

## VandenBerghe, Alissa (Consultant)

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**From:** Nykamp, Monique (Consultant)  
**Sent:** Wednesday, March 25, 2009 8:55 AM  
**To:** Williamson, Alec  
**Cc:** Clark, Gordon T. (Consultant); Struthers, James; 'Red Robinson'  
**Subject:** FW: comments from Gordon  
**Follow Up Flag:** Follow up  
**Flag Status:** Red  
**Attachments:** SW TASK AC Y-10393\_cost\_negot.pdf; Comments on Tunnel Exploration Scope from GC.pdf

Hello Alec

I received the comments that Gordon Clark provided for the the proposed exploration plan for the bored tunnel. The document he reviewed was our scope of work and attachments for the first phase of the explorations that are currently underway. Gordon reviewed the version of the scope that was prepared prior to negotiation, so some of the comments do not apply to the approved scope of work. I have numbered his comments in the attached PDF file. Our responses are as follows:

#1: The listing of tunnel vs.. portal borings is correct on Table 1. The total number of borings in the scope is also correct, it is just the designation that does not match.

#2, #5. The scope listed that 1 to 3 VWPs (average of 2) will be installed in each boring. Table 1 indicates 2 in each boring. Since Table 1 has a specific listing of borings, we had to assign a number of VWPs to each boring. However, we want the flexibility of putting more in some borings and less in others, and that is why the scope document has the variable number. The total number of VWPs does not change.

#3, #6, #13. The approved scope document has the language that the wells will be monitored through December 2009, which is the end of our contract. Monitoring can continue in 2010, but would have to be performed under a separate contract.

#4. We intentionally did not include the tunnel zone in Table 1 since the alignment and depth were in flux. The current alignment has raised the tunnel slightly, therefore the proposed boring depths should be sufficient. We do not plan on changing the boring depths unless the tunnel alignment is deepened.

#5. See above #2

#6. See above #3

#7. Laboratory tests will be performed on samples obtained from the borings. Table 1 is meant to represent the boring locations, not the individual lab tests.

#8. Agree with comment. We will plan on doing quartz content determinations (within the scope) on the same samples where Miller Abrasion tests are performed.

#9. Agree with comment. This is our planned approach.

#10. Agree with comment. We will evaluate particle shape.

#11. Due to the size of the borings and sonic cores, we do not anticipated recovering significant amounts of cobbles. The cobbles that are recovered will likely be if diverse rock types and mineral content. For those cobbles that are recovered and where testing is performed, we will assess rock type from the broken pieces of rock and evaluate hardness, mineralogy and mineral content from visual examination of hand specimens. We do not currently have in the budget to prepare thin sections for more sophisticated mineralogical analyses.

#12. We will prepare profiles consistent with what we have done previously, which includes geologic unit determinations and statements regarding interpretation limits.

#13. See above #3

#14. This is WSDOT language inserted into the scope document.

#15. This is the first phase of the exploration program. The boring spacing was selected to be closer at the south portal since this is an area where design needs to commence soon. The boring spacing along the tunnel was generally selected to be at about 1,000-foot spacings, with adjustments for site access and areas of critical interest (e.g. BNSF tunnel and EBI). In the second phase of drilling we plan to try and get borings about every 300 feet, depending on access.

#16, #19. This was not done because the tunnel profile was not well defined at the time the scope was submitted.

#17. The costs were developed based on separate line items for each test. Perhaps Gordon did not have the table that had the detailed cost breakdown. It is attached for your reference. Also, for the first phase of drilling, we intentionally did not include a significant number of engineering tests because the tunnel alignment has not yet been finalized. We plan on obtaining preliminary engineering parameters based on the results of the shear wave velocity testing, and other tests included in the scope. For the second phase of exploration, we plan to do double sampling in the tunnel zone and perform additional engineering tests, depending on the anticipated geologic units and the information required for design.

#18. The slug tests are also summarized on the attached cost estimate breakdown. In addition to slug tests to evaluate permeability, we are also performing laboratory permeameter tests.

#19. See above #16

In our opinion, the above comments do not warrant a change in scope, schedule or budget. If you have any other questions or comments, please let us know.

Thanks

Monique

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