry	Spring 2025	Any significant findings from the public are included in the enclosed. With this milestone, Staff intend to initiate implementation.

Findings from the activities in Stage 3 are included below:

STAGE 3 LWMP: ACTIVITIES TO SUPPORT IMPLEMENTATION

While the public engagement process for Stage 3 – and the entire plan process – is largely complete, District Staff are committed to keeping the public informed through implementation. To do so, staff will continue to prepare annual reports as part of their regular reporting process for Council and the Ministry. As part of local service planning and execution, Lake Country staff will re-engage with the public or key stakeholders, such as with sewer retrofits, integrated stormwater management, and as they have already done with water reuse (summarized below).

Every five years, the district will publish a progress report for public review and information and submit the document to the Ministry for further discussion, if warranted.

WINTER 2025 PUBLIC ENGAGEMENT FINDINGS

The District completed additional engagement activities in Winter 2025 with a focus on the reclaimed water use plan detailed in Appendix A. Emphasis was not placed on an Okanagan Lake outfall due to the District's preference to form a partnership with the City of Kelowna, and past engagement already covering this topic. .

Lake Country Farmer's Institute (LCFI) – January 25, 2025

The key messages from LCFI members questions and comments included:

- LCFI members advised that even if the District provides reclaimed water that is treated to provincial and federal guidelines, reclaimed use is unacceptable for use on food-to-mouth crops if buyers maintain their current regulations and auditing process in which they need to prove potability. For now, use of reclaimed water would be limited due to washing equipment on food-to-mouth operations.
- LCFI members expressed concern regarding soil pollution and heavy metal loading on agricultural lands with reclaimed water use. When relaying discussions with researchers at the University of British Columbia – Okanagan, members reported a knowledge gap on soil pollution in agricultural land with reclaimed water use and suggested other reclaimed uses in the region, such as golf courses and cattle ranches, may help bridge this data gap. Members want scientific research in support of reclaimed use to lead the way rather than policy.
- Further to the proposed reclaimed water phases and soil pollution, if forage areas are designated to receive reclaimed water, that may limit the land's use from changing to a food-to-mouth crop in the future.
- LCFI members want to work with the District to find uses for reclaimed water, but it mustn't have impacts on agricultural users.

Intergovernmental Session – February 5, 2025

The District hosted conversations to discuss the LWMP with representatives from the City of Kelowna, the Regional District of Central Okanagan, the Okanagan Basin Water Board, the BC Ministry of Agriculture and Food, the BC Ministry of Water Land and Resource Stewardship, the Department of Fisheries and Oceans Canada, Okanagan Basin Water Board, Interior Health and other stakeholders. The key feedback included:

- The Ministry of Agriculture and Food applauded the District for engaging the farming community and affirmed the infeasibility of reclaimed water use on food-to-mouth crops given current CanadaGAP and GlobalGAP food safety program measures. Measures of these types are unlikely to change before grocers and consumers adopt the message of reclaimed water, which is not expected in the near to medium term.
- The Ministry of Agriculture and Food expects more flexibility on forage crops but noted the possibility that current land-use as forage does not denote forage-only land-use in the future.
- A technical definition of when treated effluent returned to the environment transitions from reclaimed water to groundwater would aid local governments in developing reclaimed water uses. Particularly relevant in instances of mixing such as with the District's reclaimed water strategy.

Ministry of Environment and Parks and Ministry of Water, Lands, and Resource Stewardship and – February 6, 2025

The key feedback from this follow-up session included:

- The two Ministry's expressed interest in the possible benefit of stream flow augmentation in Middle Vernon Creek with reclaimed water. However, moving from *interest to permitting* will require frequent monitoring of the extracted water that indicates a benefit to the receiving water body.
- An authorized discharge is likely required for reclaimed water which will be the case if groundwater from the extraction well is under the influence of effluent as measured by the selected suite of parameters. The reclaimed source must meet the requirements of the municipal wastewater regulation (supported by an environmental impact study) prior to discharge in MVC.
- The District will develop a terms of reference for the Province's feedback and consider the various reclaimed use options with the Ministry's. Namely, the stream augmentation and/or habitat development and enhancement.

Okanagan Indian Band – February 25, 2025

Refer to Appendix E for a consultation summary.

Water Services Advisory Committee – February 21, 2025

On February 21, 2025, staff met with the District's Water Service Advisory Committee to provide an update on the status of the District's Liquid Waste Management Plan (LWMP) process and to outline where additional information can be accessed.

During the meeting, the committee discussed the reclaimed water use strategy, and the group passed the following resolution:

"*THAT the Water Services Advisory Committee supports the development of a reclaimed water reuse strategy, provided that it's implementation does not negatively impact the agricultural community's ability to sell it's product or have long-term impact on agricultural farm land.*"

Let's Talk Lake Country - Ongoing

The District has regularly updated the Let's Talk Lake Country forum throughout the LWMP process. The public provided significant feedback during Stage 1-2 and an update on Stage 3 activities was made available to the public in winter 2025.

CLOSURE

Though LWMP plan process are a significant undertaking, the District remarks on the activities, local effort, and constructive outcomes of this plan as something worth application by others, either in Lake Country or elsewhere.

APPENDIX E – INDIGENOUS CONSULTATIONS UPDATE

LWMP STAGE 3 IMPLEMENTATION | DOLC

DATE: March 26, 2025 FILE: 1577.0110.01 PAGE: 1 of 2
SUBJECT: Indigenous Consultations Update

PURPOSE AND PROCESS RECAP

Lake Country's *preferred direction* for liquid waste management came together as part of the Stage 1-2 Report process and includes various projects and programs that contribute to a healthier watershed. The first two stages of the project involved considerable effort by District Staff and Council to deepen and broaden the relationships with the Okanagan Indian Band, the designated community by other area First Nations to be Lake Country's primary partner in the LWMP. Efforts and outcomes from the Stage 1-2 relationship building efforts were detailed and submitted to the Province in 2022.

STAGE 3 UPDATE AND ONGOING PROCESS EFFORTS

District Staff continue to build the relationship with OKIB so that implementation can build on the partnership, of shared interest to both parties. For example, relationships can build on the sewer and water servicing to the Duck Lake IR 7 which acts as the *foundation* for continuing to work together. But there is no *ceiling* on the possibilities for environmental and water stewardship in the region between both communities.

Lake Country continues to strengthen its relationship with the two communities and, since the Stage 1-2 report submitted 1.5 years ago, has focused on these activities:

a) Extend invitations from the District's Mayor & Council to OKIB Chief and Council to meet and build relationships. Include the LWMP onto that agenda when possible.

b) Initiate formal//semi-formal communications between senior leadership e.g., the District's CAO to the Band Administrator, to discuss ongoing community strategies or initiatives of shared-interest, such as the LWMP.

c) Continue with Community-to-Community engagements which adds some formality but significant benefit to creating the conditions to work together.

d) Invite OKIB staff (from Project staff at the District) to discuss the LWMP, the preferred direction, and to seek out interest in working together through implementation.

e) Identify shared interests (e.g., wastewater servicing to IR Duck Lake, or, water quality monitoring partnership) and proposing to meet hoping that the LWMP discussions can be a next step from the discussion.

f) Continue to work through NationConnect and look to refer to a letter outlining the LWMP to OKIB and other indigenous communities about the status of the plan. As discussed below, the two groups organized a meeting in winter 2025 using NationConnect.

g) Consider a funding or partnership offer and formally present that initiative to OKIB where a relationship already exists.

h) Looking for opportunities and extending offers to OKIB for traditional welcomes when Lake Country invites guests to participate on significant community endeavours in the traditional territory.

i) Add the LWMP discussion or other environmental topics to any established projects between the two communities, such as the Indigenous Cultural Centre, under development in Lake Country.

RECENT CONSULTATION

On February 25, 2025, the District visited OKIB to provide an update on the status of the LWMP, particularly the reclaimed water reuse strategy. The District summarized the three reclaimed water implementation phases as discussed in Appendix A. However District staff also clarified that their priorities are to maximize disposal to ground, secondly develop reclaimed uses, and thirdly send the remainder to an Okanagan Lake outfall (preferably via Kelowna). The District's preference is to connect to an outfall via the City of Kelowna, with whom negotiations are ongoing. For connecting to Kelowna, IR7 would use the same lift station as the District.

Further to the proposed MVC stream augmentation, the first phase of the reclaimed water reuse strategy, the District confirmed that water quality remains a major focus of the environmental impact study being conducted as part of the District's Beaver Lake Chain and Vernon Creek Water Management Plan.

CLOSURE

A working relationship with OKIB can not be forced, and municipal staff honor this principle. The effort requires building trust, respect, and a demonstrated track record of listening. Lake Country Staff and Council continue to navigate the opportunities to strengthen ties between the two communities. Of all the opportunities to work together to date, the opportunity to partner on water reuse approaches, water quality monitoring, and local stormwater quality exhibits appear to have the most merit. Opportunities for OKIB staff or members to be involved in carrying out environmental stewardship duties at cost to Lake Country are a point of particular importance. While nothing is confirmed at this time, the potential opportunities warrant further consideration.

Lake Country Staff and Council will continue to consult with OKIB on implementation well beyond the limits of the Stage 3 process.

Lake Country Staff is grateful for the efforts by OKIB staff and Ministry Staff to participate and support the consultation efforts to date. The collaborative desire to build a partnership remains strong.

APPENDIX F – WATERSHED RESILIENCY

LWMP STAGE 3 IMPLEMENTATION | DOLC

PURPOSE

To summarize the District of Lake Country's (the District) work that aligns with the EIS recommendations regarding watershed rehabilitation and the Province's request that the District implement such recommendations. The EIS recommended that the District:

- "Continue to pursue water rehabilitation programs within the District and its upstream watershed
- Work with other jurisdictions to:
    - Improve watershed resilience,
    - Map source water vulnerability through the watersheds to identify zones of high risk where conservation/rehabilitation provide the best protection,
    - Reduce wildfire risk throughout the Okanagan watersheds particularly in riparian areas and around infrastructure,
    - Increase climate change preparedness in urban areas, and
    - Encourage water conservation."[1]

WATERSHED PROGRAMS AND PARTNERSHIPS

Regarding watershed rehabilitation and resiliency, Lake Country partners with neighbouring jurisdictions on various watershed initiatives and has undertaken several other programs and studies local to the District. These initiatives include:

- North Aberdeen Plateau Watershed Resilience Plan

A collaborative effort by OKIB, the District, and RDNO with support from the University of Victoria's POLIS Project on Ecological Governance, MoF, and WLRS. The objective is to develop a comprehensive watershed sustainability plan to protect water security and cultural heritage for future generations in the North Aberdeen Plateau Watershed which includes both the Beaver Lake and Oyama Lake Watersheds. This plan has three components:

- A watershed resilience plan

[1] Larratt Aquatic Consulting, District of Lake Country Okanagan Lake Cleaned-Water Return Outfall Receiving Environment Environmental Impact Study Summary Report, 2023

- Watershed protection efforts (such as the road rehabilitation initiative discussed later)
- A wildfire resilience plan

MoF is also partnering with BC Wildfire Services (BCWS) in a multi-year $15 million project to support wildfire resiliency planning. This is in collaboration OKIB, and local and provincial agencies.

While the watershed sustainability plan is developed, various parties (Tolko Industries, OKIB, and the District) are currently finalizing a terms of reference (TOR) document to guide watershed activities in the interim.

- Rehabilitation of non-status roads in vulnerable areas of the community watershed

The Ministry of Forests (MoF) leads this program, supported by the District, with the objective of improving drainage and long-term management of non-status roads high-risk areas to source water quality. The program has rehabilitated four sites with drainage directly above the District's drinking water intakes, three within the Beaver Lake Watershed and one within the Oyama Lake Watershed. Plans are in place to rehabilitate two more sites in the community watershed subject to MoF funding and commitment (awaiting announcement).

- The Kalamalka Lake (and Wood Lake) Technical Working Group

The District is working with neighbouring jurisdictions, provincial agencies, and other parties (i.e. Tolko Industries, Oceola Fish and Game Club) to facilitate collaborative planning for (1) managing water quality and quantity in the Kalamalka Lake Watershed and (2) supporting local government in fulfilling obligations under the Drinking Water Protection Act. These efforts involve

- Implementing a watershed protection plan
- Identifying risks to drinking water and developing actions to mitigate these risks
- Providing recommendations to watershed users, senior government entities, and other stakeholders on objectives, strategies, policies, and land use legislation to protect water quality and quantity

Currently the TOR and Plan is under review by the OKIB Council and upon approval the technical working group will formally begin meeting.

- Foreshore Integrated Management Planning (FIMP)

The FIMP initiative is lead by Living Lakes Canada and establishes a survey method to assess lake foreshore health, with a focus on habitats for at-risk aquatic species in the Columbia basin. Evaluating foreshore conditions helps quantify freshwater biodiversity impacts for the purpose of guiding sustainable lake management. Living Lakes Canada's FIMP work also assesses whether current management practices effectively mitigate development impacts, acting as a practical conservation tool.

A cultural assessment for sensitive areas of Wood and Kalamalka Lakes is underway with OKIB and Living Lakes Canada. This will be followed by an RFP for an ecological assessment in 2025, with OKIB collaborating on tasks like drone footage and data collection alongside the selected consultant.

- Okanagan Lake Responsibility Plan

The District collaborated with ONA on this plan with the objective of developing collaborative Syilx and non-Syilx decision-making processes that protect water, ecosystems, and land against environmental threats, while supporting sustainable habitat and climate resilience. The plan seeks to foster stronger Syilx and non-Syilx relationships and influence regional environmental policies for long-term change in land-use planning and ecosystem protection.

The most recent stage of this initiative in 2022-2024 was the Development and Implementation of the siwɬkʷ (water) Responsibility Action Plan. This included the November 2024 signing of the Memorandum of Understanding which details the commitments of participating governing bodies to the siwɬkʷ plan.[2]

- Wood Lake Study – A review of Historical Conditions, Current Trends, and Recommendations for Sustainable Future

The District, with additional funding by OBWB, retained Larratt Aquatic Consulting (LAC 2023) to undertake a study to assess Wood Lake's condition in comparison to historical periods and recommend sustainable management approaches. LAC 2023 identified declining water quality, increasing nutrients, and the impacts of urban and agricultural development. The recommended actions to improve lake health include riparian restoration, educational programs, and invasive species management.

- Zebra and Quagga Mussels Risk Assessment Mapping

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[2] ONA 2024 – https://syilx.org/projects/k%C9%ACusxnitk%CA%B7-okanagan-lake-responsibility-planning-initiative/

The District retained LAC in 2024 to map and determine the vulnerability of various lakes and water intakes to invasive mussels. It follows OBWB's recommendations and uses parameters such as calcium, pH, dissolved oxygen, temperature, and salinity to assess the viability of an area to host the invasive species in question. Upland lakes were found to be "not at risk" due to low calcium levels, while Okanagan and Kalamalka lakes were deemed "at risk" due to higher calcium concentrations favorable for mussel growth.

- Beaver Lake Chain & Vernon Creek Water Management Plan

This plan outlines sustainable infrastructure strategies for managing drought risk in Beaver Lake, managing agricultural and other demands, and supporting both the Province's and the Districts objectives to supply environmental flow needs (EFNs) in Middle Vernon Creek (MVC) to preserve Kokanee habitat. In Winter 2025, the District is hosting consultation and engagement sessions with OKIB, neighbouring jurisdictions, provincial agencies, OBWB, and other interested parties. These sessions will update local and provincial parties on the infrastructure solutions identified in the current phase (2024-2025), as listed below:

- Groundwater withdrawal adjacent to the WWTP for flow augmentation
- A control structure on Duck Lake
- Partial bypass of Duck Lake from Upper Vernon Creek to Middle Vernon Creek

For the next phase of the work, the District commissioned feasibility studies for each infrastructure option to (1) advance preliminary engineering designs supported by environmental assessments and (2) identify actionable steps in the regulatory pathway for each project. Scheduled for completion by late Fall 2025.

- Water Conservation Plan

The District's 2024 Water Conservation Plan provides strategic direction for water conservation within the District, aiming to reduce water consumption while ensuring adequate water supply and safeguarding against drought. It projects an annual reduction in water consumption of 355 ML and aims to increase water supply by 1,766 ML, with an additional 6,500 ML of storage capacity through various initiatives. The plan details demand-side strategies (e.g., variable rate structures, leak detection) and supply-side strategies (e.g., removing Beaver Lake obstruction, water management plan) for implementation within the next 3-5 years, with further exploration of alternatives over the next decade.

CLOSURE

Lake Country continues to develop and participate in watershed stewardship initiatives and is grateful to their partners and the leaders of other interjurisdictional efforts. We trust the District's approach to such initiatives addresses the Province's intent in their Stage 1 and 2 report feedback.

APPENDIX G – LWMP FINANCIAL ANALYSIS MEMO

LWMP STAGE 3 IMPLEMENTATION | DOLC

URBAN SYSTEMS MEMORANDUM

DATE: February 13, 2025
TO: Kiel Wilke, Utilities Manager
CC: Ehren Lee, Urban Systems
FROM: Joel Short, Urban Systems
FILE: 1577.0122.01
SUBJECT: Liquid Waste Management Plan Financial Analysis

1.0 INTRODUCTION

This memo sets out the results of a financial analysis on the District of Lake Country sewer system for the Liquid Waste Management Plan in the following sections:

- Finance Principles
- Background information
- Assumptions
- Results
- Conclusions

2.0 FINANCE PRINCIPLES

This section sets out the broad financing principles that guide the analysis. The five main guiding principles and relevant points are set out below:

1. Sewer service is self funding:
   - Sewer service should be self-funding – it should not receive funding from other services.
   - Achieve full cost recovery by those directly benefiting from the service.
   - Paid by those predominantly benefiting from the community sewer system.
2. Growth pays for growth:
   - Development pays for improvements and future works required to service development.
   - The portion of projects required for growth are allocated to growth.
   - Costs are generally recovered through Development Cost Charges, but infrastructure is also built by developers, or paid for directly up front by developers.
3. Sewer Retrofit through Local Service Areas:
   - Sewer retrofit of existing neighbourhoods will be considered through a Local Service Area process; areas include:
     - Oyama existing neighbourhoods (Cornwall, Isthmus area)
     - Winfield un-serviced areas (Bond, Kelvern, Winview, Pretty, Mountview)
   - The area that benefits pays for the sewer extension.

- Paid for through local service area process.
- Sewer retrofit projects will depend on grants to proceed.
- Timing for these Local Service Area projects is after the WWTP upgrades and a long-term effluent disposal option is secured.

4. Septage facility is funded as a regional service:
   - Septage facility is self funded as a Regional service, and is not subsidized by the Lake Country Sewer Utility.
   - Full cost recovery funded by the District of Lake Country charging the Regional District which covers costs by charging septage haulers, and haulers charge users to cover tipping charges.
5. Stormwater funded with mobility:
   - Stormwater operations, maintenance and capital projects will not draw on sewer revenues.
   - Most stormwater components are ditches along roadways and drainage associated with curb & gutter usually along sidewalks.
   - Stormwater is considered as part of the mobility network.
   - Separate from the LWMP and sewer function.
   - Projects identified through Storm Water Master planning process are funded under General Revenue and Transportation Parcel Tax.

3.0 BACKGROUND INFORMATION

This memo is based on background information drawn from the following:

- District of Lake Country Liquid Waste Management Plan Stage 1 / 2 Report Final Draft August 2022.
- District of Lake Country Development Cost Charge Bylaw Background Report March 2016, along with coordination with current update to DCC bylaw.
- District Of Lake Country Financial Plans, Financial Statements and Annual Reports 2020, 2021, 2022, 2023
- District of Lake Country Sanitary Sewer Regulation and Rate Bylaw 1176, 2022 Consolidated Version.
- District of Lake Country Sewer Service Parcel Tax Bylaw 98-224 Consolidated Version.
- Lake Country Sewer Service Parcel Tax Amendment Bylaw 918, 2015.
- District of Lake Country Wastewater Management Plan Parcel Tax Bylaw 98-182.
- Information provided by the District of Lake Country Finance Department including details on the Sewer revenues and expenditures and numbers of users who pay user fees and parcels that pay parcel taxes.

- Information provided by the District of Lake Country Engineering on estimates of timing for capital projects and current system parcels and users.

Currently the Liquid Waste Management system in Lake Country is funded through the following main sources:

- Sewer Parcel Tax
    - Originally established to pay for the initial Sewage Treatment System debt that retires in 2024.
    - Applies to about 3,400 parcels that are connected or could be connected to the Sewage Treatment System.
    - Currently set at $275 per year per parcel.
- Environmental Levy
    - Originally established to ensure that all parcels in Lake Country help pay for the benefit of a community Sewage Treatment System.
    - Applies to all parcels ~6,300 in Lake Country.
    - Currently set at $75 per year per parcel.
- User Fees
    - Established to pay for ongoing costs of the Sewage Treatment System.
    - User fees apply only to those connected to the Sewage Treatment System.
    - $250 per year single detached dwellings or multi family units; $100 for secondary suites; commercial units pay based on the usage.
    - About 3480 homes pay $250 per year, and about 370 secondary suites pay the extra $100 per unit. About 58 Commercial and Industrial properties pay based on usage that includes an excess discharge fee.

4.0 ASSUMPTIONS

This memo is based on discussions with District Staff regarding assumptions and details. A number of key assumptions for the analysis are as follows:

- Grants of 66% are assumed for the large projects including long-term effluent disposal and the phase 5 upgrades. For the phase 4 upgrades which have been completed and was not grant funded, the annual debt servicing costs are used in the model. It is understood that phase 5 upgrades and funding assumptions are subject to change, depending on negotiations with City of Kelowna.

- Borrowing is required for all major projects including Phase 4 upgrades, long-term effluent disposal option, and Phase 5 upgrades construction.
- Borrowed funds are through the Municipal Finance Authority over 20 years at 5%. Note that the current MFA rate is about 4.5%.
- Assumed $200,000 for asset renewal starting in 2024 for 5 years until 2029 when it increases to $350,000 for 3 years, then increasing to $500,000 per year in 2032.
- Aim to have User Fee revenues replace the $350 Parcel Taxes, with 2024 as the last year the Parcel Taxes are paid. Part of the logic is that debt payments for Phase 1 end in 2024.
- Apply a $275 fee to parcels that could readily connect to sewer but are not connected, similar to the water system non-connected fee, and what they are currently paying.
- The analysis is conducted as a constant 2024 dollar analysis. Inflation has been accounted for in the modeled scenarios from 2025 to 2028.
- Operations and maintenance costs are based on costs for 2022, from Sewer Utility Fund data run November 29, 2023, with increases over time to account for expansions in the system as noted below.
- Wage related increases are 2% per year to account for increasing qualification levels over time. This is in addition to inflationary increases.
- Administration costs increase at 2% per year, to account for costs that rise slightly faster than inflation.
- Connections costs remain constant.
- Collection system and lift station operations and maintenance contracted services and materials/supplies to double over 20 years as District system size is expected to double. This results in a rate of 3.5% increase per year.
- Sewer Lift station utilities costs double over 20 years relative to system flow. This results in a rate of 3.5% increase per year.
- Oyama sewage treatment plant increase at 2% per year, to account for costs that rise slightly faster than inflation, but this cost is eliminated after the sewer retrofit occurs in 2034, since the plant will no longer be required.
- Wastewater Treatment plant operations contracted services and materials and supplies to double over 20 years as plant size could double. This results in a rate of 3.5% increase per year.
- Wastewater Treatment plant Utilities increases double over 20 years relative to system flow. This results in a rate of 3.5% increase per year.

- Operations and Maintenance cost for the Septage handling portions of the facility are assumed to be covered through the agreement with the RDCO to cover these costs.
- There are some capital expenditures that are shared between the septage facility and the community sewage facility and the portions of these shared costs that are allocated to the sewage facility are included in the sewage cost recovery analysis. The portions allocated to the septage facility are assumed to be covered through the agreement with the RDCO to cover these costs.
- Existing connections and units are based on 2024 and 2025 information from staff, as follows:

Environmental Levy	6282
Parcel Tax	3400
Parcels connected to sewer	3150
Parcels that have access but are not connected	250
User Fee Residential	3481
User Fee Suite	373
User Fee Commercial (non-residential)	58

- Future growth and development units are based on discussions with staff and a growth rate of approximately 3.1% which is consistent with the Official Community Plan High growth rate scenario. With staff we assumed 4000 residential equivalent units of growth with 67% assumed to be multi family units and 33% single detached units. We also assumed that 20% of new single detached units will have secondary suites, which will be in addition to the 4000 units. Growth is assumed to occur evenly over the 20 years. This rate may be lower than growth projected in the most recent housing needs report, but this analysis uses somewhat conservative projections to avoid having a revenue shortfall in the future.
- The resulting annual growth is as follows:
    - 66 Single detached units per year
    - 13 Secondary suites per year
    - 134 Multi family units per year
    - 1.2 ICI (Industrial, Commercial, and Institutional) new properties
- Retrofit units (largely single detached dwellings on individual parcels) will be added to the system starting in 2034, over 5 years, for a total 757 units or about 151 units per year.

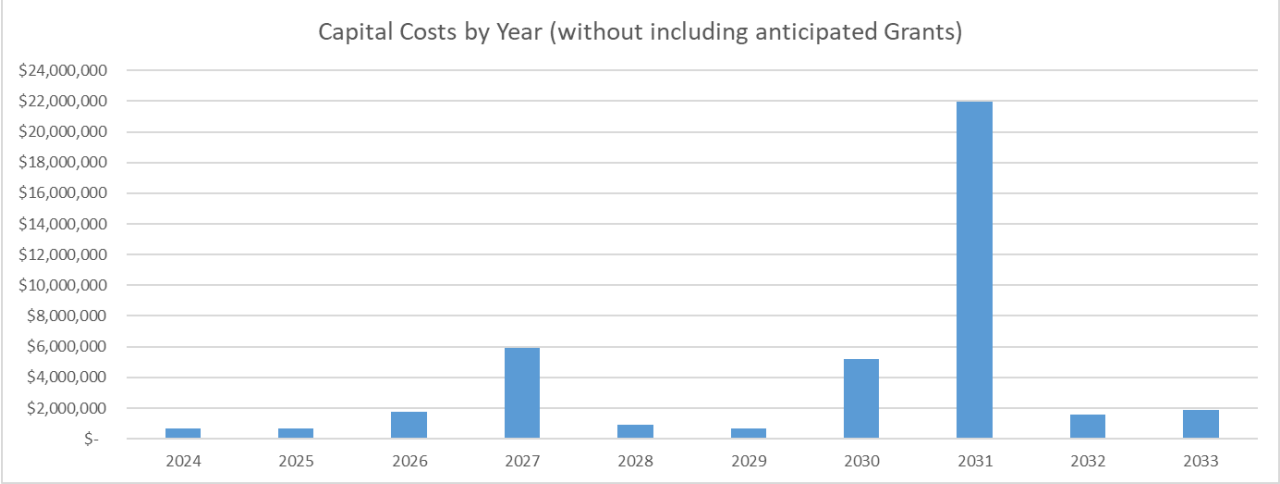
We recognize that these figures are constantly changing, but for this high level analysis we will use these figures.

- Capital projects timing and costs are based on the figures set out in the background reports, and based on discussion with staff.
- The costs and timing as set out in the financial analysis are summarized in the Table 4.1 below. The table shows the total amounts of the project costs, without including the anticipated grants.

Table 4.1 Capital projects

Project Name	Cost Recovery Note	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Phase 4 Upgrades	80% DCC - growth related	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148	$ 674,148
Turtle Bay Sewer Realignment - Construction	Not DCC - paid by existing users					$ 250,000					
Lodge Road Force Main Twinning Partial	80% DCC - growth related			$ 1,100,000							
Lodge Road Force Main Twinning Partial	80% DCC - growth related									$ 900,000	
WWTP and Septage Improvements	$1,000,000 allocated to Septage, Remainder is 80% DCC				$ 3,750,000						
McCarthy Lift Station and Gravity sewer	80% DCC - growth related				$ 1,500,000						
Seymour Lift Station and Force Main	80% DCC - growth related							$ 4,000,000			
Lodge Road and Jensen Road Gravity Sewer	80% DCC - growth related										$ 1,215,000
WWTP Phase 5 upgrades	80% DCC - growth related								$21,275,000		
Sludge Bin Enclosure	50% septage, 50% existing users							$ 500,000			

- The chart below shows total amounts of capital costs in each year without including the anticipated grants. The large spike in 2031 is for the Phase 5 upgrades. The size of the spikes indicates the importance of obtaining grants to reduce the costs to the District, and the need to borrow for the projects in order to spread out the costs over time. The chart does not include



the planned retrofit costs, which will likely be paid with grants and by the properties in the Local Service Area.

- For DCC benefit allocation and funding sources, a broad assumption is that 20% of the growth related project costs are allocated to the existing population and therefore need to be paid from the fees collected; and 80% of the costs are allocated to growth and need to be paid for by DCCs. Approximately 20% of the projected sewer growth comes from existing properties. These include properties that currently have access to the sewer system but are not yet connected, as well as those that will be connected through retrofit sewer projects.. We recognize that this will vary from project to project, with some allocated 100% to growth and others having a lower

allocation to growth, but for this high level analysis we will assume 20% allocated to existing, and 80% to growth. Equipment replacements are not paid for through DCCs and are not allocated to growth at all.

- Lake Country Business Park is not included in the current analysis as it is still in the early stages of development. The project is anticipated to be self-funded through Development Cost Charges (DCCs) and local service area parcel taxes.
- Retrofit sewer has the following assumptions:
    - $20.825 million cost for Winfield area retrofit.
    - $10.152 million cost for Oyama area retrofit.
    - $11.685 million cost for Oyama trunk sewer.
    - 66% Federal/Provincial Grant.
    - 16% Okanagan Basin Water Board Grant.
    - 50% of cost for Oyama Trunk line and Oyama retrofit areas allocated to growth and paid for through DCCs since providing sewer to Oyama will serve growth in the area. Note that the existing DCC bylaw identifies that 50% of the Oyama Lift station and Forcemain is allocated to new growth.
    - Retrofit starts in 10 years, in 2034.
    - Undertaken as a Local Service Area.
    - All capital costs are paid for by the properties receiving the service, inside the Local Service Area; the broader District does not cover part of the costs of the Local Service Area.

- The sewer DCCs are currently being updated, and this financial analysis model uses a simplified calculation of the DCCs that has been coordinated with the Sewer DCC updates. The DCCs used will likely not be exactly the same as in the actual DCC update, but they will be within the range of accuracy useful for the LWMP financial analysis.
- The District plans for a larger Reclaimed Irrigation Water system in certain areas of the community by 2038. Currently the estimated cost is about $20 million, but due to the number of unknowns and the timing 14 years in the future, the financial model only addresses this project in a general way. The model shows how the District can be in a positive position for the sewer capital reserve fund to help this option proceed. It is anticipated that this project would be paid for from a combination of water and sewer reserves, plus grant funding.

5.0 RESULTS

Applying the assumptions presented in Section 4, the financial model indicates that the District needs to collect $2.4 million per year, increasing to $2.9 million by 2029 and $3.2 million by 2030. While multiple scenarios were analyzed, including variations of several factors, this memorandum focuses on the three scenarios that align with the financial principles and meet the required revenue targets.

- Scenario 1: 4-Year Smoothed – Rates are gradually increased over 4 years.
- Scenario 2: Accelerated – rates are increased at once in 2025, then subsequent minor inflationary adjustments.
- Scenario 3: 4-Year Smoothed with Multifamily Rate at 80% - This calculates the rates assuming multifamily properties are charged at 80% of the detached residential base rate.
- For all three scenarios we assume inflation at 3% for 2025 and 2% for years 2026 to 2028.

5.1 FEES AND TAXES

In basic terms the analysis shows that the Sewer Parcel Tax, and the Environmental Levy can be replaced with a User Fee with a moderate increase in annual costs to the users, keeping projects on schedule. The current system of charging a Sewer Parcel Tax, an Environmental Levy, and a User Fee can be replaced with a single User Fee, and the total amount charged will need to increase depending on the scenario. The tables below illustrate the shift under the three different scenarios.

Scenario 1: 4-Year Smoothed

Type of Charge	Existing	2025	2026	2027	2028
Environmental Levy	$75	$0	$0	$0	$0
Sewer Parcel Tax	$275	$0	$0	$0	$0
User Fee for • Detached Residential • Multi Family (Stratified) • Commercial	$250	$640	$670	$700	$720
Total	$600	$640	$670	$700	$720

Secondary Suite User Fee	$100	$115	$120	$130	$140
Multi family Non-Stratified User Fee	$250	$320	$470	$630	$720
Commercial Excess Discharge Fee	$250	$260	$270	$280	$290

Non-connected User Fee	$0	$275	$290	$295	$300

Scenario 1 shows the rates gradually increasing over 4 years from 2025 to 2028 through a combination of increases required to generate enough revenue and increases due to inflation.

Scenario 2: Accelerated

Type of Charge	Existing	2025	2026	2027	2028
Environmental Levy	$75	$0	$0	$0	$0
Sewer Parcel Tax	$275	$0	$0	$0	$0
User Fee for • Detached Residential • Multi Family (Stratified) • Commercial	$250	$700	$705	$710	$715
Total	**$600**	**$700**	**$705**	**$710**	**$715**

Secondary Suite User Fee	$100	$115	$120	$130	$140
Multi family Non-Stratified User Fee	$250	$350	$495	$640	$715
Commercial Excess Discharge Fee	$250	$280	$280	$285	$285
Non-connected User Fee	$0	$275	$290	$295	$300

Scenario 2 shows an immediate increase in rates in 2025 required to generate enough revenues, and then gradual increases in rates beyond 2025 dues to inflation.

Scenario 3: 4-Year Smoothed with Multifamily Rate at 80%

Type of Charge	Existing	2025	2026	2027	2028
Environmental Levy	$75	$0	$0	$0	$0
Sewer Parcel Tax	$275	$0	$0	$0	$0
User Fee for • Detached Residential • Commercial	$250	$665	$720	$760	$790
Total	**$600**	**$665**	**$720**	**$760**	**$790**

Multi family (Stratified) User Fee	$250	$530	$575	$610	$635
Total for Multi Family (Stratified)	**$600**	**$530**	**$575**	**$610**	**$635**

Secondary Suite User Fee	$100	$115	$120	$130	$140
Multi family Non-Stratified User Fee	$250	$265	$405	$550	$635
Commercial Excess Discharge Fee	$250	$265	$290	$305	$320
Non-connected User Fee	$0	$275	$290	$295	$300

Scenario 3 shows the rates gradually increasing over 4 years from 2025 to 2028 through a combination of increases required to generate enough revenue and increases due to inflation. With the multi family units paying only 80% in scenario 3, the rates for detached residential and commercial need to increase compared to Scenario 1 to compensate for the reduced revenue from multi family.

A number of specific factors were addressed in the scenarios:

- Secondary suites - The existing charges for secondary suites are based on charges that are 40% of the user fees, however if we retained the secondary suites at 40% of the new user fees, the rates for suites would increase dramatically from, for example 40% of $250 = $100 to 40% of $700 = $280. Rather than have secondary suites increase from $100 to $280, we will have the secondary suites increase by a percentage similar to the increase in total sewer charges. For example, if the total charge increases from $600 to $700, this is an increase of about 17%, so the secondary suite charge would increase from $100 to $117, rather than to $280.
- Non-stratified multifamily - Non-stratified multifamily properties, such as apartment buildings, pay a single parcel tax and user fees based on the number of units. For example, currently a ten-unit apartment building pays one $75 Environmental Levy and one $275 Sewer parcel tax and ten $250 user fees ($2,500) for a total of $2,850 annually in sewer charges. On the other hand, a ten-unit stratified apartment building would pay the environmental Levy, sewer parcel tax and user fee for each unit or a total of $600 per unit or $6,000. If we switch directly to all user fees at, for example, $700 per unit, the 10 unit non-stratified would jump from $2,850 to $7,000 annually. To mitigate that jump we propose to gradually phase in the increase for non-stratified properties for all scenarios.
- Commercial excess discharge fee – Commercial users (including industrial and institutional) pay a user fees and excess consumption fee based on Q1 water consumption. For example, if their Q1 water consumption is 5x larger than a standard residential household, they are charged 1x user fee and 4x excess consumption fees for that year. Currently the excess consumption fee is based off the user fee of $250. If the user fee increases from $250 to $700, it disproportionately

impacts this user group. The District has 58 ICI sewer accounts, and among those, 238 excess discharge fees were charged. Based on a review of data by District staff, it was determined that we should charge the 238 excess discharge fees at 40% of the user fee, as this reflects the operational cost of processing the additional sewage, for all scenarios..

The District should revaluate the costs and the financial plan within the next five years to determine if any further rate adjustments are warranted.

In all Scenarios a charge of $275 per year is proposed for the approximately 250 parcels that have access to sewer but are not connected, similar to the water system non-connected fee. The rates shown have been increased by inflation.

For lots that currently do not pay the Sewer parcel tax, but do pay the Environmental Levy (even though they are not connected to Sewer), those lots would no longer pay the $75, so their annual costs decrease by $75. These parcels that are currently not connected and don't have direct access to the District community sewer system, and only pay the $75 Environmental Levy, will no longer pay any charges related to District sewer.

The resulting User Fees can sustain the Sewer Capital Works Reserve Fund, while paying for costs, including the following:

- Operations & Maintenance costs of about $1.7 million per year.
- The portion of capital cost allocated to the existing sewer users.
- The total capital costs which amount to about $34.5 million between 2026 and 2033, with about $14 million coming from grants, $1.25 million from the septage agreement, about $15 million from DCCs, and about $4.2 million from rates.
- Existing debt service payments which include about $77,000 per year for WWTP Stage 3 and about $674,000 per year for Stage 4 upgrades.
- Lake Country pays for the sewage portion of capital projects that are shared between the Lake Country sewage facility and septage facility service provided to the Regional District.
- The $200,000 for asset renewal starting in 2024 for 5 years until 2029 when it increases to $350,000 for 3 years, then increasing to $500,000 per year in 2032.
- The financial model projects the annual required revenue to support the current plan which ranges from about:
    - $2.4 million in 2025;
    - $2.9 million in 2028; and
    - $3.2 million by 2030.

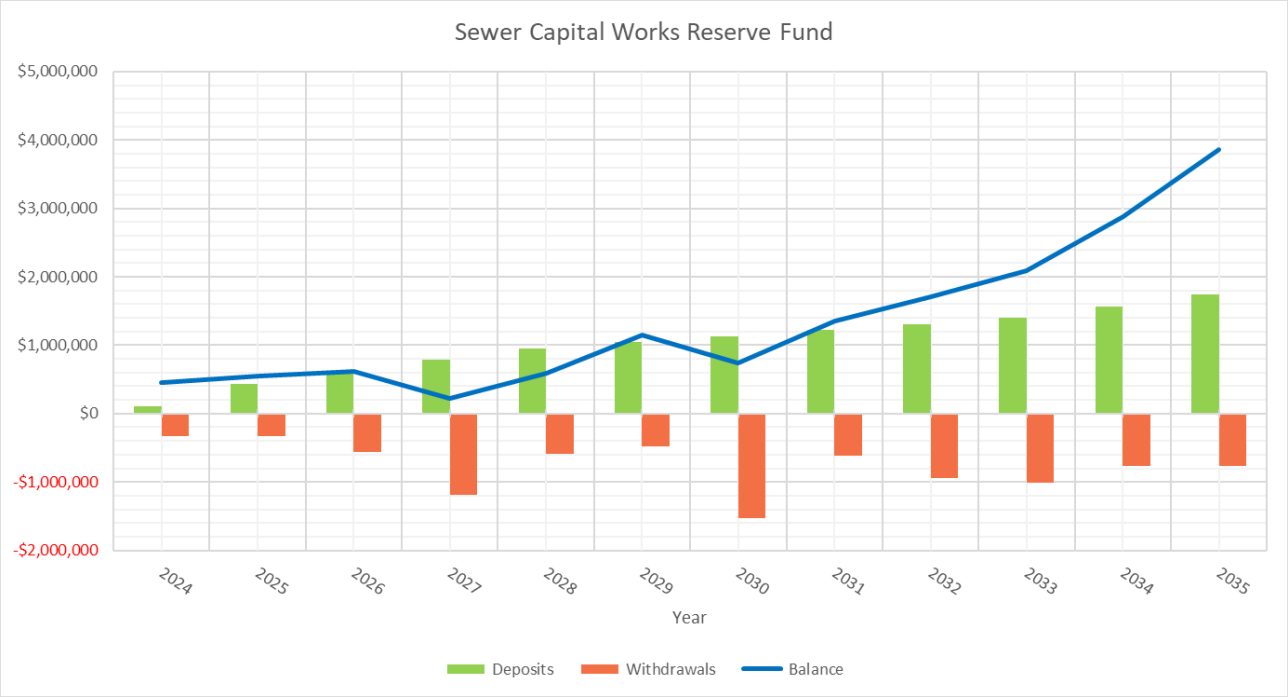
5.2 SEWER CAPITAL WORKS RESERVE FUND

The balance in the sewer capital works reserve fund is an indication of the sustainability of the sewer finances over the years. Revenues go into this fund and expenditures come out of it for the capital projects required. If the reserve fund goes negative, then the District needs to increase rates to keep it healthy. At the proposed rates, the sewer capital works reserve fund balance generally stays between $250,000 and $2 million providing flexibility to address issues over the 10 years from 2024 to 2033. The fund aims to have a healthy balance of about $4 million in 2035.

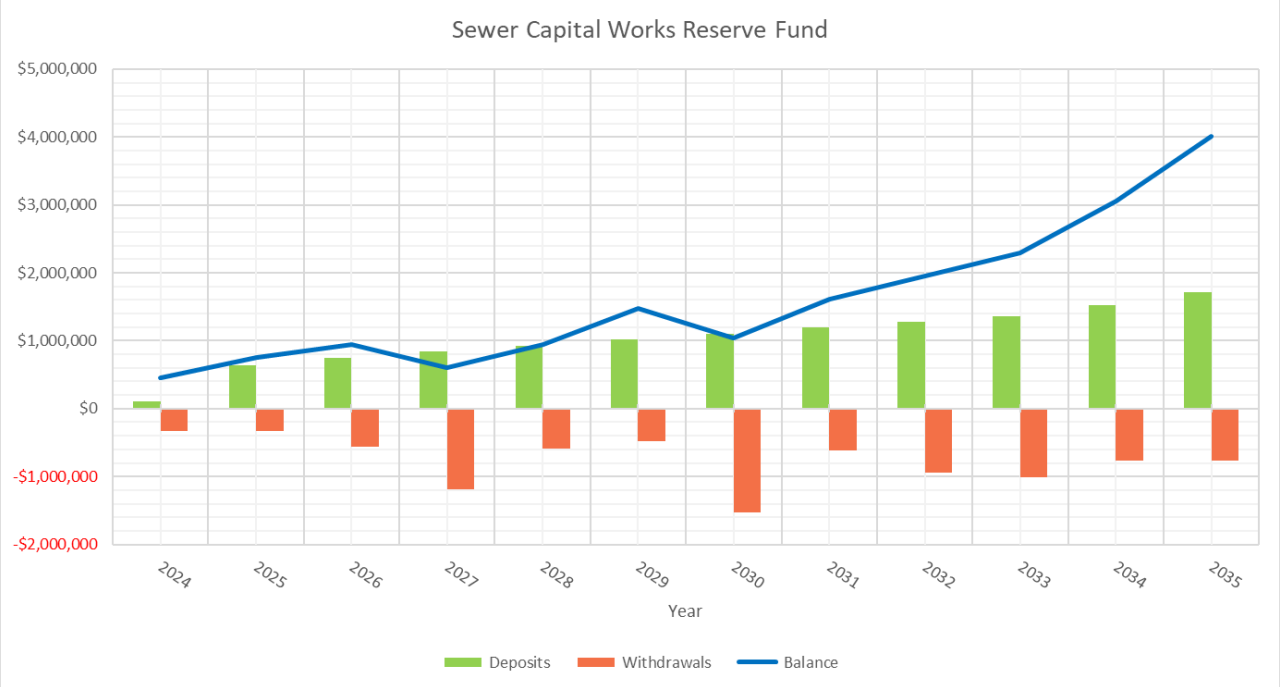
The model projects over 20 years to the year 2044 and it shows the sewer capital works reserve fund increasing to about $19 million, but that is because the last major capital project identified is in 2034 and after that the reserve fund simply collects money without having to spend anything on capital projects. Of course, by the time we get closer to 2034 the District will identify more major capital projects that need to be constructed, which will continue to draw down on the reserve fund before it gets to $19 million. One of those projects is the potential Reclaimed Irrigation Water facilities with a cost of about $20 million. Having the reserve fund moving in positive direction helps position the District for such capital expenditures in the future.

The charts below show the projected Sewer Capital Reserve Fund deposits for Scenarios 1, 2 and 3, withdrawals and balance during the period where we are projecting capital expenditures, until 2035. The chart shows a relatively steady amount of withdrawals from the fund compared to the spikes in the chart showing capital cost per year, because the annual impact on the reserve fund is reduced by obtaining grants, and spreading out costs over time through borrowing for major projects.

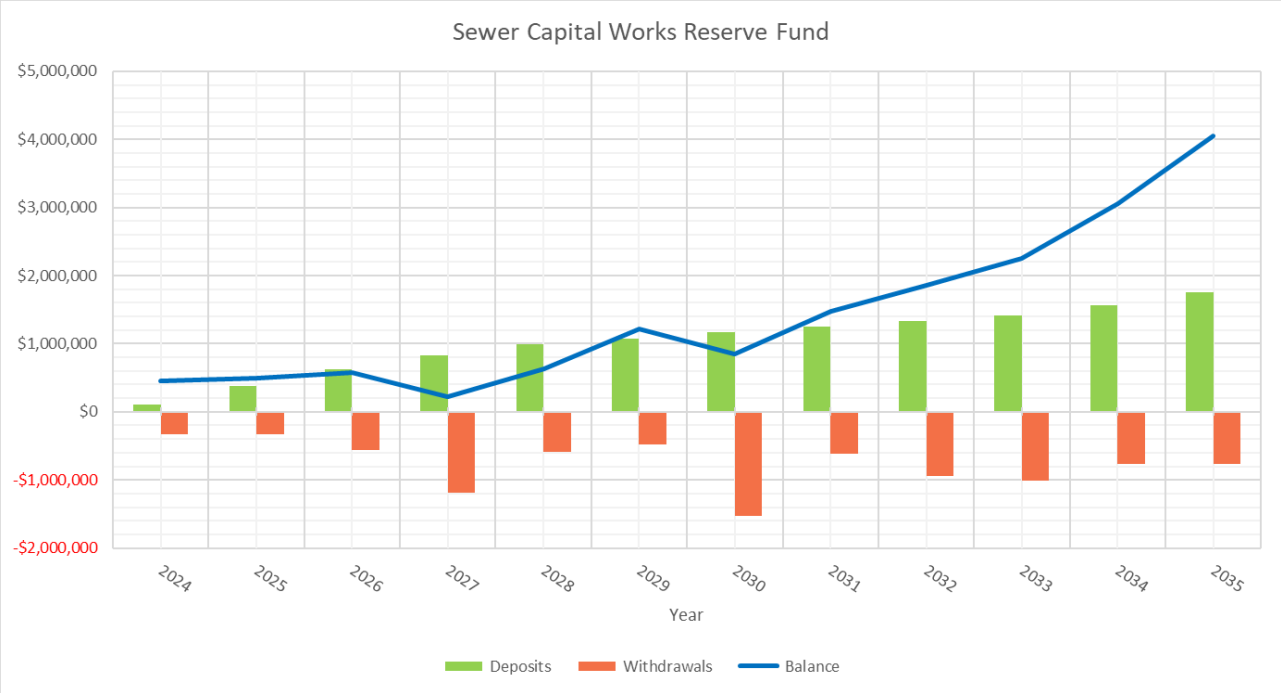
Scenario 1 - 4-Year Smoothed – Rates are gradually increased over 4 years



Scenario 2 - Accelerated – rates are increased at once in 2025.



Scenario 3 – 4-Year Smoothed with Multifamily Rate at 80%



The charts for all three scenarios are similar and show the reserve fund balance remains positive with a dip in 2027 when there are significant expenditures. After 2027 the reserve fund builds to just over $4 million by 2035.

Scenario 2 with the immediate rate increase shows a healthier reserve fund in the early years from 2025 to 2028. Scenarios 1 and 3 that more gradually phase in the rate increase sees the reserve fund stay at a lower level until the full rates are implemented, after which the fund begins to build to healthier levels.

5.3 PROJECT TIMING

The timing of projects can have a measurable impact on the finances. The anticipated timing for various projects is set out in Table 4.1. In general, if we build the projects sooner than set out in the table, the reserve fund balance will be lower and may even go negative. If the District builds projects sooner, or in a more compressed timeline with more projects in fewer years, the reserve fund does not have enough time to collect the money needed to pay for the projects. Conversely, if the District delays projects or spreads out the timing, that generally improves the balance in the reserve fund. In addition, as growth occurs the District has more units to pay the user fees, so waiting a couple of years allows for more units to pay fees resulting in more revenues each year. Of course, if the District delays projects too much then the community needs to wait longer for projects which might result in reduced levels

of service or other issues. In some cases, it might not be possible to delay projects because of the potential negative impacts.

The timing of projects represents a balance between the need for the projects and the funds available to build the projects. The analysis shows that the project timing set out in Table 4.1 results in a balance, with projects built in a timely manner and sustainable finances for the sewer system.

5.4 DEVELOPMENT COST CHARGES

In order to address the costs allocated to new growth the Sewer DCC rates need to increase significantly. The model projects that the Sewer DCCs for a single detached dwelling needs to increase from the existing rates. Since many of the projects are required primarily to serve growth, the model allocates much of the project costs to new growth (typically 80% to new growth / 20% to existing, project dependant). This is consistent with the philosophy that growth should pay for growth.

6.0 CONCLUSIONS

Conclusions that can be drawn from the results are as follows:

- Lake Country can sustainably finance the Liquid Waste Management System by applying the finance principles set out in this memo, which include:
    - Sewer service is self funding from its users.
    - Growth pays for growth.
    - Sewer Retrofit through Local Service Areas and Senior Government Support.
    - Septage facility is funded as a regional service.
    - Stormwater funded with mobility.
- Lake Country can consider replacing the revenues generated by the Sewer Parcel Tax and Environmental Levy with revenues generated by User Fees. The current Sewer Parcel Taxes could be replaced by User Fees in 2025 with a moderate increase.
- Parcels that can readily connect but are not connected could pay a charge of $275 per year (adjusted to inflation). Parcels that are not connected or do not have the ability to connect will no longer pay a charge for sewer.
- The cost for users will increase moderately. Currently residential users pay $600 per year through a combination of Environmental Levy, Sewer Parcel Tax, and Sewer User Fees. After eliminating the Environmental Levy and the Sewer Parcel Tax, users directly benefiting from the sewer system will pay somewhat more in total annual charges as a User Fee. Properties that

are not connected to sewer and cannot readily connect will not pay the Environmental Levy or any other charges related to sewer..

- Depending on the scenario, residential users could see an increase in gradual steps over 4 years from $600 to $720 per year. If the increase occurs in one step, the rates would go from $600 to $700 in 2025. If multi family is reduced to pay 80% of detached residential, then the multi family rate stays lower increasing from $600 to $635 over 4 years, but the detached residential rate needs to gradually increase more from $600 to $790 over 4 years.
- Lake Country will need to take advantage of grants to reduce the costs to the District, and will need to use borrowing to spread out the costs of large projects over time.
- The District can sustainably construct the required projects by following the timing set out in Table 4.1, which generally has most projects constructed over a nine year period from 2025 to 2033.
- Sewer DCCs will need to increase. Lake Country should continue to update the Sewer DCCs to reflect the new costs, the allocation of those costs to growth, and the sewer area growth projections.
- The District will need to regularly review rates as capital programs evolve and to ensure that cost assumptions keep pace with inflation.

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APPENDIX H – RESPONSE TO BC ENV COMMENTS ON THE DLC OKANAGAN LAKE PROPOSED OUTFALL EIS

LWMP STAGE 3 IMPLEMENTATION | DOLC

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Response Memo for 2nd year of sampling

Kiel Wilke

Utilities Manager – District of Lake Country

Cc: Joanne Quarmby and Ehren Lee

Dec 13, 2024

This memo serves as part one of a two-part response to the latest round of BC ENV comments on the DLC Okanagan Lake Proposed Outfall EIS. The goal of this memo is to address the question of additional year(s) of sampling.

Jamie Self

Senior Aquatic Biologist, R.P. Bio

Heather Larratt,

Principal Aquatic Biologist R.P. Bio.

Background

Overview

LAC, in partnership with Urban Systems, developed an Environmental Impact Study (EIS) for a proposed but as yet theoretical return water discharge to the north basin of Okanagan Lake by the District of Lake Country (DLC). This study, part of a broader update to DLC's liquid waste management plan (LWMP), addressed the multiple vectors of concern that such an outfall could present ranging from direct effects on plants, algae, and invertebrates within the receiving environment to broader changes in nutrient status for the north basin. The conclusion of this study is summarized below.

> The ENV long-term monitoring data and 2021 field data indicate that an outfall at the proposed location would not overwhelm the assimilative capacity of Okanagan Lake, given phosphorus concentrations in the north basin that were far below their historic averages as of 2020. The proposed DLC outfall is not expected to alter the water quality objective exceedance behaviour and would rank as a relatively small source of nutrients compared to large natural sources, watershed disturbance, wildfires, urban stormwater, and existing larger outfalls.

Timeline

Date	Event	Report Rev #
June 2020	1st TOR Established	
Feb 2, 2021	Extensive TOR revision by D. Einarson (ENV)	
Aug 2020 to Nov 2021	LAC performs agreed upon field work program	
Dec 2021	Draft of EIS submitted for Review	1
Feb 28, 2022	T. Gray (ENV) provides comments on EIS draft	
June 2022	LAC provides revised draft of EIS	2
Jan 16, 2023	T Gray (ENV) provides comments on revised EIS draft	
Jan 21, 2023	Meeting between ENV, DLC, Urban Systems, and LAC to review progress on LWMP	
April 2023	LAC provides updated EIS report for final draft review to DLC and Urban Systems	3
May 2023	LAC finalizes the EIS report	Final
Nov 29, 2024	LAC, Urban Systems, and DLC meet to discuss new requests from ENV	

Response to New ENV Feedback

Question 1: Did LAC put forward the recommendation of a second year of monitoring to augment the 2020 EIS field work?

Through recent (2024) correspondence, ENV has indicated interest in an additional year of monitoring to be conducted at the proposed outfall site. There appears to be some possible misunderstanding about this original source of this idea.

In the EIS, LAC has prescribed two detailed sampling program designs for DLC should it continue to pursue the Okanagan Lake outfall. These can be found in Section 9.2 of the EIS report.

1) Participate in the Okanagan Lake Collaborative Monitoring Program. DLC joining this program seems appropriate and would allow for increased sampling of the north basin based on increased availability of funds.
2) An independent sampling program designed to meet the requirements of the MWR.

During the 2nd round of review (response dated Jan 16, 2023), T. Gray of ENV made the following comment:

> Repeating elements of the EIS sampling program over another year and assessing for all parameters for which there is a WQO would provide an improved estimate for water quality inter-annual variability and reduce uncertainty at the proposed outfall location.

Tim clarified his thoughts later in his response:

> The recommended monthly sampling frequency proposed in the EIS for at the proposed outfall, IDZ and 1 km downstream locations may not be sufficient to detect potential changes in water quality and the plankton community with the additional nutrient loading from the proposed outfall.
> …
> Furthermore, if further refinement of the findings in the EIS study is needed, repeating the sampling program over another year for assessment against the WQOs could be done to reduce uncertainty about water quality at the proposed outfall location.

LAC acknowledged this comment in our supplemental response dated Feb 23, 2023:

> - DLC could implement the expected monitoring program in advance of outfall construction.
> - The program would harmonize methodologically with the Okanagan Lake Collaborative Monitoring Program (OCMP) to ensure all WQO's are addressed.
> - Any monitoring program would need approval from DLC staff and council

Implementing a second year of monitoring was therefore not recommended in the EIS prepared by LAC.

Question 2: What are the pro's and con's of adding an additional year of monitoring?

Since the first year of monitoring occurred during flood-influenced years, it may not be typical. The massive White Rock Lake wildfire also occurred during the sampling program; this fire will likely affect north basin water quality for several years post-fire. However, a "typical year" is more elusive than ever in recent decades. Climate-driven variables including flood, wildfire impact, increased intense storms and extreme temperatures limit the value of all targeted short-term monitoring. Further, introduction of invasive mussels will impact water chemistry and disrupt food chains, reducing the predictive value of historic data.

Using long-term data sets, such as the 50-year ENV dataset from 0500730, is vital to detecting and interpreting change. Adding a second year of monitoring would be unlikely to reduce risks inherent in EIS modelling meaningfully. Perennial monitoring with consistent methodology that aligns with other monitoring elsewhere (i.e. OCMP) is essential to clarifying outcomes for the DLC LWMP.

Question 3: What would DLC joining the Okanagan Collaborative Monitoring Plan (OCMP) provide?

This is a moderate cost program that gradually accumulates growing season data, long-term. It monitors the parameters for which there are Okanagan specific water quality objectives (WQOs) to detect change with consistent methodologies. The program design was developed in partnership between ENV and the municipalities that engage in continuous release of treated effluent into Okanagan Lake (Kelowna, RDCO, and Summerland) with the specific goal of meeting their discharge monitoring requirements. In LAC's opinion, joining the OCMP would increase certainty on Okanagan Lake long-term biochemical behaviour and improve estimates of potential impact.

At four sites within Okanagan Lake, OCMP collects:

- Total Nitrogen (1,5,10m and 20,32,45m composites)
- Total Phosphorus (1,5,10m and 20,32,45m composites)
- Nitrogen to Phosphorus Ratio (1,5,10m and 20,32,45m composites)
- Chlorophyll-a (1, 5, 10 m composite)
- Phytoplankton - taxonomy (1, 5, 10 m composite)
- Phytoplankton - biovolume (1, 5, 10 m composite)
- Zooplankton – taxonomy (0-45 m vertical plankton net pull)
- Zooplankton – biomass (0-45 m vertical plankton net pull)

Summary Conclusion

The current request by ENV to evaluate a second year of study is based upon a suggestion made in the 2nd round of EIS review by ENV staff biologist Tim Gray. LAC evaluated this request at the time and felt that instead of repeating another intensive one-off sampling program, DLC should be considered for inclusion into the OCMP. A long-term sustainable program that integrates with existing monitoring programs to provide data targeted at the specific Okanagan Lake WQOs would ultimately be of more value in reducing uncertainty surrounding water quality values at the potential outfall.

Response Memo for Additional Modelling of Effluent Plume

Kiel Wilke
Utilities Manager – District of Lake Country
Cc: Joanne Quarmby and Ehren Lee

Dec 13, 2024

This memo serves as part two of a two-part response to the latest round of BC ENV comments on the DLC Okanagan Lake Proposed Outfall EIS. The goal of this memo is to address the question of additional modelling of the effluent plume.

Jamie Self

Senior Aquatic Biologist, R.P. Bio

Heather Larratt,

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Response to New ENV Feedback

Expand scope of modelled results

ENV expressed interest in expanding the range of scenarios that were modelled for in the EIS. The original modelling focused on producing a dilution curve and then applying that curve to average concentrations in the existing effluent data. These results indicated that:

> the modelled concentrations of nitrogen species, phosphorus, and chloride were at or below the average concentrations in Okanagan Lake indicating that the plume should reach equilibrium with the surrounding water within the IDZ (Table 14).

Table 14: Modelled concentrations of effluent constituents at edge of IDZ

Parameter		Effluent Concentration during 2020		Modelled Concentration @ Edge of IDZ	Effluent Requirement	Aquatic Life Chronic Guideline	Okanagan Lake Objective	Okanagan Lake Concentration At 60m
		Mean	SD					
Total Ammonia	mg/L as N	0.481	0.384	0.002 - 0.02	1.18*	1.18	-	0.02
Unionized Ammonia	mg/L as N	0.0027	0.0035	0.00001 - 0.00027	1.25	-	-	-
Nitrate	mg/L as N	1.68	0.35	0.008 - 0.07	-	3	-	0.07
TN	mg/L as N	3.84	0.58	0.019 - 0.16	6	-	0.230	0.250
TP	mg/L as P	0.281	0.064	0.001 - 0.012	0.25	-	0.008	0.009
Chloride	mg/L	114	7.2	0.553 - 4.75	-	-	-	5.3

Note: Modelled concentrations lower than the Okanagan Lake average indicate that the plume is expected to have reached equilibrium with the surrounding water by the edge of the IDZ

* Calculated using BC ENV ammonia table for average Okanagan Lake conditions at 60 m: pH = 8.0, Temp = 5.0 °C

ENV expressed interest in applying the model results to the prospective effluent target criteria as well as the existing average data. The goal of this would be to evaluate if the plume would meet guidelines and objectives at the edge of the IDZ in the full range of scenarios covered by the Operational Certificate (OC).

Comparing the dilution model developed in the EIS against the full range of scenarios is given in Table 1. These reveal that for most of the scenarios, the guidelines or objectives could be met at the edge of the IDZ. TP under normal operating conditions would meet the objective at the edge of the IDZ with the 95th percentile showing that the vast majority of the data is close to the mean and therefore would meet the objective. However, occasional outliers were observed up to the 2 mg/L daily discharge maximum. Under these rare conditions, the plume would exceed the objective at the edge of the IDZ. This does not present a risk to aquatic life because this guideline relates only to the influence of TP on phytoplankton growth. New modelling conducted for this memo revealed that achieving the objective at the edge of IDZ for TP under these rare conditions is unlikely to be possible. A very large 100 port diffuser assembly (50 m long) did increase dilution significantly but still achieved a minimum dilution ratio of 150:1 compared to the 250:1 that would be required for 2 mg/L TP to be brought below the 0.008 mg/L TP objective (Table 2).

Table 1: Modelled concentrations at edge of IDZ under full range of OC scenarios

Parameter	Effluent Target	Target Type	Guideline	Modelled Values @ edge of IDZ	Achieved or failed?	Dilution Ratio Required	Distance (m)
$CBOD_5$	10			0.049 - 0.417	Achieved		
TSS	10			0.049 - 0.417	Achieved		
TP	0.25	annual avg	0.008	0.001 - 0.010	Achieved mostly	31.3	10
	2	daily max	0.008	0.01 - 0.083	Maximum of 2 mg/L would exceed obj at edge of IDZ	250.0	450
	0.395	95th Percentile of 2020 Effluent		0.002 - 0.016	Achieve mostly		
Ammonia	10	day max	1.18	0.049 - 0.417	Achieved	8.5	<10
	6	annual avg	1.18	0.029 - 0.25	Achieved	5.1	<10
NO3	10	day max	3	0.049 - 0.417	Achieved	3.3	<10
	6	annual avg	3	0.029 - 0.25	Achieved	2.0	<10
TN	6	annual avg	0.23	0.029 - 0.25	Okanagan Lake does not meet this objective currently	26.1	<10
	10	day max	0.23	0.049 - 0.417	Okanagan Lake does not meet this objective currently	43.5	10
Fecal coli / 100mL	4800	Geo-mean	200	23 – 200	Achieved	24	100
pH	6 to 9				pH value would meet objective without dilution, as reported in 2.1.2 of EIS		
Metals	*Data were not available at the time of writing but DLC has added these parameters to its monitoring program*						

Table 2: Comparison of new modelling for larger diffuser assembly to achieve TP objective

Season	Dilution Ratio @ 100m	Dist to 250:1 Dilution Ratio (m)	#Ports
Winter	282.4	60	50
Spring	128.5	450	50
Summer	135	135	50
Winter	396.5	35	100
Spring	153.9	325	100
Summer	157.5	300	100

Summary Conclusion

The current request by ENV to evaluate additional modelling was performed. The full range of scenarios available under the potential OC were calculated. These results supported the original EIS conclusion that the plume would meet relevant objectives at the edge of the IDZ. The only parameter that did not meet the IDZ criteria was the daily maximum TP of 2 mg/L. Fortunately the historic TP data from the DLC treatment plant reveal that TP concentrations of this magnitude are very rare and upgrades to the WWTP as part of the LWMP process should further reduce the frequency of these extreme outliers. In addition, any releases of the higher TP concentrations would need to be limited, in order to also meet the annual average concentration requirement of 0.25 mg/L.

APPENDIX I – MINISTRY OF ENVIRONMENT AND PARKS RESPONSES TO STAGE 1-2 REPORT

LWMP STAGE 3 IMPLEMENTATION | DOLC

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August 10, 2023

District of Lake Country
LWMP Amendment Combined Stage 1 & 2 Report

His Worship Mayor Blair Ireland
and Councillors
District of Lake Country
10150 Bottom Wood Lake Road
Lake Country, BC V4V 2M1

VIA EMAIL: mayorandcouncil@lakecountry.bc.ca

Dear Mayor and Council:

Re: District of Lake Country: Liquid Waste Management Plan Amendment – Combined Stage 1 & 2 Report

Thank you for submitting the District of Lake Country (District) Liquid Waste Management Plan Amendment – Stage 1 / 2 Report – Final Draft dated August 31, 2022 (the Report), and the associated District of Lake Country Okanagan Lake Cleaned-Water Return Outfall Receiving Environment Environmental Impact Study Summary Report dated May 2023 (the EIS).

As previously communicated, the two stated objectives for a Liquid Waste Management Plan (LWMP) are to protect public health and the environment and to adequately consult the public. Within LWMPs, local governments are encouraged to show leadership and innovation in water conservation, watershed security, resource recovery, energy conservation, climate change adaption and mitigate, and asset management.

In addition, the LWMP process is an opportunity to advance reconciliation with Indigenous Nations. The province has a duty to consult Indigenous Nations whenever a decision or activity could impact claimed or proven Aboriginal Rights and Title. Although the duty to consult rests with the province, local governments are expected to engage Indigenous Nations throughout the planning process to build relationships, understand potential impacts on Indigenous interests and consider modifying plans to avoid or mitigate those impacts, if needed. To be successful, the LWMP must show how Indigenous Nation interests were considered.

The Ministry has reviewed the submissions with respect to the "*Interim Guidelines for the Preparation of a Liquid Waste Management Plans*" (July 2011) and the standards outlined in the Municipal Wastewater Regulation, and have the following comments for consideration when preparing the Stage 3 Report:

1. The District is proposing "flexible/Adaptive return options" to ensure the safe return of cleaned water back to the environment. However, the Report does not provide sufficient detail on the investments needed to support flexibility such as maintaining the ground discharge works and investing in reclaimed water use. This was a comment included in previous communication on the draft Report.

   As outlined in section 5.7 of the Interim Guidelines for Preparing a Liquid Waste Management Plan, proper development and evaluation of reclaimed water options should be done alongside planning of sewage conveyance facilities and disposal facilities. The planning of the conveyance route for the outfall should be done in conjunction with the planning and development of reclaimed water use.

   In addition, the District is located in a water deficit area surrounded with agricultural lands. Reclaimed water use presents an opportunity to support agriculture, reduce potable water demand and reduce the volume of effluent that will be discharged to the Lake. Public consultation and Indigenous Engagement to date have shown support for the use of reclaimed water.

   As such, please include the following in the Stage 3 Report:
   - The cost and timeline for repairing the current groundwater galleries so they can continue to be used as part of the suite of discharge options.
   - A comprehensive reclaimed water use options analysis to inform commitments to reclaimed water use with associated costs and timelines that can be implemented alongside the development of the outfall conveyance route and investments in expanding the conveyance infrastructure.

2. The EIS adequately fulfills the Terms of Reference with the understanding that additional analysis relating to emerging contaminants will be included in the Stage 3 Report and considered during the application process for the Operational Certificate. The EIS shows that several water quality objectives are not being met at the proposed discharge location and concludes that although the proposed discharge is not expected to alter the water quality objective exceedance behavior, the environmental context of the proposed discharge is concerning. Given this conclusion, we recommend that the District show meaningful commitments to limiting the quantity of effluent discharged to Okanagan Lake as part of the flexible approach and implementing the EIS recommendations with respect to watershed rehabilitation.

3. The commitments to expanding and retrofitting the collection system are the largest proposed expenditure in the Report at $38.9 million. The source and breakdown of these costs is not presented. According to the Community Sewer Servicing Strategy and Infrastructure Needs and Cost Analysis (Urban Systems, 2020), the total estimated cost of sanitary collection system upgrades is $5.9M. Section 3.1.2 and 3.1.3 discuss onsite systems but do not discuss the 700 properties proposed to be "retrofitted" and how they were selected. Given the potential benefit with respect to reduced phosphorous load to surface water, commitment to connecting onsite systems could be an important commitment to environment protection in the LWMP. Please provide additional information to support this investment in the collection system including a breakdown in costs and the expected environmental benefit.

4. The Report includes several commitments that show leadership in addressing non-point sources of pollution including a non-point source pollution plan, the integrated stormwater management plan, establishing stormwater quality monitoring, undertaking a public sani-dump study and extending the collection system. The Ministry recommends that all commitments included in the Stage 3 Report be specific, measurable, achievable, relevant and timebound to help ensure their success.

5. The Report provides class C estimates and commits to further refining them to class B standards in the Stage 3 Report. Please ensure that the cost estimates include operation and maintenance costs in addition to capital costs. All costs must be presented as cost per household to ensure transparency during consultation.

6. Further information on how engagement with Indigenous Nations has shaped the recommendations is needed in the Stage 3 Report. Work done by the District to understand potential impact on Indigenous Interests and adapt the plan to mitigate those impacts will support the timely review of the Stage 3 Report.

7. Public consultation on Stage 3 must be designed to reach as many members of the public as possible to ensure community buy-in on the approach and understanding of the associated cost per household going forward. Consider a mail-out to residents outlining the commitments and costs in addition to the activities outlined in the Stage 3 scope of work and additional in-person townhalls to present the proposed outfall conveyance route and the results of the reclaimed water options analysis.

As soon as the Stage 3 process is initiated, please submit an application for an amendment to the District's Operational Certificate under the Environmental Management Act (see Apply for a waste discharge authorization - Province of British Columbia (gov.bc.ca). This process will consider the terms and conditions for implementing the proposed Liquid Waste Management Plan commitments and ensure a timely review and decision by the Director in the event the Minister approves the Liquid Waste Management Plan.

If you have any questions regarding this letter, please contact Melanie Mamoser at 250-739-8328 or melanie.mamoser@gov.bc.ca.

Yours truly,

Liz Archibald
Section Head, Community Liquid Waste Management
Environmental Protection Division

Cc: Greg Buchholz, gbuchholz@lakecountry.bc.ca
Ehren Lee, elee@urbansystems.ca

April 23, 2024 File: LWMP District of Lake Country

His Worship Mayor Blair Ireland and Councillors
District of Lake Country
10150 Bottom Wood Lake Road
Lake Country, BC V4V 2M1

VIA Email: mayorandcouncil@lakecountry.bc.ca

Dear Mayor and Council:

Re: The Role of Reclaimed Water in the District of Lake Country's Liquid Waste Management Plan

I am writing today to connect with the District of Lake Country and request an update on how the Stage 3 Report is progressing.

I also want to take this opportunity to provide additional context on the suggestions my staff have offered in our response to the Stage 1/2 Report last summer. When reviewing Liquid Waste Management Plan stage reports, our goal is to support local governments in developing a successful plan by pointing out where improvements can be made based on the provincial LWMP guidance and provincial priorities. To that end, we made some suggestions with respect to reclaimed water use as the importance of considering it may not be fully understood.

The province's overarching policy with respect to waste is to follow the 5R pollution prevention hierarchy (Reduce, Reuse, Recycle, Recover and Residuals Management) and to promote a circular economy. In alignment with these policies, the province encourages municipalities to look at their liquid waste as a resource instead of a waste.

Although the Environmental Impact Study concluded that a single discharge to Okanagan Lake would not have a measurable impact on the lake, it did highlight that there is cause for concern on the overall environmental health of the lake at this location. This has been confirmed by what we've been seeing in other reports as well. As such, it is imperative we all do our part to reduce the cumulative impacts on Okanagan Lake by limiting discharges.

We were encouraged by the Stage 1/2 Report proposal for a hybrid approach to managing the municipal liquid waste that involves the use of reclaimed water. However, without meaningful commitments to exploring and implementing the opportunities for reclaimed water use in the Stage 3 Report, in practice, the approach will primarily rely on a discharge to Okanagan Lake.

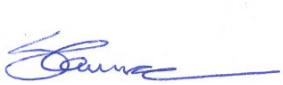
The District is located in a water deficit area surrounded by agricultural land. Reclaimed water use presents an opportunity for climate change adaptation to support agriculture and reduce potable water demand. Public consultation and Indigenous Engagement to date have shown support for the use of reclaimed water.

This is why the ministry has strongly suggested that the Stage 3 Report include comprehensive evaluation of reclaimed water use options. This evaluation would inform commitments to reclaimed water use by identifying associated costs and timelines that can potentially be implemented alongside the development of the outfall conveyance route and investments in retrofitting and expanding sewer service. This is the right time to be thinking about reclaimed water use infrastructure and identifying potential users, both private and public.

In addition, reclaimed water use can improve the chances of a project receiving funding. All the infrastructure funding programs managed by the province are consistently oversubscribed leaving many funding applications unsuccessful. Successful projects are selected using a review process to compare project outcomes against program goals and provincial priorities. In recent years, a key provincial priority has been climate adaptation. As such, a project with a commitment to reclaimed water use has a better chance of securing grants.

At this time, I'm requesting that the District of Lake Country provide a brief update on the status of the Stage 3 Report development and estimated timelines as to when the draft will be submitted to my staff for review prior to final submission to the Minister. Additionally, please let me know if there is anything we can do to further support the District as you work to complete the Stage 3 Report.

Sincerely,



Cassandra Caunce
Director, Communities, IPM & AgriFood Authorizations
Authorizations and Remediation Branch
Environmental Protection Division

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Ehren Lee, elee@urbansystems.ca