

**REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, 20 JUNE 2007**

SUBJECT RESPONSE TO WATER ADVISORY COMMITTEE MOTIONS

ISSUE

To meet future water demand through water conservation, reuse and recycling and rainwater harvesting, and include 'backcasting' in strategic planning

BACKGROUND

In December 2006, the Water Advisory Committee (WAC) resolved as follows:

'That the Regional Water Supply Commission amend the *Strategic Plan for Water Management* to set out an explicit goal for meeting growth in water demand through water conservation, reuse and recycling, and rain water harvesting.'

'That the Regional Water Supply Commission include water conservation backcasts to the year 2050 as a formal element of future strategic water planning initiatives.'

These motions were received by the Regional Water Supply Commission on January 17, 2007. The District of Central Saanich also considered and endorsed these motions.

Water Conservation

Currently, demand management programs are managed and funded solely by Capital Regional District (CRD) Water Services. With the exception of the Water Conservation Bylaw, these programs rely on voluntary public participation through the marketing of demand management programs. To date, these programs have been successful in maintaining overall demand at 1995 levels despite the growth of the last few years. Indoor water use has declined, water use in the industrial/commercial/institutional sector has declined, but outdoor water use has, if anything increased with the trend to longer, dryer summers and increased use of in-ground sprinkler systems. A new campaign 'It Just Takes 1' was launched this spring targeting outdoor water use with positive public response to date.

In the future, reliance on voluntary programs may be insufficient to reach long term conservation goals, particularly given the evidence of climate change being experienced. Achieving the long term goal may require intervention in areas in which the CRD does not have jurisdiction such as zoning, subdivision approvals, and retail water pricing. To ensure the goal is achieved, retail purveyors will have to be actively involved. For example, municipalities can impose conditions on subdivision approvals that would improve the efficiency of water use. Other jurisdictions have imposed restrictions on the allowable area of turf, required the use of drought tolerant plants, mandated high efficiency washing machines, and have introduced conservation rate structures such as increasing block rates and seasonal rates to curb demand.

To date, implementation of recommendations to local municipalities from the Commission to put conservation measures in place has been limited. In new subdivisions adjacent to decentralized treatment plants, municipalities could mandate installation of pipes now for future distribution of treated waste water for irrigation.

Water Reuse and Recycling

The liquid waste management plan (LWMP) will be developed on a decentralized model and will allow for potential water reuse in the future. The minutes of the May 23, 2007 meeting are attached for information (**Attachment 1**). There are a number of challenges with water reuse and recycling including:

- The infrastructure investment needed to deliver the water to the end user,
- The energy requirements to deliver the water to end users,
- Public acceptance of secondary sewage treatment effluent for reuse,
- Pricing structure for effluent reuse,
- The seasonality of irrigation, approximately 4 months per year,
- Irrigation of food crops with treated sewage effluent,
- Voluntary or mandatory connection to recycled water,
- Potential risks to public health.

There are a number of benefits, including:

- Reduced potable water use,
- Reduced discharges to the aquatic environment,
- Nutrient value of effluent.

There are no local large industrial or commercial users in this region that could use recycled water. Parks, golf courses and agriculture account for less than 3% of total water use with most of the use between May and September. The largest irrigation users are single family home owners.

At the last Commission meeting, reference was made to Singapore and its reuse of reclaimed water as a source of drinking water. Singapore takes the secondary effluent from its sewage treatment plant and processes it for blending with water from the city's reservoirs. A three stage treatment process is used comprised of microfiltration using one of the highest quality membranes available, reverse osmosis and ultraviolet disinfection. The plant capacity is 10,000 m³ per day or less than 1% of Singapore's daily water use. Most of the recycled water is destined for industrial use. To put this volume in perspective, average daily demand in this region is about 150,000 m³ per day.

Rainwater Harvesting

Rainwater harvesting holds the most potential for reducing indoor water demand particularly for new construction when dual piping systems and storage tanks can be installed at minimal cost. Harvested rainwater could be used for toilet flushing. Given our climate, four months with little rainfall, the cost of the storage needed for irrigation is likely to be prohibitive.

Water Conservation Backcasts

Backcasting refers to the idea of planning from a future desirable outcome followed by the question 'what actions do we need to take today to achieve that outcome?'. When the Commission considered the *2004 Review of the Strategic Plan for Water Management*, deferring expansion of water supply for 50 years was discussed. The position taken by the Commission at the time was to expand Demand management programs to achieve deferral to 2050 and beyond, if demand starts to escalate. An analogy of this approach is the Apollo moon missions of the 1960's. The goal was to reach the moon. While on the way, the space crafts were off course 95% of the time but were able to reach the moon through a series of mid-course corrections. These corrections could be made because the crew had a very clear idea of their desired outcome. This is the approach being taken with the water management strategy. Overall demand remains essentially unchanged since 1995, and we are ahead of where we need to be to meet the goal. So at this point we are on the way to achieving the goal, despite the dramatic expansion of development and climate change as evidenced by the increase in the number of days under extreme fire hazard. This confirms the climate change prediction of warmer, dryer summers. If and when demand starts to 'take us off course' a 'mid-course' correction can be made to reach the goal.

As the strategic plan is formally updated every five years, with the next update due in 2009, the Commission may wish to adopt a policy separate from the strategic plan that sets a goal of deferring water supply expansion to at least 2050.

FINANCIAL IMPLICATIONS

Without a detailed plan of how to address the increase in outdoor water use, it is difficult to assign a budget amount. Given that we are ahead in our goal to defer expansion beyond 2050, such a plan can be prepared in 2008 for funding and implementation in 2009 and beyond.

According to Dr. Takashi Asano, University of California, 'A common misconception in planning for wastewater reclamation and reuse is that reclaimed wastewater represents a low-cost, new water supply'. An order of magnitude capital cost to install a conventional distribution system, i.e. pumps and pipes, to distribute treated effluent throughout the region would be in the range of \$500 million. All of the water would have to be pumped, as treatment plants are typically at the lowest point in the system. By comparison the capital cost to develop the Leech River supply, assuming a water treatment plan would be required, would be in the range of \$100 million to \$150 million. From an economic perspective, developing the Leech River would be preferred to the reuse of treated effluent.

SUMMARY

Achieving deferral of expansion of water supply to 2050 and beyond through water conservation, reuse and recycling, and rainwater harvesting will require the CRD, and its member municipalities, to cooperate in the implementation of a comprehensive demand management program, which will include voluntary and regulatory initiatives. With the current development boom, municipalities will need to encourage developers, either voluntarily or through regulation, to propose 'outside the traditional box' approaches to subdivision design to reduce the water needs of developments, particularly outdoor water use. The Westhills LEED development may well be the standard to be emulated.

While the technology is available to reuse and recycle water for either non-potable or potable uses, costs would be high, health implications would need to be assessed, and public acceptance would need to be gauged before proceeding. If the commission wishes to examine this issue in more detail, funding can be included in the 2008 budget to conduct a study on treated effluent reuse. An article entitled 'Wastewater Reuse Conserves Water and Protects Waterways' by Caigan McKenzie of the National Environmental Services Centre (US) is attached for information (**Attachment 2**).

RECOMMENDATION

That the Regional Water Supply Commission:

1. Request that water purveyors in the region consider opportunities for reducing water use in new developments as part of the requirements for development permits; and
2. Include, for consideration, funding in the 2008 budget for investigating water use reduction opportunities, including treated wastewater and rainwater harvesting.