REGIONAL DISTRICT
of Fraser-Fort George

INVITATION TO TENDER
CS-22-07

SUPPLY AND INSTALLATION OF ANTENNA TOWER

Regional District of Fraser-Fort George
155 George Street, Prince George BC V2L 1P8
Telephone 250-960-4400 / Toll Free 1-800-667-1959 / Fax 250-562-8676
http://www.rdffg.bc.ca

TABLE OF CONTENTS

1.0 INVITATION AND INSTRUCTIONS

The Regional District of Fraser-Fort George (the "Regional District") invites tenders for the supply and installation of an antenna tower for Regional District property located at 5645 Buckhorn Lake Road, Prince George, BC.

The Regional District's objective is to award a contract to the successful tenderer who can demonstrate the ability to deliver a high quality, well managed project.

1.1 Tender Documents

Tender documents may be obtained on, or after, **December 15, 2022**:

a) in a PDF (public document format) file format from the Regional District's website at www.rdffg.bc.ca; and
b) on the BC Bid® website at www.new.bcbid.gov.bc.ca.

All subsequent information regarding this ITT, including addenda and answers to questions will also be available as above.

It is the sole responsibility of the tenderer to ascertain that they have received a full set of the ITT documents. Upon submission of their tender, the tenderer will be deemed conclusively to have been in possession of a full set of the ITT documents.

Inquiries relating to this ITT are to be directed by email to the Project Manager:

Bonnie Seitz, Community Public Safety Assistant
Regional District of Fraser-Fort George
Email: bseitz@rdffg.bc.ca

1.2 Closing Date and Time

Submissions to ITT CS-22-07 will be received until **2:00:00 p.m. local time on January 26, 2023**. Submissions received after the stated closing date and time will be disqualified and not considered by the Regional District.

1.3 Tender Submissions

Submissions to ITT CS-22-07 may be delivered to the Regional District office by mail, drop off, courier or by email. Submissions by fax will NOT be accepted.

For delivery by **mail, drop off or courier** submissions must be enclosed in a sealed envelope with the following information written on the outside of the delivery envelope:

a) Attention: General Manager of Financial Services
Regional District of Fraser-Fort George
3rd Floor 155 George Street
Prince George, BC V2L 1P8

b) INVITATION TO TENDER CS-22-07
SUPPLY AND INSTALLATION OF ANTENNA TOWER

c) Responding organization's name and address.

For **email** submissions:

a) Email the completed submission to:
General Manager of Financial Services
purchasing@rdffg.bc.ca

b) In the email subject line put **RDFFG CS-22-07** and tenderer's **Business Name.**

c) For closing purposes, the official time of receipt of the submission is determined by the time of the receipt of the email. Submissions received by email after the closing date and time will not be accepted.

d) The responsibility for submitting a response to this ITT to the correct email address on or before the closing date and time will be solely and strictly the responsibility of the tenderer. Submissions sent to any email address other than the one identified in Section 1.3 will not be accepted.

e) Maximum file size able to be received by the Regional District is 35 MB.

To be considered, tenders must be signed by an authorized signatory. By signing the tender, the tenderer is bound to the statements made in response to this ITT. Any tender submission received by the Regional District that is unsigned will be rejected.

1.4 Regional District's Right to Reject Tender

The Regional District reserves the right, in its sole discretion, to waive informalities in tenders, reject any and all tenders, or accept the tender deemed most favourable in the interests of the Regional District. The lowest, or any tender, will not necessarily be awarded.

Tenders which contain qualifying conditions or otherwise fail to conform to the instructions contained in this ITT may be disqualified or rejected. The Regional District may, however, in its sole discretion, reject or retain for its consideration tenders which are non-conforming because they do not contain the content or form required by the ITT, or for failure to comply with the process for submission set out in this ITT, whether or not such non-compliance is material.

The Regional District reserves the right to reject a tender based on potential or perceived conflict of interest on the part of a tenderer. Without limitation, the Regional District reserves the discretion to reject any tender where:

a) one or more of the directors, officers, principals, partners, senior management employees, shareholders or owners of the tenderer, is an officer, employee or director of the Regional District, or is a member of the immediate family of an officer, employee or director of the Regional District; or

b) in the case of a tender submitted by a tenderer who is an individual person, where that individual is an officer, employee or director of the Regional District, or is a member of the immediate family of an officer, employee or director of the Regional District.

When submitting a tender, the tenderer is required to complete, sign, and include with their tender a Conflict-of-Interest Disclosure Statement (Appendix A).

The Regional District reserves the right to reject any tender submitted by a tenderer who is, or whose principals are, at the time of tender, engaged in a lawsuit against the Regional District in relation to work similar to that being proposed.

1.5 Waiver of Claims for Compensation

Except for a claim for the reasonable cost of preparation of its tender, by submitting a tender, each tenderer irrevocably waives any claim, action, or proceeding against the Regional District including, without limitation, any judicial review or injunction application, and any claim against the Regional District and its elected officials, officers and employees for damages, expenses or costs, loss of profits, loss of opportunity or any consequential loss for any reason, including any such claim, action or proceeding arising from:

a) any actual or alleged unfairness on the part of the Regional District at any stage of the tender process, including without limitation, any alleged unfairness in the evaluation of a tender or award of a contract;

b) a decision by the Regional District not to award a contract to that tenderer; or

c) the Regional District's award of a contract to a tenderer whose tender does not conform to the requirements of this ITT.

1.6 Ownership of Tenders

All materials produced by the Contractor for the Regional District including, but not limited to records, reports, drawings, as built drawings, and manuals to fulfill this Contract will be provided in hard copy as well as in an agreed upon electronic file format and will become and remain the exclusive property of the Regional District without restriction.

Any materials provided by the Regional District to the Contractor as a result of this Contract will remain the exclusive property of the Regional District and upon receiving written notice from the Regional District requesting delivery of the same, be immediately delivered to the Regional District by the Contractor, whether such notice is given before, upon, or after the expiration or sooner termination of this Contract.

1.7 Confidentiality and Freedom of Information

Tenders will be received and held in confidence by the Regional District, subject to the provisions of the *Freedom of Information and Protection of Privacy Act* and this ITT. Each tender should clearly identify any information that is considered to be confidential or propriety information. Tenderers are responsible to review the *Freedom of Information and Protection of Privacy Act* for further information.

All tenders submitted to the Regional District becomes the property of the Regional District. The Regional District will provide a debriefing for tenderers, upon request by a tenderer, subject to the *Freedom of Information and Protection and Privacy Act*.

The Contract resulting from this ITT process is subject to the provisions of the *Freedom of Information and Protection and Privacy Act*. The Contractor will treat as confidential and will not, either before, or after the expiration or sooner termination of this Contract, without the prior written consent of the Regional District General Manager of Corporate and Legislative Services publish, release or disclose or permit to be published, released or disclosed, any information supplied to, obtained by or which comes to the knowledge of the Contractor as a result of this Contract except insofar as such publication, release or disclosure is necessary to enable the Contractor to fulfil their obligations under this Contract, or by the laws of British Columbia.

1.8 Errors, Omissions, Clarifications

Tenderers finding discrepancies, errors, or omissions in this ITT, or requiring clarification on the meaning or intent of any part therein, should immediately request in written form **by email**, clarification from the Project Manager Bonnie Seitz, bseitz@rdffg.bc.ca. The Regional District will not accept responsibility for any damages, costs or expenses incurred by a tenderer in reliance on oral instructions. Any work done in preparation of a tender after discovery of discrepancies, errors, or omissions in the ITT will be done at the tenderer's risk unless the discrepancy, error, or omission is reported in accordance with this provision.

Any requests for explanations, interpretations, or clarifications made by tenderers must be submitted in writing by email to the Project Manager by 2:00 p.m. on **Thursday, January 12, 2023,** in order that addenda, if necessary, are available to all tenderers in time to be considered for the preparation of their tender.

If the Regional District, in the Regional District's sole discretion, determines that a clarification, addition, deletion, or revision of the ITT is required then the Regional District will issue an addendum and the

addendum will be posted on the Regional District's website and BC Bid (see S. 1.1). **It is the sole responsibility of the tenderer to check for addendums.**

All addenda, if any, issued for this ITT must be signed by the tenderer and included with the tender submission and will form part of the Contract documents.

1.9 Proof of Ability

Tenderers will be competent and capable of performing the work as described as detailed in Appendix C – Scope of Work & Specifications. The tenderer may be required to provide evidence of previous experience and financial responsibility before a contract is awarded.

1.10 Sub-Contractors

a) The Regional District will accept tenders where the tenderer proposes to have sub-contractors provide some of the services so long as the tenderer is the lead entity and has sole responsibility to deliver the services under the Contract. The Regional District will enter into a contract with the Contractor only.

b) Sub-contractors will be bound by all the terms and conditions of this ITT and resulting Contract with the Contractor, including, but not limited to Insurance, Indemnity, Conflict of Interest and Confidentiality.

c) All sub-contractors and the work that they will be performing must be clearly identified in the tenderer's tender on the List of Sub-Contractors form. No additional sub-contractors will be added, nor other changes made, without the written consent of the Regional District.

2.0 TENDER FORMAT

Tenderers are asked to respond utilizing the following format and sequence of their tender in order to provide consistency in tenders and to ensure each tender receives full and complete consideration.

a) Tenderers will complete pages 14 through 19:

- Tender Form: to be completed, signed, and witnessed.
- List of Sub-Contractors: to include sub-contractor's legal name and the work to be performed by the sub-contractor.
- Tenderer's Experience in Similar Work: a minimum of three (3) references are required, to include a brief description of projects similar in size and scope to this ITT, together with the corresponding contact names and phone numbers for reference checks.
- Schedule of Prices to include: Project Price; Taxes Payable; Total Contract Price; GST Tax Registration Number; WorkSafeBC Registration Number; Work Completion Date; tenderer's name; address; telephone number; email address; and signature of the authorized person.
- Completed Appendix A – Conflict of Interest Disclosure Statement.

b) **All addenda, if any, issued for this ITT. Each addendum must be signed by the tenderer and included with the tender and will form part of the tender documents.**

c) A Start to Completion Workplan: to include construction start date, milestones, and completion dates.

d) Drawings of the tower, foundation, and antenna line bridge

e) Additional information that the tenderer may choose to provide.

3.0 TENDER EVALUATION

Evaluation of tenders will be by a committee formed by the Regional District in order to provide a recommended award of contract. Tenders should be clear, concise, and complete. The following tender evaluation methodology will be used by the committee to evaluate the tenders received:

a)	Compliance with ITT requirements and Appendix C – Scope of Work & Specifications	**35%**
b)	Project management experience, length and quality of experience of the tenderer in doing similar work	**20%**
c)	Acceptability of reference checks conducted by the Regional District	**5%**
d)	Start to Completion Workplan and acceptable schedule	**10%**
e)	Price	**30%**
	TOTAL	**100%**

Where tender prices are the same, the Regional District will consider the tenderer's experience in similar work beyond the minimum standards established in this ITT.

Throughout the evaluation process, the Regional District, at its sole discretion, may request additional written clarification and/or supplemental information from selected Tenderers as part of the evaluation process.

4.0 CONTRACT

4.1 Form of Contract

The Contract will be in the form of:

- the complete CS-22-07 ITT document, including appendices and any addenda;
- Tenderer's tender submission; and
- a Contract Agreement similar to the sample provided in Appendix B of this ITT.

4.2 Examination of Tender and Contract Documents

The contractor will satisfy themselves as to the practicability of executing the work in accordance with the contract, and they will be held to have satisfied themselves in every particular before making up their tender by inquiry, measurement and calculation.

All measurements within this tender document are approximate. The contractor will be responsible for any final measurements required for the purpose of preparing a tender.

The contractor will be deemed to have satisfied themselves as to the sufficiency of the tender for the work and the Total Contract Price stated in the Schedule of Prices. The Total Contract Price will cover all the contractor's obligations under the Contract, and all matters necessary to the proper completion and maintenance of the work, and will include the supply of all labour, equipment, transportation, materials, supervision, services, warranty, taxes and assessments, together with the contractor's overhead and profit, except where otherwise provided for in the Contract.

4.3 Award of Contract

The Award of Contract is anticipated to be made not later than **Thursday, February 16, 2023**. All Tenderers will be advised in writing of the results of the ITT evaluation process.

The Regional District, in its sole discretion, may delay the Award of Contract date as deemed appropriate by the Regional District. The tenderer awards the Contract (the "Contractor"), will have fourteen (14) calendar days to provide the required insurance certificate under Section 11.0 and proof of WorkSafeBC Coverage in Section 12.4 upon notification that the Regional District has accepted its tender.

5.0 START TO COMPLETION WORKPLAN

As specified in Section 2.0 c), the tender submission will include a Start to Completion Workplan. At a minimum, the work is to be completed by **September 30, 2023.** At the discretion of the Regional District, the Contract completion date may be extended.

6.0 WARRANTY

The Contractor will provide a one-year warranty against defects on all work completed. The one-year warranty period will begin on the project completion date and will be over and above the fifty-five (55) day performance assurance holdback referred to in Section 9.0.

7.0 CONTRACT PRICE

The Schedule of Prices must be completed and included in the tender submission. All prices for the work shall be stated in Canadian dollars. Any applicable Federal or Provincial taxes, or levies, must be included in the Total Contract Price, but are to be listed separately from the Total Contract Price. The Total Contract Price must be open for acceptance for sixty (60) calendar days after the closing date and time, unless otherwise stated by the Regional District.

8.0 PAYMENT

Following completion of the work, the Regional District will pay for the work completed to the Regional District's satisfaction, by the thirtieth (30th) day of the month following that for which payment is required on receipt by the Regional District of an invoice from the Contractor. The Regional District will inspect the work before making payment. No payment will be made for materials supplied by the Regional District.

9.0 HOLDBACK

The Regional District may withhold 15% of the total payment due under the Contract as a performance assurance holdback. The holdback will be released to the Contractor once the following two conditions have been satisfied:

a) the work has been completed to the satisfaction of the Regional District; and

b) the Regional District has received notification from WorkSafeBC that all required WorkSafeBC assessments have been paid for the period covering the Contract term.

10.0 CHANGES

The Regional District, without invalidating the Contract, may make changes by altering, adding to, or deducting from the work. The Contractor will proceed with the work as changed and the work will be executed under the provisions of the Contract. No changes will be undertaken by the Contractor without written order of the Regional District, except in an emergency endangering life or property, and no claims for additional compensation will be valid unless the change was so ordered. The Regional District will entertain no payment for extra work or changes in the Contract unless a "Change Order" form is completed and signed by the Regional District and the Contractor.

11.0 INSURANCE

The Contractor shall, without limiting its obligations or liabilities, and at its own expense, provide and maintain throughout the Contract term, the following insurances with insurers licenced in the Province of British Columbia, in forms acceptable to the Regional District. All required insurance (except automobile insurance on vehicles owned by the Contractor) shall be endorsed to show the Regional District as additional insured and provide the Regional District with thirty (30) days' advance written notice of cancellation or material change. The Contractor will provide the Regional District with evidence of the required insurance, in a form acceptable to the Regional District, upon notification of award and prior to the execution and delivery of the Contract:

a) Commercial General Liability (CGL) in an amount not less than $3,000,000 inclusive per occurrence insuring against bodily injury and property damage and including liability assumed under the Contract. The Regional District is to be added as an additional insured. Such CGL coverage shall include the following liability extensions: Contingent Employers Liability, Broad Form Products & Completed Operations, Personal Injury, Blanket Contractual, and Cross Liability.

b) Automobile Liability on all vehicles owned, operated, or licensed in the name of the Contractor in an amount not less than $2,000,000 per occurrence.

c) Non-owned Automobile Liability insurance in an amount not less $2,000,000 per occurrence.

d) Equipment insurance on all equipment owned or rented by the Contractor to its full insurable value.

The Contractor shall ensure that all sub-contractors forming from this Contract meet the insurance requirements outlined in Section 10.

It is the sole responsibility of the Contractor to determine if additional limits of liability insurance coverage are required to protect them from risk.

12.0 SERVICE SPECIFICATIONS

12.1 Start and Duration of Contract

The Contract becomes effective upon execution by both parties and will remain in force until completion of the work.

12.2 Permits and Regulations

The Contractor will, at their own expense, procure all other permits, certificates, and licences required by law for the execution of the Work and will comply with all federal, provincial and local laws and regulations affecting the execution of the Work, save in so far as the Contract Documents specifically provide otherwise.

If the Contractor shall discover any provision in the Contract that is contrary to or inconsistent with any laws or regulations, the Contractor will notify the Project Manager in writing.

12.3 Service Level

The Contractor will exercise good public relations while fulfilling their responsibilities under the Contract and will ensure their employees and sub-contractors do the same. The Contractor will ensure their employees and sub-contractors have sufficient knowledge, skill and experience to properly and safely perform the work.

12.4 WorkSafe BC

The Contractor will use due care and take all precautions to assure the protection of persons or property and will comply with the Workers' Compensation Act of the Province of British Columbia.

Prior to undertaking any of the work in this Contract, the Contractor will provide their WorkSafeBC number and will keep current all assessments required to be paid in relation to the Contract amount. The Contractor will provide a clearance letter from WorkSafeBC to the Regional District prior to the execution of this Contract.

12.5 Vaccination Policy

The Regional District of Fraser-Fort has a Communicable Disease Plan and supporting program to minimize the risk of COVID-19 and other identified infectious agents capable of transmission in our operations. The Regional District has implemented a COVID-19 targeted vaccination compliance program as an additional measure towards protecting our workers, contractors and customers from workplace exposure to the COVID-19 virus and to take reasonable measures to ensure uninterrupted service delivery.

a) Any Regional District employees working with the successful tenderer or the tenderer's workers will be fully vaccinated.

b) The Contractor will ensure that any workers and/or sub-contractors it provides for this project that are required to work inside a Regional District facility or work side-by-side with Regional District employees are fully vaccinated.

Fully vaccinated individuals are those that have obtained a full series of COVID-19 vaccines authorized by Health Canada. All Individuals must be prepared to provide proof of vaccination by way of a BC Vaccine Card in a digital or paper version (or equivalent format if vaccinated in a different jurisdiction) when requested to do so. Tenderers and contractors that do not reside in Canada and commute across border will be required to produce validated International Entry documentation prior to entering Regional District facilities.

12.6 Damage to Existing Property or Facility

In the event of damage to the Regional District's facility or property arising from actions of the Contractor, their employees or sub-contractors, the procedure will be as follows:

a) The Contractor will immediately advise the Regional District of any damage to the Regional District's facility or property.

b) Upon investigation, the Regional District will notify the Contractor of damages to be repaired.

c) If the Contractor does not reply within twenty-four (24) hours, the Regional District will repair, to the appropriate specifications or regulations, and deduct the cost of the repair from payment to the Contractor.

13.0 INDEMNITY

Notwithstanding the compliance of the Contractor with all the clauses concerning insurance, the Contractor shall indemnify, protect, and save harmless the Regional District, its officials, officers, employees, volunteers, servants, and agents from and against any and all liabilities, damages, losses, claims, costs, expenses of any kind whatsoever (including reasonable legal costs, hereafter referred to as "claims") arising from the Contractor's negligence, errors or omissions, including any such claims brought by a third party against the Regional District for personal or bodily injury, including death, or for property damage, that arise out of, or are connected with, or caused by the negligence, or other error or omission in the performance of the work, on the part of the Contractor and its directors, officers, employees, agents and sub-contractors. If the Regional District pays, or is required to pay, any claims, or if the property of the Regional District is charged or encumbered by any liens, judgments or other charges as a result of any claims, then the Regional District shall be entitled to recover from the Contractor all damages, costs, fees or other charges

incurred by the Regional District in satisfying such claims together with any costs or expenses incurred in so doing. The Contractor covenants and agrees that this clause shall survive the termination of the Contract herein granted.

14.0 RIGHTS OF WAIVER

A waiver, or any breach of provision of this ITT will not constitute or operate as a waiver, or any other breach, of any other provisions, nor will any failure to enforce any provision herein operate as a waiver of such provisions or of any other provisions.

15.0 SEVERABILITY

All paragraphs of the Contract are severable one from the other. Should a court of competent jurisdiction find that any one or more paragraphs herein are void; the validity of the remaining paragraphs hereof will not be affected.

16.0 DISPUTE RESOLUTION

If a claim, dispute, or controversy arises out of or relates to the interpretation, application, enforcement, or performance of Services under this Contract, the Contractor and the Regional District agree first to try in good faith to settle the dispute by negotiations between senior management of the Contractor and the Regional District. If such negotiations are unsuccessful, the Contractor and the Regional District agree to attempt to settle the dispute by arbitration if both parties agree. If the dispute cannot be settled through arbitration, the Contractor and the Regional District may agree to attempt to settle the dispute through good faith mediation. If the dispute cannot be resolved through mediation and unless otherwise mutually agreed, the dispute shall be settled by litigation in an appropriate court in the Province of the Regional District.

17.0 NOTICE OF DEFAULT

If the Contractor is in default of the performance of any of its material obligations set out in the Contract, the Regional District may, by written notice to the Contractor, require such default to be corrected. If within fifteen (15) days' receipt of such notice the default has not been corrected or reasonable steps, as determined by the Regional District in its sole discretion, have not been taken to correct the default, the Regional District without limiting any other right it may have, may immediately terminate the Contract.

17.1 Termination

The Regional District shall compensate the Contractor for all Service performed hereunder through to the date of any termination and all-reasonable costs and expenses incurred by the Contractor in effecting the termination. All drawings, plans or other documents resulting from the Services, whether complete or in a draft form, produced by the Contractor prior to the termination of the Contract, will be provided to the Regional District within ten (10) business days of the termination date.

18.0 FORCE MAJEURE

If either the Contractor or the Regional District are prevented from performing their obligations under the Contract, or where the Regional District’s work in respect of which the Contractor is providing Services cannot be performed, because of an act of God, an act of a legislative, administrative or judicial entity, fire, flood, labour strike or lock-out, epidemic, unusually severe weather, or other similar cause outside of the control of the Parties (collectively "Force Majeure"), then the obligations of the Contractor and the Regional District under the Contract shall be suspended for so long as the condition constituting Force Majeure continues. The Party affected by Force Majeure shall provide the other Party with notice of the anticipated duration of the Force Majeure event, any actions being taken by the Party providing notice to avoid or minimize the effect of the Force Majeure event and shall make reasonable efforts to remove or mitigate the effects of the condition constituting Force Majeure. Upon the termination of the Force Majeure event, the Regional District shall grant to the Contractor a time extension for performance of any milestone dates required as part of the Services as may be agreed with the Contractor or, if the Regional District and the Contractor are unable to reach agreement, as determined by the dispute resolution process under Section

16 “Dispute Resolution” of the ITT. Whereas a result of Force Majeure there is a material increase in the Contractor’s cost of or the time required for the performance of the Services that is not offset by a decrease in cost, then the Regional District shall increase the amount of the service fee payable to the Contractor under Section 7 “Contract Price” of this ITT, as may be agreed by the Contractor, or as determined under Section 16 “Dispute Resolution” of the ITT. If the event of Force Majeure results in a material increase in the cost of the work to be performed in respect of which the Contractor is providing the Services, then the Regional District may choose not to proceed with the completion of the work and may terminate this Contract. If the Regional District terminates this Contract following the termination of the Force Majeure event, then it shall compensate the Contractor in accordance with Section 17.1 “Termination” of this Contract.

TENDERER CHECKLIST

Before submitting your Tender, check the following points:

Before submitting your Tender, check the following points:

☐ Has the Tender Form been signed and witnessed?

☐ Has the List of Sub-Contractors been completed?

☐ Has the Tenderer's Experience in Similar Work been completed?

☐ Has the Schedule of Prices been completed?

☐ Has Appendix A - Conflict of Interest Disclosure Statement been completed?

☐ Has a Start to Completion Workplan been included?

☐ Are all addenda, if any, included and signed?

☐ Is the tender submission complete?

☐ Is the submission enclosed in a **sealed** envelope? (if submitting by hard copy)

☐ Is the tenderer duly incorporated under the laws of British Columbia?

☐ Are both the tender submission envelope and the courier envelope (if submitting by hard copy and sending by courier) both labelled fully?

For hard copy submissions ensure that the tender is returned in a **sealed** envelope clearly marked on the outside with:

- ☐ Attention: General Manager of Financial Services
  Regional District of Fraser-Fort George
  3rd Floor, 155 George Street
  Prince George BC V2L 1P8

- ☐ INVITATION TO TENDER CS-22-07
  SUPPLY AND INSTALLATION OF ANTENNA TOWER

- ☐ Responding organization's name and address

☐ If submitting by email, is the subject line properly labelled?

Note: Your tender may be disqualified if ANY of the applicable foregoing points have not been complied with.

TENDER FORM

Date: _____

Regional District of Fraser-Fort George
3rd Floor, 155 George Street
Prince George, BC V2L 1P8

ATTENTION: General Manager of Financial Services

Dear Sir/Madam:

Having carefully examined the Instructions to Tenderers, the Sample Contract, Scope of Work and Specifications, subsequent written addenda (if any), and having satisfied myself/ourselves as to the sufficiency of the tender, the undersigned agrees to furnish all labour, transportation, equipment, materials, supervision and services and to do all work necessary for and reasonably incidental, as specified in accordance with the ITT, to do the work.

I/We agree that in consideration of having my/our tender considered for the Total Contract Price as shown on the Schedule of Prices, the Total Contract Price is open for acceptance for sixty (60) days from the date of the tender closing and will not be withdrawn during that period of time.

It is understood that payment will be made for the work on the basis of the Total Contract Price only and that any approved extras or refunds will be made by mutual agreement between the Regional District and me/us.

I/We agree that the sub-contractor(s) employed will be as listed on the List of Sub-Contractors and further agree that no changes or additions will be made to the list without written approval of the Regional District.

If I am/we are notified in writing of the acceptance of our tender, I/we agree that within fourteen (14) days from the date of the acceptance notice I/we will enter into a contract for the Total Contract Price. The form of contract will be similar to the sample contract in Appendix B.

I/We agree that the Regional District reserves the right to waive informalities in tenders, reject any or all tenders, or accept the tender deemed most favourable in the interests of the Regional District.

I/We hereby acknowledge receipt and inclusion of the following addenda to the ITT Documents:

Addendum No. _____ dated: _____ Addendum No. _____ dated: _____

Addendum No. _____ dated: _____ Addendum No. _____ dated: _____

Signed and Delivered by:

Authorized Signatory Signature	Name of Tenderer
Name of Authorized Signatory (Please print)	Address
Title	City, Province, Postal Code

Signed in the presence of:

Signature	Address
Name of Witness (Please print)	City, Province, Postal Code

LIST OF SUB-CONTRACTORS

The Contractor advises that they will be sub-contracting the following parts of the work to the sub-contractor(s) listed below. In the Contractor's opinion, the sub-contractor(s) named are reliable and competent to perform that part of the work for which each is listed. Please indicate not applicable on this page if sub-contractors are not required and include it with your tender submission. The sub-contractors named in the List of Sub-Contractors will not be changed nor will additional sub-contractors be employed except with the written approval of the Regional District.

Sub-Contractor's Legal Name	Work to be Performed by Sub-Contractor

TENDERER'S EXPERIENCE IN SIMILAR WORK

(A minimum of three references)

Year	Work Performed	Reference Contact (name and phone number)	Value

SCHEDULE OF PRICES

The Total Contract Price submitted below reflects the full cost (taxes must be shown separately), for the work as specified in ITT CS-22-07.

Supply, construction, installation, and warranty of antenna tower.	$
Other (please specify):	$
Taxes Payable:	$
CONTRACT PRICE (not including Antenna Installation):	**$**

Are you a GST Registrant? ☐ Yes ☐ No

If YES, Tax Registration Number: _____

If NO, please complete the following:
Supplier qualifies as a small supplier under Section 148 of the legislation ☐ Yes ☐ No

Is the company duly incorporated under the laws of BC ☐ Yes _____
Registration No.

WorkSafe BC Registration Number: _____

Work Completion Date: _____

Response time in emergency situations: _____

Response time in non-emergency situations: _____

Authorized Signatory Signature	Name of Tenderer
Name (Please print)	Address
Title	City, Province, Postal Code
Phone Number	Email
Date	

APPENDIX A – CONFLICT OF INTEREST DISCLOSURE STATEMENT

Invitation to Tender CS-22-07
Supply and Installation of Antenna Tower

Tenderer's Name: _____

The tenderer, including its officers, employees, and any person or other entity working on behalf of, or in conjunction with, the tenderer on this procurement process:

☐ is free of any conflict of interest that could be perceived to improperly influence the outcome of this procurement process.

☐ has not, and will not, participate in any improper procurement practices that can provide the tenderer with an unfair competitive advantage including obtaining and using insider type information to prepare a solicitation offer or participating in bid rigging.

☐ has an actual, perceived or potential conflict of interest regarding this procurement process as a result of:

State reasons(s) for Conflict of Interest:

_____

_____

_____

_____

_____

By signing below, I certify that all statements made on this form are true and correct to the best of my knowledge.

_____ _____
Print Name of Person Signing Disclosure | Authorized Representative of:

_____ _____
Signature of Person Making Disclosure | Date Signed

APPENDIX B – SAMPLE CONTRACT

BETWEEN:

REGIONAL DISTRICT OF FRASER-FORT GEORGE, a local government incorporated pursuant to the *Local Government Act* and having its business office located at:
155 George Street
Prince George, BC V2L 1P8

(hereinafter called "the Regional District")

OF THE FIRST PART

AND:

THE CONTRACTOR
a company duly incorporated under the laws of British Columbia and having a place of business at:

(hereinafter called the "Contractor")

OF THE SECOND PART

WITNESSETH that the Contractor and the Regional District hereto agree as follows:

1. The Contractor will:

   (a) Provide all necessary labour, equipment, transportation, materials, supervision, and services to perform all of the work, and fulfill everything as set forth in, and in strict accordance with, the Contract documents for the project entitled "Invitation to Tender CS-22-XX Supply and Installation of Antenna Tower" and

   (b) Commence to actively proceed with the work of the Contract once the Contract has been executed, project to be **completed by September 30, 2023.**

2. The Regional District will pay to the Contractor, as full compensation for the performance and fulfillment of this Contract, *$ to be determined* (plus applicable taxes) in Canadian funds. Payment will be made within 30 days of receipt by the Regional District in accordance with the Contract, unless other payment terms are specified in the Tenderer's submission and are acceptable to the Regional District.

3. The Regional District may withhold 15% of the total payment due under the Contract as a performance assurance holdback. The holdback will be released to the Contractor once the following two conditions have been satisfied:

   (a) the work has been completed to the satisfaction of the Regional District; and

   (b) the Regional District has received notification from WorkSafeBC that all required WorkSafeBC assessments have been paid for the period covering the Contract term.

4. This Invitation to Tender, the Tender Form, List of Sub-Contractors, Tenderer's Experience in Similar Work, Schedule of Prices, Start to Completion Workplan, completed Appendix A – Conflict of Interest Disclosure Statement, all appendices, amendments, and addenda, and the Tenderer's tender submission, are incorporated herein, to the intent and purpose as though recited in full herein, and the whole will form the Contract and will enure to the benefit of, and be binding upon, the parties hereto and their successors, executors, administrators, and assigns.

5. The Contractor, by signing this Contract and completing Appendix A – Conflict of Interest Disclosure Statement, further affirms that no conflict of interest exists or prevents their entering into this Contract.

6. In the event of a dispute between the Regional District and the Contractor, this Contract will be governed by, and will be construed and interpreted in accordance with, all the laws of the Province of British Columbia.

7. The Contractor will provide details *on terms of the warranty against defects on all work completed*. The warranty period will begin on the project completion date and will be over and above the fifty-five (55) day performance assurance holdback referred to in Section 9.0.

8. No implied contract of any kind whatsoever, by or on behalf of the Regional District, will arise or be implied from anything contained in this Contract or from any position or situation of the parties at any time, it being understood and agreed that the express contracts, covenants and agreements made herein by the parties hereto are, and will be, the only contract, covenants and agreements on which any rights against the Regional District may be founded.

9. This Contract will supersede all communications, negotiations, and agreements, either written or verbal, made between the parties hereto in respect of matters pertaining to this Contract prior to the execution and delivery hereof.

10. All communications in writing between the parties will be deemed to have been received by the addressee if delivered to *Contractor Name, Company Name* or to the Project Manager of the Regional District for whom they are intended, or if sent by hand delivery, mail or registered mail as follows:

    Contactor Name
    Company Name
    Address
    Address

    Bonnie Seitz, Project Manager
    Regional District of Fraser-Fort George
    155 George Street
    Prince George BC V2L 1P8

11. The Contractor will not sublet, sell, transfer, assign or otherwise dispose of this Contract or any portions thereof, or their right, title or interest therein, or their obligations thereunder without written consent of the Regional District, except for assignment to a bank of the payments to be received.

12. This Contract is not an agreement of employment. The Contractor is an independent contractor, and nothing herein will be construed to create a partnership, joint venture, or agency and neither party will be responsible for the debts or obligations of the other.

13. The Contractor is to coordinate all parts of this Contract as indicated in Appendix C – Scope of Work/Specifications. Where it is beyond control of the Contractor to meet the completion date as stipulated herein, the Contractor must immediately notify the Regional District in writing. It shall be at the Regional District's sole discretion to extend the completion date or waive any part or clause of this Contract. Subject to the Force Majeure (Section 18) provisions of this contract, it shall be at the Regional District's sole discretion to extend the completion date or waive any part or clause of this Contract.

IN WITNESS WHEREOF the parties have duly executed this Contract.

SIGNED ON BEHALF OF THE
REGIONAL DISTRICT OF FRASER-FORT GEORGE

_____ _____
Chair Date

_____ _____
GM of Legislative and Corporate Services Date

SIGNED ON BEHALF OF
THE CONTRACTOR

DO NOT SIGN SAMPLE ONLY

_____ _____
Signature Date

_____
(Name and Title) (Please print)

DO NOT SIGN SAMPLE ONLY

_____ _____
Signature Date

_____
(Name and Title) (Please print)

APPENDIX C – SCOPE OF WORK & SPECIFICATIONS

The Contractor will provide all labour, equipment, transportation, materials, supervision, and services to perform all of the work necessary to construct an antenna tower, including footings, foundation and transmission line bridge and installation of antennas, lines, and associated parts. Optionally supply the antenna, and lines, and optionally perform antenna and line sweep tests. All required geotechnical work will be done by the Regional District and provided to the successful tenderer. Tenderers are **not** to include the cost for geotechnical work in their tender submission.

1. The Contractor is responsible for regularly scheduling the cleanup and disposal of all materials and debris generated by their activities during the course of the work.

2. The Contractor is responsible for removal of a portion of the adjacent fence during construction and restore the fence after construction if this is needed to construct the tower.

3. The Contractor will not interfere with the day-to-day operations on the property or other work being conducted on the property while completing the work required.

4. The Regional District accepts no responsibility for damage, vandalism or theft to any of the Contractor's equipment used or stored at the site.

5. The Contractor will exercise good public relations while fulfilling their responsibilities under the Contract and will ensure that their employees do the same.

6. The Contractor will ensure that workers have sufficient knowledge, skill and experience to properly and safely perform the work.

If the unit is non-compliant on any of these specifications as outlined in Appendix C, then the fourth column on this form MUST be completed detailing what the variation being supplied is and the reason for the variation.

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
1.0	**Tower Specifications – General**			
1.1	Unless otherwise specifically stated, any references to the antenna tower shall include the complete installed tower structure including footings, foundation and transmission line bridge.			
1.2	The antenna tower shall be designed and constructed to provide a projected reliable, useable life of at least 50 years, based on normal, periodic preventative maintenance throughout the projected life of the tower.			
1.3	The antenna tower structure and all tower structure materials shall be hot galvanized steel construction.			
1.4	The concrete tower base, including footings and foundation shall be treated with a concrete sealant to prevent moisture penetration, and cracking during freezing weather conditions.			
1.5	Screw anchor foundations are acceptable as long as they meet all engineering requirements. The design, construction and installation, of the complete tower, which includes the tower structure, footings, foundation and other support structures shall as a minimum: a. meet latest CSA standard CSA S37, based on all antennae and antenna transmission lines installed as detailed on Figure 1; b. not exceed a twist and/or tilt of 1.0 degrees; c. painted to meet Canadian Obstruction Markings requirements, which is standard orange and white; d. meet all Canadian Aviation Regulations (CARs) Standards Obstruction Markings 621.19, be certified; and e. all drawings shall be signed and sealed by a Professional Engineer, qualified in the design of large self-supporting tower structures.			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
2.0	**Antenna and Antenna Transmission Line Physical Loading on the Tower**			
2.1	The tower shall be designed, constructed, and installed based on supporting the antennas and antenna transmission lines as detailed in Figure 1.			
2.2	Please note that the antenna locations and types are for tower design reference purposes only.			
2.3	Construction of the tower shall include mounting pipes for the antennas listed on Figure 1 that cannot be directly clamped to the tower legs.			
3.0	**Height Above Ground Level**			
3.1	The top of the tower shall extend 45 m (147.638 ft) above ground level.			
3.2	The height of the tower above ground shall exclude all top mounted antennas, all mountings for antennas, and lightning rods.			
4.0	**On Tower RF Transmission Line Guideways**			
4.1	The tower shall include a transmission line (cable) guideway over the entire height of the tower, for attaching and routing the antenna transmission lines as specified in Figure 1, including space for a total of 8 lines.			
4.2	The transmission line guideways shall be permanently attached to the tower and shall be designed specifically to attach the RF transmission lines with stainless steel clamps and hangers.			
4.3	The guideways shall provide for vertical cable support mounting holes at intervals of no greater than 1m (3.28 ft), to prevent cable droop, or cable stretch caused by the natural weight of the cables over the entire height of the tower.			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
4.4	The width of the guideway shall be sufficient to permit horizontal spacing of each transmission line to the next so that each line can be independently removed and installed without affecting the installation of the other lines.			
4.5	The outdoor ethernet cables may be replaced with elliptical wave guides depending on microwave radio selection.			
4.6	The Contract excludes all clamps and hangers for securing the cables to the guideway.			
5.0	**Tower Climbing Provisions**			
5.1	The tower shall be supplied complete with a permanently attached ladder and fall arrest cable or rail system that meets all CSA and WorkSafeBC standards for personnel safety, for climbing and working on the tower.			
5.2	Contractor to include 3 fall arrest cable slide/trollies.			
5.3	CSA/WorkSafeBC approved personnel climbing provisions shall be installed on the tower in such a way as to avoid interference with the cable guideways and prevent inadvertent damage to the cables or antenna systems on the tower by personnel using the equipment.			
6.0	**Tower Electrical Grounding**			
6.1	The Contractor shall supply and install all grounding for the tower. The grounding shall meet the BC electrical.			
6.2	The tower grounding will consist of a circular ground ring around the tower with 2.4 m (8 ft) ground rods connected to the ground ring conductor at 3 m to 4.6 m (10 ft. to 15 ft.) intervals.			
6.3	Ground rings shall be installed in direct contact with the earth at a depth of 1.2 m (4 ft) below the earth's surface, or below the frost line, whichever is deeper.			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
6.4	The ground ring shall be bonded separately to each tower leg.			
6.5	In all cases the ground connection shall be with #1 AWG minimum stranded copper wire. The wire shall be securely bonded at each end using listed irreversible high-compression fittings.			
6.6	The ground connections to the tower and the transmission line bridge, including the transmission line bridge supports, shall be via proper copper-bronze electrical connectors that are attached to the steel structure with threaded stainless steel or copper-bronze bolts, lock washer and nuts.			
6.7	The Contractor shall supply and install a tower ground bus and connect it to the tower grounding system. The ground bus shall be mounted on the tower near the transmission line bridge for ground connections to the antenna lines before they leave the tower to the transmission line bridge.			
6.8	The tower ground system shall be connected to the existing ground system. We have no records of how the building is grounded though most of the Regional District of Fraser-Fort George fire halls have a radial ground circling the building. If the building radial ground is not accessible, a ground wire shall be routed underground to the antenna line cable port entrance and connected to the inside ground bar.			
6.9	The actual routing of the site grounding system will be determined between the Contractor and the Regional District Project Manager or designate as part of the final design approval process.			
7.0	**Site Commissioning and Acceptance**			
7.1	The commissioning procedure shall clearly demonstrate that the tower is constructed and installed in full compliance with the Contract prior to acceptance by the Regional District.			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
8.0	**Warranty – Terms and Conditions**			
8.1	Contractor to provide a minimum one-year, all-inclusive warranty for: design; materials; equipment; parts; labour; construction; installation; and include regular service and maintenance for the first year. Warranty to begin as of date of acceptance by the Regional District.			
8.2	All written quotes shall clearly state the detailed terms and conditions of the warranty offered.			
8.3	Tenderers shall clearly state all special provisions, unique terms and conditions, and related costs to warranty the design, construction, and installation on the Schedule of Prices in "Other" if warranty exceeds the minimum shown above, otherwise warranty cost will be taken to be included in the Contract Price on the Schedule of prices.			
9.0	**Warranty – Service and Maintenance During Warranty Period**			
9.1	Tenderers shall clearly state on the Schedule of Prices their maximum response time to be on-site to correct problems where an emergency exists, for critical tower structure issues, or for safety related concerns.			
9.2	Tenderers will also provide on the Schedule of Prices their maximum response time to be on-site to correct non-emergency situations.			
10.0	**Documentation to be supplied by contractor – pre-ordering and pre-construction/installation approval documentation**			
10.1	The Contractor shall supply one hard copy and one electronic copy (format to be determined by the Regional District) of pre-order and pre-construction/installation drawings/schematics for the tower, foundation, footings, transmission line bridge, and grounding system.			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
10.2	All structural design drawings shall be signed and sealed by a Professional Engineer registered with the Association of Professional Engineers of British Columbia.			
11.0	**Documentation to be supplied by the contractor – as built drawings and documentation**			
11.1	The Contractor shall supply at least two complete hard copy sets and one electronic copy (format to be determined by the Regional District) of as built construction documentation (drawings, schematics, etc.) of the tower, foundation, footings, transmission line bridge, and grounding system.			
11.2	As built drawings for the project shall include those that clearly show where the below ground conductors and ground rods are located.			
11.3	As built drawings shall show the type of cable guideway, and capacity of all guideway provisions.			
11.4	All documentation shall be complete and unabridged and shall be in a bound or 3-ring binder manual format.			
11.5	All documentation, drawings, and schematics provided by the Contractor to the Regional District become the property of the Regional District.			
12.0	**Transmission Line Bridge**			
12.1	The tower shall be supplied and installed complete with a transmission line bridge between the tower structure and the equipment building for supporting and protecting RF transmission lines routed from the tower to the communications equipment building. Tentative length of transmission line bridge is 3.65m (12 ft.)			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
12.2	The transmission line bridge shall be designed and installed to be able to support and protect all antenna RF transmission line specified in Figure 1, as well as two additional lines for future capacity.			
12.3	The transmission line bridge shall follow a straight line from the tower to the corner of the building.			
12.4	Tentative design is for the top of the transmission line bridge to be 2.43 meters above ground level.			
12.5	The transmission line bridge shall include provisions for securing the antenna RF transmission lines individually with stainless steel or other suitable non-corrosive clamps and hangers at intervals of not greater than 1 meter over the entire length of the transmission line bridge.			
12.6	The width of the transmission line bridge protective cover shall be sufficient to permit the transmission lines to be horizontally spaced under the bridge in a way that permits each transmission line to be removed and installed without affecting the installation of the other lines.			
12.7	The transmission line bridge shall meet the same wind and ice loading requirements as the tower.			
13.0	**Contract Price**			
13.1	The Contract price on the “Schedule of Prices” is a fixed price that will not change without a change order subject to Section 10.0 Changes, and there will be no passing on of price increases to the Regional District following the signing of a contract. If you are non-compliant with this statement, please “check” the “non-compliant” column and provide page numbers in the bid submission that provide detail on potential costs that			

		Compliant	Noncompliant	State the variation being supplied if line item is noncompliant
	are being proposed to be passed onto the Regional District after the contract execution.			

APPENDIX D – OPTIONAL EQUIPMENT/SPECIFICIATIONS

		Price (excluding taxes)
1.0	**Supply of Antenna and Line and Associated Parts**	
1.1	Supply the antennas and lines numbered 1,2,3, and 6 listed on Figure 1 tower drawing.	
1.2	Supply the antenna line connectors and ground kits. Connectors are N-female.	
1.3	Supply antenna line stainless steel hangers, hardware, and any required stainless-steel clamps for mounting the hangers for horizontal antenna line runs.	
2.0	**Install of Antennas and Lines**	
2.1	Install antennas numbered 1,2,3, and 6 listed on Figure 1 tower drawing.	
2.2	Install the antenna line hangers, lines, and connectors for the above.	
2.3	Horizontal runs of antenna lines on the tower shall be supported by clamps and hangers, Ty wraps are not acceptable.	
2.4	Install antenna line ground kits at the top of the tower, and where the lines leave the tower to the transmission line bridge. The bottom ground kit wires will be bolted to the supplied ground bus bar.	
2.5	All antenna connectors and ground kits outside the building shall be properly weather proofed. The contractor will discuss the method to be sued for the antenna connector weather proofing with the Regional District of Fraser-Fort George technical staff before the work is done.	

		Price (excluding taxes)
3.0	**Perform Antenna and Line Sweeps Tests**	
3.1	Perform antenna and line sweep tests for the antenna and lines numbered 1, 2, 3, and 6 listed on Figure 1 tower drawing, and provide the test results.	

FIGURE 1 – BUCKHORN TOWER LAYOUT

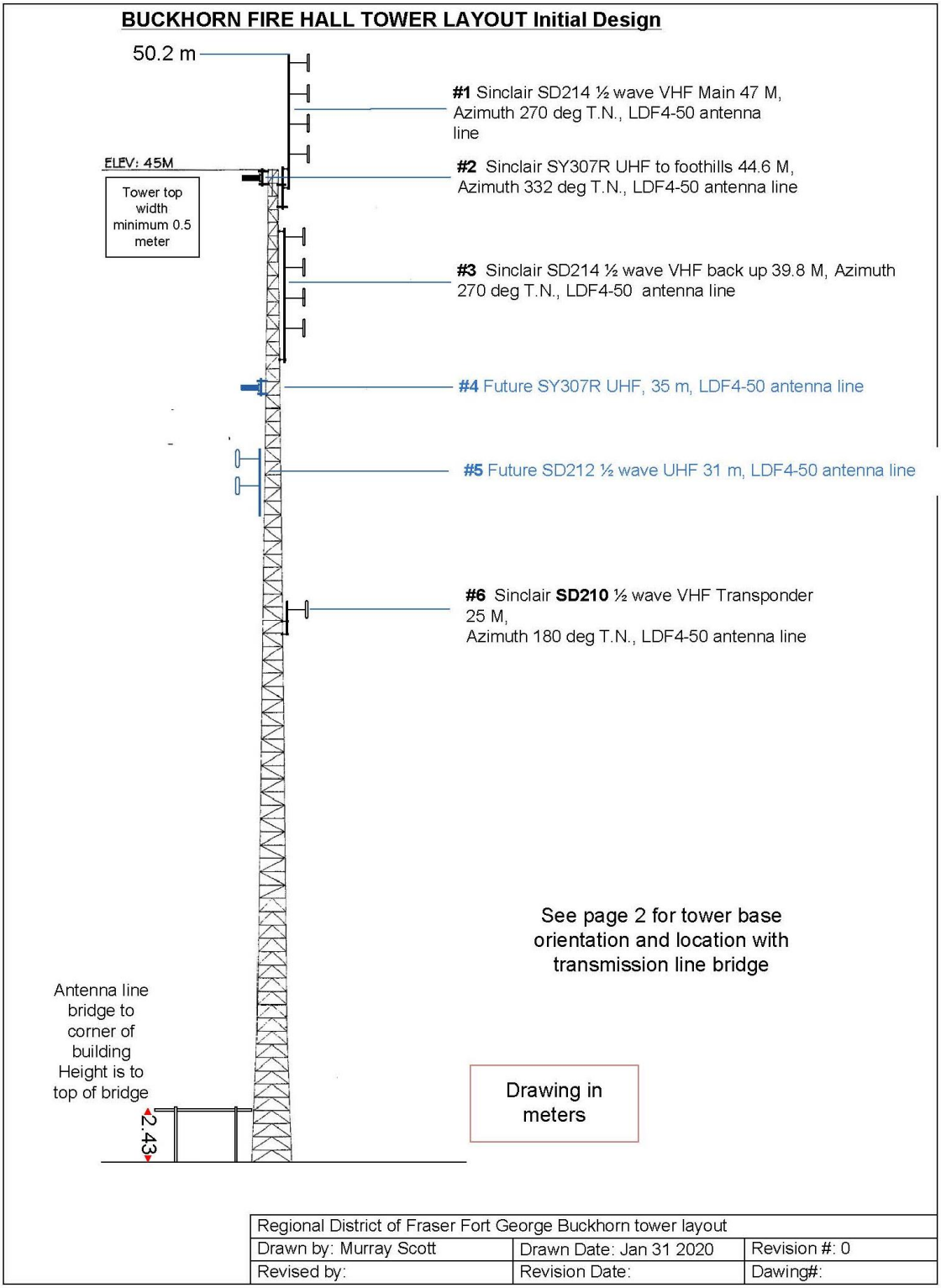
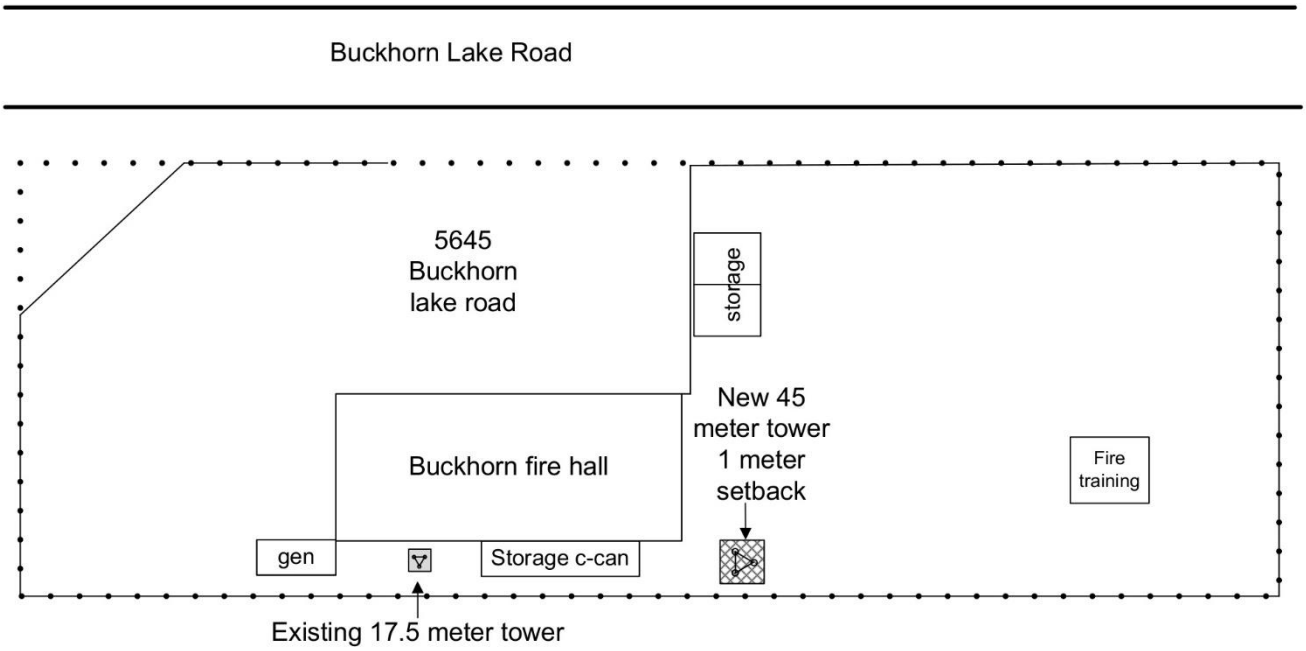
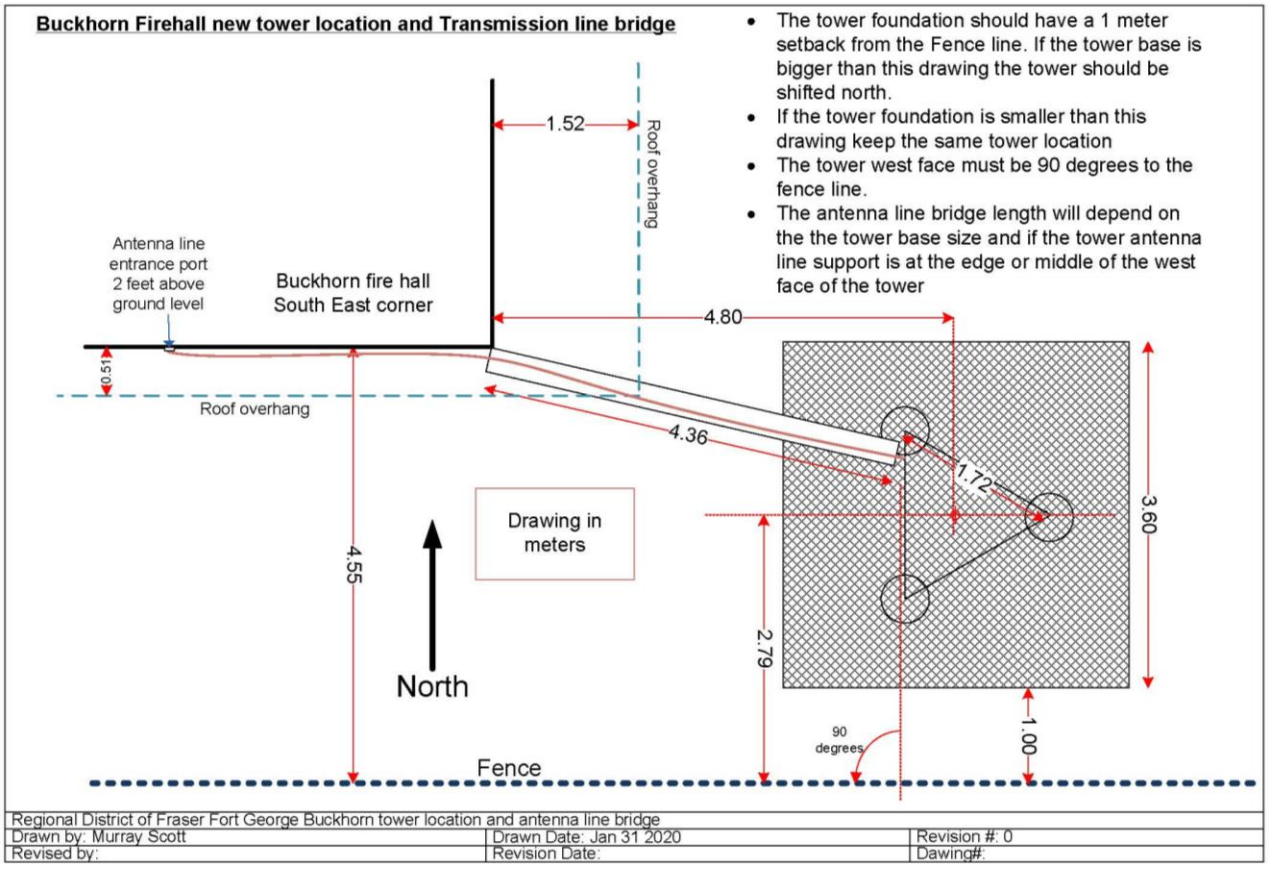


FIGURE 2 – SITE LOCATION





ATTACHMENT – GEO TECHNICAL REPORT

Our File: 2341-02750-19

TECHNICAL MEMO

To	From
Melanie Perrin, Manager of Public Safety Operations Regional District of Fraser Fort George	Walter B. Rathbun, P.Eng. Reviewed by: George Zhou, P.Eng. 2341- Prince George, BC
Re	**Date**
Geotechnical Assessment for Buckhorn Fire Hall Communication Tower 5645 Buckhorn Lake Road, Prince George, BC	March 9, 2021

1. Introduction

As requested, McElhanney Ltd. (McElhanney) has prepared this report which summarizes our geotechnical recommendations for the proposed cellular communications tower located at civic address 5645 Buckhorn Lake Road in Prince George, BC. The geotechnical assessment results and recommendations for the proposed development are reported herein.

The work was undertaken in accordance with the McElhanney Client Agreement dated October 8, 2020. No biological, archaeological, or environmental reviews were completed as part of this assessment.

2. Scope of Work

The scope of work for this geotechnical assessment as agreed in McElhanney's client agreement is summarized as follows:

- Summary of encountered soil and groundwater conditions;
- Suitability of the site for the proposed development;
- Geotechnical considerations that may impact design and/or construction;
- Shallow and pile foundation design;
- Seismic Site Classification;

Following review of soils information and a discussion with the Client, parameters for input to foundation design allowing the option of either modification of the shallow foundation design or, if necessary, an option combined with helical pile foundations. This has been provided due to the encountered firm, fine grained soils at depth and expected overturning moments at the base of the tower structure.

3. Proposed Development

This assessment will support the development of a new 50.2m high cellular communications tower designed by Westower Communications at the existing Buckhorn Firehall located in Prince George, BC. It is understood that the tower will be located approximately 1m north the existing rear fence, and approximately 3.05m east of the existing Buckhorn fire hall building. **Figure 1** shows the proposed layout and location of the tower.

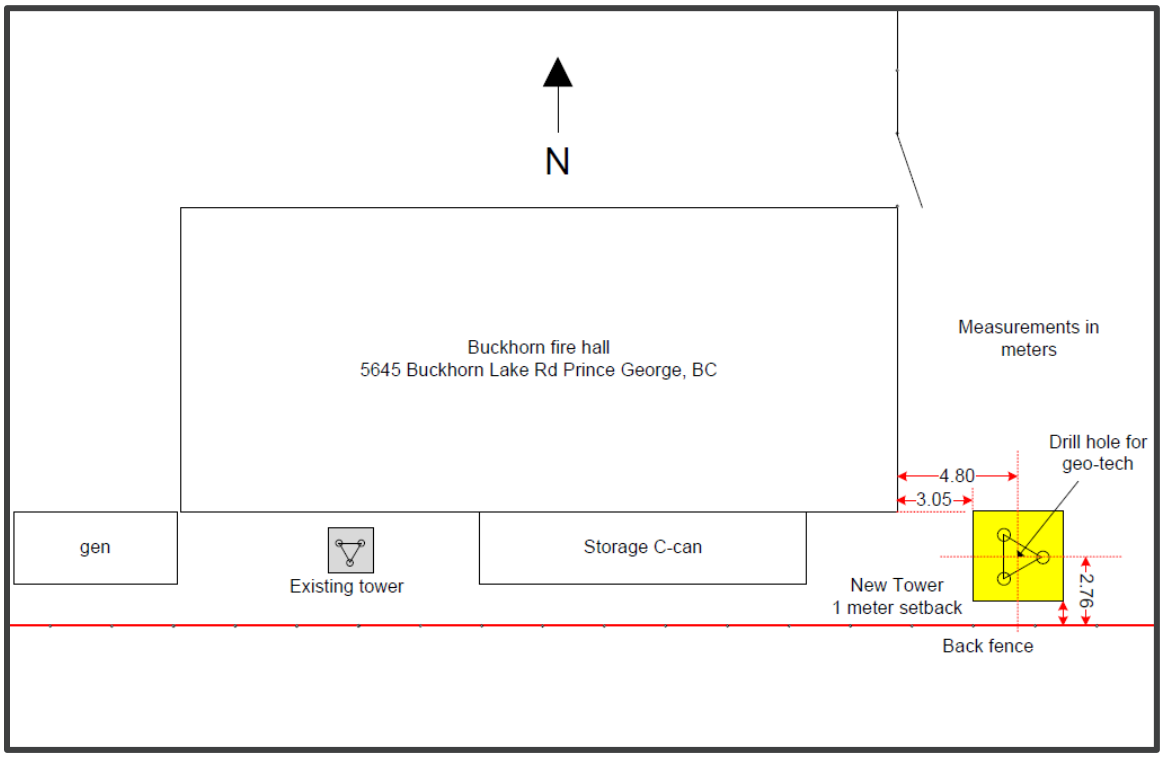


Figure 1: Site location plan showing location of proposed tower in relation to the Buckhorn Fire Hall Building.

The preferred tower construction will consist of a reinforced shallow 3.6m x 3.6m pad foundation founding at 2.5m depth, with three columns extending from the pad affixed to the tower base, as shown in drawings provided by the Client (Westower Drawing No. 961399, dated April 23, 1996).

4. Approach and Methodology

4.1. DESKTOP REVIEW

The following background information was reviewed when preparing this report:

- RDFFG-Buckhorn VFD Tentative new tower location for Geotech, Revision 4 (provided by Client, dated May 6, 2020).
- Surficial Geology – Prince George, British Columbia. Map 1288A, accompanies GSC Bulletin 196, published 1971, Geological Survey of Canada, Department of Energy, Mines and Resources.
- MOE Technical Report 29. *Soils of the Prince George – McLeod Lake Area*, Report No. 23 British Columbia Soil Survey, dated January 1989, Victoria, BC.

4.2. GEOLOGIC SETTING

Available surficial geology mapping and references indicate the site is underlain by glacio-lacustrine deposits as shown in the sketch provided in **Figure 2** below.

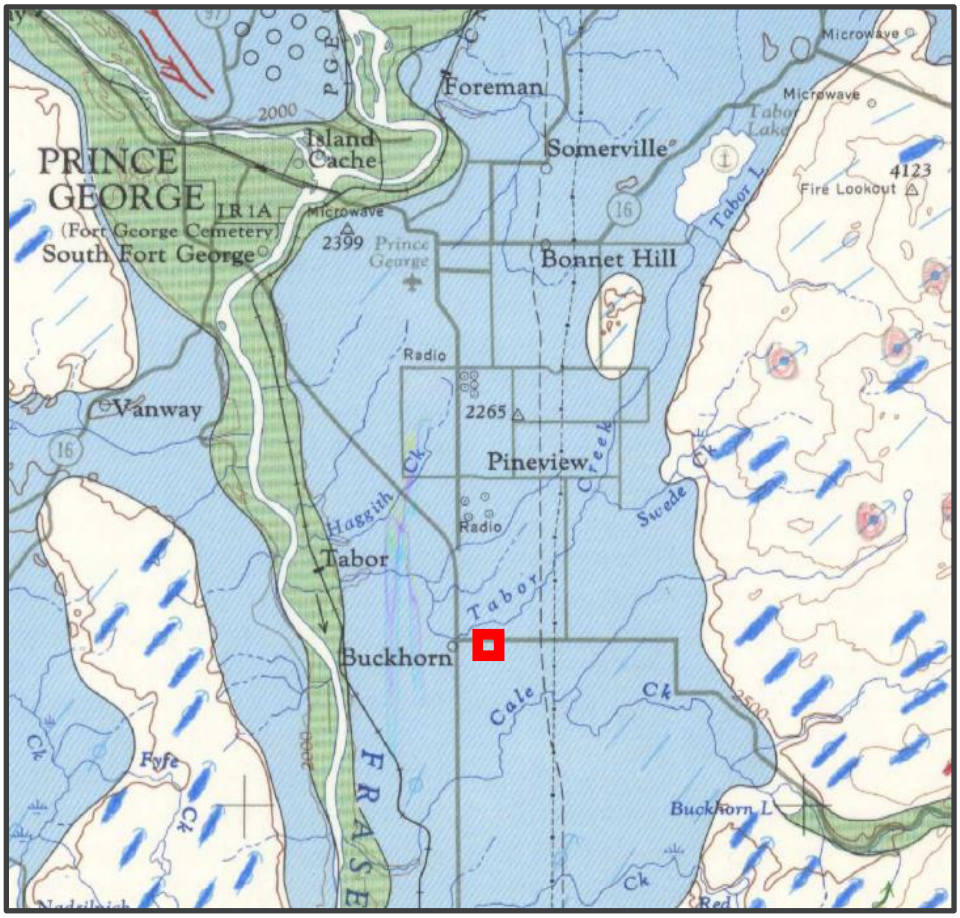


Figure 2 – Portion of "Surficial Geology - Prince George (reproduced from Map 1288A, Geological Survey of Canada, Department of Energy, Mines and Resources).

The MOE Technical Report 29 indicate glacio-lacustrine deposits in the vicinity of Prince George are predominantly of clayey and silty, with inclusions of sand, and are usually well sorted and well stratified lake deposits of glacial origin (MOE, 1989, p. 11).

4.3. GEOTECHNICAL DRILLING INVESTIGATION

The geotechnical investigation was supervised by McElhanney personnel on November 4, 2020. The investigation included the drilling of two (2) solid stem augured boreholes (BH20-01 and BH20-02) to a maximum depth of 17.3m. The approximate borehole locations are shown on the attached **Drawing B-01.**

Prior to the investigation, a BC One Call was carried out and local underground utilities operators were contacted to determine the location of existing utilities in the study area. A qualified utility locates sub-contractor was engaged to ensure that proposed boreholes did not interfere with existing utilities.

Boreholes were completed using a CME 850X solid stem auger drill rig owned and operated by Geotech Drilling Services Ltd. based out of Prince George, BC. Standard Penetration Testing (SPT) was conducted in regular intervals in BH20-01 and BH20-02 at the time of the geotechnical investigation. SPT blow counts were logged in 0.15m intervals to produce blow count profiles as depicted in the attached borehole logs.

The subsurface and groundwater conditions encountered during drilling were logged and photographed in the field by McElhanney. Soil samples were collected, labelled, sealed in containers, and sent to McElhanney's Prince George material testing laboratory for further assessment.

Following completion of the investigation, borehole locations were logged with a handheld GPS summarized in **Table 4-1** below. Boreholes were backfilled to surface level with spoil material and tamped using a handheld shovel.

Table 4-1: *Borehole Summary [1].*

BOREHOLE ID[1]	LOCATION (UTM COORDINATES) [2]		MAXIMUM DEPTH[3] (m)	DEPTH TO GROUNDWATER[3] (m)
	NORTHING	EASTING		
BH20-01	523358	5960558	17.3	10.3
BH20-02	523363	5960564	11.2	10.3

Notes:

1. Refer to borehole log sheets for detailed description of subsurface soil and groundwater conditions.
2. Borehole locations were logged using a handheld GPS by McElhanney on November 4, 2020.
3. Depth of hole below ground surface and SPT depth measurements are approximate.

5. Site Conditions

The legal description of the subject property is Lot 1, Plan PGP34320, District Lot 1959, Land District 05, PID: 015-449-742, and the civic address is 5645 Buckhorn Lake Road, Prince George, BC. The land parcel is approximately 0.918 Ha in plan area.

5.1. SURFACE CONDITIONS

The proposed tower site is currently developed with the existing Buckhorn Firehall building, a generator, a storage C-can and an existing cellular communications tower. The topography of the site is generally flat, with a gentle down slope from the east towards the west of the site at an approximate grade of 5%. At the time of the drilling investigation, the lot was lightly vegetated with mainly manicured grass lawns and deciduous brush.

5.2. SUBSURFACE INVESTIGATION

Based on available soil and bedrock geology mapping, the site is expected to be underlain by glacio-lacustrine deposits. Soil conditions observed in the boreholes are summarized in **Table 5-1** and detailed in the attached borehole logs in accordance with the **Modified Unified Classification System for Soils**.

Table 5-1: *Inferred Geotechnical Units.*

BOREHOLE ID	CLAY AND SILT, TRACE SAND (GLACIO-LACUSTRINE) (m)	CLAYEY GLACIAL TILL (m)	DEPTH TO GROUNDWATER (mbgs)
BH20-01	0 - 10.6	10.6 - 17.3 (EOH)	10.4
BH20-02	0 – 10.6	10.6 – 11.2 (EOH)	10.4

Note: End of Hole (EOH), meters below ground surface (mbgs).

In general, the encountered subsurface conditions were consistent with the referenced geological mapping descriptions.

5.3. GROUNDWATER

Light to moderate groundwater seepage was observed in each borehole at the time of the investigation at a depth of approximately 10.4m. Groundwater levels can be expected to fluctuate seasonally and with cycles of precipitation. McElhanney should be contacted if there is a significant departure in groundwater conditions encountered during construction.

5.4. LABORATORY TEST RESULTS

5.4.1. Atterberg Limits

Atterberg Limit testing is summarized in **Table 5-2** and test result sheets are attached to this report.

Table 5-2: *Summary of Atterberg Limits Testing Results*

BOREHOLE ID[1]	Sample ID	ATTERBERG LIMITS				SOIL CLASSIFICATION
	DEPTH (m)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	NATURAL MOISTURE CONTENT (%)	
BH20-01	0-1.5m	33	59	26	36	MH
BH20-01	5.2-6.1	27	53	26	38	CH
BH20-01	13.7-14.3	15	29	14	14	CL
BH20-02	2.1-3.0	30	73	42	36	CH

Results of the Atterberg limits testing indicate the silts and clays encountered in the investigation range from low to high plasticity, and plasticity of fine grained soils generally decreases with depth.

5.4.2. Sieve Analysis Results

Sieve testing results are summarized below in **Table 5-3** and test result sheets are attached to this report.

Table 5-3: *Summary of Sieve Testing Results*

BOREHOLE ID[1]	Sample ID	SIEVE ANALYSIS				SOIL CLASSIFICATION
	DEPTH (m)	FINES (%)	SAND (%)	GRAVEL (%)	NATURAL MOISTURE CONTENT (%)	
BH20-01	10.7-11.3	58	30	12	14	CLAY, sandy, some gravel
BH20-02	9.1-10.7	45	43	12	17	CLAY and SAND, some gravel

The sieve test results as reported above in **Table 5-3** indicate the soil conditions encountered at BH20-01 comprise CLAY, sandy, with some gravel, at 10.7-11.3m depth, and at BH20-02 the soils comprise CLAY and SAND, some gravel from 9.1-10.7m depth.

6. Geotechnical Comments and Recommendations

6.1. SUITABILITY OF THE SITE FOR THE PROPOSED DEVELOPMENT

The above referenced site is considered geotechnically safe and suitable for the proposed development, provided that the recommendations presented herein are followed. As the site investigation encountered firm to stiff clays to silty clays overlying hard glacial till soils at depth. Options are presented herein for support of the proposed tower using both:

1. shallow foundation of 3.6mx3.6mx0.5m raft buried 2.0m below finished grade, as proposed by Westower Communications, if feasible; and,

2. A modified shallow foundation design incorporating helical piles for additional capacity.

The geotechnical recommendations presented in this report are based on site observations, field and laboratory testing results, and available designs by Westower Communications made available by the Client regarding the proposed tower, and McElhanney's experience with similar projects.

The primary concern for the tower is to keep the tower stable under a lateral force applied on the tower, including wind load and seismic loading. Since the tower is at least 50.3m high, a lateral force applied on the geometry center or mass center of the tower can generate a significant overturning moment. To keep the tower stable, the tower foundation shall be designed such that the foundation size and mass, as well as the soil weight on top of the foundation can generate a resisting moment greater than the overturning moment with a Factor of Safety of 3.0, as specified in the 2018 BC Building Code. In case shallow foundation cannot provide an adequate resisting moment, helical piles or tie down soil anchors can be considered to increase the resistance moment.

6.2. SHALLOW FOUNDATION BEARING CAPACITY

Tower foundation bearing on native soils and buried 2.0m below the finished grade as shown in the Westower foundation plans can be designed using the following bearing capacities, assuming the underlying undrained shear strength of firm clayey silt to silty clay of 50kPa:

- Ultimate Limit State (ULS) of 290kPa; and

- Serviceability Limit State (SLS) of 85kPa.

The above bearing capacities shall be used for the bearing base or raft foundation size designed under the vertical loading and loading combinations of vertical and lateral loading, as specified in the 2018 BC Building Code.

6.3. HELICAL PILE DESIGN RECOMMENDATIONS

In case the shallow foundation does not meet capacity requirements, helical piles can be installed in the corner or critical sides of the towner base for additional capacity. Helical piles of size and geometry as shown in Figure 3 in the attachments can be installed at the corners of the foundation base. Helical Piles with a shaft diameter of 41.275(2-3/8") and wall thickness of 6.45mm(0.245") have been assumed for the purposes of this assessment with three helices welded at the depth as shown in Figure 3. The helical pile shall be installed within the firm to stiff clayey silt to silt clay above groundwater with undrained shear strength of 50kPa and soil unit weight of 18.5kN/m^3.

Based on the soil undrained shear strength of 50kPa and the helical pile geometry as shown in Figure 3, single pile capacities are summarized in **Table 6-2.**

Table 6-2: Summary of Single Helical Pile Size and Capacity.

PILE SIZE	TOTAL LENGTH (m)	COMPRESSIONAL CAPACITY	TENSIONAL CAPACITY
		RESISTANCE (SLS/ULS) (kN)	RESISTANCE (SLS/ULS) (kN)
Shaft Diameter. 41.275mm, /Wall thickness 6.45mm	6.1 (from pile cap to pile tip)	72.5/145	72.5/215

Notes:
1. Based on a minimum pile spacing of 1.8m and a depth to groundwater of 10.0mbgs.
2. Three helices of diameters 305mm, 305mm, and 254mm installed at depths of 0.6m, 3.04m, and 5.48m, respectively below the base of the pad foundation.
3. Each pile must be installed to a torsional resistance of 1650ft-lb or 228 kg-m.

Alternative pile designs or deep foundation supports such as soil anchors may be used, provided McElhanney has an opportunity to review and provide comment, as necessary.

6.4. SITE PREPARATION

All other structures, including associated roadways, sidewalks, and utilities should be supported by Structural Fill on suitable native soil, as design grades require.

All unsuitable material should be removed to suitable bearing subgrade. Unsuitable materials including any non-mineral material such as vegetation, topsoil, peat, existing fills, or other materials containing organic matter. Material that is soft, loose, or disturbed should also be removed. Subgrade areas loosened by construction traffic or utility line construction should be recompacted to recommended specifications prior to placement of concrete or Structural Fill.

All undocumented fills and topsoil should be completely removed from the footprint areas of load bearing structures. Fills free of deleterious materials and environmental contaminants can be stockpiled for later use at the site. Topsoil may be reused for landscape areas.

6.5. GENERAL EXCAVATION RECOMMENDATIONS

The excavation for the tower base need to extent 2.0m deep, we recommend a 1.5H:1V or flatter side slope be used if space is available. The side slope is expected to be stable for a period of 4~5 months. However, we required the side slope be reviewed by a geotechnical engineer, once it reached 1.2 m deep, a written approval WCB inspection by the geotechnical engineer is required before any workers can entry the excavation for further operations.

Where excavation scenarios are not clearly defined in this report, the geotechnical engineer should be consulted to assess potential hazards and provide recommendations. Guidelines in the Occupational Health and Safety Regulation under Part 20, Sections 20.78 through 20.95 should be adhered to for any excavation on site, as required.

Shallower groundwater seepage or surface water runoff may result in a loss of bearing strength. Therefore, ingress of groundwater into any excavation should be controlled by grading, perimeter ditching or a combination of sumps and pumps. Any water or snow that collects on the foundation subgrade should be removed and be allowed to dry prior to construction of building foundations.

6.6. SEISMIC SITE CLASSIFICATION

The site classification for seismic site response as per the National Building Code of Canada (NBCC 2015, Section 4.1.8.4) is classified as Site Class D (“stiff soil”) for seismic design purposes.

McElhanney should be given the opportunity to review the final development plan, which could affect our recommendations.

7. Geotechnical Assurance and Quality Assurance

Prior to final design submission, it is recommended further geotechnical review of the founding conditions should be carried out to confirm that the geotechnical recommendations are sufficient and / or have been applied according to the design intent, and what if any further geotechnical investigation is required.

It is recommended that the following items are reviewed by a geotechnical engineer during construction:

- Excavation: WCB inspection for the excavation side slope
- Helical pile: Review the pile records to verify helical pile installation depth and final torque readings.
- Associated roadways, sidewalks, and utilities: stripping and structural fill backfill and compaction

Field reviews should be carried out by a qualified geotechnical engineer or their designated representative. McElhanney is able to provide material testing services during construction such as laboratory material gradation, compaction density and concrete testing if desired by the successful construction contractor.

8. Closure

The attached Limitations apply to this report and are hereby incorporated herein.

We trust that the information contained in this report is suitable for your current needs. If you have any questions or require additional information, please do not hesitate to contact us.

Yours truly,

McElhanney Ltd.

Reviewed by:

Walter B. Rathbun, P.Eng.	George Zhou, P.Eng.
Geotechnical Engineer	Senior Geotechnical Engineer

Attachments:

Appendix A: Statement of Limitations – Geotechnical Services

Appendix B: Drawing B-01 – Borehole Site Plan

Appendix C: Modified Unified Classification System for Soils

Appendix D: Laboratory Testing Results (Atterberg Limits, Sieve Testing)

Appendix E: Figure 3 – Helical Pile Concept

APPENDIX A

Statement of Limitations - Geotechnical Services

Statement of Limitations – Geotechnical Services

Use of this Report. This report was prepared by McElhanney Ltd. ("**McElhanney**") for the particular site, design objective, development and purpose (the "**Project**") described in this report and for the exclusive use of the client identified in this report (the "**Client**"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used or relied upon, in whole or in part, by a party other than the Client and Building Authority, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors and regulatory authorities for use in relation to and in connection with the Project provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies. The professional services retained for this Project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in this report. In particular, environmental conditions such as surface and subsurface contamination are outside the scope of this report.

Standard of Care and Disclaimer of Warranties. This study and report have been prepared in accordance with generally accepted engineering and scientific judgments, principles and practices. McElhanney expressly disclaims any and all warranties in connection with this report including, without limitation, any warranty that this report and the associated site review work has uncovered all potential geotechnical liabilities associated with the subject property.

Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation and regulations as they existed at the time of the site assessment. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Construction activities can significantly alter soil, rock and other geologic conditions on the site. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site, purpose, or development plans upon which this report was based, b) any changes to applicable laws subsequent to the issuance of the report, c) new information is discovered in the future during site excavations, construction, building demolition or other activities, or d) additional subsurface assessments or testing conducted by others.

Subsurface Risks. Soil, rock and groundwater data were collected in general accordance with the standards and methods described in the document. The classification and identification of soils, rocks and geologic formations was based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Interpretations of groundwater levels and flow direction are based on water level observations at selected test hole locations and are expected to fluctuate. Observations at test holes indicate the approximate subsurface conditions at those locations only. Subsurface conditions between test holes were based, by necessity, on judgement and assumptions of what exists between the actual locations sampled, and may vary significantly from actual site conditions and all persons making use of this report should be aware of, and accept, this risk. Even a comprehensive sampling and testing program, implemented in accordance with appropriate equipment by experienced personnel, may fail to detect all or certain conditions.

Information from Client and Third Parties. McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

Underground Utilities and Damages. In the performance of the services, McElhanney has taken reasonable precautions to avoid damage or injury to subterranean structures or utilities. Subsurface sampling may result in unavoidable contamination of certain subsurface areas not known to be previously contaminated such as, but not limited to, a geologic formation, the groundwater or other hydrous body. McElhanney will adhere to an appropriate standard of care during the conduct of any subsurface sampling.

Independent Judgments. McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance or sell land or with respect to public offerings for the sale of securities.

Construction. The subsurface information contained in this report were obtained for the owner's information and design. The extent and detail of assessments necessary to determine all relevant conditions that may affect construction costs would normally be greater than the assessments carried out for this report. Accordingly, a contingency fund to allow for the possibility of variations of subsurface conditions should be included in the construction budget to cover costs associated with modifications of the design and construction procedures resulting from conditions that vary from the assumptions in this report. If during construction, subsurface conditions are found to be other than those described in this report, McElhanney is to be notified and may alter or modify the geotechnical report recommendations. If McElhanney is not retained to provide services during construction, then McElhanney is not responsible for confirming or recording that subsurface conditions do not materially differ from those interpreted conditions contained in this report or for confirming or recording that construction activities have not adversely affected subsurface conditions or the recommendations contained in this report.

APPENDIX B

Drawing B-01 – Borehole Site Plan

LEGEND

⊗ BOREHOLE LOCATIONS

NOTES:

1) ALL LOCATIONS ARE APPROXIMATE
2) REFERENCED FROM BING AERIAL MAP

McElhanney

0 1:1,000 50

TITLE: BUCKHORN FIRE HALL TOWER GEOTECH	CLIENT: REGIONAL DISTRICT OF FRASER FORT GEORGE	
LOCATION: BUCKHORN, BC	DRAWN: RS	FIGURE: 1
	CHECKED: TG	
PROJECT No.: 2341-02750-19	DATE: NOVEMBER 2020	
REPORT TYPE & YEAR: GEOTECHNICAL ASSESSMENT FOR BUCKHORN FIRE HALL TOWER		

Plotted: November 13, 2020 , 16:46:57 Filename: X:\2341\2750-19 RDFFG - Buckhorn Firehall Tower Geotech\10.0 Drawings\10.5 Sheets\Buckhorn Fire Hall Tower Borehole Locations.dwg\Layout1

APPENDIX C

Modified Unified Classification System for Soils

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CLIENT Regional District of Fraser Fort George
PROJECT NAME Buckhorn Fire Hall Tower
PROJECT NUMBER 2341-02750-19
PROJECT LOCATION Prince George, BC
DATE STARTED 11/4/20 **COMPLETED** 11/4/20
GROUND ELEVATION _____ **HOLE SIZE** 0.15 m
DRILLING CONTRACTOR Geotech Drilling Ltd.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 10.30 m
LOGGED BY T.Garden **CHECKED BY** W. Rathbun
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m³)
		CLAY and SILT, trace sand (fine-grained), stiff, medium-plastic, grey-brown, moist.	GB 1				
2		CLAY, some silt, trace sand (fine-grained), very stiff, medium to high plastic, brown with orange mottling, moist.	SPT 1		2-4-6-7 (10)	400 kPA	
			GB 2			250 kPa	
4			SPT 2		1-4-5-8 (9)	350 kPa	
			GB 3				
6			SPT 3		1-2-3-5 (5)	250 kPa	
			GB 4				
8			SPT 4		1-3-3-4 (6)	250 kPa	
10			SPT 5		4-2-2-7 (4)	100 kPa	

SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

(Continued Next Page)

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CLIENT Regional District of Fraser Fort George
PROJECT NAME Buckhorn Fire Hall Tower
PROJECT NUMBER 2341-02750-19
PROJECT LOCATION Prince George, BC

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m^3)	SPT N VALUE ▲ / PL MC LL / FINES CONTENT (%)
		CLAY, some silt, trace sand (fine-grained), very stiff, medium to high plastic, brown with orange mottling, moist. *(continued)*						
		CLAY, silty (low-plastic), sandy, some gravel (sub-rounded to sub-angular), hard, brown, grey, damp.	SPT 6		9-23-35-27 (58)			
12			GB 5					
14			SPT 7		16-20-28-35 (48)			
16			SPT 8		18-21-34-25 (55)			

End of borehole due to reaching target depth.
Light groundwater seepage starting @ 10.3m.
Borehole backfilled with cuttings and tamped with handheld shovel.
Bottom of borehole at 17.30 meters.

McElhanney Ltd.

CLIENT Regional District of Fraser Fort George
PROJECT NAME Buckhorn Fire Hall Tower
PROJECT NUMBER 2341-02750-19
PROJECT LOCATION Prince George, BC
DATE STARTED 11/4/20 **COMPLETED** 11/4/20
GROUND ELEVATION _____ **HOLE SIZE** 0.15 m
DRILLING CONTRACTOR Geotech Drilling Ltd.
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Auger
▽ **AT TIME OF DRILLING** 10.30 m
LOGGED BY T.Garden **CHECKED BY** W. Rathbun
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m³)	SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0		CLAY and SILT, trace sand (fine-grained), soft, medium to high plastic, grey-brown, moist.	GB 1					
2			SPT 1		1-2-5-8 (7)			▲
			GB 2					
4			SPT 2		2-2-4-4 (6)			▲
			GB 3					
6			SPT 3		2-2-3-4 (5)			▲
			GB 4					
8			SPT 4		2-3-3-3 (6)			▲
10		Transitions to CLAY and SAND (fine-grained), some gravel, soft, medium to high plastic, grey-brown, moist.	GB 5					

(Continued Next Page)

CLIENT Regional District of Fraser Fort George

PROJECT NAME Buckhorn Fire Hall Tower

PROJECT NUMBER 2341-02750-19

PROJECT LOCATION Prince George, BC

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	DRY UNIT WT. (Mg/m^3)	SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
		CLAY and GRAVEL (sub-rounded to sub-angular), sandy, some silt (poorly graded), hard/dense, brown-grey, damp.	SPT 5		19-32-34-60 (66)			▲

End of borehole due to reaching target depth.
Light groundwater seepage starting @ 10.3m.
Borehole backfilled with cuttings and tamped with handheld shovel.
Bottom of borehole at 11.20 meters.

APPENDIX D

Laboratory Testing Results:
-Atterberg Limits
-Sieve Testing

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ATTERBERG LIMITS
Laboratory Analysis Report
ASTM D4318

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
CLIENT: Regional District of Fraser Fort-George
SAMPLE: GB01 BH20-01
DEPTH: 0'-5'
DATE SAMPLED: Nov. 4, 2020
DATE TESTED: Nov. 21, 2020

SOIL PREPARATION ('X' those that apply):

Wet:		**Wash (#40)**	
Dry (Air)		**Dry (#40)**	x
Dry (Oven)	x	**Mech.**	

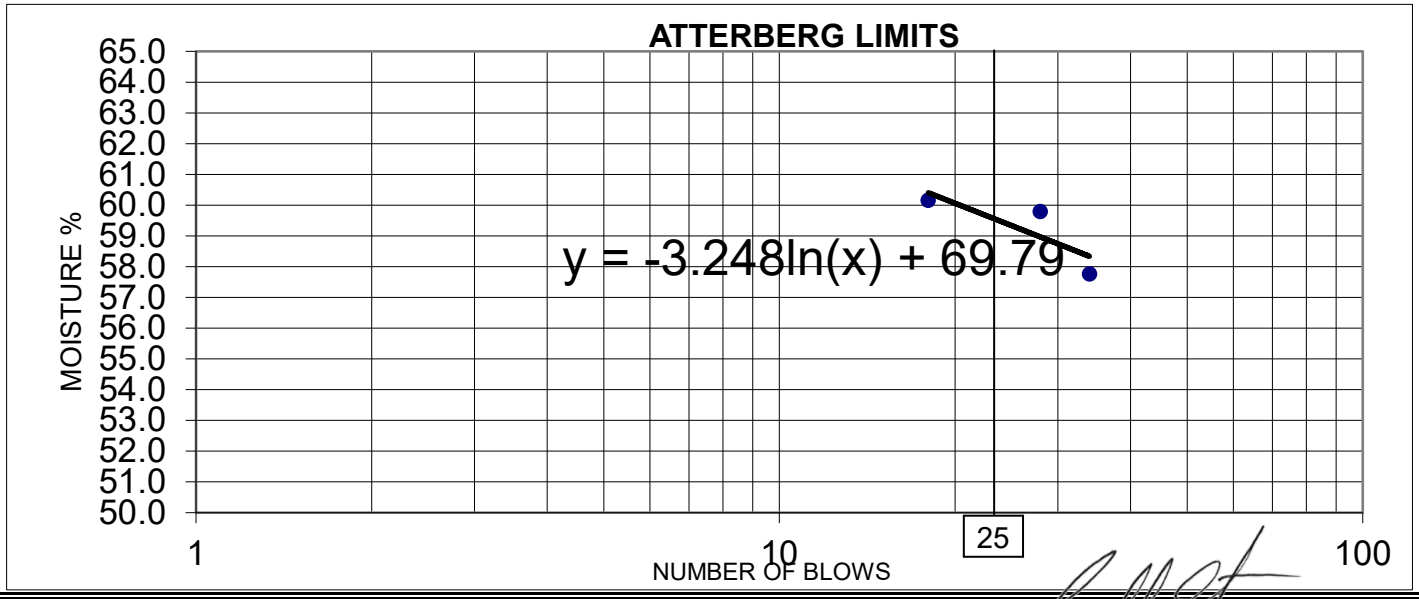
	LIQUID LIMIT			PLASTIC LIMIT	
TRIAL NO.	1	2	3	4	5
NO. OF BLOWS	34	28	18		
WT.OF WET SAMPLE +TARE (GRMS.)	30.49	29.97	29.24	19.31	19.22
WT.OF DRY SAMPLE +TARE (GRMS.)	24.50	24.14	23.64	18.11	17.96
TARE (GRMS.)	14.13	14.39	14.33	14.34	14.31
MOISTURE CONTENT %	57.8	59.8	60.2	31.8	34.5

RESULT SUMMARY

Liquid Limit (LL)	**59** %	Natural Water Content	**36** %
Plastic Limit (PL)	**33** %	Flow Index	**24.10**
Plastic Index (LL-PL)	**26**	Toughness Index	**1.09**
		Liquidity Index (B Value)	**0.11**

SOIL DESCRIPTION:

SOIL CLASSIFICATION - **MH**



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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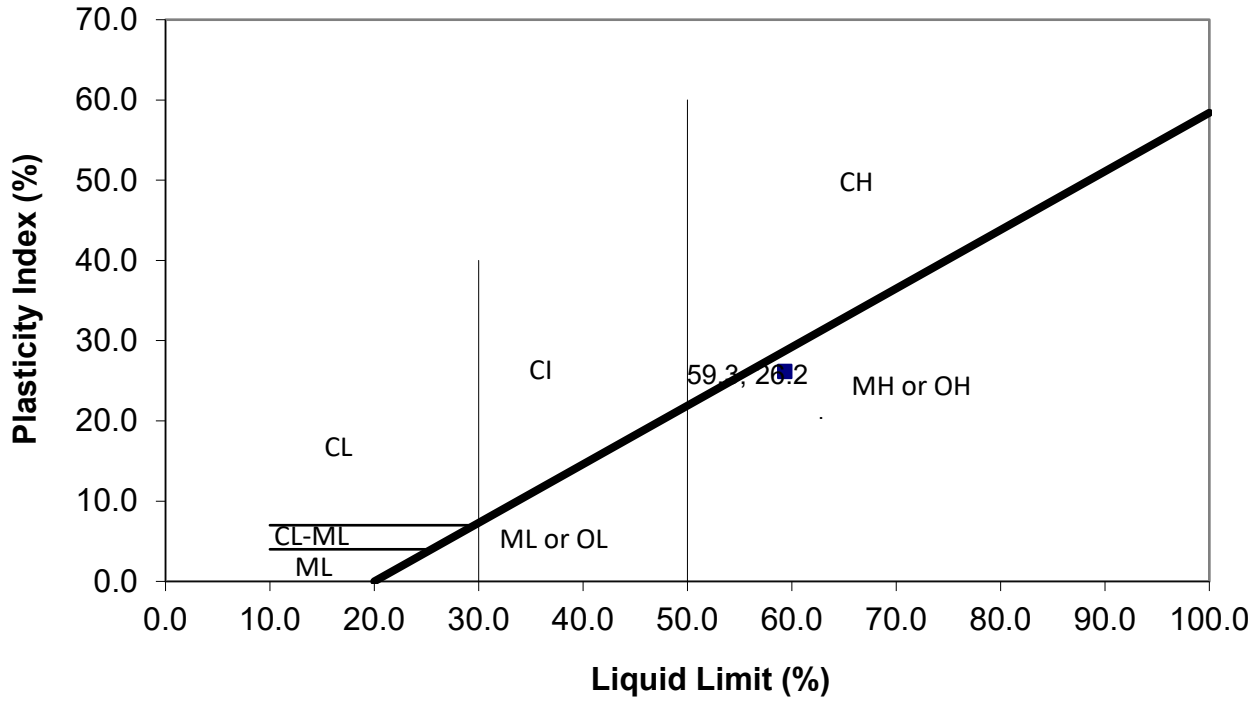
Tel: 250-561-2229 Fax: 250-563-1941

ATTERBERG LIMITS
Laboratory Analysis Report

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
DATE SAMPLED: Nov. 4, 2020 **DATE TESTED:** Nov. 21, 2020

Sample I.D.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Soil Classification	Natural Water Content (%)	Soil Description / Comments
GB01 BH20-01	59.3	33.2	26.2	MH	36.2	MH

Plasticity Chart



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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ATTERBERG LIMITS
Laboratory Analysis Report
ASTM D4318

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
CLIENT: Regional District of Fraser Fort-George
SAMPLE: BH20-01 GB04
DEPTH: 17'-20'
DATE SAMPLED: Nov. 4, 2020
DATE TESTED: Nov. 21, 2020

SOIL PREPARATION ('X' those that apply):

Wet:		**Wash (#40)**	
Dry (Air)		**Dry (#40)**	x
Dry (Oven)	x	**Mech.**	

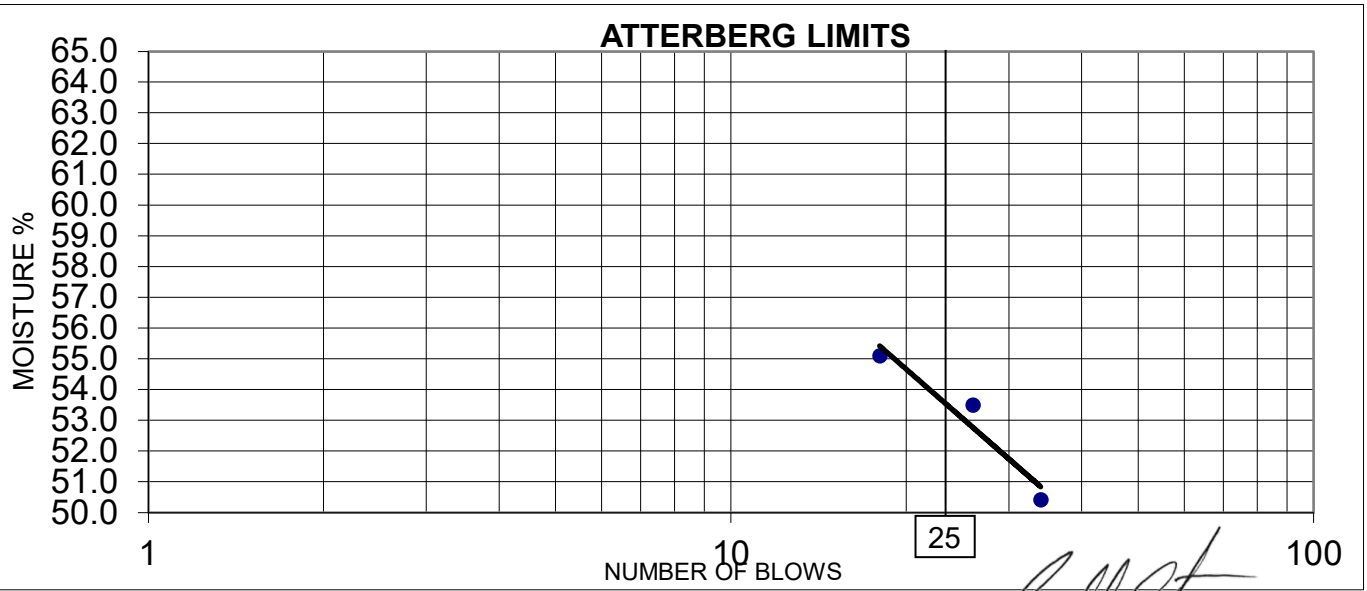
	LIQUID LIMIT			PLASTIC LIMIT	
TRIAL NO.	1	2	3	4	5
NO. OF BLOWS	34	26	18		
WT.OF WET SAMPLE +TARE (GRMS.)	31.93	30.62	31.50	22.45	21.01
WT.OF DRY SAMPLE +TARE (GRMS.)	25.87	24.96	25.35	20.70	19.50
TARE (GRMS.)	13.85	14.38	14.19	14.19	14.07
MOISTURE CONTENT %	50.4	53.5	55.1	26.9	27.8

RESULT SUMMARY

Liquid Limit (LL)	**53** %	Natural Water Content	**38** %
Plastic Limit (PL)	**27** %	Flow Index	**26.45**
Plastic Index (LL-PL)	**26**	Toughness Index	**0.97**
		Liquidity Index (B Value)	**0.42**

SOIL DESCRIPTION:

SOIL CLASSIFICATION - **CH**



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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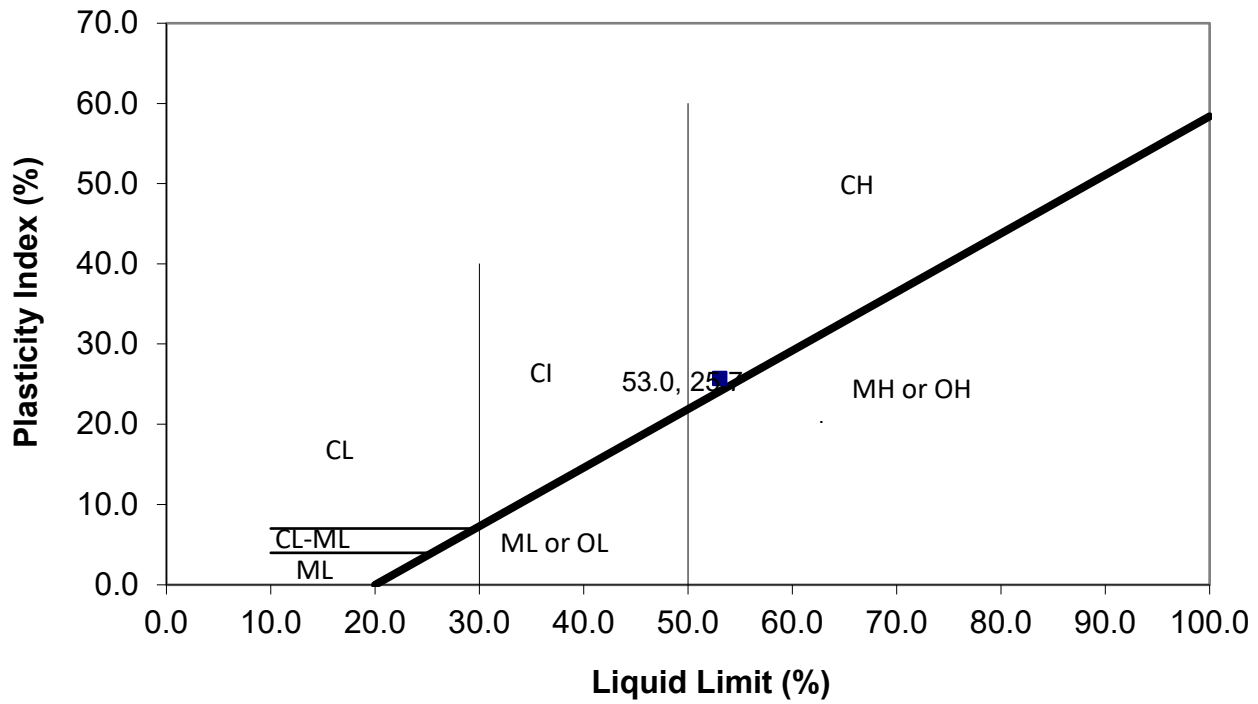
ATTERBERG LIMITS
Laboratory Analysis Report

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
DATE SAMPLED: Nov. 4, 2020 **DATE TESTED:** Nov. 21, 2020

Sample I.D.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Soil Classification	Natural Water Content (%)	Soil Description / Comments
BH20-01 GB04	53.0	27.3	25.7	CH	37.9	CH

Plasticity Chart



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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ATTERBERG LIMITS
Laboratory Analysis Report
ASTM D4318

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
CLIENT: Regional District of Fraser Fort-George
SAMPLE: BH20-01 SPT07
DEPTH: 45'-47'
DATE SAMPLED: Nov. 4, 2020
DATE TESTED: Nov. 21, 2020

SOIL PREPARATION ('X' those that apply):

Wet:		**Wash (#40)**	
Dry (Air)		**Dry (#40)**	x
Dry (Oven)	x	**Mech.**	

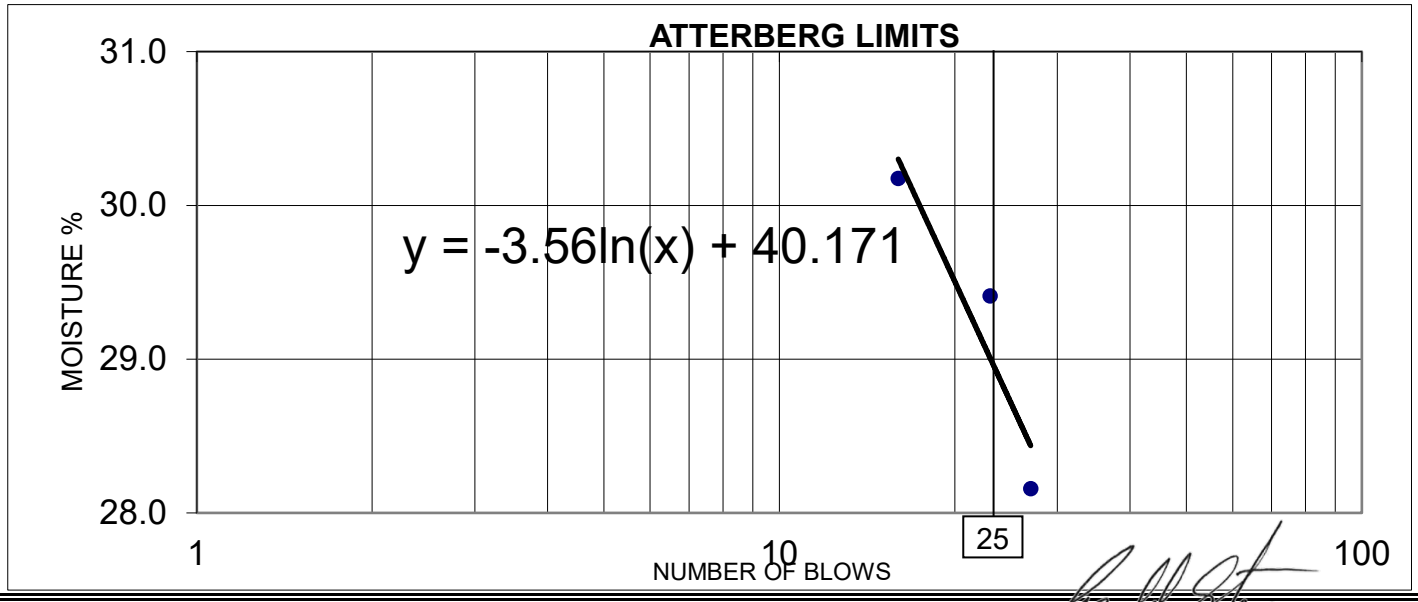
	LIQUID LIMIT			PLASTIC LIMIT	
TRIAL NO.	1	2	3	4	5
NO. OF BLOWS	27	23	16		
WT.OF WET SAMPLE +TARE (GRMS.)	27.54	29.22	31.18	19.18	19.58
WT.OF DRY SAMPLE +TARE (GRMS.)	24.62	25.82	27.26	18.56	18.91
TARE (GRMS.)	14.25	14.26	14.27	14.30	14.36
MOISTURE CONTENT %	28.2	29.4	30.2	14.6	14.7

RESULT SUMMARY

Natural Water Content	**14** %		
Liquid Limit (LL)	**29** %	Flow Index	**18.00**
Plastic Limit (PL)	**15** %	Toughness Index	**0.78**
Plastic Index (LL-PL)	**14**	Liquidity Index (B Value)	**-0.08**

SOIL DESCRIPTION:

SOIL CLASSIFICATION - **CL**



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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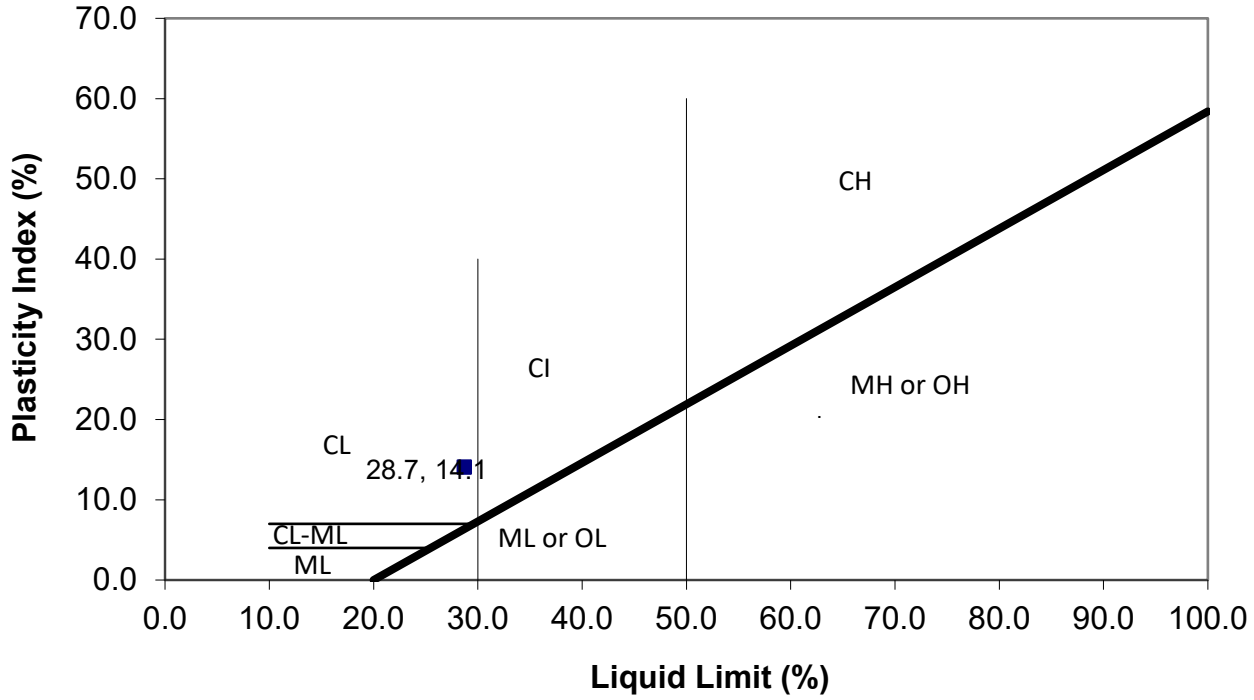
ATTERBERG LIMITS
Laboratory Analysis Report

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
DATE SAMPLED: Nov. 4, 2020 **DATE TESTED:** Nov. 21, 2020

Sample I.D.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Soil Classification	Natural Water Content (%)	Soil Description / Comments
BH20-01 SPT07	28.7	14.6	14.1	CL	13.6	CL

Plasticity Chart



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

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ATTERBERG LIMITS
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ASTM D4318

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
CLIENT: Regional District of Fraser Fort-George
SAMPLE: BH20-02 GB02
DEPTH: 7'-10'
DATE SAMPLED: Nov. 4, 2020
DATE TESTED: Nov. 21, 2020

SOIL PREPARATION ('X' those that apply):

Wet:		**Wash (#40)**	
Dry (Air)		**Dry (#40)**	x
Dry (Oven)	x	**Mech.**	

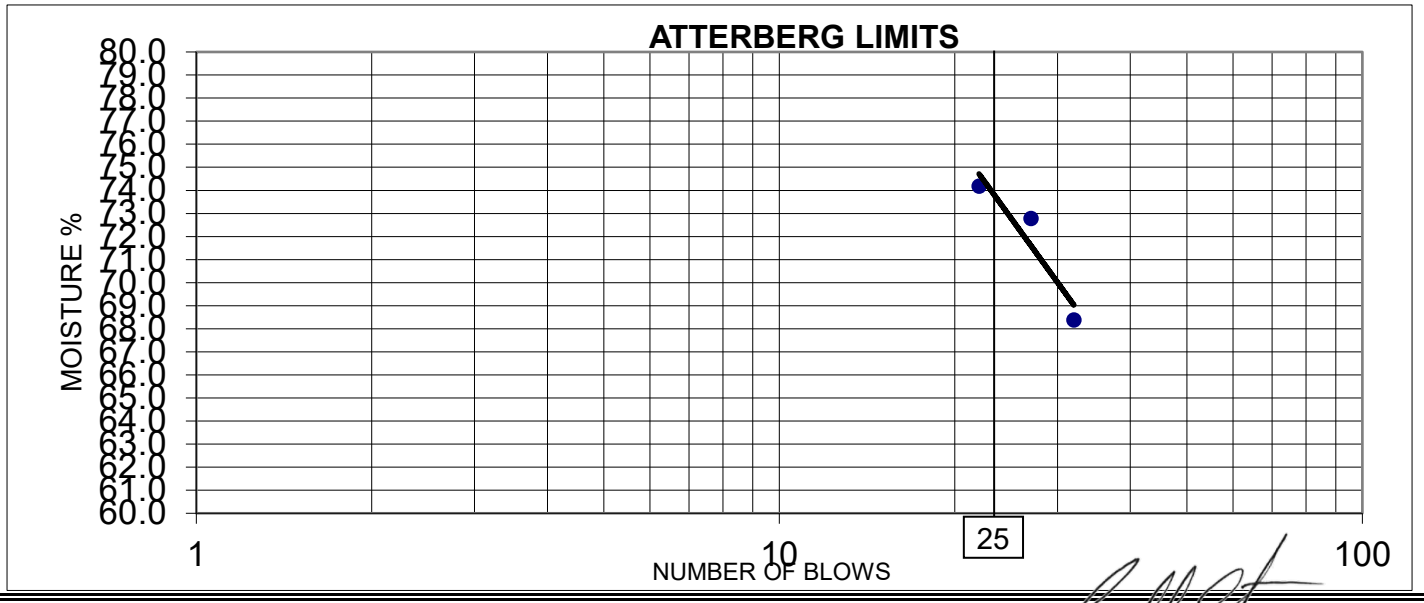
	LIQUID LIMIT			PLASTIC LIMIT	
TRIAL NO.	1	2	3	4	5
NO. OF BLOWS	32	27	22		
WT.OF WET SAMPLE +TARE (GRMS.)	28.00	26.63	32.49	18.31	20.05
WT.OF DRY SAMPLE +TARE (GRMS.)	22.42	21.36	24.79	17.32	18.80
TARE (GRMS.)	14.26	14.12	14.41	14.36	14.34
MOISTURE CONTENT %	68.4	72.8	74.2	33.4	28.0

RESULT SUMMARY

Liquid Limit (LL)	**73** %	Natural Water Content	**36** %
Plastic Limit (PL)	**31** %	Flow Index	**59.74**
Plastic Index (LL-PL)	**42**	Toughness Index	**0.70**
		Liquidity Index (B Value)	**0.14**

SOIL DESCRIPTION:

SOIL CLASSIFICATION - **CH**



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

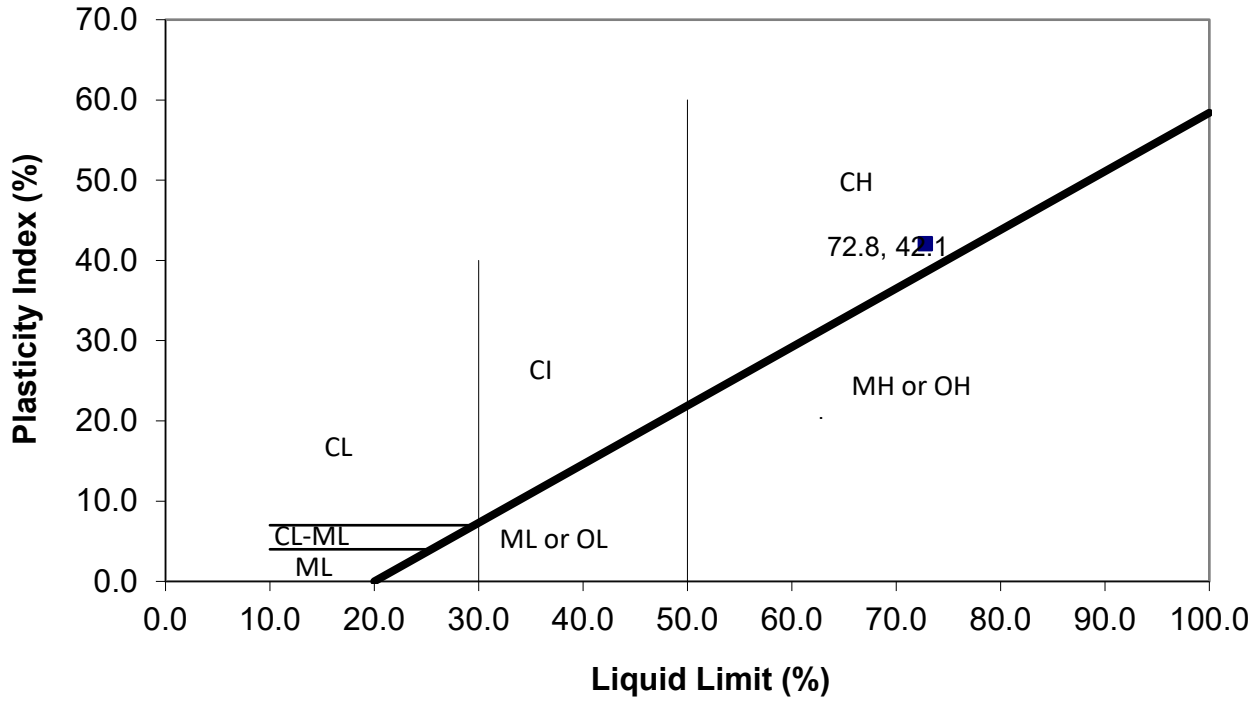
McElhanney Ltd.
12-556 North Nechako Rd
Prince George, BC, Canada, V2K 1A1
Tel: 250-561-2229 Fax: 250-563-1941

ATTERBERG LIMITS
Laboratory Analysis Report

PROJECT NAME: Buckhorn Firehall Geotechnical Assessment
PROJECT NO. 2341-02750-19
DATE SAMPLED: Nov. 4, 2020 **DATE TESTED:** Nov. 21, 2020

Sample I.D.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Soil Classification	Natural Water Content (%)	Soil Description / Comments
BH20-02 GB02	72.8	30.7	42.1	CH	36.3	CH

Plasticity Chart



Tested by: T.Garden

Reviewed by: Gerald Stevenson, Laboratory Supervisor

Mcelhanney LTD
12-556 North Nechako Road, Prince George, BC

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

PROJECT NO. 2341-2750-19
CLIENT Regional District of Fraser
C.C. Fort George

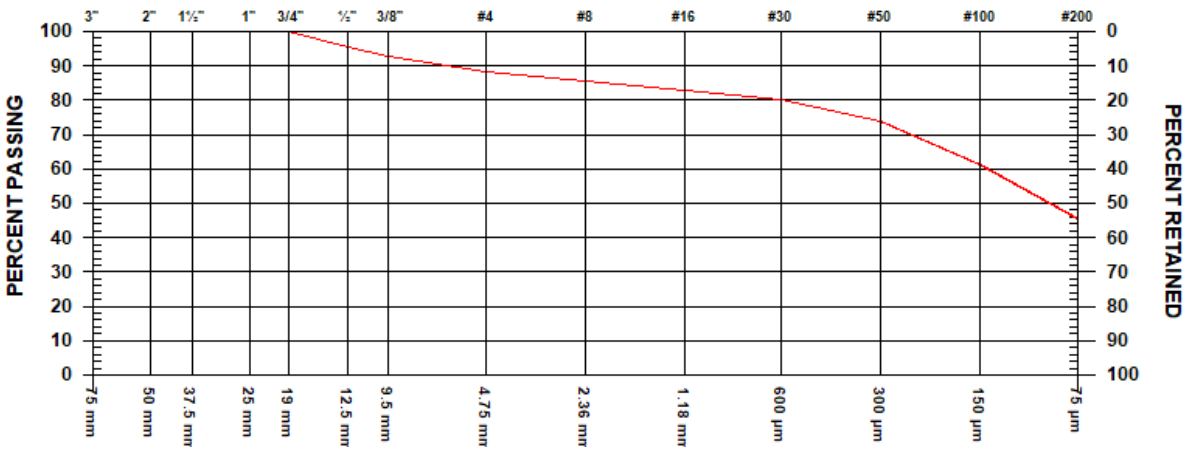
TO
Regional District of Fraser Fort George
155 George Street
Prince George, BC
V2L 1P8

PROJECT RDFFG General
Buckhorn Firehall Geotech — Prince George
CONTRACTOR Geotech Drilling Ltd.

SIEVE TEST NO. 1 DATE RECEIVED 2020.Nov.05 DATE TESTED 2020.Nov.22 DATE SAMPLED 2020.Nov.04

SUPPLIER
SOURCE BH20-02 Grab 5 30'-35'
SPECIFICATION
MATERIAL TYPE Drill Sample

SAMPLED BY TG
TESTED BY GB
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm		
2"	50 mm		
1 1/2"	37.5 mm		
1"	25 mm		
3/4"	19 mm	100.0	
1/2"	12.5 mm	95.4	
3/8"	9.5 mm	92.6	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm	88.4	
No. 8	2.36 mm	85.4	
No. 16	1.18 mm	82.9	
No. 30	600 µm	80.2	
No. 50	300 µm	73.7	
No. 100	150 µm	61.3	
No. 200	75 µm	45.3	

MOISTURE CONTENT 17.2%

COMMENTS

 2020.Dec.01 Mcelhanney LTD PER. _____

Mcelhanney LTD
12-556 North Nechako Road, Prince George, BC

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

PROJECT NO. 2341-2750-19
CLIENT Regional District of Fraser
C.C. Fort George

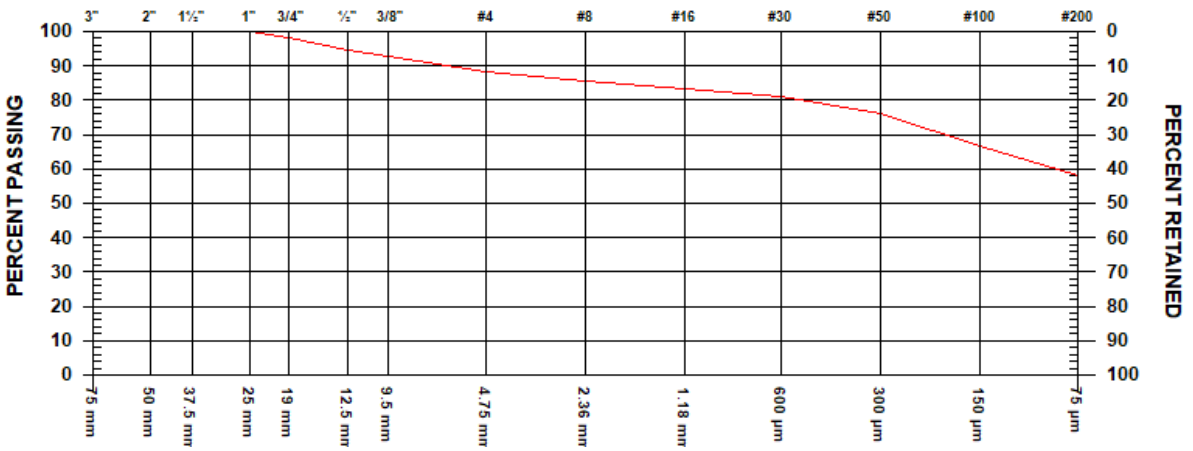
TO
Regional District of Fraser Fort George
155 George Street
Prince George, BC
V2L 1P8

PROJECT RDFFG General
Buckhorn Firehall Geotech — Prince George
CONTRACTOR Geotech Drilling Ltd.

SIEVE TEST NO. 2 DATE RECEIVED 2020.Nov.05 DATE TESTED 2020.Nov.22 DATE SAMPLED 2020.Nov.04

SUPPLIER
SOURCE BH20-01 SPT6 35'-37'
SPECIFICATION
MATERIAL TYPE Drill Sample

SAMPLED BY TG
TESTED BY GB
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm		
2"	50 mm		
1 1/2"	37.5 mm		
1"	25 mm	100.0	
3/4"	19 mm	98.3	
1/2"	12.5 mm	94.7	
3/8"	9.5 mm	92.7	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm	88.3	
No. 8	2.36 mm	85.6	
No. 16	1.18 mm	83.3	
No. 30	600 µm	81.2	
No. 50	300 µm	76.0	
No. 100	150 µm	66.9	
No. 200	75 µm	58.0	

MOISTURE CONTENT 14.0%

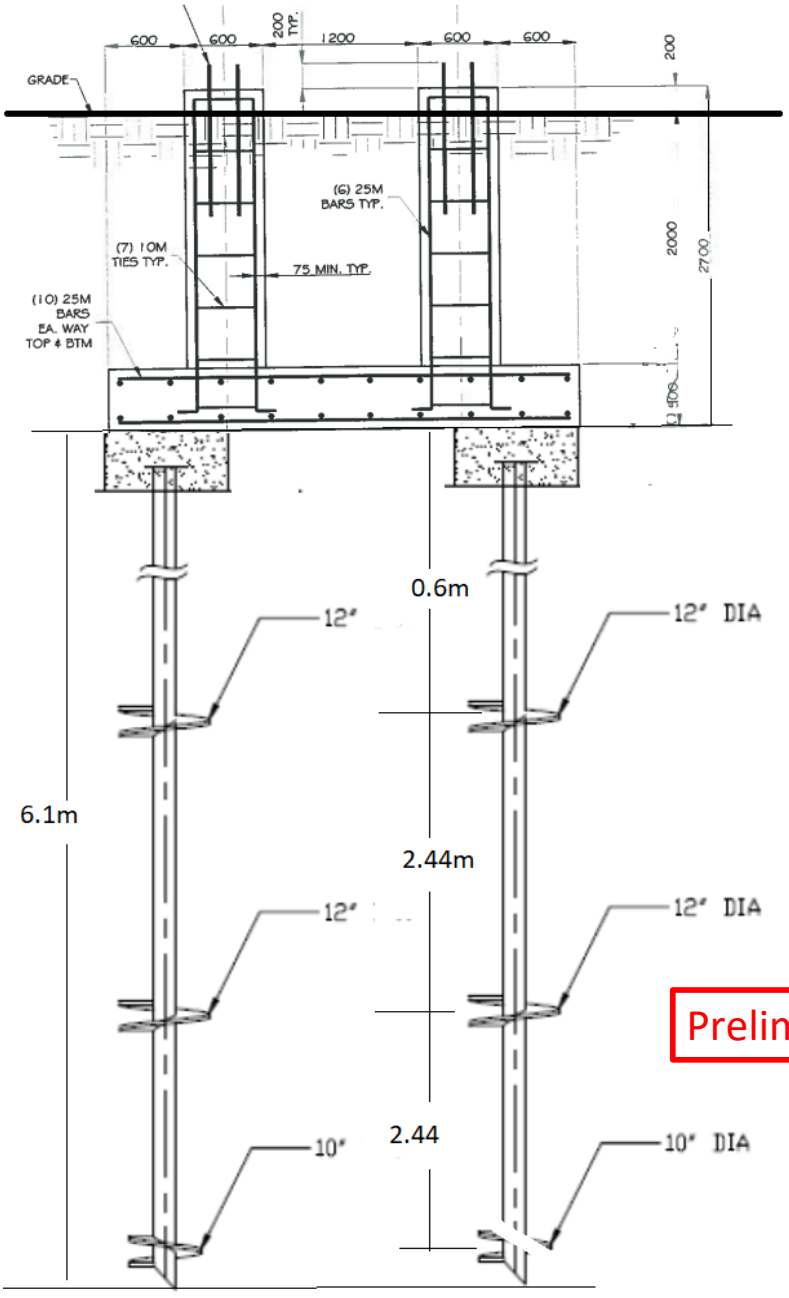
COMMENTS

 2020.Dec.01 Mcelhanney LTD PER. _____

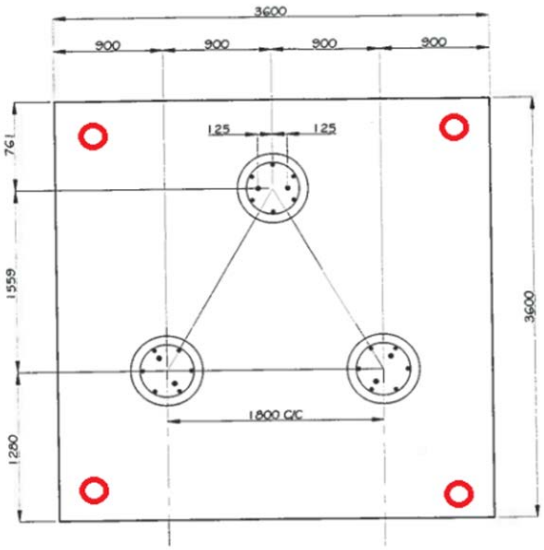
APPENDIX E

Figure 3 – Helical Pile Concept

Section View



Plan View



Preliminary - Not for Construction

Notes:

1. Drawing modified from Westower Drawing no. 961399, dated April 23, 1996.
2. Four helical piles to be installed at the corners of foundation pad base as needed to increase resistance to overturning moment.
3. Helical pile shaft diameter is 41.275mm (2-3/8"), shaft wall thickness 6.45mm (0.245"), and total length is 9.1m (30ft).
4. Three helical plates of diameter 305mm (12"), 305mm (12"), and 254 (10") installed at indicated depth intervals.
3. Each pile installed to a torsional resistance of 1650ft-lb and minimum depth of 6.1m (20ft) below the underside of Westower pad foundation as shown in drawing no. 961399, dated Apirl 23, 1996.

McElhanney

Buckhorn Fire Hall - Communications Tower
Buckhorn, BC
Figure 3 - Helical Pile Concept

9-Mar-21