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2 September, 2009

Ms. Debra J. Oakman, CMA
Chief Administrative Officer
Comox Valley Regional District
600 Comox Road,
Courtenay, BC, V9N 3P6

Dear Ms Oakman:

RE: Hornby Island Fire Hall – Follow Up Study

We were engaged June 10, 2009 to conduct a follow up report to provide information requested by the Committee to assist in the decision for the future of the Hornby Island Fire Protection Services. The initial list of information requested was considerable and after meeting with staff it was agreed that this letter report would address only select issues raised. The full scope of information requested is attached as Appendix A.

We agreed to conduct the following:

• Clarifications on existing fire hall -	DEFER
• Survey work	PROCEED
• Analysis of survey grades	PROCEED
• Evaluation of mechanical and electrical costs	PROCEED
• Condition assessment	DEFER
○ Mechanical	
○ Electrical	
• Clarifications on New Fire Hall -	PARTIAL
• Pomeroy code comparison analysis	PROCEED
• Coordination of consultants	AS REQUIRED

We also discussed and supported the intention to use the services of Mr. Rob Owen and the office of the Fire Commissioner to provide a more 'official' and impartial review of the existing hall from an operational requirement. We understand that this has been done and will be presented for consideration along with this report.

Survey – 5% Slopes

- *Criteria: Provide slope information regarding the **existing site** and explore options and cost of achieving a road grade of 5% or less between the Fire Hall aprons and Central Road.*

The surveyor firm of Hoerburger Land Surveyors was engaged to conduct a topographic survey of the area to provide data with which to evaluate the site. The recommended slope guideline cited is 5% as being acceptable for moving loaded pumper trucks around the site. Slopes greater than this present a problem. Slope was also cited as a limiting condition by Mr. Owen of the Office of the Fire Commission. Standard Ministry of Transport (MoT) design guides also recommend reduced slopes in certain applications. Attached is an example where, after crossing a culvert such as the one off Central road, the recommended slope for commercial applications is +/- 2%.

The survey is attached for reference. The current slope from Central Road to the existing bays is 12%. There is a 9m elevation gain from the road to the back of the property. The survey plan shows how far down Central Road an access would have to be located to achieve 5%. As shown, even 130 m down the road to the entrance to the Emcon site will not achieve this grade. To access the back of the property one would have to acquire the Emcon site and start a road at the far end. That would achieve a 6% grade.

A review of the west side of the property was conducted in the same manner. The slope up off Central Road is 10% and on the adjacent property. The slope to get to the back of the property is 10.3%. A 5% slope into the existing bays can be achieved by starting the access 35m down Central Road on the adjacent property. A 7% slope to the back of the property can be achieved only if a road starts 70m along the road from the property line.

A 5% road grade can access the bays by moving the current accesses 20 – 30 m along the road in each direction. Both options require the acquisition of additional property.

It is not practical to develop a road system to access the back of the property which meets the criteria.

If property is acquired the cost to achieve these slopes to the cited standard is minor and estimated at less than $50,000 plus design fees.

- *Criteria: Provide slope information regarding the proposed **new site** as described in the Ministry of Transportation email of February 5/09. Identify options and cost for achieving a road grade of 5% or less between the Fire Hall aprons and Central Road.*

Two elevation lines were run across the potential site located across from the existing fire hall. Based on direction from the client, our understanding was that the lot was approximately 80m along the road

frontage by 100m deep. The proposed lot is uniformly graded at approximately 5% from Central Road to the back of the property.

The dimensions of the lot will be a factor in the eventual configuration of the hall design. If double loaded bays are imperative then there is judged to be sufficient space for various suitable alignments. All configurations will allow for the 5% guideline to be met on this site. No extraordinary costs will be involved with developing access from Central Road or from cuts or fill.

Evaluation of Costs

- *Criteria: Provide clarification and rationale for the 32% of total cost being for mechanical and electrical systems noted in the Ketza estimate.*

The construction industries are supported by firms that standardize and accumulate data on construction costs. Various sources attempt to create standardized formats for the presentation and formulation of construction costs. Data analysis allows unit rates to be developed for every aspect of construction and differentiates between types of construction i.e. residential versus commercial. Even within sectors of construction, such as commercial, cost data is accumulated and available to differentiate various types of commercial construction. This is necessary because the unit rate to build, say a hospital, is considerably different from that to build a fire hall.

After having reviewed a considerable database of construction project cost firms such as RS Means Building Construction Cost Data and Reed Construction Data have determined a statistically acceptable pattern for the estimation of mechanical and electrical costs for projects. This enables Owners, Architects, Engineers and contractors to reasonably estimate that portion of a project without developing details sufficient to send to particular mechanical or electrical trade firms for costing.

The percentage for mechanical and electrical varies based on opinion, local conditions, or market conditions but is generally within the range of 30 – 35% of total construction value similar to what the Ketza Pacific Construction Ltd estimator used. In this particular case, Ketza used their bid information on a recently quoted fire hall. Their information would have been based on actual quotes received from trade contractors. In their covering letter Ketza stated they used "job costing compiled in the construction of the North Cedar Fire Hall and consulting with Westbay Mechanical, Houle Electric, Tayco Paving and others..."

We contacted Ketza 5 August 2009 to further enquire on the matter. They have informed us that they have just won a contract to build a fire hall in Whitehorse. It is a $10M project of which the electrical and mechanical portions were 31% of the successful bid.

- *Criteria: Provide clarification regarding the 40% Remote Location Premium noted in the Pomeroy Report but not explored in the Ketza Report*

- *Criteria: Provide clarification regarding the Quality of Estimate of the Pomeroy Report.*

The Pomeroy estimate was based on their assessment of the methodology to be used in upgrading the masonry walls. They used real construction cost data from the completion of four recent seismic upgrade projects completed in Comox and Campbell River using similar techniques developed on these projects which also consisted of the upgrade of concrete block walls. Those numbers were from projects that were delivered well under budget using innovative and expedient methods of delivery. In other words, the numbers were likely as low and as accurate as possible as opposed to higher values if the same work was estimated by a Quantity Surveyor. It is therefore reasonable to conclude that the unit rates are accurate. The sources of the estimate from Pomeroy however, did not have a factor for the remote location of Hornby Island. Pomeroy chose to use a value of 40% premium based on the availability of accommodation for workers, the cost of transportation of building materials across two islands. This factor is difficult to estimate and it would be fair to say that any contractor bidding the work would be equally cautious of their costs.

Since publication of the report in October 2008 Pomeroy was engaged to conduct a similar evaluation of a seismic retrofit of a school on Cortes Island. In that case a Quantity Surveyor from Vancouver was used to estimate the work. The firm of Denis Walsh Associates Ltd estimated the work and then added a 30% allowance for the location factor for Cortes Island. A copy of their estimate can be made available on request. The conclusion is that the use of a premium of the magnitude of 30 to 40 % is reasonable.

Paragraph 6.0 of the Pomeroy evaluation (see Appendix A to the Option Analysis Report) states the qualifications of the Pomeroy report. Closer review will indicate that they have not estimated for Architectural, mechanical or electrical work nor building envelop work that would be triggered by the upgrade. They have also not estimated the cost of temporary accommodation for the fire hall and have assumed construction during non peak tourist seasons. These items would increase the costs but may be assumed to be covered by the 40% premium allowance.

The following is the response of Mr. John Wallace, P.Eng to the question posed regarding their estimate:

"The second question posed by the committee was regarding the 40% increase in base cost that we selected for Hornby Island. This selection was based on two considerations, firstly the isolation of the site from contractors that are familiar with the type of work required for this project. In cost terms this means increases due to travel time and accommodation of the construction crew. Material cost will be higher as well, but labour cost are the largest cost item. The second consideration at the time of the report was the very busy construction market. Our experience was that more isolated projects were prices highly, not just for the extra travel time and accommodation, but also to accommodate higher hourly rates to even attract crews who would be willing to take the work. The contractors also had higher overhead costs and greater profit expectations for locations such as Hornby. The construction cost premium today is likely to be less than it was in Sep. 2008, though we would

not assume less that 25 to 30 percent, unless a Construction Manager and capable local crew could be found then costs could further decrease. In general, now is a good time to build as construction costs are significantly less that in recent years."

John A. Wallace, P.Eng., MIStructE, Struct.Eng.
Director
Structural Engineering

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Clarification on New Fire Hall

- *Criteria: Explore Options and develop estimated cost for the demolition and removal of existing fire hall including estimated cost of a contaminated site study.*

This aspect is to be addressed 'partially'. The risk to the existing site is contamination from hydrocarbons. The crew conducts small fire training by using cooking oil and other fuels set alight in a metal drum. Evidence was observed that the soil around this area is contaminated. As well there is a large fuel tank on the adjacent property. The generator, which also straddles the property line, would also require the soil around it to be examined. A current quote for a hydrocarbon site investigation of a 30m x 60m area by a geotechnical engineering firm is in the $30,000 range through drilled investigation. The eventual cost for the fire hall would depend on the findings and permeability of the soil. A preliminary investigation could be conducted more cheaply with localized digging with a backhoe or shovel and sending samples off to a lab for testing. That would effectively give an indication of what problem may exist.

Costs to demolish the fire hall would depend on the amount of de-construction that could occur, or alternatively, be required. While deconstruction for re-use reduces landfill fees, unless the labour can be acquired inexpensively, the labour costs exceed the value. Using an excavator, with no consideration to separating waste streams, the existing walls could be pulled down quite inexpensively. It is assumed that operational components such as radio tower and tanks are previously relocated to the new hall. Some options would be:

- Deconstruction – using the volunteer force, over a period of time, all salvageable material could be removed so long as the structural elements are not de-stabilized. Re-use is a strongly support ethic in the community and it may be possible to make considerable progress at low cost. Once all re-useable materials have been removed, the structure could be brought down quickly with concrete used as fill, steel separated and sold as scrap, and wood burned, or ground and composted.

- Demolition and Segregation – this option would use an excavator to tear down the building and, using the equipment, separate concrete material from steel from wood. Disposal options would be evaluated with concrete being used as fill, steel sold for scrap, and wood burned or buried.
- Demolition and Disposal – this option is to use an excavator to claw the material into a pile and landfill it.

A reasonable estimate could be provided once the expectations of the client are identified.

General

- *Criteria – Provide updated escalation/de-escalation of costs for both estimates*

In early 2008 escalation was estimated by Quantity Surveyors at 1.5% per month or 18% a year. The escalation used in the report in late 2008 recognized the declining economy which was reflected in the then current escalation factor of 0.75% per month or 9% per year. In early 2009 escalation was being considered as 0.25% per month or 3% per year and this value is still currently being used.

The estimates in the report took escalation to November 2009. This assumed the project would move forward. The escalation factor is relative for both options:

- New construction $1,700,000 with escalation to Nov 09 using 0.25% per month for one year say, is $51,000 vice $178,500.
- Renovate $1,000,000 with escalation to Nov 09 using .25% per month for one year say, is $30,000 vice $105,000

Application of the new escalation factors does not change the cost comparison and the conclusion that one could build new for what it would cost to renovate the existing site.

A consideration worth note is that the November 2009 escalation calculation is now moot as construction will not commence at that time. As the project has not moved forward, and a ten month period has passed, escalation has cost the project 2.5% or on the new construction option $42,500.

- *Criteria – Provide a narrative comparison of the 1998 and 2006 BC Building Code, exploring how the new code affects the cost comparisons regarding post disaster standards.*

The following is the response from Mr. John Wallace, P.Eng of Pomeroy now Genivar.

"*We understand that the committee for this project would like clarification or more explanation on two points regarding our September 30th, 2008 report.*

The first item was a need for further understanding of the differences between the post disaster requirements for seismic design in the current 2006 BC Building Code compared to the former 1998 BC Building Code. The codes are different in a few respects, generally as follows:

1. *The forces level are down in the 2006 code from the very high force level in the 1998 code, the consequences of this however do not change seismic upgrade requirements in a substantial way, nor the costs.*
2. *The code requirements for ductility of post-disaster structures has increased in the 2006 code (section 3.1 of the report) which results in the need for special detailing and construction of masonry shear walls. These requirements are very difficult to achieve in existing unreinforced construction.*
3. *The 2006 code also specifies limits on the irregularity of all structures, with more stringent requirements for post-disaster facilities. The good seismic performance of relatively symmetrical (both in plan, vertically and in terms of mass distribution) structures has been well documented but until the 2006 code this knowledge was for the most part not very specific.*

John A. Wallace, P.Eng., MIStructE, Struct.Eng.
Director
Structural Engineering

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Burnaby, BC V5H 1Z6"

Conclusion

This letter report attempts to meet the abbreviated requirements defined in the engagement letter signed June 10, 2009. If there are items that require amplification or more detailed estimates then we would be pleased to pursue those as it assists the CVRD and Hornby Island in making a decision. Thank you for this opportunity to address the matters outlined above.

Yours truly,

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Blair Pettis, P.Eng, MEng, MBA

Appendix A

From CVRD email dated 8 April, 2009

Schedule "A"

Scope of Work

Purpose:

To provide further information and clarity regarding the comparison of the two options as presented in the Options Analysis of October 2008. The goal of this information will be to demonstrate comparability of the capital cost estimates. This information will assist the Select Committee during the public information phase of the fire hall renewal project.

The consultant will provide the following information:

Repair existing fire hall option:

- Explore alternatives, with estimated costs, for the continued operation of the fire department during the repair construction, including but not limited to storage of fire/rescue apparatus and equipment, operational administration, and communications.

- Provide slope information regarding the existing site and explore options and cost of achieving a road grade of 5% or less between the Fire Hall aprons and Central Road.

- Provide clarification regarding the 40% Remote Location Premium noted in the Pomeroy Report but not explored in the Ketza Report.

- Show contingency allowances for each comparison estimate at levels consistent with the unknowns in each case.

- Provide clarification regarding the exclusions confirmed in Appendix "A" and "C" of the Options Analysis and ensure that they are compatible.

- Provide clarification regarding the Quality of Estimate of the Pomeroy Report. A copy of the cover letter may suffice.

- Provide allowances for mechanical and electrical upgrading to provide consistency with the "Build new fire hall option"

Build new fire hall option:

- Provide slope information regarding the proposed new site as described in the Ministry of Transportation email of February 5/09. Identify options and cost for achieving a road grade of 5% or less between the Fire Hall aprons and Central Road.

- Explore options and develop estimated cost for the demolition and removal of existing fire hall, including estimated cost of a contaminated site study.

- Explore options and costs to move fire hall operations to a new fire hall, including but not limited to moving the radio tower and stand-by generator.

- Provide clarification and rationale for the 32% of total cost being for mechanical and electrical systems noted in the Ketza estimate.

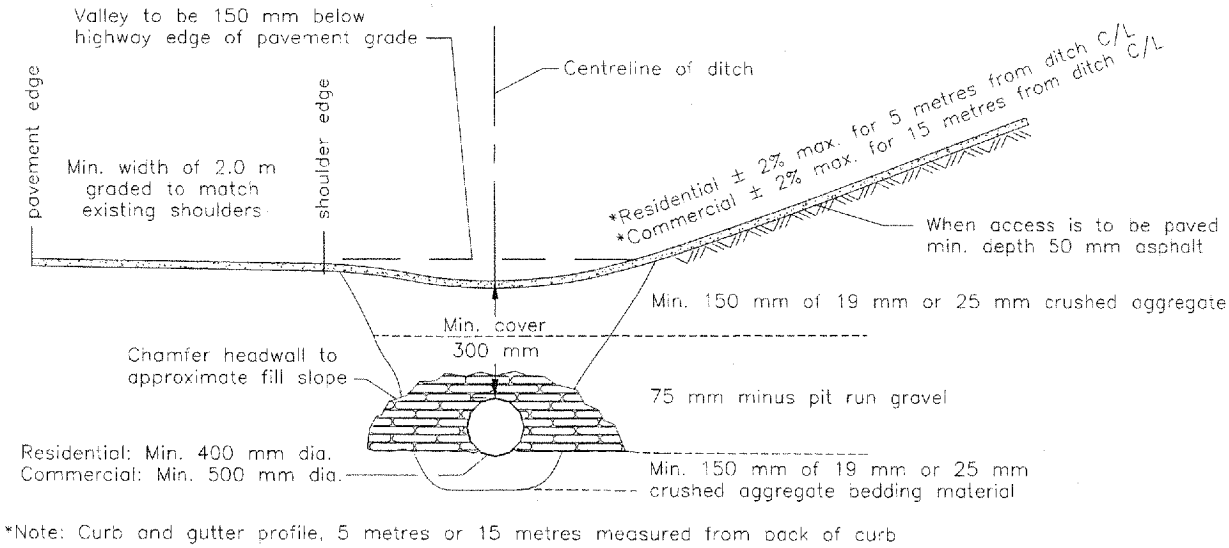
- Show contingency allowances for each comparison estimate at levels consistent with the unknowns in each case.

General:

- Provide updated escalation/de-escalation of costs for both estimates.

- Provide a narrative comparison of the 1998 and 2005 BC Building Code, exploring how the new code affects the cost comparisons regarding post disaster standards.

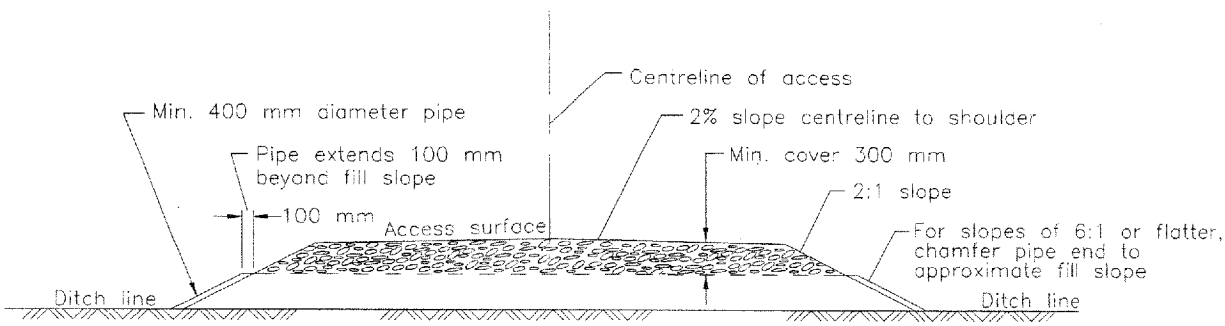
Figure 1520.K Culvert Installation



NOTE:

- *Refer to BC Supplement to TAC Geometric Design Guide for comprehensive bedding and backfill details.*
- *Minimum pipe size may be increased at the discretion of the Ministry Representative.*
- *Minimum cover shall dictate invert elevation.*
- *See Notes under **Figure 1520.D**.*

Figure 1520.L Driveway Cross Section



Driveway Culvert Installation: See **Figures 1520.K & 1520.M**

Residential Driveways: All driveway culverts shall be a minimum 400 mm diameter but may be increased at the discretion of the Ministry Representative.
Commercial Driveways: Cross and side culverts require a 500 mm minimum diameter.

TOPOGRAPHIC PLAN OF PART OF THE EXISTING AND PROPOSED HORNBY ISLAND FIRE HALL.

SCALE: 1:500 (METRIC)

0 5 10 20 30 40m

ALL DISTANCES ARE IN METRES

ELEVATIONS ARE BASED ON AN ASSUMED DATUM.

LEGEND:

BEARINGS ARE ASTRONOMIC AND DERIVED FROM PLAN 40 T 1363.

- STANDARD CAPPED IRON POST FOUND
- TRAVERSE STATION SET
- SPOT ELEVATION

N

REMAINDER
NW 1/4 SECTION 11

PROPOSED NEW LOT LINE

PROPOSED NEW LOT LINE

GATE

DRIVEWAY

EDGE OF PAVEMENT

PROPOSED NEW LOT LINE

SLOPE = 3.10%

SLOPE = 5.0%

EDGE OF PAVEMENT

SLOPE = 7.0%

SLOPE = 5.0%

DRIVEWAY

SLOPE = 10.7%

SLOPE = 10.3%

BOREHOLE

FUEL TANK

FUEL TANKS

2 STOREY FIREHALL

CENTRAL ROAD

POWER POLE

DRIVEWAY

SLOPE = 8.0%

SLOPE = 12.3%

SLOPE = 7.0%

BLOCK C
PLAN 4T1013

BLOCK H
PLAN 40T1363

OVERHEAD WIRES

SLOPE = 8.0%

REMAINDER
NW 1/4 SECTION 11

EDGE OF PAVEMENT

EMCON DRIVEWAY

BLOCK D
PLAN 4T1013

REMAINDER
NW 1/4 SECTION 11

BLOCK B
PLAN 12T17DA

HOERBURGER LAND SURVEYORS
COMOX, B.C.
250 - 0100
FILE: 14377P1 USE3
JUNE 25, 2009