# REPORT TO COUNCIL

City of Kelowna

**Date:** November 24, 2011

**File:** 1390-10

**To:** City Manager

**From:** Manager, Strategic Projects

**Subject:** Kelowna Integrated Water Supply Plan; Technical Summary Update

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**Recommendation:**

THAT Council receives, for information, the report from the Manager, Strategic Projects dated November 24, 2011, with respect to the Kelowna Integrated Water Supply Plan Project.

**Purpose:**
To advise Council of the completion of the technical elements of the Integrated Water Supply Plan Project per the MOU between the City and the Kelowna area Irrigation Districts.

**Background:**
Council recently (May 2011) extended the Memoranda of Understanding (MOU) with the Irrigation Districts to November 26, 2011. This project has been proceeding since the original MOU execution on Sept.15, 2010. The objective of the Integrated Water Supply Plan was to provide the best overall water quality solutions for all of Kelowna, regardless of the jurisdictions of the various water purveyors. The development of this report was a cooperative effort facilitated by the Kelowna Joint Water Committee with a technical group representing the 5 major water utilities within the City boundary.

Report Summary:
The report approach was based upon Provincial input received from Minister Bill Bennett in Jan. 2010 and subsequent endorsement by Council and the Boards of the four major irrigation/ improvement Districts, (Glenmore Ellison Improvement District, South East Kelowna Irrigation District, Rutland Waterworks, Black Mountain Irrigation District) based on the following principles within the MOU:

- Best Lowest Cost Solutions
- Flexibility
- Achievement of Public Health Outcomes
- Agricultural Interests Maintained

In the last 16 months the technical committee met 20-25 times to come up with a defensible technical plan and are in full agreement that considerable works are initially required to meet Health objectives in the next 3 to 5 years. A fully integrated system would be achievable in the 5 to 20 year horizon. The executive summary (attachment 1) outlines an 8 stage approach. Meeting the Health objectives within the next 3 to 5 years (stage 1-4) will require a number of utilities to significantly increase their fees. Cost estimates for the stage 1 to 4 capital works are over $40 million. Over $300 million in additional works are required for the entire plan in the 5-20 year horizon. The capital obligations of the City's utility regarding Stage 1-4 of the plan will be completed once the Cedar Creek pumping and treatment system are complete. A fully integrated water system would require all utilities to adopt large utility fee increases, especially without external funding.

The Ministry has been provided the final draft for comment. Subsequently, the Council and the Boards of the various four major irrigation/ improvement districts will be asked to endorse the final Kelowna Integrated Water Supply Plan. City staff will present the report in its final form sometime in the New Year. The final report draft files are available to view at ftp site at www.afcltd.ca

Username is **kjwc**
Password is **110722**

**Internal Circulation:**
Director, Civic Operations
Director, Financial Services

**Legal/Statutory Procedural Requirements:**
The mandate cited within the aforementioned September 15, 2010 MOU will be completed once the Council and the respective Boards have endorsed the aforementioned report and its recommendations. Further recommendations will be made to Council to adopt a process to further explore various governance solutions.

The Kelowna Water Utility is now in full compliance with Health requirements since approval of Filtration Deferral and Source Protection Plans.

**Financial/Budgetary Considerations:**
Council, in June 2011, adopted the first year of a five year rate increase financing plan for Kelowna Water Utility water quality infrastructure, operations and water quality enhancements (source protection and future filtration). Four more years of rate adjustments will be submitted to the future Council.

**Considerations not applicable to this report:**
Personnel Implications
Existing Policy
Legal/Statutory Authority
External Agency/Public Comments
Communications Comments
Alternate Recommendation

Submitted by:

M. Watt, Manager, Strategic Projects

**Approved for inclusion:** R. Cleveland, Director, Infrastructure Planning

Attachment 1: Executive Summary KIWS Plan Draft dated Nov. 9, 2011

CC: General Manager, Community Sustainability
General Manager, Community Services
Director, Civic Operations
Director, Financial Services
KJWC

# EXECUTIVE SUMMARY

## 1 INTRODUCTION

The *Kelowna Integrated Water Supply Plan* is the result of the combined cooperative efforts of five separate organizations. The City of Kelowna Water Utility (KWU), Black Mountain Irrigation District (BMID), Glenmore-Ellison Improvement District (GEID), Rutland Waterworks District (RWD), and South East Kelowna Irrigation District (SEKID) all operate major water utilities within the City of Kelowna. Although good quality water is provided to some of the region, additional treatment barriers are required to meet drinking water standards and protect all citizens of Kelowna from waterborne disease. Four of the five utilities currently do not have the required protection from *Cryptosporidium*, which was the pathogen that caused the waterborne disease outbreak in Kelowna in 1996.

### Minister's Letter

The utilities have been working to upgrade their systems with over $10,000,000 of water quality improvement works being completed in the last three years. In 2009, the four Improvement Districts lobbied the Provincial Government for direct funding assistance. The Province reviewed the preliminary information and on January 12, 2010 provided direction to the Kelowna utilities to develop a City-wide water quality improvement plan. The Province's review of the plan would be based upon how the following four principles are addressed:

1. Best-Lowest Cost solutions: The solutions must be cost effective and sustainable;
2. Flexibility: The Province stated they would be flexible in their review and that means in which to achieve the best solutions may be possible without amalgamation;
3. Achievement of Public Health Outcomes: This is a key objective;
4. Agricultural Interests Maintained: The water supply solutions must be developed maintaining the interests of agriculture.

### Memorandum of Understanding

In early 2010, the City was in the process of completing an independent Engineering Study. Once completed, the City's work was received by Council and provided background information for this document.

In August, 2010, a Memorandum of Understanding set out terms for the agreement between the five water utilities for work to be undertaken cooperatively to meet the Minister's criteria. The Memorandum of Understanding was executed on September 15, 2010.

The primary objective of this report is to develop the *Kelowna Integrated Water Supply Plan* for all of Kelowna that provides the best overall water quality solutions, regardless of utility boundaries or available sources. The development of this report was led through a technical panel of representatives appointed by the five large Kelowna water utilities.

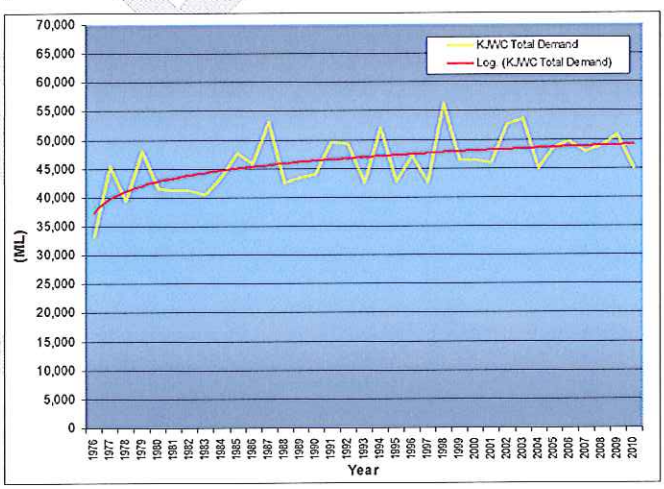
## 2 EXISTING UTILITIES

An extensive inventory of information was collected on the existing public water systems. Information in all areas of water supply service was obtained directly from each utility. This included raw and treated water quality data, number of connections, revenues and expenditures, proposed plans and costs, and total tangible capital assets. The information was compiled in Section 2 in a consistent format so that the data can be trended for future reference. Drawings for the major facilities are included in Appendix B.

Additional information was obtained from Interior Health to identify all smaller water utilities operating within Kelowna. In addition to the five large utilities there are 13 smaller utilities in the region that are described in Section 2. Water demands were estimated for the agricultural irrigation and domestic customers for all utilities.

Information on Golf Courses operating within Kelowna was obtained from the Provincial Government agricultural water demand database. There are 15 golf course and driving range facilities that were identified. Of those facilities, 7 of them obtain their water from the larger water utilities and the remaining 8 are supplied by groundwater wells.

Total historical water usage for the region was estimated and then trended. The trending for the region showed that overall water demand was increasing at a manageable rate, in spite of the recent development booms. The largest reasons for the low increase in water demand are the decrease in agricultural production and the recent densification of housing forms.



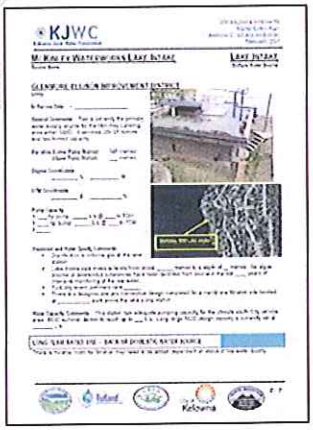

The average amount of water supplied on an annual basis by each of the five Kelowna utilities, their estimated serviced population, and their percentage of the total supply is summarized below:

| Utility | Population | Annual Demand | % of Total Demand |
|---|---|---|---|
| City of Kelowna | 62,000 | 15,800 ML | 29 % |
| Black Mountain Irrigation District | 22,000 | 13,400 ML | 25 % |
| Glenmore-Ellison Improvement District | 16,000 | 7,200 ML | 13 % |
| Rutland Waterworks District | 13,000 | 2,920 ML | 5 % |
| South East Kelowna Irrigation District | 6,000 | 11,120 ML | 21 % |
| Other smaller utilities | 1,344 | 3,433 ML | 6 % |
| **TOTAL** | **120,344** | **54,473 ML** | **100 %** |

The current average water demand for the 5 large water utilities and 13 smaller ones in the region is estimated to be 54,473 ML/year. Collectively the region is the second largest bulk water supplier behind Metro Vancouver. As the characteristic of water use and the climatic factors are constantly changing, the water demand data had to be "normalized" to account for the seasonal variations. In review of licensing, it appears that sufficient water licenses are held by the Kelowna water utilities to provide water for the foreseeable future.

## 3 Water Source Assessment

Kelowna is fortunate to have many available sources of water including Okanagan Lake, groundwater and four local creeks. Because of the agricultural base and fractured urban development, water sources were accessed as needed over the last 100 years. Historically the assessment of water quality improvements has not considered the broader regional perspective. With increased requirements for higher domestic water quality, the water utilities have been under pressure to find economical ways to provide higher quality water to their customers.




The five Kelowna utilities can access water from 41 different source locations. These sources consist of 6 intakes on Okanagan Lake, 4 intakes on local creeks, 30 groundwater wells and one reclaimed water source originating from the Kelowna Advanced Wastewater Treatment Plant. An extensive inventory of water quality data for all of the sources was collected in a consistent format. Source water data sheets were assembled for the 41 sources of raw water and are included in Appendix C.

The water sources were evaluated to determine whether the source would be a primary domestic drinking water source, a secondary domestic source, an irrigation water source or be used only in the event of an emergency. A colour coded system was used for easy identification within this report. Dark blue designated the source as a high quality domestic supply. Light blue indicated the source as a secondary domestic source, and green identified the source as water for irrigation. The classification of the 41 sources is listed below.

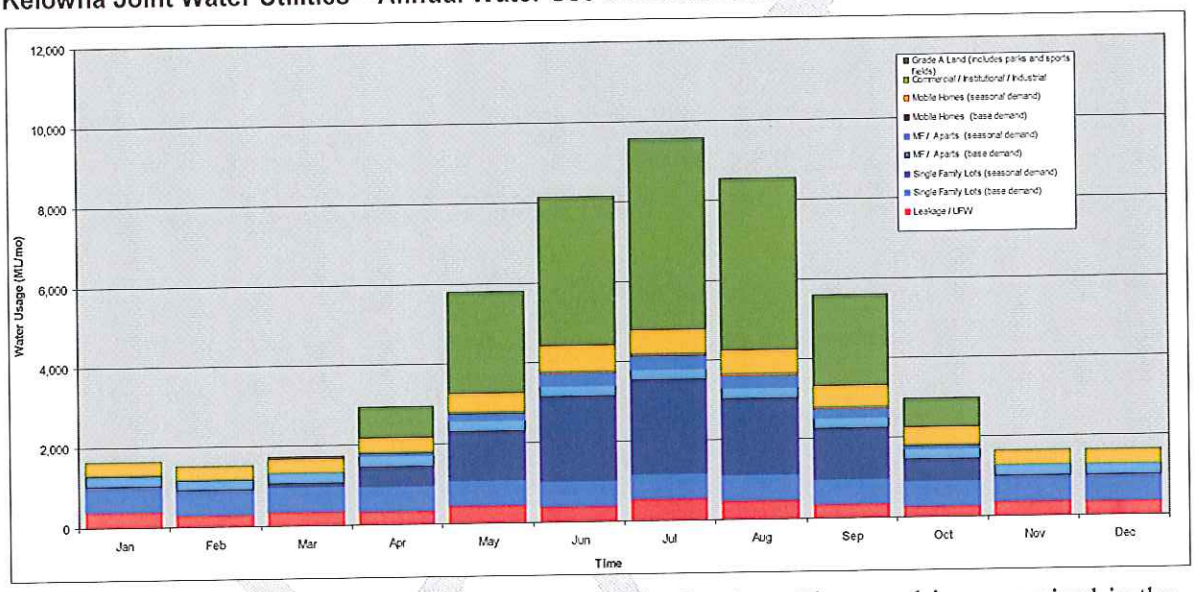
| Primary Domestic Sources | Secondary Domestic Sources | Irrigation Sources |
|---|---|---|
| High quality water source with preferred use as domestic water | Good raw water quality that meets the GCDWQ, but quality is not as high as that of the primary sources | Raw water that is suitable for irrigation, does not meet the parameters stated within the GCDWQ, but would be challenging to treat for potable use |
| Okanagan Lake Intake – GEID<br>Cedar Creek – KWU<br>Poplar Point – KWU<br>Mission Creek – BMID<br>Wells No. 8, 11,13s, 15, - RWD<br>Well No. 4 – BMID<br>East Kel Well No. 2 – SEKID<br>Airport Well No. 2 - GEID | Eldorado Intake– KWU<br>Swick Road Intake – KWU<br>McKinley Intake – GEID<br>Wells 3, 3A, 4, 6, 7E, 7W, 9, 10, 12, 13N - RWD<br>Well No. 5 – BMID<br>East Kel Well No. 1, O'Reilley Rd Well – SEKID<br>Airport 1, Lochrem, Vector 1, Ellison Well- GEID | Kelowna (Mill) Creek – GEID<br>Scotty Creek - BMID<br>Hydraulic Creek – SEKID<br>Cornish Well – BMID<br>Advanced WWTP – City of Kelowna |

The outcome of the source assessment is that for long term water supply, there should be three large intakes on Okanagan Lake and one intake on Mission Creek. These four primary sources would be supplemented with groundwater from seven (7) wells. The total capacity from these sources is significant and adequate to meet both the annual and the maximum daily demand for the service area.

# 4 WATER DEMAND MANAGEMENT

The volume of water supplied by each of the five large Kelowna water utilities was characterized. The characterization was conducted to determine the volume of water being used by the various customer groups. The information provides an indication of the volume of agricultural and domestic water used during an average or "normalized" year. With this information, informed decisions can be made on the separation of the domestic and irrigation water systems and how much water would require treatment.

**Kelowna Joint Water Utilities – Annual Water Use Characterization**




The total combined monthly water usage is illustrated in the above Figure and is summarized in the Table below. During July every year, the total water usage for the five utilities can reach 9,500 ML. Approximately half of the July monthly total is agricultural demand (dark green portion of the monthly bars). The next largest category is for domestic outdoor usage (dark blue) followed by indoor domestic and ICI usage. Leakage forms a notable portion of the total annual volume.

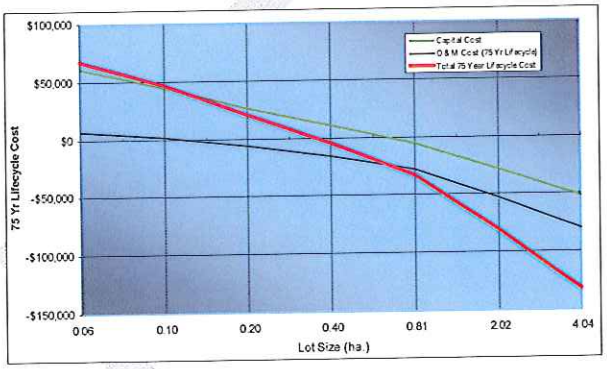
**Kelowna Joint Water Utilities – Monthly Water Demand Summary (ML/month)**

| AGGREGATE MONTHLY WATER USAGE | | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOTAL | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single Family Lots (base demand) | 30,172 | lots | 613 | 611 | 624 | 621 | 621 | 621 | 621 | 621 | 621 | 621 | 619 | 629 | 7442 | 14.46% |
| Single Family Lots (seasonal demand) | 30,172 | lots | 0 | 0 | 67 | 421 | 1141 | 2079 | 2291 | 1859 | 1190 | 518 | 0 | 0 | 9565 | 18.58% |
| MF / Aparts. (base demand) | 23,406 | units | 260 | 258 | 263 | 269 | 269 | 269 | 269 | 269 | 269 | 269 | 275 | 276 | 3213 | 6.24% |
| MF / Aparts. (seasonal demand) | 23,406 | units | 0 | 0 | 0 | 72 | 194 | 350 | 380 | 369 | 267 | 91 | 0 | 0 | 1722 | 3.35% |
| Mobile Homes (base demand) | 616 | units | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 144 | 0.28% |
| Mobile Homes (seasonal demand) | 616 | units | 0 | 0 | 0 | 14 | 20 | 33 | 43 | 36 | 28 | 12 | 0 | 0 | 186 | 0.36% |
| Commercial / Institutional / Industrial | 2,205 | conn | 343 | 346 | 353 | 366 | 485 | 653 | 612 | 603 | 548 | 450 | 363 | 350 | 5471 | 10.63% |
| Grade A Land (incl. parks/sports fields) | 4,547 | ha. | 0 | 0 | 35 | 1391 | 2632 | 3532 | 4073 | 3686 | 2370 | 1311 | 0 | 0 | 19031 | 36.97% |
| Leakage / UFW | | ML | 405 | 305 | 355 | 339 | 461 | 402 | 552 | 488 | 367 | 280 | 377 | 370 | 4702 | 9.13% |
| TOTAL KJWC WATER DEMAND | | | 1634 | 1532 | 1709 | 3504 | 5835 | 7950 | 8852 | 7943 | 5671 | 3563 | 1646 | 1636 | 51476 | 100.00% |

## Distribution System Separation

The Kelowna water utilities are much larger than an average municipal utility due to the combined nature of the agricultural and domestic water systems. There is a high capital and operational cost to filter water. There is also a significant cost to split the water system into an irrigation system and a domestic distribution system. A lifecycle analysis was carried out to determine where it is cost effective to separate the water distribution systems. This separation analysis is critical for determining where and when separation work must occur. A graph from this analysis, provided in Appendix D, is illustrated.

The key finding was that for lot sizes 1.0 acre and larger, it is more cost effective to install and operate a dual water distribution system and build a smaller filtration plant than it is to filter all water and use a single pipe.




For those service areas with high quality source water where UV disinfection and chlorination can be used, it is more cost effective to maintain a single pipe water distribution system for all lot sizes.

The water service areas where system separation is immediately required are the BMID Scotty Creek rural area, the GEID Ellison service area, and the entire SEKID service area. BMID has completed their separation of Scotty Creek. All of these service areas currently rely on creek water with high colour, high organic content, and elevated turbidity levels, making the water unsuitable for the application of UV disinfection. If filtration becomes a requirement, then remaining rural areas in GEID and BMID must be separated so that smaller water filtration plants can be constructed.

## Conservation and Demand-Side Management

The two critical pieces noted for long term water management are metering and leakage reduction.

A universal metering program is recommended so that the style, capabilities, components, and installation process for water meters is standardized, and information to the public is consistently provided. Greater economies of scale can be achieved through larger collective purchases that include all five water utilities.

Leakage reduction is an area where cost savings can be realized. There is estimated to be 947 kilometres of water mains in use throughout the City. The amount of unaccounted for water (UFW) is estimated to be 4,700 ML/year or 9.10% of the total annual demand. During the winter months, when there is no outdoor watering, leakage amounts to 22% of the daily winter demand. An objective would be to reduce the annual leakage to 5% of the total annual demand, which would be sufficient to provide the maximum daily water demand for an additional 1,100 SF residences.

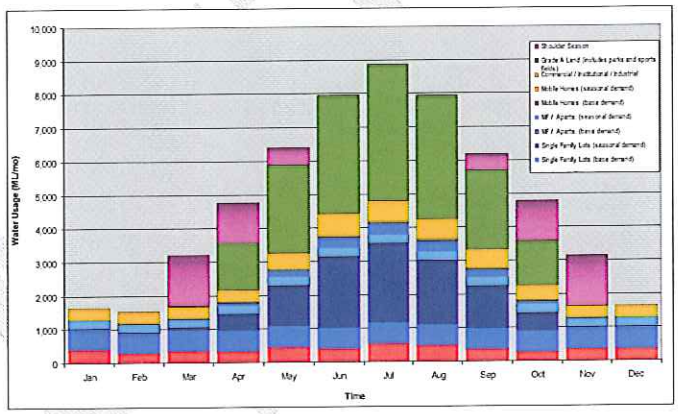
## Future Water Demands

Future water demands are considered in this plan. The plan addresses:

1. Servicing of all additional development lands identified within the 2030 Kelowna OCP;
2. Servicing of those lands currently not connected to the five large utilities;
3. Providing domestic water for the 13 smaller utilities within and around Kelowna;
4. Consideration of all agricultural demands that could be realized as set out by the Ministry of Agriculture;
5. Consideration of predicted global warming impacts as set out within the Okanagan Water Supply and Demand study.

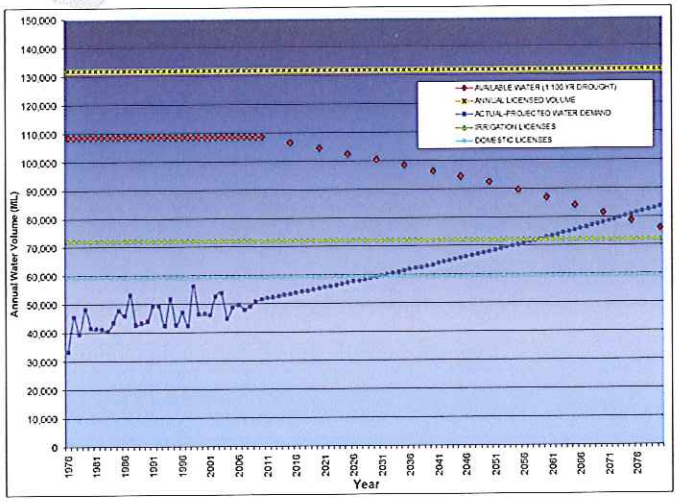
Two key graphs were generated that provide an illustration of what is to be expected in overall water demands. The upper graph shows the aggregate monthly water demand by customer group. The colours in the columns indicate:

- Red — Leakage
- Light Blue — Indoor Domestic
- Dark Blue — Outdoor Domestic (Lawn watering)
- Tan — Industrial Commercial Institutional
- Green — Agricultural Irrigation
- Purple — (Projected amount for Global Warming)




The purple column portions amount to an additional 6,400 ML of irrigation in the shoulder seasons. With global warming, the growing seasons are predicted to be longer and more water would be needed. This does not create a problem in the spring months when there is higher flow in the creeks, but additional storage is required in the fall to be able to reliably provide the additional water.

The bottom graph shows the estimated aggregate water demand from 1976-2011 and projects the future water demand in accordance with the population growth rates matching the City of Kelowna 2030 OCP. The minimum expected annual available volume of water is identified by the red line on the graph. The available water is estimated for a 1:100 return year drought and is decreasing over the decades in conformance with the works carried out within the Okanagan Water Supply and Demand Study. The estimates provided are considered to be conservative.



# 5 WATER SUPPLY AND TREATMENT PLAN

The recommended plan for how high quality drinking water is to be supplied to all residents of the City of Kelowna and to the surrounding areas is provided in Section 5. Because of the high overall cost, a staged approach is necessary in order for the plan to be achievable. The recommended approach maximizes the use of existing infrastructure and alleviates constraints created by existing service boundaries.

## Regulatory Requirements

The water quality supplied must meet the criteria of Interior Health. All larger water utilities in the Southern Interior must provide water that meets the 4,3,2,1,0 water quality criteria. The criterion is defined as:

| | |
|---|---|
| **4 log (99.99%)** | removal and/or inactivation of Bacteria and Viruses; |
| **3 log (99.9%)** | removal and/or inactivation of protozoa including *Giardia Lamblia and Cryptosporidium;* |
| **2 treatment barriers** | including at least one form of disinfection; |
| **< 1.0 NTU turbidity** | units year round; |
| **0 Total Coliforms or E.Coli** | in the system at all times |

## Project Priorities

All domestic water must meet the required water quality standard. The prioritization of work is based on reducing the highest risk areas first and then funding works that benefit the greatest number of persons. The project priority goals are listed in order:

G-1 **Eliminate all Boil Water Notices (BWNs):** The reduction of Boil Water Notices can be realized through system separation and the use of higher quality raw water sources;

G-2 **Eliminate all Water Quality Advisories (WQAs):** Water Quality Advisories would be reduced through accessing the best quality raw water sources and upgrading water treatment barriers;

G-3 **Meet the IH 4,3,2,1,0 Requirement:** This would be accomplished through use of high quality water and cost effective water treatment technologies such as UV disinfection followed by chlorination;

G-4 **Meet MACs and AO Criteria:** The plan will then ensure that all water quality parameters are below the Maximum Acceptable Concentrations (MACs) set out within the Guidelines for Canadian Drinking Water Quality (GCDWQ). Improvements would then ensure water will meet the aesthetic objectives (AOs) within the GCDWQ;

G-5 **Filter all Drinking Water:** This objective is more costly and will result in substantial rate increases for most of the water service areas. Protecting the raw water sources and meeting the IH deferral requirements are steps to be taken to reduce risks and costs so that filtration is not required in the near future.

The utilities must achieve Goal No. 3, to meet the IH requirement as soon as possible. The risk to the public for known waterborne pathogens and the completing the necessary improvements is part of the operating permits for some of the utilities.

### Water Quality Improvement Plan - Approach

The approach developed by the Technical Committee is designed to provide the best, lowest cost water quality improvements. The plan is technically defendable, is simple to implement, and is to be carried out in eight (8) stages:

S-1 **Improve Source Water Quality:** Access water from the highest quality available water sources;

S-2 **UV disinfection and Filtration Deferral:** Maximize the use of Ultra-violet disinfection throughout the region as it is proven to be the Best Available Technology and a cost effective barrier that is required for use on the high quality surface water sources ;

S-3 **Primary Separation:** These are the agricultural areas that require separation immediately. They include the Ellison area (GEID) and almost all of the SEKID service area;

S-4 **Phase 1 Interconnections:** Interconnect the existing water distribution system grids in order to improve the interconnection capacity and emergency supply capacity;

S-5 **Ancillary Works / Reassessment of Status:** These projects improve water quality, redundancy, protect source water quality and/or assist in overall water management;

S-6 **Secondary Separation:** These secondary areas including the Scenic area in GEID and the Morrison, McKenzie, Gallagher's Road and Belgo areas within BMID;

S-7 **Filtration of Primary Sources:** If any of the four primary water sources experiences significant deviations in raw water quality, filtration and/or additional treatment barriers would be added;

S-8 **Phase 2 Interconnections:** The second stage of interconnections is to provide substantial capacity between utilities through the construction of high capacity transmission mains.

### Centralization of Water Treatment vs. Multiple Sites

The issue of many vs. few vs. a single centralized water treatment site was considered by the project team. Factors considered in the evaluation including water treatment plant siting, available land area, transmission main routing, alternate treatment technologies, staging of treatment, system redundancy, source capacity and economics.

The cost to utilize UV disinfection forms a critical part of the plan. Ultraviolet (UV) light disinfection is considered to be the Best-Available-Technology(BAT) and is approximately $1/10^{th}$ the capital and operational cost of filtration. UV disinfection followed by chlorination kills or inactivates all known microbiological risks in the source waters. The one-year financing cost for a filtration facility would be equivalent to the capital cost for a complete UV disinfection facility. This plan maximizes the use of UV disinfection followed by chlorination.

It is recognized that with more than 40 available water sources, it is beneficial to reduce the number of primary sources. The number of UV disinfection facilities was limited to the four primary domestic sources, 3 on Okanagan Lake at Cedar Creek, Poplar Point and McKinley Landing, and one for Mission Creek. In the longer term, filtration may still be required. Although the location for where filtration

will first be required should not be determined at this time, all four large UV sites have room for filtration. The future decisions on filtration will be a function of raw and treated water quality and risks present in the future and should be deferred until the end of Stage 5. During the Stage 5 reassessment, the priority for building transmission capacity vs. constructing filtration would be assessed. The ability to convey substantial water from a cleaner source may be a feasible strategy to defer the need to immediately install filtration.

### Project Costs

The capital cost per stage for water quality improvements is set out in the table below. There are 48 projects proposed in the 8 project stages. Individual project costs are listed in Table 5.10 in Section 5 along with a realistic time frame in which to complete the projects. Detailed project data sheets for the proposed projects are provided in Appendix E.

**Cost Per Water Quality Upgrade Stage (No funding assistance – highest cost)**

| No. | Project Stage | | Stage Cost | Cumulative Cost |
|---|---|---|---|---|
| 1 | Raw Water Upgrades | ( 4 projects) | $ 13,547,695 | $ 13,547,695 |
| 2 | UV Disinfection | ( 4 projects) | $ 13,766,528 | $ 27,314,222 |
| 3 | Primary System Separation | ( 8 projects) | $ 13,079,317 | $ 40,393,540 |
| 4 | Stage 1 - Interconnections | ( 4 projects) | $ 13,081,827 | $ 53,475,367 |
| 5 | Miscell. Water Projects | ( 7 projects) | $ 27,896,049 | $ 81,371,416 |
| 6 | Secondary Separation | ( 8 projects) | $ 17,188,475 | $ 98,559,891 |
| 7 | Filtration | ( 8 projects) | $ 181,567,045 | $ 280,126,936 |
| 8 | Stage 2 - Interconnections | ( 5 projects) | $ 81,468,750 | $ 361,595,686 |

To meet the minimum requirements of Interior Health, the Kelowna water suppliers must complete all projects to the end of Stage 3 for a total cost of $40,400,000. To achieve a more resilient solution for the region, they must complete all projects to the end of Stage 5 for a total cost of $86,000,000. Stage 5 works include better interconnections, reservoir storage to buffer deviations in raw water quality, and several conveyance projects.

The rate impact per stage has been calculated for each of the utilities. To complete Stage 3 line, the resulting annual water rate for the utilities varies greatly from $294 per Single Family Equivalent (SFE) for RWD, to as high as $1,188 for SEKID. SEKID and GEID are the utilities that have the greatest economic challenges to complete Stage 3 improvements.

Funding assistance would greatly benefit those specific service areas. The rate impacts for all five utilities are provided in the Tables on the next page. The tables show the rate impact per utility per stage of work without and with $^{2}/_{3}$ funding assistance.

**SFE Water Rate Impact per Stage ( No Financial Assistance )**

| | Project Cost | Financing Cost Per Year | KWU | BMID | GEID | RWD | SEKID | Annual Water Rate with no assistance. |
|---|---|---|---|---|---|---|---|---|
| Units | | | 25,339 | 8,562 | 5,668 | 5,094 | 2,240 | 46,903 |
| Existing Rate | $ - | $ - | $ 295.80 | $ 392.40 | $ 459.60 | $ 294.00 | $ 517.00 | $ 343.60 |
| STAGE 1 | $ 13,547,695 | $ 1,181,150 | $ 295.80 | $ 392.40 | $ 586.78 | $ 294.00 | $ 824.98 | $ 368.78 |
| STAGE 2 | $ 27,314,222 | $ 2,381,378 | $ 303.37 | $ 459.09 | $ 663.95 | $ 294.00 | $ 824.98 | $ 394.37 |
| STAGE 3 * | $ 40,393,540 | $ 3,521,693 | $ 303.37 | $ 459.09 | $ 721.58 | $ 294.00 | $ 1,188.23 | $ 418.68 |
| STAGE 4 | $ 53,475,367 | $ 4,662,226 | $ 323.37 | $ 484.89 | $ 731.66 | $ 294.00 | $ 1,188.23 | $ 443.00 |
| STAGE 5 ** | $ 81,371,416 | $ 7,094,331 | $ 341.65 | $ 692.91 | $ 779.06 | $ 355.13 | $ 1,244.87 | $ 494.85 |
| STAGE 6 | $ 98,559,891 | $ 8,592,900 | $ 341.65 | $ 806.87 | $ 871.30 | $ 355.13 | $ 1,244.87 | $ 526.80 |
| STAGE 7 | $ 280,126,936 | $ 24,422,743 | $ 782.47 | $ 1,120.85 | $ 1,219.17 | $ 355.13 | $ 1,244.87 | $ 864.30 |
| STAGE 8 | $ 361,595,686 | $ 31,525,560 | $ 933.90 | $ 1,272.29 | $ 1,370.61 | $ 506.57 | $ 1,396.31 | $ 1,015.74 |

**SFE Water Rate Impact per Stage ( 2/3 Financial Assistance - Best Case Scenario )**

| | Project Cost | Reduced Financing Cost/Yr | KWU | BMID | GEID | RWD | SEKID | Annual Water Rate with 2/3 assistance |
|---|---|---|---|---|---|---|---|---|
| Units | | | 25,339 | 8,562 | 5,668 | 5,094 | 2,240 | 46,903 |
| Existing Rate | $ - | $ - | $ 295.80 | $ 392.40 | $ 459.60 | $ 294.00 | $ 517.00 | $ 343.60 |
| STAGE 1 | $ 13,547,695 | $ 393,717 | $ 295.80 | $ 392.40 | $ 529.00 | $ 294.00 | $ 619.66 | $ 351.99 |
| STAGE 2 | $ 27,314,222 | $ 793,793 | $ 298.32 | $ 414.63 | $ 554.72 | $ 294.00 | $ 619.66 | $ 360.52 |
| STAGE 3 * | $ 40,393,540 | $ 1,173,898 | $ 298.32 | $ 414.63 | $ 573.93 | $ 294.00 | $ 740.74 | $ 368.63 |
| STAGE 4 | $ 53,475,367 | $ 1,554,075 | $ 304.99 | $ 423.23 | $ 577.29 | $ 294.00 | $ 740.74 | $ 376.73 |
| STAGE 5 ** | $ 81,371,416 | $ 2,364,777 | $ 310.15 | $ 489.80 | $ 585.05 | $ 306.97 | $ 748.96 | $ 394.02 |
| STAGE 6 | $ 98,559,891 | $ 2,864,300 | $ 310.15 | $ 527.79 | $ 615.80 | $ 306.97 | $ 748.96 | $ 404.67 |
| STAGE 7 | $ 280,126,936 | $ 8,140,914 | $ 457.09 | $ 632.45 | $ 731.75 | $ 306.97 | $ 748.96 | $ 517.17 |
| STAGE 8 | $ 361,595,686 | $ 10,508,520 | $ 608.52 | $ 783.88 | $ 883.19 | $ 458.41 | $ 900.40 | $ 668.60 |

Regardless of the political structure or ownership of the utilities, the responsibility of costs for the service areas is expected to be maintained at this time. Each utility will be treated essentially as a specified service area. As identified in the tables, the filtration (Stage 7) and large transmission mains (Stage 8) components add substantial cost to the annual water rates.

The proposed *Kelowna Integrated Water Supply Plan* defers the high filtration and transmission main cost projects to some time in the future, which still achieving the regulators water quality requirements. This approach reduces capital debt servicing and reduces operating costs.

## 6 GOVERNANCE STRUCTURES

The *Kelowna Integrated Water Supply Plan* considers regional issues and water service delivery structures beyond the current status quo. There are many structures available to provide water service. Governance can exist in many forms, but generally it exists anytime a group of people come together to accomplish an end. Ultimately the application of good governance serves to realize organizational and societal goals. Good governance must serve the goals of the greater good of all of Kelowna. In this case, the end objective is to provide a safe, reliable and cost effective water supply for all of the citizens of Kelowna. There are many definitions for governance with most focusing on three important aspects:

1. Authority;
2. Decision-making, and;
3. Accountability.

The definition for governance adopted within this report is set out as follows:

*Water governance refers to the range of political, organizational and administrative processes through which communities articulate their interests, their input is absorbed, decisions are made and implemented, and the decision makers are held accountable in the development and management of water resources and delivery of water services (K.Bakker, 2009, adapted from Hall and Rodgers, 2003)*

Principles for good governance were developed and are included in Section 6.3.

A governance information workshop was held on September 22, 2011 where all Councillors, Trustees and senior staff from the larger water utilities were invited. Principles for water supply governance were discussed at the workshop. Several governance models were presented as information. Opinions on the models were collected for their political acceptability, their functionality, and if their structure would be able to implement the *Kelowna Integrated Water Supply Plan.*

There are many governance models for water that already exist and operate within Kelowna. Eight potential governance models are presented in Section 6. The models are described as follows:

1. Existing Status Quo ( 5 large utilities);
2. Enhanced KJWC Governance ( 5 existing utilities with enhanced financial capacity);
3. Amalgamation under City ( Single utility under City of Kelowna authority);
4. Regional Bulk Water Provider (under City or Regional District);
5. Water Commission (with independent Board and decision making authority);
6. Reduced Number of Water Utilities (reducing from 5 to as few as 2);
7. Corporatization of Utilities;
8. Privatization of Utilities.

The characteristics of each governance model are described in Section 6.

The governance workshop and evaluation of governance models was useful for the purposes of education, communications and determining structures may be suitable for Kelowna's water service areas. The following key points related to governance are concluded:

1 Any of the governance models listed could be used to implement the 8 Stage *Kelowna Integrated Water Supply Plan*, however the costs and effectiveness of implementation could greatly vary for each of the models;

2 The recommendations of this report are consistent with the principles for good Water Governance listed in Section 6.4;

3 The eight governance models are summarized in a consistent format. Advantages and Areas of Concern are listed. For any model to be effective, the Areas of Concern listed would have to be evaluated to determine if the concerns are in-fact valid, and then appropriate policy would have to be developed to ensure that the model can be effectively implemented

4 The eight governance models discussed at the workshop are described within Section 6. There were four models identified during the workshop as most preferred, that could be considered in future discussions on the subject, upon consideration by Elected Officials:
   - Enhanced KJWC Governance
   - Amalgamation under City
   - Water Commission
   - Reduced number of Utilities

5 The risk associated with major governance changes is that it will delay the implementation of important water quality improvements. There is also a concern that the changes will complicate and impair current levels of service;

6 It is recommended that the Kelowna utilities collectively apply for Senior Government funding assistance. Any funding that would be received from the Province would be allocated to the immediate stage of the project work and would be split at appropriate percentages between those projects listed in that phase. This approach must be ratified by the elected local officials;

7 This report provides the agreed upon priority for grant funding allocations for the proposed water quality improvement projects in Kelowna. The funding priorities related to City-wide issues such as roads, parks, housing, etc. are determined by City Council. Funding for water is one of many municipal funding issues facing the City of Kelowna;

8 The *Kelowna Integrated Water Supply Plan* Technical Committee has not received clear direction from the Provincial Ministry of Community Development, Sport and Culture of where problems exist with the current governance structure and where improvements are necessary to better serve the public;

This report is designed to allow all of the water utilities to work together better in an integrated manner. By doing so, the overall water system could become easier to amalgamate at some time in the future. Cooperative projects, consistent practices and expectations, and support across the utilities are planned within this document. The issue of governance will continue to arise is the future and the information provided within Section 6 provides a starting point for further discussions in improving water governance.