

Regional District of Okanagan-Similkameen

Okanagan Falls Area Liquid Waste Management Plan - Amendment Stage 3 Report

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Project Number:

111102-03

Date:

July, 2010

Updated: November 29, 2010

November 29, 2010

Doug French, P.Eng.
Manager of Public Works
Regional District of Okanagan-Similkameen
101 Martin Street
Penticton, BC V2A 5J9

Dear Mr. French:

Project No: 111102-03

Regarding: RDOS Okanagan Falls Stage 3 LWMP Report

Attached please find three (3) printed copies of the updated RDOS Okanagan Falls Stage 3 report. Two (2) copies of the report are intended for submission to the Ministry of Environment when you submit the report for Approval by the Regional Manager as required by the Minister of Environment when he approved the LWMP.

The Stage 3 report contains an Executive Summary of the overall process, a summary of the **Preferred Solution**, a summary of options that were considered but were not selected for implementation, a summary of the public consultation efforts plus a listing of the Bylaws that will be required to implement the Liquid Waste Management Plan. This LWMP includes several items that were to be implemented at a future date, however public feedback during the process showed very strong support for implementing these next stages just as soon as funding is available. In addition, it is our belief that residents in the plan area would like the RDOS to proceed with funding applications for the provision of sewer service to Skaha Estates and the Kaleden Lakeshore areas even before the new treatment facility is completed and placed in service. The updated Stage 3 report includes the information required by the Minister in his Approval of the LWMP and all the necessary support documents.

It has been our pleasure to work with you throughout the updating of the Stage 3 Report for this LWMP.

Sincerely,
AECOM Canada Ltd.



Timothy R., Forty, P.Eng.
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Distribution List

# of Hard Copies	PDF Required	Association / Company Name
1	1	Andrew Reeder, RDOS

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
0.0	Tim Forty	April 8, 2010	Draft Stage 3 Report outline
0.1	Tim Forty	June 6, 2010	First Draft for review Stage 3 Report
0.2	Tim Forty	June 7, 2010	Second Draft for review
0.3	Tim Forty	June 13, 2010	Third Draft for review, updated from RDOS review comments
1.4	Tim Forty	November 28, 2010	Update to report as required by the Minister when he approved the LWMP. Draft for RDOS review.
1.5	Tim Forty	November 29, 2010	Final report after review by the RDOS

AECOM Signatures

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Overview

The Stage 3 report provides an overview of the Liquid Waste Management Plan (LWMP) amendment that has been developed for the management of wastewater for the Regional District of Okanagan-Similkameen (RDOS) for the Okanagan Falls Area. The Okanagan Falls Area as discussed in this LWMP, consists of the Okanagan Falls community much of which is currently serviced by a sanitary sewer system, plus the Kaleden and Skaha Estates communities which currently are not serviced by sanitary sewer systems. LWMPs are encouraged by both the Ministries of Environment and Health, where existing or anticipated impacts from wastewater treatment and disposal practices threaten the environment or public health. A LWMP investigates existing circumstances, researches viable alternatives and improvements and finally, with public input, recommends the most financially, socially and environmentally acceptable solutions.

The RDOS and the Ministries of Environment and Health are all concerned that continued management of sewage wastes in the Okanagan Falls Area utilizing the existing sewage treatment and effluent disposal system is simply not sustainable in its present form. This view is shared by the LWMP Advisory Committee (AC) and the general public in the Okanagan Falls area.

The LWMP amendment will provide an update with respect to wastewater management and existing conditions in the Okanagan Falls, Kaleden and Skaha Estates areas and detail the impact upon the environment since the completion of the original LWMP in 1989. The amendment will involve identifying and developing suitable option(s) for the management of domestic wastewater in the plan area for both the short and long term and will build upon the results of previous related studies undertaken by the RDOS.

The likelihood of obtaining future senior government infrastructure grant funding for implementing later stages of the LWMP will be greatly assisted by an approved LWMP.

A study conducted by AECOM (formerly Earth Tech Canada Ltd.) entitled "*Okanagan Falls – Sewage Treatment Plant – Strategic Review*" dated August 2005, (referred to as the *2005 Strategic Review*) identified a number of options that could be utilized to upgrade the existing sewage collection, sewage treatment and effluent handling systems. There was considerable public involvement in the development of this *2005 Strategic Review*, and subsequently the Ministry of Environment agreed that a Combined Stage 1 / Stage 2 LWMP process would be appropriate. The recommendations from the *2005 Strategic Review* study have been incorporated directly into the body of this report as they are the background required for a complete Stage 1 LWMP report. Based on the strength of public support for the recommendation in the *2005 Strategic Review*, that the new wastewater treatment plant should be relocated to the South of the existing plant, away from populated areas, the RDOS made arrangements to purchase a property that met these requirements. Prior to final purchase the property was removed from the ALR and rezoned to permit the construction and operation of a wastewater treatment plant. These recommendations regarding the location and treatment process are two of the *Preferred Solutions* that form the core of the first part of the first stage of the implementation of this LWMP.

The effluent that will be generated must be capable of being discharged directly to the Okanagan River Channel and the high level of treatment by the Biological Nutrient Removal (BNR) process will ensure this is the case. Several other BNR plants in the Okanagan currently discharge to the Okanagan Lake system with no known adverse effects and it is anticipated that this discharge will be no different. Several concepts for the beneficial reuse of plant effluent, as well as two public education programs, were identified during the previous studies and the LWMP process. The LWMP AC and the public supported reclaimed water (effluent) irrigation with a possible demonstration project proposed for Keogan Park and wetlands enhancement for the Vaseux Lake wetlands currently managed by Ducks Unlimited. Environmental impact studies for the irrigation project and the wetlands enhancement project will need to be conducted in accord with the *Code of Practice for the Use of Reclaimed*

Water as well as cost estimates prior to these options being presented to the public and the RDOS Board for a final decision regarding the implementation of either, neither or both reuse projects during the first stage of implementation of the LWMP. It is possible that all effluent will be discharged to the Okanagan River Channel during the winter months and although the use of reclaimed water for beneficial use by irrigation or wetlands enhancement is strongly desired, the actual amount of reclaimed water that can be diverted for beneficial use is as yet unknown. Effluent not diverted to beneficial use will be discharged to the Okanagan River Channel. The possible reuse projects are to be presented to the public to ascertain their wishes regarding implementation at a Public Information Meeting (PIM) once the environmental studies and predesign are completed to provide the necessary environmental, cost and flow information.

The public provided strong feedback that they wished to proceed with the provision of sewer service to Kaleden Lakeshore and Skaha Estates as soon as possible and based on that feedback the RDOS should make application for infrastructure grant funding as soon as the next grant program is announced. The sewerage of the Kaleden Lakeshore and Skaha Estates areas are scheduled as the second stage of the implementation of this LWMP.

The Minister of Environment approved the LWMP on July 21, 2010, and as part of his approval required that the results of the pre-design assessment of the effluent disposal options be presented to the public and stakeholders in a public meeting for review and comment. He further required that the updated and completed Stage 3 LWMP report which included the recommended solution for the disposal of treated effluent be submitted to the Regional Manager, Environmental Protection for approval before the plant is commissioned. This is that revised report.

The recommended effluent disposal option consists of the discharge of all of the effluent to the Okanagan River Channel. This recommendation was necessitated by the requirement to maintain affordability for the residents of Okanagan Falls. Consequently the options of enhancing the wetlands adjacent to the Okanagan River Channel, utilizing effluent for irrigation purposes, and the installation of grit removal and dewatering at the treatment plant were all postponed as cost saving measures that will be reviewed during the next phase of the LWMP implementation. The next phase of implementation is to provide sewer service to Skaha Estates and Kaleden Lakeshore residents. It is anticipated that the postponed effluent management options and the unit processes at the treatment plant will be reviewed and if found to be affordable would then be implemented. This approach was supported by the citizens of Okanagan Falls and by the RDOS Board.

The updated information is discussed in Section 8 of this Updated Stage 3 report and the supporting documentation is contained in Appendices A through F.

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Definitions and Acronyms

• ADF	Average Day Flow
• AWWT	Advanced Waste Water Treatment
• Biosolids	The solids waste, or sludge, from a sewage treatment plant that has received treatment to remove pathogens and is of a quality that it is suitable for use as a soil amendment or soil conditioner (See OMRR).
• Blackwater	Waste associated with toilets
• BOD	Biological Oxygen Demand. The amount of oxygen needed to breakdown the organic matter in the wastewater.
• BNR	Biological Nutrient Removal. An advanced tertiary sewage treatment process that removes nutrients biologically from sewage wastes and can produce an effluent that may be discharged to surface waters without negative impact.
• CCME	Canadian Council of Ministers of the Environment
• COP	Code of Practice. Refers to a code which defines acceptable practices, developed under the <i>Municipal Sewage Regulation</i> . An example is the <i>Code of Practice for the Use of Reclaimed Water</i> which is a key reference and guidance document for implementing reclaimed water use and complying with the MSR.
• Disinfection	A treatment process used to kill or deactivate pathogenic material. Chlorination and UV are processes commonly used for disinfecting effluent before discharge to the environment.
• Effluent	The treated liquid discharge from a sewage treatment plant.
• Greywater	Waste associated with wash water (ie, shower/bath, cooking, etc)
• IHA	Interior Health Authority
• LWMP	Liquid Waste Management Plan
• MCRD	Ministry of Community and Rural Development formerly known as the Ministry of Community Development, (MCD), the Ministry of Community Services, (MCS), the Ministry of Corporate, Aboriginal and Women's Services (MCAWS), and prior to that as the Ministry of Municipal Affairs, (MA).
• MoE	Ministry of Environment
• ML	Mega Litre (1,000,000 litres or 1,000 m ³)
• MSR	<i>Municipal Sewage Regulation</i> . A regulation that prescribes the treatment requirements for the authorized discharge of municipal wastes to the environment.
• OC	Operational Certificate. The OC provides the conditions under which a discharge, authorized by the Minister when a LWMP was approved, must occur.
• Okanagan Falls Area	The Okanagan Falls Area includes the communities of Okanagan Falls, Skaha Estates and Kaleden

• OMRR	<i>Organic Matter Recycling Regulation.</i> The regulation that prescribes the required treatment for sludge to produce a useful biosolids product that may be utilized as a soil amendment or soil conditioner.
• Oxidation Ditch	The existing WWTP is an Oxidation Ditch. A secondary sewage treatment plant which uses a rotating “brush aerator” in an oval racetrack configuration to create an aerobic environment wherein microbes break down the sewage wastes.
• Primary	Primary treatment consists of the removal of suspended solids from the influent wastewater.
• Reclaimed Water	The effluent from a wastewater treatment plant that has undergone sufficient treatment that it may be used for golf course or crop irrigation, for wetlands enhancement or for stream flow augmentation.
• ROW	Right-of-Way.
• RI	Rapid Infiltration.
• Secondary	Secondary treatment consists of primary treatment plus the removal of BOD from wastewater.
• Sewage	Also known as raw sewage, municipal wastewater, liquid waste or wastewater
• Sludge	The solid or semi-solid waste from a sewage treatment plant. Sludge may be processed into useful biosolids in accord with the requirement of the OMRR.
• Septage	The semi-solid waste pumped from septic tanks.
• STP	Sewage Treatment Plant.
• Tertiary	Tertiary treatment consists of secondary treatment with nutrient removal processes added. The City of Kelowna operates an advanced tertiary treatment plant utilizing BNR technology to produce effluent of such high quality that it can be discharged directly to Okanagan Lake with no adverse affect.
• TSS	Total Suspended Solids.
• UV	Ultra Violet. UV is a form of disinfection where high intensity ultraviolet light is used to kill or deactivate pathogenic material.
• Wastewater	Often meant as a short form for Municipal Wastewater in the LWMP context, one portion of which is raw sewage.
• WWTP	Wastewater Treatment Plant.

1. EXECUTIVE SUMMARY

This Stage 3 report outlines the results of the Combined Stage 1 / Stage 2 effort for the amendment of the existing Liquid Waste Management Plan (LWMP) for the Regional District of Okanagan-Similkameen (RDOS) for the Okanagan Falls Area. The Okanagan Falls Area as discussed in this LWMP, consists of the Okanagan Falls community much of which is currently serviced by a sanitary sewer system, plus the Kaleden and Skaha Estates areas which currently are not serviced by a sanitary sewer system. This Amendment provides an update to the previous LWMP and summarizes existing conditions within the Okanagan Falls Area. The work undertaken as part of the Combined Stage 1 / Stage 2 process involved, in part, reviewing the “*Okanagan Falls – Sewage Treatment Plant – Strategic Review*” dated August 2005 (referred to hereinafter as the *2005 Strategic Review*) completed by AECOM under the previous company name of Earth Tech Canada Ltd. The *2005 Strategic Review* involved identifying and developing suitable options for the management of domestic wastewater for the Okanagan Falls, Kaleden and Skaha Estates areas. Due to the extensive public involvement throughout the *2005 Strategic Review* development process, this study was considered to be essentially equivalent to a “normal” Stage 1 process for the development of a LWMP. As a result, the Ministry of Environment authorized the RDOS to utilize a Combined Stage 1 / Stage 2 process for this LWMP amendment rather than two separate Stages. A series of Advisory Committee meetings were held during which many options for the management of wastewater were discussed and refined by the Advisory Committee into a set of *Preferred Solutions* which were presented to the public at an open house. The open house format Public Information Meeting held at the Okanagan Falls Elementary School on November 18, 2009, served as a forum for feed-back and education for the citizens of Okanagan Falls, Skaha Estates and the Kaleden areas.

Based on feed-back from the Advisory Committee and the general public, the current approach to wastewater management is not sustainable.

The *2005 Strategic Review* identified and assessed 10 options for the treatment plant process, 4 options for the plant location, and 2 options for expansion of the sewer service area. The options covered a variety of wastewater management approaches ranging from expanding the existing sewage treatment operation to relocating the treatment system to a new site. A brief summary of all the options considered for the wastewater treatment plant are shown in this Stage 3 LWMP report. Additional details and the detailed costs may be found in the Combined Stage 1 / 2 LWMP report. The management of the wastewater treatment plant effluent was not completely finalized as there are a number of unknowns that require resolution during the predesign stage of the new wastewater treatment plant. Some effluent will likely need to be discharged to the Okanagan River Channel but the percentages could not be determined for the potential reuse options. The percentages depends on the cost effectiveness of irrigating Keogan Park with effluent and the required environmental impact study for the nearby wetlands to confirm if and how much effluent can be accepted in an environmentally sound and cost effective manner. Two necessary public education programs were identified. The LWMP Advisory Committee endorsed the findings of the *2005 Strategic Review* and the newly identified reuse and the public education program concepts. The public feedback after the Public Information Meeting on November 18, 2010 showed that the public were strongly supportive of the Preferred Solutions selected by the Advisory Committee and wanted to proceed as quickly as possible with the second stage of implementation which would provide sewer service to both the Kaleden Lakeshore area and Skaha Estates. Based on the work conducted for the Combined Stage 1 / Stage 2 report, and feedback from the Advisory Committee and the general public, it is recommended that the implementation of design and construction of the new Advanced Wastewater Treatment (AWWT) Plant utilizing Biological Nutrient Removal (BNR) sewage treatment technology at the site south of Okanagan Falls purchased by the RDOS specifically for this purpose proceed as soon as possible. This recommendation is supported by the Advisory Committee, Regional District of Okanagan-Similkameen staff and most importantly by the majority of the residents of the Okanagan Falls, Kaleden and Skaha Estates areas who provided feedback.

Public support was very strongly behind the timely provision of sewer service for both the Kaleden Lakeshore and the Skaha Estates areas and it is further recommended that the RDOS proceed with an application for grant monies for these two projects as soon as possible. The sewerage of the Kaleden and Skaha Estates areas is scheduled as the second stage of the implementation of this LWMP.

The Minister of Environment approved the LWMP on July 21, 2010, and as part of his approval required that the results of the pre-design assessment of the effluent disposal options be presented to the public and stakeholders in a public meeting for review and comment. He further required that the updated and completed Stage 3 LWMP report which included the recommended solution for the disposal of treated effluent be submitted to the Regional Manager, Environmental Protection for approval before the plant is commissioned. This is that revised report.

The recommended effluent disposal option consists of the discharge of all of the effluent to the Okanagan River Channel. This recommendation was necessitated by the requirement to maintain affordability for the residents of Okanagan Falls. Consequently the options of enhancing the wetlands adjacent to the Okanagan River Channel, utilizing effluent for irrigation purposes and the installation of grit removal and dewatering at the treatment plant were all postponed as cost saving measures that will be reviewed during the next phase of the LWMP implementation. The next phase of implementation is to provide sewer service to Skaha Estates and Kaleden Lakeshore residents and at that time it is anticipated that both the postponed effluent management options and the postponed unit processes at the treatment plant will be reviewed and would be implemented if found to be affordable. This approach was supported by the citizens of Okanagan Falls and by the RDOS Board.

The updated information is discussed in Section 8 of this Updated Stage 3 report and the supporting documentation is contained in Appendices A through F.

2. LWMP DEVELOPMENT

Liquid Waste Management Plans were introduced to British Columbia in the mid-1980s as a way of directly involving the people of a community in the process of selecting their preferred long term solution for managing liquid wastes in their community. The process involves ensuring all reasonable options are considered, and it culminates in the selection of a preferred solution or mix of solutions. The preferred solution is detailed in the LWMP documents, as are the opportunities for public involvement and details of the public consultation program. After the Minister of Environment provides formal approval the community may request grant monies for the implementation of the LWMP. Communities with an approved LWMP for the handling of their liquid wastes normally have a greater chance of success with their grant applications than those who do not. Once the LWMP is finalized Ministry staff may issue an Operational Certificate which provides the technical quality and environmental requirements for the discharge of liquid wastes that were identified in the approved LWMP.

Details of the LWMP process are included in the Combined Stage 1 / Stage 2 report.

3. LWMP AREA

The LWMP study area includes the communities of Okanagan Falls, Kaleden, and Skaha Estates. The LWMP areas are shown on **Figure 3.1** below.

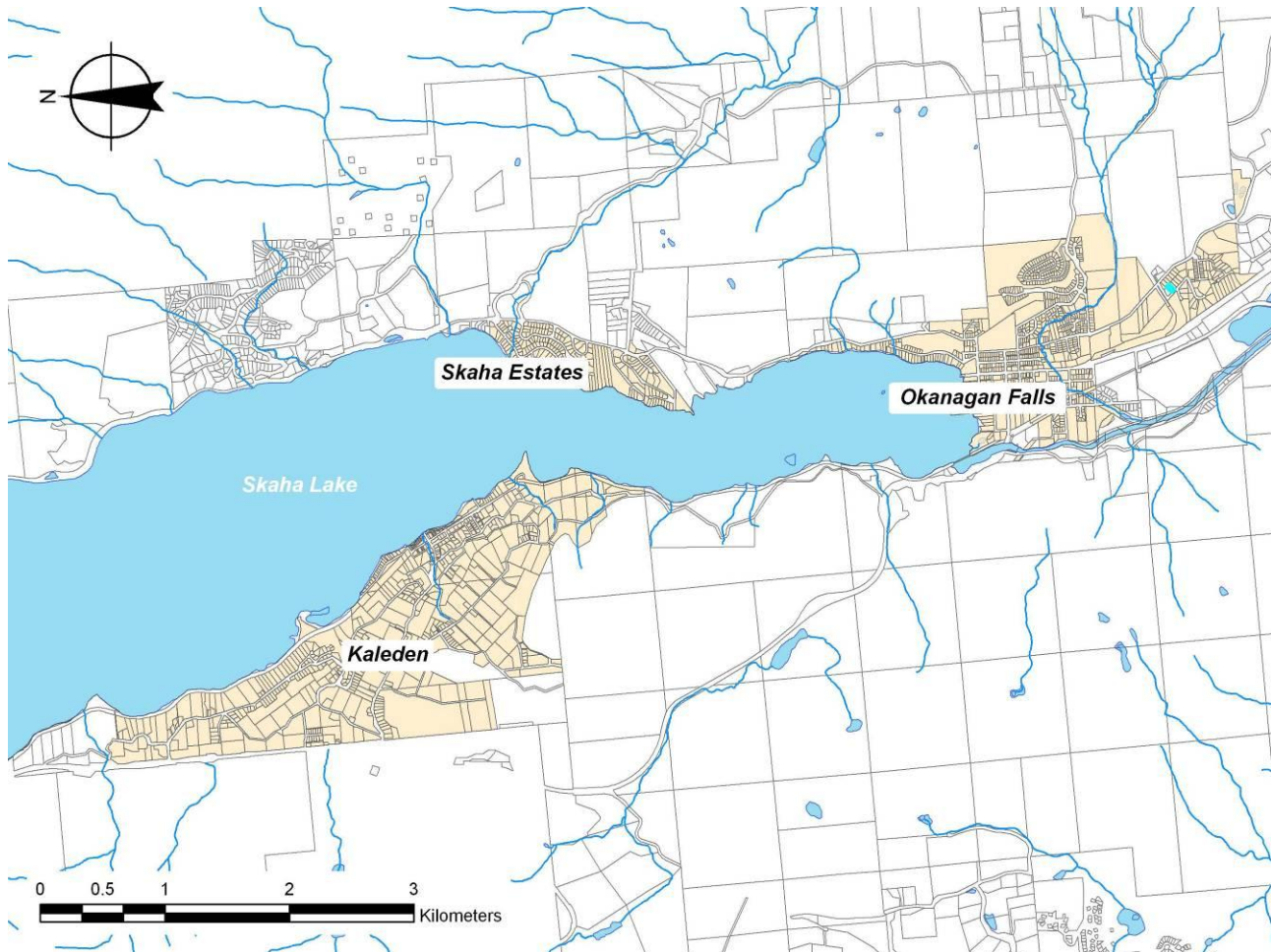


Figure 3-1: LWMP Potential Sewage Collection Areas

Sewage wastes are currently collected only within the Okanagan Falls Sewerage Area and are directed to the existing oxidation ditch secondary treatment facility. A study conducted by AECOM (formerly Earth Tech Canada Ltd.) entitled “*Okanagan Falls – Sewerage Treatment Plant – Strategic Review*” dated August 2005, identified the costs of providing sewer service to Kaleden and Skaha Estates. This information will need to be reviewed and updated when an application for grant monies for the implementation of service for Kaleden and Skaha Estates is planned.

4. PREFERRED SOLUTIONS

There were many options that were considered during the development of the Strategic Review and this LWMP. The options that were selected by the Advisory Committee and endorsed by the public are known as *Preferred Solutions*, and they are all outlined below. Financial considerations, and more specifically the limited infrastructure grant monies available, required that the options that provided Skaha Estates and / or Kaleden Lakeshore areas with sewer service be delayed until grant monies were available. The public were very strongly in favour of providing this service and made it known that they would like a grant application submitted for this service as soon as possible.

4.1 Design and Construct a Tertiary Wastewater Treatment Plant Downstream of the Existing WWTP

In 2005, following a review of the potential options and guided by the decision criteria selected by the Public Advisory Committee, the decision to replace the existing treatment plant with a new facility was made as part of the Strategic Plan. At the time that the decision was made, the location of a wastewater treatment plant site had not been secured. However, in the intervening time, based on the overwhelming support shown by the public in the *2005 Strategic Review*, the RDOS purchased land for a new site, made arrangements to remove the land from the ALR and had the property rezoned to permit the construction and operation of a proposed wastewater treatment plant on the site. Based on the work undertaken as part of the Strategic Plan and subsequent work by RDOS to secure a treatment plant site, the LWMP Advisory Committee reaffirms its support for both the plant process and the plant site. The public also indicated support for this approach both during the *2005 Strategic Review* process and at the November 18, 2009 Public Information Meeting.

Table 4-1: Proposed Treatment Plant Per Connection Capital Costs for Okanagan Falls Alone

Cost Estimates

Sewage Treatment Plant Cost Breakdown						
OK Falls (Cost per Connection)	Sewage Treatment Plant Capital Cost	Total Cost per Connection	Annual Cost per Connection with no grants*	Annual Cost per Connection with \$6.25M Grant	Annual O&M Cost + Capital Reserve per Connection	Total Annual Cost per Connection
Capital Cost, OK Falls Alone	\$10,149,300	\$8,185	\$680	\$243	\$395	\$639
*Annual cost is calculated as being amortized over 20 years at 5.3% interest						

The detailed 2009 cost estimate for the wastewater treatment plant is given in the Combined Stage 1 / Stage 2 report in Appendix C as Table C-1. The total cost is estimated at \$10,149,300 including engineering, contingency and taxes (GST at 5%). The cost for the treatment plant would be borne by all connected users on a per connection basis as shown in Table 4-1 which works out, for the 1,240 connections in the Okanagan Falls sewer area, to be an annual cost of about \$639 per year per connection for 20 years at the current Municipal Finance Authority (MFA) rate of 5.3% and with the 2/3 infrastructure grant. Grant monies will be forthcoming from the OBWB under their capital works grant but as the formula is extremely complex their actual grant amount has yet to be determined, but it could reduce the annual cost per connection.

Based upon the estimated annual operating cost for the treatment plant shown in Table C-6 in Appendix C of the Combined Stage 1 / 2 report, the annual cost per connection for the treatment plant will be about \$395 for operations, maintenance and capital replacement for each connection in the Okanagan Falls sewer service area.

Additionally, the RDOS has a 1 acre minimum lot size requirement for new subdivisions without sewer. As a result, there may be some additional demand for sewer service from new subdivisions. The OCP and ALR will provide controls on this type of development and appropriate DCCs will ensure that there are adequate resources available to cover off the replacement of the necessary plant capacity that would be utilized by latecomers to the system.

Table 4-2: Treatment Plant Annual Operating Costs Per Connection, Okanagan Falls Alone

O&M Annual Connection Cost Breakdown			
	O&M Cost per Year	Number of Connections	Annual O&M Cost per Connection
OK Falls	\$490,000	1,240	\$395

There will be additional grant funding of up to 18% of the capital works costs from the OBWB, which will lower the overall costs for both the treatment plant and the later expansion of the collection system to Skaha Estates and the Kaleden Lakeshore areas. Due to the complexity of the calculations the exact amounts are not available at this time.

The cost estimates for all the works proposed for this LWMP are provided in detail within 'Appendix C' and summarized in tables within 'Section 10: Identified Options' in the Combined Stage 1 / 2 report..

Kaleden Lakeshore and Skaha Estates

Given the very strong feedback from the public at the Public Information Meeting on November 18, 2009, it is anticipated that the RDOS will apply for additional grant funding to provide service to both Kaleden and Skaha Estates as soon as new infrastructure grant programs are announced. Once those areas are serviced, the total number of connections will increase, which will reduce the cost to all users for the remainder of the 20 year loan repayment to MFA. This means that the Okanagan Falls users will benefit from both a capital cost and operating and maintenance (O&M) cost saving each year, once the Skaha Estates and Kaleden Lakeshore areas are provided with sewer service. Additionally, Development Cost Charges (DCCs) paid by any new developments would further reduce the debt load and reduce the annual per connection capital cost loan repayment amount.

When Kaleden Lakeshore and Skaha Estates are serviced, there will be a small additional power cost involved with the additional flow but the overall annual operating and maintenance cost per connection will drop, due to economy of scale with more users connected. There will also be a small additional pumping cost to the Skaha Estates and Kaleden Lakeshore users to convey their sewage to the treatment plant.

Location

The proposed treatment plant will be constructed downstream of the existing treatment plant site, near where the KVR right of way crosses the Okanagan River Channel (Figure 4-1). The treatment process would consist of concrete bioreactor tanks and mechanical equipment to dewater the sludge.

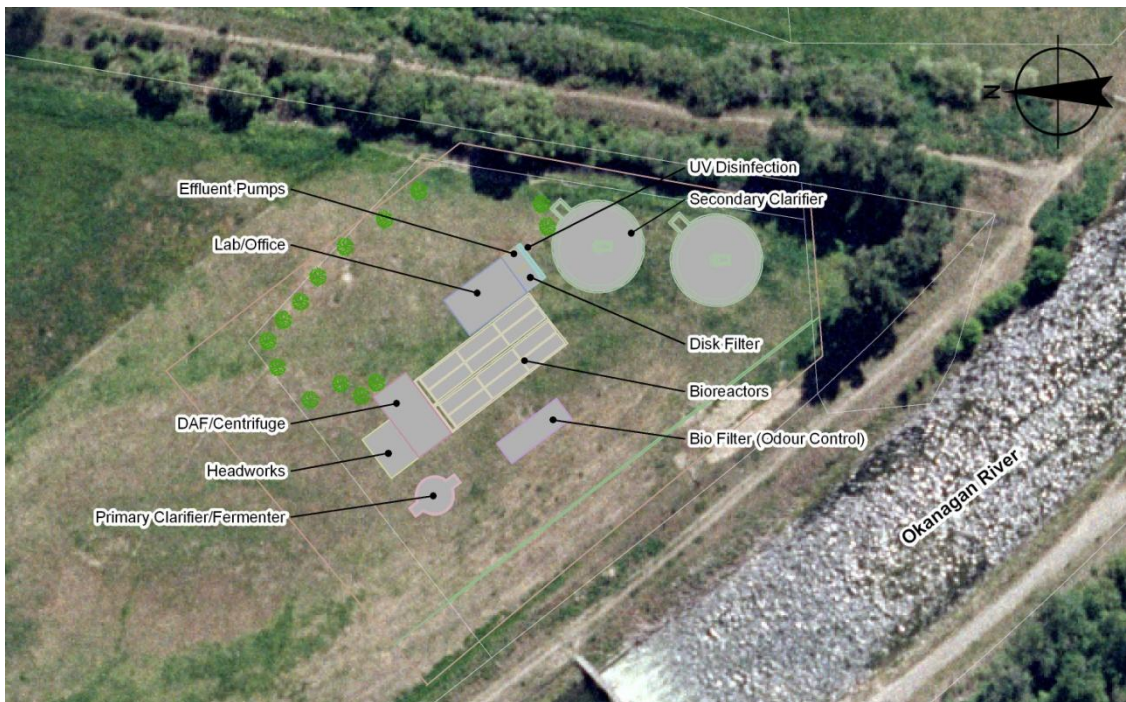


Figure 4-1: Proposed Treatment Plant Site

The RDOS has purchased and rezoned the proposed plant site to permit a sewage treatment plant to be constructed and operated on the strength and support accorded the *2005 Strategic Review*. The RDOS made an application to remove the plant site property from the Agricultural Land Reserve and has already received conditional approval from the Agricultural Land Commission.

Aesthetic Considerations

The new facility will be designed with odour control and noise attenuation to minimize impacts to surrounding residents. An appropriately sized buffer around the treatment plant site would be highly desirable and was supported by the public at the November 18, 2009 Public Information Meeting. A berm and / or a vegetative screen would be beneficial to shield the treatment plant from view. Architectural consideration will be given to aesthetically pleasing building design that will be in harmony with the farming characteristics of the neighbourhood. A specialist architectural consultant, Bevanda Architecture Inc., was retained to produce conceptual drawings of “Farm like buildings and structures” suitable for housing the proposed treatment plant for the purposes of illustrating our considerations to visual aesthetics to the public. The intent is to construct a treatment plant that would not be out of place in the rural farming area where it will be located. Public interest and support for the concept was shown at the November 18, 2009 PIM and several local residents expressed a desire to be involved with the selection process for the final design of the architectural treatment for the plant buildings. A conceptual architectural rendering for the treatment plant buildings and civil works is shown in Figure 4-2 and is provided in expanded detail in Appendix D of the Combined Stage 1 / Stage 2 report.



Figure 4-2: Proposed Treatment Plant Site with conceptual architectural treatment by Bevanda Architecture Inc.

Solids Management

For the new wastewater treatment plant, it is proposed that the dewatered sludge would be transported to the Campbell Mountain composting facility for final stabilization. The Campbell Mountain composting facility is operated by the City of Penticton. The RDOS is currently reviewing the long term aspects of the management of sludge from all treatment plants in the area. The present concept of producing compost material for consumers from the wastewater treatment plant sludge is expected to continue for the foreseeable future. There is a possibility that the operation could be relocated to a new Regional Landfill site, if one should be selected when next the Regional Solid Waste Management Plan is updated.

Effluent Management

A small portion of the highly treated effluent could be beneficially re-used for the irrigation of Keogan Park. This would reduce the demand for potable water. The public supported this concept and will be asked to confirm their support once the Environmental Impact Studies and costing of all the effluent management options is completed during the predesign stage. It is also possible that effluent irrigation of nearby fields growing animal fodder could be utilized. Currently in other Okanagan communities, school grounds and playing fields are being irrigated with highly treated effluent and it is recommended that this additional alternative use be investigated.

Wetlands adjacent to the Okanagan River Channel could benefit from additional water flow and the treatment plant effluent. Costs have yet to be developed for this concept as an Environmental Impact Study is required to determine if it is possible to enhance these wetlands with effluent. Wetland enhancement has shown to be successfully utilized elsewhere and *Ducks Unlimited* are very enthusiastic supporters towards the possibility. The public were very positive about this concept and will be asked to reconfirm this support after the EIS and costing has been completed during the predesign stage.

The RDOS contacted Ducks Unlimited and were advised that they have "...had previous experience with treated sewage effluent being used to supplement the water supply in natural and managed wetlands. The wetlands at Vaseux NWA and adjacent areas may be good candidates for receiving treated effluent." Ducks Unlimited cautioned that this would have to be looked at in detail and approved by Environment Canada who considers the option "worthy of consideration."

An effluent outfall and diffuser will need to be designed and constructed to allow 100% of the effluent to be discharged to the Okanagan River channel should there be a delay in the reuse options implementation. In addition,

the reuse options combined may not be able to handle all the effluent generated once the Skaha Estates and Kaleden Lakeshore areas are serviced particularly during the seasonal flow variations so the outfall must be capable of handling all the effluent. To ensure the public was aware of the outfall discharge possibilities, a newsletter was distributed to every residence in Okanagan Falls, Kaleden and Skaha Estates describing the possible scenario of 100% effluent discharge to the river. The public supported the concept of an effluent outfall and will be asked to reconfirm this support, after the EIS and cost analysis has been completed, during the proposed public information meeting in the pre-design stage. The public information meeting was held on September 22, 2010. The details of the meeting and feedback from the public are discussed in Section 8 below.

With the new discharge methods proposed, a suggestion was made that the specialized artificial environment created by the unexpected surfacing of RI basin effluent to form "Johnson Lake", be relocated to the wetlands area.

Site Access

An access road from Highway 97 will need to be provided, reducing impacts on residential and commercial areas from truck traffic. Negotiations are currently underway between the RDOS and the Ministry of Transportation and Highways who have yet to make a decision with respect to the proposed new access road.

Education

A water conservation strategy should be developed and implemented for the Okanagan Falls sewerage area. The strategy should include a water conservation education programme and bylaws to require new development to install low flow fixtures. The RDOS does not inspect plumbing to ensure it meets BC Building Code and as a result it is possible that the low flow fixtures may not actually be being installed in new buildings as mandated. Garburettors are also prohibited under the current Operational Certificate, however as they are available for purchase in local building supply retail outlets it is possible that some units are being installed. It would be prudent for the RDOS to implement plumbing inspections to ensure compliance with the BC Building Code and the Operational Certificate to reduce the flow of excess water and unnecessary biological material that must be treated at the treatment plant. The public supported this recommendation and it forms part of the "Preferred Solution" for the Okanagan Falls area.

A sewer use strategy also needs to be developed and implemented for the Okanagan Falls sewerage area. The strategy should include a sewer use educational programme explaining what should not be discharged to the sewer system and a sewer use bylaw to prohibit the discharge of unsuitable materials to the sewer system. The public supported this recommendation and it forms part of the "Preferred Solution" for the Okanagan Falls sewerage area.

Additionally, a public information programme should be developed to explain how to operate and maintain a septic tank for those residents who are in the LWMP area but will not be connected to sewer service. The information developed during the sewer use strategy could also be utilized to assist those who are still using septic tank tile field systems to prolong the longevity of their systems as what should not be discharged to a community sewer system should also not be discharged to a septic system. The public supported this recommendation and it forms part of the "Preferred Solution" for the Okanagan Falls area.

5. OPTIONS NOT SELECTED FOR IMPLEMENTATION

There were many options that were considered during the development of the *2005 Strategic Review*, and this LWMP amendment. The options that were not selected for implementation by the Advisory Committee are all outlined below.

5.1 Treatment Plant Upgrade Options

The *2005 Strategic Review* examined ten options for upgrading the Okanagan Falls sewage treatment plant. As required in the LWMP process reporting, all the options including advantages and disadvantages are provided in the following sections. The option that was selected as the *Preferred Solution* was Option 7, which requires an upgrade of the treatment process to BNR at a site downstream of the existing site. Option 7 does not appear in this section as it appears in the *Preferred Solutions* section immediately above.

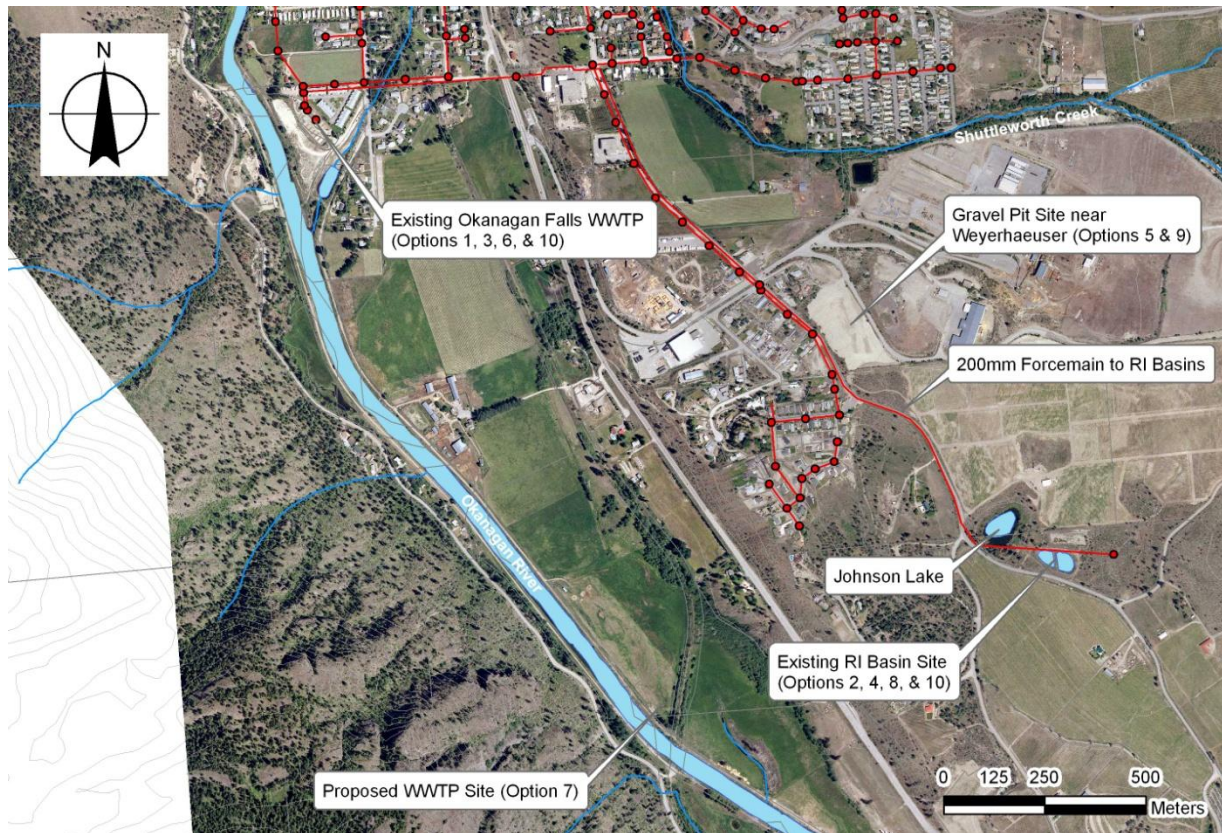


Figure 5-1: Location of Treatment Options

5.1.1 Option #1: Upgrade Oxidation Ditch at Existing WWTP Site

The existing oxidation ditch could be increased in size to provide for the 25 year servicing horizon. The upgrade oxidation process would be designed with a mechanical sludge thickener and de-watering facility, noise attenuation and advanced odour control to minimize impacts to the surrounding residential area.

Residuals from the plant would be trucked to the Campbell Mountain composting facility. The effluent pump station would be retained to allow disposal of effluent at the RI site. The amount of pumping could be reduced during the growing season by supplying effluent for irrigation water.

Disadvantages: The oxidation ditch process requires a relatively large area – approximately two times the space of an activated sludge process. The larger surface area of the oxidation ditch would make advanced odour control more expensive.

Although the existing site could accommodate an oxidation ditch process designed to treat wastewater loadings to 2030 (i.e. the 25-year time horizon), it may be a challenge to provide for longer term servicing (i.e. 25 – 75 years).

Even if the treated wastewater is reused as irrigation water, effluent disposal would require continued use of the pumpstation and RI basins during the winter. Any trucking of residuals for disposal would require passing through residential and commercial areas of town.

Decision: This option was not selected by the 2005 Strategic Review PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.2 Option #2: Oxidation Ditch at RI Site

An oxidation ditch could be constructed at the existing rapid infiltration (RI) basin to provide for the 25 year servicing horizon. The existing wastewater treatment plant would be de-commissioned and the effluent pumpstation converted to a wastewater liftstation. Wastewater would be pumped through the existing forcemain to the RI basins. Effluent would be disposed of at the RI basins.

The new oxidation ditch process would be designed with a mechanical sludge thickener and de-watering facility. Residuals from the plant would be trucked to the Campbell Mountain composting facility. Since the site can provide for a buffer zone, the facility could be designed with moderate odour control and noise attenuation.

Disadvantages: An oxidation ditch located at the RI site will rely on the uninterrupted operation of the wastewater liftstation. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in sewage overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

Wastewater pumps are designed with an open impeller to handle the high solids content – this feature reduces the pump efficiency. Pumping wastewater to a plant near the RI basins would have an increased power and maintenance cost over existing pumping. In addition, substantial upgrades to the existing pumps (or construction of a booster pump station) are required to provide for a high-lift wastewater station.

Currently, there are no developed fields nearby that could be supplied with effluent for irrigation water.

Vineyards are located adjacent to the RI basins. The presence of a wastewater treatment facility may be perceived as a land-use conflict.

Decision: This option was not selected by the 2005 Strategic Review PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.3 Option #3: Conventional Activated Sludge (Secondary) at Existing WWTP Site

A conventional activated sludge process could be constructed at the existing treatment plant site to provide for the 25 year servicing horizon. The process would consist of concrete bio-reactor tanks designed to minimize the vertical profile. A digester would be incorporated into the facility to stabilize waste sludge and mechanical equipment would be used for dewatering. The dewatered sludge would be trucked to the Campbell Mountain composting facility.

The facility would be designed with advanced odour control and noise attenuation to minimize impacts on nearby residents.

The effluent pump station would be retained to allow disposal of effluent at the RI site. The amount of pumping could be reduced during the growing season by supplying effluent for irrigation water.

Disadvantages: The capital cost of an activated sludge process is higher than an oxidation ditch process.

Any trucking of residuals for composting would require passing through residential and commercial areas of town.

Even if the treated wastewater is reused as irrigation water, effluent disposal would require continued use of RI basins during the winter.

Decision: This option was not selected by the 2005 Strategic Review PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.4 Option #4: Conventional Activated Sludge (Secondary) at the RI Site

A conventional activated sludge process could be constructed at the RI site to provide for the 25 year servicing horizon. The process would consist of concrete bio-reactor tanks designed. A digester would be incorporated into the facility to stabilize waste sludge. Mechanical equipment would be used to dewater the sludge. Residuals from the plant would be trucked to the Campbell Mountain composting facility. Since the site can provide for a buffer zone, the facility could be designed with moderate odour control and noise attenuation. Effluent would be disposed of at the RI basins.

The effluent pumpstation at existing WWTP site would need to be converted to a wastewater liftstation. Wastewater would be pumped through the existing forcemain to the RI basin site.

Disadvantages: Wastewater pumps are designed with an open impeller to handle the high solids content – this feature reduces the pump efficiency. Pumping wastewater to a plant near the RI basins would have an increased power and maintenance cost over existing pumping. In addition, substantial upgrades to the existing pumps (or construction of a booster pump station) are required to provide for a high-lift wastewater station.

A treatment plant located at the RI site will rely on the uninterrupted operation of the wastewater liftstation. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in sewage overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

Vineyards are located adjacent to the RI basins. The presence of a wastewater treatment facility may be perceived as a land-use conflict.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.5 Option #5: Conventional Activated Sludge (Secondary) Near Weyerhaeuser

A conventional activated sludge process could be constructed near the Weyerhaeuser mill site to provide for the 25 year servicing horizon. The existing wastewater treatment plant would be de-commissioned and the effluent pumpstation converted to a wastewater liftstation. Wastewater would be pumped through the existing forcemain to the new site. The process would consist of concrete bio-reactor tanks, a digester to stabilize waste sludge, and mechanical equipment to dewater the sludge. The dewatered sludge would be trucked to the Campbell Mountain composting facility. Effluent would be pumped to RI basins for disposal.

Since the area is zoned industrial and can provide for a buffer zone, the facility could be designed with moderate odour control and noise attenuation.

Disadvantages: Wastewater pumps are designed with an open impeller to handle the high solids content – this feature reduces the pump efficiency. Pumping wastewater to a plant near the Weyerhaeuser site would have an increased power and maintenance cost over existing pumping. In addition, substantial upgrades to the existing pumps (or construction of a booster pump station) are required to provide for a high-lift wastewater station.

A treatment plant located near the Weyerhaeuser site will rely on the uninterrupted operation of the wastewater liftstation. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in sewage overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

There are limited existing fields in the vicinity currently being used to grow animal fodder – additional agricultural fields would need to be developed to use all the effluent for irrigation.

A community water supply well which is located approximately 300 metres from the site will create a potential or perceived conflict of use.

This option would require purchase or lease of property.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.6 Option #6: Biological Nutrient Removal (Tertiary) at Existing Plant Site

A biological nutrient removal (BNR) plant could be constructed at the existing treatment plant site to provide for the 25 year servicing horizon. The process would consist of concrete bio-reactor tanks, a volatile fatty acid (VFA) fermenter, and mechanical equipment to dewater the sludge. The dewatered sludge would be transported to the Campbell Mountain composting facility for final stabilization of the residuals. Since the site cannot provide for a buffer zone, the facility would be designed with advanced odour control and noise attenuation.

The effluent pump station would be retained to allow disposal of effluent at the RI site. The amount of pumping could be reduced during the growing season by supplying effluent for irrigation water.

Since the existing site is owned by the RDOS, there would be no additional costs associated with land purchase.

Disadvantages: The capital and maintenance cost of the BNR process is slightly more than an activated sludge process.

Any trucking of residuals for composting would require passing through residential and commercial areas of town. The frequency of trucking would be similar to other processes.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the disadvantages noted above.

5.1.7 Option #8: Fixed Film RBC at Existing RI Site

A Rotating Biological Contactor (RBC) plant could be constructed at the existing RI site to provide for the 25 year servicing horizon. A RBC consists of a series of plates mounted on a rotor. The biological film which grows on the plates as they are cycled through the wastewater consumes carbonaceous BOD5. Sludge can usually be mechanically de-watered without further stabilization and trucked to a composting or landfill facility. Effluent would be disposed of at the RI basins.

The effluent pumpstation at the existing WWTP site would need to be converted to a wastewater liftstation. Wastewater would be pumped through the existing forcemain to the RI basin site.

Disadvantages: Wastewater pumps are designed with an open impeller to handle the high solids content – this feature reduces the pump efficiency. Pumping wastewater to a plant near the RI basins would have an increased power and maintenance cost over existing pumping. In addition, substantial upgrades to the existing pumps (or construction of a booster pump station) are required to provide for a high-lift wastewater station.

A treatment plant located at the RI site will rely on the uninterrupted operation of the wastewater liftstation. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in sewage overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

RBC's are sensitive to overloading and low temperature conditions (i.e., not as robust as other treatment processes).

Vineyards are located adjacent to the RI basins. The presence of a wastewater treatment facility may be perceived as a land-use conflict.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.8 Option #9: Fixed Film RBC at Site Near Weyerhaeuser

A Rotating Biological Contactor (RBC) plant could be constructed at a site near the Weyerhaeuser mill to provide for the 25 year servicing horizon. A RBC consists of a series of plates mounted on a rotor. The biological film which grows on the plates as they are cycled through the wastewater consumes carbonaceous BOD5. Sludge can be mechanically de-watered without stabilization and trucked to a composting or landfill facility. Effluent would be pumped and disposed of at the RI basins.

The effluent pumpstation at the existing WWTP site would need to be converted to a wastewater liftstation. Wastewater would be pumped through the existing forcemain to the RI basin site.

Disadvantages: Wastewater pumps are designed with an open impeller to handle the high solids content – this feature reduces the pump efficiency. Pumping wastewater to a plant near the Weyerhaeuser site would have an increased power and maintenance cost over existing pumping. In addition, substantial upgrades to the existing pumps (or construction of a booster pump station) are required to provide for a high-lift wastewater station.

A treatment plant located near the Weyerhaeuser site will rely on the uninterrupted operation of the wastewater liftstation. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in sewage overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

RBC's are sensitive to overloading and low temperature conditions (i.e., not as robust as other treatment processes). A community water supply well which is located approximately 300 metres from the site may create a potential or perceived conflict of use.

This option would require purchase or lease of property.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

5.1.9 Option #10: Primary at Existing WWTP Site and Secondary at RI Site

The treatment process could be split and located at two separate locations. The existing oxidation ditch could be converted to a primary treatment facility. Residuals from the primary treatment system could be dewatered and composted. Due to the close proximity of residential units, the primary process would need to be designed with advanced odour control and noise attenuation.

Primary effluent would be pumped to an oxidation ditch (secondary) treatment facility located at the RI site.

The new oxidation ditch at the RI site would be designed with a mechanical sludge thickener and de-watering facility. Residuals from the plant would be trucked to the Campbell Mountain composting facility. The facility would require moderate odour control and noise attenuation.

Disadvantages: An oxidation ditch located at the RI site will rely on the uninterrupted operation of the wastewater liftstation to pump primary effluent. Back-up power and pumping redundancy increase the reliability of the liftstation, however, a forcemain rupture would result in primary effluent overflows unless emergency storage is provided. Therefore, emergency storage should be provided.

Currently, there are no developed fields nearby that could be supplied with effluent for irrigation water.

Trucking residuals from the primary treatment site for disposal would require passing through residential and commercial areas of town.

Vineyards are located adjacent to the RI basins. The presence of a wastewater treatment facility may be perceived as a conflict.

Decision: This option was not selected by the *2005 Strategic Review* PAC or this LWMP AC for further consideration, due to the weight of the disadvantages noted above.

6. CONSULTATION

6.1 Public Consultation

Public Consultation is a very important component of any LWMP. There was considerable public consultation during the development of the *2005 Strategic Review* which was documented with the final report. In essence, there was sufficient public support for the recommended course of action in the *2005 Strategic Review* that the RDOS began the implementation of the recommendations even prior to the completion of this LWMP. In summary, the *2005 Strategic Review* recommended that the treatment process be upgraded to a full BNR process and the treatment plant be relocated to a new location south of Okanagan Falls near the feedlot. The RDOS purchased the land requested, received permission from the Agricultural Land Commission to remove the property from the Agricultural Land Reserve, and rezoned the property to permit the construction and operation of a community sewage treatment facility. The AC and the public feedback at the November 18th 2009 Public Information Meeting confirmed support for the findings of the *2005 Strategic Review*.

The November 18, 2009 Public Information Meeting had a count of about 60 people who signed in but counts at the three presentation sessions indicated that there were closer to 100 persons who attended the PIM. The PIM was advertised in the newspapers and an informational mailout was sent to everyone in Okanagan Falls, Kaleden and Skaha Estates. Information contained in the mailout included a brief review of the *2005 Strategic Review* findings and timelines showing the project milestones. The mailout outlined the Advisory Committee's Preferred Solutions including the first stage of implementation for the treatment plant and the second stage for the extension of sewer service to Kaleden Lakeshore and to Skaha Estates. Support items such as effluent reuse options and public education items were also noted. A copy of the mailout appears in the first section of the Public Consultation Support Documentation in Appendix B of the Combined Stage 1 / Stage 2 LWMP amendment report.

The Public Information Meeting began at 4:00 pm. There was a public sign in log and several members of the RDOS Staff and two members of the AECOM consulting team were present to answer questions. Ten story boards were setup as an informational aid to help the visiting public understand the details of the LWMP process and the Preferred Solutions. Presentation of the Preferred Solutions was repeated three times (5:00 pm, 6:00 pm and again at 7:00 pm). The presentation which included details of the LWMP process concluded with an overview of the Preferred Solutions and was generally well received. There were many interesting questions and answers and based on comments from the exit survey the public were generally very satisfied with the process. The exit survey compilation can be found in its entirety in the Combined Stage 1 / Stage 2 report in the third section of the Public Consultation Support Documentation in Appendix B.

The Ministry of Environment wished to be absolutely certain that the residents in the LWMP plan area were aware that there was a possibility that the outfall to the Okanagan River channel could be the sole point of discharge for the effluent if the wetlands enhancement option and the irrigation option should not be economically or technically feasible. Even with these two options being successfully implemented there is a possibility that a substantial portion of the effluent could still be discharged to the Okanagan River channel at times throughout the year. At the end of the Pre-design stage for the new wastewater treatment plant there will be a Public Information Meeting to present the costs of the effluent management options and the relevant technical findings to the public. Feedback would be solicited from the public during the meeting will assist in the determination of the final resolution of the *Preferred Solution* for the management of the effluent from the wastewater treatment plant.

6.2 Agency Consultation

Consultation with government agencies and their subsequent feedback is the component of the LWMP process that ensures that the mandates of the agencies are respected and that all issues and concerns related to those agencies mandates are addressed.

6.2.1 Ministry of Environment

Ministry of Environment staff were very supportive throughout this LWMP process and provided assistance and support for the application for grant funding for the implementation of the LWMP even prior to the completion of the LWMP. Their support was based upon the findings and overwhelming public support for the *2005 Strategic Review*. This review recommended that the treatment process be upgraded to full Biological Nutrient Removal and that the plant should be relocated to the south of the Okanagan Falls residential area near to an existing feedlot. The three letters signed by three different Ministry staff members are included in Appendix F in the Combined Stage 1 / Stage 2 report.

A Ministry Ecosystems Biologist provided the comment that a suitably qualified professional be retained to identify site specific environmental concerns and appropriate recommendations regarding requirements for the proposed wetlands enhancement option and also noted that there would also be requirements from Environment Canada.

6.2.2 Interior Health

Interior Health staff were very supportive throughout the LWMP process and provided letters of support for the application for grant funding for the implementation of the LWMP even prior to the completion of the LWMP. The three letters signed by three different Interior Health staff members are included in Appendix F in the Combined Stage 1 / 2 report.

Interior Health also indicated during the course of the Public Information Meeting that there were other areas adjacent to Skaha Estates that are currently experiencing septage disposal issues that they would like to see included when the Skaha Estates area is sewered. A separate letter was sent providing additional details of this concern and a copy is included in Appendix F in the Combined Stage 1 / 2 report.

6.2.3 Environment Canada

The Canadian Wildlife Service of Environment Canada provided a letter of comment for the concept of beneficial utilization of effluent for the enhancement of wetlands wherein a recommendation was made that a thorough environmental assessment be conducted. The letter is included in Appendix G in the Combined Stage 1 / Stage 2 report.

6.3 First Nations Consultation

Repeated attempts to contact both the Penticton Indian Band and the Okanagan Nation Alliance met with no response. Details are contained in Appendix H in the Combined Stage 1 / Stage 2 report.

7. BYLAWS

There are a number of bylaws that will need to be developed for the implementation of this LWMP. Some of the bylaws are financial in nature whilst others are needed to identify the specific areas that will be served by the sewer system.

7.1 Financial (borrowing) Bylaws Required for the Implementation of each Preferred Solution

The Regional District Office of the CAO department already has considerable familiarity with developing the necessary financial borrowing bylaws and it is recommended that they be the lead agency in their development. The RDOS will liaise with the consultant during the bylaw preparation to ensure the development of these bylaws proceed as soon as possible after the Ministerial Approval of the LWMP is received.

There will be a need for a borrowing bylaw for the proposed new BNR wastewater treatment facility and for the funding for the development of the public education programmes noted as being part of the preferred solution. The bylaw for the control of material discharged to the sewer system (Source Control Bylaw) and for Mandatory water conservation also require enforcement bylaws as without enforcement capabilities the bylaws should not be implemented.

After the RDOS is successful in obtaining grant funding for the extension of sewer service to the Skaha Estates and Kaleden Lakeshore areas, a borrowing bylaw will also be required to implement this portion of the LWMP. This bylaw should be developed in-house by RDOS staff.

7.2 Mandatory Source Control

A bylaw for mandatory source control for the sewer system could be developed by RDOS staff based on the existing source control requirements in the existing Operational Certificate of the current sewage treatment plant. The development of this bylaw should proceed as soon as the LWMP is approved by the Minister so it is in force prior to the commissioning of the new BNR treatment plant. In addition, a public education component will be critical to ensure that the public is aware of what should and should not be discharged to the sewer system. This public education programme could also provide benefit to the septic tank system users not connected to the sewer system as it would provide recommendations to help extend the useful life of their systems.

7.3 Mandatory Water Conservation

A mandatory water conservation bylaw could be developed by a consultant. Other municipalities should be contacted to obtain sample wording and recommendations as to enhancing the efficacy of the bylaw from those who already have such a bylaw in effect. There is no immediacy for the completion of this bylaw as it will not be required unless the Water Conservation public information program fails to produce the desired results.

7.4 Mandatory Connection when a Publicly Owned and Operated Sewer System is Available within the Identified Sewerage Area

The drafting of this mandatory connection bylaw and the development of timelines for connection to the sewer system should proceed by a consultant immediately after the LWMP has been approved.

8. MINISTER'S APPROVAL OF THE LWMP

8.1 Minister's conditions

The Minister applied two conditions in his letter of Approval of the LWMP. The two conditions were:

1. The results of pre-design assessment of effluent disposal options must be presented to the general public and stakeholders in a public meeting for review and comments, and
2. The completed Stage 3 LWMP report, which includes the recommended solution for the disposal of treated effluent, must be approved in writing, by the Regional Manager, Environmental Protection, before the new treatment plant is commissioned.

A copy of the Minister's Approval letter of July 21, 2010 is contained in Appendix A.

8.2 RDOS Advisory Design Committee (ADC) and its Recommendations

The RDOS established an Advisory Design Committee (ADC), which included a number of local citizens, to provide advice for complying with the conditions imposed by the Minister and the commitment made by the RDOS that the treatment plant structures would not appear out of place in its rural farming area setting. A total of four (4) ADC meetings were held. Information was presented by the consultant and conceptual plant renderings were presented by Bevanda Architecture. A list of the ADC members and the notes taken at each of the four meetings is contained in Appendix B.

Table 8-1: Predesign Cost Estimates, Incorporates Cost Saving Postponements

Estimated Capital Cost Breakdown	Total Cost	Estimated Annual Cost per Connection AFTER all Grants
Overall Predesign Capital Cost Estimate	\$11,033,000	\$210
Overall Operating and Maintenance (O&M) Cost each Year	\$462,940	\$375
Total Cost per Connection per Year	-	\$585

The cost of treatment and the desire to minimize the cost to area residents required that all effluent management options other than the absolutely necessary river outfall be delayed until a later phase. The decision was made by the ADC to postpone both the wetlands enhancement and the effluent irrigation projects.

The predesign estimated costs were higher than anticipated and if the plant were to be built as originally conceived the cost per connection would have exceeded the maximum acceptable level of \$585 per year as decided by the ADC. (See Table 8-1)

The ADC carefully reviewed the cost savings developed during the predesign stage that could be realized by postponing a number of unit processes at the treatment plant and the options for effluent reuse (See Table 8-2). The committee recommended that these items be postponed to ensure that the costs did not cause an unacceptable

financial burden on the citizens of Okanagan Falls. Neither the consultant nor the ADC members were in support of completely eliminating any of the deferred items. It was recognized that all deferred items would be reviewed and if possible, added back into the project during the next phase of the LWMP implementation when the Kaleden Lakeshore and Skaha Estates residents are connected to the treatment system.

Table 8-2: Cost Savings Realized from Postponing Specific Items

Postponed Items	Total Additional Estimated Capital Cost (Includes Contingency & Engineering)	Comments
1. Enhancement of Vaseux Lake Wetlands Includes supply pipeline below river and development of head pond and treatment marsh	\$430,000	Would provide for reduced effluent volume discharge to Okanagan River
2. Effluent Reuse Includes pumps and piping to supply effluent for irrigation at Keogan Park and adjacent farm land	\$250,000	Would allow for beneficial reuse of effluent and reduce potable water demand
3. Grit Removal	\$500,000	Would reduce wear and increase life of process equipment
4. Sludge Dewatering Includes a centrifuge to achieve 20%-25% solids content in the dewatered sludge	\$1,080,000	Would reduce transportation requirements for hauling thickened sludge to Penticton WWTP and allow for direct delivery of dewatered sludge to the compost facility

There was an additional cost of \$240,000 to fulfil the Ministry of Transportation and Highways requirement to provide a highway connection and an upgrade to the rural road which leads to the proposed treatment plant, (see Table 8-3). The RDOS is currently investigating whether this feature should actually be a requirement for the treatment plant project and if possible to have the requirement rescinded or postponed so that all current funds allocated for the project go towards implementing the LWMP.

Table 8-3: Cost Savings Realized IF Highway Road Restoration is not Required

Additional Postponed Item	Total Additional Estimated Capital Cost (Includes Contingency & Engineering)	Comments
1. Upgrade Rail Road Between Highway 97 & Rail Bed Includes providing for highway connection and upgrade to rural road section	\$240,000	RDOS staff investigating whether this feature is a requirement of the project

The ADC reviewed several different conceptual design renderings for the treatment facility and selected one particular style. The ADC asked that a number of the unit process in the plant be relocated to reduce the visual impact of the new facility. The selected conceptual rendering was applied to the revised plant buildings and structures.

A public information meeting was convened on September 22, 2010 to present to the general public and stakeholders the effluent disposal options, the updated cost estimates, and a conceptual overview of the proposed architectural rendering for the new treatment plant structures. The newsletter that was sent to every home in Okanagan Falls for the September 22 2010 Open House and the advertisements that appeared in two local newspapers are shown in Appendix C.

A copy of the storyboards which were used as centrepieces for discussion during the open house one-on-one discussion with the members of the public are contained in Appendix D. The recommendations from the ADC were also compiled and shown to the public in a PowerPoint presentation which may be found its entirety in Appendix E.

The discussions and presentation focussed on the costs and the necessity of postponing two treatment process items, grit removal and dewatering, and the effluent utilization options of irrigation and wetlands enhancement. Consequently, all the effluent would be discharged to the Okanagan River Channel until such time as funding became available to permit the implementation of the postponed items. It was noted that it was anticipated that all the postponed items should be able to be reinstated when the funding became available to connect Skaha Estates and Kaleden Lakeshore residents to the treatment system.

The feedback responses from the Public Information Meeting showed 100% support for delaying the wetlands enhancement and irrigation projects and discharging all the effluent to the Okanagan River Channel. There was overwhelming support for the conceptual architectural treatment proposed. Interestingly, residents from outside the currently sewered area once again stated their desire for sewer service as happened during the previous Public Information Meetings. The sign-in sheets, exit survey and the summarized results may be found in Appendix F.

In summary, the public and the RDOS Board support discharge of all the effluent from the proposed Okanagan Falls Wastewater Treatment Plant into the Okanagan River at this time. They further support postponing the effluent utilization options and two process items until funding becomes available for the implementation of these items, which is anticipated to occur when the Kaleden and Skaha Estates areas are connected to the system.

Appendix A

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**Minister's Approval Letter for the Liquid
Waste Management Plan**



Reference: 127924

JUL 21 2010

Dan Ashton, Chair,
 and Directors
 Regional District Okanagan-Similkameen
 101 Martin Street
 Penticton BC V2A 5J9

Dear Chair Ashton and Directors:

I am pleased to advise you that Ministry of Environment staff have reviewed the Regional District of Okanagan Similkameen's (RDOS) Okanagan Falls and Area, Liquid Waste Management Plan Amendment (the Plan) that was adopted by the RDOS Board of Directors on July 8, 2010, and submitted to me in accordance with section 24(1) of the *Environmental Management Act*.

Based on the recommendations of Regional Environmental Protection staff in the Ministry of Environment's Penticton office, I am satisfied that there has been an adequate public review and consultation process with respect to the development of the Plan. The Plan reflects strategies to address the specific areas of concern identified through the Plan development process, and demonstrates RDOS's ongoing commitment to environmentally and fiscally responsible liquid waste management within its boundaries.

Accordingly, pursuant to section 24(5) of the *Environmental Management Act*, I hereby approve the plan with the following conditions:

1. The results of pre-design assessment of effluent disposal options must be presented to the general public and stakeholders in a public meeting for review and comments; and
2. The completed Stage 3 LWMP report, which includes the recommended solution for the disposal of treated effluent, must be approved, in writing, by the Regional Manager, Environmental Protection, before the new treatment plant is commissioned.

The Regional District may now adopt the LWMP Amendment and begin working towards formal implementation of the plan. Please have your staff consult with Environmental Protection staff in Penticton regarding issuance and/or amendment of authorization(s) that may be required for implementation of the Plan. Furthermore, RDOS may wish to strike a Monitoring and Advisory Committee to address any concerns that may arise during implementation.

.../2

Ministry of
 Environment

Office of the
 Minister

Visiting Address:
 4-4th Avenue Buildings
 Victoria BC V8V 1X6

Tel/Fax: 250 962-1187
 250 962-1856

Appendix B

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**Advisory Design Committee (ADC)
Members and ADC Meeting notes**

Advisory Design Committee Members

ORGANIZATION	TITLE	FIRST NAME	LAST NAME
RDOS Director	Mr.	Bill	Schwarz
RDOS Alternate Director	Mr.	Tom	Styffe
RDOS	Mr.	Alf	Hartviksen
RDOS	Ms.	Liisa	Bloomfield
RDOS	Mr.	Andrew	Reeder
AECOM	Mr.	Piero	Galvagno
AECOM	Mr.	Tim	Forty
Local Citizen	Mr.	Ted	Lynch
Local Citizen	Mr.	Bryan	Telford
Local Citizen	Mr.	Gerry	Hughes
Local Citizen	Mr.	Marshal	Stinson
Bevanda Architecture Inc.	Mr.	Nick	Bevanda



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
MEETING OF ADVISORY DESIGN COMMITTEE FOR
OKANAGAN FALLS WASTEWATER TREATMENT PLANT

BRIEF MINUTES

Brief minutes of the main points discussed for the meeting of the Advisory Design Committee for the discussion of the Okanagan Falls new wastewater treatment plant held at Kenyon House in Okanagan Falls at 7:00 p.m. on Wednesday, July 14, 2010.

ATTENDEES:

Bill Schwarz, RDOS Director
Tom Styffe, RDOS Alternate Director
Alf Hartviksen – RDOS
Liisa Bloomfield – RDOS
Piero Galvagno, AECOM
Tim Forty, AECOM

Ted Lynch, Local Citizen
Bryan Telford, Local Citizen
Marshall Stinson, Local Citizen
Nick Bevanda, Bevanda Architecture

Absent – Andrew Reeder, RDOS and Gerry Hughes, Local Citizen

Meeting started at 7:00 PM

Introduction

Discussion around “what we expect?” from all points of view

- Aesthetics and how will impact neighborhood?
- What will be done for odour control?
- Input on additional upgrades possible for future
- Good design that fits into the community
- Look at what to do with the effluent

Background info –

- **ACTION:** RDOS to send Strategic review 2005, Kaleden and Skaha Estates report 2007, to learn history of project; also send copies of the aerial layout and architectural renderings to four local citizens by Friday July 16th.

Discussion around methods of heating the new building & capturing energy

- At this time there is not enough return for the capital cost involved
- Grants are available for the panels (i.e. OK College received one)
- Wind turbines could be installed
- Geothermal could also be used

Main concerns of residents on the ridge – Bryan

- Reflective roof panels on buildings
- Number of windows in building
- Light pollution – focusing of light downwards
- Dust control

- Covers on bioreactor/clarifier tanks
- Trees needed to hide structures

Discussion of various topics:

- Suggestion raised to relocate the primary clarifier further south on property
- Suggestion for installing pergola type roofs of the clarifier/bioreactors
- Discussion around ensuring everyone is aware of the actual building height

Question raised by Director Schwarz – What about the properties in Okanagan Falls that are not currently hooked into the sewer – will they be? (such as Thomas Place)

- Some of these properties have asked in the past to connect but the RDOS could not allow connections due to capacity issues of the old plant
- **ACTION: RDOS** – look into the service area expansion regulations and determine a course of action

Next steps

- Review the conceptual building renderings, make comments
- Meet again next week to discuss likes, dislikes, changes, etc.
- After meeting, Nick to make changes to building/landscape designs
- **ACTION: AECOM** – bring large printouts to mark up at the meeting

Meeting concluded around 9:00 pm

Next meeting: Wednesday, July 21, 2010 at 7:00 PM at Kenyon House



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
MEETING OF ADVISORY DESIGN COMMITTEE FOR
OKANAGAN FALLS WASTEWATER TREATMENT PLANT

MINUTES

Brief minutes of the main points discussed for the meeting of the Advisory Design Committee for the discussion of the Okanagan Falls new wastewater treatment plant held at Kenyon House in Okanagan Falls at 7:00 p.m. on Wednesday, July 21, 2010.

ATTENDEES:

Bill Schwarz, RDOS Director
Tom Styffe, RDOS Alternate Director
Ted Lynch, Local Citizen
Bryan Telford, Local Citizen
Marshall Stinson, Local Citizen
Piero Galvagno, AECOM

Tim Forty, AECOM
Nick Bevanda, Bevanda Architecture
Andrew Reeder – RDOS
Alf Hartviksen – RDOS
Liisa Bloomfield – RDOS

Absent – Gerry Hughes, Local Citizen

Meeting started at 7:00 PM

Discussion around Project Budget

- Send out newsletters to committee members – Action: Liisa
- Look at numbers again and provide clarification on how the money is broken down for the taxes – Action: Piero
- Analysis of numbers for operation and annual costs – Action: Piero
- See if cut/fill can be minimized at the site – Action: Piero

Architectural Discussion

- Picture on what plant will look like from east side with correct size and location; incorporate applicable aesthetic recommendations on design – Action: Nick
- Cost savings – simpler version of the building
- Vegetation – discussion on types (trees – poplars)
- Likes/Dislikes
 - One roof height preferred
 - One story
 - Want windows on the ends (N and S faces)
 - Want mechanical equipment on east side
 - Like lots of trees

Discussion regarding the access road

- Send letter sent by RDOS to MOT to Bill via email – Action: Andrew
- Bill will discuss with senior government – Action: Bill
-

Plant components

- Lunchroom, office, changing facilities – WCB regulations, Health regulations
- Needs flexibility to add on reuse options in future
- Wetland conceptual design – to federal government for consideration –
Action: Liisa send to Bill
- Footbridge – possible money from other source – Action: Bill

Public meeting to be planned for September

- Possible Date: September 22, 2010

Meeting concluded around 9:00 pm

Next meeting: Wednesday, August 18, 2010 at 7:00 PM at Kenyon House



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
MEETING OF ADVISORY DESIGN COMMITTEE FOR
OKANAGAN FALLS WASTEWATER TREATMENT PLANT

MINUTES

Brief minutes of the main points discussed for the meeting of the Advisory Design Committee for the discussion of the Okanagan Falls new wastewater treatment plant held at Kenyon House in Okanagan Falls at 7:00 p.m. on Wednesday, August 25, 2010.

ATTENDEES:

Bill Schwarz, RDOS Director
Committee Chair

Tom Styffe, RDOS Alternate Director

Bryan Telford, Local Citizen

Gerry Hughes, Local Citizen

Piero Galvagno, AECOM

Tim Forty, AECOM

Nick Bevanda, Bevanda Architecture

Alf Hartviksen, RDOS

Liisa Bloomfield, RDOS

Absent – Ted Lynch & Marshall Stinson, Local Citizens; Andrew Reeder – RDOS

Call to Order:

- at approximately 7:00 PM Director Schwarz called meeting to order

1. Adoption of the Agenda

Bryan Telford moved, seconded by Piero Galvagno, motion carried to accept the Agenda

Adoption of the July 21, 2010 Minutes

Minutes not available – will be sent out to committee by Friday August 27th

2. Follow-up from July 21 Meeting

Discussion around Project Budget

- Preliminary estimates reduced from \$639 to \$590; however with each change of design and market rates the final number will fluctuate until project is complete
- Misconceptions among residents looking at old 2005 numbers
- Current design is “bare-bones”
- Listing of costs for each option removed or made more efficient – Action: Piero

3. Architectural Discussion

- Design was reworked with direction from AECOM on what was minimum requirements for the treatment plant
- Extras were removed, simplified design, functional building
- Analyzed 1 story versus 2 story – 2 story is better option
- WBC & BC Building Code – dictate the rooms required for staff
- Upper floor can be minimally finished on areas not yet needed, possible other savings on not constructing all of floor, retrofitting cost in future – Action: Piero and Nick

- Picture on what plant will look like from east side with correct size and location; incorporate applicable aesthetic recommendations on design – Action: Nick
- Look into material reuse for cladding and sustainability – Action: Piero and Nick
- Rendering from Bryan's property – Action: Nick
- What LEED criteria are we including – Action: Piero
- Determine what view Bryan would see of clarifier/bioreactor water surface; can wall just be raised or is roof needed? – Action: Piero
- Develop cost for cladding and roof options for clarifier/bioreactor tanks – Action: Piero

4. Communications Plan

- Newsletter to residents by September 14 – Action: RDOS
- Ads in papers for meeting (Skaha Matters) – Action: RDOS
- Exit survey for residents at meeting – Action: RDOS and AECOM

5. Open House Meeting Format

- Date: September 22, 2010
- Similar to meeting in November 2009
- Book venue – Okanagan Falls rec gym and extra room – Action: RDOS
- Storyboards: Action: AECOM
 - LWMP update
 - Effluent options
 - Cost
 - Extra costs for options
 - Architectural renderings
 - Schematic of plant
 - Additional boards as determined
- Presentation given 2 to 3 times during meeting – Action: Tim
- Exit survey – Action: RDOS

6. Committee Feedback

- Request to citizens members to discuss project and solicit feedback from neighbors – Action: Bryan, Gerry, Marshall and Ted
- Send out committee contact list – Action: Liisa
- Send out minutes to committee members – Action: Liisa
- Send out pre-design report when available from consultant – Action: RDOS

7. Next meeting:

- Wednesday, September 15, 2010 at 7:00 PM at RDOS office at 101 Martin Street in Penticton

Meeting adjourned around 8:45 pm



REGIONAL DISTRICT OF OKANAGAN-SIMILKAMEEN
MEETING OF ADVISORY DESIGN COMMITTEE FOR
OKANAGAN FALLS WASTEWATER TREATMENT PLANT

MINUTES

Brief minutes of the main points discussed for the meeting of the Advisory Design Committee for the discussion of the Okanagan Falls new wastewater treatment plant held at RDOS Office in Peticton at 7:00 p.m. on Wednesday, September 15, 2010.

ATTENDEES:

Bill Schwarz, RDOS Director
Tom Styffe, RDOS Alternate Director
Ted Lynch, Local Citizen
Bryan Telford, Local Citizen
Piero Galvagno, AECOM
Tim Forty, AECOM

Nick Bevanda, Bevanda Architecture
Andrew Reeder – RDOS
Alf Hartviksen – RDOS
Gerry Hughes, Local Citizen

Absent – Marshall Stinson, Local Citizen
Lisa Bloomfield – RDOS

Meeting started at 7:00 PM

1. **ADOPTION OF AGENDA**

2. **BUSINESS ARISING OUT OF MINUTES:**

2.1 Correction to Nick Bevanda's email address: nick@bevanda.ca

2.2 Honourable Barry Penner, Minister of Environment and John Slater – MLA – Boundary Similkameen

ACTION: Andrew to write letter on behalf of Director Schwarz to Mr. Slater and cc. Minister.

2.3 Community Feedback from Design Committee
T. Lynch, Cedar Village – he has had very positive feedback, 9 people liked design and landscaping.
B. Telford has no concerns over appearance or project.
Other – public supportive

ACTION: RDOS staff to look at costs of other Wastewater Treatment Plants in other communities.

3 **OPEN HOUSE PRESENTATION**

T. Forty presented the presentation for the Open House. Some changes were suggested for presentation.

ACTION: RDOS to provide notepads for Committee members at Open House for recording comments from the public.

4 EXIT SURVEY

Alf Hartviksen will provide wording for exit survey.

5 FUTURE SEWER HOOK-UPS

How do we accommodate other residents who would like to hook up to sewer. Have specific meeting to discuss the expansion and costs for hook-ups.

Meeting concluded around 9:00 pm

Open House scheduled for September 22, 2010 at Okanagan Falls School gymnasium.

Appendix C

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**Newsletter sent to every home in
Okanagan Falls and the newspaper
advertisements**

Okanagan Falls Community Wastewater Treatment Plant Update



September 2010

Wastewater Treatment Plant Progress

The RDOS, Advisory Design Committee and AECOM Canada Ltd. have been busy creating the Pre-Design of the new treatment plant to produce the most efficient, economical and socially acceptable solution. The Pre-Design is nearing completion so we're bringing the details of the site layout, building appearance, and some other design features to the community for feedback.

To make sure public concerns were heard during the design of the new treatment plant, an Advisory Design Committee was assembled and began meeting in July. The committee gathered several times to discuss the emerging design and the costs of the new treatment plant. Many ideas for cost savings were considered, as were several options for the appearance of the plant structures at the new site. The committee has now reached a consensus on the overall design and scope for the new wastewater plant.

All feedback from the community at the Open House will be considered before the final design is made for the treatment plant. When the treatment plant construction is ready to begin, a newsletter will be sent regarding the contract scheduling and any disruptions that may occur within the community during the construction.

Public members of the committee include:	• Director Bill Schwarz	• Ted Lynch
	• Alternate Tom Styffe	• Marshal Stinson
	• Gerry Hughes	• Bryan Telford

Liquid Waste Management Plan (LWMP)

The Okanagan Falls Area LWMP was completed and approved in July 2010 with the following condition for public consultation:

Presentation of the Pre-Design assessment of the effluent disposal options to the general public and stakeholders in a public meeting for review and comment.

The three disposal options considered were:

1. Enhancement of the Vaseux Lake Wetlands [Year round]:
 - Construct supply pipeline under the river and develop initial receiving pond and treatment marsh
 - Capital Cost: \$430K Property Sewer Tax: \$27/year extra
2. Irrigation of Keogan Park and adjacent farmland [Seasonal]:
 - Pumps and piping to supply effluent for irrigation
 - Capital Cost: \$250K Property Sewer Tax: \$16/year extra
3. River Discharge Only: [Requirement for Backup in ALL Options]:
 - Diffuser and piping into the bottom of the River
 - Capital Cost: \$200K included in project budget - no extra sewer tax

After careful review, the committee recommended that we build the plant so it can be expanded to include the wetlands and irrigation options in the future when grant money becomes available. Feedback from the public at the Open House is encouraged and an exit survey form will be provided.

You're Invited!

The Regional District and the Advisory Design Committee invite you to see and talk about the progress of the new Wastewater Treatment Plant design.

OPEN HOUSE

Wednesday,
September 22, 2010

OK Falls Elementary
School Gymnasium
1141 Cedar Street

4 PM to 8 PM

Presentations will be given at
5 PM, 6 PM, and 7 PM

Committee members, Regional District staff and engineering consultants will be available to answer your questions.

For more information call
Darcy Kirkpatrick at the
Regional District
250-490-4112



Proposed look of new treatment plant site

Cost Estimates:

At the November 2009 Open House for the LWMP the total cost of sewer service per connection was estimated at:

- \$639 per year/connection

As the design of the new plant has developed, many cost saving ideas have been added and the current estimated cost is:

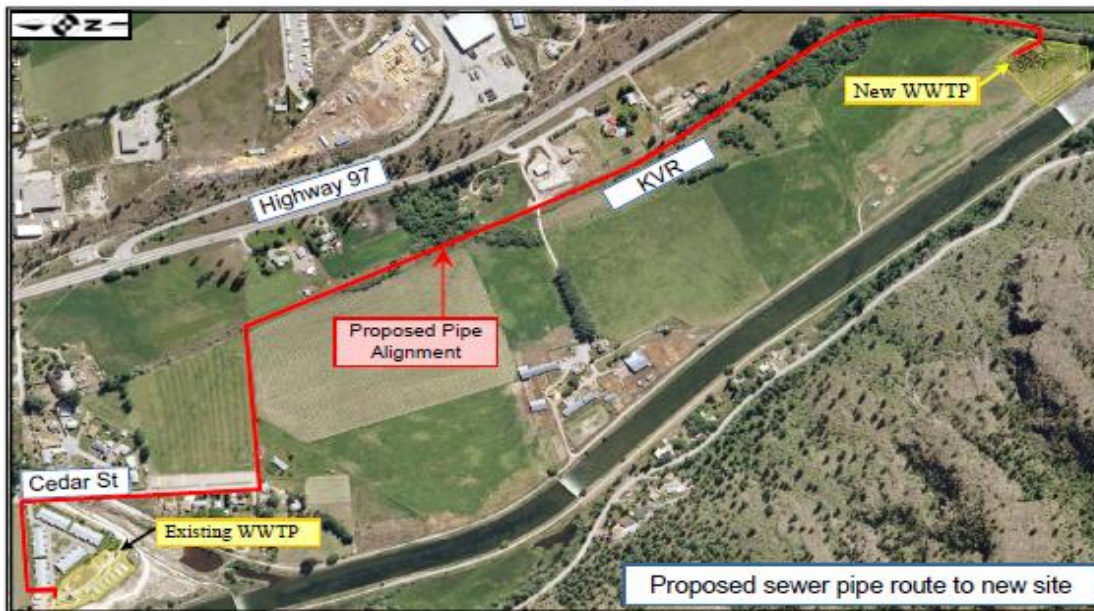
- \$585 per year/connection

Many cost savings were realized by postponing the construction of some of the treatment processes and effluent management options until a later stage. Information on the cost saving choices will be presented at the Open House to enable you to provide comment.

Project Schedule:

- March 2011: Design completion
- March and April 2011: Tender for construction
- May 2011: Newsletter to update public
- May 2011: Construction commences
- April 2012: Plant will be operational

Also, in the immediate OK Falls area, future sewer connection projects are encouraged by the RDOS. Owners within each neighbourhood without sewer service will be contacted and meetings will be set up to discuss options and estimated costs to connect.



Proposed sewer pipe route to new site

REGIONAL DISTRICT of OKANAGAN-SIMILKAMEEN



Regional District of Okanagan-Similkameen

Open House for Okanagan Falls residents

**Wednesday, September 22 from 4 PM to 8 PM
at Okanagan Falls School Gymnasium
1141 Cedar Street**

**The Regional District of Okanagan-Similkameen
and the Advisory Design Committee invite you to see and talk about
the progress of the new Wastewater Treatment Plant design.**

**The Pre-Design is nearing completion so we're bringing the details of
the site layout, building appearance, and some other design features
to the community for feedback.**

**Presentations will be given at
5 PM, 6 PM and 7 PM**

**Committee members, RDOS staff, and the engineering consultants
will be available to answer your questions.**

For more information please call:

Darcy Kirkpatrick, RDOS Engineering Services Secretary at 250-490-4112

Appendix D

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**Storyboards used at the Public
Information Meeting**



Welcome to the Okanagan Falls WWTP Pre-Design Information Meeting

The goal of this information meeting is to:

- Show you what the new treatment plant site will look like after construction
- Describe the treatment process and how the effluent will be managed
- Update the cost estimates

RDOS Staff, Advisory Committee Members and AECOM consultants are here to answer your questions

Presentations begin at 5pm, 6pm and 7pm



The Regional District of Okanagan-Similkameen, Advisory Design Committee and Area D Director, Bill Schwarz thank you for participating.

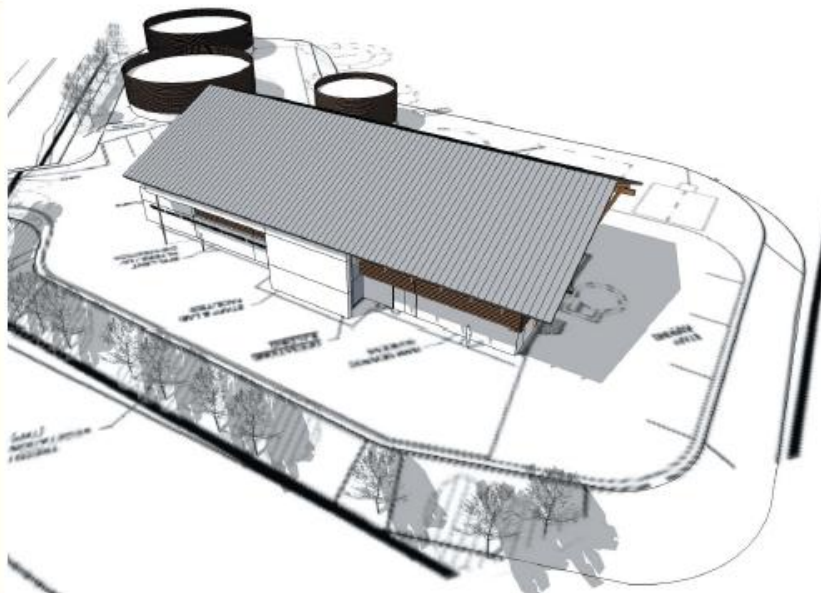


Okanagan Falls **Wastewater Treatment Plant**
PRE-DESIGN PUBLIC INFORMATION SESSION

Pre-Design Review



- Three different wastewater treatment options were short-listed and compared
- Conventional biological nutrient removal (BNR) was selected based on a consideration of economic, social, environmental and technical criteria
- The selected option has the lowest life-cycle cost, is a proven, robust technology and provides flexibility in future staging of upgrades
- The new wastewater treatment plant (WWTP) will be designed to produce effluent with very low nutrient concentrations to allow direct discharge to the Okanagan River
- Odour control and treatment will be incorporated in the design
- Architectural renderings have been used to ensure aesthetics are addressed



Okanagan Falls **Wastewater Treatment Plant**
PRE-DESIGN PUBLIC INFORMATION SESSION

Rendering of Proposed New WWTP

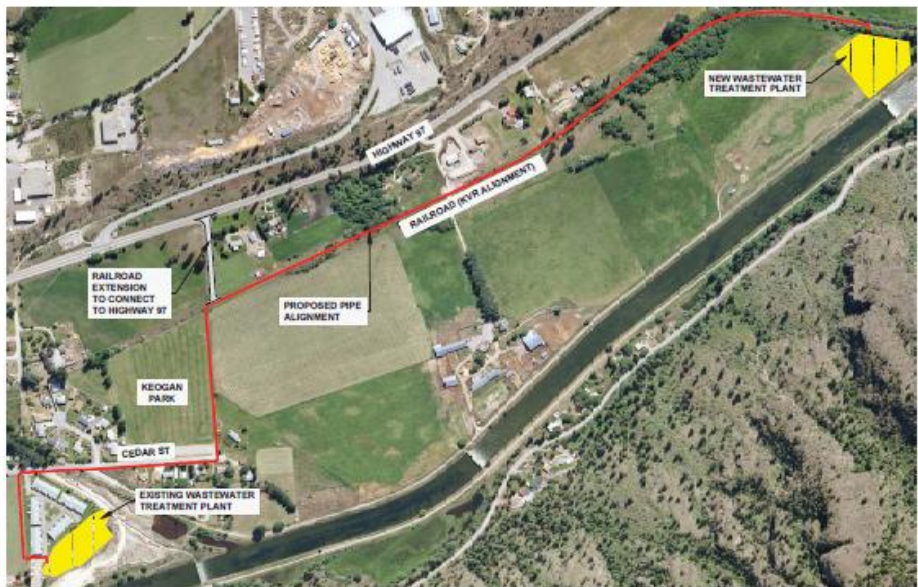
- Architectural rendering showing the appearance of the new WWTP building, by Bevanda Architecture



Okanagan Falls **Wastewater Treatment Plant**
PRE-DESIGN PUBLIC INFORMATION SESSION

Proposed Alignment of Sewer Main

- A new pumped forcemain will be used to convey wastewater from the current plant site to the new wastewater treatment plant (WWTP)
- The existing KVR alignment will be used as an access road to the new WWTP
- A new extension to Rail Road will be constructed to allow connection to Highway 97



Okanagan Falls **Wastewater Treatment Plant**
PRE-DESIGN PUBLIC INFORMATION SESSION



Costing Update

- The total WWTP capital cost and the annual operating and maintenance costs are shown as well as the annual Cost per Connection
- The capital cost per connection includes all Federal/Provincial grant monies, the OBWB grant and capital reserves
- The total cost per connection is estimated to be \$585 per year

Annual Cost per Connection (User)

Estimated Capital Cost Breakdown	Total Cost	Estimated Annual Cost per Connection AFTER all grants
Overall Pre-design Capital Cost Estimate	\$11,033,000	\$210
Overall Operating + Maintenance (O&M) Cost each year	\$462,920	\$375
Total Cost per Connection per year	-	\$585



Cost Savings from Postponed Items

- Some items have been deferred to minimize capital costs – these savings have been accounted for in the estimated \$585 per year connection
- Preferred items could be added back into this stage of the project if there is sufficient support from the ratepayers of Okanagan Falls
- Additional potential options could be incorporated into future upgrades to the WWTP, including when sewer service is extended to include Skaha Estates and the Kaleden Lakeshore area
- The Rail Road upgrade was a requirement from the Ministry of Transportation and Highways and RDOS staff are determining whether it can be deferred
- The cost of upgrading Rail Road is included in the \$585 per year connection estimate

Items Deferred From Current Stage to Lower Costs

Additional Potential Options	Total/Additional Estimated Capital Cost (Includes Contingency & Engineering)	Estimated Sewer Tax	Comments
1. Enhancement of Vaseux Lake Wetlands Includes supply pipeline below river and development of head pond and treatment marsh	\$430,000	\$27	Would provide for reduced effluent discharged to Okanagan River
2. Effluent Reuse Includes pumps and piping to supply effluent for irrigation at Keogan park and adjacent farm land	\$260,000	\$16	Would allow for beneficial reuse of effluent and reduces potable water demand
3. Grit Removal	\$600,000	\$32	Would reduce wear and increase life expectancy of process equipment
4. Sludge Dewatering Includes a centrifuge decanter to achieve 20-25% solids content of sludge	\$1,080,000	\$69	Would reduce transportation requirements for hauling thickened sludge to Penticton WWTP and allows for direct disposal of dewatered sludge to the compost facility

Items Being Considered for Deferral

Additional Potential Options	Total/Additional Estimated Capital Cost (Includes Contingency & Engineering)	Estimated Sewer Tax	Comments
1. Upgrade Rail Road Between Highway 97 & Rail Bed Includes providing for highway connection and upgrade to rural road section	\$240,000	\$15	RDOS staff investigating whether this feature is a requirement of the project

Plant Effluent Discharge to River and to Wetlands

- As part of the current upgrades, treated effluent will be discharged to the Okanagan River using an outfall fitted with a diffuser (see upper pane)
- In the future when funding becomes available a portion of the effluent could be conveyed to the Vaseux Lake wetlands on the opposite side of the river channel and used for habitat enhancement (see lower pane)
- The option of enhancing the Vaseux Lake wetlands is currently being discussed with Environment Canada and Ministry of Environment staff to determine detailed requirements



Okanagan Falls **Wastewater Treatment Plant**
PRE-DESIGN PUBLIC INFORMATION SESSION

Appendix E

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**PowerPoint presentation given at the
Public Information Meeting**



**Regional District of Okanagan Similkameen
Pre-Design
Public Information Meeting
Okanagan Falls Wastewater
Treatment Plant**

Piero Galvagno, P.Eng.

Tim Forty, P.Eng.



September 22, 2010



Pre-Design Public Information Meeting Agenda

- Why are we here?
- Advisory Design Committee Members
- Key Project Issues
 - Link to LWMP
 - BNR Process Selection
 - Cost Management
 - What will it cost you?
 - Postponed items
 - Plant Process and Location
 - Architectural Rendering, by Bevanda Architecture
 - Exit Survey



Pre-Design Public Information Meeting Why are we here?



Pre-Design Public Information Meeting *Why are we here?*

- Outline the results of the AECOM review of the Biological Nutrient Removal (BNR) process options considered and identify the selected process
- Outline pre-design cost estimates for the RDOS Okanagan Falls treatment plant which have been updated from the LWMP conceptual cost estimates
- Outline where cost savings have been achieved
- Outline the effluent management concept adopted by the Advisory Design Committee (ADC) to minimize project cost
- Show ADC selected plant architectural design concept
- Satisfy LWMP Approval requirements



AECOM

Advisory Design Committee Members



Advisory Design Committee (ADC)

- The ADC met several times to review, discuss and provide input into the costs and architectural treatment planned for the new plant

ORGANIZATION	TITLE	FIRST NAME	LAST NAME
RDOS Director	Mr.	Bill	Schwarz
RDOS Alternate Director	Mr.	Tom	Styffe
RDOS	Mr.	Alf	Hartviksen
RDOS	Ms.	Liisa	Bloomfield
RDOS	Mr.	Andrew	Reeder
AECOM	Mr.	Piero	Galvagno
AECOM	Mr.	Tim	Forty
Local Citizen	Mr.	Ted	Lynch
Local Citizen	Mr.	Bryan	Telford
Local Citizen	Mr.	Gerry	Hughes
Local Citizen	Mr.	Marshal	Stinson
Bevanda Architecture Inc.	Mr.	Nick	Bevanda



Key Project Issues: Link to LWMP



AECOM

Link to LWMP: Priorities

- Based on the public consultation, key objectives for the treatment plant upgrade include:
 - Eliminate odour and noise impacts on nearby residents
 - Minimize aesthetic impacts – integrate into landscape
 - Utilize effluent for wetland enhancement and irrigation
 - Affordable – balance cost and benefits
- Use the treatment plant expansion as an opportunity to benefit the community and natural surroundings
- Keep the community involved

Key Project Issues: BNR Process Selection



BNR Process Selection

- Three different Biological Nutrient Removal wastewater treatment options were short-listed and compared
 - Conventional Biological Nutrient Removal (BNR)
 - Membrane Biological Nutrient Removal (MBNR), and
 - Sequencing Batch Reactor (SBR)
- Conventional BNR was selected based on consideration of economic, social, environmental and technical criteria
- The selected option has the lowest life-cycle cost, is a proven, robust technology and provides flexibility in future staging of upgrades
 - Many other similar BNR plants are currently in service in the Okanagan so there is a pool of local expertise



BNR Process Selection

- The new wastewater treatment plant (WWTP) will be designed to produce effluent with very low nutrient concentrations that will permit direct discharge to the Okanagan River
- Odour control and treatment will be incorporated in the design
- Architectural renderings have been used to ensure aesthetics issues are addressed
 - The proposed final appearance was selected by the Advisory Design Committee



Key Project Issues: Cost Management



Key Project Issues:
Implications of Cost Estimates

- The predesign estimated costs were higher than anticipated and if the plant were to be built as originally conceived the per connection costs would have exceeded the maximum acceptable per connection costs
- The entire treatment process was carefully reviewed and unit processes that could be postponed were identified
- The cost of treatment and the desire to minimize the cost to area residents required that all effluent management options other than the absolutely necessary river outfall be delayed until a later phase
 - Wetlands enhancement, *delayed*
 - Irrigation, *delayed*



Cost Overview: *What will it cost you?*

Estimated Capital Cost Breakdown	Total Cost	Estimated Annual Cost per connection AFTER all grants
Overall Pre-Design Capital Cost Estimate	\$11,033,000	\$210
Overall Operating and Maintenance (O&M) Cost each year	\$462,940	\$375
Total cost per connection per year	-	★ \$585 ★



Cost Saving from Postponed Items

- Some items have been deferred to minimize capital costs – these savings have been accounted for in the estimated \$585 per year connection
- Preferred items could be added back into this stage of the project if there is sufficient support from the ratepayers of Okanagan Falls
- Additional potential options could be incorporated into future upgrades to the WWTP, including when sewer service is extended to include Skaha Estates and the Kaleden Lakeshore area



AECOM

Cost Saving from Postponed Items

Additional Potential Options	Total Additional Estimated Capital Cost (Includes Contingency &)	Estimated Sewer Tax	Comments
1. Enhancement of Vaseux Lake Wetlands Includes supply pipeline below river and development of head pond and treatment marsh	\$430,000	\$27	Would provide for reduced effluent volume discharge to Okanagan River
2. Effluent Reuse Includes pumps and piping to supply effluent for irrigation at Keogan Park and adjacement farm land	\$250,000	\$16	Would allow for beneficial reuse of effluent and reduce potable water demand
3. Grit Removal	\$500,000	\$32	Would reduce wear and increase life of process equipment
4. Sludge Dewatering Includes a centrifuge to achieve 20-25% solids content in the dewatered sludge	\$1,080,000	\$69	Would reduce transportation requirements for hauling thickened sludge to Penticton WWTP and allow for direct delivery of dewatered sludge the the compost facility

Note: If there is sufficient support for any or all of these items they **COULD** be added back in to this stage of the project for the additional costs shown. The choice is yours, please let us know by way of the exit survey.



AECOM

Cost Saving from Postponed Items

Additional Potential Options	Total Additional Estimated Capital Cost (Includes Contingency & Engineering)	Estimated Sewer Tax	Comments
1. Upgrade Rail Road Between Highway 97 & Rail Bed - includes providing for highway connection and upgrade to rural road section	\$240,000	\$15	- RDOS staff investigating whether this feature is a requirement of the project

- The Rail Road upgrade was a requirement from the Ministry of Transportation and Highways and RDOS staff are determining whether it can be deferred
- The cost of upgrading Rail Road is included in the \$585 per year connection estimate



AECOM

Effluent Management

- As part of the current upgrades, all the treated effluent will be discharged to the Okanagan River using an outfall fitted with a diffuser
- In the future when funding becomes available a portion of the effluent could be conveyed to the Vaseux Lake wetlands on the opposite side of the river channel and used for habitat enhancement
- The option of enhancing the Vaseux Lake wetlands is currently being discussed with Environment Canada and Ministry of Environment staff to determine detailed requirements



AECOM

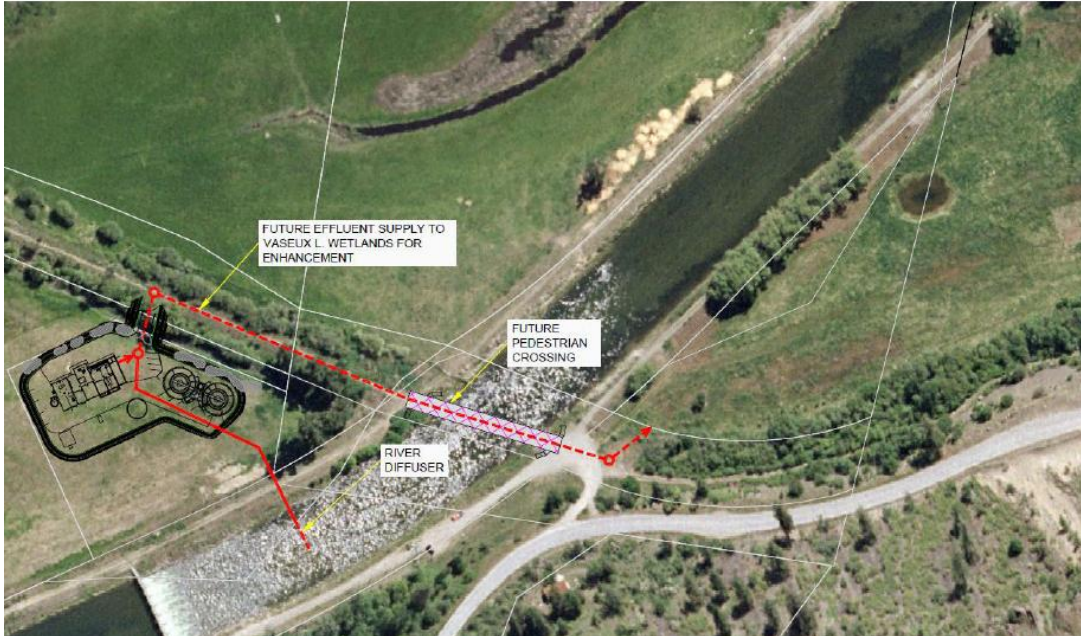
UV LIGHT BANKS



Effluent Management



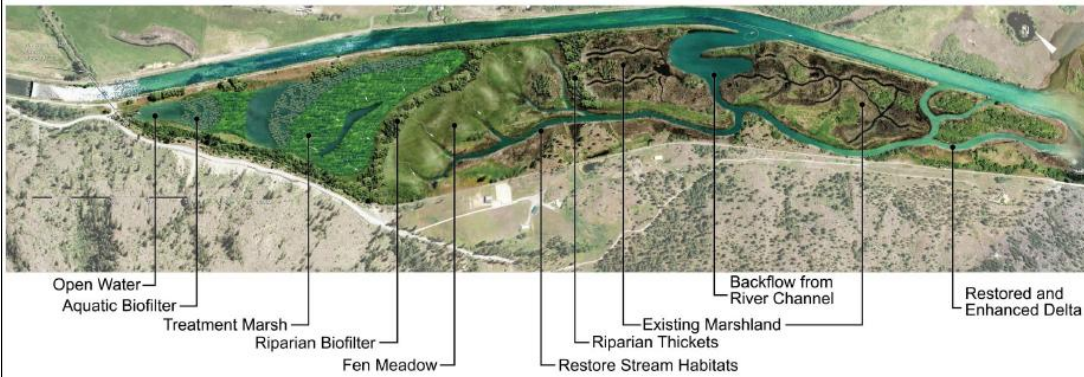
Effluent Management



Vaseux Lake Wetlands



Wetland Ultimate Concept Plan



Note: The Wetlands Enhancement project will likely be considered outside the STP upgrade path and it is likely that separate funding for this project will be requested when grant programs are available



AECOM

Irrigation Concept Plan

- The effluent, known as “Reclaimed Water” will be used in the treatment process as process water and will be used for irrigation on the plant property
- The irrigation of Keogan Park and other properties is not affordable within the cost constraints but may be possible at some time in the future in a later phase

Note: The delayed process items and the use of reclaimed water off the plant site will be reconsidered when servicing monies become available for Skaha Estates and Kaleden



AECOM

Key Project Issues:

Treatment plant location, general layout and process

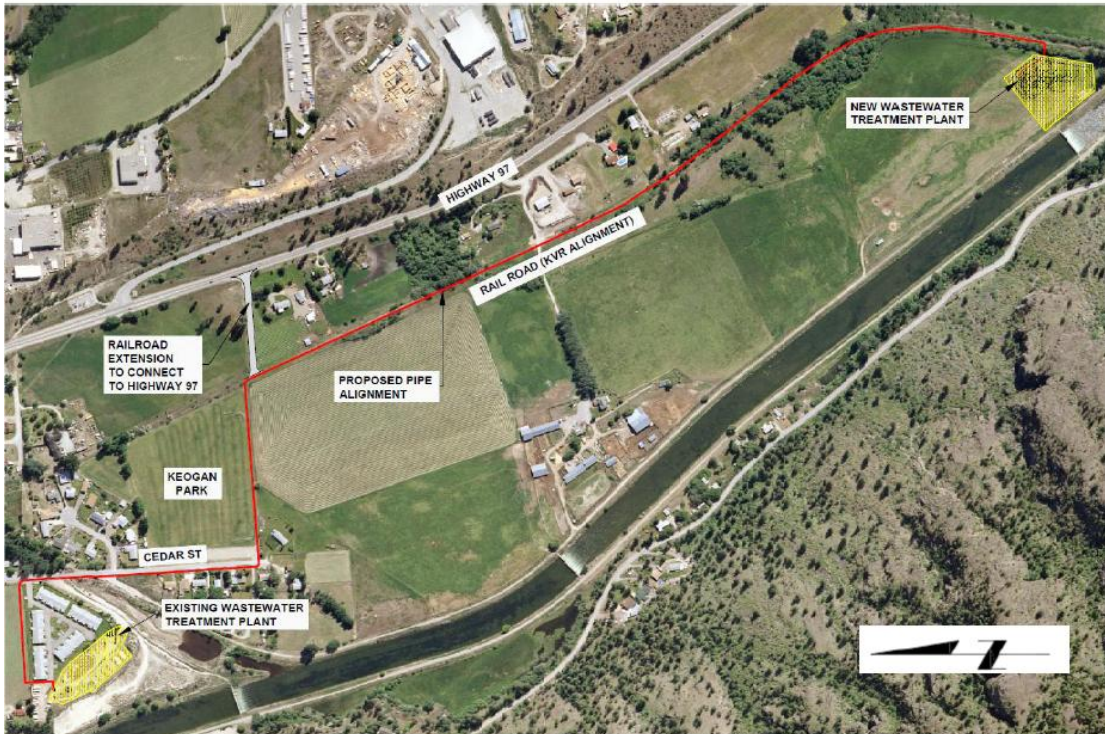


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Location of New Plant and Sewer Main

- A new pumped forcemain will be used to convey wastewater from the current plant site to the new wastewater treatment plant (WWTP)
- The existing KVR alignment will be used as an access road to the new WWTP
- A new extension to Rail Road will be constructed to allow connection to Highway 97

Location of New Plant and Sewer Main



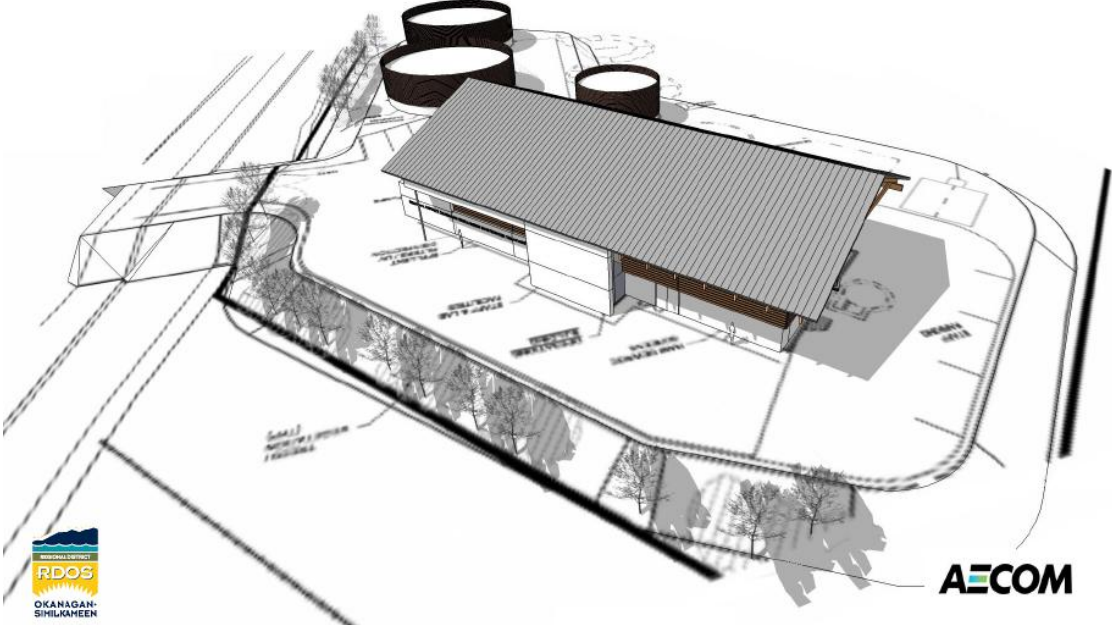
Key Project Issues: Architectural Renderings by Bevanda Architecture



AECOM

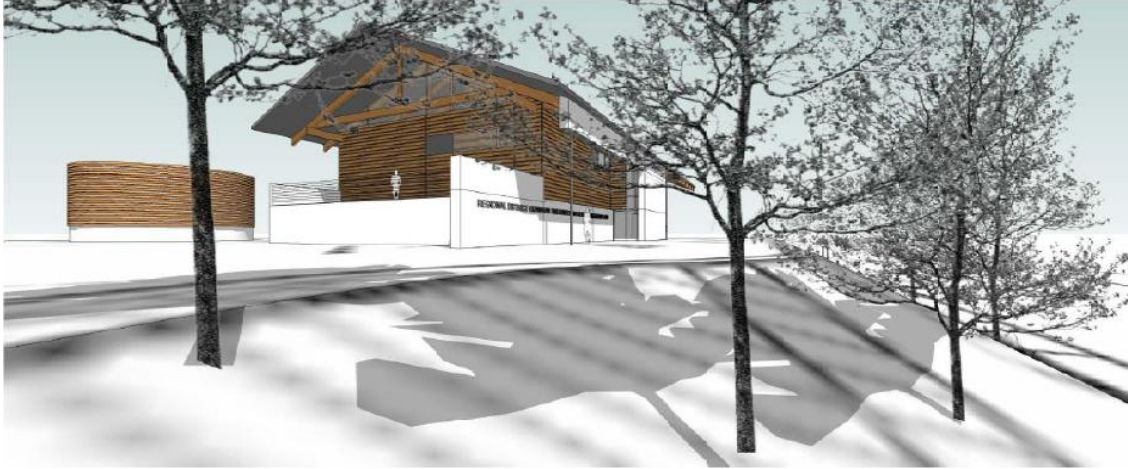
Architectural Plant Rendering

By Bevanda Architecture



Architectural Plant Rendering

By Bevanda Architecture



Architectural Plant Rendering
By Bevanda Architecture



Architectural Plant Rendering
By Bevanda Architecture



Architectural Plant Rendering

By Bevanda Architecture



Architectural Plant Rendering

By Bevanda Architecture



Architectural Plant Rendering

By Bevanda Architecture



Aesthetic Mitigation Example (Vegetation Added)



AECOM



Key Project Issues: Exit Survey



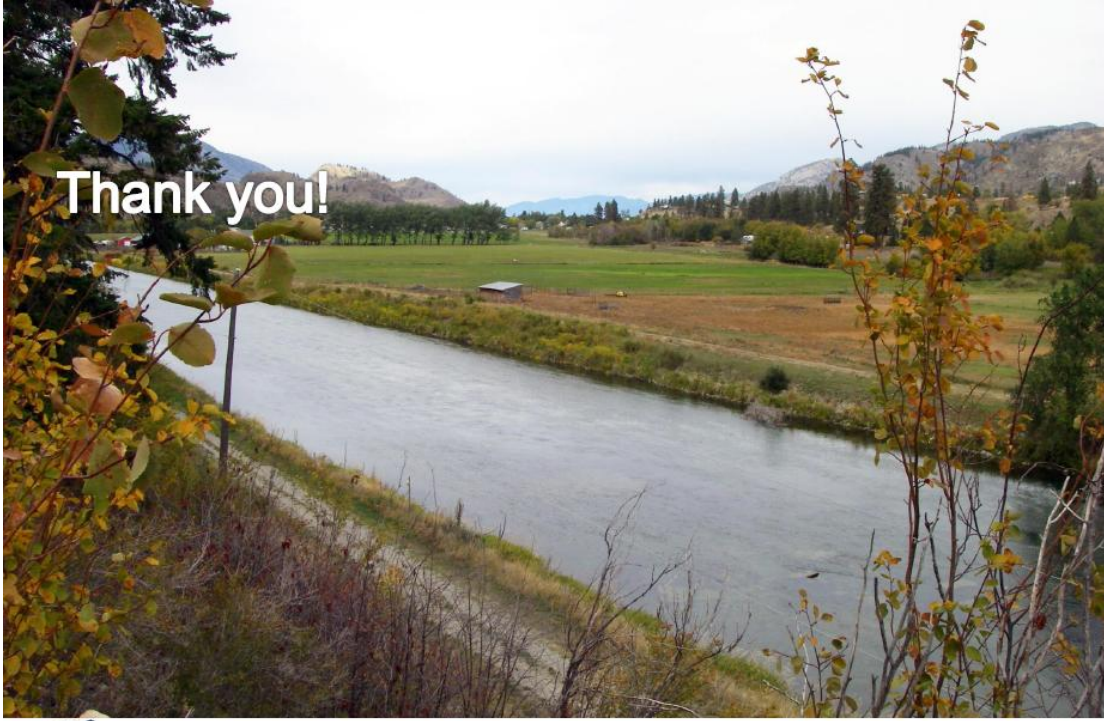
AECOM

Exit Survey

- Please complete the exit survey!
 - and drop it off at one of the following locations:
 - a) The box near the exit
 - b) The Economic Development Office at OK Corral
 - c) Drop it off or mail it to the RDOS in Penticton, or
 - d) Scan it and email it to the RDOS in Penticton at info@rdos.bc.ca
- We really do need and want **your** feedback!



AECOM



Thank you!



Appendix F

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

**Public Information Meeting Sign in sheet,
Exit Survey and responses from the public**

Okanagan Falls WWTP

Open House

Sign In Sheet

Name	Civic Address
R. King	1238 CEDAR ST.
Ben & Esther Strubing	1410 Cedar St.
R. Emerson	1348 CEDAR ST.
Elizabeth & Julius Borch	14-1410 Cedar St
[Signature]	709 BIRCH ST
Bet & Steve Dale	438 Eastside Rd
Donna Wright	106 Eastside Rd.
TIM SYRITTE	5224 THOMAS PL OFFICER
Marilyn & Don Campbell	5028 THOMAS PL.
Boyd & Joan Coelius	2150 Pinewinds Place
Gloria & Tony Solomon	1410 Cedar St.
HAGEN KRUGER	2122 PINEWINDS PL.
MICHAEL DESTIMAVILLE	325 EASTSIDE Rd.
Roger Cavadin	102 Industrial Place
GARY HURMAN	511 Sunny by Rd Ok Falls
Louis & Annette Albaredo	816 Birch street OK FALLS
Bob Mchey	5225 Thomas Pl Ok Falls
Ronald Reed	5213 10 TH
Archie Marchant	1540 Hawthorne Cres

Okanagan Falls WWTP

Open House

Sign In Sheet

<u>Name</u>	<u>Civic Address</u>
W. Q. Edoby	7-1410 Cedar St Ok Falls.
J. [unclear]	2327 Sunvale place.
A. [unclear]	377 Pinem Dr
Soren M. [unclear]	2447 Penacutt Dr.
Don Gubsey	1-1410 Cedar St. OK Falls
K. [unclear]	4809 - Bassett ave OK Falls.
ROD STURRI	331 Eastside Rd.
K. [unclear]	331 Eastside Rd.
Ken Mac Kay	#30 - 1840 Oliver Rd
Steve Anderson	1129 Ash Street
Krista Anderson	1129 Ash Street
BRYAN TELFORD	#33 - 1840 OLIVER RANCH Rd.

Okanagan Falls WWTP
Open House

Sign In Sheet

Name	Civic Address
Mr + Mrs. Jim Fraser	5216 5876 Tomas Pl. O.K. Falls.
Alan Whitman	155 Devon Dr. Skaha Estab / 20



**OKANAGAN FALLS AREA WASTEWATER TREATMENT PLANT
PRE-DESIGN OPEN HOUSE EXIT SURVEY AND FEEDBACK**

1. Do you agree with the *Advisory Design Committee's* recommendation of constructing a river discharge for liquid effluent now and deferring wetlands discharge enhancements and irrigation to the future?

Yes No

Comments: _____

2. Would you want to enhance the wetlands as a year round method of effluent disposal . . .

Yes No ,

if this could be accomplished for ±\$27/ yr additional sewer tax as presented this evening and as indicated in September 2010 newsletter

Yes No

Comments: _____

3. Would you want to reuse effluent water for irrigation on a seasonal basis . . .

Yes No ,

if this could be accomplished for ±\$16/ yr additional sewer tax as presented this evening and as indicated in September 2010 newsletter

Yes No

Comments: _____

4. Do you find the architectural renderings of the waste water treatment plant and site to be fitting and/or suitable in character and appearance? If not, what revisions would you suggest?

Yes No

Comments: _____

5. If your property/ residence is currently not served by the Okanagan Falls sewer system are you in favour of receiving service and in what timeframe? (*address required below*)

Yes No (*Street Address* : _____)

Comments: _____

Please provide any additional comments: _____

(use reverse side of page if necessary)

Okanagan Falls Area WWTP Pre-Design Open House Exit Survey and Feedback

September 22, 2010

	Yes	No	Not answered
Question 1:			
Do you agree to constructing river discharge of effluent and defer wetlands discharge and irrigation for future	19	0	
<i>Comments:</i>			
Future is the key word			

Question 2:			
Part I - Would you want to enhance wetlands with effluent disposal year round	11	8	
Part II - Would you agree to \$27 year additional sewer tax for enhance the wetlands as method of effluent disposal	9	8	2
<i>Comments:</i>	none		

Question 3:			
Part I - Would you want to reuse effluent water for irrigation	9	9	1
Part II - Would you agree to \$16 year additional sewer tax for reuse effluent for irrigation	4	11	4
<i>Comments:</i>	none		

Question 4:			
Do you find architectural renderings of WWTP fitting in character and appearance	17	1	1
<i>Comments:</i>			
I was approached by one of the committee members for feedback on the possible designs. Much appreciated.			
Fancy looking			
Suggest covering BNR Tanks			
Must not be made of wood			
Too Fancy			

Question 5:	Timeframe
If not in service area are you in favour of receiving service and in what timeframe:	
Yes - Skaha Estates	
Yes - 331 East Side Road	Now
Yes - Cedar Street	
Yes - 5224 Thomas Place	As soon as possible
Yes - 5216 Thomas Place	Within next few years
No - 1 response	
Not answered - 13	

Additional Comments:
The high pressure line to the new plant should follow the shortest route along the river, thus elimination the up grade of \$250,000 refund by Highways on the other side of the field.
Because we're both retired, I would like some cost estimates for such an undertaking.
It can not happen soon enough. Thank you to all who worked and are working on this project.
I feel that the Grit Removal feature should be added now to ensure no damage is done to new pipes and equipment. Once Ducks Unlimited on board with funds then #2 - wetlands method should go ahead.
It sounds like inclusion of the Grit Removal would be wise at this time to avoid some major costs in the future.
Keeping the costs low is very important as OK Falls is low income retirement town.
Senior Citizen on fixed income not able to swallow the extra cost.

Appendix G

**Okanagan Falls Area Liquid Waste
Management Plan – Amendment Updated
Stage 3 Report**

Statement of Qualifications and Limitations

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client
- as required by law
- for use by governmental reviewing agencies

Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.