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REPORT TO WILDERNESS MOUNTAIN WATER SERVICE COMMISSION
MEETING OF TUESDAY, MARCH 31, 2015

SUBJECT **COST ESTIMATE FOR A PROPOSED ELECTRICAL CABLE CONNECTION FOR PORTABLE GENSET**

ISSUE

To conceptualize and prepare a cost estimate to extend a buried electrical cable connection from the existing water treatment plant to a convenient location on Cains Way for a portable genset.

BACKGROUND

At the Wilderness Mountain Water Service Commission (commission) meeting of October 7, 2014 the commission requested that the Capital Regional District (CRD) staff investigate an option of providing an electrical cable connection from the water treatment plant (plant) site to a location at the end of the access road near Cains Way.

The intent of the cable would be to allow a portable generator set (genset) to be connected to the plant without having to transport a genset to the actual plant location. Further, the intent of the genset would be to provide backup power to the plant in the event that there was an interruption in BC Hydro's primary electrical service.

In terms of water storage, the water system design engineering company, Bullock Baur Associates, prepared a report dated February 9, 1996, indicating that the required storage volume consisted of the sum of fire flow (based on 400 Igal per minute for two hours or 48,000 Igal) plus 25% of the maximum day demand for balancing, totaling approximately 57,000 Igal.

The CRD staff measured the tank volumes and calculated the effective volume of the round tank to be approximately 24,500 Igal and the square tank to be approximately 30,300 Igal, totaling 54,800 Igal. The approximate seasonally daily usage is less than 20,000 Igpd and 10,000 Igpd in the summer and winter respectively as recently recorded by the CRD.

The access road to the plant is steep, granular surfaced, single-lane and large trees parallel the road which could limit access to the plant site should trees fall in a wind storm event. It should be noted that if fallen trees should occur along the access road, it would be expected that fallen trees would occur along the Ministry of Transportations and Infrastructure's road network as well which may impact the mobilization of a portable genset.

The issue related to providing a permanent stationary genset was raised in 2011 (attached staff report - WMWSC meeting of January 28, 2011 – Attachment 1) and at that time it was resolved to defer the genset purchase and rely on mobilizing a temporary genset from the CRD's inventory, subject to availability, or a local rental company if it was determined that the primary BC Hydro service would be interrupted for an extended period. The conceptual cost estimate for a permanent genset installation in 2011 was $43,000 which could be between $45,000 and $50,000 should a genset be purchased and installed in the near future. The revised cost reflects inflation and further refined cost estimates.

The CRD conceptualized the electrical cable connection, whereby a cable would be connected at the plant, buried paralleling or under the existing access road to a location near Cains Way for an approximate length of 230 metres at an estimated cost of $50,000 for construction, engineering

and contingency plus applicable tax (refer to Attachment 2). At the Cains Way terminus, a receptacle would be mounted on a post for the operator's connect the portable genset. A small level parking pad equivalent to a vehicle parking space would be created to accommodate the genset as well.

In the event that a genset would be mobilized and connected, the genset would remain onsite and run automatically for the duration as required and periodically attended to by the CRD operators to assess status and for refueling. Portable gensets are typically contained within a sound reduction enclosure and therefore, there would be a minor amount of noise to contend with during its deployment.

In terms of construction issues, a buried cable could be aligned within the existing access road, noting that the water main is in a similar alignment (exact location is unknown). Otherwise, a trench would have to be dug adjacent to the road through the underbrush and large tree roots and potentially bedrock. Exploratory test pits would assist in finalizing the cable alignment and depth of bury and locate the existing water main to ensure it is not damaged during construction. The construction activities may create turbid runoff and therefore, would have to be mitigated, possibly with erosion control structures and/or silt fencing and reseeding of and disturbed vegetation.

In terms of approvals, the land owner shall be consulted, possibility The Land Conservancy may have interest in the project as they did for the plant project and possibly an electrical permit in accordance with the BC electrical code.

ALTERNATIVES

Alternative 1 – Status Quo

That the Wilderness Mountain Water Service Commission receive this report for information and utilize the existing electrical connection at the water treatment plant should a genset be mobilized to site.

Alternative 2 – Electrical Cable Connection

That the Wilderness Mountain Water Service Commission direct the CRD staff to install a 230 metres cable and related works between Cains Way and the water treatment plant for the provision of a temporary genset at an estimated cost of up to $50,000 plus tax to be funded from the service's capital reserve account subject to available funding.

Alternative 3 – Permanent Standby Generator

That the Wilderness Mountain Water Service Commission direct the CRD staff to purchase and install a permanent genset at the water treatment plant for an estimated cost of up to $50,000 to be funded from the service's capital reserve account subject to available funding.

IMPLICATIONS

Alternative 1 - By not installing a cable, and should a primary BC Hydro power outage occur, the CRD can mobilize a portable genset to the plant, but there may be a situation whereby fallen trees would have to be cleared.

Should there be a delay in sourcing, mobilizing and commission a portable genset, the two existing water storage tanks contain a volume of water that could be used for a period, based on

seasonal demand, until primary or secondary power is restored or provided. Regardless of whether a cable is installed, any fallen trees would have to be removed eventually in order to gain safe access to the plant for the operators.

If the Commission pursues the installation of real-time data collection and reporting (SCADA), then the tank volume can be monitored and appropriate action taken.

If the power is out and the access road is not accessible, then the Commission may consider trucking potable water to the storage tanks until such time the plant is returned to normal operating service.

Alternative 2 - By installing a cable to connect the plant to the Cains Way location, the CRD operators will be able to energize the plant regardless of the condition of the plant access road. The cost of such an improvement is comparable to that of a permanent genset installation. The operating cost for a cable would be minimal and should be serviceable for decades, provided the demand for power does not significantly increase in the future.

Alternative 3 - Should the commission install a permanent genset the capital cost would be about $50,000 and there would be annual maintenance costs for consumable (fuel filters, oil, etc.) and testing activities to ensure serviceability, estimated at approximately $1,000 per annum. However the commission would have a full time dedicated genset to address all possible scenarios.

CONCLUSION

Although the concept of locating a receptacle at a location more accessible for the CRD operators in the event that primary power is not provided by BC Hydro, the capital and operating costs and logistics of construction are considered excessive and therefore, it is proposed not to provide the cable. Further, if SCADA equipment is installed the CRD operators will be better informed of the storage tank levels and be able to take action if and as required.

RECOMMENDATION

That the Wilderness Mountain Water Service Commission receive this report for information and utilize the existing electrical connection at the water treatment plant should a genset be mobilized to site.

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SM/TS:ls
Attachments: 2

Attachment 1

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REPORT TO WILDERNESS MOUNTAIN WATER SERVICE COMMISSION
MEETING OF FRIDAY 28 JANUARY 2011

SUBJECT **SUPPLY AND PURCHASE OF STANDBY POWER UNIT**

ISSUE

The Wilderness Mountain Water Service Commission desires to purchase and install standby power for the utility, to ensure continuity of water supply to the community during power outages.

BACKGROUND

The existing Wilderness Mountain Water system has two facilities that require power to operate. These are the Wilfred Reservoir intake/booster pump station and the hydropneumatic station at the Ambience Place tank site. The hydropneumatic station takes water from the two 140 m^3 (30,000 Imperial gallon) balancing storage tanks and boosts pressure to the upper zone, which would otherwise experience minimal pressure from the tanks. This zone has not received standby power in the past and it is not proposed in the future.

The Wilfred Reservoir intake/booster pump station site consists of an intake pump (7 ½ hp), chlorination equipment, lighting, heating, and general power outlets. In the past, a privately owned generator had been made available to meet demand from the Wilfred Reservoir to the two balancing storage tanks, during a power outage. This arrangement placed an undue burden on the generator owner, it also interfered with the accountability of qualified staff for safe and reliable operation of the system. This has been replaced in the interim with the Capital Regional District (CRD) agreeing to make a portable standby power source available to the community in an emergency event.

A review of the loading at the existing intake/booster pump station indicates the lake pump, chlorination equipment and lights can be operated with a 10kW generator. Design considerations, including operating environment, duty cycle, serviceability, manual or automatic start-up, and fuel type have significant implications with respect to cost and function of the standby power system. Generators designed for residential use typically would not meet the required standards for the commercial application that is the drinking water supply system and, as such, warranties would be voided. There are different options for fuel, each having advantages and disadvantages. As access to the site for recharging the fuel source during power outages would likely be under less than ideal conditions, diesel would be the preferred fuel. The CRD has several vehicles capable of transporting and dispensing diesel under poor road conditions. Having diesel close to the water source would require special attention to environmental protection, for example spill containment and spill kits. The choice of manual or automatic start up would likely be cost driven but, as the operator would have to travel to the facility, an automatic function may quickly pay for itself. If the unit is to remain in situ, an all-weather enclosure will be required with the generator on a concrete housekeeping pad. If sound attenuation is required, then additional costs will be incurred.

The CRD has retained a consultant (KWL) to review viable cost effective alternatives to provide water treatment that meets the various drinking water guidelines. The outcome of this review is not yet available, however they have indicated they are considering an alternate site for the treatment process train due in part to the residuals that will be generated by the proposed alternatives. It is also likely that the new process will include additional electrical loads.

The CRD has standard operating procedures for standby power sources, which would be applicable to the Wilderness Mountain Water service. The level of automation for the standby power system would be determined from these procedures.
A standby power system for the Wilfred Reservoir pump station would include the following components, with corresponding conceptual costs:

Item Description	Commercial Grade Unit
20 kW Generator	$15,000
Transfer switchgear	$ 5,000
Fuel Tanks	$ 3,000
Housekeeping pad/ building	$10,000
Design, delivery & installation	$10,000
TOTAL CONCEPTUAL COST ESTIMATE	**$43,000**

ALTERNATIVES

1. That the Wilderness Mountain Water Service Commission defer the decision to purchase and install a permanent standby power system until detailed design and cost estimates for the treatment upgrades are complete, and rely on mobilization of a potable unit during an emergency event.

2. The Wilderness Mountain Water Service Commission authorize the expenditure of up to $43,000 from Loan Authorization Bylaw No. 3504 for the purchase and installation of a commercial grade standby power system at the Wilfred Reservoir pump station site.

IMPLICATIONS

Alternative 1

The total treated water storage capacity for Wilderness Mountain of 280 m^3 would be sufficient for several days without power, particularly during the winter when demand is less. Without permanent standby power at Wilfred reservoir, the deployment of a portable unit during a power outage would require use of operating contingency funds. Firefighting capacity would be diminished during a power outage. Deferring the decision to proceed with a permanent generator would enable the future electrical design load to be considered for generator sizing, as well as determining whether the available funding is sufficient to include standby power in a construction tender. As an interim measure CRD staff have agreed to deploy a portable generator as needed to maintain continuity of water service.

Alternative 2

The purchase of standby power equipment was not part of the original capital upgrade project, which has a budget of $708,000. An additional $45,000 was included in the loan authorization when the service was converted to the CRD, but has not been assigned to the project. The additional funding may be allocated as directed by the Commission however, once used, it would no longer be available to address treatment issues if required. Treatment upgrades are required to meet the legislated requirements for the drinking water supply, while standby power is not. In addition to the capital cost of the unit, the Commission will need to budget for annual fuel and maintenance costs.

CONCLUSIONS

A permanent standby power system at the Wilfred Reservoir pump station site would benefit the community however, the design requirements for standby power will not be known until at least preliminary design and cost estimates have been completed for the treatment upgrades. Funds are available for the standby power unit however, deferring the project would ensure that the funds are used to the greatest benefit of the community.

RECOMMENDATION

That the Wilderness Mountain Water Service Commission defer the decision to purchase and install a permanent standby power system until detailed design and cost estimates for the treatment upgrades are complete, and rely on mobilization of a portable unit during an emergency event.

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Attachment 2

The conceptual cost estimate is as follows:

Description	Conceptual Cost Estimate	Comments/Notes
Civil		
Cable Trenching	$13,000	Electrical code compliant, assumes rock excavation
Genset Parking Pad	$1,000	Clear/grub/excavate/import granular material
Exploratory Test Pits/utility locates	$2,000	Locates, rubber-tired hoe, recording technician, etc.
Electrical		
Supply only/power cable	$7,000	Suitable for buried service, marker tape/planks, etc.
Supply Receptacle, post, etc.	$1,000	Terminus connections, etc.
Installation labour	$8,000	
Provisional		
Rock Excavation	$10,000	Unquantified, mob/demob, P/B survey, permits, etc.
Environmental	$3,000	Allowance for runoff mitigation and re-vegetation
Subtotal	**$45,000**	
Engineering and Contingency (~10%)	$5,000	
Total Estimated Cost	**$50,000**	Based on conceptual information
Plus applicable tax		