# Mackenzie County

River Road Subdivision
Fort Vermilion, Alberta

MACKENZIE COUNTY - River Road Subdivision

Bearisto & Associates
ENGINEERING & SURVEY

**21 GEME6061**
**DATE xx, 2022**

**Grande Prairie**
10940 – 92 Ave, Grande Prairie, AB T8V 6B5
**P:** 780.532.4919 **F:** 780.532.4739
**Calgary**
1212 1 St SE Unit 102, Calgary, AB T2B 0G8
**P:** 780.532.4919 **F:** 780.532.4739

**TF:** 1.855.879.5973
**www.baseng.ca**

**NOTICE TO BIDDERS**

**Mackenzie County**
Sealed tenders addressed to Mackenzie and marked " River Road Subdivision Development" will be received at the offices of the **Mackenzie County** **until 2:00:59 p.m. local time, XXXXXX, 2022,** for the construction of:

## River Road
## Subdivision Development

The work to be done consists of:

- Clearing and site grading
- Removals
- Earthworks
- Road construction
- Drainage construction including ditching and culverts
- Sanitary sewer construction including gravity main and manholes
- Watermain construction
- Lot Servicing
- Traffic accommodation
- Landscaping
- Geotextiles and Erosion Control
- Coordination with shallow utilities

**To be complete by Sept 30, 2022**

The lowest or any other bid will not necessarily be accepted as allowed in the Instructions to Bidders.

Joseph Thoms, M.Eng., P.Eng.
Senior Project Manager
Beairsto & Associates Engineering and Survey
#102, 1212 – 1St Steet SE
Calgary, Alberta
T2G 2H8
Phone: 403.455.5537
Email: josepht@baseng.ca

No Pre-Tender meeting will be held.

**Table of Contents**



Included by Reference:

- Mackenzie County General Municipal Improvement Standards (GMIS)
- Alberta Transportation's Standard Specifications for Highway Construction
- Alberta Transportation's Standard Specifications for Bridge Construction
- Alberta Transportation's Design Guidelines for Erosion and Sediment Control for Highways
- ATCO Electric Standards – Underground Residential Distribution Systems Guidelines (AES);
- Telus Outside Plant Practices and Standards (TOPPS);
- Alberta Electrical Utility Code (AEUC);
- CSA Standards for Overhead and Underground Systems;
- ASTM Standard F1962-11 (ASTM);

**END OF SECTION**

**Contract Drawings**

| Number | Name | Sheet | Revision |
|---|---|---|---|
| 1 | Title Page / Site Plan | | 4 |
| 2 | List Of Drawings,Abbreviations, Legend,and General Notes | G-01 | 4 |
| 3 | Legal Overall | LE-01 | 4 |
| 4 | Transportation Overall | TR-01 | 4 |
| 5 | Overall Utilities | OU-01 | 4 |
| 6 | Lot Grading | LG-01 | 4 |
| 7 | Disinfection and Testing | DI-01 | 4 |
| 8 | N-S Road Plan and Pofile | PP-01 | 4 |
| 9 | W-E Road Plan and Pofile | PP-02 | 4 |
| 10 | Typical Sections N-S Road | XS-01 | 4 |
| 11 | Typical Sections W-E Road | XS-02 | 4 |
| 12 | Typical Details | DT-01 | 4 |

**END OF SECTION**

# 1 General

## 1.1 LIMITATION OF LIABILITY

.1 The Bidder agrees that the Owner's sole obligation, in return for the Bidder's preparation and submission of its bid, is to give consideration to the bid in accordance with the Contract Documents. The Bidder hereby waives any claim for damages or costs of any nature against the Owner and the Consultant (including, without limitation, the cost of preparing and submitting the bid, and any anticipated profits and contributions to overhead) arising out of the Owner's use of its discretion under the Contract Documents and the Consultants' advice to the Owner.

## 1.2 INVITATION

.1 Bid Call

Offers signed under seal, executed, and dated will be received in **HARDCOPY**

Up to:

**Tuesday, XXXXXX, 2022, 2:00:00 P.M Mountain Standard Time**

addressed to:

**Mackenzie County**
**4511 - 46 Avenue**
**Phone: (780) 927-3718**
**Fax: (780) 539-9871**
**Fort Vermilion, Alberta**
**T0H 1N0**

and clearly marked:

**River Road**
**Subdivision Development**
**21GEME6061**

.1 Offers submitted after the above time will not be opened.
.2 **Submit all Information Submittal Forms** with the Bid forms at the Bid closing time. Failure to do so may result in rejection of the Bid by the Owner.
.3 Offers will be opened and reviewed privately after the Bid Closing time.
.4 Amendments to the submitted offer will be permitted if received prior to Bid closing and if endorsed by the same party or parties who signed and sealed the original offer. Faxed amendments or Bids will not be accepted.

**1.3 INTENT**

The intent of this Bid call is to obtain an offer to perform **subdivision development (site clearing, grading, roadwork, water and sewer) for a new subdivision in the Fort Vermilion area** for a Unit Price contract, in accordance with the Contract Documents.

.1 Initiate work within the time stated in **Special Provisions – SP 3 "Key Milestone Dates"**

.2 Perform Substantial Performance of the Work by date as indicated in **Special Provisions – SP 3 "Key Milestone Dates"**

.3 Bids shall be prepared and submitted, and the bidding process administered in accordance with these bidding requirements.

**1.4 THE OWNER**

.1 The Owner is hereby identified as:

**Mackenzie County**
**4511 - 46 Avenue**
**Phone: (780) 927-3718**
**Fax: (780) 539-9871**
**Fort Vermilion, Alberta**
**T0H 1N0**

.2 Direct communication to The Owner by any Bidder will not be answered. All correspondence and communication will be through the Consultant identified in Section 1.5 unless instructed otherwise. Any questions must be submitted in writing.

**1.5 THE CONSULTANT**

.1 The **Consultant** is hereby identified as:

**Beairsto & Associates Engineering & Survey Ltd. (BASE)**
**10940 - 92 Avenue**
**Grande Prairie, AB T8V 6B5**
**www.baseng.ca**

**1.6 CONTRACT DOCUMENTS IDENTIFICATION**

.1 Contract Documents are identified as Project number **21GEME6061** as prepared by the Consultant.

**1.7 CONTRACT/BID DOCUMENTS**

.1 Bid Form.

.2 Definitions

.1 Contract Documents as defined in these documents.
.2 Bid Documents: Contract Documents supplemented with Instructions to Bidders, Bid Form, and Supplementary Bid Forms identified herein.
.3 Bid, Offer, or Bidding: Act of submitting an offer under seal.
.4 Bid Price: Monetary sum identified in Bid Form as an offer to perform work.

.3 Availability

.1 Tender documents are available in digital format only.
.2 Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer license or grant for other purposes.

.4 Examination

.1 Upon receipt of Bid Documents verify that documents are complete.
.2 Immediately notify the Consultant upon finding discrepancies or omissions in Bid Documents.

.5 Document Coordination

.1 Verify drawings with the Drawing Index to ensure that the set is complete. Verify the number of pages in, and date of each Section of the Specifications with the Table of Contents to ensure the book of Specifications is complete. Inform Consultant immediately if copies of Drawings or Specifications are not complete.
.2 Notify the Consultant of any discrepancies or omissions in or between Drawings and Specifications, or if any doubt as to the meaning or intent therein exists prior to **five (5) working days** to the closing of Bids. Addenda to the documents will be issued in accordance with below.

.6 Queries/Addenda

.1 Direct all questions in writing to the **two (2)** named persons below:

.1 **Joseph Thoms** of BASE.
Email: **josepht@baseng.ca**

.2 **Izabela Matyka** of BASE.
Email: **izabelam@baseng.ca**

.2 Addenda may be issued during the bidding period. All addenda become part of Contract Documents. Include costs in Bid Price.
.3 Verbal answers are only binding when confirmed by written addenda.
.4 Clarifications requested by Bidders must be in writing not less than **five (5) working** days before the date set for receipt of Bids. A reply will be in the form of an addendum, a copy of which will be forwarded to known Bidders no later than **two (2) working days** before receipt of Bids.

.7 Product/System Options

.1 Where Bid Documents stipulate a particular product, substitutions will be considered by Consultant up to **five (5) days** before receipt of Bids.
.2 When a request to substitute a product is made, the Consultant may approve substitution and will issue an Addendum to known Bidders for this purpose.

.3 In submission of substitutions to products specified, Bidders shall include in their Bid, any changes required in work to accommodate such substitutions. A later claim by Bidder for an addition to contract price because of changes in work necessitated by use of substitutions shall not be considered.
.4 Submission shall provide sufficient information to enable the Consultant to determine the acceptability of such products.
.5 Provide complete information on required revisions to other work to accommodate each substitution, dollar amount of additions to or reductions from Bid Price, including revisions to other work.
.6 Unless substitutions are submitted in this manner and subsequently accepted, provide products as specified.
.7 Approval to submit substitutions prior to submission of Bids is required.

## 1.8 SITE ASSESSMENT

.1 Site assessments will not be a requirement of the tender process. If required, a viewing of the site can be scheduled with the Consultant.

## 1.9 QUALIFICATIONS

.1 Subcontractors

.1 Owner reserves the right to reject a proposed subcontractor for reasonable cause.
.2 Refer to the General Conditions of the Contract for further details.

## 1.10 BID SUBMISSION

.1 Bid Ineligibility

.1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind may, at the discretion of Owner, be declared informal. If so declared, the bid will be rejected.
.2 Bids with Bid Forms and enclosures which are improperly prepared may, at the discretion of the Owner, be declared informal. If so declared, the bid will be rejected.
.3 Bids that fail to include security deposit, bonding or insurance requirements may at the discretion of the Owner, be declared informal. If so declared, the bid will be rejected.

.2 Submissions

.1 **Bidders shall be solely responsible for delivery of their Bids in the manner and time prescribed.**
.2 Mackenzie County has a **multi-envelope submission**. Envelope 1 shall include all project mandatory information and Envelope 2 shall include the evaluated submittals. Envelope 1 will be opened first. Envelope 2 will only be opened if all mandatory requirements are satisfied. All envelopes will be clearly marked with Bidder’s name, project name and Owner’s name on the outside.

.1 Submit Envelope 1 (Mandatory Submittals) and Envelope 2 (Evaluated Submittals) in a closed opaque envelope, clearly identifying the envelope #, Bidder’s name, project name, and Owner’s name on the outside.

.2 **Envelope 1 - Mandatory Submittals** shall be sealed and contain the required Supplements to Bid Form documents listed in Section 1.13.

.3 **Envelope #2 - Evaluated Submittals** shall be sealed and contain the signed and sealed Bid Form and the required Supplements to Bid Form documents listed in Section 1.14. Submit one copy of the executed offer on the Bid Form provided, signed with original signature(s), and corporate sealed where applicable. The second copy of the Bid Form is provided for Bidder's records

.3 Should Envelope 1 not contain all the required documentation listed in Article 1.13 then Envelope 2 containing the bid amount will not be considered.
.4 Bids received by fax or email shall be rejected.
.5 Submit one copy of executed offer on Bid Forms provided, signed and with corporate seal together with the required security.
.6 Improperly completed information, irregularities in Bid Bond, may cause Owner not to open Bid envelope and declare Bid informal.

## 1.11 BID WITHDRAWAL AND MODIFICATIONS

.1 Bid Withdrawal:

.1 Bidders may withdraw their Bid at any time up to Bid Closing time on request in writing, addressed to, and received by the Consultant at the Bid submission email address prior to Bid Closing time.
.2 Withdrawn Bids may be resubmitted in accordance with these Instructions to Bidders providing the resubmitted Bid is received at the email indicated, prior to Bid Closing time.

.2 Bid Modifications:

.1 Modifications may be made at any time prior to Bid Closing time.
.2 Modifications shall be made only in writing, addressed to The Owner at the Bid submission email address closing and indicating the name of the Project.
.3 Modifications directing a change in a Bid amount shall reveal neither the original amount nor the revised amount. State only the amount to be added to or deducted from the original Bid amount.
.4 Owner will not accept responsibility for the content of modifications or modifications that are, for any reason, delayed, illegible or otherwise improperly received.
.5 Late or improperly received Bid Modifications will cause rejection of the Bid as indicated.

.3 Persons withdrawing Bids or making Bid Modifications in person shall show a letter signed by the original Bidder as proof of authorization to do so. Persons not showing proper authorization will not be allowed to modify or withdraw a Bid.

## 1.12 ALL BIDDERS MUST BID TO THE SPECIFIED TERMS AND CONDITIONS.

.1 Any Bidder taking exception to any of the specified terms and conditions, and wishing to Bid to a qualified or alternate term or condition, may only do so providing that:

.1 The Bidder has first tendered a price based on The Owner's terms and conditions verbatim.
.2 The Bidder offer of qualified or alternate terms or conditions must clearly define the details of any such changes, and set out individually and in full detail the additional or reduced amount that applies to each change.

.2 In evaluating Tenders, selection of the successful Bidder will be on prices tendered to The Owner's terms and conditions verbatim. If that Bidder has offered additional or reduced amounts based on qualified or alternate terms and conditions, The Owner may accept or reject such alternate terms and conditions as may be deemed in The Owner's best interests.

.3 The words "terms and conditions" used in this clause refer only to that portion of the Tender Documents setting out the requirements other than the detailed work or Project Specifications.

**1.13 BID ENCLOSURES/REQUIREMENTS – ENVELOPE 1 - MANDATORY SUBMITTALS**

.1 Consent of Surety

.1 Submit with Bid Bond, a Consent of Surety, stating that surety providing Bid Bond is willing to supply Performance and Labour and Materials Payment Bonds specified in amounts not less than fifty (50%) percent of Bid price.
.2 Include cost of bonds in Bid Price.
.3 Bid Bond must be issued by a surety company licensed to conduct business in the province or territory where the work is located.

.2 Security Deposit

.1 Bids shall be accompanied by a security deposit as follows: Bid Bond in an amount not less than ten (10%) percent of Bid price.
.2 Endorse Bid Bond in name of Owner as obligee signed and sealed by the principal (Contractor) and surety.
.3 Use the latest edition CCDC or approved forms.
.4 Security deposit will be returned after delivery to Owner of required Performance and Labour and Materials Payment Bond(s) by accepted Bidder.
.5 If no contract is awarded, all security deposits will be returned.

.3 Company Information

.4 Past Projects Experience

.5 List of Equipment

.6 List of Sub-Contractors

.7 Extra Work Labour Rates

.8 Extra Work Equipment Rates

.9 Key Staff

.10 Construction Schedule

.11 Insurance

.1 Provide signed "Undertaking of Insurance" on a standard form provided by the insurance company stating intention to provide insurance to Bidder in accordance with insurance requirements as noted in **Section 1.45 of the General Conditions of the Contract**

.12 Copy of Safety Program

.13 Safety Certification

.1 Submit a copy of valid Certificate of Recognition (COR) as issued by the Alberta Construction Safety Association (ACSA) or another certifying organization authorized by Alberta Labour to issue CORs with Bid submission. Failure to provide COR will cause rejection of the Bid as noted below.

.2 Bidders not in possession of a valid COR may prequalify if in possession of a valid Temporary Letter of Certification (TLC) issued by the ACSA.

.3 Bidders who do not possess a COR or TLC, and wish to obtain information about obtaining a COR or TLC, are advised to contact:

The Alberta Construction Safety Association
#101, 13025 St. Albert Trail,
Edmonton, Alberta T5L 5G2

Telephone: (780) 453-3311 or 1-800-661-2272
Facsimile: (780) 455-1120 or 1-877-441-0440
Web Site: www.acsa-safety.org

.14 WCB Letter

## 1.14 BID ENCLOSURES/REQUIREMENTS – ENVELOPE 2 - EVALUATED SUBMITTALS

.1 Bid Form Requirements

.1 The Bidder, in submitting an offer, accepts the time period stated in the Contract documents for performing work. The completion date in the Agreement shall be this completion time added to the commencement date.

.2 Bidder, in submitting an offer, agrees to complete work by the date indicated in Contract Documents but may propose a revision to contract time with an adjustment to the Bid price.

.3 Owner requires that work of this contract be completed as quickly as possible and consideration will be given to the time of completion when reviewing Bids submitted.

.2 Fees for Changes in Work

.1 The Contractor or Subcontractor performing the work of the Change Order or Change Directive shall be entitled to a mark-up of ten (10%) percent for overhead and profit. When work is performed by a sub-contractor and sub-sub-contractor, the Contractor shall be entitled to a fee of five (5%) percent.

.3 Bid Signing

.1 Bid form shall be signed under seal by Bidder.

.2 Sole Proprietorship: Signature of sole proprietor in presence of witness who will also sign. Insert words "Sole Proprietor" under signature. Affix seal.

.3 Partnership: Signature of all partners in presence of witness who will also sign. Insert word “Partner” under each signature. Affix seal to each signature.

.4 Limited Company: Signature of duly authorized signing officer(s) in normal signatures. Insert officer's capacity in which signing officer acts, under each signature. Affix corporate seal. If Bid is signed by officials other than President and Secretary of company, or President-Secretary-Treasurer of company, copy of by-law resolution of Board of Directors authorizing them to do so must also be submitted with Bid in Bid envelope.

.5 Joint Venture: Each party of joint venture must execute Bid under respective seals in manner appropriate to such party as described above, similar to requirements of Partnership.

**1.15 FOR CLARITY THE BIDDERS' SUBMISSION SHALL BE IN TWO (2) ENVELOPES:**

**Envelope 1** – Mandatory Submittals (Section 00 45 00)

- •1 Consent of Surety
- •2 Bid Bond
- •3 Company Information
- •2 Past Projects Experience
- •3 List of Equipment
- •3 List of Sub-Contractors
- •4 Extra Work Labour Rates
- •5 Extra Work Equipment Rates
- •6 Key Staff
- •7 Project Schedule
- •8 Certificate of Insurance
- •9 Addenda
- •10 COR Certificate
- •11 WCB Clearance Letter

**Envelope 2** – Evaluated Submittals (Section 00 40 50)

1. Signed and Completed Bid Form

**1.16 APPLICABLE LIEN LEGISLATION**

.1 Claims procedures shall be in accordance with the Builder's Lien Act of Alberta.

**1.17 OFFER ACCEPTANCE/ REJECTION**

.1 Duration of Offer

.1 Bids shall remain open to acceptance, and irrevocable for a period of **Ninety (90) days** after the Bid closing date.

.2 Acceptance of Offer

.1 Owner reserves the right to accept or reject any or all offers.

.2 After acceptance by Owner, Owner will issue to successful Bidder, a written Bid acceptance.

## 1.18 AGREEMENT ON INTERNAL TRADE AND NEW WEST PARTNERSHIP TRADE AGREEMENT

.1 The provisions of the Agreement on Internal Trade, Part IV, Chapter Five – Procurement and Annex 502.4, ("AIT" and the New West Partnership Trade Agreement ("NWPTA") apply to this Tender.

## 1.19 FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

.1 All documents submitted to the Owner will be subject to the protection and disclosure provisions of Alberta's Freedom of Information and Protection of Privacy Act ("FOIP"). FOIP allows persons a right of access to records in the Owner's custody or control. It also prohibits the Owner from disclosing the Tenderer's personal or business interests or what would be an unreasonable invasion of personal privacy as defined in sections 16 and 17 of FOIP. Tenderers are encouraged to identify what portions of their submissions are confidential and what harm could reasonably be expected from its disclosure. However, the Owner cannot assure Tenderers that any portion of the Tenderer's documents can be kept confidential under FOIP

## 1.20 TENDERS EXCEEDING BUDGET

.1 In addition to the rights contained within Section 1.17 of this document herein, if the Tender Sum of every Bidder exceeds the amount the Owner has budgeted for the Work, the Owner may reject all Tenders or attempt to negotiate a lower price with the Bidder who, in the sole and unfettered discretion of the Owner, has submitted the most advantageous Tender.

.2 Each Bidder acknowledges and agrees that the Owner has the sole and unfettered discretion to employ any criteria in order to determine the Tender most advantageous to the Owner, that the Owner has no obligation to disclose such criteria.

.3 By submitting its Tender, each Bidder waives its right to contest in any action, application, case or legal proceeding in any court, the decision which the Owner may pursue under this Article.

If the Tender Sum of every Bidder exceeds the amount budgeted for the Work and the Owner negotiates with the Bidder who has submitted the Tender considered most advantageous to the Owner:

.4 All statements made by either side in the course of negotiation are without prejudice and confidential;

.5 In particular, the Owner's attempt to negotiate with such Bidder does not constitute a rejection of its Tender; and

.6 The Owner will not attempt to obtain a lower price for the same work that the Bidder originally bid on, but may attempt to obtain a lower price for an altered scope of work. In no event will the Owner be obliged to disclose the amount budgeted for the Work.

**2 Products**

**2.1 NOT USED**

**3 Execution**

**3.1 NOT USED**

**END OF SECTION**

**SUBMIT TO:** **Mackenzie County - Submit as Envelope 2**

**PROJECT:** **River Road Subdivision – BASE Project # 21GEME6061**

BIDDER: _____
(Legal Company Name)

_____

(Street Address or postal box number)

_____

(City/Town, Province, Postal Code)

## 1.1. BID PRICE

The undersigned **BIDDER**, having carefully examined the Contract Documents and the locality of the proposed Work, and having full knowledge of the Work required and of the materials to be furnished and used, hereby agrees to provide all necessary materials, supervision, labour, and equipment and perform and complete all Work and fulfill everything that is set forth in strict accordance with the Contract Documents and Addendums numbered *_____to_____ for the price stated below and as detailed in Section 1.5 "Bidder Summary"

_____
BID PRICE: (Bid Price written grammatically, including allowance if any, excluding GST)

($_____
BID PRICE: (Bid Price written numerically, including allowance if any, excluding GST)

*NOTE: To be completed by Tenderer.

Submitted this_____ day of_____ 20____.

The undersigned also agrees:

1 That the Tenderer has familiarized themselves with the project location, scope, site conditions, standards and specifications, detailed design drawings and schedule of quantities. In addition, the Tenderer has requested additional information where they felt necessary and has received responses that have satisfied the original inquiry.

2 That all bid form supplements and all submittal forms called for by the Bid Documents form an integral part of this Bid.

3 In submitting this Bid, We understand that a Bid Revision will not be called if minor changes to the Bid Documents are contemplated by the Owner, or after Bid Closing.

4 The Owner reserves the right to request a Bid Revision from any or all Bidders where significant modifications to the Bid Documents become apparent at, or after Bid Closing.

5 That this Bid is made without any connection, knowledge, comparison of figures or arrangements with any other company, firm or person making a tender for the same Work; and that no person or firm other than the Tenderer whose signature is affixed below has any interest in this tender or in the proposed Contract.

6 That this Bid is irrevocable for N**inety (90)** days after closing time.

7 That within ten (10) days from the date of “Notice of Award” of this tender, to:

**7.1** Execute the Agreement between Owner and Contractor as specified in the Contract Documents.

**7.2** Furnish and pay for a **Contract Performance Bond**, in the form of a bond as described in **Section 00 60 00 - Bonding.**

**7.3** Furnish and pay for a **Labour and Material Bond**, in the form of a bond as described in **Section 00 60 00 - Bonding.**

**7.4** Furnish a copy of a current Mackenzie County business license.

**8** Subject to ***GC 1.26– Notice to Proceed of the General Conditions***, to commence and actively proceed with the Work on or anytime after the date identified within the Notice to Proceed, and to complete all Work under the Contract as specified in the Contract Documents.

9 That the estimate of quantities of Work itemized in the Tender Form serves only to provide a basis for comparing tenders and that the actual job quantities will not necessarily correspond with the quantities itemized in the Tender Form, and further, that the Owner has the right to increase or decrease the quantities in any or all items and to eliminate items entirely from the Work.

**10** That payment for the Work done will be made on the basis of the actual progress measured and assessed by the Consultant and the prices shown on the Tender Form which shall be compensated in full for the Work done under the terms of the Contract.

**11** That should the Contractor fail to perform the Work to the level of Construction Completion by the time specified within ***GC 1.27****Error! Reference source not found.* ***- Construction Commencement and Completion of the Contract Documents*** subject to the adjustments identified within ***GC 1.31 – Adjustment of the Completion Dates***, the Contractor shall be required to compensate the Owner in accordance with ***GC 1.25****Error! Reference source not found.* ***– Construction Schedule.***

**12** That no bonus will be allowed for completion in less time than that stated above.

**13** To do all Extra Work not reasonably inferable from the specifications or drawings but called for in writing by the Consultant and to accept as full compensation thereof, payment in accordance with provisions of ***GC 1.52 – Extra Work of the General Conditions.***

14 To guarantee and maintain the Work for a minimum period of **two (2) years or until the issuance of the Final Acceptance Certificate**, whichever is greater. Such guarantee and maintenance are to be related only to materials, workmanship, construction practices, and structural integrity under normal winter and summer maintenance activities.

15 This Bid includes the following:

**15.1** Part 1 - Completed Document 00 45 00 – Mandatory Submittal Forms (Sealed in Envelope 1)

**15.2** Part 2 **(This Document)** - Completed and signed Document 00 40 50 – Bid Form (Sealed in Envelope 2)

.1 Competed Bid Form as follows in sections 1.2 – 1.5 of this document.

.2 Receipt of Addenda

The Tenderer acknowledges receipt of the following Addenda and agrees that they form part of the Tender Documents and are included in the Tender. The details are as follows:

| **Addendum Number** | **Date of Addendum** | **Number of pages** | **Date Addendum Received by Tenderer** |
|---|---|---|---|

NOTE: If no Addenda is received indicate in the above.

## 1.2. Bidder Agreement

**NAME OF BIDDER:** _____

DATE: _____

LEGAL STATUS OF BIDDER: ☐ Corporation ☐ Partnership ☐ Sole Ownership

CURRENT ADDRESS OF BIDDER: _____

| NAMES AND ADDRESSES OF THE CORPORATE OFFICERS OR MEMBERS OF THE BIDDER ORGANIZATION: | |
|---|---|
| NAME | POSITION |
| ADDRESS | |
| NAME | POSITION |
| ADDRESS | |
| NAME | POSITION |
| ADDRESS | |

SIGNATURE OF WITNESS

SIGNATURE OF BIDDER

NAME OF WITNESS

ADDRESS OF WITNESS

ADDRESS OF WITNESS

CORPORATE SEAL

## 1.3. Affidavit Verifying Corporate Signing Authority

I, _____ of _____in the Province of Alberta make oath and say:

1. I am an officer or a director of _____named in the within or annexed instrument (or caveat).

2. I am authorized by the corporation to execute the instrument (or caveat) without affixing a corporate seal.

SWORN before me at the _____ in the Province of Alberta this

_____ day of _____ , _____.

_____
Signature

_____
A Commissioner for Oaths in and for the Province of Alberta

Print Name: _____

My Commission Expires: _____

## 1.4. Schedule of Quantities

## 2.7 Schedule of Quantities

**Project:** River Road Subdivision **Project Number:** 21GEME6061

**Phase:** 0

**Owner:** Mackenzie County

| Item No. | Description | Reference | Quantity | Unit | Unit Price | Extension |
|---|---|---|---|---|---|---|
| **Schedule "A" - Sanitary Sewer System** | | | | | | |
| **A. 1** | **Trenching and Backfilling** | | | | | |
| A. 1.1 | 0.0 - 3.5m - 300mm Lifts | *GMIS E.7, SP* | 53.9 | L.M. | $ | $ |
| A. 1.2 | 3.5 - 4.5m - 300mm Lifts | *GMIS E.7, SP* | 20.0 | L.M. | $ | $ |
| A. 1.3 | 4.5 - 5.5m - 300mm Lifts | *GMIS E.7, SP* | 258.8 | L.M. | $ | $ |
| **A. 2** | **Sanitary Sewer Pipe - Supply & Install (c/w B Bedding)** | | | | | |
| A. 2.1 | 200mm Diameter PVC SDR35 | *GMIS E.3,SP* | 332.7 | L.M. | $ | $ |
| A. 2.2 | Riser for Video Inspection | *GMIS E.3, SP* | 1.0 | ea | $ | $ |
| A. 2.3 | Remove and Dispose of Existing Sanitary Sewer Pipe | *SP* | 86.0 | L.M. | $ | $ |
| **A. 3** | **Manholes - Supply & Install** | | | | | |
| A. 3.1 | 1200mm Diameter | *GMIS E.4, E.7, SP* | 23.2 | V.M. | $ | $ |
| A. 3.2 | Remove and Dispose of Existing Manholes | *GMIS E.4, E.7, SP* | 3.4 | V.M. | $ | $ |
| **A. 4** | **Manhole Frame and Cover - Supply & Install** | | | | | |
| A. 4.1 | F39 | *GMIS E.4, SP* | 5.0 | ea | $ | $ |
| A. **5** | CCTV Inspection | *GMIS E.8, SP* | 593.7 | L.M. | $ | $ |
| **A. 6** | **Connections to Existing Sanitary Sewer System** | | | | | |
| A. 6.1 | Construction Bulkheads | *GMIS E.7, SP* | 2.0 | ea | $ | $ |
| A. 6.2 | Break Into Existing Main | *GMIS E.7, SP* | 1.0 | ea | $ | $ |
| **Total Schedule "A" - Sanitary Sewer System** | | | | | | **$** |

| Item No. | Description | Reference | Quantity | Unit | Unit Price | Extension |
|---|---|---|---|---|---|---|
| **Schedule "B" - Water Distribution System** | | | | | | |
| **B. 1** | **Trenching and Backfilling** | | | | | |
| B. 1.1 | 3.5 to 4.5 - 300mm Lifts | *GMIS D.13, SP* | 191.7 | L.M. | $ | $ |
| B. 1.2 | 4.5 to 5.5 - 300mm Lifts | *GMIS D.13, SP* | 175.4 | L.M. | $ | $ |
| **B. 2** | **Water Main Pipe - Supply & Install (c/w B Bedding)** | | | | | |
| B. 2.1 | 150 mm PVC DR18 | *GMIS D.3,SP* | 7.1 | L.M. | $ | $ |
| B. 2.2 | 200mm PVC DR18 | *GMIS D.3,SP* | 360.0 | L.M. | $ | $ |
| B. 2.3 | Remove and Dispose of Existing Water Main Pipe | *GMIS D.3,SP* | 98.0 | L.M. | $ | $ |
| **B. 3** | **Valves - Supply & Install** | | | | | |
| B. 3.1 | 150mm - Gate Type | *GMIS D.5, SP* | 3.0 | ea | $ | $ |
| B. 3.2 | 200mm - Gate Type | *GMIS D.5, SP* | 6.0 | ea | $ | $ |
| B. 3.3 | Blow-Off/Chlorine Injection Point | *GMIS D.5, SP* | 5.0 | ea | $ | $ |
| B. 3.4 | Valve Box Extensions | | | | | |
| *B. 3.4.1* | *0.60m* | *GMIS D.5, SP* | 18.0 | ea | $ | $ |
| **B. 4** | **Fittings - Supply & Install** | | | | | |
| B. 4.1 | Tees - 200mm x 200mm x 200mm | *GMIS D.7, SP* | 1.0 | ea | $ | $ |
| B. 4.2 | Tees - 200mm x 200mm x 150mm | *GMIS D.7, SP* | 3.0 | ea | $ | $ |
| B. 4.3 | Bend - 200mm x 45° | *GMIS D.7, SP* | 1.0 | ea | $ | $ |
| B. 4.4 | Cross Tees - 300mm x 300mm | *GMIS D.7, SP* | 1.0 | ea | $ | $ |
| B. 4.5 | Plugs - 200mm | *GMIS D.7, SP* | 3.0 | ea | $ | $ |
| **B. 5** | **Hydrants - Supply & Install** | | | | | |
| B. 5.1 | Fire Hydrant | *GMIS D.6, SP* | 3.0 | ea | $ | $ |
| B. 5.2 | Hydrant Extensions | | | | | |
| *B. 5.2.1* | *1.22m* | *GMIS D.6, SP* | 3.0 | ea | $ | $ |
| B. 6 | Rigid Insulation - 100mm | *GMIS D.4, SP* | 125.0 | L.M. | $ | $ |
| **B. 7** | **Connections to Existing Systems** | | | | | |
| B. 7.1 | Break Into Existing Watermain | *GMIS D.14, SP* | 1.0 | ea | $ | $ |
| **Total Schedule "B" - Water Distribution System** | | | | | | **$** |

| Item No. | Description | Reference | Quantity | Unit | Unit Price | Extension |
|---|---|---|---|---|---|---|
| **Schedule "C" - Service Connection System** | | | | | | |
| **C. 1** | **Excavating, Trenching and Backfilling** | | | | | |
| C. 1.1 | 0.0 to 3.5m - 300mm Lifts | *GMIS D.7, GMIS E.7, SP* | 415.0 | L.M. | $ | $ |
| **C. 2** | **Water Service - Supply & Install (c/w B Bedding)** | | | | | |
| C. 2.1 | 25mm Copper or Composite | *GMIS D.4, SP* | 266.0 | L.M. | $ | $ |
| C. 2.2 | 38mm Copper or Composite | *GMIS D.4, SP* | 119.0 | L.M. | $ | $ |
| C. 2.3 | Reconnect Existing Water Service | *GMIS D.4, SP* | 2.0 | ea | $ | $ |
| **C. 3** | **Sewer Service - Supply & Install (c/w B Bedding)** | | | | | |
| C. 3.1 | 100mm PVC SDR28 | *GMIS E.6, SP* | 261.0 | L.M. | $ | $ |
| C. 3.2 | 50mm Series 160 Polyethylene (Low Pressure) | *GMIS E.5, SP* | 80.0 | L.M. | $ | $ |
| C. 3.3 | Reconnect Existing Sewer Service | *GMIS E.5, GMIS E.6, SP* | 2.0 | ea | $ | $ |
| **C. 4** | **Water Service Fittings - Supply & Install** | | | | | |
| C. 4.1 | Main Stops | *GMIS D.4, SP* | 17.0 | ea | $ | $ |
| C. 4.2 | Service Saddles - 200mm | *GMIS D.4, SP* | 17.0 | ea | $ | $ |
| C. 4.3 | Curb Stops | *GMIS D.4, SP* | 17.0 | ea | $ | $ |
| C. 4.4 | Service Box and Marker Post | *GMIS D.4, SP* | 17.0 | ea | $ | $ |
| **C. 5** | **Sewer Service Fittings - Supply & Install** | | | | | |
| C. 5.1 | Tees 200mm x 200mm x 100mm | *GMIS E.6, SP* | 14.0 | ea | $ | $ |
| C. 5.2 | Curb Stops | *GMIS E.5, SP* | 1.0 | ea | $ | $ |
| C. 5.3 | Service Box and Marker Post | *GMIS E.5, SP* | 1.0 | ea | $ | $ |
| C. 5.4 | Service Riser (<2m) - 100mm | *GMIS E.6, SP* | 12.0 | Assy. | $ | $ |
| C. 5.5 | Riser for Video Inspection - 100mm | *GMIS E.6, SP* | 16.0 | ea | $ | $ |
| C. 6 | Rigid Insulation - 100mm | *GMIS D.4, GMIS E.5, SP* | 104.0 | L.M. | $ | $ |
| **C. 7** | **Shallow Utilities** | | | | | |
| C. 7.1 | Excavating, Trenching and Backfilling | | | | | |
| *C. 7.1.1* | *0.0 to 1.5m - 150mm Lifts* | *SP* | 100.0 | L.M. | $ | $ |
| C. 7.2 | Underground Ducts for Road Crossings | | | | | |
| *C. 7.2.2* | *100mm PVC, Type DB2* | *SP* | 600.0 | L.M. | $ | $ |
| **Total Schedule "C" - Service Connection System** | | | | | | **$** |
| **Schedule "D" - Site Works** | | | | | | |
| **D. 1** | **Site Grading** | | | | | |
| D. 1.1 | Clearing and Grubbing | *GMIS G.6,SP* | 1.0 | L.S. | $ | $ |
| D. 1.2 | Topsoil Stripping | *GMIS G.6, SP* | 3,500.0 | m3 | $ | $ |
| D. 1.3 | Common Excavation | | | | | |
| *D. 1.3.1* | *On-Site Cut* | *GMIS G.6, SP* | 16,100.0 | m3 | $ | $ |
| **Total Schedule "D" - Site Works** | | | | | | **$** |

| Item No. | Description | Reference | Quantity | Unit | Unit Price | Extension |
|---|---|---|---|---|---|---|
| **Schedule "E" - Road Works** | | | | | | |
| **E. 1** | **Roadway Embankments** | | | | | |
| E. 1.1 | Unsuitable Subgrade | *AT 2.3.4.4, GMIS G.6, SP* | 200.0 | m3 | $ | $ |
| E. 1.2 | Subgrade Preparation | *AT 3.1, GMIS G.6, SP* | 7,400.0 | m2 | $ | $ |
| E. 1.3 | Woven Geotextile Fabric (Nilex P500 or Approved Equivalent) | *GMIS G.5.13, SP* | 1,500.0 | m2 | $ | $ |
| E. 2 | Surface Details | | | | | |
| E. 2.1 | Supply of Aggregates | *AT 3.2, AT 5.2, SP* | 2,650.0 | t | $ | $ |
| E. 2.2 | Subgrade Excavation and Granular Fill (Soft Spot) | *AT 3.1.2.1, SP* | 150.0 | t | $ | $ |
| E. 2.3 | Gravel Surfacing Designation 4, Class 25 (100mm) - First Year | *AT 3.2, AT 3.3, GMIS G.5.13, SP* | 1,300.0 | t | $ | $ |
| E. 2.4 | Gravel Surfacing Designation 4, Class 25 (50mm) - Second Year | *AT 3.2, AT 3.3, GMIS G.5.13, SP* | 700.0 | t | $ | $ |
| E. 2.5 | Gravel Surfacing Designation 3, Class 20A (150mm) - Trails | *GMIS G.5.13,SP* | 500.0 | t | $ | $ |
| E. 3 | CSP - Supply & Install | | | | | |
| **E. 3.1** | 600mm x 12.0m (under approach) c/w Riprap | *AT 2.4, AT 2.5, GMIS G.12, SP* | 15.0 | ea | $ | $ |
| **E. 3.2** | 600mm x 14.0m (under road) c/w Riprap | *AT 2.4, AT 2.5, GMIS G.12, SP* | 1.0 | ea | $ | $ |
| **E. 3.3** | 600mm x 28.0m (under road) c/w Riprap | *AT 2.4, AT 2.5, GMIS G.12, SP* | 1.0 | ea | $ | $ |
| **E. 3.4** | 600mm x 9.0m (under trails) c/w Riprap | *AT 2.4, AT 2.5, GMIS G.12, SP* | 3.0 | ea | $ | $ |
| **E. 3.5** | Remove and Dispose Existing CSP Culvert | *SP* | 23.0 | L.M. | $ | $ |
| E. 4 | Traffic Signage - Supply & Install | | | | | |
| E. 4.1 | Traffic Sign | *GMIS G.10.2, SP* | 9.0 | ea | $ | $ |
| E. 4.2 | Total Poles Required | *AT 5.18, GMIS G.10.2, SP* | 9.0 | ea | $ | $ |
| E. 5 | Landscaping | | | | | |
| **E. 5.1** | **Road Ditch + Boulevard** | *AT 2.6, AT 2.20, GMIS H.2, SP* | 6,900.0 | m2 | $ | $ |
| **E. 5.2** | **MR** | *AT 2.6, AT 2.20, GMIS H.2, SP* | 8,300.0 | m2 | $ | $ |
| E. 6 | Erosion Control (North American Green) | | | | | |
| **E. 6.1** | **RevetMax Flexible Revetment System (ShoreMax Transtion Mats)** | *SP* | 1,100.0 | m2 | $ | $ |
| **E. 6.2** | **Turf/Earth Reinforcement Mat System (TMAX)** | *SP* | 1,200.0 | m2 | $ | $ |
| **Total Schedule "E" - Road Works** | | | | | | **$** |

## 1.5. Bidder Summary

**Schedule of Quantities Summary - River Road Subdivision**

| Item | Total |
|---|---|
| Total Schedule “A” Sanitary Sewer System | |
| Total Schedule “B” Water Distribution System | |
| Total Schedule “C” Service Connection System | |
| Total Schedule “D” Site Works | |
| Total Schedule “E” Road Works | |
| | |
| **Total (Not including GST)** | |

**END OF SECTION**

**SUBMIT TO:** **Mackenzie County – Submit as Envelope 1**

**PROJECT:** **River Road Subdivision – BASE Project # 21GEME6061**

BIDDER: _____
(Legal Name)

_____

(Street Address)

_____

(City, Province, Postal Code)

## 1 Information Submittal Forms

### 1.1 PROVIDE THE FOLLOWING INFORMATION SUBMITTAL FORMS TO THE OWNER AS A PART OF THE BID SUBMISSION.



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**Information Submittal Forms Follow**

## 1.2 CONSENT OF SURETY / BID BOND

.1 Submit with Bid Bond, a Consent of Surety, stating that surety providing Bid Bond is willing to supply Performance and Labour and Materials Payment Bonds specified in amounts not less than fifty (50%) percent of the Bid price

.2 Include cost of bonds in Bid Price.

.3 Bid Bond must be issued by a surety company licensed to conduct business in the province or territory where the work is located.

## 1.3 COMPANY INFORMATION

Please provide the following information:

Company Principles (Names & Roles): Size of Firm (employees): _____

_____

_____

_____

_____

_____

_____

Years in Business: _____

## 1.4 PAST PROJECTS EXPERIENCE

Indicate below, recent work completed and also the Contractor's key staff to be employed on the project.

| YEAR | DESCRIPTION OF WORK | VALUE | CLIENT AND CONTACT NAME |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

Letters of reference may be required from clients listed above detailing quantity and quality of work. Contact name shall be provided.

## 1.5 LIST OF EQUIPMENT

To be included:

Type of Equipment, Manufacturer, Model Number, Capacity or Size, Age, Condition, Owner, Any other pertinent comments.

| ITEM | NOTES |
|---|---|
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## 1.6 LIST OF SUB-CONTRACTORS

The names of the sub-contractors that will be employed on the items of work are listed below. No further sub-contractors will be employed without the written approval of the consultant to a request made in writing by the contractor.

| SUB-CONTRACTOR | ADDRESS | WORK ITEM |
|---|---|---|
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## 1.7 EXTRA WORK LABOUR RATES

The following labour rates will be used for all extra work by the contractor and all sub-contractors. The following rates include workers' compensation, unemployment insurance, holiday pay, statutory holidays, public liability and public damage insurance, overtime and all other payroll costs.

| POSITION | RATE / HOUR |
|---|---|
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## 1.8 EXTRA WORK EQUIPMENT RATES

These Equipment rates will be used for all extra work by the contractor and all sub-contractors. The following rates are inclusive of the equipment operator and the related costs such as workers' compensation, unemployment insurance, holiday pay, statutory holidays, public liability and public damage insurance, overtime and other payroll costs.

| EQUIPMENT | RATE / HOUR |
|---|---|
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## 1.9 KEY STAFF

Indicate below, the key staff who will be assigned to complete the work on this contract:

| POSITION | NAME | QUALIFICATIONS AND PAST EXPERIENCE |
|---|---|---|
| **Project Manager** | | |
| **Safety Professional** | | |
| **Superintendent** | | |
| **Foreman / Forewoman** | | |
| **Foreman / Forewoman** | | |

## 1.10 SAFETY PROGRAM

Please provide a copy of your company's safety procedures and program.

## 1.11 PROJECT SCHEDULE

**PROJECT:** **River Road Subdivision – BASE Project # 21GEME6061**

Provide dates for the following project milestone

1. Construction Mobilization _____
2. Commence Construction _____
3. Substantial Performance _____
4. Total Performance of the Work _____

These above dates are the anticipated dates at the time of tender and are subject to adjustment by the Owner as provided for in the Contract Documents. These dates are provided in order to identify the measure of time allocated for the project.

## 1.12 INSURANCE

Provide signed "Undertaking of Insurance" on a standard form provided by the insurance company stating intention to provide insurance to Bidder in accordance with insurance requirements as noted in **Section 1.45 of the General Conditions of the Contract**

## 1.13 WORKERS' COMPENSATION BOARD SUBMITTALS

The contractor shall obtain and submit to the Owner a certificate of an account with the Workers' Compensation Board.

## 1.14 COR

Photocopy of Certificate of Recognition (COR) issued by the Alberta Construction Safety Association

## 1 General

### 1.1 CONTRACT PERFORMANCE SECURITY

.1 Contractor shall provide security for performance of the Contract in the form of the following:
  .1 Performance Bond for fifty (50%) percent of the Contract Price.

### 1.2 SECURITY FOR PAYMENT OF CLAIMS

.1 Contractor shall provide security for payment to claimants for labour and material used or reasonably required for use in the performance of the Contract. Such security shall be in the form of the following:
  .1 Labour and Material Payment Bond for fifty (50%) percent of the Contract Price.

### 1.3 FORMS OF ACCEPTABLE SECURITY

.1 Surety Bonds
  .1 Performance Bond shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Performance Bond, CCDC Document No. 221.
  .2 Labour and Material Payment Bond shall be in accordance with the Canadian Construction Documents Committee (CCDC) Standard Form of Labour and Material Payment Bond, CCDC Document No. 222.
  .3 Consign bonds to The Owner.

### 1.4 SUBMISSION OF SECURITY

.1 Submit security to The Owner within **ten (10) days** after Bid is accepted.

### 1.5 RELEASE OF CONTRACT PERFORMANCE BONDING

.1 Intermediate releases of security will be made only upon written request by the Contractor.

.2 Release of Performance Bonds will be in accordance with the General Conditions of the Contract.

### 1.6 RELEASE OF SECURITY FOR PAYMENT OF CLAIMS

.1 Release of Labour and Materials Bonds will be in accordance with General Conditions of the Contract.

**2 Products**

**2.1 NOT USED**

**3 Execution**

**3.1 NOT USED**

**END OF SECTION**

# General Conditions

**Table of Contents**

## 1.1 DEFINITIONS

**ABNORMAL WEATHER**

Abnormal Weather" means adverse temperature, precipitation, wind or other adverse weather condition which, in any two (2) week period, differs from the statistical average for that condition in that period by more than one standard deviation, calculated based on relevant data available from Environment Canada, covering the twenty (20) year period immediately preceding the Notice of Award.

**ACCEPTANCE CERTIFICATES**

"Construction Completion Certificate" (CCC) shall mean a certificate issued by the Municipality upon satisfactory and actual completion of the Work as per the purposes for which the Work was intended and for which it is being used. The issuance of this certificate shall mark the commencement of the Maintenance or Warranty period as defined further in this section. Such certificate may be issued with deficiencies, if such deficiencies are considered by the Consultant to be of a minor nature and do not impede the utilization of the Work. Some deficiencies may require the input of the municipality to determine whether or not they are minor and if the Work can be accepted without their immediate correction.

"Final Acceptance Certificate" (FAC) shall mean a certificate issued by the Consultant and approved by the Owner, within fourteen (14) days of the expiration of the Maintenance or Warranty period provided all conditions of the Contract have been met by the Contractor. Generally, the issuance of this certificate shall relieve the Contractor of all their contractual obligations and the Contract shall be considered as closed.

***ADDENDUM***

"Addendum" is a written communication issued from the office of the Consultant informing of changes to be made in the Work before the end of the period allowed for receiving tenders.

***ADD-DELETE WORK***

"Add-Delete Work" shall mean Work within the original scope of the Contract but with increased or decreased quantities and/or modifications to the location, as determined by the Consultant. Generally, advisement is done through an Add-Delete Work Order.

***BUILDER'S LIEN ACT***

"Builder's Lien Act" - shall mean the Builder's Lien Act, R.S.A. 2000, Chapter B-7 and amendments / updates made thereto.

***BULLETIN***

"Bulletin" is a written communication issued from the office of the Consultant informing of changes to be made in the Work. A Bulletin is issued prior to the end of the period allowed for receiving tenders and such changes do not alter the amount of the Contract sum.

***BUSINESS DAY***

"Business Day" means any day other than a Saturday, Sunday or statutory holiday recognized in the province or territory wherein the Project Site is located.

***CERTIFICATES OF PAYMENT***

"Progress Payment Certificate" (PPC) shall mean a certificate issued periodically by the Consultant to the Owner, based on which payments on account are made to the Contractor.

***CERTIFICATE OF SUBSTANTIAL PERFORMANCE***

"Certificate of Substantial Performance" shall mean, without limiting the definition in the Builders' Lien Act, a document issued by a Contractor or Sub-Contractor for purposes of holdback release as per the terms and conditions of such Act. Certificate(s) of Substantial Performance are not applicable to Work carried out under the Public Works Act.

***"CHANGE"***

Change" means an increase or addition to, a reduction or deletion from or an extension of the Work or the Construction Schedule, or the replacement of a proposed subcontractor or supplier, which results in a material change to the Contract Time or Contract Price.

***CHANGE DIRECTIVE"***

"Change Directive" means a written instruction signed by the Owner and issued by the Consultant to the Contractor directing the Contractor to proceed with a Change despite the absence of an agreement as to the adjustment of the Contract Price or Contract Time, or both, as applicable.

***CHANGE ORDER***

"Change Order" is a written document issued by the Consultant describing the Work and authorizing an estimated amount by which the Contract sum is to be substantially altered as a result of changes in quantities, modifications to the Work, or addition of Extra Work. Such statement, including authorization to proceed with the Work, shall be delivered to the Contractor prior to the Work being undertaken.

***COMPLETION DATE***

"Completion Date" shall be the date by which the Work is required to be at the level of Construction Completion, this being at the level of completion warranting the issuance of a CCC.

***COMPLETION LEVELS OF WORK***

"Substantial Performance" shall mean a level of completion meeting the terms and conditions stipulated in the current edition of the Builders' Lien Act, and warranting the issuance of a Certificate of Substantial Performance by the Contractor or Sub-Contractor. Substantial Performance is only applicable to release of holdback, will not necessarily result in the issuance of a CCC, and does not apply in any aspect for Work done under the Public Works Act.

"Construction Completion" shall mean a level of completion warranting the issuance of a CCC with or without deficiencies. If a CCC is issued with deficiencies, the Consultant shall specify a time frame for the total correction of all deficiencies, as solely determined by the Consultant acting reasonably. Failure to meet the specified time frame for correction will result in the revocation of the current CCC in its' entirety, and will further result in the Maintenance or Warranty period commencing only upon the date of the total correction of all deficiencies and the issuance of a new CCC.

"Final Completion" shall mean a level of completion wherein all the contractual obligations of the Contractor have been fully met. This shall include the successful conclusion of all repairs to the Work under Maintenance or Warranty obligations at time of expiration of the Maintenance or Warranty period; and as officially confirmed by the issuance of a FAC by the Consultant and the approval by the Owner.

***CONSULTANT***

"Consultant" means the Professional Engineer or Engineering consulting firm that has been retained by the Owner to:

a) administer the Contract;
b) be responsible in total or in part for the design, horizontal and vertical layout, testing, and inspection of the Work;
c) certify the quality of the Work including the preparation of accurate record drawings; and
d) be applicable to and qualified for the project to be undertaken, and licensed to practice in the Province of Alberta;

***CONTRACT***

"Contract" shall mean the written agreement between the Owner and the Contractor for the construction of the Project and the provision of the Works and the furnishing of labour, equipment and material in the construction of the Work,

and shall include without limiting the generality of the foregoing, the Tender Forms, Contract Forms, Contract Bonds, Plans, Specifications, Special Conditions or Provisions, Notices, Supplemental Specifications, Specification Amendments and all supplemental agreements required to complete the Work.

***CONTRACT DOCUMENTS***

"Contract Documents" shall mean and include the complete set of documents, Specifications, drawings and Bulletins incorporated therein, as listed in the Table of Contents.

***CONTRACTOR***

"Contractor" wherever used in these documents shall mean the party of the second part, as named in the Contract Agreement, who has been duly appointed and authorized by the Owner to proceed with the Work as outlined herein.

***DEFICIENCY***

"Deficiency" shall mean completed Work as determined by the Consultant, which is being used for what it was intended, but does not fully meet the Conditions or Specifications of the Contract.

***DRAWINGS"***

"Drawings" means the graphic and pictorial drawings, sketches and representations, whether electronic or paper-based, prepared to represent the Work and issued by the Consultant, including plans, elevations, sections, details, schedules, and diagrams.

***EQUIPMENT OR PLANT***

"Equipment" or "Plant" shall mean anything and everything except persons used by the Contractor in the performance of the Work and except material as defined herein.

***EXTRA WORK***

"Extra Work" shall mean Work outside the original scope of the Contract, as determined by the Consultant, and generally authorized in writing by a Change Order or Add-Delete Work Order.

***FIELD MEMORANDUM***

"Field Memorandum" is a written communication from the Consultant and/or the Consulting Consultant, delivered at the site to the Contractor.

***HEREIN AND HEREOF***

"Herein" and "Hereof" and similar expressions wherever used in the Contract Documents shall relate to the whole of the Contract Documents and not to any one (1) paragraph alone, unless the context specifically requires it.

***IMPLIED PROVISIONS***

In the Contract:

a) words importing male persons include female persons and corporations;
b) words in the singular include the plural and words in the plural include the singular;
c) the applicable law shall be the law of the Province of Alberta;
d) time shall be of the essence;
e) headings and subheadings are not substantive and are inserted for convenience of reference only.

***MAINTENANCE OR WARRANTY PERIOD***

"Maintenance" or "Warranty Period", however it is referenced within the Contract Documents, shall be a minimum **two (2) year period of time** immediately following the date stated in the Construction Completion Certificate or the period of time from the date stated in the Construction Completion Certificate to the date the Final Acceptance Certificate is issued, whichever is greater. During this time the Contractor shall warrant the Work to be free from any defect or failure due to the Contractor's neglect, faulty workmanship or faulty material supplied under the Contract and to withstand climatic, maintenance, and normal operational conditions. Routine maintenance of defective Work by the Contractor, solely at the Contractor's cost, may be required if such maintenance is deemed necessary by the Owner to protect the interest or interests of the Public, and shall be so undertaken until such time as the Work is fully corrected.

***MATERIAL OR MATERIALS***

"Material" or "Materials" shall, unless otherwise specified, mean anything and everything other than persons or the Contractor's equipment which is manufactured, processed, or transported to the site, or existing on the site, and incorporated into the complete Works.

***MUNICIPAL AUTHORITY***

"Municipal Authority" shall refer to the Approving Authority and/or jurisdiction under which the project is geographically located.

***MUNICIPALITY***

"Municipality" shall mean the County, City, Town, Village or Territory having jurisdiction over the municipal infrastructure maintenance and improvements in the area the Work is being completed.

***OWNER***

"Owner" means a person having an estate or interest in land at whose request, express or implied, and

a) on whose credit;
b) on whose behalf;
c) with whose privity and consent; or
d) for whose direct benefit;

Work is done on or material is furnished for an improvement to the land and includes all persons claiming under them whose rights are acquired after the commencement of the Work or the furnishing of the Material.

***OTHER CONTRACTOR***

"Other Contractor" wherever used in these documents means any person or firm or corporation employed by or having a Contract directly or indirectly with the Owner other than through the Contractor.

***PERSON OR PERSONS***

"Person" or "Persons" shall mean individuals, corporations, partnerships and all other legally existing entities.

***PROJECT***

"Project" shall mean, without restricting the generality of the foregoing, the boundaries of the Work as defined by the Consultant and as limited to that which is contracted herein, subject to extensions or revisions as allowed in this Contract.

***PROJECT MANAGER***

"Project Manager" shall mean the employee assigned by the Consultant to the Project Work, acting within the scope of particulars entrusted to them. This representative is the direct Consultant's representative and is employed by the Consultant.

***PROJECT SPONSOR***

"Project Sponsor" shall mean the employee, agent or official assigned by the Owner to the Project Work, acting within the scope of the particular duties entrusted to them. This representative is the direct Owner's representative but is not employed by the Consultant.

***PRIME CONTRACTOR***

"Prime Contractor" is the Contractor who is responsible for Work activity and safety on site to establish and maintain a system or process that will ensure compliance with the latest amended Occupational Health and Safety Act.

***PROGRESS PAYMENT CERTIFICATE***

"Progress Payment Certificate" shall mean a certificate issued periodically by the Consultant, based on which payments on account are required to be made by the Owner to the Contractor for the Work completed.

***SPECIFICATIONS***

"Specifications" shall include all specifications and the directions, schedules, special conditions/provisions and requirements contained herein, together with all written agreements made or to be made, pertaining to the method and manner of performing the Work, or to the quantities or quality of Material to be furnished under the Contract.

***SHOP DRAWINGS***

"Shop Drawings" means one or more Drawings, diagrams, illustrations, photographs, schedules, performance charts, technical brochures, samples, models and other data which are to be provided by or through the Contractor or the Subcontractors to illustrate details of a portion of the Work.

***SUB-CONTRACTOR***

"Sub-Contractor" wherever used in these documents includes only those having a direct Contract with the Contractor and it includes one who furnishes material worked to a special design according to the plans or specifications of this Work but does not include one who merely furnishes material not so worked.

***SUBSTANTIAL PERFORMANCE***

"Substantial Performance" shall have the same definition as is provided by Sections 2 of the Builders' Lien Act, current edition.

***SURETY***

"Surety" shall mean the Company bound with the Contractor to provide security, respectively, for one or more of:

a) the due performance of the Contract;
b) the payment in full for all items of labour and materials used or reasonably required for use in the performance of the Contract;
c) the repair of any damage to or failure in the Work to which the Contract relates and for which the Contractor is responsible under the Contract.

The Company must be licensed to do business in the Province of Alberta.

***TENDERER***

"Tenderer" or shall mean any individual, partnership, corporation or company who submitted a tender for the Work contemplated, acting directly or through a duly authorized representative.

***WORK ORDER***

"Work Order" is a written statement issued by the Consultant authorizing an estimated amount by which the Contract sum is to be altered as a result of changes in or additions to the Work. Such statement, including authorization to proceed with the Work, shall be delivered to the Contractor by either an Addendum or Field Memorandum.

***WORK OR WORKS***

"Work" or "Works" shall mean, unless the context otherwise requires, all or any part of the Work to be performed under this Contract, whether complete or incomplete, as originally set forth or as revised by the Consultant. These terms shall mean to include any and all labour, materials, equipment tools and incidentals required to be provided by the Contractor to complete and perform their obligations in accordance with the Contract.

***WRITTEN NOTICE***

"Written Notice" shall be deemed to have been duly served if:

a) delivered in person or by courier to the individual or to a member of the firm or to the office of the corporation for whom it is intended;
b) if delivered at or sent by registered mail to the business address identified in the section "Receipt of and Addresses for Notices in Writing"; or
c) delivered by facsimile, email or other forms of electronic communication and a confirmation of receipt is obtained by the sender. The confirmation of receipt can be in the format of either a verbal, written or electronic response.

## 1.2 INTENT OF CONTRACT DOCUMENTS

The Contract Documents shall be signed in quadruplicate by the Owner and the Contractor.

The intent of the Contract Documents is that the Contractor shall provide all necessary permits, processes, materials, supervision, labour, equipment, and all else necessary for the proper execution and testing of the Work unless specifically noted otherwise. The Contractor shall do all the Work shown on the drawings and described in the Specifications and all incidental work necessary to complete the Work outlined in the Contract.

## 1.3 DRAWINGS AND SPECIFICATIONS FURNISHED

Except as provided for otherwise, a maximum of two (2) copies of drawings and specifications for the execution of the Work shall be furnished to the Contractor without charge.

Additional instructions may be issued by the Consultant during the progress of the Work by means of drawings or otherwise for clarification of the drawings and specifications, or as may be necessary to explain or illustrate changes in

the Work to be done. One (1) complete set of drawings and specifications shall be maintained at the job site and shall be available to the Consultant at all times.

## 1.4 SHOP DRAWINGS

The Contractor shall furnish to the Consultant, at proper times, all shop and setting drawings or diagrams which the Consultant considers necessary in order to clarify the Work intended or to show its relation to adjacent Work of other trades. The Contractor shall make any changes in such drawings or diagrams which the Consultant may require consistent with the Contract, and shall submit sufficient copies of the revised prints to the Consultant for approval, following which three (3) copies shall be returned to the Contractor if approved by the Consultant.

When submitting shop drawings and setting drawings, the Contractor shall notify the Consultant in writing of changes made therein from the Consultant's drawings or specifications.

The Consultant's approval of such drawings, or of the revised drawings shall not relieve the Contractor from responsibility for errors made by the Contractor therein or for changes made from the Consultant's drawings or specifications not covered by the Contractor's written notification to the Consultant.

## 1.5 DOCUMENT CONFLICT

In case of any inconsistency or conflict between the provisions of the Contract Documents, the provision of such documents thereto shall take precedence and govern in the following order:

a) Change Order
b) Addenda
c) Special Conditions
d) Contract Agreement
e) General Conditions
f) Detail Specifications
g) Drawings
h) Tender Form
i) Instructions to Tenderer
j) Notice to Tenderers
k) All Other Documents

1. Figured dimensions on the drawings take precedence over measurement scale from the drawings, and large-scale drawings take precedence over those of smaller scale.
2. In case of conflict in materials and methods, the specifications govern.
3. Supplementary drawings and specifications supersede their antecedents.
4. In case of conflict between figured dimensions on a drawing and the dimensions of a specified product, the dimensions of the specified product govern.
5. The drawings and specifications complement each other, and anything called for by one shall be as binding as if called for by both.
6. If compliance with two or more standards or specifications is specified and the standards or specifications establish different or conflicting requirements, the most stringent requirement shall apply.
7. Documents of a later date shall govern over a similar type of document of an earlier date.

## 1.6 DISCREPANCIES

Any discrepancy found between the drawings and specifications or any errors or omissions in the drawings and specifications shall immediately be reported to the Consultant who shall promptly correct such error or omission in writing. Any Work done after discovery of such discrepancy errors or omissions shall be done at the Contractor's risk.

## 1.7 MATERIAL TESTS AND MIX DESIGNS

The Consultant will inform the Contractor of the Geotechnical Engineering Consulting firm designated for the project materials testing. It is the responsibility of the Contractor to ensure the Geotechnical Engineering Consulting firm's representative is informed of the daily project progress so the required sampling, testing and inspections can be scheduled. The Contractor is responsible to remain in contact with the Geotechnical firm and to ensure the various sampling, testing and inspection results are obtained by the Consultant in a timely manner. The cost of providing the foregoing beyond the extent called for in the specifications shall be charged to the Contractor with the initial costs being the responsibility of the Owner. The Work shall be in accordance with approved material tests and mix designs.

## 1.8 SURVEY MARKERS

The intended locations of the Works shown on the drawings are approximate unless location dimensions are shown. The exact location will be established by the Consultant on the site through the provision of survey markers.

The Contractor must ensure they are satisfied as to the correctness and meaning of the provided survey markers before commencing the Work. No claim will be allowed on account of alleged inaccuracies, unless the Contractor notifies the Consultant thereof in writing in time for the Consultant to verify or check such markers before the Work is commenced.

The Contractor shall provide reasonable and necessary opportunities and facilities to enable the Consultant to complete the surveys. The Contractor shall not proceed until they have made timely demands upon the Consultant for, and has received from the Consultant, such points and instructions as may be necessary for the Work to progress. The Contractor is required to provide upon request an assistant to the Consultant for the purpose of verifying grades, elevations and distances as required and deemed necessary by the consultant.

The Contractor shall assume responsibility for detailed dimensions and elevations measured from the supplied survey markers.

The Consultant shall provide the Contractor with the following survey markers for the indicated project components:

| ***Project Component*** | ***Description*** | | ***Provision*** |
|---|---|---|---|
| General | Site benchmarks to be provided as dictated by the extents of the project. | | ~100m separation |
| Underground | Alignment staking and offset to structures and fittings | | 1 Set |
| Siteworks | Stripping Limits | | 1 Set |
| | Grading | Initial | 1 Set |
| | | Intermediate | 1 Set |
| | | Final | 1 Set |
| Concrete Curbs, Gutters, Sidewalks | Baseline for each alignment/profile | Alignment/Profile Examples: Monolithic concrete structures, separate sidewalk, trails/paths (one side only) | 1 Set |
| ***Project Component*** | ***Description*** | | ***Provision*** |
| Roads<br>Asphalt Trails<br>Ditches | Baseline for each alignment/profile | Alignment/Profile Examples: Road Centreline, Trails/paths (one side only), ditches | 1 Set |
| | Roads with ditch | Baseline | 1 Set |
| | | Road Centreline | 1 Set |
| | | Gravel Staking (where required) | 1 Set |
| | | Culvert Staking | 1 Set |
| | | Road Shoulder | 1 Set |

| | | | | |
|---|---|---|---|---|
| | | Final Grade Stakes | Toe of Shoulder | 1 Set |
| Landscaping | Final Grade Stakes | | | 1 Set |

The above is the standard distribution of survey markers that can be expected to be provided on projects. Additional survey may be provided on a case specific basis where the above does not provide adequate coverage. These instances may be identified in the special conditions of the contract and/or will be discussed in detail at the pre-construction meeting.

The Contractor is to make survey requests and direct any survey related questions or comments towards the Inspection Manager, Inspection Supervisor and/or the Project Party Chief. Requests made by the Contractor must take into consideration the following:

a) 48 hours' notice should be provided to the Consultant for survey required when possible;

b) The scope of survey work requested by the Contractor must warrant the allocation of survey personnel to the project.

c) The site must be ready for the survey crew(s) to enter and install survey markers at the time requested by the Contractor.

Beairsto & Associates Engineering Ltd. survey crews will carry out all reasonable survey requests in a timely manner inclusive of general baseline maintenance. The Contractor is requested to carefully preserve all provided survey markers. In the case where wilful or careless destruction or disturbance of survey markers occurs, unreasonable and excessive survey requests occur and/or the Contractor does not provide an effective site grades person the Contractor could be responsible for compensating the Consultant at the going hourly rate for the survey personnel utilized/impacted and disbursements for survey materials (i.e. lathe and hub).

The Contractor is to understand that the above is the normal provision for survey data. Anything differing from the above is considered out of scope for the provision of the survey.

If the Contractor requires machine control files and/or surface files it is their responsibility to determine during the tender period the type of file formats and control file information that is available to them through BASE. BASE is able to provide some surface file formats and the associated control information. If the desired file format is not available from BASE to the Contractor, it is the responsibility of the Contractor to determine how to convert the available data to the format they require. Any additional work requested by the Contractor of BASE will be charged directly to the Contractor at BASE's regular rates. Unpaid amounts will be withheld from progress payments to the Contractor until such time as the Contractor provides payment.
In the event the Contractor feels there is a discrepancy between the data they have been provided in regards to control files and surfaces and the actual requirements in the field, it is the Contractor's responsibility to provide BASE with specific and recorded/calculated data identifying the discrepancy prior to BASE providing a field survey for verification.

Regardless of the Contractor's construction methodology, BASE will provide field staking as identified in the table and information above. It is the Contractors sole responsibility to utilize this data and to carry out various comparative surveys to ensure the survey file data being implemented by their machine control is matching the staking being provided. These surveys must be recorded so the information can be verified by BASE. Failure by the Contractor to do this, regardless of the correctness or accuracy of the data provided to them in file format by BASE, relieves BASE of any wrong doing. BASE is not responsible for the Contractors use or implementation of data provided.

## 1.9 LOCAL CONDITIONS

The Contractor shall by personal inspection, examination, calculation, or testing; satisfy themselves with respect to the local conditions to be encountered and the quantity, quality, and practicability of the Work. No verbal agreement or conversation with any officers, agents or employee of the Owner, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations herein contained.

A geotechnical report of the site may be available to the Contractor upon request if available.

## 1.10 THE CONSULTANT AND THE CONTRACTOR

The Consultant is in the first instance the interpreter of the Contract and judge of its performance. Subject to the following two paragraphs of these General Conditions, the Contractor shall have complete control of their operation or operations at the site.

The Consultant shall have the authority to stop the Work whenever such stoppage may be necessary, in the Consultant's reasonable opinion, to ensure the proper execution of the Contract or that there exists a danger to life or property.

Should the Contractor hold any decision of the Consultant to be at variance with the Contract, or to be in error, the Contractor may refer any dispute to arbitration in accordance with the arbitration section of these General Conditions.

## 1.11 SUPERVISION

The Contractor shall keep on the Work, during this progress, a competent superintendent and any necessary assistants, all satisfactory to the Consultant. The superintendent shall not be changed without the consent of the Consultant unless the superintendent proves to be unsatisfactory to the Contractor or ceases to be in the Contractor's employ.

The superintendent shall represent the Contractor in their absence and directions on minor matters given to them shall be held to be given to the Contractor. Important decisions shall be given in writing to the Contractor. The Contractor shall give efficient supervision to the Work using their best skill and attention.

The successful Contractor must have a representative on call or standby for twenty-four (24) hours a day for the duration of the Contract. The Contractor will supply the Consultant in writing with the name, residing address and telephone number of the standby representative for use in case of emergencies.

## 1.12 PROJECT MEETINGS

### 1. Pre-Construction Meeting

A mandatory meeting will be held prior to the start of construction. This meeting will be scheduled in a timely manner by the Consultant after the Contract is awarded. This meeting will be held at the Consultant's office or at an alternate location arranged by the Consultant. It is required that the following people be in attendance at the pre-construction meeting:

a) Consultant as the Owners representative.
b) Project Manager.
c) Consultant's Field Inspector.
d) Project Survey Party Chief.
e) Contractor's Superintendent.
f) Sub-Contractor's Superintendent.

Without the above representatives in attendance at the meeting, the pre-construction meeting will not proceed, and therefore construction will not commence.

If it is decided during the pre-construction meeting that a site meeting is required prior to the start of construction, this will be scheduled at the pre-construction meeting and construction will not start until the site meeting has been completed with the same attendees present.

### 2. Progress Meetings

Progress meetings will be scheduled by the Consultant's Project Manager or Field Inspector as required. Accommodation for progress meetings shall be provided by the Contractor at or near the site. The Consultant shall give to all parties advance notice of the meeting dates, times and locations. The Contractor shall have in attendance the Field Superintendent / Site Foreman and, if requested by the Consultant, representatives of the Sub-Contractors. The Consultant shall also have the Project Manager and/or the Field Manager in attendance. The Owner may have a representative in attendance. Notes of the meeting will be taken by the Consultant and copies will be distributed to attendees.

All costs associated with progress meetings shall be considered incidental to the Work described elsewhere and no extra payment will be made for claims in this regard.

## 1.13 SUB-CONTRACTORS

The Contractor shall, as soon as possible after Notice of Award, notify the Consultant in writing of the names of Sub-Contractors not identified in the Schedule of Quantities, and shall not employ any that the Consultant may, within a reasonable length of time, object to as incompetent or unfit. Nothing in the Contract Documents shall create any contractual relationship between the Sub-Contractors and the Owner. The Contractor agrees that they are fully responsible for acts or omissions of their Sub-Contractors, and of a person or persons directly or indirectly employed by them. The Consultant shall upon request furnish to any Sub-Contractor, whenever practical, evidence of the amount certified to their account. None of the Work contemplated under this Contract shall be sublet to other Contractors without the written permission of the Owner.

## 1.14 OTHER CONTRACTS

The Owner reserves the right to enter into other contracts that are directly related with this project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work and shall properly connect and coordinate their Work with that of the other Contractors.

If any part of the Contract Work depends for proper execution and results on the Work of any other Contractor, this Contractor shall inspect and promptly report to the Consultant any defects in such Work that render it unsuitable for the proper execution and results. The Contractor's failure to inspect and report shall constitute an acceptance of the other Contractor's Work as fit and proper for the reception of their Work, except as to defects which may develop in the other Contractor's Work after the execution of the Work.

To ensure the proper execution of the Contractor's Work, they shall measure Work done by others and shall at once report to the Consultant any discrepancy between the executed Work and drawings.

## 1.15 MATERIAL SUPPLIED BY THE CONTRACTOR

The Contractor shall use materials of Canadian manufacture to the fullest extent practical. The Contractor shall supply all materials unless it is especially stipulated to the contrary. Materials used in the Work shall meet the requirements of the specifications, or where not detailed in the specifications, shall be to the Consultant's satisfaction. Unless otherwise specified all materials shall be new.

The Contractor is required to provide the Consultant with a materials list for all materials that are to be used in the proposed Work. In addition, the Contractor is required to provide the Consultant with documentation identifying the quantity of materials being delivered to site for either immediate use in the Work or for storage on the Work site. Failure to provide this information to the Consultant at the time the materials are delivered to site may result in the Consultant rejecting the materials from being permitted on the Work site and/or used in the proposed Work. The Contractor must provide the Consultant with a minimum of twenty-four (24) hours' notice when they are scheduling a component of Work where large quantities of materials are to be delivered to Work site (such as the delivery of base course material and/or asphaltic concrete pavement). The notification is required so the Consultant can schedule personnel to be present on site to receive the material information for each delivery unit to the Work site.

Schedules of piping, fittings, reinforcing, or other materials indicating quality and/or dimension, which are shown on the drawings or in the applicable section of the specifications, are intended only to assist the Contractor in their quantity takeoff. Quantities and dimensions shown therein are not guaranteed to be accurate and shall be checked by the Contractor prior to placing an order for such material.

Any requests the Contractor may have regarding materials equal to those specified, or any substitutions of materials shall be brought to the Consultant's attention prior to the date of tender closing. Sufficient time shall be allowed for the Consultant to evaluate whether the proposed materials or changes are acceptable within the required specifications of the Contract.

Should the Contractor or supplier wish to use another product prior to tender or during construction that is not specified, the Contractor shall provide to the Consultant and the Municipality, upon request, a portion or all of the following information:

a) sample of the product if logistically possible;

b) documentation showing CSA and ASTM and/or AWWA certification;

c) Three letters of recommendations from previous nonpartisan users of the product;

d) Ten (10) individuals, companies or institutions who have used the product including phone numbers and addresses;

e) a field of history of over three (3) years of successful implementation.

The product information so submitted by the Contractor will be jointly reviewed by the Consultant and the Municipality. A decision will be made as to the suitability of this product. Providing information alone does not guarantee use of that product for construction.

Unless otherwise stipulated, the Contractor shall provide all water, light and power, and gas necessary for the execution of the Work.

## 1.16 MATERIALS BY OWNER

The Owner will provide only such materials as are specifically listed as being supplied by the Owner.

Immediately after Contract execution, materials supplied and delivered by the Owner to the site prior to Contract execution or stockpiled at another designated location but dedicated to this site, the Contractor shall be required to examine such materials for quality and defects. The same shall apply to materials delivered following execution of the Contract. The Contractor shall sign a statement of materials' acceptance specifically listing materials and quality thereto and noting all defective material. In so accepting these materials, the Contractor shall assume responsibility for their protection and, except for latent defects not reasonably noticed at the time of examination, for their quality.

Unless otherwise specified, the Contractor shall take delivery of materials supplied by the Owner at the point of delivery nearest to the Works. The Contractor shall, at their own cost, pay all demurrage, insurance, standby charges, and other unloading costs, and costs of transporting such material from the point of delivery to the site. The Contractor shall verify the delivery dates of materials provided by the Owner and shall arrange Work Schedules to comply therewith.

## 1.17 MATERIAL STORAGE

The Contractor at their own cost shall store all materials provided for the Work either by themselves or the Owner, until they have been incorporated into the completed Works. Storage of materials shall be confined to the immediate Work area and no stockpiling of materials in advance of this area is allowed unless otherwise provided in the Contract. Materials shall be stored in such a manner so that pedestrian and property safety is not compromised. The storage of materials shall not obstruct normal pedestrian flows and shall not interfere with traffic movement adjacent to the Work area.

Material shall be so stored as to ensure the preservation of their quality and fitness for the Work, and shall be protected from vandalism and theft. Storage material shall be located so as to facilitate prompt inspection. Faulty materials shall not be stored on the site.

## 1.18 REJECTED WORK AND MATERIALS

All materials which do not conform to the requirements of the Contract Documents, are not approved by the Consultant, or are in any way unsatisfactory or unsuited for the purpose for which they are intended, will be rejected. Any defective Work, which shall include materials, whatever the cause thereof, and without limiting the generality of the foregoing, whether the result of poor workmanship or use of defective material, shall be removed within ten (10) days after written notice is given by the Consultant, and the Work shall be re-executed by the Contractor. The removal of Work and the re-execution thereof shall be at the expense of the Contractor, and the Contractor shall pay the cost of replacing the Work which shall include materials of other Contractors destroyed or damaged by the removal of the rejected Work or materials and the subsequent replacement with acceptable Work. The fact that the Consultant may have previously overlooked such defective Work shall not constitute an acceptance.

Repeat or corrective Work made necessary by adverse weather, or failure of the Contractor to adequately protect the Work during the prosecution of the Work, shall be at the Contractor's expense.

If, in the opinion of the Consultant, it is not expedient to re-excavate defective Work, the Owner may deduct from the Contract price the difference in value between the Work done and that called for by the Contract, the amount of which shall be determined by the Consultant.

## 1.19 OWNER'S RIGHT TO CORRECT DEFICIENCIES

Upon failure of the Contractor to perform the Work in accordance with the Contract Documents, and ten (10) days after written notice to the Contractor, or without notice if an emergency or danger to the Work or public exist; the Owner may, without prejudice to any other remedy the Contractor may have, take action to have such deficiencies corrected. The cost of Work performed by the Owner in correcting deficiencies shall be paid by the Contractor.

## 1.20 PROTECTION OF WORK AND PROPERTY

The Contractor shall verify the limits of construction with the Consultant prior to commencement of construction.

The Contractor shall continuously maintain adequate protection of all their Work from damage and shall protect the Municipality's and/or Owner's property from injury or loss arising in connection with this Contract.

It is the intention of the Contract to minimize the extent of damage to areas surrounding the immediate Work sites. The Contractor shall take whatever means are necessary to minimize this damage at no extra cost to the Owner. The Contractor shall make good any such damages, injury or loss and shall be responsible for any costs incurred to rectify such damages.

The Contractor shall provide and maintain at their cost all passageways, detours, guard fences, lights and other facilities for protection required by public authority and local conditions.

In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor, without special instructions or authorizations from the Consultant, shall act, at their discretion, to prevent such threat, loss or injury, and the Contractor shall so act, without appeal if so instructed or authorized.

**1. Non-Municipality Utilities and Structures**

At a minimum of one (1) week prior to commencing any excavation, the Contractor will notify the utility companies of the location and the nature of the Work to be undertaken. The Contractor will investigate and determine the location of all applicable overhead and buried utilities including, but not limited to, the following:

a) Telephone Lines
b) Power Lines
c) Gas Lines
d) Telegraph and Signal Lines
e) Cablevision Lines
f) Pipelines

The Contractor at their expense is to conduct their operations in accordance with the requirements of the utility authorities having jurisdiction.

**2. Traffic Accommodation – Motor Vehicular**

a) Minor Interruption - Barricade Permits shall not be required for minor traffic interruptions although the Contractor must comply with traffic signing, control, and safety processes as required by the Municipality. Generally this shall apply to local roads and short term delays.

b) Moderate Interruption - Barricade Permits may be required. The Contractor shall consult with the Consultant to determine the need for a permit application. Generally, this shall apply to minor collector roads and intermediate term delays.

c) Major Interruption - Barricade Permits shall be required. The Contractor shall complete and provide to the Consultant an application 48 hours in advance of the Work. Under no circumstances are detour signs to be installed, removed, or relocated by the Contractor unless specifically approved to do so by the Consultant.

Generally this shall apply to roads designated as major collectors or higher, and the disruption is expected to be long term.

Unless special permission is obtained from the Municipality through the Consultant, traffic shall not be completely blocked off for more than three (3) blocks at any one time. Necessary signs, barricades and signal men shall be provided by the Contractor in order to direct and protect the public. Service stations, garages and businesses of such nature that depend on vehicle trade, must be given special consideration in order to prevent excessive or unnecessary financial loss due to blocked traffic.

**3. Municipality Utilities and Structures**

Prior to the commencement of any Work in a construction area, it is the Contractor's responsibility to inspect and check the condition of all affected valves, manholes, catchbasins, or any other Municipality appurtenances including legal iron posts, lot pins and Survey Control Monuments. Deficiencies or damages are to be noted and such documentation to be forwarded to the Consultant three (3) workdays prior to the start of Work in the area. Failure to complete such an inspection, or failure to provide the Consultant with deficiency or damage documentation, shall constitute acceptance by the Contractor. The Contractor, having accepted such items, shall be required to restore such items to a condition satisfactory to the Consultant at the Contractor's own expense.

## 1.21 WORKERS' COMPENSATION REGULATIONS

The Contractor shall ensure compliance, including payments due thereunder, on their part and on the part of all their Sub-Contractors, with the Workers' Compensation Act and Regulations thereunder, especially provisions having to do with the prevention of accidents and disease and the provision of safe working conditions.

At any time during the term of the Contract, when requested by the Consultant, the Contractor shall provide such evidence of compliance by themselves and their Sub-Contractors.

In any case where pursuant to the provisions of the Workers' Compensation Act, the Workers' Compensation Board orders the Contractor, or one of their Sub-Contractors in respect to their operations under this Agreement to cease operations because of failure to install or adapt safety devices or appliances or methods directed by order of the Board, or required by the Act or Regulations thereunder, or because the Board is of the opinion that conditions or immediate danger exists that would be likely to result in injury or to any person, the Consultant shall have the authority to stop the Work under the section pertaining to the Consultant and the Contractor.

## 1.22 LANDS BY OWNER

The Owner shall provide lands upon which the Work is to be performed. Where Work is to be performed on lands owned by others, the Owner shall obtain the necessary easements or right-of-ways.

## 1.23 LANDS BY CONTRACTOR

Any lands other than those which the Work is to be performed which may be required for temporary facilities, storage purposes or access to the Work site, other than those provided by the Owner, shall be provided by the Contractor with no liability to the Owner.

## 1.24 PERMITS AND REGULATIONS

The Contractor shall, at their own expense, procure all permits, certificates and licenses required by law for the execution of the Work and shall comply with all federal, provincial, and local laws, regulations and ordinances affecting the execution of the Work.

The Contractor shall make all arrangements with the local authorities, Alberta Infrastructure / Transportation, and the operating department of the railways for detours, traffic signs, traffic lights and/or signals, as required, prior to and during construction of the Works under or across highways and railway right-of-ways and shall be responsible for all operations and maintenance and costs of same.

## 1.25 CONSTRUCTION SCHEDULE

The Contractor shall:

a) Revise and resubmit to the Consultant the detailed Construction Schedule submitted as part of the tender documents *(**Section 1.10 of the Information Submittal Forms**)* one (1) week prior to the Pre-Construction meeting. This schedule, once revised and deemed acceptable by the Consultant will be the Contractor's proposed construction schedule and will form part of the Contract Documents.
b) Monitor the progress of the Work relative to the construction schedule and update the schedule on a weekly basis or as requested by the Consultant; and
c) Advise the Consultant of any revisions required to the schedule as a result of inclement weather and/or addition of Work to the contract through a Change Order.

The construction schedule referred to above must satisfy the requirements identified in *(**Section 1.10 of the Information Submittal Forms**)* and demonstrates the Work will be performed in conformity with the dates and subject adjustments identified within **GC *Section 1.27 - Construction Commencement and Completion***

Should the Contractor fail to complete the Work under this Contract by the date specified in ***GC Section 1.27 - Construction Commencement and Completion*** subject to the adjustments identified within **GC *Section 1.31 - Adjustment of Completion Dates*** the Owner shall be entitled to make deductions as described in **GC *Section 1.32 - Failure to Complete on Time*** **and** ***GC Section 1.33 - Duration of Work and Site Occupancy***

## 1.26 NOTICE TO PROCEED

Following the execution of the Contract Agreement by the Contractor, written Notice to Proceed with the Work shall be given to the Contractor by the Owner. The Contractor is allowed to commence Work on or any time after the date identified within the Notice to Proceed and shall prosecute the Work regularly and without interruption thereafter, unless otherwise directed in writing by the Consultant, in such manner as to secure the completion of the Work contracted for within the time stated in the Contract Agreement. Time shall be the essence of the Contract.

## 1.27 CONSTRUCTION COMMENCEMENT AND COMPLETION

The Work to be performed under this Contract is to be commenced as indicated within **GC *Section 1.26 - Notice to Proceed***. The Work must be to the point of Construction Completion by the Completion Date identified within ***GC Section 1.27 - Construction Commencement and Completion*** of the Contract Documents subject to the adjustments identified within *Section* ***1.31 - Adjustment of Completion Dates*** **of the General Conditions**.

## 1.28 NO COMPENSATION

Except as expressly provided in the following Sections, **GC *Section 1.29 - Differing Conditions***, ***GC Section 2 - Compensation for Standby***, **GC *Section 1.31 - Adjustment of Completion Dates*** and **GC *Section 1.33 - Duration of Work and Site Occupancy***, the Contractor does not have any claim for compensation, delay, inconvenience, completion date adjustments, additional site occupancy or lane closure days, or damages, including indirect, special, incidental, punitive, exemplary, or consequential damages or damages for loss of profits, against the Owner or Consultant for any suspension, stoppage, hindrance or delay from any cause whatsoever.

## 1.29 DIFFERING CONDITIONS

If, during the execution of the Work, the Contractor encounters surface or sub-surface conditions, not resulting from inclement weather, which meets all the following requirements:

- differ substantially from those indicated in the Contract documents;
- differ materially from those ordinarily found and generally recognized as inherent in construction activities of the character provided in the contract documents
- could not have been reasonably discovered during the Tenderer's investigation of the Site in accordance with Section 1.2 - Tenderer's Investigation.
- were not foreseeable by a reasonably experienced contractor; and
- are not expressly dealt with elsewhere in the Contract

then the Contractor must notify the Consultant and Owner promptly, before such conditions are disturbed if possible. In any event the Contractor must give written notice to the Consultant and Owner within seven (7) calendar days after first observance of the conditions. On receipt of such notice from the Contractor, the Consultant will promptly investigate such conditions. Failure to provide written notice within the prescribed time period will preclude the Contractor from proceeding under this section.

If the Consultant or Owner notice potential differing conditions, the Consultant will give notice to the Contractor that the Consultant will investigate such conditions.

If as a result of the Consultant's investigation, the Consultant determines that a differing condition exists, which would cause or result in an increase or decrease to the scope of the Work, the cost to be incurred by the Contractor, or in the time required to perform the Work, then the Consultant may recommend to the Owner for the Owner's consideration, one or more of the following:

- provide instruction to the Contractor on how to proceed including, but not limited to, removing all or a portion of the Work, revising all or a portion of the Work, or continuing the Work as set out in the Contract.
- adjust one or more of the following:
  - Construction Completion date(s);
  - Site Occupancy days; or
  - Lane Closure days; or
- adjust the amount of payment for the Work in accordance with the Contract including, if applicable, ***Section 1.52 - Extra Work***, or reduce the amount to be paid under the Contract. Additional costs will be based on unit rates as set out in the Contract, or as negotiated as appropriate.

The Contractor may pursue the matter further through the process detailed in **GC *Section 1.63 - Claims and Dispute Resolution*** if:

1. the Consultant determines that a differing condition does not exist, or
2. the Consultant determines that a differing condition exists but the Contractor believes the Consultant's instructions or adjustments are inconsistent with the intent or scope of the Contract or are given in error. Then the Contractor must give notice to the Consultant and proceed to carry out the instructions.

Upon encountering differing surface or sub-surface conditions, the Contractor is responsible for implementing measures to reduce impacts related to these conditions. The Contractor is not entitled to payment for that portion of costs incurred which could have been reasonably avoided by the Contractor.

## 1.30 TEMPORARY SUSPENSION OF WORK

**1. <u>Authority to Suspend Work</u>**

.1 Consultant Authority

The Consultant and the Consultant's Representative have the authority to suspend the Work, in whole or in part, for such a period as he may deem necessary:

- due to conditions that he considers unfavourable for the prosecution of the Work;
- due to the failure of the Contractor to comply with any provision of the Contract;
- if in the Consultant's opinion, the Contractor fails to adequately provide for or there is imminent danger to workers, utilities or the safety of the public;
- if in the Consultant's opinion there are re-occurring safety issues; or
- when the Contractor fails to comply with orders or directions issued by the Consultant regarding traffic accommodation operations, permit condition non-compliances or failure to safeguard the environment, utilities or the public.

In situations where the Consultant is not on site, the Owner will have the authority to suspend the Work.

Upon receipt of a notice to suspend the Work, the Contractor must immediately suspend the specified operations. Suspensions do not vitiate or void all or any part of the Contract, or any security or obligation for the performance thereof, or relieve the Contractor of any other responsibility under the terms of the Contract including the preservation and care of the Site and material and equipment on the Site.

During a period of suspension, the Contractor must not remove from the Site without the consent of the Consultant any part of the material or equipment previously provided for the Contract.

.2 Contractor Authority

Consent of the Consultant is required before the Contractor is authorized to suspend Work.

**2. Compensation for Standby**

Subject to the other provisions in this section, when the Project or any part of it is suspended by order of the Consultant for a reason which is not related to the Contractor's performance of the Work, the Owner may consider compensation for payment of standby costs incurred by the Contractor and an extension to the Construction Completion date in accordance with ***Section 4.31 - Adjustment of Completion Dates***, General. When such compensation is requested, the costs must be, in the opinion of the Owner, legitimate, reasonable, and supported by proper documentation.

If the Contractor and Owner cannot agree that the requested compensation is legitimate, reasonable and supported by proper documentation, the Contractor may submit a claim in accordance with **GC *Section 1.63 - Claims and Dispute Resolution.***

When the Owner fails to provide right-of-way necessary for access to the Site and has not so notified the Contractor in the special provisions of the Contract, and in the Consultant's opinion alternate work areas are not available or practical to allow continued prosecution of the Work, the Owner may consider compensation for standby, for up to a maximum of ten days.

The Owner will not pay for standby costs related to any of the following:

- Weather or other natural conditions
- Suspension, stoppage, hindrance or delay for all or any part of the Project due to an act or omission by the Contractor that is not in compliance with the Contract or is the fault of the Contractor including, without limiting the generality of the foregoing, delays by strikes of the employees of the Contractor or sub-contractors;
- Failure by the Contractor to carry out orders given by the Consultant;
- Any failure by the Contractor to comply with a requirement or provision of the Contract;
- Any failure by the Contractor to provide for the safety of the public or the Contractor's, Owner's or Consultant's work force;
- Any failure by the Contractor to protect the property of the Owner or others;
- Any delay occurring while Defective Work is being remedied;
- Any change in the quantity of any item of Work from the estimated quantity shown in the Contract Unit Price Schedule;
- Any equipment or workers which were not actually present and actively working on the Project immediately prior to the suspension of the Work;
- Any haul trucks or their drivers used on the Project;
- Any suspension of the Work that is less than four (4) hours in duration; and
- Testing of material or Work for compliance with Specifications and Plans.

When a request for compensation for standby is considered by the Owner, costs which in the opinion of the Owner could not have been avoided by the judicious handling of workers and supervisors, equipment, and plant, will be paid to the Contractor in an amount that the Owner believes to be fair and reasonable. For the purposes of this section, compensable costs are only the idle time rate of equipment or plant and the idle time of workers and supervisors including any applicable accommodation costs.

Compensation for standby time of supervisory staff, labour, equipment and plant will be determined by the Owner, and in accordance with the following:

i. The time paid for will not exceed eight hours in any one calendar day;
ii. Saturdays, Sundays and statutory holidays will be excluded;
iii. Overhead costs and loss of profit will be excluded; and
iv. The idle time equipment rates will be determined by the Owner.

Upon termination of the suspension by the Consultant or the Owner, the Contractor is required to resume operations at once.

## 1.31 ADJUSTMENT OF COMPLETION DATES

**1. General**

If the Contractor has mobilized to Site and is diligently proceeding with the Work, then the Owner may adjust the specified Construction Completion date, interim completion date, and/or previously adjusted completion date, as applicable when all the following conditions apply:

a) The Contractor must submit a written completion date adjustment request to the Consultant as soon as possible after the occurrence of the circumstance giving rise to the request and not later than fourteen (14) calendar days after the occurrence of the circumstance. Failure to submit a request within this time period will prejudice the Contractor's opportunity to receive an adjustment to the completion date, unless the Contractor can demonstrate to the satisfaction of the Owner that such delay did not prejudice the ability of the Owner to validate the request;
b) The written request must include a revised detailed schedule of the Contractor's Work to enable completion on or before the requested adjusted completion date;
c) The circumstances precipitating the request occurred prior to the interim completion or Construction Completion date, as applicable, and the Contractor demonstrates to the satisfaction of the Consultant that the circumstance impacted the overall project schedule, preventing completion of the applicable Work by the specified interim completion or Construction Completion date; and
d) The reason for the request, stated in the request, is one or more of the following:

i. Completion of the applicable Work requires significantly greater amounts or quantities than those estimated amounts or quantities shown in the Contract;
ii. The Site was not available to the Contractor through no fault of the Contractor;
iii. There was a delay in the availability of materials which are to be supplied by the Owner;
iv. The Consultant suspended the Work and standby payments are payable in accordance with Section 4.30 - Temporary Suspension of Work;
v. Despite the Contractor's diligence and best efforts, a third party fails to:

a. Provide permission to the Contractor to work in the proximity or to cross Utility installations or railways; or
b. Provide access to or relocate any Utility installations or railways within a reasonable time

and this was unforeseeable by the Contractor and the Contractor cannot rearrange its Work to accommodate the delay;

vi. There is a delay resulting from an order of a court, or from strikes or lock-outs;
vii. A differing condition is determined to exist in accordance with **GC *Section 1.29 - Differing Conditions***; or
viii. Contractor works on the Site less than half a Normal Working Day for reasons of inclement weather, or conditions resulting from inclement weather, as determined by the Consultant.

Time spent during or immediately after inclement weather on rectifying conditions resulting from inclement weather will be excluded when calculating a Normal Working Day.

This exclusion applies to time spent on:

- Towing traffic or blading the road surface to facilitate the passage of traffic;
- Ripping, drying and/or re-laying material to restore the material to the condition it was prior to the occurrence of inclement weather; or
- Any other required activities that rectify or restore the Site and the Consultant believes are necessary before any Work on the Site can continue.

Inclement weather occurring after the Construction Completion date, interim completion date, and/or previously adjusted completion date, will not be considered as a reason for the delay in the applicable completion date.

**2. <u>Force Majeure Delay</u>**

Neither party will be considered in default in performance of its obligations hereunder to the extent that performance of such obligations is delayed, hindered, or prevented by a Force Majeure Event.

If the Contractor claims that he has been or will be delayed by reason of a Force Majeure Event in the progress of the Work, the Contractor must, as soon as possible after the Force Majeure Event and not later than fourteen (14) calendar days after becoming aware of the Force Majeure Event, make a written request to the Owner for an extension of time within which to complete the Work or any portion of it. The request must state the reasons for the delay and the amount of additional time the Contractor considers necessary. The applicable scheduled completion date or other time for performing the Work will be extended by an equitable period of time to allow for the delay resulting from the Force Majeure Event. No extension of time will be granted unless the Contractor makes a written request within fourteen (14) calendar days. No additional compensation other than an extension of time will be considered against any delays due to Force Majeure.

The Contractor does not have any further recourse or claim against the Owner, nor does the Contractor have any right of action or claim against the Owner, for loss or damage suffered by reason of such delay.

Both the Owner and the Contractor must be prompt and diligent to remove all causes of interruption or delay in the Work, insofar as each is able to do so.

## 1.32 FAILURE TO COMPLETE ON TIME

Without limiting any other rights or remedies the Owner has under this Contract, in equity or at law, if any Work required to be completed by the applicable completion date remains incomplete after that date the Owner will deduct from money due to the Contractor, Damages for Delay, actual loss or damages, or both.

If there are insufficient funds to cover these amounts, the Owner may invoice the Contractor. The Contractor must promptly pay the amounts invoiced within 60 days.

Damages for the delay and actual loss or damages are set out below:

a) Damages for Delay

The Contractor agrees to provide to the Owner, in accordance with the Public Works Act, Chapter P-46, Section 11 (2)(b), a stipulated sum per calendar day for each and every calendar day or part thereof beyond the applicable completion date(s) that the Work remains uncompleted, regardless of actual loss or damages, and in accordance with the following terms:

i. The sum of $1,500.00 per calendar day. This sum will be applied daily for every completion date missed and may result in multiple sums being charged per calendar day. For example, if Work required for two or more completion dates remains incomplete this sum will be applied to each missed completion date until the Work associated with the applicable completion date is complete. The Contractor will notify the Consultant when the applicable work is complete and the Consultant will confirm that all applicable Work is completed and the assessment of damages for delay for the applicable Work will cease.

The Contractor will not be assessed damages for delay for the time spent correcting any Defects identified during the Construction Completion Inspection.

This daily rate will be reduced to $500.00 per calendar day if all Work has been completed, except for minor cleanup.

ii. For all Contracts other than bridge only or seal coat Contracts, regardless of the daily rate charged, there will be no Damages for Delay assessed during the time period between December 1 and April 30 of the following year.

For the purposes of this section, seal coat contracts will be considered micro-surfacing, slurry seal, double seal coat, graded aggregate seal coat and chip seal coat.

On chip seal coat Contracts there will be no Damages for Delay assessed during the time period between September 16 and April 30 of the following year.

*iii.* There will be no Damages for Delay assessed during the period of a seasonal or prolonged shutdown agreed to by the Owner provided the Contractor has and continues to comply with all the requirements of ***Section 1.34 - Seasonal or Prolonged Shutdown***.

iv. There will be no Damages for Delay assessed for calendar days lost due to inclement weather or conditions resulting from inclement weather, that occur after the specified or adjusted completion date.

The Contractor is advised that some specifications, manuals, guidelines, and/or other documents may make reference to “Liquidated Damages”. All such references mean “Damages for Delay” as described in this section.

b) Actual Loss or Damages

In addition to the daily stipulated sum for Damages for Delay, as set out in Clause (i), the Contractor agrees to provide to the Owner in accordance with the Public Works Act, Chapter P-46, Section 11 Completion of Work (2) (a), the actual loss or damages suffered by the Owner for each and every calendar day beyond the specified or adjusted completion date that the Work remains uncompleted for one or more of the following items:

i. The additional cost of maintenance and repair necessary to safely operate or protect the highway infrastructure including, but not limited to, line painting, pavement irregularities including pothole repair, guardrail and other safety or protection items;
ii. The cost of accommodating traffic over, through or around portions of the Project; or
iii. Related claims from third parties against the Owner for damages.

## 1.33 DURATION OF WORK AND SITE OCCUPANCY

### 1. General

For Contracts containing a bid item for "Site Occupancy" the Contractor will have indicated the number of Site Occupancy Days it requires to complete the Work.

Where Contracts contain multiple Site Occupancy bid items for separate components of the Project, each Site Occupancy bid item will be administered separately for the applicable Work as outlined in the Unit Price Schedule, Special Provisions or both.

### 2. Calculation of Site Occupancy Days

Site Occupancy Days will be calculated as whole days. The assessment of Site Occupancy Days will commence on the day of the first disturbance within the Project. Thereafter, every day will be counted as a Site Occupancy Day except if:

- The Contractor is prohibited from working due to restrictions imposed by local bylaws after the Contract has been awarded or as a result of directives from the Consultant or the Owner.
- The Contractor schedules employee time off subject to the conditions in **GC *Section 3 - Employee Time Off***.
- The Contractor pre-schedules interruptions to continuous prosecution of the Work for distinct phases of the Work at different times, approved by the Consultant.

    - Distinct phases of Work generally include the larger work groups such as grading, base, paving, pile driving, girder erection, or concrete deck pour, which require different types of equipment and can be completed as a single phase. The Consultant may approve scheduled interruptions for other components of the Work at its discretion. Any such interruptions must be clearly identified in the Contractor's construction schedule. For clarity, pavement markings and guardrail/barrier construction are not considered distinct phases of work.

- The Project is delayed due to inclement weather subject to **GC *Section 4.- Inclement Weather***.
- The Project is under an approved seasonal shutdown in accordance with **GC *Section 1.34 - Seasonal or Prolonged Shutdown***
- The Contractor is working exclusively on:
    - The development or reclamation of borrow areas or gravel sources;
    - The production of aggregates;
    - The maintenance or restoration of haul roads;
    - The preparation and installation of temporary silt fencing or erosion/sediment control measures; or
    - The construction of milled rumble strips.

    regardless of when these are completed.

### 3. Employee Time Off

The Contractor is allowed a maximum of eight non-charged Site Occupancy days per thirty calendar day period for the purpose of allowing employee time off, providing:

- the Consultant is given at least seven calendar days' notice;

- there is no ongoing Work which requires the Consultant's presence; and no more than five consecutive calendar days are taken at one time.

The first thirty calendar day period begins on and includes the first Site Occupancy day. Any employee time-off days not taken within the specified thirty calendar day period will not be carried forward into the subsequent periods. When the number of calendar days for a period is less than thirty, the allowable employee time off days will be prorated.

**4. Inclement Weather**

A day on which the Contractor works on the Site less than half a Normal Working Day for reasons of inclement weather, or rectifying conditions resulting from inclement weather, as determined by the Consultant, will not be counted as a Site Occupancy day.

Rectifying conditions resulting from inclement weather includes:

- Towing traffic or blading the road surface to facilitate the passage of traffic;
- Ripping, drying and/or re-laying material to restore the material to the condition it was prior to the occurrence of inclement weather; or
- Any other required activities that rectify or restore the Site and the Consultant believes are necessary before any Work on the Site can continue.

**5. Working During Periods of Inclement Weather or Pre-scheduled Interruptions**

If, in the opinion of the Consultant, the Contractor is only able to perform minor Work including, but not limited to, clearing, seeding, guardrail/barrier, permanent highway signing, highway lighting, pavement marking, temporary and permanent environmental protection, fencing, culvert rip-rap and trimming backslopes:

- during periods of inclement weather subject to **GC *Section 4 - Inclement Weather***; or
- during pre-scheduled interruptions between phases of the Work such as earthwork, granular base course and asphalt concrete paving and prior to the completion of these phases of the Work;

then Site Occupancy Days will not be counted.

The performance of such Work at any other time prior to the Project being ready for the Construction Completion inspection as detailed in **GC *Section 7 - Conclusion of Site Occupancy*** will result in the assessment of Site Occupancy days.

**6. Completion of Pavement Markings**

When the Contract includes a pavement markings component, the Owner will determine the priority of expeditious completion of pavement markings based on traffic volumes and other safety considerations; and will identify the project in the Special Provisions as either a Priority or Non-Priority Line Painting project.

Subject to the exceptions detailed in **GC *Section 2 - Calculation of Site Occupancy Days*:**

For Priority Line Painting projects Site Occupancy days will to be counted until all Work including all pavement markings are complete and the Project is ready for the Construction Completion inspection as detailed in *Section 7 - Conclusion of Site Occupancy*.

For Non-Priority Painting projects, all pavement markings must be completed within 5 calendar days of the completion of surfacing work. During this five-day period, Site Occupancy Days will only be counted for those days on which the Contractor is performing pavement markings or other Work necessary to prepare the Project for Construction Completion inspection. If, after this five calendar day period, the pavement markings have not been completed, Site Occupancy days will be counted until all pavement markings are complete and the Project is ready for the Construction Completion inspection as detailed in **GC *Section 7 - Conclusion of Site Occupancy***.

**7. Conclusion of Site Occupancy**

Subject to the exceptions specified in **GC *Section 1.33 - Duration of Work and Site Occupancy***, assessment of Site Occupancy Days will cease entirely when, in the opinion of the Consultant, the Project is ready for the Construction Completion inspection as detailed in **GC *Section 1.60 - Construction Completion Certificate and Acceptance***. Site Occupancy Days will not be assessed during the period from the date of completion of the entire Work to the actual date of the Construction Completion inspection.

**8. Site Occupancy Reporting and Adjustments**

The Consultant will, on a weekly basis, summarize for the Contractor on the weekly report, the number of Site Occupancy Days counted on the Contract during that week. In the event that the Contractor disagrees with the number of Site Occupancy Days counted, the Contractor must within one week of the date of the weekly report, notify the Consultant in writing of reasons for the disagreement, otherwise the number of Site Occupancy Days shown on the weekly report are final.

The number of Site Occupancy Days may be adjusted if there was:

- a significant increase or decrease in the estimated quantities;
- late delivery of Owner supplied materials;
- design changes to the Project; or
- any other reason which in the opinion of the Consultant is outside the control of the Contractor, or could not have been reasonably foreseen by the Contractor.

If the Contractor believes he is entitled to an increase in the number of Site Occupancy Days then the Contractor must submit a written request to the Consultant as soon as practicable, but in any event no later than prior to the completion of the Work. The Contractor must set out the reasons for the request, and include reasons justifying the number of additional Site Occupancy days required.

**9. Payment**

Payment for "Site Occupancy" will be made as follows:

If the Contractor completes the Work in the exact number of Site Occupancy days bid by the Contractor plus any additional days approved under **GC*Section 8 - Site Occupancy Reporting and Adjustments*** (collectively " Contractor Site Occupancy Days") no payment will be made.

If the Contractor completes the Work in fewer Site Occupancy Days than the Contractor Site Occupancy Days, a payment equal to the unit price per day as shown in the unit price schedule, multiplied by the difference between the Contractor Site Occupancy Days and actual number of Site Occupancy Days will be made.

If the Contractor completes the Work in more Site Occupancy days than the number of Contractor Site Occupancy, an assessment equal to the unit price per day as shown in the unit price schedule, multiplied by the difference between the Contractor Site Occupancy Days and actual number of Site Occupancy Days will be made and charged to the Contractor. Without limiting any other rights or remedies the Owner has under this Contract, in equity or at law, this assessment may be deducted from any monies due the Contractor.

Those provisions for Site Occupancy in no way negates or mitigates the conditions of **GC *Section 1.31 - Adjustment of Completion Dates*, *GC Section 1.32 - Failure to Complete on Time*,** or ***GC Section 1.27 - Construction Commencement and Completion.***

## 1.34 SEASONAL OR PROLONGED SHUTDOWN

The Contractor may request a seasonal or prolonged shutdown if the contract is a:

Roadway Contract or a Combined Contract and it is on or after November 1 or Work cannot or should not progress due to anticipated prolonged inclement weather, specification requirements, safety or environmental reasons; or
Bridge Only Contract and in the Department and the Consultant's opinion, Work cannot or should not progress due to inclement weather, specification requirements, safety or environmental reasons.

If the Consultant is considering the Contractor's request for the shutdown the Contractor must attend a joint meeting and the Contractor is responsible for developing a shutdown plan outlining the Contractor's methods and procedures for monitoring and maintaining the Project during the shutdown period. The shutdown plan will also outline any responsibilities of the other parties. The Contractor is responsible for implementing the shutdown plan developed in accordance with the requirements of Specification 7.1, Traffic Accommodation and Temporary Signing of Alberta Transportation's Standard Specifications for Highway Construction.

The Contractor may only shutdown if the shutdown is agreed to by the Department. The Contractor is responsible for monitoring and maintaining the Site in accordance with the shutdown plan including, but not limited to, temporary works or additional traffic control measures, or both. Notwithstanding the preceding, on Combined Contracts, the Contractor

is to continue working on the Bridge(s) unless in the Department and the Consultant's opinion, Work cannot or should not progress due to inclement weather, specification requirements, safety or environmental reasons.

If the Consultant grants a shutdown, the Contractor acknowledges and agrees that the Contractor is responsible, at its own expense, to comply with the requirements and provide all items in the shutdown plan including, but not limited to, temporary works or additional traffic control measures, or both; and the Contractor will promptly remove these items when they are no longer required. The Department will not make any separate or additional payment for costs associated with implementing the shutdown plan.

Until the Shutdown Notification is issued in accordance with Section 7.1.10, Specification 7.1, Traffic Accommodation and Temporary Signing of Alberta Transportation's Standard Specifications for Highway Construction and subject to the terms of the shutdown plan, if it snows or rains, then snow removal and ice control are the responsibility of the Contractor. The Contractor must remove snow and control ice in accordance with the Owner's Maintenance Standards or enters into an agreement with the maintenance contractor, including identifying any potential hazards (e.g milled surfaces) to the maintenance contractor.

## 1.35 OWNER'S RIGHT TO TERMINATE CONTRACT

Should the Contractor fail to begin Work under the Contract within the period of time specified, or fails to prosecute the Work with sufficient workmen and equipment, or with sufficient materials to ensure the prompt completion of the Work, or shall perform the Work unsuitably, or shall neglect or refuse to remove materials, or perform anew such Work as shall be rejected as defective and unsuitable, or shall discontinue the prosecution of the Work, or shall fail or refuse to place additional equipment on the Work when so ordered by the Consultant, in order to complete the Work within the time specified; the Owner shall give notice to the Contractor and their Surety of such delay, neglect or default, specifying the same.

If the Contractor, within a period of six (6) days after such notice, shall not proceed in accordance therewith, then the Owner shall have full power and authority, without violating the Contract, to take the prosecution of the Work out of the hands of the Contractor, to appropriate or use any or all materials and equipment on the ground that may be suitable and acceptable, and may enter into an agreement for the completion of the Contract, according to the terms and provisions thereof, or use such other methods as in its opinion may be required for the completion of the said Contract in an acceptable manner.

All costs of completing the Work shall be deducted from any monies due, or which may become due, to the Contractor. In the case the expense so occurred by the Owner shall be less than the sum which would have been payable under the Contractor, if it had been completed by the said Contractor, then the Contractor shall be entitled to receive the difference, and in case such expense shall exceed the sum which would have been payable under the Contract, then the Contractor shall be liable and pay to the Owner the amount of the excess.

## 1.36 CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

The Contractor shall have the right to terminate the Contract, subject to the section pertaining to payment withholding, if at any time:

a) The Work is stopped for three (3) months, under an order of any Court, or other public authority through no act or fault of the Contractor, or anyone employed by them.
b) The Owner fails to pay the Contractor any sum certified by the Consultant or Arbitrator, provided that written notice of intention to terminate the Contract is given to the Owner after twenty (20) days have elapsed since certification, and payment is not made within ten (10) days of receipt of said notice.

## 1.37 USE OF COMPLETED PORTIONS

The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding that the time for completion of the entire Works or such portions may not have expired; but such taking possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents. If such prior use increases the cost of, or delays the completion of, uncompleted Work or causes refinishing of completed Work, the Contractor shall be entitled to extra compensation or extension of time, or both as the Consultant may determine.
If a plan for taking possession and use of portions of the Work has been stipulated in the Contract Documents, then the Contractor shall have no claim for compensation or extension of time on that account.

## 1.38 CLEAN-UP

Clean-up during construction shall be an ongoing process and areas becoming available at the site or providing access to the site, such access being utilized by the Contractor and / or public vehicular traffic or pedestrians; shall be kept in a clean state as determined by the Consultant and upon request, cleaned by the Contractor without cost to the Owner. Furthermore the area shall not be encumbered with products which are unnecessary and have no further use in that immediate area.

On or before the completion of the Work the Contractor shall, without extra charge therefore, carefully clean out all structures and shall tear down or remove or otherwise dispose of all temporary structures they built and shall remove all rubbish from the grounds which the Contractor has occupied or utilized as access along the line of Work.

Clean-up during construction shall be an ongoing process and areas becoming available to vehicular traffic or pedestrians shall not be encumbered with products which are unnecessary and have no further use in that immediate area.

## 1.39 DISPOSAL OF EXCAVATED OR OTHERWISE REMOVED MATERIALS

Large sections of unmanageable curb and gutter or sidewalk containing reinforcing, may be hauled to alternative disposal sites as selected by the Contractor, or shall be subject to the Municipality Landfill fee schedule when hauled there, if no alternative site is available.

All milled asphalt is to be removed to the disposal site indicated on the Contract Plans or to the Municipality's Landfill unless otherwise directed.

Clean fill will be accepted at the Landfill Site at no charge and loads will be directed to the stockpile area within the Landfill Site.

The Contractor shall be responsible for the maintenance of disposal sites and access roads when necessary. All associated Work is to be carried out at no additional cost to the Owner.

## 1.40 PROJECT RECORD DRAWINGS

The Consultant will provide the Contractor with two (2) project drawings sets of either 22" x 34" or 24" x 36" in size for record drawing purposes. One set is to be used as a working copy to record the infrastructure installation information on a daily basis by the Contractor. The second set is to be used as a clean record drawing set on which the information from the working copy is to be transferred once the project is completed.

The Contractor will maintain project record drawings and accurately record deviations from Contract documents caused by site conditions and changes ordered by the Consultant. The working copy of the project record drawings are to be updated on a daily basis by the Contractor with changes recorded in red on the drawing set. Failure to do so will result in a 5% deficiency holdback, at the discretion of the Consultant, from the current amount due to the Contractor on the progress payment certificate for the affected time period.

Borelogs from directional drilling component of the project must be recorded daily on transposed upon the working copy of the project record drawings. A copy of the field recorded Borelogs from the directional drilling component must be submitted to the Consultant as the support documentation for the working copy of the project record drawings. Failure to do so will result in a 5% deficiency holdback, at the discretion of the Consultant, from the current amount due to the Contractor on the progress payment certificate for the affected time period.

Upon project completion, the Consultant may withhold 5% of the entire contract cost from the final progress payment certificate (prior to the release of the lien holdback) until the Contractor provides the Consultant with a clean set of accurate and complete project record drawings.

In each of the instances above the Contractor has fifteen (15) working days to produce the required record drawing information to the Consultant. If this does not occur the Consultant may, without notice to the Contractor, generate the required record drawings and all of the associated costs to obtain the record drawing data will be the responsibility of the Contractor and the 5% deficiency holdback will be retained until such time as the Consultant is compensated for their work.

## 1.41 ASSIGNMENT

Neither party to the Contract shall assign the Contract nor any monies due there under without the written consent of the other.

## 1.42 WATER USED BY CONTRACTOR

No persons other than the employees of the Municipality are to operate the Municipality's fire hydrant valves or other appurtenances for any reason. Failure to comply with this order will result in prosecution.

The Contractor must contact the utility company for information on obtaining water, current rates and related information.

The cost of water is to be included in the Contract cost and will not be paid as a separate item.

## 1.43 INDEMNITY

Except as provided in **GC *Section 1.41 - Assignment*** the Contractor shall indemnify and hold harmless the Owner, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of or attributable to the Contractor's performance of the Contract, providing that such claims, damages, losses or expenses are:

a) attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and

b) caused by a negligent act or omission of the Contractor or anyone for whose acts the Contractor may be liable.

The obligation of the Contractor under this General Specification shall apply only to the extent that such claim, demands, losses, expenses, costs, damages, actions, suits, or proceedings do not arise out of a negligent act or omission of the Owner, the Consultant, their agents or employees.

## 1.44 ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees and shall save the Owner harmless from loss of account of suits or claims for infringements of patents in the doing of the Work.

## 1.45 INSURANCE

The Contractor shall maintain and keep in force Insurance during the term of this Contract until all Work required to be performed under the terms of this Contract is satisfactorily completed as evidenced by the formal acceptance of the Owner through the issuance of a FAC. Insurance must include coverage for the making good of faulty Work and materials, in an insurance Company or Companies and under policies of insurance acceptable to and approved by the Owner.

Only policies issued by companies authorized to do business under the laws of the Province of Alberta shall be deemed acceptable under this Contract.

The Contractor shall maintain and keep in force the following:

a) Comprehensive General Liability Insurance

Comprehensive General Liability Insurance protecting the Owner, the Owner's representative and/or the Consultant, the Contractor and their respective servants, agents or employees against damages arising from personal injury (including death) and claims for property damage which may arise out of the operations and completed operations of the Contractor, its Sub-Contractors, and their respective servants, agents or employees under the Contract.

This insurance shall be for an amount of not less than **FIVE MILLION DOLLARS ($5,000,000.00)** inclusive per occurrence and shall include a standard form of cross liability clause.

b) Automobile and Mobile Equipment Insurance

Automobile Liability Insurance on all licensed vehicles owned by or leased to the Contractor, protecting against damages arising from bodily injury (including death) and from claims for property damage arising from the operations of the Contractor, its servants, agents or employees. This insurance shall be for an amount inclusive per accident.

Contractor's Equipment Insurance covering all equipment owned or rented by the Contractor and its servants, agents or employees against all risks of loss or damage with coverage sufficient to allow for immediate replacement, and shall contain a waiver of subrogation against the Owner.

"Certified True" Certificates of Insurance reflecting evidence of the required insurance shall be filed with the Owner prior to the commencement of the Work.

Certificates shall contain a provision that coverage afforded under these policies will not be cancelled until at least thirty (30) days prior written notice has been given to the Owner.

In the event the Insurance Certificate provided indicates that the insurance shall terminate and lapse during the period of this Contract, the Contractor shall furnish, at least thirty (30) days prior to the expiration of the date of such insurance, a renewed Certificate of Insurance as proof that equal and like coverage for the balance of the period of the Contract and extension there under is in effect.

The Contractor shall not continue to Work pursuant to this Agreement unless all required insurance remains in full force and effect. When changes in the Contract are material to the risk, the Contractor shall notify the Insurance Companies and have the insurance coverage adjusted. In the event that the Owner uses completed portions of the Works prior to the date of completion, any increase in cost of insurance arising out of this use shall not be at the Owner's expense.

## 1.46 FIRE INSURANCE

The Contractor shall maintain fire insurance acceptable to the Owner, with standard extended coverage endorsement, in the joint names of the Owner and the Contractor to a total no less than eighty percent (80%) of the total value of the Work done and material delivered to the site, payable to the Owner and Contractor as their respective interests may appear, and protecting each in such terms as will preclude subrogation claims by the insurer against anyone of the insured there under.

In the event of a loss, the Contractor shall act on behalf of the Owner and themselves for the purpose of adjusting the amount of such loss with the insurer. On completion of such an adjustment, the Contractor shall repair the damage and complete the Work, and shall be entitled to receive from the Owner, in addition to any sum due under the Contract, the amount at which the Owner's interest has been appraised in the adjustment, to be paid as the Work of restoration proceeds and in accordance with the Consultant's certificates. Damage shall not affect the right and obligations of either party under the Contract except as aforesaid, and except that the Contractor shall be entitled to such reasonable extension of time for the completion of the Work as the Consultant may decide.

## 1.47 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall comply with the provisions of the Occupational Health and Safety Act, Statutes of Alberta, 1980, Chapter 0-2, and amendments thereto and regulations there under, and shall at all times ensure that all equipment and manpower at the worksite shall comply with the requirements of the said Act and regulations there under. The Contractor shall be the Prime Contractor, general representative and agent of the Owner for the purposes of insuring compliance with safety regulations for themselves. In the event that the worksite of two or more prime Contractors coincides, it shall be the responsibility of the prime Contractor of this Contract to liaise with all other prime Contractors and jointly develop a health and safety system or process for the affected worksite.

The Contractor shall at all times during the continuation of this Contract with the Owner observe all the provisions of the Labour Relations Act, Workers' Compensation Act, Employment Standards Act and the Occupational Health and Safety Act as well as rules and regulations pursuant thereto. In the event the Contractor fails to comply with the said Acts and any regulations there under, and the Owner is required to do anything or take any step or pay any sums to rectify such non-compliance, the Owner may subtract the costs of such rectification from any monies owing to the Contractor. In situations where two Contractors are on site during portions of the Work the Underground Contractor will be deemed the Prime Contractor. Once the Underground Contractor has Substantially Performed their Work, notified the Consultant of their position and vacated the site, the Prime Contractor will revert to the Road Contractor.

## 1.48 BOND

The Contractor, prior to the signing of the Contract, shall furnish a Contract Performance Bond from an acceptable Surety company in the amount of fifty percent (50%) of the total Contract amount covering the faithful performance of a Contract.

The Contractor shall supplement the Performance Bond with a Labour and Material Payment Bond in the amount of fifty percent (50%) of the total Contract price.

Both Bonds shall include the value of the Goods and Services Tax. The Bond shall remain in force after completion of construction for a minimum of two (2) years.

When the Contract sum is increased, the Contractor shall advise the Surety to have the Bonds amended to cover this additional amount.

## 1.49 MAINTENANCE OR WARRANTY PERIOD

If at any time after the date of the Construction Completion Certificate, and prior to the granting of the Final Acceptance Certificate, any portion of the Work requiring repair by reason of faulty material, or workmanship, or failure of backfill material(s) by means of settlement, or failure to meet specifications, the Owner shall notify the Contractor that such repairs are necessary and shall define the amount and nature of Work to be done in order to make repairs. This shall include any Work identified prior to the Final Acceptance Certificate and not yet repaired.

If the Contractor does not make repairs within ten (10) days after such notice, delivered either in person or by mail, the Owner shall have the right to purchase materials and employ men and equipment necessary to execute such repairs. All invoices that are reflective of the Work undertaken will be forwarded to the Contractor. The Contractor will be required to pay all invoices within thirty (30) days or have the amount reduced from the Contract, Surety or any other monies owed. In the case where immediate restoration of services are required, then the Owner may arrange for the immediate restoration of services and charge to the Contractor or their Surety the cost of such repair.

Should the Contractor fail to complete all Maintenance or Warranty repairs, whether or not notice is served by the Owner, before the expiry of the Maintenance or Warranty Period, and should the Owner elect not to undertake the repairs themselves, the Maintenance or Warranty Period shall automatically be extended an additional one (1) year from the original CCC date with all terms and conditions of the Maintenance or Warranty obligation remaining in effect and shall be inclusive of additional failures that may develop in the additional period.

## 1.50 CONTINGENCIES

When called for in the Contract Documents, the Contractor shall include contingencies in the calculation of the tender sum as required in the Schedule of Quantities. Expenditures from these allowances shall be made only upon the written authority of the Consultant. The unexpended balance shall be deducted from the final Contract amount.

## 1.51 CHANGES IN THE WORK

The Owner may as the need arises, order changes in the Work by additions, deletions, modifications or variations without invalidating the Contract and without notice to the Contractor's Surety. The value, if any, of such changes shall be taken into account in ascertaining the amounts of the Contract sum. Notification and authorization of such changes shall be by Owner approved Change Orders or Add-Delete Work Orders.

All such Work shall be executed under the conditions of the Contract supplemented where necessary for varying conditions.

Add-Delete Work shall be at the tendered unit prices as directed by the Consultant. Extra Work authorization may be supplemented by a Field Memorandum. The Value of any Extra Work shall be determined as per *Section 1.52 - Extra Work* Advisement of the Bonding Company, for significant increases in the value of the Contract Sum due to changes in Work, shall be the responsibility of the Contractor as per ***Section 1.48 - Bond***.

## 1.52 EXTRA WORK

Extra work includes Work not specified in the Contract or of a class not included in the Contract but Work that is required to achieve the intent or scope of the Contract.

The Contractor must carry out extra work ordered by the Consultant in writing. Only extra work as ordered in writing by the Consultant will be paid for. The Extra Work can be ordered by the Consultant in the form of an Add/Delete Work Order, Change Order or similar.

Payment will be made at the unit prices in the Contract, or if, in the opinion of the Consultant, there is no applicable Contract unit price, at the new unit prices or lump sums agreed to by both the Owner and the Contractor. If there are no applicable or new unit prices or lump sums then payment will be made as detailed in the remainder of this section. Prior to any extra work being done all costs and quantities for labour, equipment and materials must be approved by the Consultant in writing.

**1. Labour**

For all labour directly involved in the extra work, the Contractor will be paid:

i) As per the rates provided by the Contractor as part of their tender submission in Section 1.6 of the Information Submittal Forms or
ii) where not provided in the previous, the actual cost of labour including the wages at the scale being paid on the Contract Work, and including payments made to, or on behalf of the workers, for holiday pay, Workers' Compensation Board assessment, insurance and pension payments, plus 20 % of this total.

**2. Equipment**

For each piece of equipment used directly in the extra work, including all vehicles and power tools but excluding small tools, the Contractor will be paid:

i) the rates provided during the tender in **Section 1.7 of the Information Submittal Forms**;
ii) the rates shown in the Equipment Rental Rates Guide and Membership Roster as issued by the Alberta Roadbuilders and Heavy Construction Association;
iii) for third party equipment rental accounts, the rates invoiced by the third party, provided these rates were approved by the Consultant prior to the commencement of the Extra Work; or
iv) at the agreed price or rates as stated in the Consultant's extra work order.

**3. Equipment Rental Rates Guide and Membership Roster**

The applicable Equipment Rental Rates Guide and Membership Roster is the latest version in effect at the time of tendering identified as "*Equipment Rental Rates Guide and Membership Roster, an Alberta Roadbuilders and Heavy Construction Association Publication*."

If the Alberta Roadbuilders and Heavy Construction Association (ARHCA) revises its "Equipment Rental Rates Guide and Membership Roster" before the extra work on the Contract is commenced, the schedule containing the higher rates for a particular piece of equipment will apply.

**4. Purchased Material**

For all material purchased by the Contractor, solely to perform or to be incorporated into the extra work the Contractor will receive payment:

i) at the agreed price as stated in the Consultant's extra work order to which no allowance will be added; or
ii) if there is no agreed price, at the amount shown on the supplier's invoices to which 15% will be added.

**5. Supervision**

For supervision required directly for the extra work operation, the Contractor will be paid the actual cost of superintendent's or foreman's wages at the scale being paid on the Work, including statutory payments made to them or on their behalf for holiday pay, Workers' Compensation Board assessment, insurance and pension payments, plus 20 % of this total.

If the supervisory personnel is also engaged on Work other than the extra work, only that portion attributable to the extra work will be paid for by the Owner.

**6. Transportation of Workers and Equipment**

The vehicles used in the transportation of the workers required exclusively for the extra work are considered equipment and will be paid for as provided in **GC *Section 2 - Equipment*** for the period for which the vehicles are required. The transportation of heavy construction equipment hauled or otherwise moved to the project exclusively for the extra work, or when necessary from separated points on the Site to the location of the extra work, will be paid for at the applicable rates in accordance with **GC *Section 2 - Equipment***, provided that the means of transporting the equipment has been previously authorized by the Consultant.

**7. Payment for Extra Work**

The compensation provided in this section is payment in full for all charges including any and all indirect costs, overhead and profit, and for the use of small tools for which no rental is allowed.

The Contractor is required to submit its request for payment for extra work before the fifteenth calendar day of the month following that in which such extra work was performed. The Contractor must provide supporting documentation acceptable to the Consultant, giving details as to dates, quantities, rates, third party invoices and any other information as necessary.

Each day, on which Extra Work is being done, where the Work being performed is hourly based and not quantity based, the Contractor shall submit to the Consultant a statement in triplicate of the man-hours, equipment rental hours and materials used. Each copy shall be signed by the Consultant; one copy shall be returned to the Contractor, the second copy being the Consultant's field copy and the third copy used in calculating the actual costs of the Extra Work.

When the Extra Work being performed is done so concurrently with the previously contracted Work and the Contractor indicates that the Extra Work not impact their construction schedule, there will not be an allowance for an adjustment to the Completion Date for the Extra Work.

When the alternative occurs, the Extra Work is performed consecutively and the Contractor indicates that adjustments to the construction schedule are required, there will be an allowance for an adjustment to the Completion Date for the Extra Work. The Completion Date will be extended an additional day for each full work day the Contractor's forces are performing the Extra Work to the satisfaction of the Consultant. The Contractor must ensure that the forces allocated to perform the Extra Work are representative of the Work required to be performed.

The Performance Bond shall be extended to cover Extra Work and the Maintenance or Warranty period shall apply to this Work.

**8. Unauthorized Work**

Any Work done by the Contractor on its own initiative, which is beyond the lines, grades, or descriptions shown on the Plans and Specifications or established by the Consultant, or without required notification, will be considered as unauthorized and will not be paid for.

Upon order of the Consultant, unauthorized Work must be remedied, removed or replaced by the Contractor at its expense, in a manner acceptable to the Consultant.

Should the Contractor fail to comply promptly with any order made under this section, the Owner may in addition to its other rights and remedies under the Contract, cause unauthorized Work to be remedied, removed or replaced, and deduct the costs incurred from any money due or to become due to the Contractor.

## 1.53 INSPECTION OF WORK

The Contractor shall allow the Consultant, and County representatives access and provide adequate facilities for access to any part of the Works at all times.

If the specifications, Consultant's instructions, laws, ordinances, or any public authority requires any Work to be specially tested or approved, the Contractor shall give the Consultant, and County advance notice of their preparedness for such inspections, and if the inspection is by an authority other than the Consultant, of the date fixed for such inspection.

The Consultant shall inspect the Work promptly and without causing unreasonable delay to the Contractor. Extra payment will not be made to Contractor for delay occasion by any inspection, and extension of completion time will not be allowed for delay resulting there from.

On request by the Consultant, or County, the Contractor shall open for inspection any part of the Work that has been covered up. If the Contractor refuses to comply with such a request, the Owner may employ other persons to uncover the Work.

If the Work is found to be in accordance with the Contract requirements, then the cost of uncovering and recovering the Work shall be borne by the Owner. If any of the Work was uncovered by the Contractor in contravention of the Consultant's instructions, or if the uncovered Work is found not to be in accordance with the Contract requirements, then the cost of uncovering the Work shall be charged to the Contractor.

The acceptance or the lack of comment on the part of the Consultant, of methods of construction employed by the Contractor shall not relieve the Contractor of any responsibility of any errors therein and shall not be regarded as an acceptance of responsibility for the Work done by the Contractor.

## 1.54 PROGRESS PAYMENT AND CERTIFICATES

The Contractor will provide the Consultant with an Application for Progress Payment on the 25th day of each month in which the Contractor has a progress claim. The application must be clear and concise with:

a) all reference items in agreement with the contracted Schedule of Quantities; and
b) all quantities and amounts in agreement with previous Progress Payment Certificates;

Within five (5) business days of receipt of the Application for Progress Payment, the Consultant will review the application and provide the Contractor with their recommended Progress Payment Certificate. The Contractor must either provide the Consultant with a corresponding invoice in the amount identified within the Progress Payment Certificate or contact the Consultant directly to discuss any perceived discrepancies. The Contractor is to note that interim Progress Payments are estimates of the Work completed for the time period identified upon the certificate. The Consultant will not release a Progress Payment Certificate to the Owner without being provided with an Application for Progress Payment and a supportive invoice from the Contractor in agreement with the recommended amount.

Where unit prices apply, payment will be calculated on the basis of the tendered prices and the units of Work completed as determined by the Consultant. Where a lump sum price applies, payment will be calculated on the basis of the Consultant's estimated percentage of Work completed.

Ninety percent (90%) as per the Builders' Lien Act or ninety percent (90%) as per the Public Works Act of the value of Work, including Extra Work and less deductions up to and including the last day of the preceding month, less the aggregate of previous payments, will, with the exception of the final progress payment which will be paid in accordance with the section pertaining to final progress claims of the General Conditions, become due and be payable by the Owner to the Contractor on or about the thirtieth (30th) day of each month. The Owner will retain the balance of the value of the Work done in compliance with the requirements of the Builders' Lien Act or the Public Works Act, depending upon which Act is stipulated in the Special Conditions.

The monthly estimates shall not bind the Owner in any manner in the preparation of the final estimate of the Work done, but shall be construed and held to be approximate only, and shall in no case be taken as an acceptance of the Work or as a release of the Contractor from their responsibility therefore.

## 1.55 PAYMENT WITHHELD

The Owner may withhold or nullify the whole or part of any progress payment to the extent necessary to protect itself from loss on account of one (1) or more of the following:

a) That the Contractor is not making satisfactory progress in the opinion of the Consultant;

b) That defective Work is not being remedied at all, or in the alternative, in a manner satisfactory to the Consultant. The Owner shall be entitled to retain from the payment a sum equal to two (2) times the value of any defective Work, which value shall be determined by the Consultant;

c) That the Contractor has only partially completed the work associated to an item or items in the contract, the Owner shall be entitled to retain from the payment a sum equal to the percentage of total contract cost identified below for the components/aspects listed:

    a. Lot Grading – 2%
    b. Sanitary Sewer System Video Inspection – 1%
    c. Service Connection System Video Inspection – 1%

d. Storm Sewer System Video Inspection – 1%
e. Pressure Testing of the Water Distribution System – 1%
f. Turbidity, Chlorination and Bacteriological Testing of the Water Distribution System – 1%
g. Infrastructure Installation – Grade and Build – 1%
h. Project Record drawing set – 2%
i. Materials Testing – 2%

d) That there exists unsatisfied claims for damages caused by the Contractor to anyone employed on the site or in connection with the Work;

e) That lawful affidavit(s) of claim of lien exist as per current Builders' Lien Act of Alberta, if applicable;

f) That lawful letter(s) of claim exist as per the current Public Works Act of Alberta, if applicable;

Funds used for payment withheld are to be from those owed to the Contractor for work completed and allocated for progress. Upon release of the Lien Holdback (described below), the previously allocated Lien Holdback funds become part of the general progress payment and may be withheld for known deficient work.

## 1.56 PAYMENT ON SUBSTANTIAL PERFORMANCE

Pursuant to the provisions of the Builders' Lien Act, if the Contractor or a Sub-Contractor issues a Certificate of Substantial Performance relating to their Contract or sub-contract a major lien fund shall thereby be created as of the date of such certificate.

Upon the issuance of a Certificate of Substantial Performance, the Consultant shall within ten (10) days of receipt of such certificate, determine whether the Work of the Contractor or Sub-Contractor has in fact been Substantially Performed.

If the Consultant determines that the Work of the Contractor or Sub-Contractor has in fact been Substantially Performed to their satisfaction, the Consultant shall recommend that the Owner make payment of the holdback existing as at the date of the issuance of the Certificate of Substantial Performance, in so far as that holdback relates to the Work done by the Contractor or Sub-Contractor as the case may be.

Forty-six (46) days after the date of the issuance of the Certificate of Substantial Performance the Owner will pay the holdback existing as at the date of the issuance of the Certificate of Substantial Performance that relates to the Work of the Contractor or Sub-Contractor as the case may be. Such payment should be made only if:

a) the Consultant has recommended such payment in accordance with paragraph c) of this paragraph; and

b) no liens or claims of lien are filed or registered against the lands or premises on which the Works are being done; and

c) the Contractor or Sub-Contractor as the case may be has filed with the Consultant a certificate from the Workers' Compensation Board certifying that all assessments due from the Contractor or Sub-Contractor as at the date of the Certificate of Substantial Performance have been paid; and

d) The Contractor or Sub-Contractor as the case may be has filed a statutory declaration with the Consultant declaring that all claims for the supply of materials and labour or other claims arising directly or indirectly on account of the Works have been fully paid. Such declaration shall be made after issuance of the Certificate of Substantial Performance and prior to payment; and

e) Any payment made by the Owner pursuant to this paragraph shall be received by the Contractor or Sub-Contractor as the case may be in trust for the Persons who provided Work or furnished materials to the Contractor or Sub-Contractor, to the extent that the Contractor or Sub-Contractor owes money to such Persons, all in accordance with Section 16.1 of the Builders' Lien Act.

## 1.57 RELEASE OF DEFICIENCY HOLDBACK

The Contractor must provide the Consultant with the required documentation and/or arrange for an inspection of the corrected deficient work. Release of the Deficiency Holdback shall occur once the associated deficiency work has been deemed completed by the Consultant and/or the respective governing municipality/utility. The deficiency holdback can be released in whole or in part, depending upon the status of the work.

## 1.58 RELEASE OF LIEN HOLDBACK

Release of Holdback shall be as per the following Acts, which so ever is specified in the Special Conditions as applicable to the Contract. For Work completed under either Act, release of holdback payment will be made only if:

a) the Consultant has recommended such payment; and

b) no liens, claims of lien, or claims as applicable to the Public Works Act or the Builders' Lien Act, are filed or registered against the lands or premises on which the Works are being done; and

c) the Contractor or Sub-Contractor as the case may be has filed with the Consultant a certificate from Workers' Compensation Board certifying that all assessments due from the Contractor or Sub-Contractor as at the date of the Substantial Performance Certificate or the CCC, as per the applicable Act, have been paid; and

d) The Contractor or Sub-Contractor as the case may be has filed a Statutory Declaration with the Consultant declaring that all claims for the supply of materials and labour or other claims arising directly or indirectly on account of the Works have been fully paid. In the case of the Builders Lien Act, such declaration shall be made after issuance of the Substantial Performance Certificate but prior to request for payment.

Any payment made by the Owner pursuant to this section shall be received by the Contractor or Sub-Contractor as the case may be in trust for the persons who provided Work or furnished materials to the Contractor or Sub-Contractor, to the extent that the Contractor or Sub-Contractor owes money to such persons, all in accordance with Section 16.1 of the Builders' Lien Act and the applicable section(s) in the Public Works Act, whichever is applicable.

**1. Builders' Lien Act**

a) Pursuant to the provisions of the Builders' Lien Act, if the Contractor or a Sub- Contractor issues a Certificate of Substantial Performance relating to their Contract or sub-contract, a major lien fund shall be thereby created as at the date of such certificate.

b) Upon the issuance of a Certificate of Substantial Performance the Consultant shall within ten (10) days of receipt of such certificate, determine whether the Work of the Contractor or Sub-Contractor has in fact been Substantially Performed.

c) If the Consultant determines that the Work of the Contractor or Sub-Contractor has in fact been Substantially Performed to their satisfaction, the Consultant shall recommend that the Owner make payment of the holdback existing as at the date of the issuance of the Certificate of Substantial Performance, in so far as that holdback relates to the Work done by the Contractor or Sub-Contractor as the case may be.

d) Forty-six (46) days after the date of the issuance of the Certificate of Substantial Performance, the Owner will pay the holdback existing as at the date of the issuance of the Certificate of Substantial Performance as that relates to the Work of the Contractor or Sub-Contractor as the case may be.

**2. Public Works Act**

Ninety-one (91) days after the date of the issuance of the CCC, the Owner will pay the holdback existing as at the date of the issuance of the CCC that relates to the Work of the Contractor.

## 1.59 REMOVAL OF LIENS AND/OR CLAIMS

The Contractor shall:

a) prior to requesting the release of holdback, remove at their own expense all affidavits of claim of lien, or letters of claim filed or registered against the lands, premises, or project upon which the Work is done or is being done, or reasonable evidence of the probable filing of such affidavits (or an affidavit) of claim of lien or of filing or registration of liens (or a lien); and

b) indemnify and save harmless the Owner from liability arising out of any such actions.

## 1.60 CONSTRUCTION COMPLETION CERTIFICATE AND ACCEPTANCE

Upon completion of construction, all portions of the Work shall be pre-inspected carefully by the Contractor who shall satisfy themselves that every item has been completed and that the whole Works are in a clean and tidy condition, and ready in all respects for Acceptance by the Owner and/or the Municipality. The Contractor shall then, by writing to the

Consultant and completing a Construction Completion Inspection Request form, request a Construction Completion Inspection of the Works. At this point the Consultant will schedule the Construction Completion Inspection requiring the following parties' attendance:

a) Consultant as the Owner's representative;
b) Project Manager;
c) Consultant's Field Inspector; and
d) Contractor's Superintendent;
e) Municipality's Representative;

If the Work being inspected was that completed by the Sub-Contractor then the Sub-Contractor's superintendent must also be in attendance.

On receipt of a written recommendation from the Consultant, the Municipality, subject to its acceptance of this recommendation and provided the Contractor has complied with all the provisions of the Contract, shall issue the CCC. Such recommendation will only be made by the Consultant following:

a) A full and detailed inspection of the Work has been undertaken and documented by the Consultant.

b) A written statement from the Contractor has been received by the Consultant, detailing the nature and estimating the dollar value of any and all claims and demands of the Contractor for Extra Work, quantity adjustment, unit rate application, or otherwise in connection with payments to be received from the Owner. Should the Contractor determine that no such claims or demands exist; the Contractor is nonetheless obligated to so advise the Consultant by a written statement stating the same. Failure to submit either statement will suspend the issuance of the CCC.

If the Contractor considers that all the deficiencies are minor, and the Contractor believes that they cannot rectify all the deficiencies promptly for reasons beyond their control other than for reasons of inclement weather and / or season shutdown, the Contractor may in writing request a conditional acceptance of the Works at the Construction Completion level. Such a request must state a time frame / date by which deficiencies shall be totally completed and such request shall be submitted to the Consultant, but shall not be considered by the Consultant until the statement referred to in b) above has been submitted. Subject thereto, the Consultant will consider the request, and will make such recommendation thereon to the Owner as the Consultant shall in their absolute discretion think fit.

The Owner will consider the Consultant's recommendation and will decide in its absolute discretion how far, if at all, and on what terms to accede to the Contractor's request. Without limiting the generality of the foregoing, the Owner will require assurance that acceding to such request will not prejudice its rights under any applicable lien legislation or bonds.

## 1.61 FINAL PROGRESS PAYMENT

The final progress payment will represent the total payment due to the Contractor for the completed Work. The final Progress Payment Certificate will be prepared and recommended for payment by the Consultant following a written statement from the Contractor to the Consultant stipulating their agreement to all quantities and all claims or demands for Extra Work, quantity adjustment, unit rate application, or otherwise in connection with payments to be received from the Owner.

The final progress payment will be made by the Owner within thirty (30) days following the date of receipt of the written statement by the Consultant. No holdback will be retained if the holdback retention period has expired and the required holdback release documentation has been received.

The Final Progress Payment Certificate may be suspended for the following reasons:

a) Failure of the Contractor to submit such statement as required in the first paragraph in this section within sixty (60) calendar days of the CCC will be deemed as acceptance of the authenticity and correctness of all payments and all payments shall be deemed as final. However, the final progress payment will be suspended until the Contractor's intentions are known as per b).

b) In the event the Contractor fails to appropriately communicate with the Consultant in writing, or still disagrees with the payment or payments after due negotiation with the Consultant, and upon expiration of the sixty (60) day period as per a), the Contractor must state their intentions in writing within seven (7) calendar days and by registered mail. Failure to do so will result in the revocation of the CCC. Pending the Contractor's disclosure, the Owner may continue to suspend the payment.

## 1.62 FINAL ACCEPTANCE OF THE WORK

Sufficiently prior to expiration of the Maintenance or Warranty period, all portions of the Work shall be pre-inspected carefully by the Contractor who shall satisfy themselves that the whole Works are in a clean and tidy condition, and ready in all respects for Acceptance by the Owner and/or the Municipality. The Contractor shall then, by writing to the Consultant and completing a Final Acceptance Inspection Request form, request a Final Acceptance Inspection of the Works.

If deficiencies are identified during the Contractor pre-inspection of the Work, the Contractor must inform the Consultant and the Consultant will then accompany the Contractor on an Initial Final Acceptance Inspection of the Works. The Initial Final Acceptance Inspection must occur prior to the Contractor commencing repairs on the site deficiencies. During the inspection the Consultant will compile a list of the deficiencies and indicate the party responsible for the remediation. The Consultant will provide the Contractor with an Initial Final Acceptance Inspection Form within two (2) days of said inspection, listing the deficiencies and the party responsible for each of the deficiencies remediation. The Contractor will then have ten (10) days to repair all deficiencies listed on the form. Deficiencies listed that indicate the remediation as a third party responsibility must be repaired by the Contractor but the Contractor will be compensated for the repairs as per contracted unit rates.

If the Contractor does not make repairs within ten (10) days after such notice, delivered either in person or by mail, the Owner shall have the right to purchase materials and employ men and equipment necessary to execute such repairs. In the case where immediate restoration of services is required, then the Owner may arrange for the immediate restoration of services. The cost of the deficiency repairs will be charged to the Contractor or the Contractor's Surety. Once all deficiencies are remediated the Consultant will schedule the Final Acceptance Inspection requiring the following parties' attendance:

a) Consultant as the Owner's representative;
b) Project Manager;
c) Consultant's Field Inspector; and
d) Contractor's Superintendent;
e) Municipality's Representative;

On receipt of a written recommendation from the Consultant, the Municipality, subject to its acceptance of this recommendation and provided the Contractor has complied with all the provisions of the Contract, will issue the FAC fourteen (14) days after expiration of the Maintenance or Warranty period.

Such recommendation will only be made by the Consultant following the complete inspection of the Works.

Record drawings, if applicable, must be provided prior to the issuance of the FAC.

No Certificate other than the Final Acceptance Certificate shall be deemed to constitute acceptance of any Work or any other matter in respect of which it is issued or be taken as an acceptance of the due performance of the Contract or of any part thereof, or the accuracy of any claim or demand by the Contractor or of additional or varied Work having been ordered by the Owner nor shall any other Certificate conclude or prejudice any of the powers of the Consultant.

## 1.63 CLAIMS AND DISPUTE RESOLUTION

In the case of any dispute between the Owner and the Contractor or any questionable decision of the Consultant subject to Arbitration, during the progress of the Work or in no event after final payment has been made and accepted, either party hereto shall be entitled to give to the other notice of such dispute and to demand Arbitration thereof. Such notice shall be in writing and shall specify the matter to be submitted to Arbitration, and in it said party shall name a person to act as Arbitrator; thereupon within ten (10) days after receipt of such notice, the other party by written notice shall choose a name of second Arbitrator; the two (2) Arbitrators so chosen shall forthwith jointly select a third Arbitrator, giving Written Notice to both parties of the choice so made, and fixing a place and time for meeting not later than thirty (30) days thereof, at which both parties may appear and be heard, touching such controversy relating to the matters aforesaid. In the case the two (2) Arbitrators shall fail to agree upon a third Arbitrator, or in case the party notified of the demand for Arbitration shall fail to name the second Arbitrator within the time stipulated, such third Arbitrator, or such second and third Arbitrators as the case may be, upon application of either party, of which the other shall be given notice shall be named pursuant to the statutes of the Province of Alberta. The parties may agree to submit the matter to one (1) Arbitrator, whose award shall be as binding as that of the three (3) Arbitrators.

The submission and arbitration proceedings shall be under the provisions of the Arbitration Act of the Province of Alberta. The decision of the said Arbitrator(s) shall be made in writing within thirty (30) days after the completion of hearings thereon, and signed by a majority of them.

Arbitration proceedings shall not take place until after the completion or alleged completion of the Work except:

a) on a question of Certificate for Payment; or

b) In the case where either party claims that the matter in dispute is of such nature as to make immediate Arbitration proceedings necessary while the evidence is available.

The Arbitrator(s) in their decisions shall determine which party shall bear all or a portion of the cost and expenses of the Arbitration including the fees of the Arbitrator(s) and the said Arbitrator(s) may in such decision allocate such costs and expenses between the parties in such amounts as they deem fair and equitable by reason of such decision.

## 1.64 CERTIFICATE OF RECOGNITION (C.O.R.)

The Contractor is encouraged to register in a Certificate of Recognition (C.O.R.) Program under the Alberta Construction Safety Association appropriate to their industry as an Active Member or an Associate member.

The Prime Contractor, to qualify for Work values of $ 50,000.00 or more, shall provide a Certificate of Recognition identifying them as an active member of the Alberta Construction Safety Association.

A Sub-Contractor, to qualify for Work values of $ 25,000.00 or more, shall provide a Certificate of Recognition identifying them as an active member of the Alberta Construction Safety Association.

Contractors and/or Sub-Contractors not complying with this section, will not be accepted as qualified to compete on Municipality Work or Work on Municipality projects.

## 1.65 EARLY USE OF THE WORK BY OWNER

At the Owner's sole discretion and upon Notice to the Contractor, the Owner may take early possession of and use any completed or partially completed portions of the Work before Substantial Performance of the Work has been achieved. Such early possession and use by the Owner shall not constitute an acceptance of any portion of the Work which is not in accordance with the requirements of the Contract.

If early use of particular completed or partially completed portions of the Work is expressly provided for in the Contract Documents then the Contractor will not be entitled to any adjustments of Contract Time or Contract Price as a result of such early use in accordance with those provisions.

If early use of particular completed or partially completed portions of the Work is not expressly provided for in the Contract Documents, early possession or use of those portions of the Work shall be considered a Change and the provisions of *Section 1.51 - Changes in the Work* shall apply.

In the event that the Owner takes early possession of and uses any completed or partially completed portions of the Work before Substantial Performance of the Work has been achieved, then the Warranty Period for the portions of the Work that are under early possession or use by the Owner shall commence on the date the early possession and use commences.

Under no circumstances shall possession and use of completed or partially completed portions of the Work be considered a Change if such possession and use commences after the expiry of the Contract Time. The Owner shall not be liable for any costs incurred by the Contractor after the expiry of the Contract Time as a result of the Owner's possession and use of completed or partially completed portions of the Work.

## 1.66 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall comply with the provisions of the Occupational Health and Safety Act, SA 2017 c O-2.1, and amendments thereto and regulations thereunder or any successive legislation and shall at all times ensure that all subcontractors at the Site shall comply with the requirements of the said Act and regulations thereunder. The Contractor shall be the general representative and agent to the Owner for the purposes of ensuring compliance with safety

regulations for both itself and subcontractors. Contractor shall bring to the attention of subcontractors the provisions of the Occupational Health and Safety Act and regulations thereunder.

For the purposes of the project, Contractor is assigned the role of Prime Contractor for the Site and is responsible for ensuring compliance with the Occupational Health and Safety Act by all employers and employees on the Site.

The Contractor shall have either full certification in the Alberta Labour approved "Certificate of Recognition" (C.O.R.) Program appropriate to their industry or a Temporary Letter of Certification (T.L.C.) issued by the Alberta Construction Safety Association or other appropriate industry association.

## 1.67 CANADIAN ANTI-SPAM LEGISLATION

In accordance with Canadian anti-spam legislation, each Party consents to contact the other Party and its personnel through electronic messages relating to the Project. Following completion of the Project, either Party may withdraw consent by contacting the other Party.

## 1.68 COVID-19 PANDEMIC

COVID-19 Pandemic – The Contractor and the Owner acknowledge the presence of the COVID- 19 virus in Canada, and other jurisdictions forming part of the supply chain for materials and labour required for the Project (the "COVID-19 Pandemic").

Known Impacts – The consequences and impacts of the COVID-19 Pandemic existing as of the date of this Agreement including, without restriction:

1. orders, directives and recommendations of any Government Authority issued up to and including the date of this Agreement, and respecting public health or other requirements related to response to and prevention of infection by the COVID-19 virus;

2. impacts to availability of labour or materials required in order to carry out the Work, arising from the COVID-19 Pandemic.

3. any the impacts of self-isolation/quarantine or regulated quarantine as regulated by the Province.

(the "Known Impacts"), are known to the Contractor and to the Owner, have been accounted for by the Contractor within the Construction Schedule, as well as the Contract Price.

Without restricting any of the foregoing, and notwithstanding anything contained within the Construction Contract, the Contractor and the Owner covenant and agree as follows:

Known Impacts – the Contractor shall not be entitled to any Claims for changes to the Contract Schedule, or Claims for compensation, due to any Known Impacts;

1. No Reimbursement – the Contractor shall not be entitled to any reimbursement of any costs, losses ,expenses or any other form of damages incurred by the Contractor necessitated by a suspension or delay under Section *1.30 - Temporary Suspension of Work*, where the suspension is due to a compliance with any order, directive or recommendation of any Government Authority related to the COVID-19 Pandemic, and/or due to any Known Impacts of the COVID-19 Pandemic;

2. No Suspension – notwithstanding anything contained within **GC *1.30 - Temporary Suspension of Work***,, a suspension of the Work because of a compliance with any order, directive or recommendation of any Government Authority related to the COVID-19 Pandemic, and/or because of any Known Impacts of the COVID-19 Pandemic, whether ordered by the Owner or the Consultant or not, shall not be deemed to be a suspension of the Work within the meaning of **GC *1.30 - Temporary Suspension of Work***;

**3.** Delay – in the event that a "stop work" or similar order is issued by a court of Governmental Authority as a result of the COVID-19 Pandemic and provided that such order was not issued as the result of an act of fault of the Contractor or any Person for whom the Contractor is responsible at Law, and provided the Consultant determines that there is no concurrent delay that has been caused by the Contractor or any Person for whom the Contractor is responsible at law, the Owner may, acting reasonably but at its sole and absolute discretion,

may extend the Contract Time by the number of Business Days from the date of an issuance of any stop work order to the issuance of a notice to proceed. , other than the foregoing and notwithstanding anything contained within GC 47 DELAY, no extension of the Contract Time shall be made and no adjustment in the Contract Price shall be made for any delay caused by a compliance with any order, directive or recommendation of any Government Authority related to the COVID-19 Pandemic, and/or caused by any Known Impacts of the COVID-19 Pandemic, whether ordered by the Owner or the Consultant or not, shall not be deemed to be a suspension of the Work within the meaning of **GC *1.30 - Temporary Suspension of Work*.**

4. No Claims from Extensions Granted – notwithstanding anything contained within ***Section 1.31 - Adjustment of Completion Dates***, unless otherwise agreed to by the Owner, the granting of an extension of the Contract Time due to compliance with any order, directive or recommendation of any Government Authority related to the COVID-19 Pandemic, and/or due to any Known Impacts of the COVID-19 Pandemic, shall not give the Contractor grounds to make any Claims whatsoever for additional payment.

5. No Cumulative Effect – notwithstanding anything contained within ***Section 1.31 - Adjustment of Completion Dates***, no extension of Contract Time shall be made and no adjustment in the Contract Price shall be made for any delay Claim that is based on the concept of the cumulative effect of orders, directives or recommendations of any Government Authority related to the COVID-19 Pandemic, and/or due to any Known Impacts of the COVID-19 Pandemic.

6. Self-Isolation/Quarantine – the Contractor shall not be entitled to any Claims for changes to the Contract Time, or Claims for compensation, due to any requirement that an employee of the Contractor or any Subcontractor are required to self-isolate or quarantine as a result of diagnosis or potential diagnosis as being COVID-19 positive;

7. Contractor Termination – the Contractor shall not be entitled to terminate this Agreement pursuant to **GC *1.36 - Contractor's Right to Terminate Contract***, and/or **GC *1.30 - Temporary Suspension of Work***, in the event that Work is stopped or delayed pursuant to **GC *1.30 - Temporary Suspension of Work***, where the suspension is due to an order, directive or recommendation of any Government Authority related to the COVID - 19 Pandemic, and/or due to any Known Impacts of the COVID-19 Pandemic;

8. Mitigation – notwithstanding anything contained within the Construction Contract, the Contractor's mitigation plan respecting the known Impacts of the COVID-19 Pandemic will include the following:

    a. Schedule correction;
    b. Labour replacement;
    c. Public protection.

**END OF SECTION**

## SP 1. WORK SITE

.1 The work site for this project is located West of Fort Vermilion.

.2 The pertinent drawings for this project are listed in Section 00 00 15 “List of Drawings” and entitled:

**Mackenzie County**
**River Road Subdivision**

## SP 2. SCOPE OF WORK

.1 The project is generally comprised of constructing a subdivision with fifteen (15) lots. This will include, but not be limited to, clearing and grading of the site (including lots), a gravel access road, ditch drainage and storm culverts. Water and sanitary installation including lot servicing and all associated features.

.2 The Work is to be conducted in accordance with the plans and specifications, including, but not limited to, the following:

.1 Clearing and site grading
.2 Removals
.3 Earthworks
.4 Road construction
.5 Drainage construction including ditching and culverts
.6 Sanitary sewer construction including gravity main and manholes
.7 Watermain construction
.8 Lot Servicing
.9 Traffic accommodation
.10 Landscaping
.11 Geotextiles and Erosion Control
.12 Coordination with shallow utilities

.3 Each bidder acknowledges that he has examined the site and the surrounding areas, and is familiar with the site, environmental and geotechnical conditions and or any other restrictions which could affect or limit the Contractor’s operations.

## SP 3. KEY MILESTONE DATES

.1 Contractor shall commence work upon award.

.2 The Contractor shall submit shop and installation drawings and schedules, **15 days** from being awarded the contract, showing all information necessary to explain fully the design features, appearance, function, fabrication, installation and the use of system components in all phases of operation.

.3 The site shall be available for the commencement of installation on **June 01, 2022**, subject to the work by others being completed.

.4 Reach Substantial Performance of the Work by **September 30, 2022**.

.5 The Warranty Period for this Contract is two (2) years.

## SP 4. LOCAL CONDITIONS AND INCIDENTAL ITEMS

.1 The Contractor is to ensure that they are familiar with the site and any restrictions that they may encounter during the construction process.

.2 If excavation shoring, additional workspace, or any other construction process, material, procedures, etc. which are not specifically addressed as line items in the project Schedule of Quantities, the Contractor is to accept that these are not individual pay items and/or extra pay items. These items are to be considered as incidental to the specific Works to which they are associated. No additional compensation will be provided for any of the above or alike. The Contractor must include these requirements within their associated unit rates.

## SP 5. REFERENCE STANDARDS AND AGREEMENTS FOR THE WORK

.1 The current version of the **Mackenzie County General Municipal Improvement Standards (GMIS)** are to be followed for all construction unless otherwise noted in these specifications or on the Contract drawings. The absence of a reference to the **Mackenzie County General Municipal Improvement Standards (GMIS)** does not imply non-compliance or relieve the Contractor of their duty to review and follow these standards.

.2 Should any discrepancy or ambiguity arise between any of the clauses in current **Mackenzie County General Municipal Improvement Standards (GMIS)**, provincial and federal standards, or amendments or additions thereto, and any other clause in any other part of the Contract Documents, the maximum conditions will govern and to be included in the Contract price.

.3 All Work shall be compliant with the requirements outlined in the Agreements made with the Owner.

.4 The specifications are integral with the drawings which accompany them, neither is to be used alone. The Contractor is responsible to make good any item or subject omitted from one but implied on the other. The Contractor is to refer to specific sections of the Contract drawings which outline specific requirements for the Work and determine what actions are to proceed.

.5 Failure to review and incorporate the drawing notes/requirements and highlight perceived discrepancies will not relieve the Contractor of any responsibility under the Contract

## SP 6. FEES, PERMITS, CERTIFICATES

.1 Contractor to obtain all permits, licences and certificates required for execution of the Work and shall provide inspection authorities with such plans and information as may be required.

.2 All related costs necessary obtain permits, licences and certificates and to coordinate with authorities is considered incidental to the Work and no additional payment shall be made.

## SP 7. COMPLETION DATES AND LIQUIDATED DAMAGES

.1 The construction site shall be available for mobilization starting on **June 01, 2022,** subject to the completion of work by others and scheduling of all fit-out work.

.2 With respect to **GC Section 1.32 "Failure to Complete on Time"**, The County of Mackenzie will be implementing a hard Completion Date of September 30, 2022.

.3 Liquidated damages in relation to the Completion Date for the subdivision completion will be accrued at a rate of One Thousand Five Hundred Dollars **($1,500)** per calendar day in respect of Mackenzie County's costs for staff and consultants.

.4 Any work completed after the Completion Date will receive a penalty of **$1,500.00** a day and continue until work is completed

.5 The parties agree that the risk of liquidated damages of the Contractor under this Contract is limited, and will not exceed the sum of Sixty Thousand dollars **($60,000.00)**

.6 The parties agree that any loss or damage that is covered by the insurance coverage provided for under this agreement will be dealt with in the usual manner for processing insurance claims and will not be affected by or limited by the Liquidated Damages provided for in this Special Provision.

.7 For any breach of Contract for which liquidated damages, or a liquidated damage rate has not been specified, Mackenzie County may claim damages on the basis of the actual loss sustained.

.8 The **September 30th, 2022,** completion day will not be adjusted because of weather and the contractor's schedule should ensure that all scheduling considerations are made to complete the project before this date.

## SP 8. PROTECTION

.1 Further to the requirements of related Article of the General Conditions:

.1 The Contractor shall protect the public, both vehicular and pedestrian, from sand, dust, construction material, air-born contaminants, exhaust fumes, noise, air blast, concrete debris, equipment, tools and all other construction hazards at all times.

.2 Any damages arising from the field operations or equipment of the Contractor shall be the sole responsibility of the Contractor.

.3 The Contractor shall follow all environmental requirements as outlined by the appropriate environmental authority.

.4 The Contractor shall clean up any tracking or spillage immediately. Should the Contractor fail to do so, The Owner may clean up the tracking or spillage at the Contractor's expense.

## SP 9. WORK IN THE VICINITY OF UTILITIES

.1 "Utilities" shall mean:

.2 Utilities and facilities which are located on, in or near the right-of-way and/or Work area which may be affected by the construction, and shall include but not be limited to pipelines, drainage works, irrigation works, waterworks, sewage works, power facilities, telephone facilities, cable facilities and related appurtenances.

.3 It is the Contractor's responsibility to locate all underground and above ground utilities and pipelines. The Contractor is responsible for the cost of repairing any gas lines, telephone cables, utilities, pipelines or any infrastructure damaged as a result of the construction.

.4 The known utility companies, owners, and operators and their representatives are as follows:

**TELUS Communications Co.**
Phone: (780) 310-CUTS
Hit TELUS Line: (780) 310-2887
Craig Burskov: (780) 538-8549

**ATCO Electric**
9602 123 Street
Grande Prairie, AB T8W 0J7
Phone: (780) 538-7089
Emergency: (800) 668-5506
Anna Lacasse:(780) 538-7018

**Northern Gas Lights Coop**
Jack Eccles
Phone: (780) 928-3881
Email: nlgc@telusplanet.net

**Mackenzie County**
Caitlin Smith
Phone: (780) 927-3718
E-mail: csmith@mackenziecounty.com

.5 The companies named within these Special Provisions have advised that they potentially have utilities located within the limits of this project. Any adjustment Work may be carried out concurrently with the construction operations.

.6 Dependent upon the magnitude and degree of complexity of the adjustments required, the Work may not be completed until the latter stage of their operations. In that event, the Contractor shall be required to arrange their operations clear of those utilities until the required adjustments are completed and permission to construct in their vicinity is received. The Contractor shall not have any claim for compensation or damages against the Owner for any stoppage, delays, inconvenience or damage sustained by them due to any interference from the utilities or infrastructure, or the operation of moving them.

.7 The Contractor, in undertaking any Work near existing power lines shall comply with the Regulations under the Electrical Protection Act.

.8 It shall be the responsibility of the Contractor to coordinate his work and schedule with these utilities and any other contractors as may be required to work on the project

.9 The Contractor shall conform to Provincial, Municipal and Utility regulations during construction in proximity to utility structures. This is to include all required utility crossing agreements.

.10 It shall be the responsibility of the Contractor to coordinate his work and schedule with all utilities and any other contractors as may be required to work on the project

.11 The Contractor shall provide all coordination with Utility owners as required before and during construction.

.1 The Contractor shall notify the authority having jurisdiction over each utility one (1) week in advance of his anticipated plan to carry out work in the vicinity of that utility. He shall also arrange, if required, for a representative of the utility company to be present at the time the work is being carried out, at no cost to the Owner.

.2 Make arrangements with all utility companies for protection of pipelines, conduits, drainlines, wiring, and other structures, whether underground, on the surface, or overhead, and satisfy the company that the methods or operations are effective

.3 Indemnify and save harmless the owners of these existing utilities from any loss or damage which may be suffered by reason of the operations of the Contractor in the performance of this Contract. Disturbances or damage resulting from the Contractor's operations shall be remedied at the Contractor's expense and to the satisfaction of the Consultant. .

.12 All related costs to the coordination with utilities and the above noted items are considered incidental to the Work and no additional payment shall be made

## SP 10. SITE PROTECTION, CLEAN UP AND DAMAGE

.1 The Contractor shall keep the worksite properly and efficiently cleaned for the duration of the construction. The Contractor shall be responsible for all damage that may occur as a result of improper cleaning, or damage to the worksite.

.2 The Contractor shall be responsible for the protection of surfaces or equipment provided by other Contractors during the period of installation, testing, commissioning, and training.

## SP 11. NOTIFICATION OF BUSINESSES AND RESIDENCES

.1 The Contractor shall issue construction bulletins **within ten (10) working days** before construction commences for any impacted residences, businesses, school boards and emergency services. The bulletin should include the starting date and ending date of construction, the scope of the Work, the name of the Contractor including the name and contact information of the site superintendent and the Consultant.

.2 The Contractor shall issue construction bulletins to affected residents and businesses prior to any construction activities that result in a change to access or service. **Ten (10) days' notice** shall be given to all affected residents and businesses prior to any interruption in service.

.3 Copies of all notices and bulletins shall be sent to The Consultant and The Owner.

## SP 12. TEMPORARY WATER SERVICING

.1 During the course of the Work, it will be necessary to disconnect water and sewer servicing to **Two (2)** residences as the new water and sewer mains are installed. The Contractor shall provide temporary servicing to each property such that no interruption in serving is encountered by these residences.

.2 The Contractor shall supply all required materials and labour to install the temporary servicing system with new pipe, including all required valves and connection points for the systems.

.3 The Contractor shall submit a Temporary Servicing Plan (TSP) to the Consultant for review and approval at least **Five (5) days** prior to commencement of the Work.

.4 The temporary servicing system shall meet all standard flushing, disinfection, and testing procedures required for typical water mains and all applicable sanitary sewer specifications.

.5 All costs necessary to provide, operate temporary servicing and to remove and reinstate after completion is considered incidental to the Work and no additional payment shall be made.

## SP 13. EXISTING PROPERTY ACCESS

.1 The Contractor shall maintain all existing property accesses and intersections and shall conduct construction operations in a manner which provides the least interruptions. No Intersections or property accesses shall be removed or otherwise made impassable until new access or temporary measures have been constructed. Contractor shall keep all existing property accesses open and operational until new accesses are ready for traffic. **Five (5) days** notice shall be given to all affected residents prior to loss of normal access routes.

## SP 14. GEOTECHNICAL AND SOILS INFORMATION

.1 The Contractor is advised that geotechnical investigations and reports have been completed by **Beairsto & Associates Engineering & Survey Ltd (BASE)** and are provided with these Bid documents.

.2 The above noted report forms an integral part of the Bid. The Contractor shall familiarize himself with the purpose and limitations of the noted report when interpreting subsurface conditions reported therein for Bid preparation purposes. Any information pertaining to soils and/or borehole logs are furnished by the Owner as a matter of general information only, and borehole descriptions of the logs are not to be interpreted as descriptive of conditions other than those of the boreholes themselves. Neither the Owner nor the Consultant assumes responsibility for any use or interpretation of the geotechnical assessment on the part of the Bidder, or any assumptions or decisions based thereon.

.3 The Contractor at his own cost, as the Contractor deems necessary, shall conduct additional testing during any phase of the project that he determines is necessary in order to complete the project and the Contractor shall advise The Consultant prior to commencement and obtain all necessary permits and approvals required for such testing at his own cost

## SP 15. ACCOMMODATION OF PUBLIC TRAFFIC

.1 The Contractor shall execute the Work in such a manner as to minimize any inconvenience which may be caused by operations to the general public using pathways and roads within the Project area, and to provide all safety measures, as an incidental part of the Contract.

## SP 16. INSURANCE AND INDEMNITY

.1 The Contractors' attention is specifically drawn to **GC 1.45 "Insurance"** and **GC 1.43 "Indemnity**", outlining the requirements for Contractors' Insurance and Indemnity, respectively. The Contractor shall be required to furnish proof of insurance, including all specific requirements of these clauses, prior to commencement of the Work.

## SP 17. CONTRACTOR'S SITE SUPERVISION/AVAILABILITY

.1 The Contractors' attention is specifically drawn to **GC 1.11 "Supervision"** outlining the requirements for commitment and availability of the Contractors' key personnel. The Owner retains the right to suspend or terminate the Contract in the event that the Contractor is unable to provide or keep on the worksite the key personnel identified therein.

.2 The Contractor shall make efforts to ensure that key personnel are available and responsive to The Consultant or The Owner at all times during the project.

## SP 18. GEOTECHNICAL QUALITY CONTROL RESPONSIBILITIES AND NOTIFICATIONS

.1 The Contractor is advised that all roadway, pipe installation, embankment compaction and imported material testing for Quality Control (QC), including establishing all required proctor, Atterberg limits and organic content tests data will be the responsibility of the Contractor. Together with the monthly progress claim and revised project schedule, the Contractor will submit to The Consultant a compaction report signed by his Geotechnical Consultant certifying that all backfilling and compactions during the period complies with Contract Specifications. The cost of all quality control as required by the Contractor shall be covered under the cash allowance for Geotechnical Materials testing.

.2 The Contractor is advised that **Beairsto & Associates Engineering & Survey Ltd (BASE)**. has been engaged to conduct the Owner's Quality Assurance (QA) Testing as a separate and additional function to The Contractor QC. BASE shall provide periodic testing for concrete, gravel, suitability of soils, moisture content, and material densities for the Owner. QA testing shall be coordinated by The Contractor with The Consultant.

.3 The Contractor is responsible to provide at least **forty-eight (48) hours** advance written notice to The Consultant for providing an on-site material tester to check densities, test concrete, gravel or any other construction material requiring testing. The Contractor shall be aware that availability of an on-site material tester cannot be guaranteed should an advance notice of less than forty-eight (48) hours is given by The Contractor. No additional compensation and/or time extension shall be granted to The Contractor for any delays to the Work arising from short notice(s).

.4 The Contractor is advised that the provision of Quality Assurance (QA) Testing on behalf of The Consultant shall not be construed to relieve the Contractor of applicable Quality Control (QC) requirements.

## SP 19. MATERIAL REUSE OR REMOVAL AND DISPOSAL

.1 The Contractor is to note that all items and material identified for disposal such as concrete/gravel are to be removed from the project and shall be disposed of by The Contractor at his own expense, at an off-site location located by The Contractor and approved by The Consultant.

.2 All work associated with finding a legal and safe location for disposal of materials, including, but not limited to, tipping fees, hauling costs, any additional charges incurred for the disposal of material outside normal operating hours, shall be considered incidental to the Work performed.

## SP 20. HYDROVAC REQUIREMENTS

.1 The Contractor shall be responsible for satisfying himself as to the location and disposition of all underground and surface utilities in the project area at all times. The identification of certain hydrovac location requirements by the Consultant shall not be construed to remove the ultimate responsibility of the Contractor for locating and protecting all utilities in the project area. The execution of hydrovac works to determine the location of utilities, where necessary, shall be incidental to and included within the bid price of the unit of work for which it is applicable.

.2 Hydrovaccing shall include all equipment, labour and materials, for the hydrovaccing, the material disposal, backfilling of holes and coordination with utility owners.

## SP 21. DEWATERING

.1 Dewatering is defined as lowering and/or controlling any type of groundwater levels during construction in order to create a dry work environment. This is defined also as diverting and/or draining any type of surface water as rainfall or snowmelt runoff to facilitate the installation of the proposed Works.

.2 The dewatering system shall be of sufficient capacity to lower and maintain the groundwater table to an elevation at least 500 mm below the bottom of the excavation and to allow material to be excavated in a reasonably dry condition.

.3 The discharge of water containing clay, silt, sand or other deleterious material into Municipal sewer, watercourse or natural water body shall be prohibited without the proper approvals. Where the conditions so require, provide flocculation tanks, settling basins, filtering or other treatment facilities to remove suspended solids or other deleterious materials and testing water prior to discharge. It is The Contractor's responsibility to confirm that discharged water meets Alberta Environment criteria and to arrange for the proper disposal permit and adhering to the conditions of the permit.

.4 Remove any collected water in excavation and make good any excavated surfaces damaged by such water by further excavation and building up to required elevations with 50 mm gravel or other adequately compacted materials, equal to the originally specified conditions.

.5 Divert surface water away from excavations.

.6 All related costs to the above-mentioned works are considered incidental to the Work and no additional payment shall be made.

## SP 22. PRIME CONTRACTOR

.1 Responsibility for Work Site Safety will be the Contractor, "Prime Contractor":

.2 The Contractor shall, for the purposes of the Occupational Health and Safety Act (Alberta), and for the duration of the Work of this Contract:

.1 Be the "Prime Contractor" for the "Work Site", and
.2 Meet all requirements of the Occupational Health and Safety Act and Regulations, Workers Compensation Board legislation, the Fire Code legislation and all other applicable laws that govern work place safety.

.3 The Contractor shall direct all Subcontractors, Sub-Subcontractors, Other Contractors, Employees, Suppliers, Workers and any other persons at the "Work Site" on safety related matters, to the extent required to fulfill its "Prime Contractor" responsibilities pursuant to the Act, regardless of:

.1 Whether or not any contractual relationship exists between the Contractor and any of these entities, and
.2 Whether or not such entities have been specifically identified in this Contract.

.4 Safety Certification: Safety Certification is a condition of contract award; the Contractor is required to maintain a valid Certificate of Recognition (COR) for the duration of the Work of this Contract.

.5 At no time shall Mackenzie County or its representatives assume the role of Prime Contractor during this project

## SP 23. LANDOWNER'S RELEASE

.1 Should the Contractor enter privately owned land for any reason during the execution of the Work for the project, the Contractor is required to obtain the landowner's permission and a "Landowner Release" outlining the landowner's acceptance of the condition of which the property has been left for any disruption to private property. In addition, the Contractor shall indemnify and hold harmless the Owner and their Consultant for any claims the landowners may have regarding the Contractor's Work on private lands.

.2 The Contractor shall provide a copy of the agreement between the Contractor and the landowner(s) to the Consultant

## SP 24. STANDARDS, SPECIFICATIONS AND GUIDELINES

.1 The Contractor will perform all the Work, supply and install all materials and equipment to the manufacturer's specifications and must adhere to these Standards, Specifications and Guidelines outlined in the Bid/contract documents. Additionally, they will adhere to the latest version of all pertinent sections of the following specification manuals:

.1 Mackenzie County General Municipal Improvement Standards (GMIS)
.2 Alberta Transportation Standard Specifications for Highway Construction (ATHC);
.3 Alberta Transportation's Standard Specifications for Bridge Construction
.4 Alberta Transportation's Design Guidelines for Erosion and Sediment Control for Highways
.5 ATCO Electric Standards – Underground Residential Distribution Systems Guidelines (AES);
.6 Telus Outside Plant Practices and Standards (TOPPS);
.7 Alberta Electrical Utility Code (AEUC);
.8 CSA Standards for Overhead and Underground Systems;
.9 ASTM Standard F1962-11 (ASTM);

.2 The specifications are integral with the drawings which accompany them, neither is to be used alone. The contractor is responsible to make good any item or subject omitted from one but implied on the other. The Contractor and Consultant are to refer to specific sections of the Contract drawings which outline specific requirements for the Work and determine the actions are to proceed. Failure to review and incorporate the drawing notes/requirements and highlight perceived discrepancies will not relieve the Contractor of any responsibility under the Contract

.3 All designs, construction activities, provided materials and testing shall conform to the identified standards as noted above and good engineering practices.

.4 If a particular item or construction activity is not specifically identified that does not relieve the contractor of the responsibility to perform the work as per these documents and as per standards of practice.

.5 Additional clarifications, specification omissions, adjustments, modifications and changes can be found in within this section of the Bid/Contract documents. Note that items not addressed in the Special Provisions are to be considered as regular line items that follow the standards, specifications and guidelines contained within the manuals listed above.

## SP 25. CONTRACTOR DOCUMENTS

.1 Construction Schedule

.1 The Bidder is required to complete the Bidder's Construction Schedule. The Construction Schedule must identify the start date and completion dates for construction.

.2 Upon award of the Contract and prior to the pre-construction meeting the Contractor shall submit for review, to the Consultant a construction schedule in the form of a bar chart showing all the principle phases of the work. Failure to do so may result in a delay the start of his work and will not alter the completion date. The Contractor shall also ensure that sufficient forces are applied to the project at all times so that benchmark dates are achieved. The Contractor will be required to attend a construction meeting with the Owner and Consultant to review, discuss and/or amend the schedule. The Contractor shall update the schedule and submit it to the Consultant on a bi-weekly basis prior to each construction meeting.

.3 All costs associated with the meeting, schedule preparation, mobilization and demobilization shall be considered incidental to the work described elsewhere and no extra payment will be made for claims in this regard.

.4 The Contractor will not be permitted to commence work prior to the start date identified in the Contractors' construction schedule without two weeks prior notice to the Owner and the Consultant. This is to allow the Owner to, either; undertake pre-installation activities, or to provide time for the contract signing, Contractor submission of Traffic Accommodation Strategy plans and ECO plans.

.2 Traffic Accommodation

.1 The Contractor shall submit a Traffic Accommodation Strategy (TAS) to the Consultant for review at least seven (7) calendar days prior to the pre-construction meeting, in accordance with Alberta Transportation manual "Traffic Accommodation in Work Zones and its Urban Supplement" – current edition.

.2 Failure to meet the approved traffic accommodation plan will result in a Work Stoppage Order in accordance with ***GC 1.10 "The Consultant and the Contractor"*** if, in the opinion of the Consultant, there exists a danger to life or property.

.3 Public traffic and access to businesses shall be accommodated, without interruption, on a 24 hour per day basis. The Contractor shall provide the Consultant with detailed plans and drawings of the proposed traffic accommodation measures at least **one (1) week** prior to the pre-construction meeting. Stage construction may be incorporated.

.4 The Contractor must assign a capable individual(s) that will be on duty 24hrs a day to perform maintenance and regular inspection of the Traffic Accommodation signage and features during both working and non-working hours.

**The County will not entertain any Traffic Accommodation Strategy that closes any roadways surrounding the sites.**

.5 Traffic Accommodation shall include the submission of a TAS, supply and erection of all necessary signs, sign inspection, preparation and submission of daily sign log sheets, notification and media advertising, flag persons and detours required or as specified by the Consultant to provide safe, efficient traffic control during the construction period in accordance with these specifications: Alberta Transportation Specifications and the Transportation Association of Canada Uniform Traffic Control Devices Standards. The Consultant may recommend partial, or if necessary, negative payment if traffic control or maintenance is not completed satisfactorily, or if the Contractor fails to conform to the specification.

.6 It is the Contractor's responsibility to inform the Police Department, Fire Department, Ambulance Services and Transit Department of the proposed Work schedule and changes to the schedule, including times of Work and activities required on the various street locations within the City and County.

.7 The Contractor shall provide and maintain flag persons, traffic signals, barricades, and lights/lanterns, as may be required, to direct the flow of equipment used in performance of Work and protect public traffic. Make arrangements with local governing authorities when these facilities will disrupt the normal flow of public traffic.

.3 Traffic Accommodation During Construction

.1 The Contractor shall make suitable provisions, including the use of detours, to accommodate all vehicular and pedestrian traffic safely and with a minimum of inconvenience through or around the Work. Road closures will not be permitted as part of the construction methods.

.2 The Contractor shall provide, install, maintain and protect traffic control devices, such as signs, barriers, fences and lights, at his own expense. No changes to signal operation will be permitted. If temporary signals are utilized as part of Work sequencing, signal timings and sequencing must be similar to existing until new signals are operational.

.3 The Contractor shall provide the required number of Alberta Infrastructure & Transportation certified flag persons, attired in current standard clothing, during all periods of active equipment operations that may affect normal traffic operations.

.4 The Contractor shall control his operations to ensure emergency vehicle operations and normal school bus operations are not interfered with, and shall ensure that there is uninterrupted access to developments along the project(s).

.4 Parking

.1 Parking will not be permitted on site; with the exception of construction vehicles properly equipped with flashing beacons and appropriate insurance as stated in ***GS Section 4.45 " Insurance"***. The Contractor shall not allow workers to park on streets and roads if disruptive to public traffic flow or access to site.

.2 Preparation and implementation of an acceptable TAS will be considered incidental to the work performed and no additional payment will be provided. This will include all materials, labour, equipment, supervision and any other incidentals necessary to complete the Work.

.5 Environmental Construction Operations Plan (ECO Plan)

.1 The Contractor shall be responsible for temporary erosion and sediment control measures as an incidental part of this Contract. Without limiting generality of the foregoing, there is a preference to employ strong erosion control measures at source locations (i.e. - tackifying of exposed slopes, use of excavated check dams) rather than sediment control measures at downstream locations (i.e. - silt fencing.) Sediment control measures should be focused at key locations such as open ditches or watercourses.

.2 Any issues or concerns regarding the erosion and sediment control shall be addressed to the Consultant at the pre-construction meeting, prior to commencement of the Work.

.3 The Contractor shall prepare and implement an ECO Plan for each phase of the project, in accordance with Alberta Infrastructure & Transportation's manual entitled "ECO Plan Framework," the latest version. The Plan shall detail temporary environmental control measures that the Contractor shall undertake to comply with all applicable legislation, regulations and approvals during the course of construction and during "winter shut down". The ECO Plan shall not cover any permanent or long term environmental, or erosion control devices or Work specified in the Contract.

.4 The Contractor shall submit the ECO Plan to the Consultant at least seven (7) calendar days prior to the pre-construction meeting. The Consultant will review the ECO Plan and communicate any concerns to the Contractor at least three (3) calendar days prior to the pre-construction meeting. The Contractor shall address any issues or concerns regarding the proposed the ECO Plan to the satisfaction of the Consultant prior to the commencement of the Work.

.5 The finalization of the Plan, to the mutual satisfaction of the Consultant and the Contractor, does not constitute an approval or assurance from the Consultant or the Owner that the temporary environmental control measures detailed in the ECO Plan are sufficient to ensure compliance with all applicable legislation, regulations or conditions of approval. The Contractor is ultimately responsible to ensure all measures used on the project are sufficient to ensure compliance with all applicable authorities. This may mean increasing the number of installations, providing alternate devices or modifying procedures.

.6 Preparation and implementation of an acceptable Environmental Construction Operations Plan (ECO Plan) will be considered incidental to the work preformed and no additional payment will be provided. This will include all materials, labour, equipment, supervision and any other incidentals necessary to complete the Work.

.7 The Contractor shall make regular inspection of erosion and sediment control devices installed on site. As a minimum, site inspections on active sites must be conducted at least every seven (7) days during dry weather and at critical times when precipitation or snowmelt may be capable of causing erosion (inspection must occur during or within twenty-four (24) hours of significant precipitation or snowmelt). The Contractor shall maintain written reports of such inspections and make such reports are available to The Consultant upon request.

.6 Notice of Accident

.1 In the event of any accident caused by or related to the work being carried out under this contract, the Contractor shall, in addition to compliance with provincial or local regulation, submit to the Consultant within **two (2) calendar days** of its occurrence, a full and complete written report of the accident, including names of persons involved, nature and character of injury and property damage.

.7 Approved Materials

.1 The Contractor shall supply the Consultant with a full material list for all material to be installed. No deviation from the approved material shall be permitted without the written approval of the Consultant. Unapproved material shall be removed and replaced with approved materials to the satisfaction of the Consultant, at the Contractor's expense. The Contractor shall supply the material list (with compliance certificates) to the Consultant **fourteen (14) calendar days** prior to installation.

## SP 26. RIGHT–OF–WAY RESTRICTIONS

.1 The Contractor shall ensure that his forces and those of all subcontractors shall be under a duty to use due care to ensure no private property is entered on or damaged in the prosecution of the work. Without restricting the generality of the foregoing, the Contractor shall, at his own expense, make provisions as necessary to avoid any such damage. The Contractor agrees to hold harmless the County of Mackenzie, its Consulting Consultant, their employees, and agents from any and all third-party claims, demands, or actions which may result from damages caused on private lands due to entrance by the Contractor, negligence, wilful harm, or crimes by the Contractor or the Contractor's employees or agents.

## SP 27. HOURS OF WORK

.1 Hours of Work conform to the Mackenzie County applicable Bylaws. Any work outside of these hours will need prior approval.

## SP 28. SURVEYS

.1 The Contractor shall, as an incidental part to this Contract, be responsible for providing all survey services on the project, including, but not limited to, measurement of quantities for payment, laying out and establishing all baselines and elevations as required for the Work using existing benchmarks, monuments, the establishment of points, lines and grades, for all project works.

.2 To facilitate the provision of survey services by the Contractor, the Consultant may provide the following digital information:

.1 LandXML files for centreline alignment and profiles.
.2 LandXML files for lip of gutter or edge of pavement alignments and profiles.
.3 LandXML files for pipe alignments and profiles.
.4 CSV Point files for elevations shown on the Pavement Elevation plans.
.5 AutoCAD DWG of roadway linework base including pathways and sidewalks.

.3 It is the responsibility of the Contractor to verify digital information against the hard copy Issued for Construction drawings. In the event of a discrepancy between the digital information and the drawings, the latter shall prevail

## SP 29. CONTRACTOR TO PROTECT MANHOLES AND CATCHBASINS FROM CONSTRUCTION DEBRIS

.1 The Contractor shall ensure that during any repairs or while working in the vicinity of Catch Basin or Manholes (Sanitary or Storm) that the catch basin or manhole remain free of debris. The contractor shall supply and place some form of protection within or around manholes, catch basins, or water valve stands to protect from construction debris. The type of protection shall be identified within the ECO plan and shall be “industry standard”. Construction debris includes, but is not limited to, soil (silt, sediment, clay, etc.), gravel, asphalt, concrete, concrete washout, topsoil, garbage, etc. The contractor shall not proceed with any work until such protection is in place and accepted by the Consultant. The protection shall be maintained by the Contractor at all times and inspected at a minimum weekly, especially after any rainfall event and provide documentation of the inspection to the Consultant on a weekly basis. Any sediment and debris collected around the protection device shall be cleaned and disposed of in accordance with the manufacturer’s specifications.

.2 If debris gets into a sanitary or storm manhole the contractor must notify the Consultant, in the case of debris in sanitary manhole to determine the means by which the manhole shall be cleaned. All cost associated with the cleaning of the manhole will be charged to the Contractor. If debris get into a storm manhole or catch basin the contractor will be responsible to have the manhole cleaned to the satisfaction of the Consultant.

## SP 30. PIPELINE OR UTILITY CROSSINGS

.1 Pipeline or Utility crossings are incidental to the trenching unit rates unless otherwise specified. Should an outside party mandate hydro-vacuuming of the lines as the sole procedure for uncovering a line or as part of an application requirement, only those disbursement costs will be borne by the owner. These costs will be billed directly to the owner at no mark-up.

## SP 31. AUGER, TRENCHING, BACKFILLING AND RESTORATION

.1 It is the Contractors choice of trenchless methodology to utilize for the installation of the watermain as identified in the drawings. The Contractor is responsible for installing the infrastructure to be compliant with the standards and specifications identified within the contract documents. Contractors are not to submit a Bid package if they are not able to install the infrastructure as indicated on the detailed design drawings.

## SP 32. TABLE OF QUANTITIES / UNITS

.1 Work items listed in the schedule of quantities shall be paid for as per the indicated unit rate. This unit rate shall be full compensation for all materials and labour necessary for the work, including, but not limited to, the supply of all materials and equipment necessary, installation, testing and final acceptance of the finished work item as per the conditions of the Contract and referenced specifications.

.2 If a particular item or construction activity is not specifically identified in the schedule of quantities then this item is assumed to be incidental to the Work and no payment shall be made for that item.

## SP 33. SCHEDULE A – SANITARY SEWER SYSTEM

.1 Material Submission

.1 The Contractor must provide a list of all materials and shop drawings to be used for the project specific to the infrastructure associated to the Consultant's review. Only materials in this regard that have been approved by the Consultant can be used and incorporated into the works. It is at the risk of the Contractor to proceed with the materials procurement process prior to receiving approval from the Consultant for the materials list and shop drawings provided. This process is considered incidental to the project and no additional compensation will be provided to the Contractor for adjustments in materials and/or project delays.

.2 The Contractor is to ensure that all materials and procedures used meet the requirements of **Mackenzie County General Municipal Improvement Standards (GMIS)** and the standards in these specifications, whether expressly noted or not.

.2 Trenching and Backfilling

.1 Payment for Trenching and Backfilling shall be at the unit price per linear meter (LM) and shall be full compensation for all work necessary for the installation of sanitary sewer per depth class, including trench excavation, disposal of surplus excavated material, backfilling with approved material, reinstatement of structures impacted by the work to pre-construction condition and all other work and materials as noted in this section and on the Contract Drawings.

.3 Sanitary Sewer Pipe – Supply and Install

.1 Sanitary sewer will be measured horizontally from centreline of manhole to centreline of manhole in liner metres (LM) of each size and class of pipe supplied and installed. The unit price bid per meter for Sanitary Sewer shall be full compensation for all work necessary for the supply and installation of sanitary sewer per depth class, including all materials, labour and equipment, supply and installation of all pipe, fittings, the supply and placement of bedding, and related materials, laying and jointing, testing of the system, and all other work and materials as noted in this section and on the Contract Drawings.

.4 Riser for Video Inspection

.1 Measurement and payment for this item shall be at the unit price per each (ea.) as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete the work in accordance with Mackenzie County specifications

.5 Manholes – Supply and Install

.1 Payment for manholes shall be at the unit price per vertical meter (V.M.) shown in the Bid Form measured to the nearest centimetre. The measurement for payment will be from the lowest invert to the top of the manhole frame. The items included shall be the supply of all materials, the construction of the complete manholes, including base, steps, excavation, backfill and clean-up, and all incidentals necessary to complete the work in accordance with these specifications.

.6 Manholes – Remove and Dispose of Existing Manholes

.1 Payment for the "Remove and Dispose of Existing Manholes" shall be at the unit price per vertical meter (V.M.) shown in the Bid Form measured to the nearest centimetre. This shall include all work, equipment and materials associated the excavation and removal of these items, including, but not limited to, tipping fees, hauling costs, any additional charges incurred for the disposal of material outside normal operating hours, clean-up, and all incidentals necessary to complete the work in accordance with these specifications.

.7 Frames & Covers – Supply and Install

.1 Measurement and payment for this item shall be at the unit price per each (ea.) as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete the work in accordance with Mackenzie County specifications.

.8 CCTV Testing

.1 Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete the work in accordance with Mackenzie County specifications.

.2 Measurement and payment for this item shall be at the unit price per linear meter (LM) as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete the work in accordance with Mackenzie County specifications.

.9 Connection to Existing Systems - Bulkheads

.1 Payment for "Bulkheads" will be at the unit price for each (ea.) shown in the Bid Form. Such payment will be full compensation as required of all materials labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.10 Connection to Existing Systems – Break into Existing Mains

.1 Payment for "Break into Existing Mains" will be at the unit price for each incidence (ea.) shown in the Bid Form. Such payment will be full compensation for the locating of the existing system connection point, removal and installation as required of all materials, fittings, adapters, labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.11 Pipe System

.1 The contractor will need to clean the line prior to the commission of the lines. Swabbing or pigging may be utilized to complete the cleaning process. All Work and items included in this work are considered incidental and no additional payment will be made.

## SP 34. SCHEDULE B - WATER DISTRIBUTION SYSTEM

.1 Material Submission

.1 The Contractor must provide a list of all materials and shop drawings to be used for the project specific to the infrastructure associated to the Consultant's review. Only materials in this regard that have been approved by the Consultant can be used and incorporated into the works. It is at the risk of the Contractor to proceed with the materials procurement process prior to receiving approval from the Consultant for the materials list and shop drawings provided. This process is considered incidental to the project and no additional compensation will be provided to the Contractor for adjustments in materials and/or project delays.

.2 The Contractor is to ensure that all materials and procedures used meet the requirements of **Mackenzie County General Municipal Improvement Standards (GMIS)**.

.2 Trenching and Backfilling

.1 Payment for Trenching and Backfilling shall be at the unit price per linear meter (LM) and shall be full compensation for all work necessary for the installation of watermain per depth class, including trench excavation, disposal of surplus excavated material, backfilling with approved material, reinstatement of structures impacted by the work to pre-construction condition and all other work and materials as noted in this section, and on the Contract Drawings

.3 Water Main Pipe – Supply and Install

.1 Supply and installation of Watermain pipe in shall be paid for at the unit price bid per linear metre (LM) measured in place, through all valves and fittings for the Class of watermain indicated. This price shall be full compensation for all work necessary for the installation of watermains, including laying and jointing, supply and placement of bedding, testing, flushing and disinfection.

.2 Concrete for bedding, encasement of pipes, supports and thrust blocks are not to be measured separately and will be considered incidental to Work and no additional payment will be made.

.4 Water Main Pipe – Remove and Dispose of Existing Water Main Pipe.

.1 Payment for the "Remove and Dispose of Existing Water Main Pipe." shall be at the unit price per linear meter (LM) shown in the Bid Form measured to the nearest centimetre. This shall include all work, equipment and materials associated the excavation and removal of these items, including, but not limited to, tipping fees, hauling costs, any additional charges incurred for the disposal of material outside normal operating hours, clean-up, and all incidentals necessary to complete the work in accordance with these specifications.

.5 Valves – Supply and Install

.1 Supply and installation of valves in shall be paid for at the unit price bid per each (ea.) for the size of valves indicated. This price shall be full compensation for all work necessary for the supply and installation, including all necessary labour and equipment required to meet specifications. Valve Boxes shall be considered part of the installation of valves and there shall be no additional payment for valve boxes

.2 Supply and installation of "Blow of/Chlorine Injection Point" shall be paid for at the unit price bid per each (ea.)as indicated in the table of quantities. This price shall be full compensation for all work necessary for the supply and installation, including all necessary labour and equipment required to meet specifications.

.3 Payment for the supply of all materials and the installation of all valve box extensions will be the unit price for each length (ea.) shown in the Bid Form. Such payment will be full compensation for all materials, labour equipment, supervision and all incidentals necessary to complete the work in accordance with these specifications.

.6 Fittings – Supply and Install

.1 Measurement and payment for this item shall be at the unit price per each (ea.) item as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete and test the work in accordance with these specifications.

.7 Hydrants – Supply and Install

.1 Payment for the supply of all materials and the installation of all hydrants will be the unit price for each (ea.) shown in the Bid Form. Such payment will be full compensation for all materials (exclusive of hydrant extensions but inclusive of hydrant markers), labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.2 Measurement and payment for "Hydrant Extensions" shall be at the unit price per each (ea.) as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete the work in accordance with these specifications.

.8 Rigid Insulation

.1 Supply and installation of "Rigid Insulation" shall be paid for at the unit price bid per linear metre (LM) measured in place, for the thickness of insulation indicated. The type shall be Dow Styrofoam Hi - 40 insulation as indicated in the Mackenzie County General Municipal Improvement Standards (GMIS).

.2 This price shall be full compensation for all work, equipment and materials necessary for the supply and installation of the insulation to these specifications.

.9 Connections to Existing Systems

.1 Payment for "Break into Existing Watermain" will be at the unit price for each incidence (ea.) shown in the Bid Form. Such payment will be full compensation for the locating of the existing system connection point, removal and installation as required of all materials, fittings, adapters, labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.2 Note that blow-offs are included in the above even if they are to be utilized in the cleaning and disinfection process of the work.

.10 Testing

.1 Testing shall be as per AWWA standards unless otherwise specified. Source water to be utilized from the existing system upon approval or a potable water truck may be supplied. At all times the existing system is to be separated from the new system until all approvals are in place. The cost of all testing is to be included in the associated work item and no extra or additional payment will be made for testing.

## SP 35. SCHEDULE C – SERVICE CONNECTION SYSTEM

.1 Excavating, Trenching and Backfilling

.1 Payment for Excavating, Trenching and Backfilling shall be at the unit price per linear meter (LM) and shall be full compensation for all work necessary for the pipe installation per depth class, including trench excavation, disposal of surplus excavated material, backfilling with approved material, reinstatement of structures impacted by the work to pre-construction condition and all other work and materials as noted in the Contract Documents.

.2 Water Services – Supply & Install (c/w Bedding)

.1 The supply and installation of water services shall be paid for at the unit price bid per linear metre (LM) measured in place per each pipe class or size. This price shall be full compensation for all materials and labour necessary for the installation of service lines including disposal, excavation, supply and placement of bedding, all backfill, compaction and testing as required.

.2 Payment for "Reconnect Existing Water Service" will be at the unit price for each (ea) reconnection of existing services as indicated in the bid form. Such payment will be full compensation for the locating of the existing connection point, installation as required of all materials, fittings, adapters, labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.3 Sanitary Service - Supply & Install (c/w Bedding)

.1 The supply and installation of sanitary services shall be paid for at the unit price bid per linear metre (LM) measured in place per each pipe class or size. This price shall be full compensation for all materials and labour necessary for the installation of service lines including disposal, excavation, supply and placement of bedding, backfill, compaction and testing.

.2 Payment for "Reconnect Existing Sewer Service" will be at the unit price for each reconnection of existing services as indicated in the Bid form. Such payment will be full compensation for the locating of the existing connection point, installation as required of all materials, fittings, adapters, labour, equipment, supervision and all incidentals necessary to complete the work to these specifications.

.4 Water Service Fittings – Supply and Install

.1 Measurement and payment for these items shall be at the unit price per each (ea.) item as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete and test the work in accordance with these specifications.

.5 Sewer Service Fittings – Supply and Install

.1 Measurement and payment for these items shall be at the unit price per each (ea.) item as indicated in the Bid Form. Payment is inclusive of all materials, equipment, labour and incidentals necessary to complete and test the work in accordance with these specifications.

.6 Rigid Insulation – 100 mm

.1 Watermain / Sewer installed less than 1.2m from the top of the pipe to the ground surface shall be insulated with Dow Styrofoam Hi - 40 insulation, or approved equivalent. Thickness, width and installation to be as per the Mackenzie County General Municipal Improvement Standards (GMIS).

.2 Payment for this item shall be per linear metre (LM) of installed insulation including all materials and labour required.

.7 Shallow Utilities

.1 Payment for "Excavating, Trenching and Backfilling" shall be at the unit price per linear meter (LM) and shall be full compensation for all work necessary for all installation per depth class, including trench excavation, disposal of surplus excavated material, backfilling with approved material, reinstatement of structures impacted by the work to pre-construction condition and all other work and materials as noted in this section, and on the Contract Drawings

.2 Payment for "Underground Ducts for Road Crossings" shall be paid for at the unit price bid per linear metre (LM) measured in place per each duct size and type as indicated in the table of quantities. This price shall be full compensation for all materials and labour necessary for the supply and installation of the ducts including disposal, supply and placement of bedding, all backfill, compaction and testing as required.

## SP 36. SCHEDULE D - SITE WORKS

.1 Clearing and Grubbing

.1 Payment for Clearing and Grubbing will be at the Lump Sum Cost (LS) as indicated in the Bid Form. Such payment will be full compensation for all movement of this material exclusive of topsoil placement.

.2 Any material not utilized onsite for the remediation process upon the completion of the work is to be removed from the site to a location procured by the Contractor which is suitable for the disposal or use of the material. This excess material will not be paid under this line item – it will be compensated through waste excavation.

.2 Topsoil Stripping

.1 Payment for Site Grading – Topsoil Stripping will be at the unit price per cubic metre ($m^3$) as indicated in the Bid Form. This payment shall include but is not limited to, supply of material, labour and equipment, excavating, screening, hauling to any distance, stockpiling, the addition of fertilizer (if required), placement, spreading, grading and removal of any excess and unsuitable organic material, to be completed as required for the Work. Such payment will be full compensation for all movement of this material exclusive of topsoil placement.

.2 Any material not utilized on site for the remediation process upon the completion of the work is to be removed from the site to a location procured by the Contractor which is suitable for the disposal or use of the material. This excess material will not be paid under this line item – it will be compensated through waste excavation.

.3 Final quantities will be calculated by surveyed cross-sections

.3 Common Excavation

.1 Common material is considered as any excavated material that can be re-used and incorporated into the Works. This material must be used within the contract limits and be compacted to the requirements of the said area. Any materials identified onsite as extra is the responsibility of the Contractor to dispose of and is considered as Waste.

.2 It is the responsibility of the Contractor to ensure that all compaction is completed as per the referenced specifications. Payment for all work associated with common excavation will be included in the applicable unit price bid per cubic meter ($m^3$). This payment will be full compensation for all labour and equipment, excavating, hauling to any distance and stockpiling, backfilling, reloading, hauling and spreading, grading and compacting, and necessary remediation, and complete as required or the Work.

.3 Final quantities will be calculated by surveyed cross-sections

## SP 37. SCHEDULE E – ROAD WORKS

.1 Roadway Embankments

.1 Unsuitable Subgrade

.1 Any materials identified as unsuitable shall be the responsibility of the Contractor to dispose of. Payment measurement will be based on field measured quantities for material removed. This payment will be full compensation for all labour, equipment, tools, disposal costs and incidentals necessary to complete the Work.

.2 Subgrade Preparation

.1 After the roadway and/or trail is excavated the contractor shall pack and grade the subgrade to remove areas that are uneven or loosened during the excavation. In addition, the contractor shall ensure that the crowned (or cross fall) is graded properly ensuring drainage.

.2 During the embankment construction, materials shall be placed in successive uniform layers not exceeding 300 mm loose thickness. Each layer shall be compacted to a minimum of 98 % of Standard Proctor Maximum Density, with the earth materials field moisture content being maintained within +/- 2 % of the Optimum Moisture Content, unless stated otherwise. Only native or imported earth material approved by the Consultant shall be used for embankment construction

.3 Prior to placement of the granular materials, the subgrade should be proof-rolled to identify any soft areas. Subgrade areas, which may be determined to be structurally deficient through proof-rolling, should be strengthened by procedures to be evolved in the field.

.4 Payment shall be as per the bid item “Subgrade Preparation” in the Schedule of Quantities, based on a square meter ($m^2$) basis as measured in the field by the Consultant. Payment will be full compensation for labour, equipment, tools and all incidentals necessary to complete the Work.

.3 Woven Geotextile Fabric

.1 Payment for the supply of all materials and the installation of "Woven Geotextile Fabric" will be the unit price per square meter ($m^2$) of the material type as shown in the Bid Form. Such payment will be full compensation for all materials, labour, equipment, supervision, and all incidentals necessary to supply and install these items as noted on the Contract Drawings, as per these specifications and as per the manufacturers specifications.

.2 Surface Detail

.1 All granular materials used in this project will meet the Granular Base Course (GBC) will meet **Mackenzie County General Municipal Improvement Standards (GMIS)**. The Contractor shall pay particular attention to Section G.6. Construction of the GMIS.

.2 Payment for "Supply of Aggregates" will be as per the unit price bid in the unit price bid per tonne (t) in the unit price schedule measured in the field by the Consultant. Payment will be full compensation for all labour, equipment, tools and all incidentals required for the supply of all aggregates as listed in the table of quantities and as noted in these specifications.

.3 Payment for "Subgrade Excavation and Granular fill" will be as per the unit price bid per tonne (t) in the unit price schedule measured in the field by the Consultant. Payment will be full compensation for all labour, equipment, tools and all incidentals necessary to excavate and remove all soft material, placement of suitable material, compaction and testing as required per specifications.

.4 Payment of all "Gravel Surfacing" material will be as per the unit price bid per tonne (t) in the unit price schedule, per each gravel surfacing type, usage and class as noted and measured by the Consultant.

.1 This payment will be full compensation for all labour, equipment, tools and incidentals necessary to complete and test the gravel. In the case of the second year, the 50 mm topping shall also include all necessary grading and reshaping of the road to the approved profile.

.2 Contractor is to note that 100mm of gravel is to be placed in the first year and a 50mm resurfacing is to be placed in the second year.

.3 CSP Pipe Culverts

.1 Materials

.1 Culverts shall be corrugated steel or concrete reinforced Class III. Depth of cover shall meet the manufacturer's requirements, with a minimum of 300 mm.

.2 Construction

.1 All construction and supplied materials shall confirm to **Mackenzie County General Municipal Standards (GMIS).** In particular the contractor's attention is drawn to section G. 12 DRAINAGE AND CULVERTS of the GMIS.

.2 Excavation and Preparation of Base

.1 Excavation for the culvert base shall be to a depth of not less than 0.3m below the invert grade and shall be sufficient width to permit assembly of the pipe and the operation of compaction equipment on either side of the pipe. All soft, yielding or unsuitable material at this level shall be removed to a depth satisfactory to the Consultant. Excavated material shall be replaced with gravel or other acceptable material to provide a firm foundation of uniform density throughout the entire length of the pipe.

.2 On completion of excavation for the culvert base and the removal and replacement of any soft, yielding or unsuitable material the Contractor shall compact the exposed surface to uniform density. The Contractor shall then construct the culvert bed to the established elevation using gravel material or other material acceptable to the Consultant. The culvert bed shall be compacted in accordance with *AT Specification 2.3, Grading*. The width of the culvert bed shall be 3 times the culvert diameter or span. When the culvert installation is in rock, excavation for the culvert base shall be carried out to a depth of not less than 0.2 m below the invert grade.

.3 The width of the culvert bed shall be a minimum of 1.5 times the diameter or span of the culvert. Where gravel bedding or backfill is used, impervious, compacted clay cut-offs shall be constructed at both ends of the culvert as shown on Drawing CB6-2.4M1.

.3 Installation

.1 General

.1 The culvert shall be installed on the prepared base, true to the designed lines and grades unless otherwise established by the Consultant. Separate sections shall be securely joined together in accordance with the Manufacturer's instructions. Coupler bands shall be used for metal and polyethylene pipe and unless otherwise specified, rubber gasket type joints shall be prepared and made between sections of reinforced concrete culvert. At all coupling and joint areas and at areas of concrete pipe that have external bells, depressions shall be constructed in the culvert bed so that the pipe is uniformly supported along its entire length. The Contractor shall use due care when installing the culvert to avoid damaging the material. Damaged culvert materials shall be removed and replaced by the Contractor at his own expense.

.4 Backfilling

.1 General

1. Backfill under the haunches and immediately adjacent to the culvert extending from the culvert base up to an elevation of 30 percent of the vertical height of the culvert shall be comprised of select gravel or soil material, as directed by the Consultant. Backfill immediately adjacent to the culvert above this level shall be comprised of select soil material. All backfill material shall be free from frozen lumps and organic material. Backfill within 300 mm of the culvert wall shall be free from stones of diameter larger than 80 mm.

.5 All backfill material shall be placed in layers not exceeding 0.15 m in depth. Each layer shall be thoroughly compacted at optimum moisture content by means of pneumatic or other mechanical tamping equipment. Backfill and compaction layers shall be brought up simultaneously and evenly on both sides of the culvert filling all corrugations and ensuring firm contact with the entire bottom surface of the pipe. This compaction procedure shall be continued until the backfill reaches a minimum elevation of 0.3 m above the top of the pipe, or greater, as determined by the Consultant if necessary to carry the weight of construction equipment without damage to the culvert.

.6 Backfilling of the remainder of the culvert excavation, beyond the immediate region of the culvert, shall be carried out in accordance with 5.14 Site Grading. Compacting equipment shall be operated parallel to the longitudinal axis of the culvert, until sufficient fill has been placed to proceed with construction of the embankment in the normal manner. The remaining construction of the grade embankment over the installation may then proceed in accordance with 5.14 Site Grading.

.3 Measurement and Payment

.1 Excavation for Culvert Installation

.1 Measurement and payment for excavation for culvert installation will be in accordance with *AT Specification 2.3, Grading.* Where the Contractor chooses to construct embankments before installing culverts, there will be no payment for subsequent excavation of these embankment materials.

.2 Supply and Installation of Culverts

.1 Measurement for the supply and installation of culverts, and downdrains will be made in metres based on the total invert length of pipe installed, including elbows and sloped end sections. Payment will be made at the unit price bid per metre for "Culverts - Supply and Install" for the various types and sizes of culvert specified.

.2 This payment will be full compensation for supplying all culvert pipe materials including couplers and appurtenances, preparing the culvert bed, installing the pipe, backfilling, the supply and placement of Rip Rap (**as per detail G-14 – Hand Placed Rip-Rap for Pipe Culverts in the Mackenzie County General Municipal Improvement Standards**), and all labour, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant. No separate payment will be made for the installation of oakum in joints. Payment for this work will be included in the unit price bid for supplying and installing the culverts.

.4 Traffic Signage

.1 Payment for the supply of all materials and the installation of all Traffic Signage will be per the unit price for each (ea.) shown in the Bid Form. Such payment will be full compensation for all materials, labour, equipment, supervision, and all incidentals necessary to complete the work to these specifications.

.1 Signs bearing non-uniform letters or numerals, crooked borders, chipping or flattening of materials or other unworkmanlike defects will be rejected.

.2 All work related to the installation of new signage shall be in accordance with the Alberta Transportation Standard Specifications for Highway Construction, Specification 7.7 ”Permanent Highway Signing” and any specifications, drawings, notes or instructions noted therein.

.3 All Sign products and materials shall be selected from the list of PROVEN PRODUCTS as currently published on the Alberta Transportation Products List, available on the Department’s webpage.

.2 Payment for the supply of all materials and the installation of all poles will be the unit price for each (ea.) shown in the Bid Form. Such payment will be full compensation for all materials labour, equipment, supervision, and all incidentals necessary to complete the work to these specifications.

.4 Landscaping

.1 The Contractor shall grade and place existing topsoil to a minimum depth of 100mm and will include hydroseeding. The Contractor is to manage their operations accordingly to ensure the areas impacted are minimized. No additional compensation will be provided for quantities greater than the amount identified in the project Schedule of Quantities.

.2 Payment shall be as per the bid item “Landscaping – Road Ditch + Boulevard” in the Schedule of Quantities, based on square meter ($m^2$) as measured in the field by the Consultant. Payment will be full compensation for supplying, hauling, fine grading, placing and all labour, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

.3 Payment shall be as per the bid item “MR” in the Schedule of Quantities, based on square meter ($m^2$) as measured in the field by the Consultant. Payment will be full compensation for supplying, hauling, fine grading, placing and all labour, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

.5 Erosion Control

.1 Payment for the supply of all materials and the installation of all Erosion control will be the unit price per square meter ($m^2$) of the material type as shown in the Bid Form. Such payment will be full compensation for all materials, labour, equipment, supervision, and all incidentals necessary to supply and install these erosion control items as noted on the Contract Drawings, as per these specifications and as per the manufactured specifications

## SP 38. WASTE EXCAVATION

.1 The Contractor shall excavate and remove unusable and excess material free of stripped topsoil as required to reach subgrade elevation and any undercut required as determined in the field. Notify Consultant whenever unsuitable materials are encountered in cut or embankment sections and remove unsuitable materials to depth and extent directed.

.2 The Contractor is required to excavate and haul material offsite and for finding a waste location for the removed waste material. This will be considered incidental to the work performed and no additional payment will be provided. This will include all labour, equipment, tools, hauling, disposal costs and all incidentals necessary to remove and dispose of the waste.

.3 Haul Routes

.1 Haul routes and hauling equipment to be approved by Consultant.
.2 Keep haul routes clean and free of dust and spilled material.
.3 Provide adequate traffic control and warning signs on haul routes to ensure the safety of the public.
.4 Restore haul routes to original condition.

## SP 39. LANDSCAPING

.1 All landscaping will have a two (2) year warranty and maintenance period. Final landscaping (topsoil and seed) work is to be scheduled after all utility work has been completed. A landscaping Construction Completion Certificate (CCC) and Final Acceptance Certificate (FAC) will be issued separately if landscaping work is delayed due to a seasonal shutdown.

## SP 40. SCC, CCC AND FAC INSPECTION

.1 The Contractor will be responsible for booking SCC, CCC, and FAC inspections when the site is substantially complete, and will provide all traffic control, equipment and labour necessary to complete all inspections. All contractor costs associated with inspections shall be accommodated within the Traffic Accommodation bid item. All costs will be borne by the contractor and no additional payments will be made. At the discretion of the Consultant, if adequate resources are not provided to perform the inspection, it will be terminated and rescheduled for a time when adequate resources are made available.

## SP 41. CONTRACTOR'S WORK AND STORAGE AREA

.1 The Contractor shall identify the area which they wish to utilize as storage within the work area. All materials stored on site shall be stored in a manner deemed safe. All costs associated for remediation of the site to its original state shall be paid by the contractor and the Contractor shall hold the Mackenzie County and the Consultant harmless for all resulting claims.

## SP 42. SITE RENTAL FORMS

.1 Site Rental forms completed for each week during the duration of the project will be provided to the contractor at the beginning of each week or at weekly construction meetings for the contractors review and acceptance. Site Rental forms are to be signed and returned within seven (7) calendar days of receipt in acceptance or alternatively provide comments or requested changes to the previously applied site days to the project.

## SP 43. ARCHAEOLOGY, ANTIQUES AND RELICS

.1 This section includes items of archaeological value include all artifacts of prehistoric origin, of historic origin, and all human and animal remains.

.2 Relics and antiques may include such items as cornerstones of old buildings, contents of buildings and similar objects found on site or in buildings to be demolished

.3 All items of suspected value shall remain the property of the Owner, and recovery of them shall be governed by federal, provincial, and municipal statutes.

.4 Contractor to supply shoring, barricades and all other equipment required, for the safe recovery of such items

.5 Pursuant to Section 31 of the Historical Resources Act, the Contractor shall notify the Consultant immediately in the event that any archaeological resources, paleontological resources, Aboriginal traditional use sites and/or historic period sites are discovered during the course of construction. Pursuant to information from the appropriate governing body, it may be necessary for the Consultant to issue further instructions regarding the documentation of these resources.

.6 The Consultant will issue a Change Order, if in the opinion of the Consultant the Contractor is unduly delayed or is required to perform extra work, the provisions of ***GC 1.51 "Changes in the Work"*** shall apply. The Consultant will not issue a Change Order if the Contractor is able to proceed immediately in another part of the project and continue work.

**END OF SECTION**

# GEOTECHNICAL EVALUATION REPORT

River Road Subdivision

Beairsto & Associates Engineering Ltd.
10940 – 92 Avenue
Grande Prairie, AB T8V 6B5

Beairsto & Associates

ENGINEERING & SURVEY

# GEOTECHNICAL EVALUATION REPORT

## River Road Subdivision

**SUBMITTED TO:**

**Mackenzie County**
4511-46 Avenue
Fort Vermilion, AB, T0H 1N0

**SUBMITTED BY:**

**Beairsto & Associates Engineering Ltd.**
10940 – 92 Avenue
Grande Prairie, AB T8V 6B5

BASE PROJECT NUMBER:
**21GEME6061-1**

**December 2021**

Beairsto & Associates
ENGINEERING & SURVEY

Beairsto & Associates
ENGINEERING & SURVEY

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# 1.0 INTRODUCTION

Beairsto & Associates Engineering Ltd. (BASE) conducted a geotechnical evaluation for the proposed River Road Subdivision located at River Lot 11, Range 3, Fort Vermilion Settlement, Mackenzie County, Alberta. The objective of this evaluation was to assess the general subsurface soil and groundwater conditions at the subject site for the design and construction of the proposed residential subdivision.

This report presents the results of the exploration program and geotechnical recommendations for the development.

# 2.0 PROJECT DESCRIPTION

It is understood that the proposed development will consist of 15 newly subdivided lots and one roadway. It is understood that the proposed roadway will consist of a gravel structure. Details of the proposed buildings for the residential development are not available for this preliminary geotechnical evaluation.

# 3.0 SITE DESCRIPTION

The subject site is located within River Lot 11, Range 3, Fort Vermilion Settlement, Mackenzie County, Alberta. The undeveloped subject site covers an approximate area of 56,470 m2, is bounded to the north by River Road, undeveloped properties to the east, south and southwest, and developed properties to the northwest.

A site plan showing the proposed development and other features described above is presented in Figure 1 in **APPENDIX A**.

# 4.0 INVESTIGATION SUMMARY

## 4.1 Field Investigation Program

Prior to field drilling, BASE conducted the necessary underground utility clearances at the site through Alberta One-Call.

Fieldwork consisted of advancing four (4) boreholes on the site. On September 29, 2021, the boreholes were advanced using a track mounted, solid stem auger drill rig contracted from Green-Zone Environmental of La Crete, Alberta. Each of the four (4) boreholes (BH1, BH2, BH3 and BH4) were advanced to 9.6 m depth. Borehole locations were chosen by representatives of BASE and are shown on the site plan (Figure 1) in **APPENDIX A**.

BASE Geotechnical personnel logged the soil samples and auger cuttings according to the Modified Unified Soil Classification System (MUSCS) standard, described under the Explanation of Terms and Symbols in **APPENDIX B**. The soil sampling and testing sequences are shown on the borehole logs also located in **APPENDIX B**. In general, disturbed auger samples were obtained at approximately 0.76 m depth intervals to determine the in-situ soil profile for each borehole. Standard Penetration Tests (SPT's) were conducted at select depths to assess the in-situ strength of the soil types encountered.

Groundwater seepage conditions were monitored during drilling. Machine slotted, 25 mm standpipe piezometers were installed in the four boreholes to facilitate long-term monitoring of groundwater levels. Standpipe installation details are provided on the corresponding borehole logs. Groundwater levels were measured approximately two weeks after the completion of drilling, on October 15, 2021, by BASE personnel. Groundwater depths are presented on the logs in **APPENDIX B** and in the text of the report.

### 4.2 Laboratory Testing Program

The laboratory testing program consisted of forty-eight moisture content, three Atterberg limits, five hydrometer and four water-soluble sulphate concentration tests. These tests were conducted on selected soil samples. Laboratory results are presented in the laboratory reports in **APPENDIX C** as well as on the respective borehole logs in **APPENDIX B** and elsewhere in the text of this report.

## 5.0 SUBSURFACE CONDITIONS

### 5.1 Soil Conditions

The general subsurface soil stratigraphy encountered consisted of topsoil, silt, clay, and sand. The following presents a brief description of the soil layers encountered.

#### *5.1.1 Topsoil*

A thin layer of surficial topsoil (approximately 150 mm thick) was encountered in BH1. Topsoil was organic and contained some plant roots. Topsoil was not encountered in the remaining boreholes drilled on site.

#### *5.1.2 Silt*

A silt soil layer was encountered at different depths in the four boreholes drilled on this site. The silt soil consisted of trace fine grained sand and trace to some clay in places. The consistency of the soil varied from firm to very stiff as well as compact to very dense in the four boreholes. The soil was generally dry to moist, becoming wet at borehole depth.

One hydrometer analysis was conducted on a sample of the silt soil. The results indicated the silt soil consisted of up to approximately 4% fine grained sand, 82% silt and 14% clay.

Four water soluble sulphate tests conducted on the silt soil samples indicated a negligible sulphate concentration up to 0.02%.

Results of the laboratory tests conducted on selected silt soil sample are presented in **Table 1** and **Table 2** below:

**Table 1: Summary of Silt Laboratory Test Results**

| Borehole Number | Sample Number | Natural Moisture Content (%) | Atterberg Limit Test Results (%) | | | Particle Size Distribution (%) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Liquid Limit | Plastic Limit | Plasticity Index | Sand | Silt | Clay |
| **BH1** | S3 | 9.9 | - | - | - | 3.62 | 82.35 | 14.04 |

**Table 2: Water-Soluble Sulphate Content Test Results on Silt**

| Borehole Number | Sample Number | Sulphate Content (%) |
|---|---|---|
| **BH1** | G1 | 0.00 |
| **BH2** | S1 | 0.00 |
| **BH3** | G1 | 0.02 |
| **BH4** | G1 | 0.02 |

### *5.1.3 Clay*

Clay soil was encountered at different depths in the four boreholes drilled on this site. The clay soil was generally silty (presenting as clay and silt in BH2). The clay was generally low to high plastic, moist, dark olive grey, dark olive brown, and dark grey color. The clay soil can be classified as having firm to stiff consistency based on the SPT values (ranging from 7 to 11) obtained in the layer.

Atterberg limit tests were conducted on three representative samples of the clay soil. The results indicated a low to medium plastic consistency. Two hydrometer analyses were conducted on samples of the clay soil. The results indicated the clay soil consisted of up to approximately 1% fine grained sand, 23% to 47% silt and 52% to 76% clay.

Results of the laboratory tests conducted on selected clay soil samples are presented in Table 3 below:

**Table 3: Summary of Clay Laboratory Test Results**

| Borehole Number | Sample Number | Natural Moisture Content (%) | Atterberg Limit Test Results (%) | | | Particle Size Distribution (%) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Liquid Limit | Plastic Limit | Plasticity Index | Sand | Silt | Clay |
| **BH1** | G5 | 32.7 | - | - | - | 1.26 | 23.17 | 75.57 |
| **BH2** | G1 | 29.5 | 46 | 17 | 29 | 0.71 | 46.97 | 52.32 |
| **BH3** | S1 | 23.3 | 42 | 16 | 26 | - | - | - |
| **BH4** | G3 | 11.9 | 26 | 22 | 4 | - | - | - |

### *5.1.4 Sand*

Sand soil was encountered in three of the boreholes drilled on the site. Sand layers were encountered in BH3 from the ground surface to approximately 1.68 m depth and below 8.2 m depth. Sand was also encountered in boreholes BH2 and BH4, below 8.2 m depth and 6.6 m depth, respectively. The poorly graded sand soil was fine grained, with some silt and clay (in BH3), compact to very dense, moist to wet, medium brown and brown color.

One hydrometer analysis was conducted on a representative sample of the sand soil. The results indicated the sand soil consisted of up to approximately 65% fine to medium grained sand, 15% silt and 20% clay.

Results of the laboratory tests conducted on selected sand soil samples are presented in Table 4 below:

**Table 4: Summary of Sand Laboratory Test Results**

| Borehole Number | Sample Number | Natural Moisture Content (%) | Atterberg Limit Test Results (%) | | | Particle Size Distribution (%) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Liquid Limit | Plastic Limit | Plasticity Index | Sand | Silt | Clay |
| **BH3** | G1 | 11.7 | - | - | - | 64.98 | 14.70 | 20.33 |

## 5.2 Groundwater Conditions

Upon completion of drilling, the four boreholes were dry. Machine slotted, 25 mm standpipe piezometers were installed in all four boreholes. Groundwater levels in the standpipe piezometers were measured on October 15, 2021, approximately two weeks after completion of drilling. The standpipes installed in BH1, BH2, BH3 were dry, the groundwater level in BH4 was 7.86 m and presented in Table 5 below:

**Table 5: Groundwater Measurements**

| Borehole No. | Approximate Depth of Standpipe Piezometers (m) | Groundwater Level on October 15, 2021 Depth Below Existing Grade (m) |
|---|---|---|
| **BH 1** | 9.6 | Dry |
| **BH 2** | 9.6 | Dry |
| **BH 3** | 9.6 | Dry |
| **BH 4** | 9.6 | 7.86 m |

It should be noted that the depth of the groundwater table typically fluctuates seasonally (it may fluctuate in the order of about ±1.5 m), depending upon several factors that include the local

geology and hydrogeology as well as effects of recharge due to infiltration from snowmelt and precipitation.

# 6.0 GEOTECHNICAL CONSIDERATIONS & RECOMMENDATIONS

Engineering assessments, discussions, and recommendations provided in this section are based on the results of this preliminary geotechnical assessment of the suitability of the subject site for the proposed residential subdivision. It is understood the proposed roadway will consist of a gravel structure.

Generally, the subsurface conditions indicate that the development of the subject site is feasible. Shallow footings (strip and spread footings) and pile foundation (bored cast-in-place concrete piles and helical screw piles) systems are feasible on the subject site. Geotechnical parameters for strip and spread footings are provided in this report. A strip and spread footing foundation system is considered feasible provided certain precautions outlined in this report are followed.

Recommendations include site preparation; gravel road structure, foundation design and construction; consideration for excavation and backfill; utility installations, site seismic class, and cement specification. Should the currently proposed gravel road design change during subsequent phases of the project, BASE Geotechnical should be given the opportunity to review the changes and revise the recommendations as appropriate.

## 6.1 Geotechnical Concerns

### 6.1.1 Frost Susceptibility

The existing native (silts and silty clays) soils were noted to be silty or have a high percentage of silts. Based on the laboratory results and our experience with similar silty soil, these soils are considered to be highly frost susceptible. Thus, they have a high potential for frost heave in the presence of water and freezing temperatures.

Recommendations for the design of building structures to mitigate frost heave are provided in Section 6.5. Additional frost considerations for the underground utilities are presented under Section 6.8. Any road structure designs will be aimed at providing commonly accepted levels of deflection for the design, and not for the purpose of mitigating the frost heave potential of the subgrade soils, therefore there is some risk of heaving within the roadways and routine maintenance works may be required.

### 6.1.2 High Plastic Soils

The clay soil has a medium to high plasticity, and hence has a potential to heave upon exposure to water. Recommendations have been provided in this report (refer to section 6.2) to help mitigate the risk of excessive heaving under grade supported slabs and any asphalt paved areas, such as driveways. Although these recommendations will help mitigate the heaving issues, it should be noted that there is still a significant risk of heaving because of the medium to high plastic soils on site.

### 6.1.3 Erodible Soils

As discussed under 6.1.1, the existing native soils were noted to have a high percentage of silt. Based on the laboratory results and our experience with similar silty soils, these materials are considered to be highly erodible. Measures presented in this report may be required to mitigate excessive erosion.

## 6.2 Site Preparation

Prior to placing any fill materials, any existing organic soil, uncontrolled fill, soft or water softened soil should be removed from areas to be filled. Qualified geotechnical personnel should then review the subgrade prior to placing of the fill.

For all areas requiring structural support (building and road areas) that would receive fill, it is recommended that the exposed subgrade is graded to a 5H:1V gradient or flatter to mitigate any differential settlement that may occur under any key structures. Fill should not be placed on frozen subgrades and fill subgrade surfaces should not be allowed to freeze prior to placing subsequent lifts. It is recommended that winter grading activities should be avoided.

For areas requiring structural support, the fill materials for the grading works should consist of either a Structural Fill or General Engineered Fill as defined in **APPENDIX D.** Organic soils could be used for general landscape areas and it is recommended that it is compacted with a reasonable amount of effort. The existing native soils free of organics and deleterious materials may be used to construct "General Engineered Fill".

Engineered Fill should be moisture conditioned to between optimum and 2% above optimum moisture content (ASTM D698) and compacted to a minimum of 98% of Standard Proctor Maximum Dry Density (SPMDD). All imported fill materials should be tested and approved by a geotechnical engineer prior to delivery to the site.

Following preparation, exposed subgrade surfaces should be proof-rolled using heavy equipment such as a loaded tandem dump truck. The procedure should be monitored by an experienced geotechnical engineer or technician. All soft areas must be sub-excavated to competent material and replaced with approved engineered fill. To promote subgrade uniformity, soft area repair should be carried out using mineral soil of a similar nature to the in-situ subgrade soils.

Final grades within structure locations and access roads should be carefully graded to prevent ponding and to direct water away from structure areas and toward adequate drainage systems.

Care should be taken to moisture condition, compact and document all grading activates.

## 6.3 Site Grading & Drainage

Surface water should be drained from the site to a positive drainage system as quickly as possible, both during and following construction. The finished grade around the buildings, exterior slabs or any structure should be such that surface water drains away from the structure footprint.

For residential homes or buildings within this development a minimum grade of 2% away from the buildings are recommended for "hard" landscaped areas (e.g.., concrete and asphalt), while a minimum grade in the range of 3% to 10% is recommended for "soft" landscaped areas (e.g.,

grassed and garden areas). A clay layer (minimum 300 mm thick) should be placed at or close to the graded surface of "soft" landscaped areas if practical and meets the requirements of the grading plan. These grades should be maintained for a minimum distance of 2.0 m from the buildings for the lifetime of the structure.

## 6.4 Building Foundations

### *6.4.1 General*

Under the current National Building Code, building foundations are to be designed using Limit States Design (LSD). The following sections briefly discuss LSD; provide geotechnical recommendations for the design and construction of shallow and deep foundations and provide the seismic site classification to be used in the building design.

### *6.4.2 Limit States Foundation Design*

Limit states are defined as conditions under which a structure or its component members no longer perform their intended function and are generally classified into the main groups of Ultimate Limit State or Serviceability Limit State. Each of these limit states are discussed in more detail below.

*Ultimate Limit States (ULS)*

ULS are primarily concerned with collapse mechanisms for the structure and, hence, safety. Foundation designs using a limit states design approach should satisfy the following design equation:

$$\Phi R_n \geq \Sigma \alpha_i S_{ni}$$ [1]

Where:

| | | |
|---|---|---|
| $\Phi R_n$ | - | Factored geotechnical resistance |
| $\Phi$ | - | Geotechnical resistance factor |
| $R_n$ | - | Nominal (ultimate) geotechnical resistance determined using unfactored geotechnical parameters |
| $\Sigma \alpha_i S_{ni}$ | - | Summation of the factored overall load effects for a given load combination condition |
| $\alpha_i$ | - | Load factor corresponding to a particular load |
| $S_{ni}$ | - | Specified load component of the overall load affects (e.g., dead load due to weight of structure or live load due to wind). |
| i | - | Various types of loads such as dead load, live load, wind load, etc. |

[1] Page 139 of Canadian Foundation Engineering Manual – 4th Edition, January 2007.

Geotechnical resistance factors should be as provided by the National Building Code and as outlined in other sections of the report. The critical design events and their corresponding load combinations and load factors should be assessed and determined by the structural engineer.

*Serviceability Limit States (SLS)*

SLS are primarily concerned with mechanisms that restrict or constrain the intended use, occupancy, or function of the structure. For foundation design, SLS are usually associated with excessive foundation movements (e.g., settlement, differential settlement, heave, etc.) or unacceptable foundation vibrations.

In general, the format criteria for Serviceability Limit States can be expressed as follows:

*Serviceability Limit ≥ Effect of Service Loads*

SLS are evaluated using unfactored geotechnical settlement properties (i.e., compressibility, Young's Modulus, etc.) to determine an SLS bearing reaction which, when applied to the foundation soil, will not exceed a specified serviceability criterion. However, the load-settlement behaviour of foundations is complex and, notwithstanding the non-linear nature of the soil, depends on the foundation type and foundation configuration.

## 6.5 Strip & Spread Footings

Strip and spread footings are feasible for residential developments on the subject property provided certain precautions outlined in this report are followed. It is anticipated footings will be founded at an elevation of about 3m below the existing grade. The footings may be designed based on the design parameters in Table 6 below.

**Table 6: Shallow Footing Design Parameters**

| Soils Type | Allowable Bearing Capacity (Working Stress Design Method) | Factored ULS Bearing Resistance |
|---|---|---|
| Silty Clay Till | 100 kPa | 150 kPa |
| **Notes:** 1. Factored ULS values include a geotechnical resistance factor of 0.5.<br>2. All footings should be founded on the native soils or Engineered Fill. | | |

The factored ULS bearing resistance value above includes a geotechnical resistance factor of 0.5. The allowable bearing capacity above is based on a total expected settlement of less than 25 mm. Adjacent footings in close proximity of each other could affect the performance of the footings. It is recommended that a 1H:1V projection from the underside of any footing should not intercept adjacent footings.

For both the ULS and SLS cases, the applicable bearing resistance should be compared to the appropriate factored structural loads to determine the governing (i.e., larger) foundation size to satisfy both conditions. Appropriate load factors based on the current building code requirements

should be applied to the working loads for the assessment of the SLS case. Once the preliminary footing sizes and loads are determined, BASE can assist with the SLS design if required.

All footings should be founded in the native, inorganic, undisturbed silt and/or clay soil or Engineered Fill soils. Footings should not be founded in loose, organics, disturbed, frozen soils, fill or other unsuitable materials not detected in the boreholes. Any unsatisfactory foundation subgrade soils must be over-excavated to competent native soils or Engineered Fill soils. The over-excavations may be brought back up to the footing design elevation with a lean mix concrete, Engineered Fill or Structural Fill as defined in **APPENDIX D**. The lean-mix concrete should have a minimum 28-day compressive strength of 3.5 MPa to 5 MPa.

The bearing surface of each footing base should be excavated in a manner to minimize disturbance of the subgrade, using excavators with a smooth edge trimming bucket. Hand cleaning of the bases of the footing excavations may be required to remove loosened soil debris. Footing subgrades must be protected from frost and the ingress of water. Foundation subgrades should be inspected by a geotechnical engineer prior to placing foundation concrete or lean mix concrete to confirm that the bearing soils are competent and that subsurface conditions are consistent with those encountered during the site investigation.

All footings must comply with the National Building Code minimum requirements. The minimum footing width should be 0.6 m regardless of bearing capacity considerations.

For protection against frost action, footings in any unheated building or unheated portions of a building should have at least 3.4 m of soil cover. Thermal insulation may be required to reduce the depth of embedment required for frost protection. Perimeter footings in heated areas should be extended to provide at least 1.5 m of soil cover. Although not required for frost protection, interior footings of heated buildings should be based at least 0.6 m below the top of the slab to provide confinement of the subgrade.

Footing subgrade soils must not be allowed to freeze subsequent to excavation operations nor subsequent to casting footings. If winter construction is anticipated, full-time heating and hoarding will be required to keep the subgrade soils in an unfrozen state.

## 6.6 Soil Bearing Certificates

Site-specific geotechnical investigations are typically not conducted for residential single-family home developments, as the geotechnical oversight is conducted at the subdivision level during the site grading operations. As a minimum, Soil Bearing Certificates should be provided upon review of the excavation for single-family homes by qualified geotechnical personnel.

## 6.7 Building Pads

A slab-on-grade system is typical for residential homes. Slab-on-grade construction is considered feasible provided certain precautions are undertaken. The exposed subgrade materials within the building pad footprint should be visually inspected by a qualified engineer and any soft or loose pockets detected should be over excavated and replaced with Select Engineered Fill as defined in **APPENDIX D**. Recommended procedures for placing backfill materials and further recommendations for construction are included in **APPENDIX D**.

To mitigate heaving issues associated with the medium to high plastic clays encountered within the building subgrade soils, it is recommend that the upper 0.5m of the subgrade soils within the proposed building footprints should consist of a granular well graded soil, such as a 80mm Pit Run Gravel or Structural Fill as defined in **APPENDIX D**, to help mitigate the risk of excessive swelling underneath the footings and slab-on-grade. The structural fill should be separated from the clay subgrade by a woven geotextile such as Nilex 2006 or equivalent.

The replacement of the upper 0.5m of the subgrade soils may be considered on a case by case basis depending on the presence of high plastic clays.

Some relative movement between floor slabs-on-grade and adjacent walls or foundations and differential movements within slab should be anticipated. Generally, if the recommendations outlined in this report are followed, these movements should be acceptably small. However, it is possible that some cracking of the slab or distortion of any internal partition walls supported by the slab may occur. Such damage may be visible, particularly if a brittle surface finishing, such as ceramic tiles, is adopted. The risk of such damage should be weighed against the additional costs associated with alternative slab support systems, such as structurally supported slab.

## 6.8 Frost Considerations

The near surface soils are considered to have a medium frost susceptibility. Effective surface drainage of the site should be provided to prevent water from remaining in contact with frost susceptible soils.

Buried water lines should have a minimum frost cover of 3.4 m. Pipes buried with less than the recommended soil cover should be protected with insulation to avoid frost effects that may cause damage or breakage of the pipes. Rigid insulation placed under areas subjected to vehicular wheel loadings should be provided with a cover of compacted granular base with a minimum cover thickness of 600 mm and in accordance with the manufacturer's written recommendation.

Where pavements are adjacent to foundation walls or grade beams, a separation strip should be installed between the pavement and the foundation walls or grade beams to permit some relative movement due to frost heave or settlement.

Insulation can also be used to reduce the depth of frost penetration and the potential for frost heaving of concrete slabs and pavements. It is recommended to insulate these types of structures by placing a layer of high strength extruded polystyrene with a minimum thickness of 100 mm underneath the pavement or base of the slab. The polystyrene insulation should extend 3.5 m horizontally out from the perimeter of the structure.

## 6.9 Pipe Support

Although it is not anticipated that there will be any difficulties with regard to the pipe support , there could be some localized soft subgrade that may require some improvements for consistent pipe foundation support. Conventional methods for pipe support are considered feasible. Due to the presence of silty soils at the site, BASE recommends the use of compacted clay plugs at regular intervals. This is to avoid erosion of the silts and possible future subsidence due to the erosion and loss of fine-grained soils into the drain gravel placed around the pipes. BASE should

be notified during construction to provide on-site recommendations for the frequency of the clay plugs in the pipe zone.

It should be noted that other plug systems may be utilized, such as the use of a lean mix concrete (3.5 MPa), which has the advantage of not requiring compaction in the haunches of the pipe. At the detailed design stage a suitable method can be discussed and designed.

## 6.10 Weeping Tile

BASE recommends that subsurface weeping tile be installed around all below-grade structures. The subsurface weeping tile should consist of 100 mm diameter perforated weeping tile with filter sock and should be covered in a suitable washed drainage gravel (e.g. Alberta transportation Designation 8 class 25). A 6 oz non woven filter fabric should be used to separate the driange gravel from the fine grained backfill soils.The weeping tile should drain to a storm sewer or sump pump to overland drainage subject to the approval of Mackenzie County.

## 6.11 Deep Fill Assessments

Deep fill assessments are recommended for all areas receiving 2.0 m depth or more fill. A time lag may be required if excessive fill (thickness greater than 4.0 m) is to be placed on site.

## 6.12 Site Seismic Class

The seismic response of the site is classified according to the National Building Code of Canada 2019 Alberta Edition, which categorizes the soil conditions into six types - Class ‘A’ to ‘F’. This classification is based on the average shear wave velocity, energy-corrected SPT N values, or undrained shear strength over the top 30 m of the soil profile.

For seismic design purposes, this site may be classified assuming a Site Class ‘D’ as per the code.

## 6.13 Excavations

Temporary excavations are expected for utility installations etc. The side slopes for the excavations should conform to Alberta Occupational Health and Safety guidelines. For stability purposes, temporary excavations through the onsite soils should be no steeper than 1 horizontal to 1 vertical (1H:1V). Flatter side slopes will likely be required to prevent sloughing and undermining effects in the sand and silt soils. Depending on the groundwater condition at time of excavation, flatter slopes may also be required in cuts below the groundwater table. It is assumed that any potential water seepage into the proposed excavation will be within practical limits, and the excavation can be dewatered using perimeter trenches, sumps, and pumps within the excavation.

## 6.14 Concrete Type

Four water-soluble sulphate concentration tests were performed on samples of the clay soils recovered from the boreholes drilled on this site. Test results indicated sulphate concentrations of up to 0.02%, which indicates indicated negligible sulphate concentrations.

Therefore, normal (Type GU) Portland cement can be used in the manufacture of subsurface concrete placed in contact with the native soil and groundwater in the project area. There may also be other factors affecting the choice of cement type, such as potential exposure to process chemicals. Any imported soil used adjacent to concrete should be tested to determine the potential risk of sulphate attack. Air entrainment is recommended for all concrete exposed to freeze-thaw cycles to enhance durability.

## 6.15 Gravel Structures

For the support of the proposed gravel road structures, the subgrade should be prepared as recommended in Section 6.2. During the removal process, it is recommended to undertake the excavation in a manner to minimize disturbance and restrict traffic on the exposed subgrade. The weather forecast should be considered before undertaking any large-scale excavations which expose sensitive silt soil subgrade. During excavation, the subgrade should be reshaped to prevent ponding of water. After final subgrade acceptance, the subgrade should be sealed with a smooth drum roller.

The proposed design is based on the assumption that the gravel structure will be constructed on a stable, prepared subgrade with a soaked California Bearing Ratio of at least 4.0 which is indicative of a low level of subgrade support expected during spring thaw when the subgrade soils will exist in a weakened condition. Ideally, a subgrade preparation is undertaken to uniformly moisture conditions the subgrade to minimize the potential for differential shrinking and/or swelling by scarifying approximately 300 mm and recompacting to 98 % of the SPMDD at a moisture content within 0 to +2 % of Optimum Moisture Content (OMC). A proof roll typically follows this to identify and replace deficient areas.

Adequate drainage of about 2.5% to 3.0% at the subgrade level should be provided to prevent saturation and softening of the subgrade soils both during and after construction.

The following design for the gravel structure is provided in **Table 7**. A relatively light loading has been assumed for the proposed roadway (i.e. based on discussion with Mackenzie County, this road appears to be have been classified as a Rural Road with an AADT of less than 100)

**Table 7: Minimum Recommended Gravel Structure Thickness**

| Gravel Structure | |
|---|---|
| **Mackenzie County GMIS Granular Material for Gravel Roads** | 400 mm |
| Woven Geotextile (Mirafi HP570 or Equivalent) | |
| **GMIS = Mackenzie County General Municipal Improvement Standards (GMIS)** | |

Granular material should meet the County's gradation and specifications also presented under Structural Fill in **APPENDIX D.**

Pavement designs are aimed at providing commonly accepted levels of deflection for the design and not for the purpose of mitigating the frost heave potential of the subgrade soils; therefore

there is some risk of heaving within the roadways and routine maintenance works may be required. Since a gravel road structure is proposed, the acceptable levels of deflection are relatively high compared to that required for an asphalt paved road, where excessive deflections will deteriorate the asphalt surface. If an asphalt surface is proposed at a future date, the subgrade should be equipped with adequate longitudinal drains to help mitigate the frost heave potential.

All granular materials should conform to the current Mackenzie County General Municipal Improvement Standards (GMIS) and should be tested and approved by BASE Geotechnical prior to delivery to the site. Both surfacing gravel and granular base course materials should be compacted to at least 100% SPMDD at moisture content within -3 % to +1 % of OMC.

Alternative gravel structure designs (using acceptable alternative materials such as geogrids) can be provided upon request.

## 6.16 Backfill Materials & Compaction Requirements

Surficial soil conditions at the site are considered to be relatively sensitive to disturbance when wet and strict attention should be given to surface water control and minimizing disturbance to the native subgrade soils.

It should be recognized that it is difficult to compact soils during the winter unless the fill soils are placed and compacted in an unfrozen condition and the working area is prevented from freezing. Any frost penetration that may have occurred should be thawed prior to fill placement. Fill must not be placed on a frozen subgrade or allowed to freeze following placement.

Backfill comprising fine grained soils should be considered frost susceptible and should not be used in areas where it may become frozen and where frost heaving would be unacceptable.

Where washing of fines is possible, fill material placed should be separated from coarser or finer material by a suitable geotextile.

During compaction, the lift thicknesses should be governed by the ability of the selected compaction equipment to uniformly achieve the recommended density but should typically be less than 300 mm in the loose state.

## 6.17 Design & Construction Guidelines

Recommended general design and construction guidelines are provided in **APPENDIX D** under the following headings:

- Shallow Foundations
- Floor Slabs-On-Grade
- Pavements
- Proof-Rolling
- Backfill Materials and Compaction
- Construction Excavations

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the work, although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and **APPENDIX D**, the main text should govern.

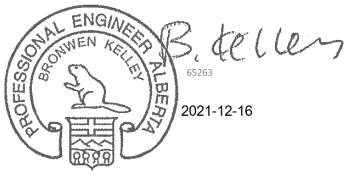
## 7.0 CLOSURE

Recommendations presented herein are based on a geotechnical evaluation of the findings in the four (4) boreholes drilled at the site. If conditions other than those reported are noted during subsequent phases of any development, Beairsto & Associates Engineering Ltd. should be notified and given the opportunity to review the current recommendations in light of any new findings.

This report has been prepared for the exclusive use of the Mackenzie County and their agents for specific application to the feasibility assessment of developing the subject site as described in this report. It has been prepared in accordance with generally accepted soil and foundation engineering practices. No warranty is expressed or implied.

Respectfully submitted,

**Beairsto & Associates Engineering Ltd.**

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Beairsto & Associates
ENGINEERING & SURVEY

# APPENDIX A

# SITE FIGURES


Mackenzie County

Bearisto & Associates
ENGINEERING & SURVEY
10940 - 92 Avenue,
Grande Prairie, AB T8V 6B5
**P:** 780 532 4919 **F:** 780 532 4739



| | |
|---|---|
| Project : River Road Subdivision | |
| Drawn By: N. Schurr | |
| Checked By: O. Abiose. P. Eng. | |
| Data File: | |
| Date: October, 2021 | |
| Horizontal Scale: N/A | Vertical Scale: N/A |

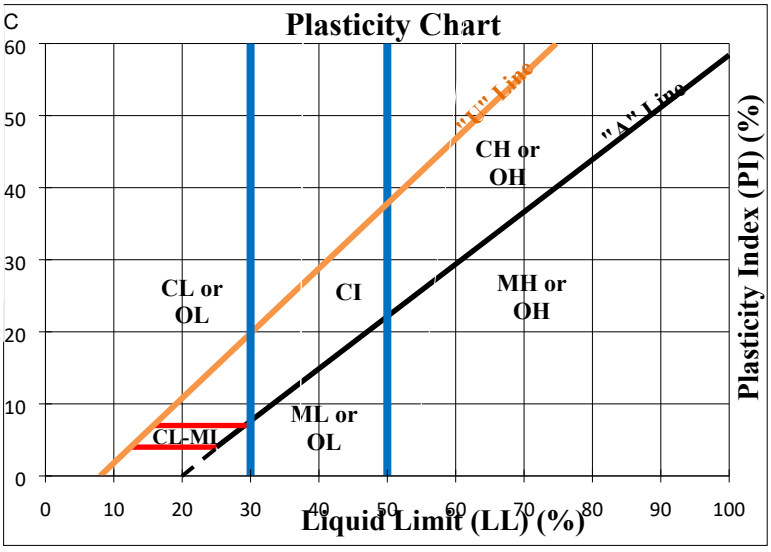
J:\Jobs\2021\21GEME6061-1\Geotech_Fort Vermilion\02-Site Plan\21GEME6061-1_BOREHOLE PLAN.dwg, 2021-10-22 3:00:31 PM, natalyas, DWG To PDF.pc3

Beairsto & Associates
ENGINEERING & SURVEY

# APPENDIX B

# BOREHOLE LOGS

| | MAJOR DIVISION | | MUCS | TYPICAL DESCRIPTION | LABORATORY CLASSIFICATION CRITERIA | |
|---|---|---|---|---|---|---|
| COARSE GRAINED SOILS | GRAVELS (MORE THAN HALF COARSE GRAINS LAGER THAN 4.75 MM) | CLEAN GRAVELS (LITTLE OR NO FINES) | **GW** | WELL GRADED GRAVELS, LITTLE OR NO FINES | $C_u=\frac{D_{60}}{D_{10}}>4$ | $C_C=\frac{D_{30}^2}{D_{60}\times D_{10}}=1$ to 3 |
| | | | **GP** | POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | NOT MEETING ABOVE REQUIREMENTS | |
| | | GRAVELS WITH FINES | **GM** | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | ATTERBERG LIMITS BELOW 'A' LINE $W_P$ LESS THAN 4 |
| | | | **GC** | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES | | ATTERBERG LIMITS ABOVE 'A' LINE $W_P$ MORE THAN 7 |
| | SANDS (MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75 MM) | CLEAN SANDS (LITTLE OR NO FINES) | **SW** | WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES | $C_u=\frac{D_{60}}{D_{10}}>6$ | $C_C=\frac{D_{30}^2}{D_{60}\times D_{10}}=1$ to 3 |
| | | | **SP** | POORLY GRADED SANDS, LITTLE OR NO FINES | NOT MEETING ABOVE REQUIREMENTS | |
| | | SANDS WITH FINES | **SM** | SILTY SANDS, SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | ATTERBERG LIMITS BELOW 'A' LINE $W_P$ LESS THAN 4 |
| | | | **SC** | CLAYEY SANDS, SAND-CLAY MIXTURES | | ATTERBERG LIMITS ABOVE 'A' LINE $W_P$ MORE THAN 7 |
| FINE GRAINED SOILS | SILTS (BELOW 'A' LINE NEGLIGIBLE ORGANIC CONTENT) | $W_L<50$ | **ML** | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY | CLASSIFCAION IS BASED UPON PLASTICITY CHART (SEE BELOW) | |
| | | $W_L>50$ | **MH** | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS | | |
| | CLAYS (ABOVE 'A' LINE NEGLIGIBLE ORGANIC CONTENT) | $W_L<30$ | **CL** | IORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS | WHENEVER THE TATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER 'F' | |
| | | $30<W_L<50$ | **CI** | INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS | E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY | |
| | | $W_L>50$ | **CH** | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS | | |
| | ORGANIC SILTS & CLAYS (BELOW 'A' LINE) | $W_L<50$ | **OL** | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY | | |
| | | $W_L>50$ | **OH** | ORGANIC CLAYS OF HIGH PLASTICITY | | |
| HIGHLY ORGANIC SOILS | | | **Pt** | PEAT AND OTHER HIGHLY ORGANIC SOILS | STRONG COLOUR OR ODOR, AND OFTERN FIBROUS TEXTURE | |
| BEDROCK | | | **BR** | SEE REPORT DESCRIPTION | | |




Note: BOUNDARY CLASSIFICATION POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%

## SOIL COMPONENTS

| FRACTION | | SIEVE SIZE (mm) | | DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS | |
|---|---|---|---|---|---|
| | | PASSING | RETAINED | PERCENT | IDENTIFIER |
| GRAVEL | COARSE | 75 | 19 | 50-35 | AND |
| | FINE | 19 | 4.75 | | |
| SAND | COARSE | 4.75 | 2.00 | 35-20 | _____Y |
| | MEDIUM | 2.00 | 0.425 | | |
| | FINE | 0.425 | 0.080 | 20-10 | SOME |
| SILT (NON-PLASTIC) OR CLAY (PLASTIC) | | 0.080 | | 10-1 | TRACE |

| OVERSIZE MATERIALS | |
|---|---|
| ROUNDED OR SUB-ROUNDED COBBLES 75 mm TO 200 mm<br>BOULDERS > 200 mm | ANGULAR ROCK FRAGMENTS<br>ROCKS > 0.75 $m^3$ IN VOLUME |

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# MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

# TERMS USED ON BOREHOLE LOGS

## TERMS DESCRIBING CONSISTENCY OR CONDITION

**COARSE GRAINED SOILS (major portion retained on 0.075 mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.**

| DESCRIPTIVE TERM | RELATIVE DENSITY | N (blows per 0.3 m) |
|---|---|---|
| Very Loose | 0 to 20% | 0 to 4 |
| Loose | 20 to 40% | 4 to 10 |
| Compact | 40 to 75% | 10 to 30 |
| Dense | 75 to 90% | 30 to 50 |
| Very Dense | 90 to 100% | Greater than 50 |

**The number of blows, N, on a 51 mm O.D. split spoon sampler of a 63.5 kg weight falling 0.76 m, required to drive the sampler a distance of 0.3 m from 0.15 m to 0.45 m.**

**FINE GRAINED SOILS (major portion passing 0.075 mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.**

| DESCRIPTIVE TERM | UNCOFINED COMPRESSIVE STRENGTH (KPA) |
|---|---|
| Very Soft | Less than 25 |
| Soft | 25 to 50 |
| Firm | 50 to 100 |
| Stiff | 100 to 200 |
| Very Stiff | 200 to 400 |
| Hard | Greater than 400 |

**NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.**

## GENERAL DESCRIPTIVE TERMS

**Slickensided – having inclined planes of weakness that are slick and glossy in appearance**
**Fissured – containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical**
**Laminated – composed of thin layers of varying colour and texture**
**Interbedded – composed of alternate layers of different soil types**
**Calcareous – containing appreciable quantities of calcium carbonate**
**Well graded – having wide range in grain sizes and substantial amounts of intermediate particle sizes**
**Poorly graded – predominantly of one grain size, or having a range of sizes with some intermediate size missing**

# ROCK DESCRIPTION TERMS USED ON BOREHOLE LOGS

## MECHANICAL STRENGTH CALCULATIONS

| TERM | UCS* (MPa) | GRADE | FIELD IDENTIFICATION ** |
|---|---|---|---|
| Extremely Strong | Greater than 250 | R6 | Specimen can only be chipped with geological hammer |
| Very Strong | 100 to 250 | R5 | Specimen requires man blows of geological hammer to fracture |
| Strong | 50 to 100 | R4 | Specimen requires more than one blow of geological hammer to fracture |
| Medium Strong | 25 to 50 | R3 | Cannot be scraped or peeled with pocketknife; can be fractured with single firm blow of geologic hammer |
| Weak | 5 to 25 | R2 | Can be peeled by pocketknife with difficulty; shallow indentation made by firm blow with geological hammer |
| Very Weak | 1 to 5 | R1 | Crumbles under firm blow with pint of geological hammer; can be peeled by a pocketknife |
| Extremely Weak | 0.25 to 1 | R0 | Indented by thumbnail |

*UCS – Unconfined compressive strength
** Correlations determined by Field Identification are approximate

## GRAIN SIZE

| NON-CARBONATE DERTITAL SEDIMENTARY ROCKS | | OTHER ROCKS | GRAIN SIZE |
|---|---|---|---|
| Conglomerate or Breccia | | Very Coarse Grained | More than 80 mm |
| Conglomerate or Breccia | | Coarse Grained | 4 to 80 mm |
| Sandstone [1] | | Medium Grained | 80 μm to 4 mm |
| FISSILE | NON-FISSILE | | |
| Silt Shale | Siltstone | Fine Grained | >2/3 silt-sized (2 to 80 μm) |
| Mud Shale | Mudstone | Fine Grained | Silt and clay-sized (<80 μm) |
| Clay Shale | Claystone | Very Fine Grained | >2/3 clay-sized (<2 μm) |

[1] Sandstone further subdivided where appropriate into fine, medium, and coarse

## DISCONTINUITY SPACING

| BEDDING | OTHER DISCONTINUITY | SPACING |
|---|---|---|
| Very Thickly Bedded | Very Widely Spaced | More than 2 m |
| Thickly Bedded | Widely Spaced | 600 mm to 2 m |
| Medium Bedded | Moderately Widely Spaced | 200 to 600 nm |
| Thinly Bedded | Closely Spaced | 60 to 200 mm |
| Very Thinly Bedded | Very Closely Spaced | 20 to 60 mm |
| Laminated | Extremly Closely Spaced | 6 to 20 mm |
| Thinly Laminated | Extremely Closely Spaced | 2 to 6 mm |
| Fissile | Extremely Closely Spaced | Less than 2 mm |

## ROCK QUALITY

| TERM | RQD |
|---|---|
| Very Poor Quality | 0 to 25 |
| Poor Quality | 25 to 50 |
| Fair Quality | 50 to 75 |
| Good Quality | 75 to 90 |
| Excellent Quality | 90 to 100 |

## WEATHERED STATE

| TERM | DEGREE |
|---|---|
| Fresh | No visible signs of weathering |
| Slightly Weathered | Weathering only on open discontinuity surfaces |
| Moderately Weathered | Rock mass weathered but not friable |
| Highly Weathered | Rock mass weathered and partly friable |
| Completely Weathered | Wholly decomposed but texture and structure preserved |
| Residual Soil | Original rock texture and structure destroyed |

## CORE RECOVERY

| TERM | DESCRIPTION |
|---|---|
| Total Core Recovery | Total recovery expressed as a percentage of run length |
| Solid Recovery | Solid recovery expressed as a percentage of run length |
| Rock Quality Designation (RQD) | Sum of lengths of solid core more than 100 mm long expressed as a percentage of run length |
| Fracture Frequency (FF) | The number of fractures per metre of core (FF's in excess of 30 denoted at 30+) |

| | | |
|---|---|---|
| CLIENT: Mackenzie County | PROJECT: River Road Subdivision | Borehole No: BH01 |
| DRILLER: Green-Zone Environmental | SITE: Fort Vermilion Settlement, Alberta | PROJECT NO: 21GEME6061-1 |
| DRILLING METHOD: Solid Stem | NORTHING: EASTING: | Elevation: |

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite Grout; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

◆ POCKET PEN (kPa) ◆ 100 200 300 400

■ BLOW COUNT (N) ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

| DEPTH (m) | SOIL SYMBOL | USCS | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE NO | SPT (N) | OTHER TESTS, COMMENTS |
|---|---|---|---|---|---|---|---|
| 0 | | OL | **Topsoil**, roots | | | | |
| | | | **Silt**, trace very fine grained sand, compact, dry, light brown color. | | G1 | | Sulphate: 0% |
| | | | | | SPT1 | 25 | |
| | | | ...trace clay below 2.29 m depth | | G2 | | |
| | | ML | | | | | |
| | | | | | SPT2 | 23 | |
| | | | ...no clay, no sand | | G3 | | |
| | | | | | SPT3 | 23 | Particle Size Distribution<br>Sand: 3.62%<br>Silt: 82.35%<br>Clay: 14.04% |
| | | | **Clay**, silty, stiff to firm, medium plastic, moist, dark olive grey color. | | G4 | | |
| | | | | | SPT4 | 11 | |
| | | CI | | | G5 | | Particle Size Distribution<br>Sand: 1.26%<br>Silt: 23.17%<br>Clay: 75.57% |
| | | | ...plasticity increases | | SPT5 | 7 | |
| | | | **Silt**, some clay, firm to very stiff, low plastic, wet, dark grey color. | | G6 | | |
| | | ML | | | SPT6 | 25 | |
| 10 | | | **END OF BOREHOLE AT 9.6m**<br>Borehole dry upon completion.<br>25 mm PVC stanpipe installed<br>Backfilled with drill cuttings and bentonite to ground surface.<br>Water level: Standpipe was dry on October 15, 2021 | | | | |

9.5, 11.2, 17.8, 10.2, 9.2, 9.9, 27.9, 26, 32.7, 30.7, 27.9, 10.6

BOREHOLE LOG FORT VERMILION BH LOGS.GPJ BEAIRSTO & ASSOCIATES ENG.GDT 21-10-25

Bearsto & Associates ENGINEERING & SURVEY

**Bearsto & Associates Engineering**
**10940 - 92 Avenue**
**Grand Prairie, Alberta, TBV 6B5**

| | |
|---|---|
| ENTERED BY: OAA | COMPLETION DEPTH: 9.6 m |
| LOGGED BY: BK | COMPLETION DATE: 09-29-21 |
| REVIEWED BY: BK | Page 1 of 1 |

| | | |
|---|---|---|
| CLIENT: Mackenzie County | PROJECT: River Road Subdivision | Borehole No: BH02 |
| DRILLER: Frontier Enviro-Drilling Ltd. | SITE: Fort Vermilion Settlement, Alberta | PROJECT NO: 21GEME6061-1 |
| DRILLING METHOD: Solid Stem | NORTHING: EASTING: | Elevation: |

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite Grout; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

◆ POCKET PEN (kPa) ◆ 100 200 300 400

■ BLOW COUNT (N) ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

| DEPTH (m) | SOIL SYMBOL | USCS | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE NO | SPT (N) | OTHER TESTS, COMMENTS | DEPTH (m) |
|---|---|---|---|---|---|---|---|---|
| 0 | | ML | **Silt**, compact, dry, brown color. | | | | | 0 |
| 1 | | CI | **Clay and Silt**, stiff, medium plastic, moist, dark olive brown color. | | G1 | | Atterberg Limits<br>Liquid Limit: 46%<br>Plastic Limit: 17%<br>Plastic Index 29% | 1 |
| 2 | | ML | **Silt**, very stiff, dry, medium brown color.<br>...trace very fine grained sand below 2.13 m depth | | SPT1<br>G2 | 27 | Particle Size Distribution<br>Sand: 0.71%<br>Silt: 46.97%<br>Clay: 52.32%<br>Sulphate: 0% | 2 |
| 3 | | | | | SPT2 | 22 | | 3 |
| 4 | | CI | **Silt and Clay**, firm, low to medium plastic, moist, dark olive grey and brown color. | | G3 | | | 4 |
| 5 | | CH | **Clay**, silty, firm, medium to high plastic, moist, dark grey color. | | SPT3 | 7 | | 5 |
| | | CI | **Silt and Clay**, firm, medium plastic, moist, dark olive grey and brown color. | | G4 | | | |
| 6 | | CH | **Clay**, firm to stiff, medium to high plastic, moist, dark grey color. | | SPT4 | 8 | | 6 |
| 7 | | | | | G5 | | | 7 |
| 8 | | | | | SPT5 | 31 | | 8 |
| | | ML | **Silt**, dense, moist, medium olive brown color. | | | | | |
| 9 | | SP | **Sand**, fine grained, dense, moist, medium brown color. | | G6 | | | 9 |
| | | | | | SPT6 | 43 | | |
| 10 | | | **END OF BOREHOLE AT 9.6m**<br>Borehole dry upon completion.<br>25 mm PVC stanpipe installed<br>Backfilled with drill cuttings and bentonite to ground surface.<br>Water level: Standpipe was dry on October 15, 2021 | | | | | 10 |

29.5 8.1 5.7 11.6 25.2 28.2 27.4 34.6 31.4 23.2 7.1 7.9

BOREHOLE LOG FORT VERMILION BH LOGS.GPJ BEAIRSTO & ASSOCIATES ENG.GDT 21-10-25

Bearsto & Associates ENGINEERING & SURVEY

**Beairsto & Associates Engineering**
**10940 - 92 Avenue**
**Grand Prairie, Alberta, TBV 6B5**

| | |
|---|---|
| ENTERED BY: OAA | COMPLETION DEPTH: 9.6 m |
| LOGGED BY: BK | COMPLETION DATE: 09-29-21 |
| REVIEWED BY: BK | Page 1 of 1 |

| | | |
|---|---|---|
| CLIENT: Mackenzie County | PROJECT: River Road Subdivision | Borehole No: BH03 |
| DRILLER: Frontier Enviro-Drilling Ltd. | SITE: Fort Vermilion Settlement, Alberta | PROJECT NO: 21GEME6061-1 |
| DRILLING METHOD: Solid Stem | NORTHING: EASTING: | Elevation: |

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite Grout; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

◆ POCKET PEN (kPa) ◆ 100 200 300 400

■ BLOW COUNT (N) ■ 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

| DEPTH (m) | SOIL SYMBOL | USCS | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE NO | SPT (N) | OTHER TESTS, COMMENTS |
|---|---|---|---|---|---|---|---|
| 0 | | SP-SC | **Sand**, fine grained, some clay, compact, moist, medium brown color. | | G1 | | Particle Size Distribution<br>Sand: 64.98%<br>Silt: 14.7%<br>Clay: 20.33%<br><br>Atterberg Limits<br>Liquid Limit: 42%<br>Plastic Limit: 16%<br>Plastic Index 26%<br><br>Sulphate: 0.02% |
| 1.7 | | CI | **Silt and Clay**, stiff, low plastic, moist, medium brown color. | | SPT1 | 14 | |
| 2.3 | | ML | **Silt**, trace clay, compact, moist, medium brown color. | | G2 | | |
| 3.7 | | | | | SPT2 | 21 | |
| 4.3 | | | | | G3 | | |
| 4.9 | | CH | **Clay**, silty, stiff, medium to high plastic, moist, medium olive grey color. | | SPT3 | 12 | |
| 5.5 | | MI | **Silt**, clayey, stiff, moist, medium plastic, medium olive grey/brown color. | | G4 | | |
| 6.3 | | CH | **Clay**, some silt, stiff, medium to high plastic, moist, dark grey color. | | SPT4 | 10 | |
| 7.0 | | | | | G5 | | |
| 7.8 | | ML | **Silt**, some clay, hard, low plastic, wet, dark grey color. | | SPT5 | 30 | |
| 8.4 | | SP | **Sand**, fine grained, very dense, wet, brown color. | | G6 | | |
| 9.4 | | | | | SPT6 | 51 | |
| 9.6 | | | **END OF BOREHOLE AT 9.6m**<br>Borehole wet upon completion.<br>25 mm PVC stanpipe installed<br>Backfilled with drill cuttings and bentonite to ground surface.<br>Water level: Standpipe was dry on October 15, 2021 | | | | |

BOREHOLE LOG FORT VERMILION BH LOGS.GPJ BEAIRSTO & ASSOCIATES ENG.GDT 21-10-25

Bearsto & Associates ENGINEERING & SURVEY

**Bearsto & Associates Engineering**
**10940 - 92 Avenue**
**Grand Prairie, Alberta, TBV 6B5**

| | |
|---|---|
| ENTERED BY: OAA | COMPLETION DEPTH: 9.6 m |
| LOGGED BY: BK | COMPLETION DATE: 09-29-21 |
| REVIEWED BY: BK | Page 1 of 1 |

| | | |
|---|---|---|
| CLIENT: Mackenzie County | PROJECT: River Road Subdivision | Borehole No: BH04 |
| DRILLER: Frontier Enviro-Drilling Ltd. | SITE: Fort Vermilion Settlement, Alberta | PROJECT NO: 21GEME6061-1 |
| DRILLING METHOD: Solid Stem | NORTHING: EASTING: | Elevation: |

SAMPLE TYPE: Shelby Tube; No Recovery; SPT Test (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite Grout; Pea Gravel; Slough; Grout; Drill Cuttings; Sand

BLOW COUNT (N) 20 40 60 80

PLASTIC M.C. LIQUID 20 40 60 80

| DEPTH (m) | SOIL SYMBOL | USCS | SOIL DESCRIPTION | SAMPLE TYPE | SAMPLE NO | SPT (N) | OTHER TESTS, COMMENTS |
|---|---|---|---|---|---|---|---|
| 0 | | | **Silt**, compact. dry, light brown color. | | G1 | | Sulphate: 0.02% |
| 1 | | ML | | | | | |
| | | | | SPT | SPT1 | 23 | |
| 2 | | | **Silt**, compact. dry, medium brown color. | | G2 | | |
| 3 | | ML | | | | | |
| | | | | SPT | SPT2 | 20 | |
| 4 | | | **Clay**, silty, stiff, low plastic, moist, light to medium grey/olive grey color. | | G3 | | Atterberg Limits<br>Liquid Limit: 26%<br>Plastic Limit: 22%<br>Plastic Index 4% |
| | | CL | | | | | |
| 5 | | | | SPT | SPT3 | 9 | |
| | | | **Silt**, very dense, dry, medium brown color. | | G4 | | |
| 6 | | ML | | | | | |
| | | | | SPT | SPT4 | 52 | |
| 7 | | | **Sand**, fine grained, very dense, moist, medium brown color. | | G5 | | |
| | | | | SPT | SPT5 | 51 | 10-15-2021 |
| 8 | | SP | | | | | |
| | | | ...wet below 8.2 m depth | | G6 | | |
| 9 | | | | SPT | SPT6 | 18 | |
| 10 | | | **END OF BOREHOLE AT 9.6m**<br>Borehole wet upon completion.<br>25 mm PVC stanpipe installed<br>Backfilled with drill cuttings and bentonite to ground surface.<br>Water level: 7.86 m read on October 15, 2021 | | | | |

8.6, 8.1, 18.4, 12.9, 11.9, 30.3, 14.4, 4.3, 3.3, 16.5, 17.7, 18.8

BOREHOLE LOG FORT VERMILION BH LOGS.GPJ BEAIRSTO & ASSOCIATES ENG.GDT 21-10-25

Bearsto & Associates ENGINEERING & SURVEY

**Bearsto & Associates Engineering**
**10940 - 92 Avenue**
**Grand Prairie, Alberta, TBV 6B5**

| | |
|---|---|
| ENTERED BY: OAA | COMPLETION DEPTH: 9.6 m |
| LOGGED BY: BK | COMPLETION DATE: 09-24-21 |
| REVIEWED BY: BK | Page 1 of 1 |

Beairsto & Associates
ENGINEERING & SURVEY

# APPENDIX C

# LABORATORY TEST RESULTS

# MOISTURE CONTENT

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D2216 - Moisture Content

| | | | |
|---|---|---|---|
| Test Date | 01-Oct-21 | Report Number | 21GEME6061-1-211001-MC001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | | Sampled By | Bronwen Kelly |
| Project | Fort Vermilion Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermilion | Sample Location | BH - 1 |
| Contractor / Driller | | Project Manager | |

## LABORATORY TEST RESULTS

| Sample Number | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 494.0 | 334.9 | 611.9 | 396.8 |
| Water Mass (g) | 47.0 | 37.5 | 109.1 | 40.3 |
| **Moisture Content (%)** | **9.5** | **11.2** | **17.8** | **10.2** |

| Sample Number | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 495.9 | 404.3 | 662.5 | 435.7 |
| Water Mass (g) | 45.8 | 40.1 | 184.9 | 113.1 |
| **Moisture Content (%)** | **9.2** | **9.9** | **27.9** | **26.0** |

| Sample Number | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 673.2 | 416.0 | 719.5 | 341.8 |
| Water Mass (g) | 220.2 | 127.8 | 200.6 | 36.2 |
| **Moisture Content (%)** | **32.7** | **30.7** | **27.9** | **10.6** |

| Sample Number | | | | |
|---|---|---|---|---|
| Dry Sample Mass (g) | | | | |
| Water Mass (g) | | | | |
| **Moisture Content (%)** | | | | |

| | | | |
|---|---|---|---|
| **Visual Material Type** | | **Test Method** | |

## VISUAL INSPECTION RESULTS (IF REQUIRED)

| Sample Number (s) | Sample Depth | Sample Description |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# MOISTURE CONTENT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D2216 - Moisture Content

| | | | |
|---|---|---|---|
| Test Date | 01-Oct-21 | Report Number | 21GEME6061-1-211001-MC001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | | Sampled By | Bronwen Kelly |
| Project | Fort Vermilion Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermilion | Sample Location | BH - 2 |
| Contractor / Driller | | Project Manager | |

## LABORATORY TEST RESULTS

| Sample Number | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 705.9 | 319.3 | 454.9 | 524.1 |
| Water Mass (g) | 208.2 | 26.0 | 26.1 | 60.9 |
| **Moisture Content (%)** | **29.5** | **8.1** | **5.7** | **11.6** |

| Sample Number | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 644.2 | 504.7 | 572.4 | 410.2 |
| Water Mass (g) | 162.2 | 142.3 | 157.1 | 142.1 |
| **Moisture Content (%)** | **25.2** | **28.2** | **27.4** | **34.6** |

| Sample Number | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 732.4 | 417.0 | 596.5 | 332.7 |
| Water Mass (g) | 229.7 | 96.6 | 42.5 | 26.2 |
| **Moisture Content (%)** | **31.4** | **23.2** | **7.1** | **7.9** |

| Sample Number | | | | |
|---|---|---|---|---|
| Dry Sample Mass (g) | | | | |
| Water Mass (g) | | | | |
| **Moisture Content (%)** | | | | |

| | | | |
|---|---|---|---|
| **Visual Material Type** | | **Test Method** | |

## VISUAL INSPECTION RESULTS (IF REQUIRED)

| Sample Number (s) | Sample Depth | Sample Description |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# MOISTURE CONTENT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D2216 - Moisture Content

| | | | |
|---|---|---|---|
| Test Date | 01-Oct-21 | Report Number | 21GEME6061-1-211001-MC001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | | Sampled By | Bronwen Kelly |
| Project | Fort Vermilion Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermilion | Sample Location | BH - 3 |
| Contractor / Driller | | Project Manager | |

## LABORATORY TEST RESULTS

| Sample Number | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 593.5 | 435.9 | 447.8 | 522.5 |
| Water Mass (g) | 69.3 | 101.7 | 88.4 | 50.4 |
| **Moisture Content (%)** | **11.7** | **23.3** | **19.7** | **9.6** |

| Sample Number | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 531.3 | 492.0 | 719.5 | 489.5 |
| Water Mass (g) | 179.3 | 137.9 | 187.4 | 161.1 |
| **Moisture Content (%)** | **33.7** | **28.0** | **26.0** | **32.9** |

| Sample Number | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 615.2 | 444.0 | 588.8 | 337.7 |
| Water Mass (g) | 181.9 | 117.1 | 58.2 | 82.6 |
| **Moisture Content (%)** | **29.6** | **26.4** | **9.9** | **24.5** |

| Sample Number | | | | |
|---|---|---|---|---|
| Dry Sample Mass (g) | | | | |
| Water Mass (g) | | | | |
| **Moisture Content (%)** | | | | |

| | | | |
|---|---|---|---|
| **Visual Material Type** | | **Test Method** | |

## VISUAL INSPECTION RESULTS (IF REQUIRED)

| Sample Number (s) | Sample Depth | Sample Description |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# MOISTURE CONTENT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D2216 - Moisture Content

| | | | |
|---|---|---|---|
| Test Date | 01-Oct-21 | Report Number | 21GEME6061-1-211001-MC001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | | Sampled By | Bronwen Kelly |
| Project | Fort Vermilion Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermilion | Sample Location | BH - 4 |
| Contractor / Driller | | Project Manager | |

## LABORATORY TEST RESULTS

| Sample Number | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 396.4 | 231.2 | 564.4 | 283.8 |
| Water Mass (g) | 34.0 | 18.7 | 103.9 | 36.5 |
| **Moisture Content (%)** | **8.6** | **8.1** | **18.4** | **12.9** |

| Sample Number | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 528.5 | 571.3 | 542.0 | 418.9 |
| Water Mass (g) | 62.8 | 173.3 | 78.0 | 18.0 |
| **Moisture Content (%)** | **11.9** | **30.3** | **14.4** | **4.3** |

| Sample Number | 9 | 10 | 11 | 12 |
|---|---|---|---|---|
| Dry Sample Mass (g) | 612.9 | 401.9 | 603.0 | 261.3 |
| Water Mass (g) | 20.2 | 66.5 | 106.7 | 49.1 |
| **Moisture Content (%)** | **3.3** | **16.5** | **17.7** | **18.8** |

| Sample Number | | | | |
|---|---|---|---|---|
| Dry Sample Mass (g) | | | | |
| Water Mass (g) | | | | |
| **Moisture Content (%)** | | | | |

| | | | |
|---|---|---|---|
| **Visual Material Type** | | **Test Method** | |

## VISUAL INSPECTION RESULTS (IF REQUIRED)

| Sample Number (s) | Sample Depth | Sample Description |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# LIMITS ANALYSIS REPORT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils - Method A

| | | | |
|---|---|---|---|
| Test Date | 06-Oct-21 | Report Number | 21GEME6061-1-AT001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | Borehole 2 |
| Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

## SAMPLE, PREPARATION & EQUIPMENT DETAILS

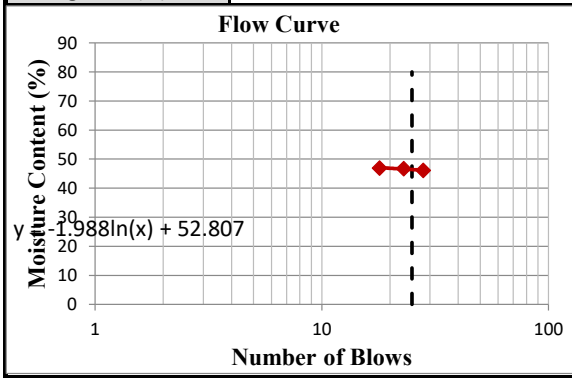
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | BH2-1 | | | | Sample Method | Grab | | | | |
| Test Method | A | | | | Natural Moisture (%) | | | | | |
| Equipment | Hand Roll | X | Mechanic | | Apparatus | | Manual | X | Mechanic | |
| Preparation | Wet | | Dry | Oven | Sieve Size | 0.425 | Washed | | Dry | X |

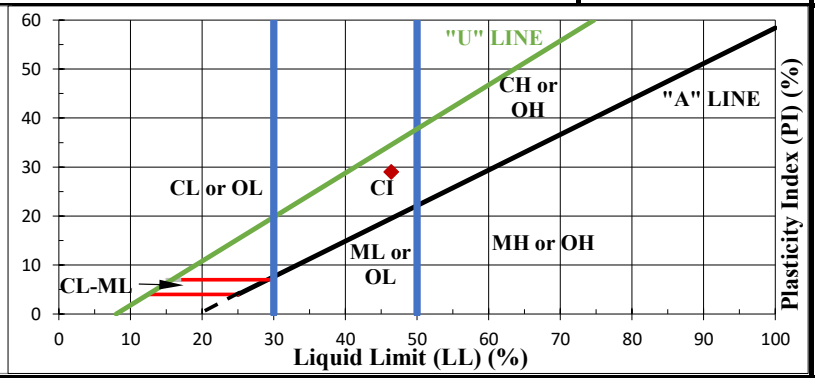
## LABORATORY TEST RESULT - LIQUID LIMITS

| Trail Number | 1 | 2 | 3 | | |
|---|---|---|---|---|---|
| Number of Blows | **18** | **23** | **28** | | |
| Wet Mass + Tare (g) | 38.38 | 34.61 | 35.85 | | |
| Dry Mass + Tare (g) | 27.09 | 24.55 | 25.49 | | |
| Water Mass (g) | 11.29 | 10.06 | 10.36 | | |
| Tare (g) | 3.06 | 3.03 | 3.01 | | |
| Dry Mass (g) | 24.03 | 21.52 | 22.48 | | |
| Moisture Content (%) | **47.0** | **46.7** | **46.1** | | |
| Corr'd Moisture (%) | | | | | |

## LABORATORY TEST RESULT - PLASTIC LIMITS

| Trail Number | 1 | 2 | | | RESULTS |
|---|---|---|---|---|---|
| Wet Mass + Tare (g) | 20.67 | 16.05 | | | Liquid Limit (%) |
| Dry Mass + Tare (g) | 17.98 | 14.18 | | | **46** |
| Water Mass (g) | 2.69 | 1.87 | | | Plastic Limit (%) |
| Tare (g) | 3.00 | 3.03 | | | **17** |
| Dry Mass (g) | 14.98 | 11.15 | | | Plastic Index (%) |
| Moisture Content (%) | **18.0** | **16.8** | | | **29** |
| Average MC (%) | **17.4** | | | | Soil Type |
| | | | | | **CI** |




## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# LIMITS ANALYSIS REPORT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils - Method A

| | | | |
|---|---|---|---|
| Test Date | 06-Oct-21 | Report Number | 21GEME6061-1-AT002 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | Borehole 3 |
| Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

## SAMPLE, PREPARATION & EQUIPMENT DETAILS

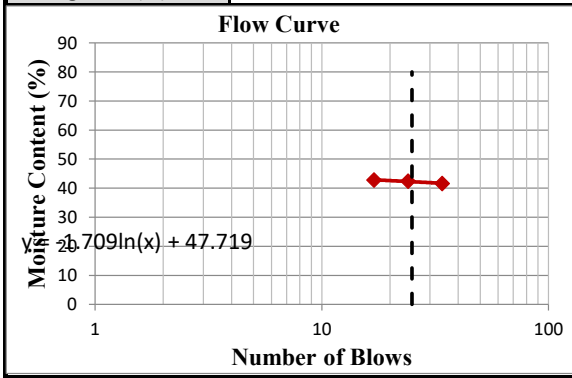
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | BH3-2 | | | | Sample Method | Spoon | | | | |
| Test Method | A | | | | Natural Moisture (%) | | | | | |
| Equipment | Hand Roll | X | Mechanic | | Apparatus | | Manual | X | Mechanic | |
| Preparation | Wet | | Dry | Oven | Sieve Size | 0.425 | Washed | | Dry | X |

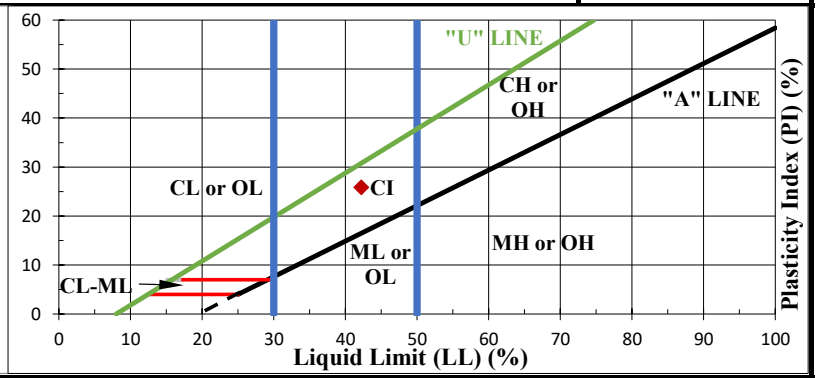
## LABORATORY TEST RESULT - LIQUID LIMITS

| Trail Number | 1 | 2 | 3 | | |
|---|---|---|---|---|---|
| Number of Blows | **17** | **24** | **34** | | |
| Wet Mass + Tare (g) | 39.87 | 35.35 | 38.64 | | |
| Dry Mass + Tare (g) | 28.83 | 25.72 | 28.18 | | |
| Water Mass (g) | 11.04 | 9.63 | 10.46 | | |
| Tare (g) | 3.03 | 3.04 | 3.04 | | |
| Dry Mass (g) | 25.80 | 22.68 | 25.14 | | |
| Moisture Content (%) | **42.8** | **42.5** | **41.6** | | |
| Corr'd Moisture (%) | | | | | |

## LABORATORY TEST RESULT - PLASTIC LIMITS

| Trail Number | 1 | 2 | | | RESULTS |
|---|---|---|---|---|---|
| Wet Mass + Tare (g) | 11.84 | 15.52 | | | Liquid Limit (%) |
| Dry Mass + Tare (g) | 10.58 | 13.80 | | | **42** |
| Water Mass (g) | 1.26 | 1.72 | | | Plastic Limit (%) |
| Tare (g) | 2.99 | 3.08 | | | **16** |
| Dry Mass (g) | 7.59 | 10.72 | | | Plastic Index (%) |
| Moisture Content (%) | **16.6** | **16.0** | | | **26** |
| Average MC (%) | **16.3** | | | | Soil Type |
| | | | | | **CI** |




## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

# LIMITS ANALYSIS REPORT

Beairsto & Associates ENGINEERING & SURVEY

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D4318 - Liquid Limit, Plastic Limit, and Plasticity Index of Soils - Method B

| | | | |
|---|---|---|---|
| Test Date | 6-Oct-21 | Report Number | 21GEME6061-1-AT003 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | Borehole 4 |
| Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

## SAMPLE, PREPARATION & EQUIPMENT DETAILS

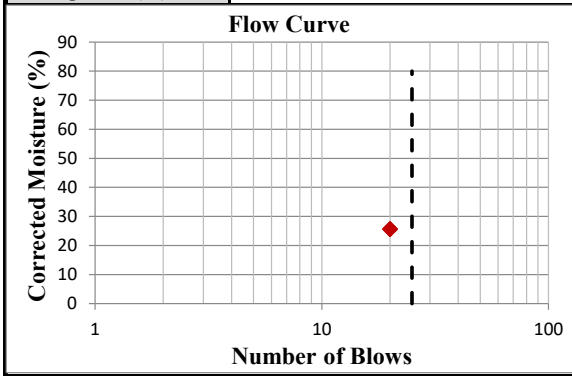
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | BH4-5 | | | | Sample Method | Grab | | | | |
| Test Method | B | | | | Natural Moisture (%) | | | | | |
| Equipment | Hand Roll | X | Mechanic | | Apparatus | | Manual | X | Mechanic | |
| Preparation | Wet | | Dry | Oven | Sieve Size | 0.425 | Washed | | Dry | X |

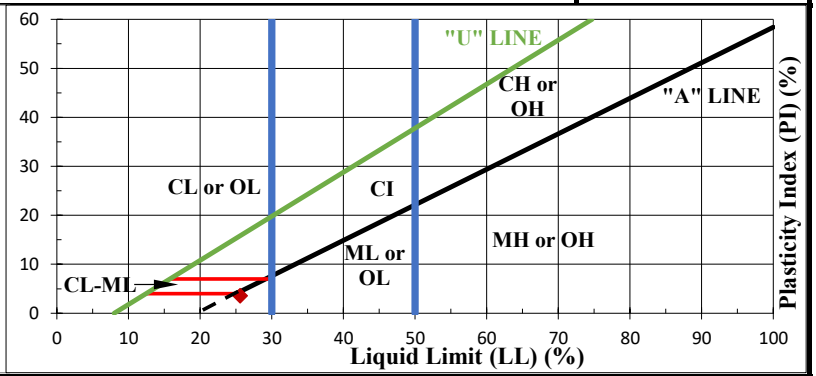
## LABORATORY TEST RESULT - LIQUID LIMITS

| Trail Number | 1 | 2 | | | |
|---|---|---|---|---|---|
| Number of Blows | **20** | **20** | | | |
| Wet Mass + Tare (g) | 25.57 | 24.32 | | | |
| Dry Mass + Tare (g) | 20.88 | 19.88 | | | |
| Water Mass (g) | 4.69 | 4.44 | | | |
| Tare (g) | 2.99 | 3.06 | | | |
| Dry Mass (g) | 17.89 | 16.82 | | | |
| Moisture Content (%) | 26.2 | 26.4 | | | |
| Corr'd Moisture (%) | **25.5** | **25.7** | | | |

## LABORATORY TEST RESULT - PLASTIC LIMITS

| Trail Number | 1 | 2 | | | **RESULTS** |
|---|---|---|---|---|---|
| Wet Mass + Tare (g) | 18.70 | 17.07 | | | **Liquid Limit (%)** |
| Dry Mass + Tare (g) | 15.85 | 14.55 | | | **26** |
| Water Mass (g) | 2.85 | 2.52 | | | **Plastic Limit (%)** |
| Tare (g) | 3.06 | 3.03 | | | **22** |
| Dry Mass (g) | 12.79 | 11.52 | | | **Plastic Index (%)** |
| Moisture Content (%) | **22.3** | **21.9** | | | **4** |
| Average MC (%) | **22.1** | | | | **Soil Type** |
| | | | | | **ML** |




## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | |

# PARTICLE SIZE ANALYSIS

Beairsto & Associates ENGINEERING & SURVEY

**UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5**

**ASTM D6913; D7928 - PARTICLE SIZE ANALYSIS OF SOILS (HYDROMETER ANALYSIS)**

| | | | |
|---|---|---|---|
| Test Date | 7-Oct-21 | Report Number | 21GEME6061-1-HD001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | BoreHole 1 |
| Contractor / Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

**SAMPLE & PREPARATION DETAILS**

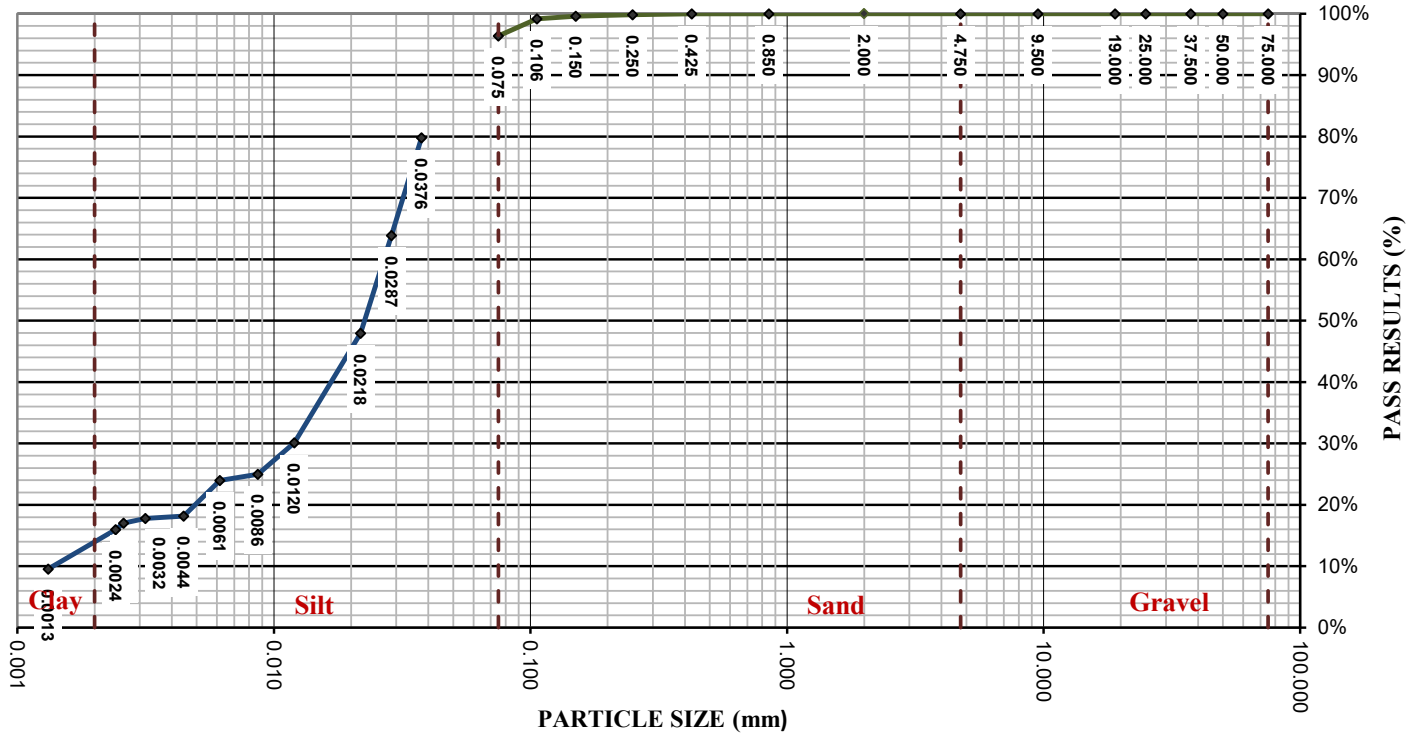
| | | | | | |
|---|---|---|---|---|---|
| Sample Number | BH1-6 | Sample Method | Grab | Visual Material Type | |
| Hydrometer Type | 151H | Sieve Method | Dry | Natural Moisture (%) | |

**LABORATORY TEST RESULTS**

| Sieve Size (mm) | | 75 | 50 | 37.5 | 25 | 19 | 9.5 | 4.75 | 2.00 | 0.850 | 0.425 | 0.250 | 0.150 | 0.106 | 0.075 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pass Results (%) | | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.98 | 99.96 | 99.84 | 99.58 | 99.16 | 96.38 |
| Particle Size (mm) | | | | | 0.0376 | 0.0287 | 0.0218 | 0.0120 | 0.0086 | 0.0061 | 0.0044 | 0.0032 | 0.0026 | 0.0024 | 0.0013 |
| Pass Results (%) | | | | | 79.78 | 63.86 | 47.94 | 30.12 | 24.99 | 23.97 | 18.15 | 17.80 | 17.00 | 15.95 | 9.55 |

**GRADATIONS (%)**

| Boulders | Cobbles | Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|
| 0.00% | 0.00% | 0.00% | 3.62% | 82.35% | 14.04% |




**ADDITIONAL COMMENTS**

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| Derek Uhl | No |

# PARTICLE SIZE ANALYSIS

Beairsto & Associates ENGINEERING & SURVEY

Beairsto & Associates ENGINEERING & SURVEY

**UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5**

**ASTM D6913; D7928 - PARTICLE SIZE ANALYSIS OF SOILS (HYDROMETER ANALYSIS)**

| | | | |
|---|---|---|---|
| Test Date | 7-Oct-21 | Report Number | 21GEME6061-1-HD002 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | BoreHole 2 |
| Contractor / Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

**SAMPLE & PREPARATION DETAILS**

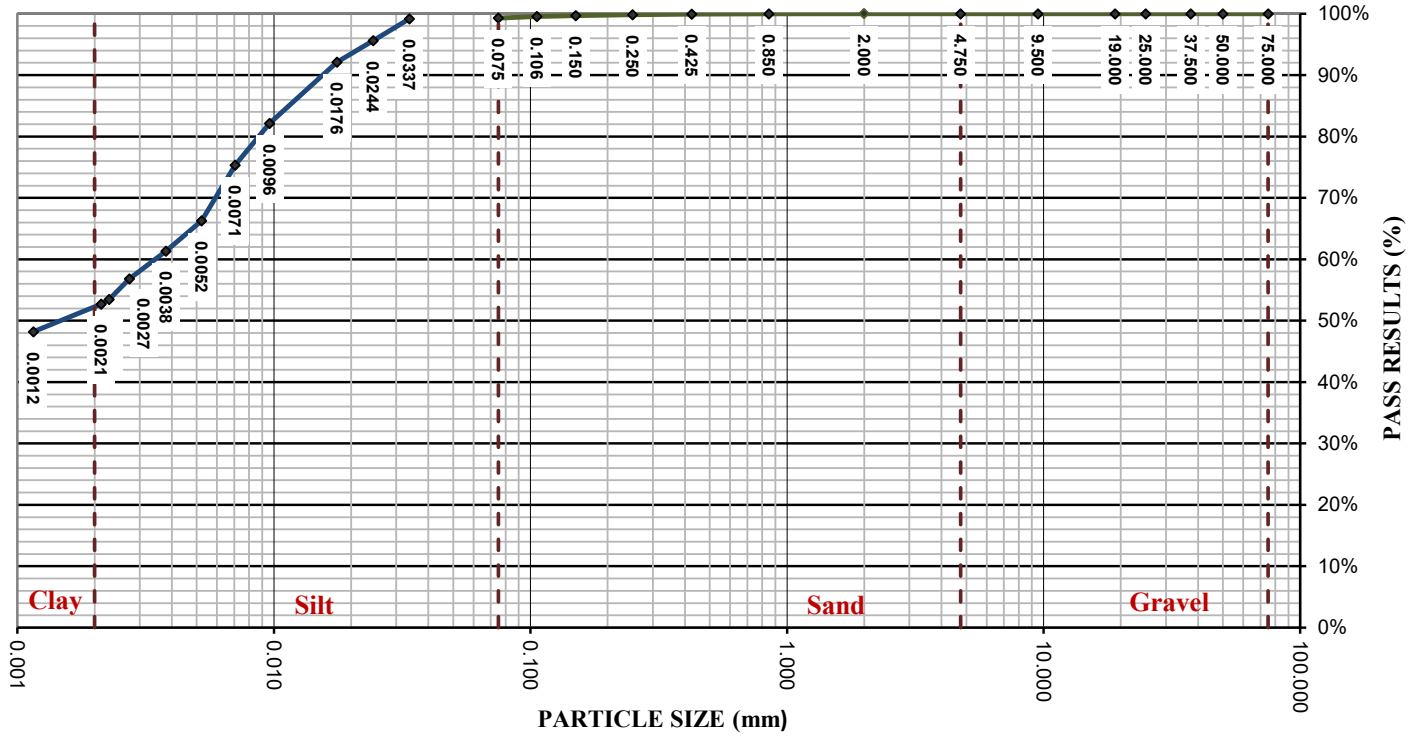
| | | | | | |
|---|---|---|---|---|---|
| Sample Number | BH2-1 | Sample Method | Grab | Visual Material Type | |
| Hydrometer Type | 151H | Sieve Method | Dry | Natural Moisture (%) | |

**LABORATORY TEST RESULTS**

| Sieve Size (mm) | | 75 | 50 | 37.5 | 25 | 19 | 9.5 | 4.75 | 2.00 | 0.850 | 0.425 | 0.250 | 0.150 | 0.106 | 0.075 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pass Results (%) | | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.98 | 99.96 | 99.82 | 99.68 | 99.53 | 99.29 |
| Particle Size (mm) | | | | | 0.0337 | 0.0244 | 0.0176 | 0.0096 | 0.0071 | 0.0052 | 0.0038 | 0.0027 | 0.0023 | 0.0021 | 0.0012 |
| Pass Results (%) | | | | | 99.17 | 95.63 | 92.10 | 82.13 | 75.36 | 66.27 | 61.32 | 56.82 | 53.45 | 52.72 | 48.21 |

**GRADATIONS (%)**

| Boulders | Cobbles | Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|
| 0.00% | 0.00% | 0.00% | 0.71% | 46.97% | 52.32% |




**ADDITIONAL COMMENTS**

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| Derek Uhl | No |

# PARTICLE SIZE ANALYSIS

Beairsto & Associates ENGINEERING & SURVEY

## UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM D6913; D7928 - PARTICLE SIZE ANALYSIS OF SOILS (HYDROMETER ANALYSIS)

| | | | |
|---|---|---|---|
| Test Date | 7-Oct-21 | Report Number | 21GEME6061-1-HD003 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | BoreHole 3 |
| Contractor / Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

## SAMPLE & PREPARATION DETAILS

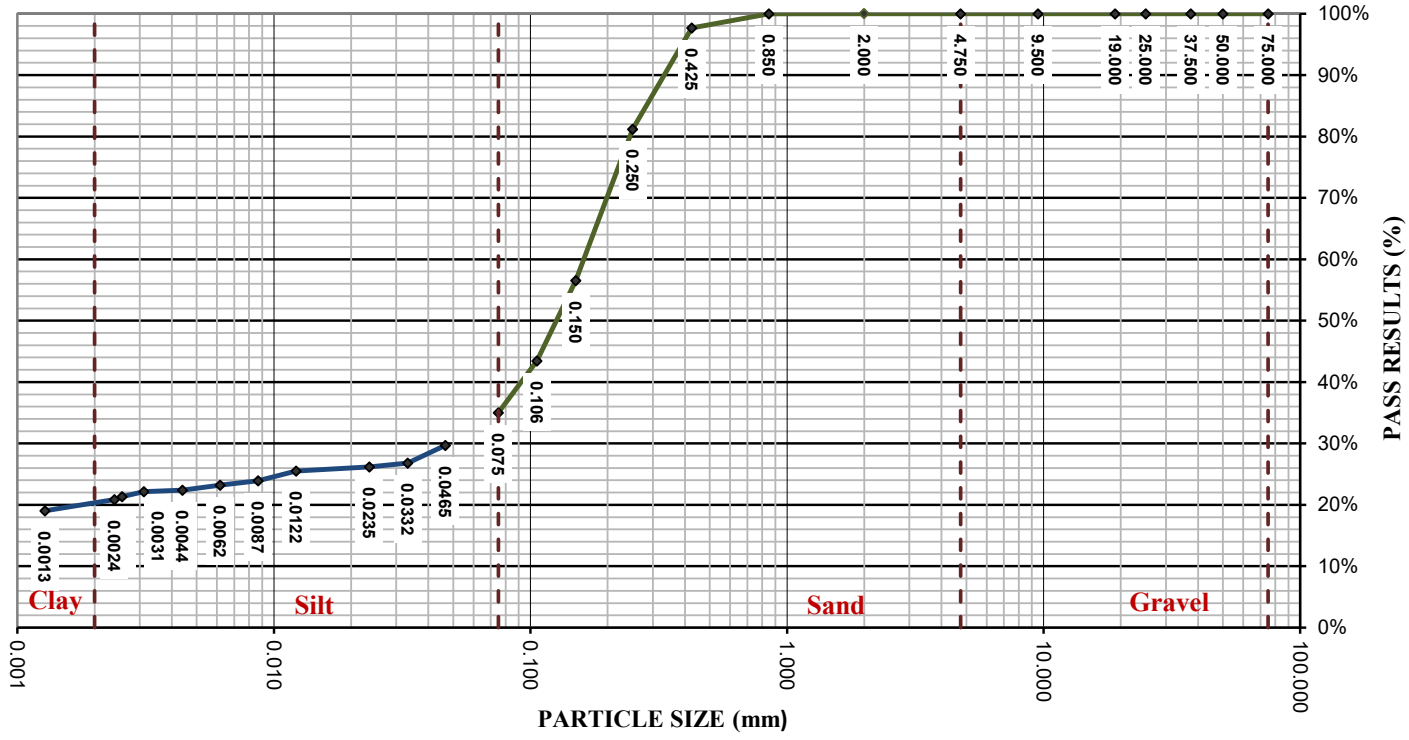
| | | | | | |
|---|---|---|---|---|---|
| Sample Number | BH3-1 | Sample Method | Grab | Visual Material Type | |
| Hydrometer Type | 151H | Sieve Method | Dry | Natural Moisture (%) | |

## LABORATORY TEST RESULTS

| Sieve Size (mm) | | 75 | 50 | 37.5 | 25 | 19 | 9.5 | 4.75 | 2.00 | 0.850 | 0.425 | 0.250 | 0.150 | 0.106 | 0.075 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pass Results (%) | | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.98 | 97.66 | 81.18 | 56.55 | 43.43 | 35.02 |
| Particle Size (mm) | | | | | 0.0465 | 0.0332 | 0.0235 | 0.0122 | 0.0087 | 0.0062 | 0.0044 | 0.0031 | 0.0026 | 0.0024 | 0.0013 |
| Pass Results (%) | | | | | 29.68 | 26.83 | 26.19 | 25.53 | 23.91 | 23.21 | 22.39 | 22.14 | 21.32 | 20.87 | 19.03 |

## GRADATIONS (%)

| Boulders | Cobbles | Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|
| 0.00% | 0.00% | 0.00% | 64.98% | 14.70% | 20.33% |




## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| Derek Uhl | No |

# PARTICLE SIZE ANALYSIS

Beairsto & Associates ENGINEERING & SURVEY

Beairsto & Associates ENGINEERING & SURVEY

**UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5**

**ASTM D6913; D7928 - PARTICLE SIZE ANALYSIS OF SOILS (HYDROMETER ANALYSIS)**

| | | | |
|---|---|---|---|
| Test Date | 7-Oct-21 | Report Number | 21GEME6061-1-HD004 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | BoreHole 1 |
| Contractor / Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

**SAMPLE & PREPARATION DETAILS**

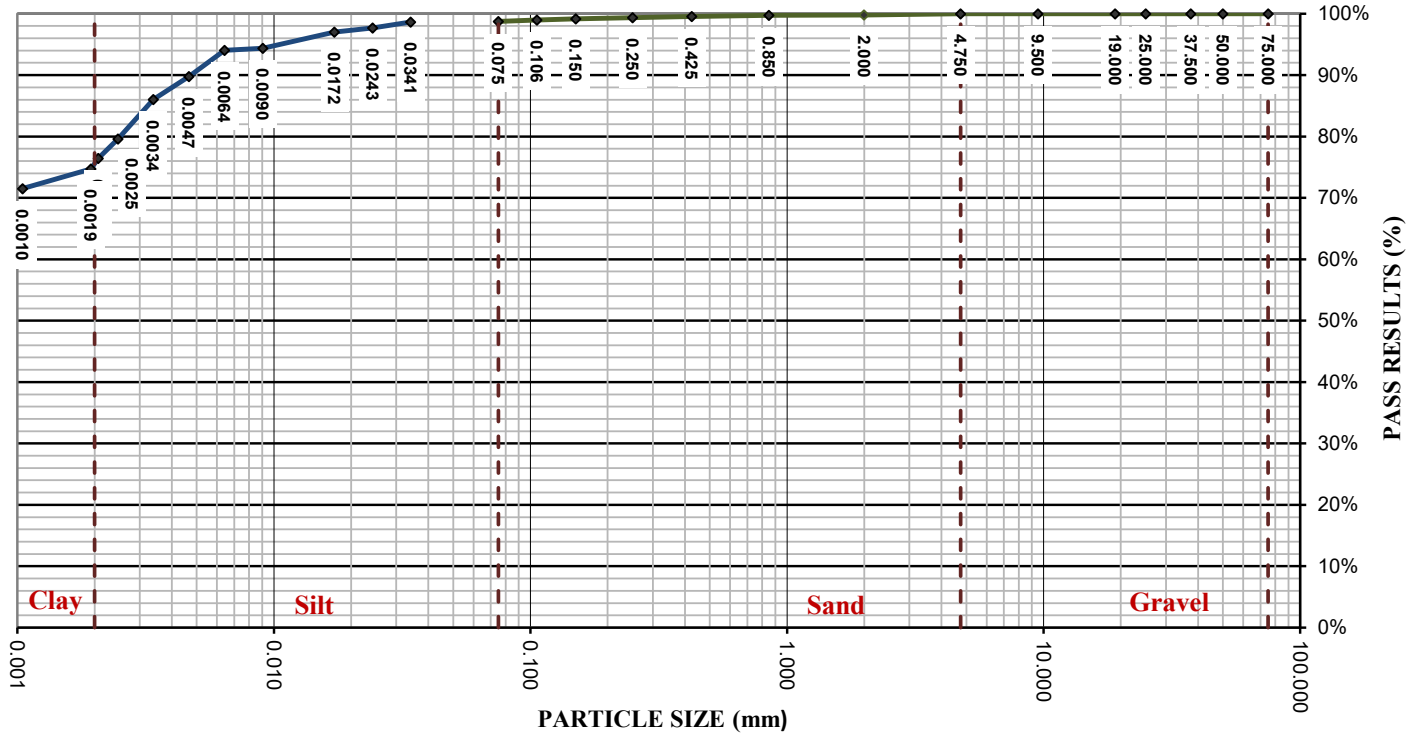
| | | | | | |
|---|---|---|---|---|---|
| Sample Number | BH1-9 | Sample Method | Spoon | Visual Material Type | |
| Hydrometer Type | 151H | Sieve Method | Dry | Natural Moisture (%) | |

**LABORATORY TEST RESULTS**

| Sieve Size (mm) | | 75 | 50 | 37.5 | 25 | 19 | 9.5 | 4.75 | 2.00 | 0.850 | 0.425 | 0.250 | 0.150 | 0.106 | 0.075 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pass Results (%) | | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.79 | 99.73 | 99.54 | 99.34 | 99.18 | 98.97 | 98.74 |
| Particle Size (mm) | | | | | 0.0341 | 0.0243 | 0.0172 | 0.0090 | 0.0064 | 0.0047 | 0.0034 | 0.0025 | 0.0021 | 0.0019 | 0.0010 |
| Pass Results (%) | | | | | 98.65 | 97.67 | 97.02 | 94.39 | 94.04 | 89.75 | 86.02 | 79.61 | 76.44 | 74.72 | 71.52 |

**GRADATIONS (%)**

| Boulders | Cobbles | Gravel | Sand | Silt | Clay |
|---|---|---|---|---|---|
| 0.00% | 0.00% | 0.00% | 1.26% | 23.17% | 75.57% |




**ADDITIONAL COMMENTS**

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| Derek Uhl | No |

# SULPHATE CONTENT

UNIT 4 - 10904 - 92 AVENUE - GRANDE PRAIRIE - ALBERTA - T8V 6B5

## ASTM C1580 - Water-Soluble Sulfate in Soil

| | | | |
|---|---|---|---|
| Test Date | 06-Oct-21 | Report Number | 21GEME6061-1-SC001 |
| File Number | 21GEME6061-1 | Lab Inspector | Ryan Bragg |
| Client | Mackenzie County | Sampled By | Bronwen Kelley |
| Project | River Road Subdivision | Sample Date | 29-Sep-21 |
| Location | Fort Vermillion, AB | Sample Location | Borehole 1-4 |
| Contractor / Driller | Green-Zone Environmental | Project Manager | Baily Lapp |

## LABORATORY TEST RESULTS

| Borehole Number | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Sample Depth | 0.75 | 1.5 | 2.25 | 0.75 |
| % SO4 (Soil) | 0.00 | 0.00 | 0.02 | 0.02 |
| **Degree** | Negligible | Negligible | Negligible | Negligible |
| **Exposure Class** | **F-2** | F-2 | F-2 | F-2 |
| Borehole Number | | | | |
| Sample Depth | | | | |
| % SO4 (Soil) | | | | |
| **Degree** | | | | |
| **Exposure Class** | | | | |
| Borehole Number | | | | |
| Sample Depth | | | | |
| % SO4 (Soil) | | | | |
| **Degree** | | | | |
| **Exposure Class** | | | | |
| Borehole Number | | | | |
| Sample Depth | | | | |
| % SO4 (Soil) | | | | |
| **Degree** | | | | |
| **Exposure Class** | | | | |

## ADDITIONAL COMMENTS

| REPORT REVIEWED BY | DEVIATIONS FROM STANDARD PROCEDURES |
|---|---|
| **Derek Uhl** | **No** |

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# APPENDIX D

# DESIGN & CONSTRUCTION GUIDELINES

# CONSTRUCTION GUIDELINE

## BACKFILL MATERIALS AND COMPACTION (MACKENZIE COUNTY)

## 1.0 DEFINITIONS

“Landscape fill” is typically used in areas such as berms and grassed areas where settlement of the fill and noticeable surface subsidence can be tolerated. “Landscape fill” may comprise soils without regard to engineering quality.

“General engineered fill” is typically used in areas where a moderate potential for subgrade movement is tolerable, such as asphalt (i.e., flexible) pavement areas. “General engineered fill” should comprise clean, inorganic granular or clay soils.

“Select engineered fill” is typically used below slabs-on-grade or where high volumetric stability is desired, such as within the footprint of a building. “Select engineered fill” should comprise clean, well graded granular soils or inorganic low to medium plastic clay soils.

“Structural engineered fill” is used for supporting structural loads in conjunction with shallow foundations. “Structural engineered fill” should comprise clean, well graded inorganic granular soils.

“Lean mix concrete” is typically used to protect a subgrade from weather effects including excessive drying or wetting. “Lean mix concrete” can also be used to provide a stable working platform over weak subgrades. “Lean mix concrete” should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

## 2.0 GENERAL BACKFILL & COMPACTION RECOMMENDATIONS

Backfill adjacent to and above footings, abutment walls, basement walls, grade beams and pile caps or below highway, street or parking lot pavement sections should comprise “general engineered fill” materials as defined above.

Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive “general engineered fill”. Such backfill should provide a relatively impervious surface layer to reduce seepage into the subsoil.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only handheld compaction equipment should be used in the compaction of fill within 1 m of retaining walls or basement walls.

All lumps of materials should be broken down during placement. Backfill materials should not be placed in a frozen state or placed on a frozen subgrade.

Where the maximum sized particles in any backfill material exceed 50 percent of the minimum dimension of the cross section to be backfilled (e.g., lift thickness), such particles should be removed and placed at other more suitable locations on site or screened off prior to delivery to site.

Bonding should be provided between backfill lifts, if the previous lift has become desiccated. For fine grained materials the previous lift should be scarified to the base of the desiccated layer, moisture conditioned and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture conditioning and recompaction.

## 3.0 COMPACTION & MOISTURE CONDITIONING

"Landscape fill" material should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of SPD.

"General engineered fill" and "select engineered fill" materials should be placed in layers of 150 mm compacted thickness and should be compacted to not less than 98 percent of SPD. Note that higher compaction levels may be specified within 300 mm of the design elevation. Cohesive materials placed as "general engineered fill" or "select engineered fill" should be compacted at 0 to 2 percent above the optimum moisture content. Granular materials placed as "general engineered fill" or "select engineered fill" should be compacted at slightly below the optimum moisture content.

"Structural engineered fill" material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100 percent of SPD at slightly below the optimum moisture content.

## 4.0 "GENERAL ENGINEERED FILL" SPECIFICATIONS

Low to high plastic clay is considered acceptable for use as "general engineered fill," assuming this material is inorganic and free of deleterious materials.

Materials meeting the specifications for "select engineered fill" or "structural engineered fill" as described below would also be acceptable for use as "general engineered fill."

## 5.0 "SELECT ENGINEERED FILL" SPECIFICATIONS

Low to medium plastic clay with the following range of plasticity properties is generally considered suitable for use as "select engineered fill":

| | |
|---|---|
| **Liquid Limit** | **= 20 to 40%** |
| **Plastic Limit** | **= 10 to 20%** |
| **Plasticity Index** | **= 10 to 30%** |

Granular materials that meet the following specifications are generally considered acceptable for use as "select engineered fill."

**Granular "Select Engineered Fill" – Percent Passing by Weight**

| Sieve Size | Mackenzie County Granular Sub-Base - 80mm | Mackenzie County Granular Material for Gravel Roadways |
|---|---|---|
| 80.0 mm | 100 | |
| 50.0 mm | 80 – 100 | |
| 25.0 mm | 50 – 75 | |
| 20.0 mm | | 100 |
| 10.0 mm | | 35-77 |
| 5.0 mm | 25 – 55 | 15-55 |
| 1.25 mm | | 0-30 |
| 80 μm | 2 – 10 | 0-12 |

In addition to the above grading limits, the following criteria should be met:

The granular material for gravel roadways should have a minimum of 40% two face fracture

**"Select Engineered Fill" – Additional Material Properties**

| Material Type | % by Weight Retained on 5.0 mm | Plasticity Index |
|---|---|---|
| Mackenzie County GSB – 80 mm | 20% min | 8 max |

*GSB – Granular Sub-base

The "gravel" should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No oversize material should be tolerated.

The materials above are also suitable for use as "general engineered fill."

## 6.0 "STRUCTURAL ENGINEERED FILL" SPECIFICATIONS

Crushed gravel used as "structural engineered fill" should be hard, clean, well graded, crushed aggregate, free of organics, coal, clay lumps, coatings of clay, silt and other deleterious materials. The aggregates should conform to the following gradation requirement .

"Structural Engineered Fill" – Percent Passing by Weight

| Sieve Size | Mackenzie County Granular Base - 20mm | Mackenzie County Granular Material for Gravel Roadways | Alberta Transportation Base Course Aggregate (D2-25 mm) |
|---|---|---|---|
| 25 mm | | | 100 |
| 20 mm | 100 | 100 | 82 – 97 |
| 16 mm | 84 – 94 | | 70 – 94 |
| 10 mm | 63 – 86 | 35-77 | 52 – 79 |
| 5 mm | 40 – 67 | 15-55 | 35 – 64 |
| 1.25 mm | 20 – 43 | 0-30 | 18 – 43 |
| 630 μm | 14 – 34 | | 12 – 34 |
| 315 μm | 9 – 26 | | 8 – 26 |
| 160 μm | **5** - 1**8** | | 5 - 18 |
| 80 μm | 2 - 10 | 0-12 | 2 - 10 |

In addition to the above grading limits, the following criteria should be met:

"Structural Engineered Fill" – Additional Material Properties

| Material Type | % Fracture by Weight (2 Faces) | Plasticity Index | L.A. Abrasion (% Loss Max) | Micro-Deval (% Loss Max) |
|---|---|---|---|---|
| Mackenzie Granular Base -20mm | 60 min | 6 max | | |
| D2-25 mm | 50 min | 6 max | 50 | 21 |

Materials that meet the above grading limits and material property criteria are also suitable for use as "select engineered fill."

# 7.0 DRAINAGE MATERIALS

The materials presented below may be used for drainage purposes. It is recommended that a Geotechnical Engineer reviews the material to be used for a specific purpose given that not all the materials presented below would be suitable for all purposes.

## 7.1 Mackenzie County

Drainage Material – Percent Passing by Weight

| Sieve Size | Mackenzie County Washed Rock | Alberta Transportation Granular Filter Aggregate (D8-25 mm) |
|---|---|---|
| 25 mm | 100 | 100 |
| 16 mm | | 90-100 |
| 10 mm | | 45-75 |
| 5 mm | 60 or more | 0-15 |
| 1.25 mm | | 0-5 |
| 80 □m | 30 or less | |

## 8.0 BEDDING MATERIALS

Bedding sand that meets the following gradation are considered acceptable.

| Sieve Size | Mackenzie County Granular Bedding Sand |
|---|---|
| 2.5 mm | 100 |
| 315 μm | 60 or more |
| 160 μm | 30 or less |
| 80 μm | 20 or less |

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# APPENDIX E

# GEOTECHNICAL TERMS & CONDITIONS

# Geotechnical General Terms, Conditions and Limitations

1. STANDARD OF CARE - In the performance of professional services, Beairsto and Associate Engineering Ltd. (BASE) used the degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession practicing in the same or similar localities. No other warranty expressed or implied is made in any manner.
2. INTERPRETATION OF THE REPORT - The CLIENT recognizes that subsurface conditions will vary from those encountered at the location where borings, surveys, or explorations are made and that the data, interpretations and recommendation of BASE are based solely on the information available to him. Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities will be based on commonly accepted practices in geotechnical or environmental consulting practice in this area. BASE will not be responsible for the interpretation by others of the information developed.
3. SITE INFORMATION - The CLIENT has agreed to provide all information with respect to the past, present and proposed conditions and use of the Site, whether specifically requested or not. The CLIENT acknowledged that in order for BASE to properly advise and assist the CLIENT, BASE has relied on full disclosure by the CLIENT of all matters pertinent to the Site investigation.
4. COMPLETE REPORT - The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to BASE by the CLIENT, communications between BASE and the CLIENT, and to any other reports, writings or documents prepared by BASE for the CLIENT relative to the specific Site, all of which constitute the Report. The word "Report" shall refer to any and all of the documents referred to herein. In order to properly understand the suggestions, recommendations and opinions expressed by BASE, reference must be made to the whole of the Report. BASE cannot be responsible for use of any part or portions of the report without reference to the whole report. The CLIENT has agreed that "This report has been prepared for the exclusive use of the named CLIENT. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. BASE accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report."
   The CLIENT has agreed that in the event that any such report is released to a third party, the above disclaimer shall not be obliterated or altered in any manner. The CLIENT further agrees that all such reports shall be used solely for the purposes of the CLIENT and shall not be released or used by others without the prior written permission of BASE.
5. LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER
   There is no warranty, expressed or implied, by BASE that
   a) the investigation uncovered all potential geo-hazards, contaminants, or environmental liabilities on the Site; or
   b) the Site is entirely free of all geo-hazards or contaminants as a result of any investigation or cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential geo-hazards or contaminants on the Site

   The CLIENT acknowledged that:
   a) the investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;
   b) unless specifically stated in the agreed Scope of Work, the investigation will not, nor is it intended to assess or detect potential contaminants or environmental liabilities on the Site;
   c) any assessment regarding geological conditions on the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations, hence there can be no assurance that undetected geological conditions, including soils or groundwater are not located on the Site;
   d) any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
   e) any assessment is also limited by the scientific possibility of determining the presence of unsuitable geological conditions for which scientific analyses have been conducted; and
   f) the laboratory testing program and analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation; and
   g) there are risks associated with the discovery of hazardous materials in and upon the lands and premises which may inadvertently discovered as part of the investigation. The CLIENT acknowledges that it may have a responsibility in law to inform the owner of any affected property of the existence or suspected existence of hazardous materials and in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed. The CLIENT further acknowledges that any such discovery may result in the fair market value of the lands and premises and of any other lands and premises adjacent thereto to be adversely affected in a material respect.
6. COST ESTIMATES - Estimates of remediation or construction costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for construction or remediation are based on the known site conditions, which can vary as new information is discovered during construction. As some construction activities are an iterative exercise, BASE shall therefore not be liable for the accuracy of any estimates of remediation or construction costs provided.
7. LIMITATION OF LIABILITY - The CLIENT has agreed that to the fullest extent permitted by the law BASE's total liability to CLIENT for any and all injuries, claims, losses, expenses or damages whatsoever arising out of or in anyway relating to the Project is contractually limited, as outlined in BASE's standard Consulting Services Agreement. Further, the CLIENT has agreed that to the fullest extent permitted by law BASE is not liable to the CLIENT for any special, indirect or consequential damages whatsoever, regardless of cause.
8. INDEMNIFICATION - To the fullest extent permitted by law, the CLIENT has agreed to defend, indemnify and hold BASE, its directors, officers, employees, agents and subcontractors, harmless from and against any and all claims, defence costs, including legal fees on a full indemnity basis, damages, and other liabilities arising out of or in any way related to BASE's work, reports or recommendations.