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June 26, 2003

File: RGC 0108

Skaha Estates Improvement District
Box 455
Okanagan Falls, B.C.
V0H 1R0

Attention: Mr. Don Allbright, Chairman

Dear Mr. Allbright:

**Subject: Summary of Engineering Report and Capital Expenditure
Program in Support of Revised Capital Expenditure Charges
for the Skaha Estates Improvement District**

1.0 Introduction

The Skaha Estates Improvement District (SEID) is in the process of reviewing and updating the Capital Expenditure Charge (CEC) bylaw for the district. In order to assist in this review process, Mr. Don Allbright, the SEID chairman, requested that Rock Glen Consulting Ltd. (RGC) provide technical and financial information relating to the water supply system capital expenditures.

Mr. Paul Glen, P.Eng., the principal of RGC, was the author of a March 2000 engineering study of the SEID water supply system (Wildstone Engineering Ltd., March 28, 2000). Technical information presented in the March 2000 Wildstone report has been relied upon during the preparation of this letter report.

This report is an update and expanded version of the RGC December 17, 2002 letter that provided background information for the development of a new CEC bylaw for the SEID.

2.0 Background to Determination of Capital Expenditure Charges

The SEID is incorporated under the *B.C. Local Government Act (The Act)*. Under Section 746 (1) (f) of *The Act* the trustees of an improvement district are allowed to make bylaws for establishing charges for capital expenditures, payable to the improvement district, and to determine the timing of the payment of these charges. The Act is administered within the B.C. Ministry of Community, Aboriginal and Women's Services.

Capital Expenditure Charges (CEC's) are a method of financing improvements to the water or sewer systems operated by an improvement district. As explained by the Ministry of

Community, Aboriginal and Women's Services, CEC's should be used to finance works and services that benefit all anticipated development in an improvement district, not for works and services that benefit only specific properties. CEC's should be developed within a framework that shares capital cost burdens equitably between existing and future development.

CEC's may be imposed to provide funds for an improvement district to pay the capital costs of providing, constructing, altering or expanding water system facilities, in order to service directly or indirectly the development for which the charges are imposed.

CEC's should be paid to the improvement district at the time of approval of the subdivision or the approval of the application for service, as the case may be.

3.0 Information Required to Calculate CEC's

The SEID operates a water system that currently services over 140 lots with domestic and irrigation water. CEC's for the SEID have not been revised since 1983. Accordingly, the Board of Trustees of the SEID has recognized a requirement to revise the current basis for assessing CEC's for new development in the improvement district.

An improvement district needs to determine several key factors in order to establish a fair and rationale basis to assess CEC's. These key factors include the following:

- Determining probable future growth in use of the water supply system. This is based upon existing and projected land use within the district and projected associated population increases.
- Development of a prioritized list of anticipated capital improvement projects for the district. These projects need to be supported by an engineering report that includes estimated timing and costs for the various projects. This report would also explain why the projects qualify as a capital improvement that should be financed by CEC's.
- Preparation of a capital expenditure program that relates planned system upgrade work with anticipated sources of revenue to pay for these capital works. This planned expenditure program should be regularly updated to reflect any changes in land use, population or use of the water system.

4.0 Skaha Estates Improvement District System

The SEID was established on November 3, 1977. The principle activity of the SEID is to provide water to Skaha Estates, a rural residential subdivision covering approximately 95 ha on the eastern shore of Skaha Lake 4 km north of Okanagan Falls, B.C. The SEID currently services some 140 lots including 7 seasonal water users. The majority of the lots are developed with single-family residences. One orchard is also serviced by the SEID.

The SEID withdraws water from Skaha Lake through a 10-inch (254 mm) combination AC and PVC intake line that extends 1158 feet (353 m) into the lake. Two vertical turbine pumps

(40 hp and 15 hp) with a combined capacity of 29 litres per second (~383 imperial gallons per minute) distribute water through a system of over 4000 m of 4 and 6 inch (100 and 150 mm) AC watermains. Water is stored in a 100 000-gallon concrete reservoir situated approximately 75 m above Skaha Lake level. The water is chlorinated at the pumphouse before pumping into the distribution system. Individual homes are connected to the system by 3/4 and 1 inch (19 and 25.4 mm) PVC pipelines.

Water demand in the SEID, as reported in the March 2000 engineering study by Wildstone Engineering Ltd., ranged from 10,000 to almost 310,000 imperial gallons per day (Igcd). Average daily demand was 90,706 Igpd, or approximately 700 Igpd for each serviced lot. Peak demand is a significantly greater 2366 Igpd for each serviced lot. Peak water demand is the result of intensive irrigation during the summer months.

The existing pumps, running full-time, can supply slightly more than 550,000 Igpd, or the equivalent of over 4000 Igpd per serviced lot. This represents approximately a 44% reserve capacity. If the larger pump were to malfunction, the smaller pump could only supply approximately 1575 Igpd per serviced lot. This could be a 33% water supply shortage during peak water periods. The system is vulnerable to pump failure, especially during peak pumping periods.

5.0 Potential New Development

There are approximately 40 ha of undeveloped land in the SEID. Current developed areas within the SEID have a density of approximately 2.5 units per hectare. Assuming that development occurs at a similar density, the undeveloped lands would add an additional 100 lots to the SEID. In addition, several landowners adjacent to the SEID have requested that they be included in the SEID service area.

Most of the potential development lands are not within the Agricultural Land Reserve (ALR), and it is understood that no new agricultural development is planned. Similarly, no industrial or commercial developments are planned within the SEID.

Table 1 on the following page summarizes potential future development within and adjacent to the SEID.

As shown below, the average growth rate for the SEID service area, and potential service areas, is anticipated to be about 6 to 7 residential units per year. This equates to approximately 240 potential new water-using properties by the year 2040.

At current consumption rates, therefore, this represents a potential average daily water demand of almost 260,000 imperial gallons. As described above, the existing water system has the capacity to supply just over 550,000 Igpd, or roughly twice the average daily demand of anticipated development up to 2040. An assessment of peak demands however, shows that there could be a shortfall of 325,000 Igpd if system capacity is not increased.

The peak capacity of the present system would be exceeded when an additional 100 lots require servicing. This assessment of system capacity makes no allowance for pump

breakdowns, fire flows, etc. A reserve pumping capacity equivalent to at least the smallest pump, and preferably the larger pump capacity, is considered prudent to provide sufficient capacity in the event of pump failure.

Table 1: Potential Future SEID Development

<i>Name/Location</i>	<i>Potential Number of Units</i>	<i>Timing</i>
Within SEID		
Racette/Eagle Rock	20	2003-2005
Czuczor/below Eagle Rock	15	2003-2010
Ricard/East of Eastside Road	40	2005-2010
Vacant lots within SEID	25	2003-2010
Sub-Total	100	2003-2010
Outside of SEID		
Sovereign Road Residents (existing)	20	2010-2020
Kenyon Lands/south of SEID	20	2020-2040
Abbey Downs/McLean Creek Road	+100	2015-2040
Sub-Total	+140	2010-2040
Totals	+240	2003-2040

6.0 Planned Capital Expenditures

The March 2000 engineering study, and this report, have identified a number of capital expenditures that should be included in future work plans for the SEID. Based upon the water supply system capacity analysis presented above, the first priority for the district should be to increase pump capacity by replacing the smaller 15 hp pump with a second 40 hp pump. The 15 hp pump would be held in reserve for use in emergencies or during scheduled pump maintenance periods. This pump upgrade should occur within the next 2 to 3 years in order to accommodate the 20 lots in the Racette Eagle Rock development that is currently under construction.

The next priority for the SEID in order to increase water system supply capacity to meet new development needs will be the installation of a second water intake with pumps, wet wells, chlorinator, etc. This second intake would likely be located at the south end of Sovereign Road where it could also service the 20 lots on Sovereign Road that are presently outside of the SEID service area.

A new water reservoir will be required to provide adequate storage capacity for residential and fire flow demands. In addition, as the Racette and Ricard lands are developed, the elevation of

the present water reservoir will be too low to provide sufficient pressure for either residential or fire fighting water demands. It is estimated that a new reservoir will be required by 2010.

In addition, there will be on-going requirements to install water distribution pipelines, to loop existing pipelines and to install new hydrants and valves as new development proceeds.

The following points summarize the capital expenditure items required to meet the anticipated residential development demand in the SEID:

- Increase water source capacity by upgrading pump capacity in the existing pumphouse.
- Increase water source capacity by installing a second lake intake line, pump house and pumps at the south end of Sovereign Road.
- Install a new 100 000 gallon reservoir to service areas at higher elevations than the current reservoir.
- Add additional distribution pipelines and loop existing lines to accommodate increased system demand.
- Install additional hydrants, valves, etc. to provide fire protection and regulate flows to new development areas.

7.0 Cost Determinations To Service New Development

As explained above, there are three main components of the water supply system that will need to be expanded to service new development, including:

- Intake, intake line, pumps and pump house.
- Distribution pipelines, valves and hydrants.
- Water reservoir. Should be at least 100 000 gallon capacity.

Anticipated capital costs for new development, including estimated dates of works, are provided in Table 2 on the following page. Table 3, also on the following page, presents unit costs for these capital works.

As shown in Table 2, the anticipated capital expenditures for new development between 2003 and 2010 are estimated to be \$470,000.00. From Table 1, it can be seen that this is based upon expected development of as many as 100 lots within the current SEID boundaries.

The capital costs to service these additional 100 lots equates to approximately \$5080.00 per new lot. Therefore, a revised capital expenditure charge of \$5000.00 per lot is considered appropriate at this time.

Table 2 Projected Capital Costs to 2010

ITEM	ESTIMATED COST	TIMING
<i>New Development Capital Costs 2003 to 2010</i>		
Upgrade Existing Pump Capacity	\$20,000.00	2005
New Water Intake Line	\$15,000.00	2010
New Pump House, Pumps, Drywells, Chlorinator, Controls, etc.	\$75,000.00	2010
New Pumps (2 @ 40 hp)	\$40,000.00	2010
New Water Reservoir- (to meet supply and pressure requirements).	\$300,000.00	2010
New/Looped Waterlines (300 m)	\$19,500.00	2010
New Valves (5)	\$6000.00	2005-2010
New Hydrants (4)	\$10,000.00	2005-2010
Engineering	\$22,500.00	2003-2010
2003 to 2010 Total	\$508,000.00	2005-2010

Table 3: Unit Costs for Capital Works

<i>ITEM</i>	<i>UNIT COST</i>
Pump (40 hp)	\$20,000.00 each
Intake Line (254 mm)	\$30.00 per metre
Pump House with wet wells, chlorinator, instrumentation, etc.	\$75,000.00 each
Concrete Reservoir (100,000 gal capacity)	\$300,000.00 each
Water Distribution Pipeline (150 mm)	\$65.00 per metre
Valves for Distribution Lines	\$1200.00 each
Hydrants	\$2500.00 each

Notes: 1) Unit costs include materials and installation.

8.0 Capital Expenditure Program

Table 4, on the following page, summarizes the planned capital expenditure program for the SEID from the present to the year 2010. Calculations for revenue and capital cost dollars available to upgrade the water supply system have been based upon a capital cost charge of \$5000.00 per new, serviced lot.

The program was designed to preclude the need to borrow funds for any of the capital expenditures. Accordingly, the majority of the spending for required capital works is planned for the year 2010 when an anticipated \$500,000.00 in capital expenditure charges will have been collected.

The capital expenditure projections should be reviewed annually by the Board of Trustees of the SEID. Adjustments to the CEC's should be made as required.

Table 4 Skaha Estates Improvement District
Summary of Waterworks Capital Expenditure Program to Year 2010

Application of Funds	2003	2004	2005	2006	2007	2008	2009	2010	Total
Waterworks									
New Pumps									
Intake Lines			\$20,000					\$40,000	\$60,000
Pumphouse/Drywells/Chlorinator								\$15,000	\$15,000
Water Reservoirs								\$75,000	\$75,000
Water Distribution Pipelines								\$300,000	\$300,000
Valves				\$9,750				\$9,750	\$19,500
Hydrants				\$3,000				\$3,000	\$6,000
Engineering	\$2,500		\$2,500		\$2,500			\$5,000	\$10,000
Total Expenditures	\$2,500	\$0	\$22,500	\$17,750	\$2,500	\$0	\$2,500	\$12,500	\$22,500
Source of Funds									
General Revenue	\$1,000	\$0	\$1,000		\$1,000		\$1,000	\$1,000	\$5,000
Surplus Funds on Hand	\$1,500		\$1,500	\$1,500	\$1,500		\$1,500	\$1,500	\$9,000
Replacement Reserve Fund			\$10,000	\$5,000				\$5,000	\$20,000
Capital Expense Charge Funds			\$10,000	\$11,250				\$452,750	\$474,000
Total Non-Loan Funding	\$2,500	\$0	\$22,500	\$17,750	\$2,500	\$0	\$2,500	\$460,250	\$508,000
Short-Term Borrowing									
Long-Term Borrowing									
Total Funding	\$2,500	\$0	\$22,500	\$17,750	\$2,500	\$0	\$2,500	\$460,250	\$508,000

- Notes: 1) Development timing as summarized in Table 1 (i.e. 100 new lots by the year 2010).
- 2) Based upon capital expense charge of \$5000.00 per new serviced lot. (i.e. \$500,000 collected by the year 2010)
- 3) Capital works unit costs and number of units as shown in Tables 2 and 3.

9.0 Closure

This summary report should be read in conjunction with the March 2000 Engineering Study report prepared by Wildstone Engineering for the SEID.

This assessment of anticipated growth for the area and resulting demands on the SEID water supply system can be supported by capital cost charges for new development of \$5000.00 per lot.

I would be pleased to discuss any aspect of this report and provide additional information, if required, for your review. Please call me at 809-9024 if you have any questions.

Yours truly,



June 26, 2003

Paul Glen, P. Eng.
Rock Glen Consulting Ltd