



Invitation To Tender

INVITATION TO TENDER NO. PS20210225 (the "ITT")

CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI STREET @ BUTE STREET

ITT NO. PS20210225

Issue Date: April 30, 2021

Issued by: City of Vancouver

Tenders are to be emailed to bids@vancouver.ca and must be received at bids@vancouver.ca prior to 3:00pm, Vancouver Time (as defined in Note 3 below), on May 27, 2021 (the “Closing Time”).

Tenders will be not be publicly opened. Tender results can be found within 48 hours of the Closing Time at the following website:

<http://vancouver.ca/doing-business/unverified-tender-results.aspx>

NOTES:

1. Tenders must be delivered to the email addressed specified above prior to the Closing Time.
2. “Vancouver Time” will be conclusively deemed to be the time indicated in the electronic timestamp the Tender receives upon delivery to the email address specified herein, which is in turn synchronized to Network Time Protocol (NTP) provided by the National Research Council of Canada adjusted to local Pacific Time Zone.
3. The City of Vancouver is open on business days from 8:30 a.m. to 4:30 p.m., Vancouver Time, and is closed Saturdays, Sundays, and holidays.
4. DO NOT SUBMIT TENDERS BY FAX.
5. All queries related to this ITT should be submitted in writing to the attention of:

Jason Lo, Contracting Specialist

Email: jason.lo@vancouver.ca

(the “Contact Person”)

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
TABLE OF CONTENTS

PART A - INTRODUCTION

Pages A-1 to A-12

- 1.0 Overview of Project
- 2.0 Sustainability
- 3.0 Tender Documents
- 4.0 Intentionally Deleted
- 5.0 Administrative Requirements
- 6.0 Conduct of ITT - Inquiries and Clarifications
- 7.0 Intentionally omitted

APPENDICES TO PART A - INTRODUCTION

- Appendix 1 Response Notification Form (1)
- Appendix 2 Specifications and Drawings

PART B - TERMS AND CONDITIONS OF ITT PROCESS

Pages B-1 to B-10

- 1.0 Definitions and Interpretation
- 2.0 Submission Instructions
- 3.0 Bonds
- 4.0 Tender Price
- 5.0 Acceptance of Tenders
- 6.0 Award of Contract
- 7.0 Examination of Tender Documents
- 8.0 Site Examination/Pre-Submission Due Diligence By Tenderer
- 9.0 Interpretation and Clarifications
- 10.0 Product Approval
- 11.0 Insurance
- 12.0 WorkSafeBC
- 13.0 Labour Rates and Equipment
- 14.0 Lists of Subcontractors and Suppliers
- 15.0 Taxes and Fees
- 16.0 Non-Resident Withholding Tax
- 17.0 No Claim Against the City
- 18.0 Dispute Resolution
- 19.0 Confidentiality and Privacy
- 20.0 Release of Information Restricted

PART C - FORM OF TENDER

Pages FT1 to FT25

- 1.0 Tender Price and Schedule
- 2.0 Electronic Payments Acknowledgement
- 3.0 Irrevocability; Notice of Award
- 4.0 Notice to Proceed
- 5.0 Conditions
- 6.0 Addenda, Amendments and Questions and Answers
- 7.0 Certification
- 8.0 Labour
- 9.0 Contract Terms in the ITT

Schedule "A" Schedule of Quantities and Prices

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
TABLE OF CONTENTS

Schedule "B"	Preliminary Construction Schedule
Schedule "C"	Subcontractors and Suppliers
Schedule "D"	Tenderer's Experience with Related Work
Schedule "E"	Force Account Labour & Equipment Rates
Schedule "F"	Form of Consent of Surety
Schedule "G"	Sustainability
Schedule "H"	Certificate of Insurance
Schedule "I"	Certificate of Existing Insurance
Schedule "J"	Undertaking of Insurance
Schedule "K"	Declaration of Supplier Code of Conduct Compliance
Schedule "L"	Conflict of Interest Declaration

PART D - FORM OF AGREEMENT

Form of Agreement

Pages AGT1 to AGT77

Schedule 1 - General Conditions
Schedule 2 - Specifications and Drawings
Schedule 3 - Schedule of Quantities and Prices
Schedule 4 - Subcontractors and Suppliers
Schedule 5 - Construction Schedule
Schedule 6 - Performance and Labour and Material Payments Bonds
Schedule 7 - Insurance Certificates
Schedule 8 - Force Account Labour and Equipment Rates
Schedule 9 - Insurance
Schedule 10 - City Pre-Contract Hazard Assessment Form
Schedule 11 - Contractor Pre-Contract Hazard Assessment Form

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART A - INTRODUCTION

1.0 OVERVIEW OF PROJECT

- 1.1 The City of Vancouver (the “City”) invites Tenders for the Water Main Trenchless Crossing Alberni Street @ Bute Street.
- 1.2 The Work generally includes, but is not limited to:
- involving the installation of steel casing pipe and ductile iron transmission water main along Bute Street, crossing Alberni Street
- 1.3 The Work Site is located at Bute Street, between W Pender Street and Haro Street, British Columbia. The Work Site is further described in the Tender Documents, including the Specifications and Drawings attached as **Appendix 2**.
- 1.4 The purpose of this ITT is to select a Tenderer with the capability and experience to efficiently and cost-effectively perform and complete the Work.
- 1.5 IF A POTENTIAL TENDERER BELIEVES THAT THE CITY MAY BE UNABLE TO SELECT IT DUE TO A CONFLICT OF INTEREST, BUT IS UNCERTAIN ABOUT THIS, THE POTENTIAL TENDERER IS URGED TO CONTACT THE CONTACT PERSON AS SOON AS POSSIBLE WITH THE RELEVANT INFORMATION SO THAT THE CITY MAY ADVISE THE POTENTIAL TENDERER REGARDING THE MATTER. SEE SCHEDULE “L” FOR AN INDICATION OF THE TYPES OF CONFLICTS OF INTEREST THAT OFTEN ARISE.

2.0 SUSTAINABILITY

- 2.1 The City’s Procurement Policy, Ethical Purchasing Policy and related Supplier Code of Conduct found at <http://vancouver.ca/doing-business/selling-to-and-buying-from-the-city.aspx> align the City’s approach to procurement with its corporate social, environmental and economic sustainability values and goals. They evidence the City’s commitment to maximize benefits to the environment through product and service selection, and to ensure safe and healthy workplaces, where human and civil rights are respected. Each Tenderer is expected to adhere to the supplier performance standards set forth in the Supplier Code of Conduct.
- 2.2 A Contractor is to provide environmentally sensitive products or services wherever possible. Where there is a requirement that a Contractor supply materials, and where such materials may cause adverse environmental effects, each Tenderer should indicate the nature of the hazard(s) in its Tender. Furthermore, each Tenderer should advise the City of any known alternatives or substitutes for such materials that would mitigate such adverse effects.

3.0 TENDER DOCUMENTS

- 3.1 The Tender Documents consist of the following and include the documents referred in Section 3.3 below):
- (a) Part A - Introduction, and its appendices:
 - (i) Appendix 1 - Response Notification Form; and
 - (ii) Appendix 2 - Specifications and Drawings;

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART A - INTRODUCTION

- (b) Part B - Terms and Conditions of ITT Process;
 - (c) Part C - Form of Tender (including all schedules),
 - (d) Part D - Form of Agreement (including all schedules);
 - (e) the Specifications (available separately and to be incorporated into the Contract when finalized);
 - (f) the Drawings (available separately and to be incorporated into the Contract when finalized);
 - (g) all addenda or amendments to the ITT, and all questions and answers in connection with the ITT, issued in writing by the City prior to the Closing Time, as well as any addenda, amendments or questions and answers issued in writing by the City after the Closing Time and accepted in writing by the Tenderers.
- 3.2 Specifications and Drawings will be made available on the City's website at <https://bids.vancouver.ca/bidopp/openbid.htm> and by searching for the ITT's reference number PS20210225.
- 3.3 The Specifications and Drawings include the "Master Municipal Specifications and Standard Detail Drawings" contained within Volume II of the Master Municipal Construction Document, supplemented by the City of Vancouver Construction Specification @2019 <https://vancouver.ca/files/cov/engineering-construction-specifications.PDF>. For certainty, all of Volume I and the following parts of Volume II of the MMCD are expressly excluded from the Tender Documents: Instructions to Tenderers - Part II. General Conditions (including Schedule 17.5.3 Letter Agreement with Referee, Changes and Extra Work flow chart, and Dispute Resolution Process flow chart).
- 4.0 INTENTIONALLY DELETED**
- 5.0 ADMINISTRATIVE REQUIREMENTS**
- 5.1 Tenderers are asked to indicate their intentions to submit Tenders by submitting the Response Notification Form (Appendix 2) to the Contact Person by email on or before **May 20, 2021**.
- 5.2 It is the sole responsibility of each Tenderer to check the City's website at <http://vancouver.ca/doing-business/open-bids.aspx> regularly for addenda, amendments and questions and answers related to this ITT, which the City may issue at any time during the process, and for any reason, at its discretion.
- 6.0 CONDUCT OF ITT - INQUIRES AND CLARIFICATIONS**
- 6.1 The City will have conduct of this ITT, and all communications are to be directed only to the Contact Person named on the cover page. Any communication from potential Proponents to City staff other than the contact person regarding the content of this RFP may lead to disqualification of the Proponent from this RFP process, at the City's sole discretion.
- 6.2 It is the responsibility of each Tenderer to thoroughly examine the Tender Documents and satisfy itself as to the full requirements of this ITT and their acceptability to the Tenderer.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART A - INTRODUCTION

6.3 The City welcomes inquiries, requests for clarification or comments from registered Tenderers. All inquiries or comments to the City must be in written form only. All inquiries, requests for clarification and comments must be e-mailed to jason.lo@vancouver.ca prior to **3 pm May 20, 2021**, and must in each case be addressed to the attention of the Contact Person. In response to inquiries, requests for clarification or comments, the City, in its sole discretion, may make amendments to this ITT or may issue questions and answers to all Tenderers who have submitted a Response Notification Form and post them on the City's website.

7.0 ELIGIBILITY TO PARTICIPATE - Intentionally Deleted

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
APPENDIX 1 (PART A) - RESPONSE NOTIFICATION FORM



CITY OF VANCOUVER
Purchasing Services

Invitation to Tender No. PS20210225

To acknowledge your intent to submit a Tender and to ensure that you receive the required information, please submit this form to the person identified below in accordance with the ITT:

Jason Lo
City of Vancouver
Email: jason.lo@vancouver.ca

Your details:

Tenderer's Legal

Name:

"Tenderer"

Address:

Telephone:

Key Contact Person:

E-mail:

We **WILL** ☐ / **WILL NOT** ☐ submit a Tender in response to ITT No. PS20210225, "CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET" on or before the Closing Time.

Signature

Name of Authorized Signatory (Please print)

E-mail Address (Please print)

Date

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
APPENDIX 2 (PART A) - SPECIFICATIONS AND DRAWINGS

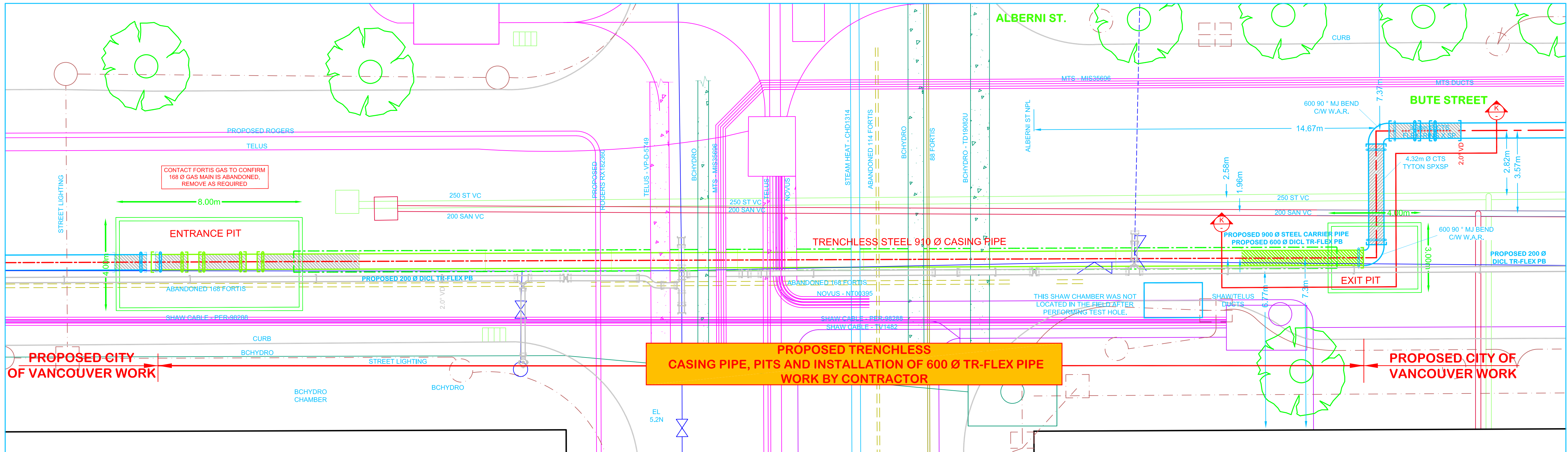
The following is the Specifications dated April 30, 2021 for Water Main Trenchless Crossing Alberni Street @ Bute Street:

Project Specific Specifications for Water Main Trenchless Crossing Alberni Street @ Bute Street

See Attached.

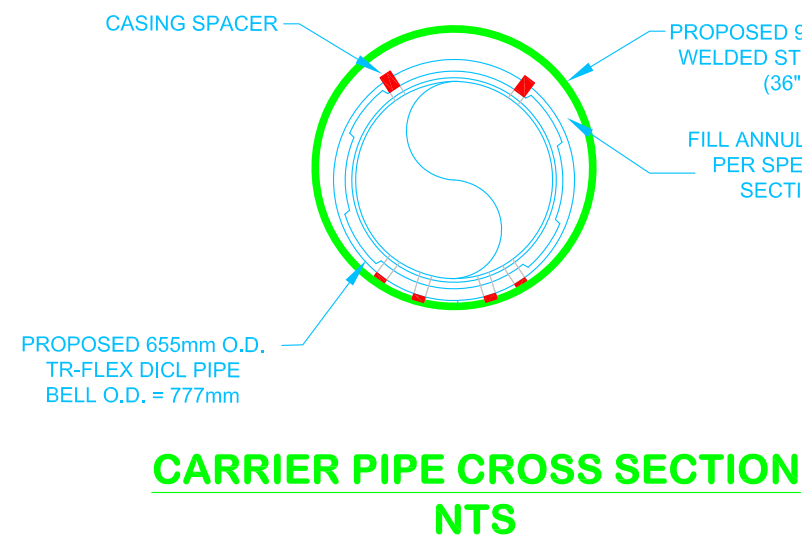
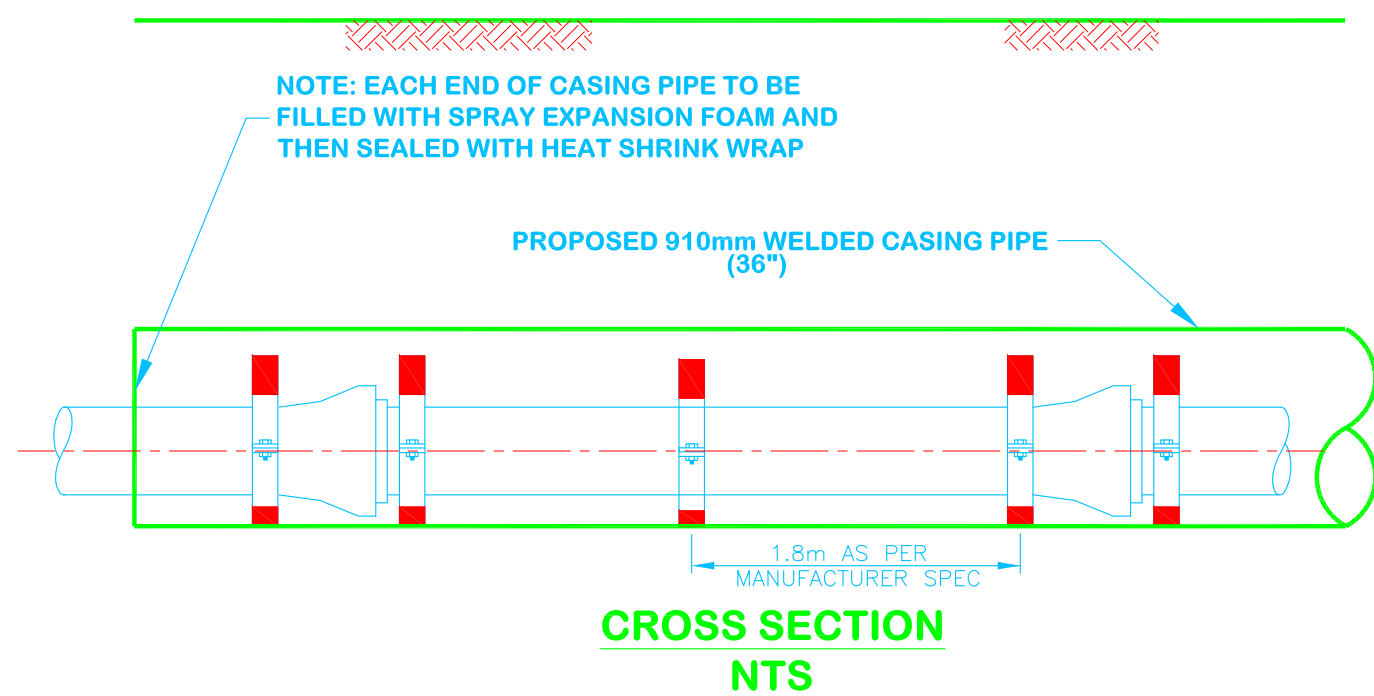
- Project Location and Site Plan - April 28, 2021
- Contract Drawing AB2025 (Sheet 12) - COV Engineering Services - Waterworks - April, 27 2021
- Drawing for Information AB2025 (Sheet 11) - COV Engineering Services - Waterworks - April, 28 2021
- Specification
 - Section 02161 Shaft Excavation and Support
 - Section 02311 Microtunneling
 - Section 02312 Open Shield Pipe Jacking
 - Section 02400 Augered Crossing
 - Section 02000 Annular Space Grouting
 - Section 02626 Welded Steel Pipe, Pipe Jacking Installation
 - Supplementary Information
- Tetra Tech Geotechnical Assessment for Haro Street Transmission Main - Trenchless Section, Dated April 20, 2021 File: 704-ENG.VGEO03478-02

DATE: 2021-04-27 - 10:14am (ensc)
PATH: \\V:\WATER\Projects\Construction\2021\13-8000-10-000200 - Bute Street, W Pender St to Haro St - 2021\Design\Bute Street Design April 25 2021.dwg
LAYOUT: Detail Sheets



NOT FOR CONSTRUCTION

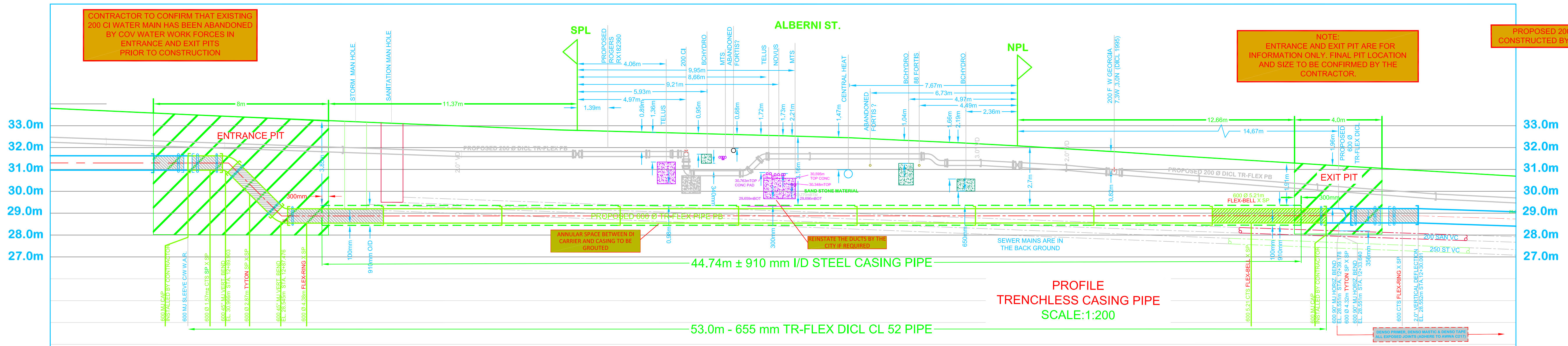
ISSUE FOR TENDER



PIPE SPECIFICATIONS	
CARRIER PIPE	AWWA CLASS 52 (DUCTILE IRON) O.D. 655mm W.T. 8.3mm OPERATING PRESSURE 110 PSI I.D. 600mm TR-FLEX JOINT
CASING PIPE	STEEL 35000 PSI MIN. YIELD STRENGTH I.D. 910mm W.T. 13.5mm WELDED JOINTS
CASING SPACER	CALPICO MODEL M8 SERIES OR EQUIVALENT I.D. 655mm W.T. 13.5mm 1.8m (6") SPACED DISTANCE

THE DEAD GAS MAIN WAS INSTALLED AT A TIME WHEN COAL-TAR ENAMEL COATING WAS USED ON FORTISBC'S STEEL GAS MAINS. COAL-TAR COATING IS KNOWN TO CONTAIN ASBESTOS AND POLYCYCLIC AROMATIC HYDROCARBONS ("PAH'S"). AS A RESULT, IF COAL-TAR COATING IS PRESENT ON THESE DEAD GAS MAINS, SAFE WORKING PROCEDURES FOR HANDLING ASBESTOS MUST BE FOLLOWED WHEN CUTTING THROUGH THE COAL TAR ENAMEL COATING. IN ADDITION, THE REMOVED SECTIONS OF THE GAS LINE MUST BE HANDLED, STORED, TRANSPORTED AND DISPOSED OF IN ACCORDANCE WITH REGULATORY REQUIREMENTS

PLEASE REFER TO: GEOTECHNICAL REPORT
704-ENG.VGE003478-02
DATED APRIL 20, 2021
PROVIDE BY TETRA TECH



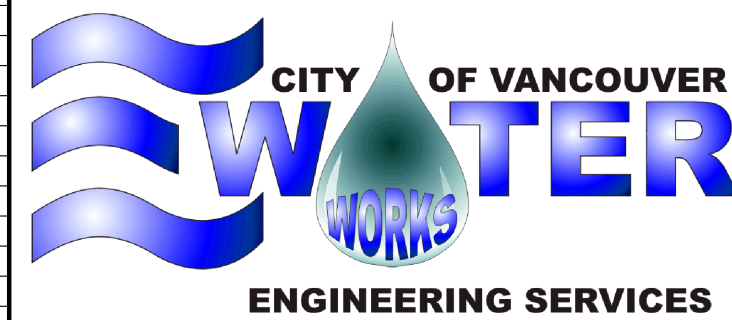
WATERWORKS OPERATIONS - RECORD DRAWING DETAILS	
DATE STARTED	DATE FINISHED
TYPE OF SOIL: CLAY, PEAT, NATIVE OTHER IMPORTED	AM'T OF COVER
PIPE TYPE: Class 52	CLEANED & CHLORINATED
FOREMAN	TRUCK #

GIS DETAILS	
COMMENTS	GIS DATE
	GIS INITIALS

SYMBOL LEGEND

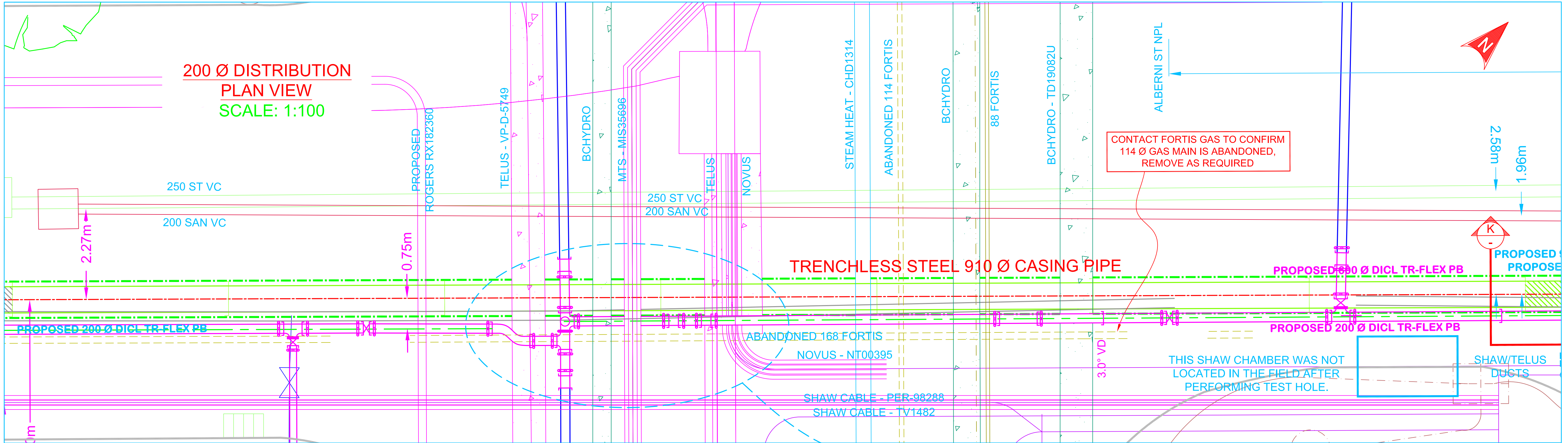
EXISTING GATE VALVE	PROPOSED GATE VALVE
EXISTING FIRE HYDRANT	PROPOSED FIRE HYDRANT
EXISTING TEE	PROPOSED TEE
EXISTING CROSS	PROPOSED CROSS
EXISTING PLUG	PROPOSED WOODEN PLUG
EXISTING REDUCER	PROPOSED WATERMAIN
EXISTING BEND	PROPOSED CAP
ABANDON EXISTING GATE VALVE	PROPOSED REDUCER
REMOVE EXISTING FIRE HYDRANT	PROPOSED THRUST BLOCK
ABANDON EXISTING REDUCER	PROPOSED SLEEVE

NO.	DATE	ISSUED FOR TENDER	REVISION	BY
1	2021-04-27	ISSUED FOR TENDER		SC



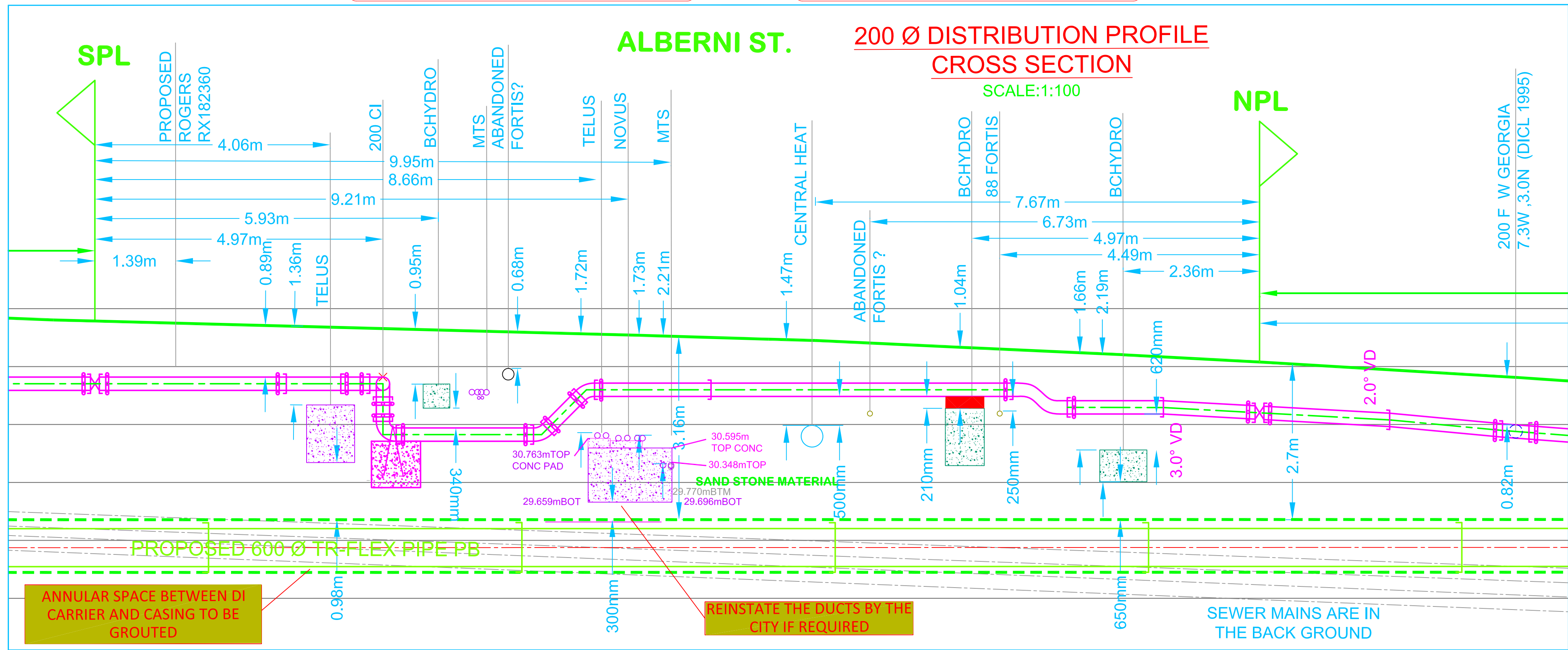
SEWER CHECK:	UTILITY CHECK:
WATERWORKS ENGINEER	CITY OF VANCOUVER - ENGINEERING SERVICES
DIV./BR. WAT. SERV. & YDS	DATE: 2021-APRIL-27
WATER DESIGN	DESIGN: S.C.
DWG. NO. S.C.	CHK:
REFS:	SHEET 10 OF 10 REVISION: 000000
	AB 2025
	THIS PRINT SUPERSEDES ALL PRINTS OF THIS DRAWING BEARING PREVIOUS REVISION NUMBERS

DATE: 2021-04-28 - 3:01pm (ense)
PATH: \\WATER\Projects\Construction\2021\13-8000-10-0000200 - Bute Street, W. Pender St. to Haro St. TM - 2021\Design\Bute Street Design April 25 2021.dwg
LAYOUT: Detail Sheets

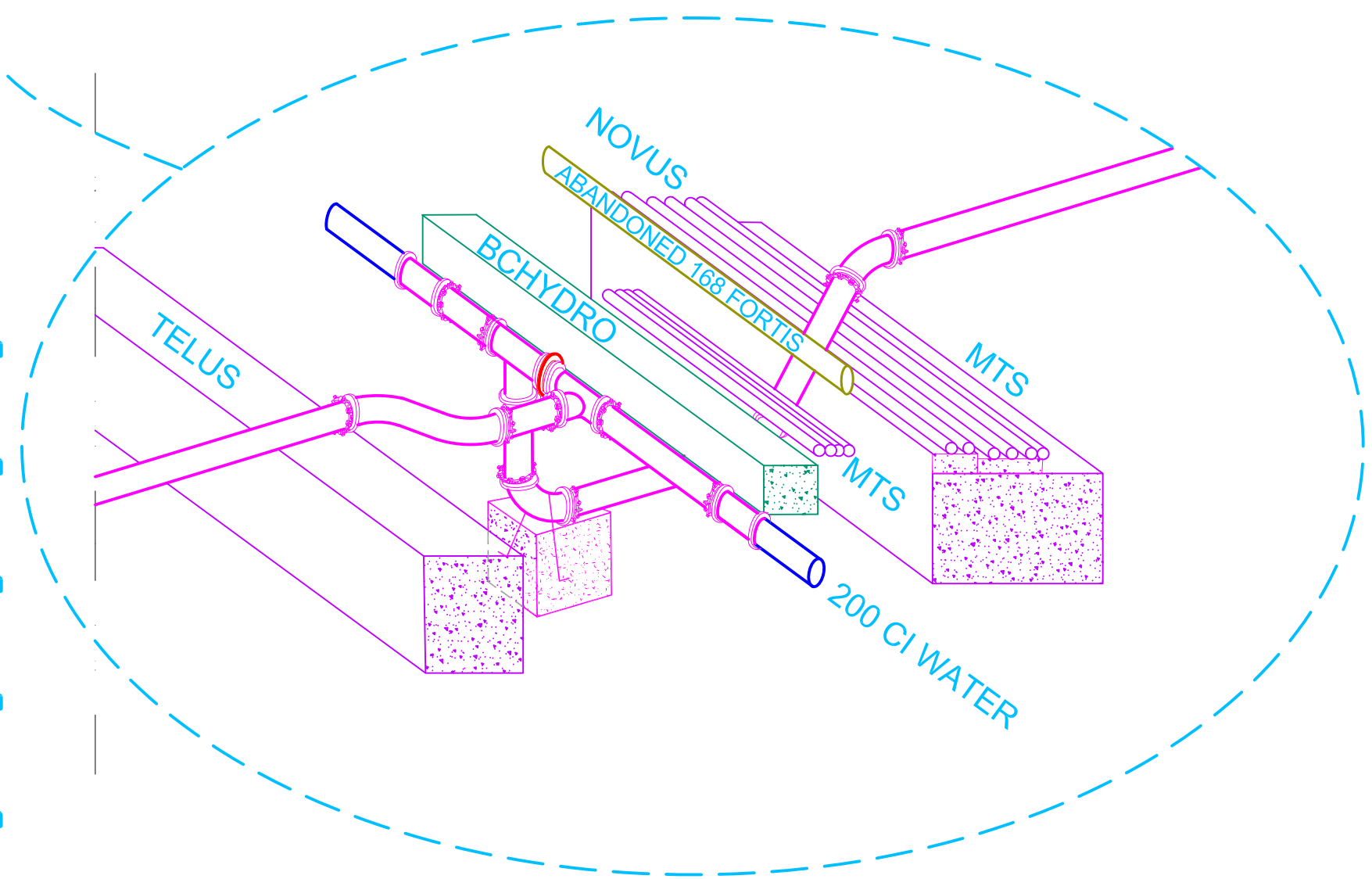


NOT FOR CONSTRUCTION

FOR INFORMATION ONLY



SUPPORT IN PLACE EXISTING BC HYDRO CONCRETE DUCTS AS PER STAMPED DRAWING DB 3909 SHEET 16 OF 16



3D VIEW BLOW UP
200 Ø TIE-IN @ ALBERNI ST.
NOT TO SCALE

WATERWORKS OPERATIONS - RECORD DRAWING DETAILS	
DATE STARTED	DATE FINISHED
TYPE OF SOIL CLAY, PEAT, NATIVE, OTHER, IMPORTED	AM'T OF COVER
PIPE TYPE Class 52	CLEANED & CHLORINATED
FOREMAN	TRUCK #
COMMENTS	
GIS DETAILS	
GIS DATE	GIS INITIALS

SYMBOL LEGEND	
EXISTING GATE VALVE	PROPOSED GATE VALVE
EXISTING FIRE HYDRANT	PROPOSED FIRE HYDRANT
EXISTING TEE	PROPOSED TEE
EXISTING CROSS	PROPOSED CROSS
EXISTING PLUG	PROPOSED WOODEN PLUG
EXISTING REDUCER	PROPOSED WATERMAIN
EXISTING BEND	PROPOSED CAP
ABANDON EXISTING GATE VALVE	PROPOSED REDUCER
REMOVE EXISTING FIRE HYDRANT	PROPOSED THRUST BLOCK
ABANDON EXISTING REDUCER	PROPOSED SLEEVE

NO.	DATE	ISSUED FOR INFORMATION ONLY	REVISION
A	2021-04-28	ISSUED FOR INFORMATION ONLY	



SEWER CHECK:	UTILITY CHECK:	CITY OF VANCOUVER - ENGINEERING SERVICES	
WATERWORKS ENGINEER	DIGITAL SEAL GOES HERE	DWG. NO. 13-8000-10-0000200	REVISION: A
DATE: 2/21/21		DESIGN: S.G.	CHK:
DWG. NO. 13-8000-10-0000200		SHEET 11 OF 16	
THIS PRINT SUPERSEDES ALL PRINTS OF THIS DRAWING BEARING PREVIOUS REVISION NUMBERS		AB 2025	

1. GENERAL

1.0 Summary of Work

- 1.0.1 The Contractor shall furnish all materials and equipment necessary for excavation and support of shaft excavations for Microtunneling, Open Shield Pipe Jacking Operations or Augered Boring. Shaft shall be constructed through the geotechnical materials as indicated in the Tetra Tech Geotechnical Assessment for Haro Street Transmission Main – Trenchless Section, Dated April 20, 2021 File: 704-ENG.VGEO03478-02. (Geotechnical Report).

1.1 Related Sections

- | | | |
|-------|--------------------------|---------------|
| 1.1.0 | Microtunneling | Section 02311 |
| 1.1.1 | Open Shield Pipe Jacking | Section 02312 |
| 1.1.2 | Augered Crossings | Section 02400 |

1.2 Reference Specifications, Codes and Standards

- 1.2.1 Not Used.

1.3 Definitions

N/A

1.4 Design Criteria

- 1.4.1 Excavation support systems shall be designed by a Civil or Structural Engineer registered in the Province of British Columbia.
- 1.4.2 The Contractor is fully responsible for selection of the shaft types, sizes and method of constructions. The size of the shafts shall be adequate to support tunnelling, microtunneling or open shield pipe jacking operations. Shafts shall be designed for the anticipated geotechnical and hydrogeological conditions as indicated in the Geotechnical Report. Shaft designs are subject to review and approval by the Contract Administrator. Contractor shall determine most appropriate shaft type for construction through site soils.
- 1.4.3 Excavation support systems shall be designed by the Contractor to support earth pressure, groundwater pressure, utility loads, equipment, traffic loads, surcharge loads and bottom heave.

- 1.4.4 Excavation support systems shall not damage adjacent structures including buildings, pipelines, and utilities.
- 1.4.5 Excavation support systems shall be generally watertight with a permitted total maximum leakage rate into a shaft of no more than 40 litres per minute. If leakage exceeds this maximum allowable leakage rate, the Contractor shall make changes to reduce the rates to acceptable levels. Leakage shall be free of any soil fines. Contractor shall be responsible for selection of ground improvements to maintain a watertight condition. Dewatering outside of the shafts shall not be permitted.
- 1.4.6 Excavation support systems shall include site grading, fencing, signage, construction of staging areas, design and construction of shaft excavations and excavation support systems, material disposal, control of groundwater, surface water and construction water, backfilling, abandoning shafts, and site restoration.
- 1.4.7 Staging areas shall be approved by the Contract Administrator.
- 1.4.8 Excavation support systems shall be constructed within the staging area.
- 1.4.9 Blasting will not be permitted during shaft construction. If rock is encountered, jack hammering may be used upon approval from the Contract Administrator.
- 1.4.10 Contractor shall design a tremie or base slab to seal the shaft from groundwater inflows and to resist uplift of the completed shaft. Tremie slab reinforcing shall be designed to structurally tie the slab to the shaft walls. The minimum acceptable factor of safety for resistance to uplift shall be 1.2 under the most extreme loading condition.
- 1.4.11 Contractor shall incorporate a sump to remove any groundwater, rainwater, runoff, or construction water that enters the shaft during shaft and tunnelling or pipe jacking operations. Contractor shall refer to the City of Vancouver discharge requirements for collected water.
- 1.4.12 Contractor shall design shafts for staged installation and removal of necessary portions to accommodate construction of connections to entry and exit of the proposed storm sewer and backfill sequences.
- 1.4.13 Launch and retrieval seals shall be provided at the shafts. These seals shall consist of one or more rubber flanges attached to a steel housing.
- 1.4.14 The shafts shall be equipped with a continuous flammable gas monitor (with alarms if gas concentrations exceed regulatory thresholds). The Contractor shall ensure independent emergency personal breathing systems are provided to each worker working in the shaft and tunnel sections per Health and Safety Guidelines.
- 1.4.15 Maintain the shafts free of waste and debris at all times.
- 1.4.16 Protect and maintain the shaft support systems from damage from the muck disposal system or from any other equipment.
- 1.4.16 Deviation from plumb shall not exceed 300 mm in 30 metres. Correction of shaft deviation and any construction and associated costs resulting from relocation of appurtenances inside the shaft,

including pipe connections caused by the shaft's deviation or other deficiencies in workmanship shall be completed at the Contractor's expense.

1.5 Submittals

- 1.5.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.5.2 Shaft Excavation and Support Work Plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed methods of construction, shaft types and dimensions, initial support system, ground improvements, equipment, materials, and the sequence of operations during construction. This work plan shall include:
 - 1.5.2.1 Sequence of shaft construction.
 - 1.5.2.2 Description of equipment and procedures to be used to construct the shafts through the overlying soils as indicated in the Geotechnical Report.
 - 1.5.2.3 Description of ground improvement measures and procedures to create watertight conditions.
 - 1.5.2.4 Description of shoring, bracing, reinforcement, and connection details.
 - 1.5.2.5 Description and procedures for providing groundwater control during launch and retrieval of tunnelling or pipe jacking equipment.
 - 1.5.2.6 Description of methods and procedures of excavation including methods for hoisting excavated material, stockpiling, and fully containing spoils.
 - 1.5.2.7 Description of methods for hauling and disposal of excavated materials.
 - 1.5.2.8 Written documentation signed by an approved disposal site indicated that the site will accept the spoil and that the site is in compliance with all applicable Provincial and Federal regulations.
 - 1.5.2.9 Procedures for checking and maintaining plumbness of shaft components.
 - 1.5.2.10 Connection details to vertical risers and open cut reaches.
 - 1.5.2.11 Description of contingency plans for excessive movement of shaft elements, flooding, bottom heave, sloughing or caving earth.
- 1.5.3 Shop drawings showing plan and section views of shaft support systems, dimensions and sizes. Drawings shall describe proposed shaft elements, vertical risers, and equipment staging within staging areas at both shaft locations. Equipment shall include cranes, front-end loader, spoil transfer areas, spoil containment system, spoil hauling equipment, pumps, generators, tool trailers, containers, and any other required equipment.
- 1.5.4 Construction schedule: Submit a detailed schedule showing all major construction activities and durations including mobilization, site preparation, shaft construction, working slab construction, equipment setup, entry seal installation, tunnelling, initial support system installation, exit seal installation, machine retrieval, annular space grouting (outside of initial support system), carrier pipe installation, annular space grouting (between carrier pipe and initial support system), shaft backfilling, site restoration and cleanup, and demobilization. Schedule is to include intended number of working hours per day and week and typical daily start and finish times. Schedule is to be maintained and updated by the Contractor every two (2) weeks.
- 1.5.5 Calculations: Submit design calculations for the shaft support systems demonstrating that the system is capable of supporting the maximum loads anticipated by the Contractor during shaft construction, tunnelling or pipe jacking operations and backfilling, consistent with the conditions

defined in the Geotechnical Report. Design calculations shall consider ground and hydrostatic loads, equipment, construction loads, and any other surcharge loads that may be reasonably anticipated during shaft construction operations. Submit design calculations for the tremie slab confirming structural connection to shaft walls. Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of British Columbia. The Contractor shall clearly state all assumptions and values used in their calculations.

- 1.5.6 Safety plan: Submit a detailed safety plan for all work activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work.
- 1.5.7 Daily Records: Daily records shall be submitted to the Contract Administrator for review by noon on the day following the shift for which the data or records were taken. These records shall include equipment and personnel on site, summary of daily construction tasks, geotechnical conditions, hydrogeologic conditions, groundwater leakage rate, excavated spoil volume, and problems encountered.
- 1.5.8 The Contractor shall conduct weekly monitoring of the entry and exit shafts using inclinometers or extensometers, as advised by the Contract Administrator, and submit a report of the results.

1.6 Quality Assurance

- 1.6.1 All shaft excavation work shall be completed by an experienced Contractor in constructing similar shafts within materials similar to those described in the Geotechnical Report.
- 1.6.2 The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator in documenting observations, measurements, and sample collection prior to, during and following all shaft construction operations.
- 1.6.3 All work shall be completed in the presence of the Contract Administrator, unless the Contract Administrator grants prior written approval to complete such work in the Contract Administrator's absence.
- 1.6.4 The Contractor shall provide safe access to all equipment in accordance with all safety regulations. The Contractor is responsible for all aspects of safety of the ground support systems.
- 1.6.5 Contractor shall take immediate action to limit loss of ground and inform the Contract Administrator should ground fall out or excessive voids occur during shaft construction, for any reason.

1.7 Measurement and Payment

- 1.7.1 Payment for a shaft includes but is not limited to the labour, materials, and equipment deemed necessary by the Contractor for saw cutting pavement, material excavation and disposal, design (stamped) and construction of the chosen shaft support and thrust wall system, dewatering, shaft seal or other means to control ground water, protection of existing utilities, temporary surface restoration and including all applicable work described in this Section as separate items for each location.

2 *PRODUCTS*

2.0 Equipment

2.0.1 Not Used.

2.1 *Materials*

2.1.1 Refer to the City of Vancouver Construction Supplementary Specifications Sections

3 *EXECUTION*

3.1 General

3.1.1 Contractor shall furnish all necessary equipment, materials, power, water and utilities for all shaft construction and excavation activities required to complete this work.

3.1.2 Shaft construction shall not begin until:

3.1.2.1 All required submittals have been completed, reviewed and accepted by the Contract Administrator.

3.1.2.2 Notification has been submitted by the Contractor to all utility companies and all required permits have been obtained.

3.1.2.3 Existing structures, utilities, trees, shrubs, and other facilities are adequately protected.

3.1.2.4 Contractor shall notify the Contract Administrator not less than 15 days before beginning any excavation.

3.1.3 The Contractor shall ensure operations on or off of the site do not interfere with traffic or create a dust, mud, or noise nuisance.

3.1.4 The Contractor is required to prepare a construction traffic management plan (Construction TMP which will be subject to review and approval by the City. The Construction TMP shall be submitted to the City a minimum of two weeks before construction.

3.1.5 Conduct shaft construction activities in accordance to all City of Vancouver safety regulations and applicable provisions of all relevant Federal, Provincial and regulatory and inspecting authorities. Contractor shall provide temporary safety railing and fencing around all excavations.

3.1.6 All excavated materials shall be completely contained when stockpiled on site and shall be disposed of by the Contractor at a landfill licenced to accept. Contractor shall immediately clean up any spills.

3.2 *Backfilling of Shafts*

- 3.2.1 The Contractor shall backfill shafts with material meeting the gradation requirements shown in the City of Vancouver Construction Supplementary Specifications.
- 3.2.2 Areas to be backfilled shall be free of debris, snow, ice, water, or frozen ground.
- 3.2.3 Backfilling shall not be completed in freezing weather and shall not be completed with frozen material.
- 3.2.4 Materials, which are compacted, shall be placed in layers no thicker than 300 mm, loose depth, and of proper moisture content before compacting to facilitate obtaining the prescribed compaction requirements in City of Vancouver Construction Supplementary Specifications and the Geotechnical Report.
- 3.2.5 The Contractor is responsible for repairing all damage and correcting all deficiencies, which may result from the settlement of backfill areas at no additional cost to the Owner.
- 3.2.6 The Contractor shall use mechanical hand compaction or vibrating plate equipment to compact backfill within one (1) metre of structures.
- 3.2.7 Contractor shall not commence backfilling operations until after pressure testing of water main has been completed.

3.3 *Site Clean-Up and Restoration*

- 3.3.1 The Contractor shall remove all construction debris, spoils, oil, grease, and other materials from the shafts and staging areas upon completion of the Work.
- 3.3.2 The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks. Only those disposal sites identified in the approved submittals shall be used.
- 3.3.3 The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Temporary restoration shall be completed no later than 2 days after site activities are complete as outlined in the City of Vancouver Construction Supplementary Specifications - Section 32 15 01S Surface Restoration.

3.4 *Surface Restoration*

- 3.4.1 Refer to City of Vancouver Supplementary Construction Specifications for temporary patching.

END OF SECTION

1 GENERAL

1.1 Summary of Work

- 1.1.1 The Contractor shall furnish all materials and equipment necessary for installation of jacking pipes using microtunneling construction techniques between the locations shown for trenchless installation technique on the Contract Drawings. The Contractor shall be responsible for selecting their means and methods to complete the water main using a two-pass installation methodology. For a two-pass installation, the nominal diameter of the steel casing pipe will be 900mm and the carrier pipe shall be 600 mm. Allowable two-pass casing pipe material include bare welded steel pipe. Allowable carrier pipe material for a two-pass installation is cement lined ductile iron pipe.

1.2 Related Sections

- | | | |
|-------|--|-----------------------------|
| 1.2.1 | Shaft Excavation and Support | Section 02161 |
| 1.2.2 | Annular Space Grouting | Section 02331 |
| 1.2.3 | Welded Steel Pipe Jacking Installation | Section 02616 |
| 1.2.4 | Carrier Pipe Installation | Section 33 11 01 Waterworks |

1.3 Reference Specifications, Codes and Standards

- 1.3.1 Not Used.

1.4 Definitions

- 1.4.1 Microtunneling: defined as a remotely controlled trenchless installation technique used for installing jacking pipe from a jacking shaft to a retrieval shaft. Hydraulic jacks located in the jacking shaft are used to propel the machine and jacking pipe to the retrieval/reception shaft. A laser or theodolite system is used for guidance. Microtunneling provides continuous support to the excavation face and used a pressurized slurry spoil removal system.
- 1.4.2 Jacking Pipe: pipe specifically designed to be hydraulically jacked through the ground directly behind the tunnelling machine.
- 1.4.3 Intermediate Jacking Station (IJS), (if needed): a special pipe section that contains a series of hydraulic jacks spaced evenly around the circumference of a jacking pipe and is placed between two pipe segments. The outer dimensions of the station are identical to the outer diameter of the jacking pipe. The station is used to provide additional hydraulic thrust or jacking force along the pipe string. Hydraulic cylinders and supporting equipment are removed upon completion of the drive and the gap between the adjacent pipe sections is fully closed.
- 1.4.4 Obstruction: an obstruction is defined as any object located wholly or partially within the cross-sectional area of the microtunneling machine that prevents its forward progress.

- 1.4.5 Two-pass installation: a microtunnel installation where the jacked pipe serves as a casing pipe and the carrier pipe is installed within the casing pipe upon completion of microtunneling activities.

1.5 Design Criteria

- 1.5.1 The microtunneling equipment shall be compatible with the geologic conditions described in the Tetra Tech Geotechnical Assessment for Haro Street Transmission Main – Trenchless Section, Dated April 20, 2021 File: 704-ENG.VGEO03478-02. (Geotechnical Report) and anticipated by the Contractor. The Contractor is solely responsible for evaluating the ground conditions and ensuring appropriate equipment and installation procedures are employed during the work. The cutter tools shall be capable of excavating material with properties as identified in the Geotechnical Report.
- 1.5.2 The Contractor is obligated to properly review and shall take all reasonable measures to understand the subsurface conditions on the alignment of the trenchless water main work. The successful contractor shall be permitted to complete additional boreholes, at the Contractors cost, within the project area if deemed necessary. The additional boreholes may proceed following approval of the location and suitable accommodations as required by the City and the Contract Administrator.
- 1.5.3 The microtunneling machine shall be equipped for automatic, continuous, real-time, electronic data logging with automatic information backup system. The cutter wheel of the microtunneling machine shall be accessible to allow man entry access to the cutters during a microtunnel drive to replace worn out cutters without the use of a rescue shaft.
- 1.5.4 The articulated joint between the two segments of the machine shall be watertight. The tail of the machine shall be gasketed to prevent material from entering between the machine and the first jacking pipe.
- 1.5.5 The machine shall be steerable in both the vertical and horizontal directions to install the jacking pipe on the line and grade shown on the Contract Drawings. Variations from design line shall not exceed 75 mm maximum. Variations from design grade shall not exceed 75 mm maximum. Under no circumstances shall the steering deviation exceed one half (1/2) of the allowable pipe joint deflection recommended by the jacking pipe manufacturer. Steering corrections shall be made in accordance with criteria provided in Section 3.2.1 of this Specification.
- 1.5.6 A laser or theodolite guidance system shall be used to guide and continuously monitor line and grade. The guidance system shall be capable of functioning at the intended maximum drive length without loss of accuracy or reliability.
- 1.5.7 The cutterhead shall have a reversible drive system to allow rotation in either clockwise or counterclockwise directions to minimize rotation or roll of the machine. The microtunneling machine shall allow for changing of cutting tools should excessive wear of cutters occur prior to completing the drive. The microtunneling machine shall consist of an access hatch that can be used to gain access to the cutters during the drive.
- 1.5.8 The radial overcut shall be a maximum of 50 mm and a minimum of 25 mm. The radial overcut shall be determined as the difference between the maximum diameter of the excavated bore created by the cutting tools and the outer diameter of the jacking pipe, divided by two. The Contractor shall determine the appropriate overcut for the geotechnical conditions as reported in

the Geotechnical Report. The Contractor shall ensure their selected overcut does not cause pipe joint deflections that exceed the maximum values as recommended by the pipe manufacturer.

- 1.5.9 Lubrication/grout ports shall be provided in each jacking pipe and spaced no greater than 3.0 m apart. A lubrication port shall also be provided in the shield of the microtunneling machine. Pipe manufacturer shall install these ports within each pipe material at the time of pipe manufacture. The lubrication ports shall have a minimum diameter of 37.5 mm and be threaded to allow connection of the lubrication and grouting systems. All ports shall be fitted with a one-way valve.
- 1.5.10 Lubrication shall be continuously injected during pipe jacking operations to reduce frictional resistance between the excavated bore and the outside of the jacking pipe. Lubrication shall include a mixture of bentonite and/or polymers (including anti-swelling additives) and water and shall be suitable for the conditions described in the Geotechnical Report.
- 1.5.11 Upon completion of the pipe jacking drive, grout shall be injected into the annular space.
- 1.5.12 The thrust block shall be designed to withstand the maximum jacking force that the hydraulic jacking system can produce without excessive deflection or displacement, based on a factor of safety of 1.5. Launch and retrieval seals shall be provided at the jacking and retrieval shafts. These seals shall consist of one or more rubber flanges attached to a steel housing.
- 1.5.13 The jacking system shall be capable of uniformly distributing the jacking force to the end of the jacking pipe. The maximum allowable jacking force applied to the pipe shall not exceed the pipe manufacturer's recommended allowable jacking load (based on a factor of safety of two).
- 1.5.14 Intermediate jacking stations, if needed shall be designed using a continuous steel casing fabricated to the same outside diameter as the jacking pipe. The steel cylinder shall be protected from corrosion with an approved epoxy paint system. Special recessed interjack pipe shall be used to accommodate the intermediate jacking station. Double rubber gaskets shall be used between the shell and the interjack pipe to provide a watertight pipe joint during operation and after removal. The steel casing and closed intermediate jacking station shall have an equal level of protection to the regular jacking pipe joints. One intermediate jacking station shall be installed within the first 30 metres behind the machine on each drive. The Contractor shall determine the required spacing of intermediate jacking stations based on the geotechnical conditions outlined in the Geotechnical Report, estimated required jacking forces, jacking capacity of jacking pipe and jacking capacity of the jacking frame in the jacking shaft. Additional intermediate jacking stations shall be installed and used if the anticipated or actual jacking forces exceed 70 percent of the allowable design capacity of jacking pipe, jacking frame in the shaft, thrust block, or thrust capacity of the intermediate jacking stations, whichever is lowest. At least two intermediate jacking stations and two specially fabricated intermediate jacking station pipes shall be on site prior to commencing each drive.
- 1.5.15 The spoil conveyance and separation system shall be designed for the full range of ground conditions as described in the Geotechnical Report. The separation system shall be compatible with the anticipated excavation rate, effective in removing the spoils from the slurry, compatible with the available staging area, and compatible with noise control requirements.
- 1.5.16 The machine shall be equipped with a continuous flammable gas monitor (with alarms if gas concentrations exceed regulatory thresholds).

1.6 Submittals

- 1.6.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.6.2 Microtunneling work plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed method of construction, equipment, materials, and the sequence of operations during construction. This work plan shall include:
- 1.6.2.1 Detailed description of the cutting tools that will be used to excavate the materials identified in the Geotechnical Report. Submit confirmation that the proposed equipment and methods of construction are capable of completing the required drive lengths in the identified geotechnical materials for this project. Explain the suitability of the proposed equipment for the ground conditions identified in the Geotechnical Report. Provide procedures for cutting tool replacement during a microtunneling drive.
 - 1.6.2.2 Description of the alignment control and guidance systems. Provide details of surveying methods that will be used to set guide rails, hydraulic jacking system and guidance system positions. Provide description of procedures to check and reset guidance system during microtunneling. Provide details of guidance system confirming the required line and grade can be achieved within the specified tolerances for the required drive lengths. Provide manufacturer's literature, drawings, and certificate of calibration for the laser or theodolite system.
 - 1.6.2.3 Description and capacity of the main jacking system including details of the thrust ring, thrust block, jacking controls, hydraulic pressure to jacking force conversions, and hydraulic jack calibration data.
 - 1.6.2.4 Description and capacity of the intermediate jacking stations, if needed including placement, number of hydraulic cylinders, hydraulic pressure to jacking force conversions, calibration data, pipe and shell materials, proposed spacings, and method of operation. Submit details including dimensions, seals, measures for corrosion protection, and method of abandonment and final seal configuration.
 - 1.6.2.5 Description of bentonite lubrication system including details of pipe lubricants to be used, manufacturer's literature, MSDS sheets, proposed lubrication procedures, and volume requirements.
 - 1.6.2.6 Description of the slurry separation system including details of coarse and fine shaker screens, hydrocyclones, centrifuge equipment, holding tank capacity, separation rates, slurry additives (including MSDS sheets), noise abatement provisions, and procedures for handling contaminated media.
 - 1.6.2.7 Description of the spoil removal, handling and transport equipment. Provide details of the disposal site indicating their willingness to accept the spoil and are in compliance with applicable regulations. Provide details for handling contaminated media. Provide copy of Disposal Site permit.
- 1.6.3 Shop drawings and equipment layout drawings: Submit shaft layout drawings detailing dimensions and locations of all equipment within available staging areas at each shaft location required to support microtunneling operations. Equipment shall include cranes, front-end loader, jacking pipe stockpiling, spoil transfer areas, spoil hauling equipment, pumps, generators, lubrication plant, control cabin, separation plant, tool trailers, containers, and any other required equipment.
- 1.6.4 Construction schedule: Submit a detailed schedule showing all major construction activities and durations including mobilization, site preparation, shaft construction, working slab construction,

thrust block construction, jacking equipment setup, entry seal installation, microtunneling, exit seal installation, machine retrieval, annular space grouting (outside of jacking pipe), carrier pipe installation, annular space grouting (between jacking and carrier pipes), shaft backfilling, site restoration and cleanup, and demobilization. Schedule is to be maintained and updated by the Contractor every two (2) weeks. Copies of revised schedules shall be provided to the Contract Administrator.

- 1.6.5 Calculations: Submit design calculations for the jacking pipe material demonstrating that the jacking pipe is capable of supporting the maximum loads during pipe jacking with respect to the Contractor's means and methods and intermediate jacking station placement strategy. Design calculations shall consider ground and hydrostatic loads, jacking force loads, and any other loads that may be reasonably anticipated during pipe jacking operations. Estimated jacking force for each drive shall be provided. Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of British Columbia. The Contractor shall clearly state all assumptions and values used in their calculations.
- 1.6.6 Jacking pipe details: Submit shop drawings of the jacking pipe showing location(s) of lubrication/grout ports, joint details, joint cushioning details, and gaskets. Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads. Submit details of pipe restraint to prevent movement of jacking pipe into shaft during stoppages and main jack retractions.
- 1.6.7 Safety plan: Submit a detailed safety plan for all work activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work. Safety plan shall be in accordance with Provincial Regulatory and City safety guidelines.
- 1.6.8 Daily Records: Daily records shall be submitted to the Contract Administrator for review by noon on the day following the shift for which the data or records were taken. These records shall include date, time, operator, tunnel drive designation, jacking pipe number and installed length, time required to jack each pipe, time required to make-up pipe connections, jacking force, rate of advance, cutterwheel speed and torque, steering ram positions, line and grade offsets, machine roll, intermediate jacking station usage and force, lubrication type, volume pumped, location, properties, and pressures, slurry inflow and outflow rates and pressures, by-pass valve position, use of high pressure jets, face pressure, spoil volume, geotechnical conditions, guidance system adjustments, ground water inflow rates, cutting tool replacements, slurry additives and properties, and problems encountered. Manual machine recordings of these parameters shall be recorded at intervals of no less than three times per pipe. Computer recorded data of machine performance parameters should be referenced to time and distance and should be recorded at time intervals of one minute or less.

1.7 Quality Assurance

- 1.7.1 Contractor's surveyor responsible for line and grade control shall be a Licensed Surveyor and shall have prior experience on similar tunnelling projects. All survey work shall be completed in SI units.
- 1.7.2 The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator in documenting observations, measurements, and sample collection prior to, during and following all pipe jacking operations. Access shall include but not limited to:
- 1.7.3.1 The Contract Administrator and/or Owner shall have full access to the microtunneling

machine, jacking system and excavation face during all site activities to visually observe jacking forces, cutter wear, and steering corrections.

- 1.7.3.2 The Contract Administrator and/or Owner shall have full access to the operator control container prior to, during, and following all microtunneling operations. This shall include providing visual access to real-time operator control screens, gauges, and indicators.
 - 1.7.3.3 The Contract Administrator and/or Owner shall have full access to the jacking and reception shafts and installed pipe string to visually inspect installed pipes, shaft seals, and line and grade.
 - 1.7.3.4 The Contract Administrator and/or Owner shall have full access to the slurry separation plant to collect samples a minimum of once per installed pipe section or every three (3) metres from the shaker screens. This shall include access to shaker screens, hydrocyclones, conveyor belts, centrifuge equipment and slurry and spoil holding tanks.
 - 1.7.3.5 The Contract Administrator and/or Owner shall have full access to the bentonite lubrication plant to visually inspect storage and mixing tank levels, lubrication pressures and pumping rates, amount and type of additives, and collection of samples to determine lubrication properties.
- 1.7.3 All work shall be completed in the presence of the Contract Administrator, unless the Contract Administrator grants prior written approval to complete such work in the Contract Administrator's absence.
- 1.7.4 The Contractor shall provide safe access to all equipment in accordance with all safety regulations.

1.8 Measurement and Payment

- 1.8.1 Payment for all work performed under this Section will be included under payment for work requiring trenchless casing pipe installation as described in other Sections.

2 PRODUCTS

2.1 Equipment

2.1.1 Not Used.

2.2 *Materials*

2.2.1 Not Used.

3 *EXECUTION*

3.1 *General*

- 3.1.1 Contractor shall furnish all necessary equipment, materials, power, water and utilities for all microtunneling activities required to complete this work.
- 3.1.2 Shaft design has been reviewed and accepted by the Contract Administrator. Shafts shall be constructed in accordance with Section 02161 - Shaft Excavation and Support.
- 3.1.3 Microtunneling operations shall not begin until:
 - 3.1.3.1 All required submittals have been completed, reviewed and accepted by the Contract Administrator.
 - 3.1.3.2 Orientation and grade of the jacking frame and guide rails have been properly surveyed and verified. Guide rails shall be securely attached to the concrete working slab to prevent movement or shifting during pipe jacking operations.
 - 3.1.3.3 Start-up inspection of mechanical and hydraulic systems has been performed. Start-up inspection shall be completed in the presence of the Contract Administrator. During this work, the Contractor shall provide baseline cutterhead rotational torque to the Contract Administrator and incorporated into their daily report. The Contractor shall also confirm proper function of steering jacks, jacking frame, guidance system, and lubrication system. Start-up inspection shall clearly document the condition of the cutting tools prior to launch.
 - 3.1.3.4 Notification has been submitted by the Contractor to all utility companies and all required permits have been obtained.
- 3.1.4 The Contractor shall ensure operations on or off of the site do not interfere with traffic or create a dust, mud, or noise nuisance. Any dust, mud, or noise nuisance shall be rectified by the Contractor, as directed by the Contract Administrator, at no additional cost to the Owner.
- 3.1.5 The Contractor shall take immediate action to rectify any condition that may jeopardize the project. Actions shall include, but are not limited to, modifying pipe lubrication materials and methods, injecting additional volume of lubrication, modifying Contractor procedures, or 24-hour operations to ensure successful completion of each tunnel drive.
- 3.1.6 Conduct microtunneling activities in accordance to all City of Vancouver safety regulations and applicable provisions of all relevant regulatory and inspecting authorities.

3.2 *Microtunneling*

- 3.2.1 Microtunneling operations shall be completed in accordance with approved submittals following design line and grade. The microtunneling machine shall be steered to maintain line and grade to the tolerances provided in Section 1.5.4 of this Specification. If the installation is off line and grade, the Contractor shall make the necessary steering corrections and return to design line and

grade at a rate of no greater than 25 mm per 7.5 m. Under no circumstances shall the steering deviation exceed one half (1/2) of the allowable pipe manufacturer's recommended joint deflection.

- 3.2.2 The Contractor shall ensure the guidance system is mounted independently from the thrust block and jacking frame. Guidance system shall be checked at least once per shift and reset by an experienced competent surveying personnel in accordance with acceptable procedures. Microtunneling operations shall be stopped if the guidance system is found to require resetting until such time as it is adjusted.
- 3.2.3 The Contractor shall monitor line and grade continuously. Deviations from line and grade shall be recorded a minimum of three times per pipe section and shall be incorporated into the Contractor's daily report.
- 3.2.4 Microtunneling operations shall be completed in a manner that does not damage the jacking pipe. In the event a section of pipe is damaged during the jacking operation, the Contractor shall immediately inform the Contract Administrator and allow the Contract Administrator to visually inspect the broken pipe section. Upon approval from the Contract Administrator, the Contractor shall temporarily repair the damaged section and shall jack the damaged section through to the retrieval shaft for removal from the pipe string. Alternatively, the Contractor may propose remedial measures to repair damaged pipe based on pipe manufacturer's recommendations to remediate damaged pipe sections subject to approval by the Contract Administrator. Damaged pipe shall not be used in the work unless permitted in writing by the Contract Administrator. Costs associated with remediation of such damaged pipe will be the sole responsibility of the Contractor.
- 3.2.5 The Contractor shall ensure the jacking pipe is handled as per manufacturer's recommendations during transportation, storage, picking, and bracing. The Contractor shall ensure proper bracing and support is provided during placement of the jacking pipe onto the guide rails or jacking frame.
- 3.2.6 The Contractor shall ensure the jacking frame and intermediate jacking stations are capable of uniformly distributing axial forces and minimizing eccentric loading that may arise from the jacking process to the jacking pipe. A properly designed thrust ring and cushion material shall be used to prevent damage to the jacking pipe. Cushion material or compression rings shall be made of plywood or other materials recommended by the pipe manufacturer and shall not extend or protrude beyond the outer diameter of the jacking pipe. All procedures shall follow recommendations of the pipe manufacturer and reviewed by the Contract Administrator. Jacking forces shall not exceed the manufacturer's recommended allowable jacking force (based on a factor of safety of two).
- 3.2.7 The Contractor shall monitor excavated spoil volumes to prevent over excavation during microtunneling operations.
- 3.2.8 The Contractor shall inject lubricants through injection ports in the tail of the machine and ports in the jacking pipe as necessary to minimize pipe friction. Pipe lubricants shall be continually injected as the jacking pipe is advanced. A minimum volume at least equal to the volume of the annular space shall be injected. Additional lubrication shall be injected where required to reduce jacking loads.
- 3.2.9 The Contractor shall provide a separation plant that will clean the excavated material from the slurry for disposal and return the slurry back to the cutting face for reuse. The separation plant shall be capable of support the size of the microtunnel being constructed, the type of geotechnical

materials being excavated, and the space available for erecting the plant. Lagoons are not permitted.

- 3.2.10 The Contractor shall ensure the slurry pressure at the cutting face balances all groundwater encountered during the excavation of the tunnel. No loss of slurry is permitted. Contractor shall control slurry pressure and avoid excessive pumping pressures to prevent the discharge of slurry at the ground surface or into any water body. Contractor shall immediately stop work and notify the Contract Administrator in the event a discharge of slurry water occurs to a watercourse. The Contractor shall resolve the discharge to the satisfaction of the Contract Administrator prior to recommencing tunnelling operations. All costs associated with rectifying the slurry discharge shall be borne by the Contractor.
- 3.2.11 The Contractor shall contain, transport and dispose of all excavated materials at an approved disposal site.
- 3.2.12 In the event the pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. Corrective work shall be completed at no additional cost to the Owner and is subject to the approval of the Contract Administrator.

3.3 Obstruction

- 3.3.1 The Contractor shall immediately notify the Contract Administrator in the event the microtunneling operation encounters an object or condition that impedes forward progress. The Contractor shall correct the condition, and remove, clear, or otherwise make it possible for the microtunneling equipment to advance past the object. No removal shaft shall be constructed or attempted without the written authorization by the Contract Administrator. Upon written notification of the Contract Administrator, the Contractor shall immediately proceed with removal of the object or obstruction by means of an obstruction removal shaft or by other approved methods, as submitted by the Contractor.

3.4 Carrier Pipe Installation

- 3.4.1 Remove all foreign material from jacking pipe and related appurtenances by flushing with water.
- 3.4.2 For a two-pass installation, the Contractor shall install the carrier pipes in accordance with City of Vancouver Construction Supplementary Specifications - Section 33 11 01 Waterworks.

3.5 Site Clean-Up and Restoration

- 3.5.1 The Contractor shall remove all construction debris, spoils, oil, grease, and other materials shall be removed from the launching shaft, retrieval shaft, jacking pipes, and staging areas upon completion of microtunneling activities.
- 3.5.2 The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks. Slurry shall be pumped into tanker trucks and disposed of at acceptable facilities

in accordance with current provincial regulations for disposal of these materials. Only those disposal sites identified in the approved submittals shall be used.

- 3.5.3 The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Temporary restoration shall be completed no later than 2 days after microtunneling activities are complete as outlined in the City of Vancouver Construction Supplementary Specifications - Section 32 15 01S Surface Restoration.

END OF SECTION

1 GENERAL

1.1 *Summary of Work*

- 1.1.1 The Contractor shall furnish all materials and equipment necessary for installation of jacking pipes using open shield pipe jacking construction techniques between the locations shown for trenchless installations technique on the Contract Drawings. The Contractor is responsible for selecting their means and methods and machine diameter to complete the water main using a two-pass installation methodology. For a two-pass installation, the nominal diameter of the casing pipe is 900mm and of the water main (carrier pipe) shall be 600 mm. Allowable two-pass casing pipe material include bare welded steel pipe. Allowable carrier pipe material for a two-pass installation include cement lined ductile iron pipe.

1.2 *Related Sections*

- | | | |
|-------|--|-----------------------------|
| 1.2.1 | Shaft Excavation and Support | Section 02161 |
| 1.2.2 | Carrier Pipe Installation | Section 33 11 01 Waterworks |
| 1.2.3 | Annular Space Grouting | Section 02331 |
| 1.2.4 | Welded Steel Pipe Jacking Installation | Section 02616 |

1.3 *Reference Specifications, Codes and Standards*

- 1.3.1 Not Used.

1.4 *Definitions*

- 1.4.1 Open Shield Pipe Jacking: Open shield pipe jacking is defined as a trenchless installation technique used for installing jacking pipe from a jacking shaft to a retrieval shaft using hydraulic jacks to propel the machine and jacking pipe forward and a laser or theodolite system for guidance. The open face nature of the tunnelling machine allows for hand-mining, mechanical mining methods, or mechanized equipment from within a shield at the front of the machine. The open face nature of the machine also allows for access to the excavation face. The shield/machine shall be steerable through the use of hydraulic jacks and an articulated section of the shield.
- 1.4.2 Jacking Pipe: Pipe specifically designed to be hydraulically jacked through the ground directly behind the tunnelling machine.
- 1.4.3 Intermediate Jacking Station (IJS): A special pipe section that contains a series of hydraulic jacks spaced evenly around the circumference of a jacking pipe and is placed between two pipe segments. The outer dimensions of the station are identical to the outer diameter of the jacking pipe. The station is used to provide additional hydraulic thrust or jacking force along the pipe string. Hydraulic cylinders and supporting equipment are removed upon completion of the drive and the gap between the adjacent pipe sections is fully closed.
- 1.4.4 Obstruction: An obstruction is defined as any object located wholly or partially within the cross-sectional area of the open shield pipe jacking machine that prevents its forward progress.

- 1.4.5 Two-pass installation: An open shield pipe jacking installation where the jacked pipe serves as a casing pipe and the carrier pipe is installed within the casing pipe upon completion of pipe jacking activities.

1.5 Design Criteria

- 1.5.1 The open shield pipe jacking equipment shall be compatible with the geologic conditions described in the Tetra Tech Geotechnical Assessment for Haro Street Transmission Main – Trenchless Section, Dated April 20, 2021 File: 704-ENG.VGEO03478-02. (Geotechnical Report) and anticipated by the Contractor. The Contractor is solely responsible for evaluating the ground conditions and ensuring appropriate equipment and installation procedures are employed during the work. The cutter tools shall be capable of excavating solid, jointed and/or fractured rock with properties as identified in the Geotechnical Report. Open shield pipe jacking operations shall be compatible with the anticipated groundwater inflow volumes as identified in the Geotechnical Report.
- 1.5.2 The Contractor is obligated to properly review and shall take all reasonable measures to understand the subsurface conditions on the alignment of the trenchless water main work. The successful contractor shall be permitted to complete additional boreholes, at the Contractor's cost, within the project area if deemed necessary. The additional boreholes may proceed following approval of the location and suitable accommodations as required by the City and the Contract Administrator.
- 1.5.3 The cutting tools shall be accessible for replacement during a drive without the use of a rescue shaft.
- 1.5.4 The shield shall be steerable in both the vertical and horizontal directions to install the jacking pipe on the line and grade shown on the Contract Drawings. Variations from design line shall not exceed 75 mm maximum. Variations from design grade shall not exceed 75 mm maximum. Under no circumstances shall the steering deviation exceed one half (1/2) of the allowable pipe joint deflection recommended by the jacking pipe manufacturer. Steering corrections shall be made in accordance with criteria provided in Section 3.2.1 of this Specification.
- 1.5.5 The articulated joint between the two segments of the shield shall be watertight. The tail of the shield shall be gasketed to prevent material from entering between the shield and the first jacking pipe.
- 1.5.6 A laser or theodolite guidance system shall be used to guide and continuously monitor line and grade. The guidance system shall be capable of functioning at the intended maximum drive length without loss of accuracy or reliability.
- 1.5.7 If a rotary type cutterhead is used to excavate the materials, the cutterhead shall have a reversible drive system to allow rotation in either clockwise or counterclockwise directions to minimize rotation or roll of the machine. The open shield pipe jacking machine shall allow for changing of cutting tools should excessive wear of cutters occur prior to completing a drive without the use of rescue shaft.
- 1.5.8 The radial overcut shall be a maximum of 50 mm and a minimum of 25 mm. The radial overcut shall be determined as the difference between the maximum diameter of the excavated bore created by the cutting tools and the outer diameter of the jacking pipe, divided by two. The Contractor shall determine the appropriate overcut for the geotechnical conditions as reported in

the Geotechnical Report. The Contractor shall ensure their selected overcut does not cause pipe joint deflections that exceed the maximum values as recommended by the pipe manufacturer.

- 1.5.9 Lubrication/grout ports shall be provided in each jacking pipe and at spacings no greater than 3.0 m. A lubrication port shall also be provided in the shield of the open shield pipe jack machine. Pipe manufacturer shall install these ports within each pipe material at the time of pipe manufacture. The lubrication ports shall have a minimum diameter of 37.5 mm and be threaded to allow connection of the lubrication and grouting systems. All ports shall be fitted with a one-way valve.
- 1.5.10 Lubrication shall be continuously injected during pipe jacking operations to reduce frictional resistance between the excavated bore and the outside of the jacking pipe. Lubrication shall include a mixture of bentonite and/or polymers (including anti-swelling additives) and water and shall be suitable for the conditions described in the Geotechnical Report.
- 1.5.11 Upon completion of the pipe jacking drive, grout shall be injected into the annular space through the ports. Once grouting has been completed, pipe plugs supplied by the pipe manufacturer shall be installed in each port.
- 1.5.12 The thrust block shall be designed to withstand the maximum jacking force that the hydraulic jacking system can produce without excessive deflection or displacement, based on a factor of safety of 1.5. The face of the thrust block shall be perpendicular to the pipe alignments.
- 1.5.13 Launch and retrieval seals shall be provided at the jacking and retrieval shafts. These seals shall consist of one or more rubber flanges attached to a steel housing.
- 1.5.14 The jacking system shall be capable of uniformly distributing the jacking force to the end of the jacking pipe. The maximum allowable jacking force applied to the pipe shall not exceed the pipe manufacturer's recommended allowable jacking load (based on a factor of safety of two).
- 1.5.15 Intermediate jacking stations shall be designed using a continuous steel casing fabricated to the same outside diameter as the jacking pipe. The steel cylinder shall be protected from corrosion with an approved epoxy paint system. Special recessed interjack pipe shall be used to accommodate the intermediate jacking station. Double rubber gaskets shall be used between the shell and the interjack pipe to provide a watertight pipe joint. The steel casing and closed intermediate jacking station shall have an equal level of protection to the regular jacking pipe joints. One intermediate jacking station shall be installed within the first 30 metres behind the machine on each drive. The Contractor shall determine the required spacing of intermediate jacking stations based on the geotechnical conditions outlined in the Geotechnical Report, estimated required jacking forces, jacking capacity of jacking pipe and jacking capacity of the jacking frame in the jacking shaft. Additional intermediate jacking stations shall be installed and used if the anticipated or actual jacking forces exceed 70 percent of the allowable design capacity of jacking pipe, jacking frame in the shaft, thrust block, or thrust capacity of the intermediate jacking stations, whichever is lowest. At least two intermediate jacking stations and two specially fabricated intermediate jacking station pipes shall be on site prior to commencing each drive.
- 1.5.16 The spoil conveyance system shall be designed for the full range of ground conditions as described in the Geotechnical Report.
- 1.5.17 The tunnelling machine shall be equipped with a continuous flammable gas monitor (with alarms if gas concentrations exceed regulatory thresholds).

1.6 Submittals

- 1.6.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.6.2 Open shield pipe jacking work plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed method of construction, equipment, materials, and the sequence of operations during construction. This work plan shall include:
- 1.6.3.1 Detailed description of the cutting tools that will be used to excavate the materials identified in the Geotechnical Report. Submit confirmation that the proposed equipment and methods of construction are capable of completing the required drive lengths in the identified geotechnical materials for this project. Explain the suitability of the proposed equipment for the ground conditions identified in the Geotechnical Report. Provide procedures for cutting tool replacement during a pipe jacking drive.
 - 1.6.3.2 Description of the alignment control and guidance systems. Provide details of surveying methods that will be used to set guide rails, hydraulic jacking system and guidance system positions. Provide description of procedures to check and reset guidance system during open shield pipe jacking. Provide details of guidance system confirming the required line and grade can be achieved within the specified tolerances for the required drive lengths. Provide manufacturer's literature, drawings, and certificate of calibration for the laser or theodolite system.
 - 1.6.3.3 Description of groundwater pumping capacity, equipment and procedures if needed.
 - 1.6.3.4 Description and capacity of the main jacking system including details of the thrust ring, thrust block, jacking controls, hydraulic pressure to jacking force conversions, and hydraulic jack calibration data.
 - 1.6.3.5 Description and capacity of the intermediate jacking stations including placement, number of hydraulic cylinders, hydraulic pressure to jacking force conversions, calibration data, pipe and shell materials, proposed spacings, and method of operation. Submit details including dimensions, seals, measures for corrosion protection, and method of abandonment and final seal configuration.
 - 1.6.3.6 Description of bentonite lubrication system including details of pipe lubricants to be used, manufacturer's literature, MSDS sheets, proposed lubrication procedures, and volume requirements.
 - 1.6.3.7 Description of the spoil removal, handling and transport equipment. Provide details of the disposal site indicating their willingness to accept the spoil and are in compliance with applicable regulations. Provide details for handling contaminated media. Provide copy of Disposal Site permit.
- 1.6.3 Shop drawings and equipment layout drawings: Submit shaft layout drawings detailing dimensions and locations of all equipment within available staging areas at each shaft location required to support open shield pipe jacking operations. Equipment shall include cranes, front-end loader, jacking pipe stockpiling, spoil transfer areas, spoil hauling equipment, pumps, generators, lubrication plant, tool trailers, containers, and any other required equipment.
- 1.6.4 Construction schedule: Submit a detailed schedule showing all major construction activities and durations including mobilization, site preparation, shaft construction, working slab construction, thrust block construction, jacking equipment setup, entry seal installation, pipe jacking, exit seal installation, machine retrieval, annular space grouting (outside of jacking pipe), carrier pipe installation, annular space grouting, shaft backfilling, site restoration and cleanup, and

demobilization. Schedule is to be maintained and updated by the Contractor every two (2) weeks. Copies of revised schedules shall be provided to the Contract Administrator.

- 1.6.5 Calculations: Submit design calculations for the jacking pipe material demonstrating that the jacking pipe is capable of supporting the maximum loads during pipe jacking with respect to the Contractor's means and methods and intermediate jacking station placement strategy. Design calculations shall consider ground and hydrostatic loads, jacking force loads, and any other loads that may be reasonably anticipated during pipe jacking operations. Estimated jacking force for each drive shall be provided. Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of British Columbia. The Contractor shall clearly state all assumptions and values used in their calculations.
- 1.6.6 Jacking pipe details: Submit shop drawings of the jacking pipe showing location of lubrication/grout ports, joint details, joint cushioning details, and gaskets. Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads.
- 1.6.7 Safety plan: Submit a detailed safety plan for all work activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work.
- 1.6.8 Daily Records: Daily records shall be submitted to the Contract Administrator for review by noon on the day following the shift for which the data or records were taken. These records shall include date, time, operator, tunnel drive designation, jacking pipe number and installed length, time required to jack each pipe, time required to make-up pipe connections, jacking force, rate of advance, cutterwheel torque (if applicable), steering ram positions, line and grade offsets, machine roll, intermediate jacking station usage and force, lubrication type, volume pumped, location, properties, and pressures, spoil volume, geotechnical conditions, guidance system adjustments, ground water inflow rates, cutting tool replacements, and problems encountered. Manual machine recordings of these parameters shall be recorded at intervals of no less than three times per pipe.
- 1.6.9 Contingency plans: Submit contingency plans for the following list of problems that may be encountered during open shield pipe jacking operations.
- 1.6.9.1 Prepare and submit a contingency plan for being unable to advance open shield pipe jacking machine and pipe string within the geotechnical materials described in the Geotechnical Report.
 - 1.6.9.2 Prepare and submit a contingency plan for jacking forces reaching allowable limits for the jacking pipe, intermediate jacking station, main jacking system, or thrust block.
 - 1.6.9.3 Prepare and submit a contingency plan for wearing out of cutting tools prior to reaching retrieval shaft.
 - 1.6.9.4 Prepare and submit a contingency plan for experiencing steering difficulties resulting in line and grade tolerances being exceeded.
 - 1.6.9.5 Prepare and submit a contingency plan for encountering ground water infiltration at the tunnel face in greater volumes than indicated in the Geotechnical Report.
 - 1.6.9.6 Prepare and submit a contingency plan for laser distortion by heat, humidity or physical disturbance.
 - 1.6.9.7 Prepare and submit a contingency plan for damaged jacking pipe.

1.7 Quality Assurance

- 1.7.1 Contractor's surveyor responsible for line and grade control shall be a Licensed Surveyor and shall have prior experience on similar tunnelling projects. Contractor's surveyor shall have a minimum of three tunnelling projects for which they were responsible for line and grade. All survey work shall be completed in SI units.
- 1.7.2 The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator in documenting observations, measurements, and sample collection prior to, during and following all pipe jacking operations. Access shall include but not limited to:
- 1.7.3.1 The Contract Administrator and/or Owner shall have full access to the open shield pipe jacking machine, jacking system and excavation face during all site activities to visually observe jacking forces, cutter wear, and steering corrections.
- 1.7.3.2 The Contract Administrator and/or Owner shall have full access to the jacking and reception shafts and installed pipe string to visually inspect installed pipes, shaft seals, and line and grade.
- 1.7.3.3 The Contract Administrator and/or Owner shall have full access to the spoil piles excavated from the tunnel to collect samples a minimum of once per installed pipe section or every three (3) metres.
- 1.7.3.4 The Contract Administrator and/or Owner shall have full access to the bentonite lubrication plant to visually inspect storage and mixing tank levels, lubrication pressures and pumping rates, amount and type of additives, and collection of samples to determine lubrication properties.
- 1.7.3.5 All work shall be completed in the presence of the Contract Administrator, unless the Contract Administrator grants prior written approval to complete such work in the Contract Administrator's absence.
- 1.7.3.6 The Contractor shall provide safe access to all equipment in accordance with all safety regulations.

1.8 Measurement and Payment

- 1.8.1 Payment for all works performed under this Section will be included under payment for work requiring trenchless casing pipe installation as described in other Sections.

2 PRODUCTS

2.1 Equipment

- 2.1.1 Not Used.

2.2 Materials

- 2.2.1 Not Used.

3 EXECUTION

3.1 General

- 3.1.1 Contractor shall furnish all necessary equipment, power, water and utilities for all open shield pipe jacking activities required to complete this work.
- 3.1.2 Shaft design has been reviewed and accepted by the Contract Administrator. Shafts shall be constructed in accordance with Section 02161 - Shaft Excavation and Support.

- 3.1.3 Open shield pipe jacking operations shall not begin until:
- 3.1.3.1 All required submittals have been completed, reviewed and accepted by the Contract Administrator.
 - 3.1.3.2 Orientation and grade of the jacking frame and guide rails have been properly surveyed and verified. Guide rails shall be securely attached to the concrete working slab to prevent movement or shifting during pipe jacking operations.
 - 3.1.3.3 Start-up inspection of mechanical and hydraulic systems has been performed. Start-up inspection shall be completed in the presence of the Contract Administrator. During this work, the Contractor shall provide baseline cutterhead rotational torque (if applicable) to the Contract Administrator and incorporated into their daily report. The Contractor shall also confirm proper function of steering jacks, jacking frame, guidance system, and lubrication system. Start-up inspection shall clearly document the condition of the cutting tools prior to launch.
 - 3.1.3.4 Notification has been submitted by the Contractor to all utility companies and all required permits have been obtained.
- 3.1.4 The Contractor shall ensure operations on or off of the site do not interfere with traffic or create a dust, mud, or noise nuisance. Any dust, mud, or noise nuisance shall be rectified by the Contractor, as directed by the Contract Administrator, at no additional cost to the Owner.
- 3.1.5 The Contractor shall take immediate action to rectify any condition that may jeopardize the project. Actions shall include, but are not limited to, modifying pipe lubrication materials and methods, injecting additional volume of lubrication, modifying Contractor procedures, or 24-hour operations to ensure successful completion of each tunnel drive.
- 3.1.6 Conduct excavation activities in accordance to all City of Vancouver safety regulations and applicable provisions of all relevant regulatory and inspecting authorities.
- 3.1.7 Continuously monitor and inspect the tunnel excavation at the face and at all times to ensure a safe and stable condition.

3.2 Open Shield Pipe Jacking

- 3.2.1 Open shield pipe jacking operations shall be completed in accordance with approved submittals following design line and grade. The open shield pipe jacking machine shall be steered to maintain line and grade to the tolerances provided in Section 1.5.3 of this Specification. If the installation is off line and grade, the Contractor shall make the necessary steering corrections and return to design line and grade at a rate of no greater than 25 mm per 7.5 m. Under no circumstances shall the steering deviation exceed one half (1/2) of the allowable pipe manufacturer's recommended joint deflection.
- 3.2.2 The Contractor shall ensure the guidance system is mounted independently from the thrust block and jacking frame. Guidance system shall be checked at least once per shift and reset by an experienced competent surveying personnel in accordance with acceptable procedures. Open shield pipe jacking operations shall be stopped if the guidance system is found to require resetting until such time as it is adjusted.

- 3.2.3 The Contractor shall monitor line and grade continuously. Deviations from line and grade shall be recorded a minimum of three times per pipe section and shall be incorporated into the Contractor's daily report.
- 3.2.4 Open shield pipe jacking operations shall be completed in a manner that does not damage the jacking pipe. In the event a section of pipe is damaged during the jacking operation, the Contractor shall immediately inform the Contract Administrator and allow the Contract Administrator to visually inspect the broken pipe section. Upon approval from the Contract Administrator, the Contractor shall temporarily repair the damaged section and shall jack the damaged section through to the retrieval shaft for removal from the pipe string. Alternatively, the Contractor may propose remedial measures to repair damaged pipe based on pipe manufacturer's recommendations to remediate damaged pipe sections subject to approval by the Contract Administrator. Damaged pipe shall not be used in the work unless permitted in writing by the Contract Administrator. Costs associated with remediation of such damaged pipe will be the sole responsibility of the Contractor.
- 3.2.5 The Contractor shall ensure the jacking pipe is handled as per manufacturer's recommendations during transportation, storage, picking, and bracing. The Contractor shall ensure proper bracing and support is provided during placement of the jacking pipe onto the guide rails or jacking frame.
- 3.2.6 The Contractor shall ensure the jacking frame is capable of uniformly distributing axial forces and minimizing eccentric loading that may arise from the jacking process to the jacking pipe. A properly designed thrust ring and cushion material shall be used to prevent damage to the jacking pipe. Cushion material or compression rings shall be made of plywood or other materials recommended by the pipe manufacturer and shall not extend or protrude beyond the outer diameter of the jacking pipe. All procedures shall follow recommendations of the pipe manufacturer and reviewed by the Contract Administrator. Jacking forces shall not exceed the manufacturer's recommended allowable jacking force (based on a factor of safety of two).
- 3.2.7 The Contractor shall monitor excavated spoil volumes to prevent over excavation during open shield pipe jacking operations.
- 3.2.8 The Contractor shall inject lubricants through injection ports in the tail of the shield and ports in the jacking pipe as necessary to minimize pipe friction. Pipe lubricants shall be continually injected as the jacking pipe is advanced. A minimum volume at least equal to the volume of the annular space shall be injected. Additional lubrication shall be injected where required to reduce jacking loads.
- 3.2.9 The Contractor shall contain, transport and dispose of all excavated materials at an approved disposal site.
- 3.2.10 In the event the pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. Corrective work shall be completed at no additional cost to the Owner and is subject to the approval of the Contract Administrator.

3.3 **Obstruction**

- 3.3.1 The Contractor shall immediately notify the Contract Administrator in the event the open shield pipe jacking operation encounters an object or condition that impedes forward progress. The Contractor shall correct the condition, and remove, clear, or otherwise make it possible for the open shield pipe jacking equipment to advance past the object. No removal shaft shall be

constructed or attempted without the written authorization by the Contract Administrator.

3.4 *Carrier Pipe Installation*

- 3.4.1 Remove all foreign material from jacking pipe and related appurtenances by flushing with water.
- 3.4.2 For a two-pass installation, the Contractor shall install the carrier pipes in accordance with the City of Vancouver Construction Supplementary Specification Section 33 11 01 Waterworks.

3.5 *Site Clean-Up and Restoration*

- 3.5.1 The Contractor shall remove all construction debris, spoils, oil, grease, and other materials shall be removed from the jacking shaft, retrieval shaft, jacking pipes, and staging areas upon completion of open shield pipe jacking activities.
- 3.5.2 The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks and disposed of at acceptable facilities in accordance with current provincial regulations for disposal of these materials. Only those disposal sites identified in the approved submittals shall be used.
- 3.5.4 The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Temporary restoration shall be completed no later than 2 days after open shield pipe jacking activities are complete as outlined in the City of Vancouver Construction Supplementary Specifications - Section 32 15 01S Surface Restoration.

END OF SECTION

1 GENERAL

1.1 General Description

- 1.1.1 An augered installation is requested where it is not feasible or desirable to install pipe by the open-cut trench method due to the disruption of the ground surface, problems with accommodating traffic and/or disruption to existing utilities. The carrier pipe, ductile iron cement lined and welded steel casing pipe shall be installed in an augered hole. The hole shall be along a predetermined alignment and grade. The hole diameter shall be as close as possible to the maximum outside diameter of the carrier or casing pipe.

1.2 Related Sections

- | | | |
|-------|--|-----------------------------|
| 1.2.1 | Shaft Excavation and Support | Section 02161 |
| 1.2.2 | Carrier Pipe Installation | Section 33 11 01 Waterworks |
| 1.2.3 | Annular Space Grouting | Section 02331 |
| 1.2.4 | Welded Steel Pipe Jacking Installation | Section 02616 |

1.3 Regulations

- 1.3.1 Not Used.

1.4 Definitions

- 1.4.1 Obstruction: An obstruction is defined as any object located wholly or partially within the cross-sectional area of the auger boring or small boring unit that prevents its forward progress.
- 1.4.2 Two-pass installation: A trenchless installation where the jacked pipe serves as a casing pipe and the carrier pipe is installed within the casing pipe upon completion of augering activities.

1.5 Design Criteria

- 1.5.1 The auger boring equipment shall be compatible with the geologic conditions described in the Tetra Tech Geotechnical Assessment for Haro Street Transmission Main – Trenchless Section, Dated April 20, 2021 File: 704-ENG.VGEO03478-02. (Geotechnical Report) and conditions anticipated by the Contractor. The Contractor is solely responsible for evaluating the ground conditions and ensuring appropriate equipment and installation procedures are employed during the work. The cutter tools shall be capable of excavating material with properties as identified in the Geotechnical Report.
- 1.5.2 The Contractor is obligated to properly review and shall take all reasonable measures to understand the subsurface conditions on the alignment of the trenchless water main work. The successful contractor shall be permitted to complete additional boreholes, at the Contractors cost, within the project area if deemed necessary. The additional boreholes may proceed following approval of the location and suitable accommodations as required by the City and the Contract Administrator.

- 1.5.3 The Contractor may elect to utilize additional boring equipment to increase the effectiveness of their methodology (ie. small bore unit). As noted above the Contractor is solely responsible for determine the most suitable equipment to complete the work.
- 1.5.4 The articulated joint between the two segments of the boring machine shall be watertight. The tail of the machine shall be gasketed to prevent material from entering between the machine and the casing pipe.
- 1.5.5 The machine shall be steerable in both the vertical and horizontal directions to install the casing pipe on the line and grade shown on the Contract Drawings. Variations from design line shall not exceed 75 mm maximum. Variations from design grade shall not exceed 75 mm maximum. Steering corrections shall be made in accordance with criteria provided in Section 3.2.1 of this Specification.
- 1.5.6 On the small boring unit a guidance system shall be used to guide and continuously monitor line and grade. The guidance system shall be capable of functioning at the intended maximum drive length without loss of accuracy or reliability.
- 1.5.7 The radial overcut by the boring unit shall be a maximum of 50 mm and a minimum of 25 mm. The radial overcut shall be determined as the difference between the maximum diameter of the excavated bore created by the cutting tools and the outer diameter of the casing pipe, divided by two. The Contractor shall determine the appropriate overcut for the geotechnical conditions as reported in the Geotechnical Report.
- 1.5.8 Grout ports shall be provided in each casing pipe and at spacing's no greater than 3.0 m. Pipe manufacturer shall install these ports within each pipe material at the time of pipe manufacture. The lubrication ports shall have a minimum diameter of 37.5 mm and be threaded to allow connection of the lubrication and grouting systems. All ports shall be fitted with a one-way valve.
- 1.5.9 Upon completion of the augering, grout shall be injected into the annular space through the ports. Once grouting has been completed, pipe plugs supplied by the pipe manufacturer shall be installed in each port.
- 1.5.10 The thrust block shall be designed to withstand the maximum jacking force that the hydraulic augering system can produce without excessive deflection or displacement, based on a factor of safety of 1.5. Launch and retrieval seals shall be provided at the launching and retrieval shafts. These seals shall consist of one or more rubber flanges attached to a steel housing.
- 1.5.11 The augering system shall be capable of uniformly distributing the jacking force to the end of the casing pipe. The maximum allowable jacking force applied to the pipe shall not exceed the pipe manufacturer's recommended allowable jacking load (based on a factor of safety of two).

1.6 Submittals

- 1.6.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.6.2 Auger Boring work plan: Submit a work plan complete with drawings, written descriptions, procedures, and manufacturer's information identifying the details of the proposed method of

construction, equipment, materials, and the sequence of operations during construction. This work plan shall include:

- 1.6.2.1 Detailed description of the cutting tools that will be used to excavate the materials identified in the Geotechnical Report. Submit confirmation that the proposed equipment and methods of construction are capable of completing the required drive length in the identified geotechnical materials for this project. Explain the suitability of the proposed equipment for the ground conditions identified in the Geotechnical Report. Provide procedures for cutting tool replacement during an augering drive.
- 1.6.2.2 Description of the alignment control and guidance systems. Provide details of surveying methods that will be used to set guide rails, auger boring system, and small boring machine. Provide description of procedures to check and reset guidance system during augering. Provide details of guidance system confirming the required line and grade can be achieved within the specified tolerances for the required drive lengths. Provide manufacturer's literature, drawings, and certificate of calibration for the chosen guidance system.
- 1.6.2.3 Description and capability of the auger boring system, small boring unit, thrust block, hydraulic pressure to jacking force conversions, and hydraulic jack calibration data.
- 1.6.2.4 Description of the spoil removal, handling and transport equipment. Provide details of the disposal site indicating their willingness to accept the spoil and are in compliance with applicable regulations. Provide details for handling contaminated media. Provide copy of Disposal Site permit.
- 1.6.3 Shop drawings and equipment layout drawings: Submit shaft layout drawings detailing dimensions and locations of all equipment within available staging areas at each shaft location required to support augering operations. Equipment shall include cranes, front-end loader, casing pipe stockpiling, spoil transfer areas, spoil hauling equipment, generators, tool trailers, containers, and any other required equipment.
- 1.6.4 Construction schedule: Submit a detailed schedule showing all major construction activities and durations including mobilization, site preparation, shaft construction, working slab construction, thrust block construction, augering equipment setup, entry seal installation, augering, exit seal installation, small boring unit retrieval, auger flight removal, annular space grouting (outside of casing pipe), carrier pipe installation, annular space grouting (between casing and carrier pipes), shaft backfilling, site restoration and cleanup, and demobilization. Schedule is to be maintained and updated by the Contractor every two (2) weeks. Copies of revised schedules shall be provided to the Contract Administrator.
- 1.6.5 Calculations: Submit design calculations for the casing pipe material demonstrating that the casing pipe is capable of supporting the maximum loads during pipe jacking with respect to the Contractor's means and methods. Design calculations shall consider ground and hydrostatic loads, jacking force loads, and any other loads that may be reasonably anticipated during auger boring operations. Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of British Columbia. The Contractor shall clearly state all assumptions and values used in their calculations.
- 1.6.6 Casing pipe details: Submit shop drawings of the casing pipe showing location(s) of grout ports, welds as well as section lengths to be used. Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads. Submit details of pipe restraint to prevent

movement of jacking pipe into shaft during stoppages; auger bore machine and auger flight retractions.

- 1.6.7 Safety plan: Submit a detailed safety plan for all work activities. The plan shall include details of air monitoring equipment, frequency of calibrating instruments, and procedures for lighting, ventilation, and electrical safeguards. Provide the name and qualifications for the site safety representative responsible for implementing the plan during the work. Safety plan shall be in accordance with Provincial Regulatory and City safety guidelines.
- 1.6.8 Daily Records: Daily records shall be submitted to the Contract Administrator for review by noon on the day following the shift for which the data or records were taken. These records shall include date, time, operator, casing pipe number and installed length, time required to auger each pipe, time required to weld casing pipe, jacking force, rate of advance, cutterwheel speed and torque, line and grade offsets, location, properties, and pressures, spoil volume, geotechnical conditions, guidance system adjustments, ground water inflow rates, and problems encountered. Manual machine recordings of these parameters shall be recorded at intervals of no less than three times per pipe. Computer recorded data of machine performance parameters should be referenced to time and distance and should be recorded at time intervals of one minute or less.
- 1.6.9 Contingency plans: Submit contingency plans for the following list of problems that may be encountered during augering operations:
- 1.6.9.1 Prepare and submit a contingency plan for being unable to advance augering machine and casing pipe within the geotechnical materials described in the Geotechnical Report.
 - 1.6.9.2 Prepare and submit a contingency plan for jacking forces reaching allowable limits for the casing pipe, or thrust block.
 - 1.6.9.3 Prepare and submit a contingency plan for wearing out of cutting tools prior to reaching retrieval shaft.
 - 1.6.9.4 Prepare and submit a contingency plan for experiencing steering difficulties resulting in line and grade tolerances being exceeded.
 - 1.6.9.5 Prepare and submit a contingency plan for welding failure and/or pipe movement into the launching shaft during stoppages and main jack retractions.
 - 1.6.9.6 Prepare and submit a contingency plan for damaged casing pipe.

1.7 Quality Assurance

- 1.7.1 Contractor's surveyor responsible for line and grade control shall be a Licensed Surveyor and shall have prior experience on similar projects. All survey work shall be completed in SI units.
- 1.7.2 The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator in documenting observations, measurements, and sample collection prior to, during and following all auger boring operations. Access shall include but not limited to:
- 1.7.2.1 The Contract Administrator and/or Owner shall have full access to the augering machine during all site activities to visually observe jacking forces and steering corrections.
 - 1.7.2.2 The Contract Administrator and/or Owner shall have full access to the boring unit operator control prior to, during, and following all augering operations. This shall include providing visual access to real-time operator control screens, gauges, and indicators.
 - 1.7.2.3 The Contract Administrator and/or Owner shall have full access to the launching and reception shafts and installed casing pipe to visually inspect installed pipes, shaft seals, and line and grade.

- 1.7.2.4 The Contract Administrator and/or Owner shall have full access to collect samples a minimum of once per installed pipe section or every three (3) metres from the spoil pile.
- 1.7.3 All work shall be completed in the presence of the Contract Administrator, unless the Contract Administrator grants prior written approval to complete such work in the Contract Administrator's absence.
- 1.7.4 The Contractor shall provide safe access to all equipment in accordance with all safety regulations.

1.8 Measurement and Payment

- 1.8.1 Payment for all work performed under this Section will be included under payment for work requiring trenchless casing pipe installation as described in other Sections.

2 PRODUCTS

1.1 Equipment

- 1.1.1 Not Used.

1.2 Materials

- 1.2.1 Not Used.

3 EXECUTION

3.1 General

- 3.1.1 Contractor shall furnish all necessary equipment, materials, power, water and utilities for all auger boring activities required to complete this work.
- 3.1.2 Shaft design has been reviewed and accepted by the Contract Administrator. Shafts shall be constructed in accordance with Section 02161 - Shaft Excavation and Support.
- 3.1.3 Auger boring operations shall not begin until:
- 3.1.3.1 All required submittals have been completed, reviewed and accepted by the Contract Administrator.
 - 3.1.3.2 Orientation and grade of the augering frame and guide rails have been properly surveyed and verified. Guide rails shall be securely attached to the concrete working slab to prevent movement or shifting during auger boring operations.
 - 3.1.3.3 Start-up inspection of mechanical and hydraulic systems has been performed. Start-up inspection shall be completed in the presence of the Contract Administrator. During this work, the Contractor shall provide baseline cutterhead rotational torque to the Contract Administrator and incorporated into their daily report. The Contractor shall also confirm proper function of the auger boring system, small boring unit, and guidance system. Start-up inspection shall clearly document the condition of the auger flights and small boring unit prior to launch.
 - 3.1.3.4 Notification has been submitted by the Contractor to all utility companies and all required permits have been obtained.

- 3.1.4 The Contractor shall ensure operations on or off of the site do not interfere with traffic or create a dust, mud, or noise nuisance. Any dust, mud, or noise nuisance shall be rectified by the Contractor, as directed by the Contract Administrator, at no additional cost to the Owner.
- 3.1.5 The Contractor shall take immediate action to rectify any condition that may jeopardize the project. Actions shall include, but are not limited to, modifying Contractor procedures, or 24-hour operations to ensure successful completion of the auger drive.
- 3.1.6 Conduct auger boring activities in accordance to all City of Vancouver safety regulations and applicable provisions of all relevant regulatory and inspecting authorities.

3.2 Auger Boring

- 3.2.1 Auger boring operations shall be completed in accordance with approved submittals following design line and grade. The augering machine shall be steered to maintain line and grade to the tolerances provided in Section 1.5.4 of this Specification. If the installation is off line and grade, the Contractor shall make the necessary steering corrections and return to design line and grade at a rate of no greater than 25 mm per 7.5 m.
- 3.2.2 Guidance system shall be checked at least once per shift and reset by an experienced competent surveying personnel in accordance with acceptable procedures. Auger boring operations shall be stopped if the guidance system is found to require resetting until such time as it is adjusted.
- 3.2.3 The Contractor shall monitor line and grade continuously. Deviations from line and grade shall be recorded a minimum of three times per pipe section and shall be incorporated into the Contractor's daily report.
- 3.2.4 Auger boring operations shall be completed in a manner that does not damage the casing pipe. In the event a section of pipe is damaged during the augering operation, the Contractor shall immediately inform the Contract Administrator and allow the Contract Administrator to visually inspect the damaged pipe section. Upon approval from the Contract Administrator, the Contractor shall temporarily repair the damaged section and shall jack the damaged section through to the retrieval shaft for removal from the pipe section. Alternatively, the Contractor may propose remedial measures to repair damaged pipe based on pipe manufacturer's recommendations to remediate damaged pipe sections subject to approval by the Contract Administrator. Damaged pipe shall not be used in the work unless permitted in writing by the Contract Administrator. Costs associated with remediation of such damaged pipe will be the sole responsibility of the Contractor.
- 3.2.5 The Contractor shall ensure the casing pipe is handled as per manufacturer's recommendations during transportation, storage, picking, and bracing. The Contractor shall ensure proper bracing and support is provided during placement of the casing pipe onto the auger frame.
- 3.2.6 The Contractor shall ensure the auger bore machine is capable of uniformly distributing axial forces and minimizing eccentric loading that may arise from the auger boring process to the casing pipe. All procedures shall follow recommendations of the pipe manufacturer and reviewed by the Contract Administrator. Jacking forces shall not exceed the manufacturer's recommended allowable jacking force (based on a factor of safety of two).
- 3.2.7 The Contractor shall monitor excavated spoil volumes to prevent over excavation during augering operations.

- 3.2.8 The Contractor shall contain, transport and dispose of all excavated materials at an approved disposal site.
- 3.2.9 In the event the pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. Corrective work shall be completed at no additional cost to the Owner and is subject to the approval of the Contract Administrator.
- 3.2.10 Excavation as per Section 02161 – Shaft Excavation and Support.
- 3.2.11 Excavate working pit to not less than 0.5 m below lowest invert of encasing pipe.

3.3 Obstruction

- 3.3.1 The Contractor shall immediately notify the Contract Administrator in the event the auger boring operation encounters an object or condition that impedes forward progress. The Contractor shall correct the condition, and remove, clear, or otherwise make it possible for the auger boring equipment to advance past the object. No removal shaft shall be constructed or attempted without the written authorization by the Contract Administrator. Upon written notification of the Contract Administrator, the Contractor shall immediately proceed with removal of the object or obstruction by means of an obstruction removal shaft or by other approved methods, as submitted by the Contractor.

3.4 Carrier Pipe Installation

- 3.4.1 Remove all foreign material from casing pipe and related appurtenances by flushing with water.
- 3.4.2 For a two-pass installation, the Contractor shall install the carrier pipes in accordance with the City of Vancouver Construction Supplementary Specification Section 33 11 01 Waterworks

3.5 Site Clean-Up and Restoration

- 3.5.1 The Contractor shall remove all construction debris, spoils, oil, grease, and other materials shall be removed from the launching shaft, retrieval shaft, casing pipes, and staging areas upon completion of augering activities.
- 3.5.2 The Contractor shall dispose of all excavated materials. Excavated materials shall be transported in lined trucks. Slurry shall be pumped into tanker trucks and disposed of at acceptable facilities in accordance with current provincial regulations for disposal of these materials if applicable. Only those disposal sites identified in the approved submittals shall be used.
- 3.5.5 The Contractor shall restore and repair any damage resulting from their construction activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Temporary restoration shall be completed no later than 2 days after augering activities are complete as outlined in the City of Vancouver Supplementary Construction Specifications - Section 32 15 01S Surface Restoration.

END OF SECTION

1 GENERAL

1.1 *Summary of Work*

- 1.1.1 The Contractor shall furnish all materials and equipment necessary for annular space grouting of the void between the outer diameter of the carrier pipe and the inner diameter of the jacked casing pipe.

1.2 *Related Sections*

- | | | |
|-------|--|-----------------------------|
| 1.2.1 | Microtunneling | Section 02311 |
| 1.2.2 | Carrier Pipe Installation | Section 33 11 01 Waterworks |
| 1.2.3 | Open Shield Pipe Jacking | Section 02312 |
| 1.2.4 | Augered Crossings | Section 02400 |
| 1.2.5 | Welded Steel Pipe Jacking Installation | Section 02616 |

1.3 *Reference Specifications, Codes and Standards*

- 1.3.1 American Society for Testing and Materials (ASTM)
- 1.3.1.1 C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 1.3.1.2 C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 1.3.1.3 C94 – Specifications for Ready Mix Concrete.
 - 1.3.1.4 C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using two inch or 50 mm cube specimens).
 - 1.3.1.5 C144 – Specification for Aggregate for Masonry Mortar.
 - 1.3.1.6 C150 – Standard Specification for Portland Cement.
 - 1.3.1.7 C937 – Standard Specification for Grout Fluidifier for Preplaced-Aggregate Concrete.
- 1.3.2 CRD C621 – Non-shrink Grout

1.4 *Definitions*

- 1.4.1 Annular Space Grouting: Grouting used to fill the void between the installed carrier pipe and the casing pipe (for a two pass microtunneling, open shield pipe jacking installation and augered crossing installation).

1.5 *Design Criteria*

- 1.5.1 The Contractor shall provide all equipment, materials, and personnel necessary to completely fill all voids between the outside installed carrier pipe and the inside of the casing pipe (for a two pass microtunneling augered boring or open shield pipe jacking installation).
- 1.5.2 The Contractor shall develop one or more grout mixes designed to completely fill all voids, to provide acceptable strength based on the size of the void, sufficient durability to prevent movement, flotation, or damage to the carrier pipe, provide adequate retardation, and provide less than one (1) percent shrinkage by volume. All grout mix proportions shall be subject to

review and acceptance by the Contract Administrator. Grout shall be low strength and non-shrinking.

- 1.5.3 Minimum strength of 0.3 MPa in 24 hours and 5 MPa in 28 days.
- 1.5.4 Grout shall consist of Portland cement, fluidifier as necessary and water in the proportions specified herein or as approved by the Contract Administrator. Up to two (2) percent bentonite by weight of cement may be added to the mix. Sand may be added to the grout mix as approved by the Contract Administrator. The Contractor shall determine if additional water and fluidifier will be required if sand is added to the grout mix.
- 1.5.5 Grout mix ratios (water/cement) shall be varied as needed to fill voids and shall be between 1:1 and 2:1 by volume.
- 1.5.6 The Contractor shall ensure proper methods are used to prevent floating and damage of the carrier pipe.
- 1.5.7 The Contractor shall use a bulkhead to facilitate annular space grouting.

1.6 Submittals

- 1.6.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.6.2 Annular space grouting work plan: Contractor shall submit a work plan detailing methods, equipment, procedures, and sequencing of grout work. Details shall include injection methods and minimum and maximum grout pressures, monitoring and recording equipment, pressure gauge calibration data, methods of controlling grout pressure, method of transporting grouting equipment and materials, and provisions to protect the pipes and linings. Contractor shall provide written certification from carrier pipe manufacturer that proposed grouting operations and procedures will not damage the carrier pipe. Contractor shall provide confirmation grout density and heat of hydration will not damage the carrier pipe and its joints.
- 1.6.3 Contractor shall submit details of grout mix proportions, admixtures, manufacturer's information, and laboratory test data verifying strength of proposed grout mixtures (24-hour and 28-day strengths).
- 1.6.4 Contractor shall submit anticipated volumes of grout to be injected for each carrier pipe.
- 1.6.5 Contractor shall submit the following grout mix/testing information for approval:
 - 1.6.5.1 Proposed grout densities and viscosity.
 - 1.6.5.2 Initial set time of grout.
 - 1.6.5.3 Grout working time before a 15 percent change in density or viscosity occurs.
 - 1.6.5.4 Bulkhead designs and locations.
 - 1.6.5.5 Buoyant force calculations during grouting.
 - 1.6.5.6 Measures to prevent carrier pipe flotation.
 - 1.6.5.7 Number and location of vents.
 - 1.6.5.8 Pressure gauge, recorder and field equipment certifications/calibrations.

- 1.6.6 Contactor shall maintain and submit daily logs of grouting operations detailing locations and times of injection, maximum and minimum pressures, volumes and grout mix details.

1.7 Quality Assurance

- 1.7.1 The Contractor shall allow access to the Contract Administrator and shall provide necessary assistance and cooperation to aid the Contract Administrator in documenting observations, measurements, and sample collection prior to, during and following all annular space grouting activities. Access shall include but not limited to:
- 1.7.1.1 The Contract Administrator and/or Owner shall have full access to the grout mixing equipment, jacking and reception shafts and installed pipe string to visually inspect the grouting procedure and record grout parameters (i.e. grout pressures, volumes, locations, etc.).
- 1.7.2 The Contractor shall immediately notify the Contract Administrator, in writing, when any problems are encountered with equipment or materials.
- 1.7.3 All work shall be completed in the presence of the Contract Administrator, unless the Contract Administrator grants prior written approval to complete such work in the Contract Administrator's absence.
- 1.7.4 The Contractor shall provide safe access to all equipment in accordance with all safety regulations.
- 1.7.5 Contractor shall prepare four (4) samples of each proposed grout mix and determine 24-hour and 28 day strength in accordance with ASTM C39 or C109. Four samples of grout shall be provided from the nozzle of the grout injection line for each three (3) cubic metres of grout that is injected but not less than one set for each grouting shift unless directed otherwise by the Contract Administrator.

1.8 Measurement and Payment

- 1.8.1 Payment for all work performed under this Section will be included under payment for work requiring annular space grouting as described in other Sections.

2 PRODUCTS

2.1 Equipment

- 2.1.1 Mixing and injection equipment shall be capable of mixing, agitating, and injecting grout in a continuous flow at the desired injection pressure. A volume meter shall be provided to monitor injected volumes.
- 2.1.2 Grout hoses shall have an inside diameter of not less than 37.5 mm and not greater than 50 mm.

2.2 Materials

- 2.2.1 Cement: Cement shall be Type II or Type V Portland Cement conforming to ASTM C150. Type II cement shall meet Table 4 false set requirements of ASTM C150.
- 2.2.2 Bentonite: Commercially processed Wyoming type powdered bentonite.

2.2.3 Sand: Conforming to ASTM C144 except where modified below.

2.2.3.1 Fineness modulus between 1.50 and 2.00.

2.2.3.2 Grading Requirements:

Sieve Sizes	Percent Passing by Weight
No. 8	100
No. 16	95 to 100
No. 30	60 to 85
No. 50	20 to 50
No. 100	10 to 30
No. 200	0 to 5

2.2.4 Fluidifier shall hold solid constituents in colloidal suspension, be compatible with the cement and water, contain an expansive shrinkage compensator, and comply with the requirements of ASTM C937.

2.2.5 Admixtures may be used subject to the approval of the Contract Administrator. Admixtures may be used to improve the pump-ability, control set time, hold sand in suspension, and to prevent segregation and bleeding.

3 EXECUTION

3.1 General

3.1.1 Contractor shall furnish all necessary equipment, materials, power, water and utilities for all annular space grouting activities required to complete this work. Contractor shall install bulkheads and appropriate venting to support grouting activities.

3.1.2 Contractor shall take all necessary precautions to protect and preserve the exterior and interior surfaces of the carrier pipe. Grout pressures shall be controlled to prevent damage to the carrier pipe and its joints.

3.1.3 Grouting operations shall be initiated upon completion of carrier pipe installation and after successful pressure testing.

3.1.4 TV inspection and recording shall be initiated upon completion of successful pressure testing.

3.1.5 All personnel in contact with grout admixtures shall wear appropriate hoods equipped with respiratory masks, gloves, and necessary protective clothing. Eye baths shall be readily available in the immediate vicinity.

3.1.6 The Contractor shall ensure operations on or off of the site do not interfere with traffic or create a dust, mud, or noise nuisance.

3.2 Mixing and Injection of Grout

3.2.1 Contractor shall test the integrity of the installed carrier pipe and constructed bulkheads for any leaks before conducting grouting operations.

3.2.2 Grout and additives shall be mixed in equipment of sufficient size to provide the desired volume, velocity, and pressure in a single operation. Contractor shall have the ability to changing the grout densities as required by field conditions during grouting operations.

- 3.2.3 Casing ends will have temporary bulkheads to contain the grout; bulkheads to be removed once the grout has set. The Contractor shall confirm with the Contract Administrator that the casing ends have been fully grouted prior to casing end sealing and backfilling.
- 3.2.4 Once grouting operations commence grouting shall proceed uninterrupted from bulkhead to bulkhead.
- 3.2.5 Grouting shall not be terminated until the estimated annular volume of grout has been injected, the density of the exhausted grout at each vent is not less than 85 percent of the density of freshly injected grout, and the viscosity of exhausted grout at each vent is not less than 85 percent of the original viscosity of freshly injected grout.

3.3 *Site Clean-Up and Restoration*

- 3.3.1 The Contractor shall immediately clean up any grout spills.
- 3.3.6 The Contractor shall restore and repair any damage resulting from their grouting activities. Property damaged shall be restored to a condition equal to or better than existing prior to construction. Temporary restoration shall be completed no later than 2 days after carrier pipe installation activities are complete as outlined in the City of Vancouver Construction Supplementary Specifications - Section 32 15 01S Surface Restoration.
- 3.3.2 The Contractor shall properly dispose of all waste wastewater arising from grouting operations. Contents of grout lines shall not be discharged into the pipe, sanitary sewer, storm drains, or surface waters.

END OF SECTION

1 GENERAL

1.1 Summary of Work

- 1.1.1 The Contractor shall furnish all materials and equipment necessary for design, supply and installation of welded steel pipes between the locations shown on the Contract Drawings. Unlined and uncoated 900 mm welded steel pipe is deemed to be suitable as a casing pipe for a two pass installation, either by Open Shield Pipe Jacking installation, Microtunneling installation or Augered Crossing installation.

1.2 Related Sections

- | | | |
|-------|------------------------------|-----------------------------|
| 1.2.1 | Shaft Excavation and Support | Section 02161 |
| 1.2.2 | Carrier Pipe Installation | Section 33 11 01 Waterworks |
| 1.2.3 | Microtunneling | Section 02311 |
| 1.2.4 | Open Shield Pipe Jacking | Section 02312 |
| 1.2.5 | Annular Space Grouting | Section 02331 |
| 1.2.6 | Augered Crossings | Section 02400 |

1.3 Reference Specifications, Codes and Standards

- 1.3.1 ASTM A139 – Specification for Electric Fusion (Arc) Welded Steel Pipe (Sizes 100 mm and Over).
- 1.3.2 AWWA C200 – Steel Water Pipe 150 mm and Larger
- 1.3.3 AWWA C206 – Field Welding Steel Pipe
- 1.3.4 AWWA M11 – Steel Pipe – A Guide For Design and Installation
- 1.3.5 AWWA C210 – Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
- 1.3.6 National Association of Corrosion Engineers (NACE) SP 0169 Control of External Corrosion on Underground or Submerged Metallic Piping Systems.

1.4 Definitions

- 1.4.1 One pass or direct jack pipe jacking installation: A pipe jacking installation whereby the jacking pipe serves as the carrier pipe.

- 1.4.2 Two pass pipe jacking installation: A pipe jacking installation whereby a jacking pipe is installed and serves as a casing pipe for a carrier pipe that is installed after completion of the pipe jacking casing pipe installation.

1.5 *Design Criteria*

- 1.5.1 The Contractor is fully responsible for the design of welded steel jacking pipe in accordance with the design requirements as established in this Specification. The welded steel pipe shall be specifically designed for installation by pipe jacking methods to resist installation loads during installation as a casing or carrier pipe.
- 1.5.2 Design of the jacking pipe shall consider all installation and service loads. These shall include jacking loads, external groundwater loads, earth loads, traffic loads, and other live and dead loads. Design shall be stamped by a registered Professional Engineer licensed in the Province of British Columbia.
- 1.5.3 The allowable jacking capacity shall not exceed 50 percent of the minimum yield strength of the jacking pipe material.
- 1.5.4 Steel casing pipe shall be new, smooth-walled carbon steel pipe conforming to ASTM Specification A139, Grade B.
- 1.5.5 Steel pipe shall have a minimum yield strength of 240 MPa.
- 1.5.6 The joints of the pipe shall be water tight and designed for an internal and external hydraulic pressure of 380 kPa at the manufacturer's recommended maximum pipe deflection.
- 1.5.7 The steel jacking pipe shall have a minimum wall thickness of 13.5 mm.
- 1.5.8 The nominal diameter of the welded steel jacking pipe shall be 900 mm.
- 1.5.9 Jacking pipe shall be furnished in lengths that are compatible with transportation requirements, shaft dimensions, allowable work areas, and Contractor's approved work plan.
- 1.5.10 Pipe connections shall be achieved by full penetration field butt welding or an integral machine press-fit connection (Permalok or equal). Field butt welding a square end piece of steel pipe to a thirty-five (35) degree (with a tolerance of plus or minus 2.5 degrees) beveled end of steel pipe is acceptable. The width of root face shall be 1.6 mm with a tolerance of plus or minus 0.8 mm. Integral machine press-fit connections shall be in accordance with the manufacturer's installation procedures and recommendations.

- 1.5.11 The outside circumference of the jacking pipe shall not vary by more than one (1) percent or 20 mm of its nominal circumference, whichever is less.
- 1.5.12 The outside diameter of the jacking pipe shall be within 5 mm of the nominal outside diameter.
- 1.5.13 Pipe shall not deviate from straight by more than five (5) millimeters per three (3) linear metres. Measurement shall be taken by measuring the gaps between the wall and a straightedge placed along any longitudinal line on the pipe's exterior surface.
- 1.5.14 Pipe ends shall be perpendicular to the straight long axis and shall not vary by more than three (3) millimeters at any point from a true perpendicular plane.
- 1.5.15 Pipe roundness: The difference between the major and minor outside diameters shall not exceed 6 mm.
- 1.5.16 Outer surface of steel pipe shall be coated with at least 30 mils of S/W Duraplate UHS or an approved equal at the discretion of the Contract Administrator.
- 1.5.17 Each pipe section shall be clearly marked on both ends to identify the manufacturer, date of manufacturer, location of plant, shift, sequence, weight per foot, and nominal diameter.
- 1.5.18 Pipe materials shall be transported, handled and stored in accordance with manufacturer's recommendations. Internal bracing shall be furnished and installed as per manufacturer recommendations. Dunnage (or 4 by 4's) shall be used such that the pipe sections are not placed directly on the ground.
- 1.5.19 The Contractor shall ensure the jacking pipe is not chipped, crushed, gouged or damaged in other way. Damaged pipe sections shall be rejected and removed from site and replaced or repaired using methods and materials approved in writing by the Contract Administrator at no cost to the Owner.

1.6 Submittals

- 1.6.1 Provide sufficient detail to allow the Contract Administrator to judge whether the proposed equipment, materials, and procedures meet the requirements of the Contract Documents. Review and acceptance of the Contractor's submittals by the Contract Administrator shall not be construed in any way as relieving the Contractor of their responsibilities under this Contract.
- 1.6.2 The Contractor shall submit written descriptions of procedures and specifications used in the manufacture of the welded steel jacking pipe. Fabrication drawings illustrating the details of the wall thickness, pipe joint and joint gasket.
- 1.6.3 The Contractor shall submit joint details including details of the cross section and circumferential length.
- 1.6.4 The Contractor shall submit certification from the jacking pipe manufacturer that the welded steel jacking pipe shall conform to requirements set out in this specification.

- 1.6.5 Calculations: Submit design calculations for the jacking pipe material demonstrating that the jacking pipe is capable of supporting the maximum loads during pipe jacking with respect to the Contractor's means and methods and intermediate jacking station placement strategy. Design calculations shall consider ground and hydrostatic loads, jacking force loads, and any other loads that may be reasonably anticipated during pipe jacking operations with appropriate safety factors (minimum factor of safety of two). Design calculations shall be sealed and signed by a registered Professional Engineer licensed in the Province of British Columbia. The Contractor shall clearly state all assumptions, design loads, and values used in calculating their jacking pipe loads and subsequent material selection.
- 1.6.6 Provide manufacturer recommendations for allowable jacking loads and ultimate jacking loads.
- 1.6.7 Submit details of pipe restraint to prevent movement of jacking pipe into shaft during stoppages and main jack retractions.
- 1.6.8 Provide manufacturer recommendations for field repair of lining and coating systems.

1.7 Quality Assurance

- 1.7.1 The Contractor shall use an experienced pipe jacking pipe manufacturer to manufacture the jacking pipe as per this Specification. Qualifications of the pipe manufacturer shall be submitted for acceptance by the Contract Administrator prior to manufacturing.
- 1.7.2 All work shall be performed under the review of quality control personnel with a minimum of five years' experience, or as approved by the Contract Administrator.
- 1.7.3 The Contractor shall immediately notify the Contract Administrator, in writing, when any problems are encountered with materials or during manufacturing of the jacking pipe.

1.8 Measurement and Payment

- 1.8.1 Payment for welded steel casing pipe installation by trenchless method includes all applicable work described in this Section and either by Microtunneling (Section 02311), Open Shield Pipe Jacking (Section 02312) or Augered Crossings (Section 02400).

2 PRODUCTS

2.1 Equipment

- 2.1.1 Not Used.

2.2 Pipe Materials

- 2.2.1 Not Used.

3 EXECUTION

3.1 General

- 3.1.1 Contractor shall furnish all necessary equipment, materials, power, water and utilities for all jacking pipe activities required to complete this work.
- 3.1.2 Pipe jacking operations shall be completed in a manner that does not damage the jacking pipe or lining and coating system. In the event a section of pipe is damaged during the jacking operation, the Contractor shall immediately inform the Contract Administrator and allow the Contract Administrator to visually inspect the damaged pipe section. Upon approval from the Contract Administrator, the Contractor shall temporarily repair the damaged section and shall jack the damaged section through to the retrieval shaft for removal from the pipe string. Damaged pipe shall not be used in the work unless permitted in writing by the Contract Administrator. Costs of replacement, repair, or installation of a new pipe shall be completed at no additional cost to the Owner.

3.2 *Installation by Pipe Jacking Methods*

- 3.2.1 Installation shall be completed in accordance with Section – 02311 Microtunneling or Section – 02312 Open Shield Pipe Jacking or Section 02400 – Augered Crossings.
- 3.2.2 The Contractor shall ensure the jacking pipe is handled as per manufacturer's recommendations during transportation, storage, picking, and bracing. The Contractor shall ensure proper bracing and support is provided during placement of the jacking pipe onto the guide rails or jacking frame.
- 3.2.3 The Contractor shall ensure the jacking frame and intermediate jacking stations are capable of uniformly distributing axial forces and minimizing eccentric loading that may arise from the jacking process to the jacking pipe. A properly designed thrust ring shall be used to prevent damage to the jacking pipe. All procedures shall follow recommendations of the pipe manufacturer and reviewed by the Contract Administrator. Jacking forces shall not exceed the manufacturer's recommended allowable jacking force (based on a factor of safety of two).
- 3.2.4 In the event the casing pipe installation does not meet the specified tolerances for line and grade, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisitions of necessary land agreements. Corrective work shall be completed at no additional cost to the Owner and is subject to the approval of the Contract Administrator.
- 3.2.5 The Contractor shall install the 600 mm ductile iron carrier pipe inside the 900 mm steel casing pipe as outlined in the City of Vancouver Construction Supplementary Specification Section 33 11 01 Waterworks.
- 3.2.6 The Contractor shall grout the space between the steel casing pipe and the carrier pipe as per Section 02331 – Annular Space Grouting.

3.3 *Testing and Final Acceptance*

- 3.3.1 Remove all foreign material from the pipe and related appurtenances by flushing with water.
- 3.3.2 The pipe shall be free from visual defects, damage, or excessive deflection. No visible infiltration shall occur through the carrier pipe or at joints.
- 3.3.3 Contractor shall repair any defective joints, pipe sections or fittings.

1.0 BACKGROUND

- 1.1 This work is required as part of the 600mm transmission water main replacement project along Bute Street, between W Pender Street and Haro Street.
- 1.2 The transmission water main replacement project will be completed by City of Vancouver Waterworks Branch ("COV WW") between May, 2021 and April, 2022. The Contractor's work involving the installation of steel casing pipe and ductile iron transmission water main along Bute Street, crossing Alberni Street, described in this tender, will be completed concurrently with the water main installation project.
- 1.3 The successful bidder will have to coordinate with the COV WW. The successful contractor shall coordinate with City of Vancouver work forces.

2.0 SCOPE OF WORK

- 2.1 The Contractor's Work is expected to include, but is not limited to:
 - 2.1.1 Mobilization and demobilization;
 - 2.1.2 Review of the Geotechnical Report provided by Tetra-Tech for information and recommendations;
 - 2.1.3 Coordination with the COV WW Survey team, who will provide the layout for the casing pipe and water main;
 - 2.1.4 Contractor to submit a Traffic Management Plan for City approval;
 - 2.1.5 Excavating the entrance and exit pits. The pits shall have the following properties:
 1. Entrance pit shall be approximately 8m long, 4m wide, and 5.4m deep;
 2. Exit pit shall be approximately 4m long, 3m wide, and 3.1m deep;
 3. Shored by steel sets;
 4. Refer to "Project Site Plan" for location.
 - 2.1.6 Hauling the excavated material to Kent Yards;
 - 2.1.7 Shoring of the entrance and exit pits as required by Work Safe BC;
 - 2.1.8 Exposing utility crossings and verify utility locations and depths. Also, hydro vacuume along side and underneath portions of the concrete block in the middle of the Alberni Street intersection as shown on the attached drawing AB2025, where the proposed clearance is shown to be approximately 0.3m between the concrete block and the proposed case pipe.
 - 2.1.9 Supporting any utilities if necessary;
 - 2.1.10 Dewatering the entry and exit pits, if required;
 - 2.1.11 Spoil removal and disposal;

- 2.1.12 Supply and installation of a 900mm diameter steel casing pipe over 45m by appropriate trenchless methodology;
- 2.1.13 Welding steel pipe sections as required to achieve the desired length
- 2.1.14 Installation of TR –flex 600mm DI CI water main, which will be supplied by the City;
- 2.1.15 Installation of the TR-flex 600mm DICL water main as per COV WW design, and spacers. Complete pressure testing.
- 2.1.16 Installation of the spacers, end caps and annular grouting.
- 2.1.17 Providing one set of survey points to indicate alignment and elevation of both the casing pipe and the DICL water main. Also, specifically, the final termination points of the DICL on either side of the intersection of Alberni and Bute Street so that the COV can later tie in.
- 2.1.18 Backfilling of pits following the DICL transmission water main pressure testing.
- 2.1.19 Backfilling of pits to surface elevation:
- 2.1.20 Hauling approved granular material from Kent Yards;
- 2.1.21 Material shall be placed in 300mm lifts and compacted to 95% SPD.
- 2.1.22 Any curb, gutter, or roadway removed or damaged shall be restored (for temporary use) by the contractor.
- 2.1.23 Permanent surface restoration shall be completed by COV.
- 2.1.24 Coordinating with COV WW for items including, but not limited to:
 - 1. Traffic restrictions and overall Traffic management plan for Bute Street;
 - 2. Laydown and work area requirements and restrictions;
 - 3. Scheduling with COV WW to coordinate timing with nearby COV WW crew.

3.0 MEASUREMENT AND PAYMENT

3.1 Excavation of the entrance & exit pits (shafts) and associated works

Payment for this lump sum item shall include all costs associated with labour, permits, and equipment required to complete the work, as described in this Contract Document. Payment for this item will be on a lump sum price.

3.2 Supply and install 45m+/- of 900mm OD Standard Steel Pipe by appropriate trenchless methodology.

Payment for welded steel casing pipe installation by chosen trenchless methodology includes all applicable work required to supply and install the casing pipe as described in

this Contract Document and Drawing(s) AB2025. Payment for the trenchless installation will be on a lump sum price.

3.3 Install 53m+/- of 600mm DI CI TR-Flex pipe,

Pipe will be supplied by the City of Vancouver and installed by the Contractor in the casing pipe and a small portion outside the casing pipe within the entrance and exit pits as per the described in this Contract Document and Drawing(s) AB2025. The pipe will be pressure tested by the Contractor, but not chlorinated. Payment for the transmission water main will be lump sum.

3.4 Backfilling of exit and entrance pits (shafts) and temporary surface restoration.

Payment for this lump sum item.

April 20, 2021

ISSUED FOR REVIEW
FILE: 704-ENG.VGEO03478-02

City of Vancouver
Engineering Services
Water Design Branch
1100-450 SW Marine Drive
Vancouver, BC V5X 0C3

Attention: Kathryn McCreary, P.Eng.
Project Engineer

Subject: Geotechnical Assessment for Haro Street Transmission Main – Trenchless Section

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was retained by the City of Vancouver (the City) to provide geotechnical engineering services related to the design of a trenchless segment of the proposed Haro Street Transmission Main project. Tetra Tech previously completed a geotechnical assessment for the overall watermain project, and the results of our original assessment were documented in a report titled “Geotechnical Assessment for Haro Street Transmission Main Replacement Project”, Rev. 2, dated April 9, 2019.

Tetra Tech’s scope of services for the current phase was outlined in our proposal, dated December 15, 2020. Authorization for the work was provided via a Purchase Order issued by the City on January 5, 2020. Our scope of work comprised subsurface exploration, laboratory testing, engineering analysis, and preparation of a geotechnical report. This report presents the findings of our subsurface exploration and provides geotechnical recommendations for design and construction of the proposed trenchless segment. Use of this report is subject to the Limitations on the Use of this Document attached in Appendix A.

2.0 PROJECT AND SITE DESCRIPTIONS

The overall Haro Street Transmission Main project consists of an approximately 2 km long, 600 mm to 900 mm diameter, ductile iron watermain in Vancouver, BC. Installation of the watermain has been mostly completed along Robson Street, Gilford Street, and Haro Street. Due to the presence of numerous existing utilities at the intersection of Bute Street and Alberni Street, the City plans to install the watermain via trenchless construction along this crossing. The trenchless section will be about 45 m long and will include a 910 mm diameter steel casing pipe containing a 600 mm carrier pipe. The top of the casing pipe will be about 1.9 m to 3.9 m below the existing road surface (see Figure 1).

The proposed trenchless section is situated within the existing paved roadway along Bute Street. The road surface slopes from south to north at a grade of about 4% to 6% along the trenchless alignment. An existing pedestrian plaza is present within the southbound lane of Bute Street on the south side of Alberni Street. Existing trees are present along both sides of Bute Street, and various existing underground utilities are present across the intersection of Bute Street and Alberni Street.

3.0 SUBSURFACE EXPLORATION

Tetra Tech carried out a subsurface exploration for the proposed trenchless section on March 5, 2021. Details regarding our utility locate, field exploration, and laboratory testing programs are provided below.

3.1 Utility Locate

Prior to our subsurface exploration, Tetra Tech submitted requests to BC One Call and Shaw Communication for information regarding existing utilities in the project area. We also reviewed existing utility information provided by the City. Before initiating ground disturbance, Tetra Tech retained a utility locate subcontractor to identify the locations of existing utilities in the field and to confirm the absence of utility conflicts at our testhole locations. The utility locates were completed using electro-magnetic and ground penetrating radar equipment.

3.2 Field Exploration

Our field exploration consisted of two testholes (TH21-01 and TH21-02), advanced to depths of 7.9 m and 7.3 m below the existing ground surface at the locations shown on Figure 1. Testholes were advanced through soil using the ODEX drilling method, and Standard Penetration Tests (SPTs) were completed to obtain soil samples and evaluate the consistency/compactness of the soils. The testholes were advanced at least 3.3 m into bedrock via coring to confirm the bedrock depth and type. Following completion, testholes were reinstated in accordance with Provincial groundwater protection requirements.

A Tetra Tech field representative was on site full-time during the field exploration program to classify the soil and bedrock encountered. Detailed testhole logs are provided in Appendix B. UTM coordinates and ground surface elevations at the testhole locations were estimated based on spatial and topographic information from the City's online VanMap website.

3.3 Laboratory Testing

Soil samples collected during the field exploration were submitted to Tetra Tech's geotechnical laboratory for further classification and testing. Laboratory testing consisted of natural moisture content measurement. The results of the laboratory testing program are presented on the testhole logs in Appendix B.

4.0 SOIL AND GROUNDWATER CONDITIONS

4.1 Surficial Geology

Surficial Geology Map 1486A (Armstrong and Hicock, 1979), published by the Geological Survey of Canada, indicates that the surficial geology along the project alignment consists of the following:

- **VCa:** *Glacial drift including: lodgement and minor flow till, lenses and interbeds of substratified glaciofluvial sand to gravel, and lenses and interbeds of glaciolacustrine laminated stony silt; overlain by marine and glaciomarine deposits; bedrock within 10 m or less of the surface.*

The alignment extends through a developed area in downtown Vancouver, and fill of variable composition and quality is expected near the ground surface and within existing utility trenches along the alignment.

4.2 Ground Conditions

The ground conditions observed in our testholes were generally consistent with the published surficial geology mapping referenced in Section 4.1. The ground conditions are described in detail on the testhole logs in Appendix B and summarized below.

- **ASPHALT:** Existing asphalt pavement was encountered at both testhole locations and was measured to be about 100 mm thick.
- **FILL:** Existing fill materials were encountered below the asphalt pavement in both testholes. The fill extended depths of about 1.2 m in TH21-01 and 3.5 m in TH21-02. The fill in TH21-01 and to a depth of about 1.4 m in TH21-02 consisted of compact brown sand, some gravel to gravelly, trace silt to silty. The fill below 1.4 m depth in TH21-02 consisted of soft grey sandy silt with some gravel and trace clay.
- **SILT (TILL-LIKE):** The existing fill materials in both testholes were underlain by till-like soil, consisting of hard grey silt, some sand to sandy, some gravel, trace clay. The till-like soil extended to depths of 2.7 m in TH21-01 and 4.0 m in TH21-02.
- **BEDROCK:** Sandstone and/or siltstone bedrock was encountered at depths of 2.7 m in TH21-01 and 4.0 m in TH21-02. TH21-01 and TH21-02 were terminated within the sandstone/siltstone bedrock at depths of 7.3 m and 7.9 m, respectively.

4.3 Geotechnical Parameters

The interpreted ground profile in Figure 1 divides the subsurface materials into three main units: Unit 1 – Fill, Unit 2 – Silt (Till-Like), and Unit 3 – Bedrock. Table 1 provides interpreted geotechnical parameters for each of the subsurface units.

Table 1: Interpreted Geotechnical Parameters

Parameter	Unit 1 – Fill *	Unit 2 – Silt (Till-Like) *	Unit 3 – Bedrock *
Moisture Content	8% to 30%	8% to 15%	3%
Consistency / Compactness (SPT N-Value)	2 to 30	50 to 100	N/A
Hydraulic Conductivity (m/s)	1×10^{-6} to 1×10^{-3}	1×10^{-10} to 1×10^{-8}	**
Friction Angle (°)	28 to 34	38 to 42	N/A
Undrained Shear Strength (kPa)	N/A	N/A	N/A
Bulk Density (kN/m ³)	19	21	25
Uniaxial Compressive Strength (MPa)	N/A	N/A	10 to 20

Notes:

* Ranges of parameters are provided to reflect the expected variability within the interpreted units. Neither the upper nor lower bound values should be interpreted to apply for the entire unit.

** Hydraulic conductivity of bedrock will be governed by joints within the rock mass.

As shown in Figure 1, the trenchless horizon is expected to extend near the interface of Unit 2 – Silt (Till-Like) and Unit 3 – Bedrock. However, Unit 1 – Fill could be encountered within the trenchless horizon along parts of the alignment, and bedding/backfill materials could be encountered around existing utilities, some of which extend to as close as about 300 mm from the top of the proposed casing pipe.

Unit 3 – Silt (Till-Like) is expected to contain about 10% cobbles and boulders by mass. Occasional boulders up to about 1.0 m in nominal diameter have been encountered within the till-like soils along open-cut sections of the project alignment and could be encountered along the trenchless section. Uniaxial compressive strengths of cobbles and boulders within the till-like soil are expected to be in the order of 200 MPa.

Dissolved gas (methane) is not expected to be encountered along the trenchless section.

4.4 Groundwater Conditions

Groundwater was not encountered in the testholes completed during our subsurface exploration. However, the groundwater conditions are anticipated to vary seasonally, and perched groundwater conditions could develop within existing fill materials overlying the till-like soils in the event of precipitation. Perched groundwater may also be encountered within backfill zones for existing utilities along the alignment.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 Trenchless Construction Methods

As noted above and shown in Figure 1, the proposed trenchless horizon is expected to traverse near the interface of Unit 2 – Silt (Till-Like) and Unit 3 – Bedrock. Unit 1 – Fill could also be encountered along parts of the alignment, including in bedding/backfill zones for existing utilities. Groundwater is generally not expected, but perched groundwater within zones of existing fill could be encountered.

Based on the anticipated soil/bedrock and groundwater conditions, we consider that microtunneling would be suitable for construction of the proposed trenchless section. A well-designed microtunneling system would enable drilling through the anticipated till-like soils and sandstone/siltstone bedrock, provide face control through potential zones of fill or groundwater, and facilitate accurate steering. However, due to mobilization and setup costs, microtunneling could be expensive for the relatively short trenchless section.

Consideration could be given to instead using a Motorized Small Boring Unit (SBU-Ms), for which the mobilization and setup costs would likely be lower. However, this system may not perform well if zones of soft/loose and/or saturated fill are encountered. Accordingly, we would recommend lowering the watermain to be fully within the bedrock for this alternative.

5.2 Entry and Exit Pits

Entry and exit pits will be required at opposite ends of the trenchless section. Entry pit dimensions of 8 m long by 4 m wide and exit pit dimensions of 4 m long by 3 m wide should be sufficient for the required equipment. Full road closures along Bute Street should be expected to provide sufficient staging area.

Entry and exit pits are expected to extend through the existing fill materials and till-like soils and into the underlying sandstone/siltstone bedrock. We expect that excavation through these materials could typically be completed using a toothed excavator bucket. A ripper attachment may be required for excavation into bedrock.

We anticipate that shoring will be required at the entry and exit pit locations. Based on the ground conditions at the pit locations, suitable shoring systems would include trench shields or slide rail systems. In the absence of significant groundwater, conventional sumps and pumps should be sufficient for excavation dewatering.

5.3 Grouting of Annulus

Following installation of the watermain, the annulus between the casing and carrier pipes should be fully filled with flowable grout. Grouting should be completed in a manner to prevent the formation of voids between the casing and carrier pipes.

5.4 Backfilling and Pavement Reinstatement

Backfilling of the entry and exit pits will be required following completion of the trenchless installation. Bedding, surround, and backfill materials for pipe sections at the entry/exit pits should conform to the 2009 Master Municipal Construction Document (MMCD), Volume II – Platinum Edition. Bedding and surround fill consisting of Pit Run Sand (MMCD Section 31 05 17, Item 2.4) should be placed within at least 150 mm below the pipe, 250 mm beyond both sides of the pipe, and 300 mm above the top of the pipe. Backfill about the bedding and surround zone should consist Pit Run Gravel (MMCD Section 31 05 17, Item 2.3). Bedding, surround, and backfill materials should be compacted in maximum 300 mm thick loose lifts to at least 95% Modified Proctor Maximum Dry Density (MPMDD). The pavement structure should subsequently be reinstated in accordance with the City's specifications.

5.5 Impacts on Existing Infrastructure

Construction of the proposed trenchless section could pose risk to nearby existing infrastructure, such as existing buildings, roads, light posts, and underground utilities. Potential affects to existing infrastructure could be related to construction-induced settlement or vibration. Namely, movement of existing underground utilities could occur adjacent to the entry/exit pit excavations or above the trenchless horizon. Vibrations from construction equipment could also affect existing structures.

We recommend conducting a pre-construction condition survey of nearby existing infrastructure to establish the baseline condition. The contractor should conduct their work in a manner to minimize potential risk to adjacent existing infrastructure.

6.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the City of Vancouver and its agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the City of Vancouver, or for any project other than the Haro Street Transmission Main Replacement Project. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of This Document included in Appendix A.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02

FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02
FILE: 704-ENG.VGEO03478-02

Prepared by:
Chris Longley, M.Eng., P.Eng.
Geotechnical Engineer
Direct Line: 778-945-5734
chris.longley@tetrattech.com

Reviewed by:
Wayne Quong, M.A.Sc., P.Eng.
Senior Geotechnical Engineer
Direct Line: 778-891-9877
wayne.quong@tetrattech.com

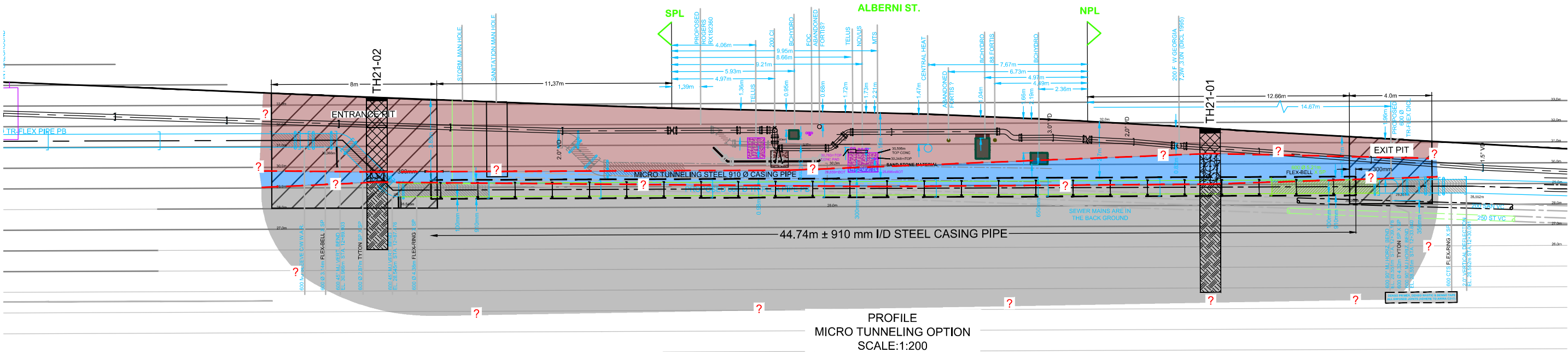
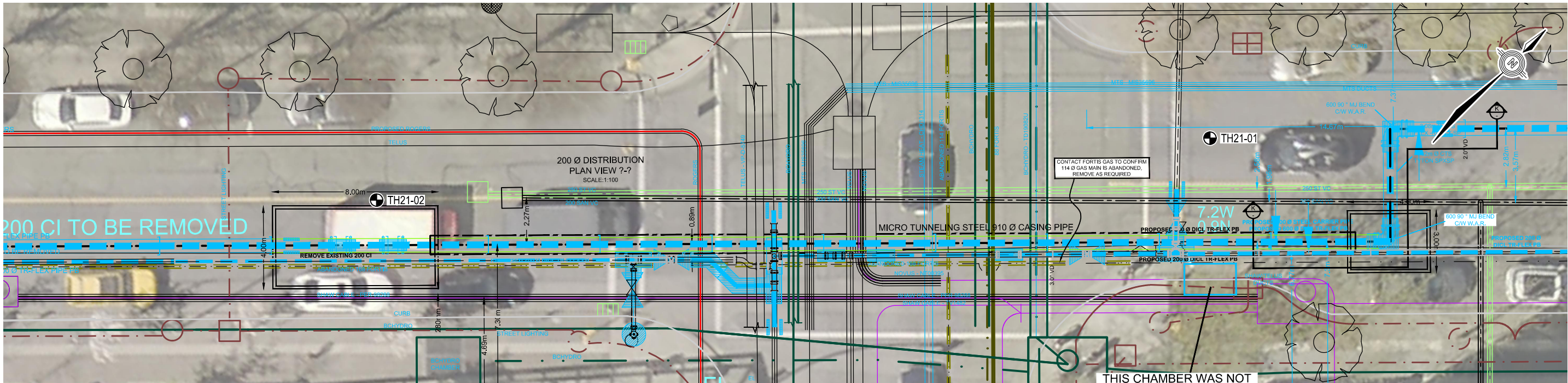
CL/WQ/sy

Attachments: Figure 1: Plan and Profile
Appendix A: Limitations on the Use of This Document
Appendix B: Testhole Logs

FIGURES

Figure 1 Plan and Profile

Q:\Vancouver\Drafting\ACAD\TEMPLATE\BASIC\TITLE BLOCK_11x17 Landscape.dwg [FIGURE 1] March 12, 2014 - 11:36:09 am (BY: FOURNIER, SAMUEL)



LEGEND

Testhole locations

STICKLOG LEGEND

Asphalt
Fill
Silt (till-like)
Sandstone/siltstone

SOIL LEGEND

Fill
Silt (till-like)
Sandstone/siltstone

NOTES

1. Based on cad files provided by City of Vancouver on April 20, 2021.

ISSUED FOR REVIEW



Scale: 1:200 @ 11"x17"

CLIENT



HARO TRANSMISSION MAIN REPLACEMENT
VANCOUVER, BC

PLAN AND PROFILE

PROJECT NO. ENG.VGEO03478-01	DWN RH	CKD CL	REV 0
OFFICE VANC	DATE April 20, 2021		

Figure 1

APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

APPENDIX B

TESTHOLE LOGS

Testhole No: TH21-01

Project: Haro Street Transmission Main

Project No: 704-ENG.VGEO03478-02

Location: Bute Street & Alberni Street

Ground Elev: 33.3 m

Vancouver, BC

UTM: 490853 E; 5459350 N; Z 10 NAD83

Depth (m)	Method	Soil Description	Graphical Representation	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit	Moisture Content	Liquid Limit	SPT (N)	Elevation (m)
0								20	40	60	80	
0		ASPHALT						20	40	60	80	33
1	ODEX	SAND (FILL), silty, some gravel to gravelly, trace to some cobbles, dry, compact, brown with trace iron oxidation			1	100	9					32
2		SILT (TILL-LIKE), sandy, some gravel, trace clay, damp to moist, hard grey			2	13	14					31
3		SANDSTONE/SILTSTONE										30
4												29
5	CORING											28
6												27
7												26
8		End of testhole at 7.9 m										25
9		- Groundwater was not observed during drilling.										24
10		- Testhole was backfilled with drill cuttings, sand and bentonite chips upon completion.										
		- Soil descriptions are based on visual classification, in addition to in-situ and laboratory testing data. Some variation throughout the interpreted soil layers should be expected.										
		- Testhole coordinates and elevations were estimated based on spatial and topographic information from VanMap and should not be relied up by the contractor.										



TETRA TECH

Contractor: Geotech Drilling Services Ltd.

Completion Depth: 7.9 m

Drilling Rig Type: Truck-mounted

Start Date: March 5, 2021

Logged By: CL

Completion Date: March 5, 2021

Reviewed By: WQ

Page 1 of 1

Testhole No: TH21-02

Project: Haro Street Transmission Main

Project No: 704-ENG.VGEO03478-02

Location: Bute Street & Alberni Street

Ground Elev: 31.7 m

Vancouver, BC

UTM: 490827 E; 5459319 N; Z 10 NAD83

Depth (m)	Method	Soil Description	Graphical Representation	Sample Type	Sample Number	SPT (N)	Moisture Content (%)	Plastic Limit	Moisture Content	Liquid Limit	SPT (N)	Elevation (m)
0								20	40	60	80	
0		ASPHALT										
0		SAND (FILL), some gravel, trace silt, moist, compact, brown										
1					1		10					31
2	ODEX	SILT (FILL), sandy, some gravel, trace clay, moist, soft, grey			2	3	29					30
3					3	2	17					29
4		SILT (TILL-LIKE), some sand, some gravel, trace clay, moist, hard, grey			4		14					28
4		SANDSTONE/SILTSTONE										
5	CORING											27
6												26
7												25
8		End of testhole at 7.3 m - Groundwater was not observed during drilling. - Testhole was backfilled with drill cuttings, sand and bentonite chips upon completion. - Soil descriptions are based on visual classification, in addition to in-situ and laboratory testing data. Some variation throughout the interpreted soil layers should be expected. - Testhole coordinates and elevations were estimated based on spatial and topographic information from VanMap and should not be relied up by the contractor.										24
9												23
10												22



TETRA TECH

Contractor: Geotech Drilling Services Ltd.

Completion Depth: 7.3 m

Drilling Rig Type: Truck-mounted

Start Date: March 5, 2021

Logged By: CL

Completion Date: March 5, 2021

Reviewed By: WQ

Page 1 of 1

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

1.0 DEFINITIONS AND INTERPRETATION

1.1 Definitions

The following capitalized terms have the meanings set out below when used in the Tender Documents, unless the context requires otherwise:

- (a) **“City”** means the City of Vancouver;
- (b) **“Closing Time”** has the meaning set out on the cover page of this ITT;
- (c) **“Contract”** means a contract substantially in the form of Part D - Form Agreement, to be entered into between the City and a successful Tenderer;
- (d) **“Contractor”** means a Tenderer, the Tender of which the City has accepted, and which Tenderer has consequently entered into a Contract;
- (e) **“Drawings”** means the portion of the Tender Documents consisting of the graphic and pictorial representations of the Work or Work requirements;
- (f) **“Engineer”** means the architect, engineer or other professional consultant who will act as the City’s agent for the purpose of managing and administering a Contract, who may be an employee of the City or an independent consultant engaged by the City on its behalf;
- (g) **“Form of Tender”** means the form of tender in Part C - Form of Tender to this ITT on which Tenderers are to complete their Tenders;
- (h) **“GST”** means the tax payable and imposed pursuant to Part IX of the *Excise Tax Act* (Canada), as amended or replaced from time to time;
- (i) **“Information and Privacy Legislation”** includes the *Freedom of Information and Protection of Privacy Act* (British Columbia) and the regulations thereunder;
- (j) **“Losses”** means, in respect of any matter, all:
 - (i) direct and indirect; and
 - (ii) consequential,

claims, demands, proceedings, losses, damages, liabilities, deficiencies, costs and expenses (including without limitation, all legal and other professional fees and disbursements, interest, penalties and amounts paid in settlement, whether from a third person or otherwise);
- (k) **“Notice of Award”** has the meaning set out in Part C - Form of Tender;
- (l) **“Notice to Proceed”** has the meaning set out in Part C - Form of Tender;

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- (m) **“PST”** means the provincial sales tax payable and imposed pursuant to the *Provincial Sales Tax Act* (British Columbia), as amended or replaced from time to time;
- (n) **“Specifications”** means the portion of the Tender Documents consisting of the written requirements and standards for products, systems, workmanship, quality, and the services necessary for the performance of the Work;
- (o) **“Tender”** means a tender submitted to the City in response to this ITT, or as used in Part C - Form of Tender, a particular such entity;
- (p) **“Tender Contract”** means the contract between the City and each Tenderer governing the ITT process;
- (q) **“Tender Documents”** means the documents identified as such in Part A - Introduction;
- (r) **“Tenderer”** means an entity eligible to participate in this ITT process;
- (s) **“Tender Price”** means the amount stipulated by the Tenderer in the space provided therefor in the Form of Tender, including all applicable taxes, which price, for greater certainty, is the Tenderer’s proposed Contract Price to complete all of the Work;
- (t) **“Work”** means the total construction and related services required by the Tender Documents; and
- (u) **“Work Site”** or **“Site”** means the area or areas on or about the City’s property where the Work is to be carried out.

All other capitalized terms used in this ITT have the meanings given to them elsewhere in the ITT.

1.2 Interpretation

- (a) In the Tender Documents, any reference to the masculine, the feminine or the neuter includes the others unless the context requires otherwise. Also, any reference to the singular includes the plural where appropriate.
- (b) If there is a conflict between or among (i) the Specifications and Drawings and (ii) the other Tender Documents, the other Tender Documents shall prevail over the Specifications and Drawings.
- (c) In these Tender Documents, the word “should” and the terms “is asked to” and “are asked to” are used to denote actions or Tender inclusions that, while not mandatory, are strongly recommended. In contrast, the terms “will”, “shall”, “must”, “is to”, “are to”, “is required to” and “are required to” are used to denote mandatory requirements of the ITT. If a Tenderer is uncertain as to whether or not a particular action or Tender inclusion is mandatory, the Tenderer should submit an inquiry to the Contact Person.

2.0 SUBMISSION INSTRUCTIONS

- 2.1 Each Tenderer must complete its Tender on the Form of Tender and submit its Tender in accordance with the instructions set forth on the cover page of the ITT and elsewhere herein.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- 2.2 Any Tender received after the Closing Time may be returned unopened to the Tenderer.
- 2.3 Faxed Tenders and/or other documents will not be accepted.
- 2.4 Each Tender must be signed by an authorized signatory or authorized signatories of the Tenderer (as necessary for due execution on behalf of the Tenderer). Each Tender by a company or partnership should specify the full legal name of the legal entity submitting the Tender.
- 2.5 All blank spaces in the Form of Tender should be filled in and all schedules completed. Any failure by a Tenderer to complete the Form of Tender may result in preference being given to competing Tenderers. All prices and notations should be legibly written in a non-erasable medium. Erasures, interlineations or other corrections should be initialled by an authorized signatory of the Tenderer.
- 2.6 Subject to any alternatives or options in respect of which the City requests pricing or other information in a Schedule to the Form of Tender, Tenders are to be all inclusive and without qualification or condition.
- 2.7 The City may, at any time and for any reason, extend the Closing Time by means of a written amendment published on the City's website, as set out in Part A - Introduction.
- 2.8 A Tenderer that has already submitted a Tender may amend its Tender prior to the Closing Time: a) by submitting an amendment identifying a plus or minus variance to the Tenderer's Tender Price; or b) by sending in a completely new Tender, clearly indicating it replaces the previously submitted Tender. Any such revision must clearly identify the ITT number and the Closing Time. A Tender revision submitted as aforesaid shall effectively amend the Tender and the City shall only review and evaluate the Tender as amended.
- 2.9 The City will not be responsible for any cost incurred by any Tenderer in preparing a Tender.

3.0 BONDS

- 3.1 Tenders will be irrevocable and each offer made therein shall remain open for acceptance by the City for a period of ninety (90) calendar days after the Closing Time. Each Tender must be accompanied by a bid bond valid for a period of ninety (90) calendar days commencing on the Closing Time, payable to the "City of Vancouver", in the amount of ten percent (10%) of the Tender Price, and not a dollar amount, as a guarantee of the due execution of a Contract and the delivery of the performance bond and labour and material payment bond required by the Form of Tender. The forms of these bonds are to be those issued by the Canadian Construction Documents Committee as follows:

Bid Bond:	CCDC 220 (latest)
Performance Bond:	CCDC 221 (latest)
Labour and Material Payment Bond:	CCDC 222 (latest)

- 3.2 A bid bond must be submitted in an electronic or digital format and must meet the following criteria:

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- (a) The version submitted by the Tenderer must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the surety company, or an approved verification service provider of the surety company.
 - (b) The version submitted must be viewable, printable and storable in standard electronic file formats acceptable to the City, and in a single file. Allowable formats include pdf.
 - (c) The verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees.
 - (d) The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Section 3.2(a).
- 3.3 Bonds failing the verification process will NOT be considered to be valid. Bonds passing the verification process will be treated as original and authentic.
- 3.4 Each Tender must be accompanied by a “Consent of Surety”, substantially in the form provided as a schedule to the Form of Tender, duly completed by a surety company authorized and licensed to carry on business in British Columbia.
- 3.5 The bid bonds of unsuccessful Tenderers will be returned to them upon request at any time after the Contract is awarded. The bid bond of the Tenderer to whom the award is made will be returned upon request of the Tenderer following: execution of the Contract; delivery of a performance bond for 50% of the Tender Price (or the aggregate tendered price for the subset(s) of the Work in respect of which a Notice of Award has been given) and a labour and material payment bond for 50% of such price; commencement of the Work; and compliance with any other conditions set out in the Form of Tender. The cost of all bond premiums must be included in the Tender Price.
- 3.6 All bonds must be issued by a surety company authorized and licensed to carry on business in British Columbia.
- 4.0 TENDER PRICE**
- 4.1 Subject to any adjustment for changes to the Work, which is approved by the City in accordance with the Tender Documents or Contract Documents, the Tender Price shall be the maximum compensation owing to the Contractor for the Work and the Contractor’s compensation shall cover and include all profit and all costs of supervision, labour, material, equipment, overhead, financing and all other costs and expenses whatsoever incurred in performing the Work.
- 4.2 If unit prices or other price breakdowns are requested in a schedule to the Form of Tender, such information **must** be included in the Tender. Furthermore, if such unit prices or other price breakdowns are requested in a schedule to the Form of Tender, such amounts may be used to compute interim progress payments and will be reviewed by the City in its evaluation of Tenders; therefore Tenderers should ensure that such amounts accurately reflect their costs for each item. A Tenderer may be required to justify any submitted unit price or other price breakdown.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- 4.3 If an itemized breakdown of the Tender Price is requested in a schedule to the Form of Tender, the City may delete any items in order to meet any budget limitation and award a Contract for only the remaining items to a Tenderer who is agreeable thereto.

5.0 ACCEPTANCE OF TENDERS

- 5.1 Despite anything to the contrary contained in the Tender Documents:

- (a) Tenderers are notified that the lowest or any Tender need not necessarily be accepted and the City reserves the right to reject any and all Tenders at any time, or cancel the ITT process, without further explanation or to accept any Tender that is considered advantageous to the City.
- (b) Acceptance of any offer made within a Tender is contingent on funds being approved and a contract award being made by, or pursuant to authority delegated by, Vancouver City Council and the compliance of the Tenderer with the conditions required to be satisfied upon receipt of a Notice of Award.
- (c) Tenders which fail to conform to the Tender Documents may or may not be disqualified or rejected. The City may or may not waive any non-compliance with the Tender Documents, including any material non-compliance, irregularity or anomaly, and including any non-compliance as to the timing of delivery of anything required by the Tender Documents, and may at its sole discretion elect to retain for consideration Tenders which are non-conforming because they do not contain the content or form required by the Tender Documents or because they have not complied with the process for submission set out in this ITT.
- (d) Where the City is of the view, in its sole discretion, that there is an ambiguity or other discrepancy which cannot be discerned or resolved from examining the contents of a Tender, then whether or not such an ambiguity or discrepancy actually exists on the face of the Tender, the City may, prior to any Contract award, solicit clarification from the Tenderer or accept clarification from the Tenderer on any aspect of the Tender. Such clarification may include the acceptance of any further documents or information which will then form part of the Tender. The soliciting or accepting of such clarification (whether or not solicited) by the City will be without any duty or obligation of the City to advise any other Tenderers or to allow them to vary their Tender Prices as a result of the acceptance of clarification from any one or more Tenderers and the City will have no liability to any Tenderer as a result of such acceptance of clarification.
- (e) The award of any Contract will be based on an evaluation of the Tenders by the City to determine which, in the City's opinion, offer the best overall value to the City. The City expects to place the greatest emphasis on price; however, the City may take into account other factors affecting value, including those concerning quality, service or sustainability, or Tenderers' past work, reputations or experience. The City may also focus, where relevant, on the overall net impact of a Tender (or an offer therein) on the finances of the City (including both capital and operating costs). Therefore, the City may accept a Tender other than the lowest Tender.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- (f) If the City determines that all Tender Prices are too high, all Tenders may be rejected.
- (g) The City may, prior to any Contract award, agree, with the Tenderer considered to provide best value or any one or more Tenderers, to certain changes to the scope of the Work or certain changes to Contract conditions, in each case without having any duty or obligation to advise any other Tenderers or to allow them to vary their Tender Prices as a result of such changes, and the City will have no liability to any other Tenderer as a result of such changes. However, each Tender must be a tender in respect of the Work set forth herein, to complete that Work, under an agreement in the form of the Form of Agreement included as Part D of the ITT, and not propose variations thereto.
- (h) Each Tenderer acknowledges and agrees that the City will not be responsible for Losses incurred by the Tenderer as a result of or arising out of submitting a Tender, or due to the City's acceptance or non-acceptance of its Tender, or any part thereof, or any breach by the City of the Tender Contract between the City and the Tenderer, or arising out of any Contract award not being made in accordance with the express or implied terms of the Tender Documents.
- (i) The City may award a Contract on the basis of policies and preferences not stated in the Tender Documents or otherwise than as stated in the Tender Documents.
- (j) Prior to any Contract award, a Tenderer may be required to demonstrate financial stability. Should the City so request, a Tenderer may be required to provide annual financial reports or a set of financial statements prepared by an accountant.
- (k) City guidelines or policies that may be applicable to the ITT will not give rise to legal rights on the part of any Tenderer, Contractor, subcontractor, supplier, or other person as against the City and will in no case create any liability on the part of the City. For certainty, the City's Procurement Policy, as amended or replaced from time to time, is now agreed to be an internal guideline document and creates no legal rights or obligations with respect to this ITT.
- (l) The City may reject any Tender by a Tenderer that has engaged in collusion with another Tenderer or otherwise attempted to influence the outcome of the ITT other than through the submission of its Tender.
- (m) The City may elect, in its sole discretion, to accept for consideration Tenders that contain conditions or qualifications that are in the nature of corrections of typos or resolutions of internal inconsistencies in this ITT or the Form of Agreement in Part D, or that represent immaterial changes to the Form of Agreement in Part D and do not consist of changes of substance or changes to allocations of risk, or with respect to the scope of any Work, that are for the avoidance of doubt only and do not suggest any deviation from the requirements of the ITT. This Section 5.1(m) is a reservation of rights for the benefit of the City and no Tenderer may rely on this paragraph to qualify its Tender.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

6.0 AWARD OF CONTRACT

- 6.1 Award of a Contract will be subject to approval by, or pursuant to authority delegated by, Vancouver City Council and the Tenderer's compliance with the conditions required to be met upon receipt of the Notice of Award.
- 6.2 Any successful Tenderer will become a Contractor and will be required to sign a Contract with the City, subject to any amendments approved by the City in writing.

7.0 EXAMINATION OF TENDER DOCUMENTS

- 7.1 Each Tenderer should examine the Tender Documents and must also satisfy itself of the extent of the Work. Each Tenderer must make its own estimate of the facilities and difficulties attending the performance and the completion of the Work.
- 7.2 No allowance will be made on behalf of a Contractor for any error, omission or negligence on the Contractor's part or for non-compliance with the requirements of the foregoing clause 7.1.

8.0 SITE EXAMINATION/PRE-SUBMISSION DUE DILIGENCE BY TENDERER

- 8.1 Tenderers should make a careful examination of the Work Site and investigate and satisfy themselves at their own risk and expense as to all matters relating to the nature and extent of the Work, the means of access to the Work Site, the extent of required coordination with public use of adjacent areas, and any and all matters which are referred to in the Specifications and Drawings and other Tender Documents, or which are necessary for the full and proper completion of any Work or are required by the conditions under which it must be performed. No allowance will be made subsequently for any error, negligence, interpretation, or misinterpretation on a Contractor's part.
- 8.2 The City and the Engineer do not make any representations or warranties concerning the completeness or accuracy of Work Site and geotechnical information (if any) provided in or with the Tender Documents, and each Tenderer must evaluate such information as part of its overall assessment of actual Work Site conditions.
- 8.3 If any Tenderer wishes to evaluate any Work Site conditions, and, for that purpose, requires access or documents from the City beyond the access and documents already provided for in this ITT, the City encourages the Tenderer to submit a written request to the City as far in advance of the Closing Time as is possible. The City will then consider whether or not to facilitate the request. In response to such a request, the City may elect to, itself, undertake a particular study and distribute the results to all Tenderers.

9.0 INTERPRETATION AND CLARIFICATIONS

- 9.1 If any Tenderer is in doubt as to the correct interpretation of any part of the Specifications, Drawings, or other Tender Documents, the Tenderer should request an interpretation of the same from the City by the time stated in Part A - Introduction, Section 6.3. In the absence of such a request, the Tenderer's Tender will be presumed to be based upon the interpretation that may be subsequently given in accordance with the Contract Documents, after award of a Contract.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- 9.2 Prior to the Closing Time, requests for clarification of the Specifications, Drawings, or other Tender Documents may be answered in writing by the City and sent to all prospective Tenderers who have submitted a Response Notification Form on or before the indicated deadline. The City is not responsible for any other explanations or interpretations of the Specifications, Drawings or other Tender Documents.

10.0 PRODUCT APPROVAL

- 10.1 Wherever any material, machinery, equipment or fixture (any “**Product**”) is specified or shown in the Tender Documents by reference to a proprietary item, product or model number, catalogue number, manufacturer or trade name or similar reference, each Tenderer obligates itself to submit its Tender and, if applicable, accept award of a Contract based upon the use of such Product. Use of any such reference in the Tender Documents is intended to establish the measure of quality which the City (or its Engineer) has determined to be requisite and necessary for the Work. Where two or more Products are shown or specified, the Contractor has the option of which to use.
- 10.2 For approval of Products other than those specified, a Tenderer should submit a request in writing to the City at least five business days prior to the Closing Time. Requests must clearly define and describe the Product for which approval is requested. Requests should be accompanied by manufacturer’s literature, specifications, drawings, cuts, performance data or other information necessary to completely describe the items. Approval by the City will only be in the form of an addendum to the Specifications issued by the City.
- 10.3 Approvals of Products, as noted in clause 10.2 above, shall only be deemed effective insofar as the Products conform to the Specifications.

11.0 INSURANCE

- 11.1 Each Tenderer should ensure that it can maintain the insurance described in the Form of Agreement (Part D).
- 11.2 The Tenderer should complete and submit the “Certificate of Existing Insurance” attached as a Schedule to the Form of Tender, together with the “Undertaking of Insurance” attached as a Schedule to the Form of Tender.
- 11.3 Following Contract award, a successful Tenderer will be required to complete a “Certificate of Insurance” for the Work, a copy of which is attached as a schedule to the Form of Tender.

12.0 WORKSAFEBC

- 12.1 The Tenderer should ensure that it can comply with all WorkSafeBC requirements, as described in the Form of Agreement (Part D).

13.0 LABOUR RATES AND EQUIPMENT

- 13.1 Tenderers must provide, if requested in a schedule to the Form of Tender, the force account labour and equipment rates setting out the all-inclusive hourly rates for all applicable types of equipment as well as the all-inclusive hourly rates for all applicable categories of labour, which rates will then apply pursuant to any Contract.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

14.0 LISTS OF SUBCONTRACTORS AND SUPPLIERS

- 14.1 Tenderers should provide, if requested in a schedule to the Form of Tender, lists of proposed subcontractors and suppliers, specifying the name and address of, and the portion of the Work to be completed by, or the equipment or materials to be supplied by, each proposed subcontractor or supplier.
- 14.2 The City reserves the right to object to any of the proposed subcontractors or suppliers listed in a Tender. If the City objects to a listed subcontractor or supplier, then the City will permit a Tenderer to propose a substitute subcontractor or supplier acceptable to the City. A Tenderer will not be required to make such a substitution and, if the City objects to a listed subcontractor or supplier, the Tenderer may, rather than propose a substitute subcontractor or supplier, consider its Tender rejected by the City and, by written notice, withdraw its tender. The City shall, in that event, return the Tenderer's bid security.

15.0 TAXES AND FEES

- 15.1 The successful Tenderer will be required to obtain and pay for any applicable municipal, provincial and federal permits and licences necessary for the proper completion of the Work. The City will not be liable in any manner for the same, and the successful Tenderer agrees to indemnify and save the City harmless from and against all claims and Losses in relation to obtaining and paying for any applicable municipal, provincial and federal permits and licences necessary for the proper completion of the Work.
- 15.2 Each Tenderer's Tender Price (and each other price offered by the Tenderer in its Tender, if applicable) must, unless otherwise expressly stated, be inclusive of all applicable municipal, provincial, federal and other taxes, and all customs and excise duties and other assessments and charges, including sales taxes assessed upon the sale of goods and services to the City under the Contract, and the successful Tenderer agrees to indemnify and save the City harmless from and against all claims which shall be made with respect thereto.

16.0 NON-RESIDENT WITHHOLDING TAX

- 16.1 Tenderers are advised that, if the Contractor is not a resident of Canada, federal tax legislation may require that a certain percentage of any Contract Price otherwise payable to the Contractor be withheld by the City and remitted to the Receiver-General for Canada. The percentage required to be withheld and remitted varies depending on, among other things, the country of residence, the provisions of any applicable tax treaties and the nature of the payment. Non-resident Tenderers may contact the Vancouver office of the Canada Revenue Agency for further details. Under any Contract, any and all money so withheld and remitted shall be treated as a payment to the Contractor against the Contract Price.

17.0 NO CLAIM AGAINST THE CITY

- 17.1 The Tenderer acknowledges and agrees that the City will not be responsible for any Losses incurred by the Tenderer, including, without limiting the generality of the foregoing, any Losses incurred by the Tenderer directly or indirectly caused by any act or omission of the City or breach of any agreement or duty by the City, express or implied, and by submitting a Tender each Tenderer shall be deemed to have agreed that it has no claim whatsoever.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

- 17.2 The Tenderer now indemnifies and will protect and save the City and any of its employees, advisors or representatives (including the Engineer) harmless from and against all Losses, in respect of any claim or threatened claim by any of its subcontractors, or materials or equipment suppliers alleging or pleading:
- (a) a breach of the Tender Contract by the City or any of its employees, advisors or representatives (including the Engineer);
 - (b) an unintentional tort, of the City or any of its employees, advisors or representatives (including the Engineer), occurring in the course of conducting this ITT; or
 - (c) liability on any other basis related to the ITT or the Tender Contract.

18.0 DISPUTE RESOLUTION

- 18.1 Any dispute relating in any manner to this ITT, except only disputes arising between the City and any Tenderer to whom the City has made an award of a Contract, which arise under such Contract, will be resolved by arbitration in accordance with the *Commercial Arbitration Act* (British Columbia), amended as follows:
- (a) The arbitrator will be selected by the City's Director - Supply Chain Management;
 - (b) Sections 17.1 and 17.2 above will:
 - (i) bind the arbitrator, the Tenderer and the City; and
 - (ii) survive any and all awards made by the arbitrator; and
 - (c) The Tenderer will bear all costs of the arbitration.

19.0 CONFIDENTIALITY AND PRIVACY

- 19.1 Each Tender, once submitted to the City, will be held in accordance with the City's role as a public body required under Information and Privacy Legislation to protect or disclose certain types of records according to certain statutory rules. Each Tender, upon submission to the City, will be received and held in confidence by the City, unless and to the extent that it is or must be disclosed pursuant to Information and Privacy Legislation or other applicable legal requirements, and except that the City may publicly disclose information about or from Tenders, including without limitation names and prices, in the course of publicly reporting to the Vancouver City Council about the ITT.
- 19.2 If unsuccessful, a Tenderer, at the City's request, shall destroy or return all copies and originals (in any format or medium) of the Tender Documents.

20.0 RELEASE OF INFORMATION RESTRICTED

- 20.1 The release of information about Tenders is restricted. Tenderers can obtain information concerning the names of the other Tenderers who have submitted a Tender and the Tender Price shown on each Form of Tender at the following website within 48 hours of the Closing Time. However, no other information is anticipated to be disclosed by the City.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART B - TERMS AND CONDITIONS OF ITT PROCESS

<http://vancouver.ca/doing-business/unverified-tender-results.aspx>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART C - FORM OF TENDER

Tender of:			
	Legal Name of Person, Partnership or Corporation (the "Tenderer")		
Business Address:			
Postal or Zip Code:			
Cheques Payable to/Remit to Address:			
Postal or Zip Code:			
Key Contact Person:			
Telephone No.:			
E-mail:			
Tax Registration Numbers (as applicable):			
Dun & Bradstreet Number (if available):		WorkSafeBC Account Number:	
City of Vancouver Business License Number (or, if available, Metro West Inter-municipal Business License Number):		Date, Jurisdiction and Form of Organization (as applicable):	

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART C - FORM OF TENDER

1.0 TENDER PRICE AND SCHEDULE

Having carefully read and examined the Tender Documents, and having agreed to the terms and conditions set out in Parts A and B of the ITT, the undersigned Tenderer (for purposes of this Tender, the "Tenderer") offers to complete the Work and to furnish all plant, tools, equipment, labour, products, material and supervision necessary therefor, and to enter into an agreement in the form of the Form of Agreement set forth as Part D of the ITT to execute the Work, for the Tender Price specified below.

ITT NO. PS20210225

The Tender Price (including all costs, taxes and fees)(as per Schedule A), is
_____ dollars
and _____ cents (\$_____)

The Tender Price includes all PST and GST.

The Tenderer's offer to complete all of the Work is an offer made according to the following schedule:

- (a) Work will begin by **June 14, 2021**, subject to the City issuing a Notice to Proceed.
- (b) Substantial performance of the Work will occur by **August 15, 2021**.
- (c) Total performance of the Work will occur by **August 31, 2021**.

2.0 ELECTRONIC PAYMENTS ACKNOWLEDGEMENT

If awarded a contract, the Tenderer agrees that all payments to be made by the City will be by electronic funds transfer, and the Tenderer will provide the City with the necessary banking information to facilitate this process.

3.0 IRREVOCABILITY; NOTICE OF AWARD

The Tenderer agrees that this Tender will be irrevocable and open for acceptance by the City for a period of ninety (90) calendar days commencing on the Closing Time, even if the Tender of another Tenderer is accepted by the City. If within this period the City delivers a written notice by which the City accepts the Tender (a "**Notice of Award**"), the Tenderer will, within ten (10) Working Days of the receipt of the Notice of Award, deliver to the City:

- (a) a performance bond and a labour and material payment bond, each in the amount of fifty percent (50%) of the Tender Price, issued by a surety licensed to carry on the business of suretyship in the province of British Columbia, and in a form acceptable to the City;

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART C - FORM OF TENDER

- (b) a detailed construction schedule consistent with the preliminary construction schedule included in this Tender, which indicates the timing of the major activities of the relevant Work and provides sufficient detail of the critical events and their inter-relationship to demonstrate such Work will be performed by the relevant completion date stated in this Tender;
- (c) a detailed traffic management plan addressing vehicular and pedestrian movement, safety and access with specific detailing on methods, signage and materials used to maintain Work Site operations and access to staff and public users of the Work Site;
- (d) a detailed Work Site-specific safety and health plan addressing as a high-level overview the health and safety issues including, but not limited to hazards, mitigation measures, site orientations, safety meetings, first aid attendant requirements, and training requirements and record keeping;
- (e) a WorkSafeBC number and a “clearance letter” confirming that the Tenderer is in WorkSafeBC compliance;
- (f) a valid City of Vancouver business licence;
- (g) banking details to support payments by Electronic Funds Transfer (EFT); and
- (h) a completed and signed Certificate of Insurance (in the form attached as a schedule to this Form of Tender) indicating that all of the insurance coverage required by the Contract is in place.
- (i) A completed Contractor’s Pre-Contract Hazard Assessment Form; and
- (j) A completed and signed Prime Contractor Agreement

4.0 NOTICE TO PROCEED

The Tenderer agrees that upon the City’s receipt and acceptance (in the City’s discretion) of the required submissions listed above, the Tenderer will, within two (2) Working Days, execute and return to the City the Contract and the other Contract Documents requiring execution (in each case, as prepared by the City for execution) and, upon the City’s receipt and acceptance thereof, the City may deliver to the Tenderer a “Notice to Proceed”, and the Tenderer will:

- (a) commence the relevant Work within two (2) Working Days of the receipt of the Notice to Proceed or such longer time as may be otherwise specified in the Notice to Proceed; and
- (b) issue, post, and copy the City on the “Notice of Project” as and when required under section 20.2 of the *Occupational Health & Safety Regulation* (BC Regulation 296/97).

5.0 CONDITIONS

- (a) The Tenderer agrees that if the Tenderer receives a Notice of Award or a Notice to Proceed and fails or refuses to comply with the requirements stated in the foregoing

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART C - FORM OF TENDER

clause 3.0 or clause 4.0, as the case may be, then such failure or refusal will be deemed to be a repudiation of the Tender Contract and refusal to enter into the relevant Contract and the City may, on written notice to the Tenderer, award the Contract to another party. It is further agreed that, as full compensation on account of damages suffered by the City because of such failure or refusal, the bid security shall be forfeited to the City in the amount equal to the lesser of:

- (i) the face value of the bid security; and
 - (ii) the amount by which the Tender Price is less than the amount for which the City contracts with another party to perform the Work.
- (b) The lowest or any submitted tender will not necessarily be accepted. The City reserves the right to reject this Tender at any time without further explanation or to accept any Tender considered advantageous to the City.
- (c) The schedules attached to this Form of Tender form an integral part of the same.

6.0 ADDENDA, AMENDMENTS AND QUESTIONS AND ANSWERS

The Tenderer acknowledges receipt of the following addenda, amendments and questions and answers to the Tender Documents:

Addendum No.
Amendment No.
Questions and Answers No.

The Tenderer agrees that it thoroughly understands and accepts the terms and conditions contained therein.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART C - FORM OF TENDER

7.0 CERTIFICATION

The Tenderer represents and warrants that this Tender complies in all respects with the Tender Documents.

8.0 LABOUR

The above stated price is based on the Work under the Contract being performed by union/non-union labour. (Delete "union" or "non-union" as applicable).

9.0 CONTRACT TERMS IN THE ITT

Without limitation, the Tenderer expressly agrees with the City to all of the terms and conditions set forth in Part A and Part B of the ITT and is bound thereby.

SIGNED on behalf of the Tenderer this _____ day of _____ 20____ by _____ the _____ duly authorized signatory or signatories of the Tenderer:

Per: _____

Name and Title: _____

Per: _____

Name and Title: _____

If the Tenderer has a corporate seal, the corporate seal should be applied in the space below:

If the Tenderer is an individual, a proprietorship or a partnership, the above signature(s) should be witnessed:

Witness signature

Witness name

Witness address

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "A" (PART C - FORM OF TENDER)

SCHEDULE "A"

SCHEDULE OF QUANTITIES AND PRICES

EACH TENDER MUST COMPLETE THIS SCHEDULE A, AS AMENDED, IN FULL. EACH PAGE OF THIS SCHEDULE A MUST BE INITIALLED BY THE SIGNATORIES OF THE FORM OF TENDER. TENDERS MUST NOT BE SUBMITTED WITHOUT A COMPLETED, DULY EXECUTED SCHEDULE A.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "A" (PART C - FORM OF TENDER)

The Tender Price to complete all of the Work is apportioned in accordance with the following table. The prices shown in each of the numbered rows of the table shall include (i) all labour, material and other costs, (ii) overhead and profit, (iii) PST, and (iv) all other taxes, duties, assessments, charges and fees, *except for GST*. GST shall be shown separately on the row provided therefor.

NOTE: Prices must be PST-inclusive. Only GST is to be shown as a separate line item.

The sum of the amounts shown in the table below **MUST** equal the Tender Price stipulated in the space provided in the Form of Tender which, for greater certainty, is the Tenderer's proposed Contract Price for a Contract to complete all of the Work.

EVERY ROW OF THE BELOW TABLE MUST BE COMPLETED WITH A DOLLAR AMOUNT, EVEN IF THAT DOLLAR AMOUNT IS \$0.

Item	Description	Amount (including PST)
1.	Excavation of the entrance & exit pits and associated works <i>(See Supplementary information for details)</i>	\$
2.	Supply and Install 45m± - 900mm OD Standard Steel Pipe by trenchless method. <i>(See Supplementary information for details)</i>	\$
3.	53 m - 600dia. DI TR-Flex pipe installation and testing (pipe and fittings to be supplied by the City, spacers supplied by the Contractor) Annular grouting included. <i>(See Supplementary information for details)</i>	\$
4.	Backfilling of Exit and Entrance Pits and temporary restoration.	\$
5.	Other (contingency allowances and any other work or costs not reflected in the items above but required to complete the Work covered by the Tender Documents)	\$

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "A" (PART C - FORM OF TENDER)

6.	Subtotal (including all PST)	\$
7.	GST (5%)	\$
8.	Tender Price (including all costs, taxes and fees)	\$ (including PST and GST)

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "A" (PART C - FORM OF TENDER)

List of Unit Prices for Any Additional Work

These unit prices will be used for changing quantities from those indicated in the Tender Documents or Contract Documents upon written instruction from the City. The unit prices will be applied in accordance with the Contract. The prices should include (i) all labour, material and other costs, (ii) overhead and profit, (iii) PST, and (iv) all other taxes, duties, assessments, charges and fees, *except for GST*.

Item	Description	Unit Price (including PST)
1.		\$
2.		\$
3.		\$
4.		\$
5.		\$

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "A" (PART C - FORM OF TENDER)

Alternate Prices

These alternate prices will be used to change the scope of the Work upon written instruction from the City. The alternate prices will be applied in accordance with the Contract. The prices should include (i) all labour, material and other costs, (ii) overhead and profit, (iii) PST, and (iv) all other taxes, duties, assessments, charges and fees, *except for GST*.

Description	Price Change to Tender Price	
	Value to Add to Tender Price (inc. PST)	Value to Deduct from Tender Price (incl. PST)
1.	\$	\$
2.	\$	\$
3.	\$	\$
4.	\$	\$

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "B" (PART C - FORM OF TENDER)

SCHEDULE "B"

PRELIMINARY CONSTRUCTION SCHEDULE

The Work is expected to begin by **June 14, 2021** and substantial performance is targeted for **August 15, 2021**. Please clearly define time requirements for project milestones identified in the table below. If necessary, please add an attachment to this Schedule.

TABLE 1 - PROJECT MILESTONES	
Milestone	Date of Completion
Mobilization	
Pits excavation	
Pipe trenchless and Welding Completion	
DI TR-Flex pipe installation and pressure testing completion, including annular grouting	
Pits backfilling and temporary restoration	
Demobilization	

Additional pages may be attached to this page. Each such additional page is to be clearly marked "ITT No. PS20210225, FORM OF TENDER - SCHEDULE B", and is to be signed by the Tenderer.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "C" (PART C - FORM OF TENDER)

SCHEDULE "C"

SUBCONTRACTORS AND SUPPLIERS

1.0 SUBCONTRACTORS

The Tenderer intends to use the following subcontractors for the portions of the Work identified below. (All subcontractors who are proposed to perform any portion of the Work should be listed.)

Subcontractor	Address	Type of Work

Additional pages may be attached to this page. Each such additional page is to be clearly marked "ITT No. PS20210225, FORM OF TENDER - SCHEDULE C", and is to be signed by the Tenderer.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "C" (PART C - FORM OF TENDER)

2.0 SUPPLIERS

The Tenderer intends to use the following suppliers and manufacturers for the Work.

Supplier	Manufacturer	Supplier Address	Item

Additional pages may be attached to this page. Each such additional page is to be clearly marked "ITT No. PS20210225, FORM OF TENDER - SCHEDULE C", and is to be signed by the Tenderer.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "E" (PART C - FORM OF TENDER)

SCHEDULE "D"

TENDERER'S EXPERIENCE WITH RELATED WORK

Tenderers should confirm that they and their proposed subcontractors have the required experience to perform the Work. Each Tenderer should submit information concerning a minimum of **three (3)** completed projects similar in scope and size to the Work, for each of itself and its proposed subcontractors, including the following information:

Description of Project:

Location of Project:

Contract Value:

\$ _____ (Cdn. Dollars)

Start and Completion Dates:

Completed on Schedule?

Yes No (Circle Correct Response)

Name of Contract City:

Name of Project Reference:

Current Telephone Number and E-mail of Project Reference:

Names of Key Personnel and Subcontractors:

Additional pages may be attached to this page. Each such additional page is to be clearly marked "ITT No. PS20210225, FORM OF TENDER - SCHEDULE D", and is to be signed by the Tenderer.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "E" (PART C - FORM OF TENDER)

SCHEDULE "E"

FORCE ACCOUNT LABOUR & EQUIPMENT RATES

Tenderers should complete the following tables setting out the all-inclusive hourly rates for all applicable types of equipment as well as the all-inclusive hourly rates for all applicable categories of labour, which rates will then apply pursuant to any Contract.

TABLE 1 - SCHEDULE OF LABOUR RATES

Job Classification	Regular Rate	Overtime Rate
	\$	\$
	\$	\$
	\$	\$
	\$	\$
	\$	\$
	\$	\$

TABLE 2 - SCHEDULE OF EQUIPMENT RATES

No.	Equipment Description	Hourly Rate	No. of Hours	Overhead And Profit	Total Price
		\$		\$	\$
		\$		\$	\$
		\$		\$	\$
		\$		\$	\$
		\$		\$	\$

Labour and equipment rates must be inclusive of all taxes except for GST, and all assessments, benefits, small tools, overhead and profits.

Additional pages may be attached to this page. Each such additional page is to be clearly marked "ITT No. PS20210225, FORM OF TENDER - SCHEDULE E", and is to be signed by the Tenderer.

SCHEDULE "F"

FORM OF CONSENT OF SURETY

PROJECT: _____

Should it be required, we the undersigned Surety Company do hereby undertake to become bound as a surety in an approved Contract Performance Bond and Labour and Material Payment Bond, each in the amount of fifty percent (50%) of the awarded Contract Price for the fulfillment of the Contract, which may be awarded to _____ at the Tender Price set forth in the attached Tender, which Performance Bond and Labour and Material Payment Bond we understand are to conform to the applicable CCDC forms and be filed with the City within 10 Working Days of receipt of Notice of Award of the Contract, unless otherwise directed by the City.

We hereby further declare that the undersigned Surety Company is legally entitled to do business in the Province of British Columbia and that it has a net worth over and above its present liabilities and the amounts herein set forth.

The Common Seal of _____
was hereto affixed in the presence of:

SCHEDULE "G"

SUSTAINABILITY

1. Please list any products or services contemplated in the Tender that are toxic or hazardous to the environment or humans and complete the following table in relation thereto.

Item	Description of Toxin/Hazard	Substantiation for Use	Mitigation strategy to reduce the effect of the Toxin/Hazard

2. Please identify the Tenderer's standard practices for disposal of obsolete or expired products or equipment.

Item	Type of Product/Equipment	Disposal Method

3. Please identify the Tenderer's current or proposed solutions to address and reduce carbon emissions.

Item	Carbon Emission Risk	Solution to Reduce Carbon Emissions

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "G" (PART C - FORM OF TENDER)

SCHEDULE "H"

CERTIFICATE OF INSURANCE

(TO BE COMPLETED IF AWARDED THE CONTRACT)

SCHEDULE "I"

CERTIFICATE OF EXISTING INSURANCE

(TO BE COMPLETED AND SUBMITTED WITH TENDER)



**CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL/TENDER**

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.
2. **NAMED INSURED** (must be the same name as the proponent/bidder and is either an individual or a legally incorporated company)

BUSINESS TRADE NAME or DOING BUSINESS AS

BUSINESS ADDRESS

DESCRIPTION OF OPERATION

3. **PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)**

INSURER _____	Insured Values (Replacement Cost) -
TYPE OF COVERAGE _____	Building and Tenants' Improvements \$ _____
POLICY NUMBER _____	Contents and Equipment \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**

Including the following extensions:	INSURER _____
✓ Personal Injury	POLICY NUMBER _____
✓ Property Damage including Loss of Use	POLICY PERIOD From _____ to _____
✓ Products and Completed Operations	Limits of Liability (Bodily Injury and Property Damage Inclusive) -
✓ Cross Liability or Severability of Interest	Per Occurrence \$ _____
✓ Employees as Additional Insureds	Aggregate \$ _____
✓ Blanket Contractual Liability	All Risk Tenants' Legal Liability \$ _____
✓ Non-Owned Auto Liability	Deductible Per Occurrence \$ _____

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles

INSURER _____	Limits of Liability -
POLICY NUMBER _____	Combined Single Limit \$ _____
POLICY PERIOD From _____ to _____	<i>If vehicles are insured by ICBC, complete and provide Form APV-47.</i>

6. ☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE** **Limits of Liability (Bodily Injury and Property Damage Inclusive) -**

INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Self-Insured Retention \$ _____

7. **PROFESSIONAL LIABILITY INSURANCE**

INSURER _____	Limits of Liability
POLICY NUMBER _____	Per Occurrence/Claim \$ _____
POLICY PERIOD From _____ to _____	Aggregate \$ _____
	Deductible Per Occurrence/Claim \$ _____

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date: _____

8. **OTHER INSURANCE**

TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____
TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

Dated _____

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "J" (PART C - FORM OF TENDER)

SCHEDULE "J"

UNDERTAKING OF INSURANCE

To: City of Vancouver

Re: CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET, PS20210225

Dear Sirs:

We, the undersigned have completed, signed and attached the "Certificate of Existing Insurance" enclosed with this undertaking and now also do hereby undertake and agree that if _____ (the "Tenderer") is awarded a Contract, we will insure the Contractor in accordance with the requirements of the Contract, the form of which is included in the Tender Documents and will form part of the Contract Documents.

Dated at _____, British Columbia, this _____ day of _____ 20____.

By: _____

Title: _____

Full Corporate Name of Insurer:

The "Certificate of Existing Insurance" provided with the ITT should be completed and signed and enclosed with this schedule, both of which are to be signed by the Insurance Company or an authorized broker on behalf of the Insurance Company. A SEPARATE FORM (AND CERTIFICATE OF EXISTING INSURANCE) SHOULD BE SIGNED FOR EACH POLICY IF THE TENDERER HAS MORE THAN ONE INSURER OR BROKER FOR ITS POLICIES.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "K" (PART C - FORM OF TENDER)

Schedule "K"
DECLARATION OF SUPPLIER CODE OF CONDUCT COMPLIANCE

Purpose: All proposed suppliers are to complete and submit this form to certify compliance with the supplier performance standards set out in the Supplier Code of Conduct.

The City of Vancouver expects each supplier of goods and services to the City to comply with the supplier performance standards set out in the City's Supplier Code of Conduct (SCC) <http://vancouver.ca/policy_pdf/AF01401P1.pdf>. The SCC defines minimum labour and environmental standards for City suppliers and their subcontractors.

Suppliers are expected to comply with the aforementioned standards upon submitting a tender, proposal, application, expression of interest or quotation to the City, or have a plan in place to comply within a specific period of time. The City reserves the right to determine an appropriate timeframe in which suppliers must come into compliance with these standards. To give effect to these requirements, an authorised signatory of each proposed vendor must complete the following declaration and include this declaration with its submission:

As an authorised signatory of _____(vendor name), I declare that I have reviewed the SCC and to the best of my knowledge, _____(vendor name) and its proposed subcontractors have not been and are not currently in violation of the SCC or convicted of an offence under national and other applicable laws referred to in the SCC, other than as noted in the table below (*include all violations/convictions that have occurred in the past three years as well as plans for corrective action*).

Section of SCC / title of law	Date of violation /conviction	Description of violation / conviction	Regulatory / adjudication body and document file number	Corrective action plan

I understand that a false declaration and/or lack of a corrective action plan may result in no further consideration being given to the submission of _____(vendor name).

Signature: _____

Name and Title: _____

SCHEDULE "L"

CONFLICT OF INTEREST DECLARATION

NO CONFLICT OF INTEREST / NO COLLUSION / NO LOBBYING

Declaration as to no Conflict of Interest in ITT

- (a) The Tenderer confirms and warrants that there is no officer, director, shareholder, partner, employee or contractor of the Tenderer or of any of its proposed subcontractors, or any other person related to the Tenderer's or any proposed subcontractor's organization (a "person having an interest") or any spouse, business associate, friend or relative of a person having an interest who is:
- a. an official or employee of the City; or
 - b. related to or has any business or family relationship with an elected official or employee of the City,
- in each case, such that there could be any conflict of interest or any appearance of conflict of interest in the evaluation or consideration of the Tender by the City, and, in each case, except as set out, in all material detail in the section titled "Disclosure" in this Schedule "L".
- (b) The Tenderer confirms and warrants that there is no person having an interest (as defined above) who is a former official, former employee or former contractor of the City and who has non-public information relevant to the ITT obtained during his or her employment or engagement by the City, except as set out, in all material detail, in the section titled "Disclosure" in this Schedule "L".

Declaration as to No Conflict of Interest Respecting Proposed Supply

The Tenderer confirms and warrants that neither the Tenderer nor any of its proposed subcontractors is currently engaged in supplying (or is proposing to supply) goods or services to a third party such that entering into an agreement with the City in relation to the subject matter of the ITT would create a conflict of interest or the appearance of a conflict of interest between the Tenderer's duties to the City and the Tenderer's or its subcontractors' duties to such third party, except as set out, in all material detail, in the section titled "Disclosure" in this Schedule "L".

Declaration as to No Collusion

The Tenderer confirms and warrants that:

- (a) the Tenderer is not competing within the ITT with any entity with which it is legally or financially associated or affiliated; and
- (b) the Tenderer is not cooperating in any manner in relation to the ITT with any other tenderer responding to the ITT,

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE "L" (PART C - FORM OF TENDER)

in each case, except as set out, in all material detail, in the section titled "Disclosure" in this Schedule "L".

Declaration as to Lobbying

The Tenderer confirms and warrants that:

- (a) neither it nor any officer, director, shareholder, partner, employee or agent of the Tenderer or any of its proposed subcontractors is registered as a lobbyist under any lobbyist legislation in any jurisdiction in Canada or in the United States of America; and
- (b) neither it nor any officer, director, shareholder, partner, employee or agent of the Tenderer or any of its proposed subcontractors has engaged in any form of political or other lobbying whatsoever with respect to the Tender or sought, other than through the submission of the Tender, to influence the outcome of the ITT,

in each case, except as set out, in all material detail, in the section titled "Disclosure" in this Schedule "L".

Disclosure [Add disclosure here.]

(NOTE: The City will evaluate each matter disclosed to determine whether and to what extent the Tenderer can be given consideration in the ITT in light of the particular matter.)

THE TENDERER HAS EXECUTED AND DELIVERED THIS DECLARATION AS AN INTEGRAL PART OF ITS TENDER IN THE MANNER AND SPACE SET OUT BELOW:

Signature of Authorized Signatory for the Tenderer

Date

Name and Title

Signature of Authorized Signatory for the Tenderer

Date

Name and Title



INVITATION TO TENDER ("ITT") NO. PS20210225

CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET

FORM OF AGREEMENT

between

and

CITY OF VANCOUVER

_____, 20____

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART D - FORM OF AGREEMENT

This AGREEMENT (this “**Agreement**”) is made as of the _____ day of _____.

BETWEEN:

CITY OF VANCOUVER, having an office at
453 West 12th Avenue
Vancouver, British Columbia, V5Y 1V4

(hereinafter referred to as the “**Owner**”)

OF THE FIRST PART

AND:

[NTD: INSERT CONTRACTOR NAME/ADDRESS]

(hereinafter referred to as the “**Contractor**”)

OF THE SECOND PART

WHEREAS:

- A. The *Owner* has appointed **Kathryn McCreary** (hereinafter referred to as the “**Contract Administrator**” for the purposes of this *Contract*) to act as its sole and exclusive agent for purposes of managing and administering the performance of the *Work* by the *Contractor* in accordance with the *Specifications*, *Drawings* and other *Contract Documents*; and
- B. The *Contractor* has agreed with the *Owner* to perform the *Work* and to furnish all plant, tools, equipment, labour, products, material and supervision necessary therefor as hereinafter set forth.

NOW THEREFORE THIS AGREEMENT WITNESSES as follows:

ARTICLE 1 ROLE OF THE CONTRACT ADMINISTRATOR

The *Owner* hereby designates and appoints the *Contract Administrator* as its sole and exclusive agent for the purpose of, on behalf of the *Owner*, managing and administering the performance of the *Work*, as set out in the *Contract Documents*. Unless otherwise notified in writing by the *Owner* to the *Contractor*, the agency of the *Contract Administrator* shall continue for the entire duration of this *Contract* including the period of any guarantees or warranties given by or through the *Contractor*. In the event of the revocation in writing of the agency of the *Contract Administrator* by the *Owner*, the *Contract Administrator* shall have no further authority under this *Contract*, except as may be specifically designated in writing by the *Owner* and agreed to in writing by the *Contract Administrator*, and all references to the *Contract Administrator* in this *Contract* shall thereafter be deemed to be references to the *Owner* or to such other person designated in writing to the *Contractor*. The *Contract Administrator* may from time to time delegate to a representative the performance of, or the authority to perform, the duties, responsibilities, rights and obligations of the *Owner* in respect of which the *Contract Administrator* has been designated and appointed as its sole and exclusive agent.

ARTICLE 2 WORK

The *Contractor* will carry out the *Work*, and will furnish all materials, equipment, products, labour, services and supervision necessary to carry out the *Work* as specified in and in accordance with the *Contract Documents*.

All of the *Work* shall be done, performed or furnished by the *Contractor* in a proper and workmanlike manner and in accordance with the requirements of the *Contract Documents* (as hereinafter defined).

ARTICLE 3 CONTRACT DOCUMENTS

3.1 The following are the *Contract Documents*, whether or not attached to this Agreement:

- (a) this Agreement and the following schedules:
 - (i) Schedule 1 - Supplemental General Conditions;
 - (ii) Schedule 2 - Specifications and Drawings (the *Specifications* and Drawings listed in Schedule 2 that are not included in Schedule 2 are incorporated by reference);
 - (iii) Schedule 3 - Schedule of Quantities and Prices;
 - (iv) Schedule 4 - Subcontractors and Suppliers;
 - (v) Schedule 5 - Construction Schedule;
 - (vi) Schedule 6 - Performance and Labour and Material Payments Bonds;
 - (vii) Schedule 7 - Insurance Certificates;
 - (viii) Schedule 8 - Force Account Labour and Equipment Rates;
 - (ix) Schedule 9 - Insurance;
 - (x) Schedule 10 - City Pre-Contract Hazard Assessment Form
 - (xi) Schedule 11 - Contractor Pre-Contract Hazard Form
- (b) the “Master Municipal General Conditions” contained within Volume II of the Master Municipal Construction Document (printing 2009), as supplemented by the Supplemental General Conditions attached hereto as Schedule 1 (collectively, the “**General Conditions**”);
- (c) the Tender;
- (d) the *Specifications* and *Drawings* (i.e., those not included in Schedule 2 but incorporated herein by reference);
- (e) the *Traffic Management Plan* provided by the *Contractor* to the *Owner* (incorporated by reference); and

- (f) insert any other relevant documents to be incorporated by reference.
- 3.2 The *Contract Documents* are complementary and what is called for by any one shall be as binding as if called for by all. The intent and spirit of the *Contract Documents* is that the *Contractor* is required to complete the *Work* in every detail within the times and for the purposes designated, and that the *Contractor* shall furnish and do any and everything necessary for such purposes notwithstanding any omission from the *Contract Documents*.

ARTICLE 4 SCHEDULE OF WORK

- 4.1 The *Contractor* will commence the *Work* as directed in writing by the *Owner*.
- 4.2 The *Contractor* will perform the *Work* diligently and in accordance with the *Construction Schedule*. The *Contractor* will:
- (a) achieve *Substantial Performance* of the *Work* on or before **August 15, 2021** and
 - (b) achieve *Total Performance* of the *Work* on or before **August 31, 2021**;
- (collectively, the “**Contract Time**”), subject to the provisions of the *Contract Documents* for adjustments to the *Contract Time*.
- 4.3 Time shall be of the essence in this *Contract*.

ARTICLE 5 PAYMENT

5.1 Contract Price

- (a) The *Contract Price* (inclusive of all PST, GST and other taxes, duties assessments, charges and fees, all permit and inspection costs, and all WorkSafeBC assessments relating to the *Work*) to do, perform and supply all the *Work* in accordance with, and perform all the obligations specified by, the *Contract Documents* is **[To Be Determined]**.
- (b) The GST payable by the *Owner* to the *Contractor* is **[To Be Determined]**. This amount is included in the *Contract Price*.
- (c) The (i) aforesaid GST and (ii) the PST and all other taxes, duties, assessments, charges and fees included in the *Contract Price* will be remitted by the *Contractor* to the applicable authorities as and when the *Owner* pays the *Contract Price* to the *Contractor* or as earlier required by applicable law.
- (d) All amounts are in Canadian dollars.
- (e) The *Contract Price* shall be subject to adjustments as provided for in the *Contract Documents*.
- (f) The payment for any *Work* under this *Contract* which shall be made to the *Contractor* by the *Owner* shall not be construed as an acceptance of any *Work* as being in accordance with the *Contract Documents*. The issuance of the *Certificate of Total Performance* shall constitute a waiver by the *Contractor* of all claims except those previously made in writing and still unsettled, if any,

and specified by the *Contractor* in its application for final payment pursuant to Section 5.2(c) above.

ARTICLE 6 NOTICES

- 6.1 Unless otherwise specifically provided in the *Contract Documents*, all notices, instructions, orders or other communications in writing shall be conclusively deemed to have been given to the *Contractor* if delivered to the *Contractor* personally (or in the case of a company, to any of its officers or directors personally), or to the *Contractor's* superintendent or foreman, or delivered by mail to the *Contractor* at the business address of the *Contractor* set forth below:

Contractor:

[NTD: Insert Contractor information]

- 6.2 Unless otherwise specifically provided in the *Contract Documents* all notices, requests, claims or other communications by the *Contractor* shall be in writing and shall be given by personal delivery or by registered mail addressed to the *Owner* at the following address:

Owner:

City of Vancouver
453 West 12th Avenue
Vancouver, British Columbia
V5Y 1V4

Attention: [insert],

provided that, each notice, request, claim or other communication that this Agreement requires to be directed to the *Contract Administrator* shall be in writing and shall be given by the *Contractor* by personal delivery or by registered mail, addressed to the *Contract Administrator* at the address set forth below, with a copy to the *Owner* at the address set forth above.

Contract Administrator:

[insert]

- 6.3 Any of the said addresses may be changed from time to time by written notice to the other party.
- 6.4 Any such notices, instructions, orders, requests or other communications sent by mail as aforesaid shall be deemed to have been given on the second business day following the mailing thereof.

ARTICLE 7 GENERAL

- 7.1 All capitalized terms used by not defined in this Agreement shall have the meaning given to them in the *General Conditions*.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART D - FORM OF AGREEMENT

- 7.2 This Agreement shall inure to the benefit of and be binding upon the respective successors and permitted assigns of the parties hereto.
- 7.3 Except as expressly set forth in the foregoing Section 7.1 or in Schedule 1, nothing in this Agreement shall be construed to give any rights or benefits to anyone other than the *Owner* and the *Contractor*.
- 7.4 This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and cancels and supersedes any prior understandings and agreements between the parties hereto with respect thereto. There are no representations, warranties, terms, conditions, undertakings or collateral agreements, express, implied or statutory, between the parties in relation to the subject matter hereof other than as expressly set forth in this Agreement.
- 7.5 No modification of or amendment to this Agreement is valid or binding unless set forth in writing and fully executed by the parties hereto and no waiver of any breach of any term or provision of this Agreement is effective or binding unless made in writing and signed by the party purporting to give such waiver and, unless otherwise provided, is limited to the specific breach waiver.
- 7.6 This Agreement is governed by and must be construed in accordance with the laws of the Province of British Columbia.
- 7.7 This Agreement is subject to the exclusive jurisdiction of the courts in the Province of British Columbia except to the extent necessary to enforce, in another jurisdiction, any judgment of any court in the Province of British Columbia.
- 7.8 The *Contractor* agrees to do all things and execute all deeds, instruments, transfers or other documents as may be necessary or desirable to give full effect to the provisions of this Agreement and the transactions contemplated by it.
- 7.9 If any term or condition of this Agreement is for any reason held to be illegal, invalid, ineffective, inoperable or otherwise unenforceable, it shall be severed and deemed to be deleted from this Agreement and the validity and enforceability of the remainder of this Agreement shall not be affected or impaired thereby. If any term or condition of this Agreement is found to be illegal, invalid ineffective, inoperable or otherwise unenforceable, but would not be so if some part of it were deleted, the term or condition shall apply with such modifications as may be necessary to make it enforceable.
- 7.10 This Agreement may be executed in any number of counterparts. All counterparts, taken together, constitute one instrument. A party may execute this Agreement by signing any counterpart.
- 7.11 Delivery of an executed signature page to this Agreement by either party by electronic transmission shall be as effective as delivery of a manually executed copy of this Agreement by such party.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the date first herein above written.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
PART D - FORM OF AGREEMENT

CITY OF VANCOUVER

by its authorized signatories:

Signature: _____

Name: _____

Title: _____

Signature: _____

Name: _____

Title: _____

Signature: _____

Name: _____

Title: _____

[INSERT NAME OF CONTRACTOR]

by its authorized signatories:

Signature: _____

Name: _____

Title: _____

Signature: _____

Name: _____

Title: _____

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

1.0	DEFINITIONS	In the Contract Documents the following capitalized and italicized words and definitions will apply. Where a definition refers to a paragraph in the Contract Documents the definition is contained in that paragraph and the defined term is indicated as capitalized, in quotations and in brackets.	
1.1	Abnormal Weather	Delete 1.1 and replace as follows:	“Abnormal Weather” means a weather condition that affects the <i>Place of the Work</i> , that is more severe or of a longer duration than the weather conditions that a person experienced with the <i>Place of the Work</i> would reasonably anticipate and that has a materially adverse effect on the <i>Contractor’s</i> performance of the <i>Work</i> . Benchmarks shall be determined by monthly historical data for the <i>Place of the Work</i> , with consideration of annual variation in monthly trends over a 5-year period preceding the construction period.
1.5	Alternate Tender	Delete 1.5	
1.6	Approved Equal	Delete 1.6.1 and replace with	“Approved Equal” has the meaning given to it in GC 4.20.
1.7	Approved Equipment Rental Rate Guide	Deleted 1.7	
1.9	Bid Security	Delete 1.9.1 and replace with	“Bid Security” means the bid security required of the Contractor pursuant to the terms of the Invitation to Tender.
1.21	Contract Administrator	Delete 1.21.1 and replace with	“Contract Administrator” means the person, firm or corporation appointed by the <i>Owner</i> and identified by the <i>Owner</i> in writing to the <i>Contractor</i> . The <i>Contract Administrator</i> may be the <i>Owner’s</i> Engineer, an employee of the <i>Owner</i> or a third party engaged by the <i>Owner</i> .
1.22	Contract Document	Delete 1.22.1 and replace with	“Contract Documents” means the documents set out in Article 3 of the Contract.
1.23	Contract Drawing	Delete 1.23.1 and replace with	“Contract Drawing” means a drawing included in Schedule 2 to the <i>Contract</i> , entitled “Specifications and Drawings”.
1.24	Contract Price	Delete 1.24.1 and replace with	“Contract Price” means the amount stipulated in Article 5 of the <i>Contract</i> .
1.33	Drawings	Delete 1.33.1 and replace with	“Drawings” means, collectively, the <i>Contract Drawings</i> , the <i>City of Vancouver Standard Detail Drawings</i> and the <i>MMCD Standard Detail Drawings</i> .
1.40	Hazardous Materials	Delete 1.40.1 and replace with	“Hazardous Materials” means any substance or material that is prohibited, controlled or regulated

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			by any Competent Authority pursuant to any Environmental Law including pollutants, contaminants, dangerous goods or substances, toxic or hazardous substances or materials, wastes (including solid non-hazardous wastes and subject wastes), petroleum and its derivatives and by-products and other hydrocarbons, all as defined in or pursuant to any Environmental Law;
1.46	Notice of Award	Delete 1.46.1 and replace with	<i>“Notice of Award”</i> has the meaning set out in the Invitation to Tender.
1.47	Notice to Proceed	Delete 1.47.1 and replace with	<i>“Notice to Proceed”</i> has the meaning set out in the Invitation to Tender.
1.49	Other Contractor	Append to 1.49.1	<i>“Other Contractor”</i> may include the <i>Owner’s</i> own work crews.
1.51	Owner	Delete 1.51 and replace with	<i>“Owner”</i> means the City of Vancouver, a municipal corporation continued pursuant to the Vancouver Charter, acting in its capacity as the owner of the <i>Street</i> , but expressly excludes the City of Vancouver, acting in its regulatory capacity.
1.55	Preliminary Construction Schedule	Delete 1.55.1 and replace with	<i>“Preliminary Construction Schedule”</i> means the schedule submitted by the Contractor as part of its Tender and attached as Schedule 5 of the Contract Documents.
1.60	Schedule of Quantities and Prices	Delete 1.60.1 and replace with	<i>“Schedule of Quantities and Prices”</i> means Schedule 3 of the Contract Documents.
1.64	Site Inspector	Delete and replace with 1.64.1	<i>“Site Inspector”</i> means the person appointed by the <i>Owner or Contract Administrator</i> as set out in GC 3.4.6.
1.67	Substantial Performance	Delete 1.67.1 and replace with	<i>“Substantial Performance”</i> means that the Work is “substantially performed” in accordance with the criteria set out in Section 1(2) of the <i>Builders Lien Act</i> (British Columbia).
1.70	Tender Closing Date and Tender Closing Time	Deleted 1.70 and replace with	<i>“Tender Closing Date”</i> and <i>“Tender Closing Time”</i> have the meanings set out in the Invitation to Tender.
1.71	Tender Price	Delete 1.71.1 and replace with	<i>“Tender Price”</i> has the meaning set out in the Invitation to Tender.
1.80	City	Add 1.80.1	<i>“City”</i> means the City of Vancouver and shall have the same definition as <i>Owner</i> .
1.81	City Engineer	Add 1.81.1	<i>“City Engineer”</i> means the General Manager of Engineering Services with the City of Vancouver or his / her delegate.
1.82	City of Vancouver Construction	Add 1.82.1	<i>“City of Vancouver Construction Specifications”</i> means the manual of supplementary <i>Specifications</i> to the MMCD produced by the City of Vancouver.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

Specification			
1.83	City of Vancouver Standard Detail Drawing	Add 1.83.1	<i>“City of Vancouver Standard Detail Drawings”</i> means the manual of supplementary standard detail drawings to the MMCD produced by the City of Vancouver.
1.84	Competent Authority	Add 1.84.1	<i>“Competent Authority”</i> means: <ul style="list-style-type: none">(a) any multinational, federal, provincial, state, regional, municipal, local or other government or governmental body and any ministry, department, division, bureau, agent, agency, commission, board or authority of any government or governmental body, domestic or foreign;(b) any domestic, foreign or international judicial, quasi-judicial or administrative court, tribunal, commission, board, panel, arbitrator or arbitral body acting under the authority of any of the foregoing; or(c) any quasi-governmental or private body exercising any statutory, regulatory, expropriation or taxing authority under the authority of any of the foregoing.
1.85	Engineer	Add 1.85.1	<i>“Engineer”</i> means the <i>City Engineer</i> .
1.86	Environmental Law	Add 1.86.1	<i>“Environmental Law”</i> means any Law which imposes any obligations relating to: <ul style="list-style-type: none">(a) the protection, management, conservation or restoration of the natural environment;(b) reporting, licensing, permitting, investigating, remediating and cleaning up in connection with any presence or Release, or the threat of the same, of Hazardous Materials; and the manufacture, processing, distribution, use, treatment, storage, disposal, transport, handling and the like of Hazardous Materials, including those pertaining to occupational health and safety.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

(c)

1.87	Intellectual Property Rights	Add 1.87.1	<i>“Intellectual Property Rights”</i> means any and all current and future proprietary rights provided under patent law, copyright law, design patent or industrial design law, or any other applicable statutory provision or common law principle, including trade secret law, that may provide a right in ideas, formulae, algorithms, concepts, inventions, know-how, computer software, database or design, or the expression or use thereof, whether registered or unregistered, together with any right to apply for or register any of the foregoing.
1.88	Invitation to Tender	Add 1.88.1	<i>“Initiation to Tender”</i> means the Owner’s Invitation to Tender No. PS20210225.
1.89	Key Personnel	Add 1.89.1	<i>“Key Personnel”</i> means the Contractor’s or Subcontractor’s personnel identified as key personnel in the Invitation to Tender.
1.90	Laws	Add 1.90.1	<i>“Laws”</i> means all laws, statutes, codes, ordinances, decrees, rules, regulations, by-laws, judicial or arbitral or administrative or ministerial or departmental or regulatory judgments, orders, decisions, rulings, determinations or awards of any Competent Authority whether or not having the force of law and any legal requirements or bases of liability under the common law or civil law, including all such Laws relating to Taxes, the environment, human health or safety, pollution and other environmental degradation, and hazardous materials , which affect or are otherwise applicable to the Work, the Contractor, the Site or any other lands affected by the Work.
1.91	Living Wage	Add 1.91.1	<i>“Living Wage”</i> means the hourly wage established by the <i>Living Wage Certifier</i> from time to time, which includes: (i) direct wages; and (ii) the value of any non-mandatory benefits such as paid sick leave, employer-paid Medical Services Plan premiums and extended health benefits.
1.92	Living Wage Certifier	Add 1.92.1	<i>“Living Wage Certifier”</i> means the Living Wage for Families Campaign, any successor entity, or, in the event the Living Wage for Families Campaign ceases to carry on operations, such other <i>Living Wage</i> certification entity designated by the <i>Owner</i> to the <i>Contractor</i> in writing.
1.93	Living Wage Employee	Add 1.93.1	<i>“Living Wage Employee”</i> means any and all employees of the <i>Contractor</i> and all <i>Subcontractors</i> of the <i>Contractor</i> that perform any part of the <i>Work</i> on a property owned by or leased to the <i>Owner</i> ,

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			including all <i>Streets</i> , sidewalks and other public rights-of-way, for at least one consecutive hour, but excluding <i>Students</i> , volunteers and employees of <i>Social Enterprises</i> .
1.94	Maintenance Security Holdback	Add 1.94.1	<i>“Maintenance Security Holdback”</i> has the meaning given to it in GC 18.4.6.
1.95	MMCD Specifications	Add 1.95.1	<i>“MMCD Specifications”</i> means the <i>Specifications</i> contained within Volume II of the Master Municipal Construction Document, as further described in GC 2.5.
1.96	MMCD Standard Detail Drawings	Add 1.96.1	<i>“MMCD Standard Detail Drawings”</i> means the Standard Detail Drawings published by the Master Municipal Construction Documents Association, 2009 version.
1.97	Project Specific Specifications	Add 1.97.1	<i>“Project Specific Specifications”</i> means the <i>Specifications</i> listed in Schedule 2 to the Agreement.
1.98	Quality Audit	Add 1.98.1	<i>“Quality Audit”</i> means those planned activities to determine the degree of compliance of day-to-day practices to the defined systems and procedures.
1.99	Quality Management	Add 1.99.1	<i>“Quality Management”</i> means the determination and execution of quality policy across a project. <i>Quality Management</i> includes <i>Quality Assurance</i> (QA), <i>Quality Control</i> (QC), and <i>Quality Audits</i> .
1.100	Reasonable Time	Add 1.100.1	<i>“Reasonable Time”</i> means, unless otherwise agreed to in writing, 5 Days.
1.101	Record Drawings	Add 1.101.1	<i>“Record Drawings”</i> are the design drawings which have been amended as required to reflect the actual constructed <i>Work</i> .
1.102	Release	Add 1.102.1	<i>“Release”</i> means any release or discharge of any Hazardous Materials including any discharge, spray, injection, inoculation, abandonment, deposit, spillage, leakage, seepage, pouring, emission, emptying, throwing, dumping, placing, exhausting, escape, leach, migration, dispersal, dispensing or disposal.
1.103	Social Enterprise	Add 1.103.1	<i>“Social Enterprise”</i> means a business that: (i) is owned by a non-profit organization or community services co-operative; (ii) is directly involved in the production and/or selling of goods and services for the combined purpose of generating income and achieving social, cultural, and/or environmental aims; and (iii) has a defined social and/or environmental mandate.
1.104	Specifications	Add 1.104.1	<i>“Specifications”</i> mean the portion of the Contract

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			Documents, wherever located and whenever issued, consisting of the written requirements and standards for products, systems, workmanship, quality, and the services necessary for the performance of the <i>Work</i> .
1.105	Street	Add 1.105.1	“Street” means public rights-of-way belonging to the City of Vancouver and includes lanes.
1.106	Student	Add 1.106.1	“Student” means an individual who is enrolled in a school, college, university or other educational institution and is employed by the <i>Contractor</i> or a <i>Subcontractor</i> , as the case may be, to obtain practical workplace experience as a requirement of or credit for their education.
1.107	Tender	Add 1.107.1	“Tender” means the Contractor’s tender, tendered in response to the Invitation to Tender.
1.108	Third-Party Property	Add 1.108.1	“Third-Party Property” means a property owned by a third party on which some or all of the <i>Work</i> is to be performed.
1.109	Third-Party Utility	Add 1.109.1	“Third-Party Utility” means a utility within a City of Vancouver right-of-way other than those owned by the City of Vancouver.
1.110	Warranty Period	Add 1.110.1	“Warranty Period” shall have the same meaning as <i>Maintenance Period</i> .
2.0	DOCUMENTS		
2.1	Execution	Add 2.1.0	The <i>Contractor</i> shall deliver all required submittals as described in the <i>Notice of Award</i> , and in a format acceptable to the <i>Owner</i> within the time specified in the <i>Notice of Award</i>
		Delete 2.1.1	Delete 2.1.1
		Delete 2.1.2 and replace with	The <i>Contractor</i> shall sign the <i>Contract Documents</i> and return them to the <i>Contract Administrator</i> within 15 <i>Days</i> after receiving them and the <i>Contract Administrator</i> shall forward them to the <i>Owner</i> for signing.
2.2	Interpretation	Delete 2.2.4 and replace with	Should any difference exist between the <i>Drawings</i> and <i>Specifications</i> , or should any errors or inconsistency occur in any or between any of the <i>Drawings</i> and <i>Specifications</i> , the <i>Contractor</i> , before proceeding, shall bring them to the attention of the <i>Contract Administrator</i> . The <i>Contract Administrator</i> shall resolve the error or inconsistency and the <i>Contractor</i> shall proceed with the <i>Work</i> in the manner directed by the <i>Contract Administrator</i> .
			The <i>Contract Administrator</i> will furnish from time to time such detail drawings and specifications as the <i>Contract Administrator</i> may consider necessary

for the *Contractor's* guidance. These detail drawings and specification shall be considered *Drawings* and *Specifications*, respectively, and shall take precedence over any previously furnished *Drawings* or *Specifications*, and shall be considered as explanatory of them and not as indicating *Changes* in the *Work* or as giving rise to any entitlement to a change in the *Contract Price*.

The *Contract Documents* shall govern and take precedence in the following order or priority with the *Contract* taking precedence over all other *Contract Documents*:

- (a) *Agreement*
- (b) *Addenda*
- (c) *Supplementary General Conditions*
- (d) *General Conditions*
- (e) *Project Specific Specifications*
- (f) *City of Vancouver Construction Specifications*
- (g) *MMCD Specifications*
- (h) *City of Vancouver Standard Detail Drawings*
- (i) *MMCD Standard Detail Drawings*
- (j) *Tender*
- (k) *Invitation to Tenders*
- (l) *All other Contract Documents*

Drawings of a larger scale shall govern over *Drawings* at a smaller scale.

Documents of later date shall govern a similar type of document of an earlier date. Figured dimensions on a *Drawing* shall govern over scaled measurements on the same *Drawing*. Scaling of dimensions, if done, is done at the *Contractor's* own risk. All dimensions on the *Drawings*, except as noted thereon, are shown in metric units.

The *Drawings* forming part of the *Contract* are intended to show the position and extent of the *Work*, the general features of the design and construction, and the dimensions and proportions of all principal parts, but neither they nor the *Specifications* are guaranteed to show or describe every part or detail of the *Work*; anything omitted from the *Drawings* and *Specifications*, which may fairly be considered to be necessary for the proper execution and completion of the *Work*, shall be deemed to be required of the *Contractor* under the

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			<p><i>Contract.</i></p>
		Add 2.2.5	<p>Notwithstanding GC 2.2.4, in the event of any inconsistency between the <i>Drawings</i> and Specifications or between any other <i>Contract Documents</i> or within any <i>Contract Documents</i> which could be construed as creating an ambiguity regarding the amount of <i>Work</i> involved, the cost or amount of product to be supplied, the <i>Contract Price</i> being lower or higher, or any other similar discrepancy or inconsistency, the discrepancy or conflict will be resolved as follows:</p> <p>(1) the more stringent will take precedence over the less stringent;</p> <p>(2) the more expensive item will take precedence over the less expensive; and</p> <p>if none of the foregoing rules (1) and (2) can be applied by the <i>Contract Administrator</i>, the more specific provision will take precedence over the less specific.</p>
		Add 2.2.6	<p>In this <i>Contract</i>, the masculine includes the feminine and bodies corporate, and each includes the others. Also, any reference to the singular includes the plural where appropriate.</p>
2.3	Instructions to Tenderers, General Conditions, Specifications, Standard Detail Drawings	Delete 2.3.1	Delete 2.3.1
2.4	Copies of Contract Documents	Append to 2.4.1	<p>All <i>Drawings</i>, <i>Specifications</i>, model and copies thereof furnished by the <i>Contract Administrator</i> are and shall remain the <i>Owner's</i> property. Such documents and models are to be used only with respect to the <i>Work</i>, are not to be copied or revised in any manner without the written authorization of the <i>Contract Administrator</i> and are to be returned to the <i>Contract Administrator</i> on request at the completion of the <i>Work</i>.</p>
2.5	Master Municipal Specifications and Standard Detail Drawings	Add 2.5	<p>The <i>Contract Documents</i> incorporate by reference the "Master Municipal Specifications and Standard Detail Drawings" contained within Volume II of the Master Municipal Construction Document (printing 2009), as supplemented by the City of Vancouver Standard Detail Drawings (rev. 2019) and the City of Vancouver Construction Specifications (rev. 2018).</p>

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

3.0	CONTRACT ADMINISTRATOR		
3.1	Appointment	Delete 3.1.2 and replace with	If for any reason the <i>Contract Administrator's</i> appointment is discontinued, then the <i>Owner</i> shall immediately notify the <i>Contractor</i> and appoint a replacement.
3.2	Authority	Add 3.2.3	Resolution of any discrepancy in technical nature between this manual, and any other referenced sources such as <i>MMCD</i> that is not covered by other <i>City</i> regulations, shall be at the sole discretion of the <i>Contract Administrator</i> , in consultation with the <i>City Engineer</i> .
3.3	Contract Administrator	Append to 3.3.7	The <i>Contract Administrator</i> is not required to acknowledge any communications from the <i>Contractor's</i> personnel, except for the <i>Superintendent</i> set out in the <i>Contract</i> . Any communications which occurs with personnel other than the <i>Superintendent</i> , regardless of format, which are not acknowledged by the <i>Contract Administrator</i> in writing, may, at the <i>Contract Administrator's</i> sole discretion shall have no bearing on any portion of the <i>Contract</i> .
		Delete 3.3.8 and replace with	The <i>Contract Administrator</i> , in consultation with the <i>City Engineer</i> , shall conduct inspections to determine the dates of <i>Substantial Performance</i> and <i>Total Performance</i> .
		Add 3.3.10	The <i>Contract Administrator</i> , in consultation with the <i>City Engineer</i> , has the authority to stop the progress of the <i>Work</i> whenever in the <i>Contract Administrator's</i> opinion such stoppage may be necessary to ensure the safety of life, or the <i>Work</i> or neighbouring property. This includes authority to make <i>Changes</i> in the <i>Work</i> , and to order, assess and award the cost of work extra to the <i>Contract</i> or otherwise, as may in the <i>Contract Administrator's</i> opinion be necessary in such circumstances. The <i>Contract Administrator</i> shall within 2 <i>Days</i> confirm in writing any instructions given verbally.
3.4	Inspection and Site Inspector	Append to 3.4.6	Such inspections may extend to any or all parts of the <i>Work</i> and to the preparation or manufacture of the products to be used whether on <i>Site</i> or elsewhere. <i>Site Inspectors</i> and surveyors shall not be authorized to revoke, alter, enlarge or accept any portion of the <i>Work</i> or to issue instructions contrary to the <i>Drawings</i> and <i>Specifications</i> .
		Add 3.4.9	In the absence of <i>Contract Administrator</i> , any of the <i>Contract Administrator's</i> personnel, whom the <i>Contract Administrator</i> may designate in writing to

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			the Contractor to supervise the <i>Work</i> , shall have (subject to the instructions of the <i>Contract Administrator</i>) full power to decide as to the manner of conducting and executing the <i>Work</i> in every particular aspect, subject to the limitations to the <i>Contract Administrator's</i> authority as contained within the <i>Contract Documents</i> , and the <i>Contractor</i> shall follow the instructions or orders of the person so designated.
3.5	Progress Payments	Add 3.5.2	The <i>Contractor</i> shall provide the <i>Contract Administrator</i> with daily breakdowns of units installed as it relates to payment, complete with corresponding weigh tickets or other relevant documentation. These summaries will be provided on intervals determined by the <i>Contract Administrator</i> , but will be no greater than 5 Days.
		Add 3.5.3	The <i>Contractor</i> shall not work on the <i>Site</i> , or cause the delivery of materials for which delivery slips submitted to the <i>Owner</i> are the basis of payment unless the <i>Site Inspector</i> is present, unless otherwise approved in writing by the <i>Contract Administrator</i> .
3.6	Contract Interpretation and Decisions	Delete 3.6.1 and replace with	The <i>Contract Administrator</i> will be the interpreter of the <i>Contract Documents</i> and the judge of the performance of both parties to the <i>Contract</i> . Interpretations and decisions of the <i>Contract Administrator</i> shall be consistent with the <i>Contract Documents</i> .
		Add 3.6.4	Notwithstanding GC 3.6.3, on all questions relating to the acceptability of material, machinery or plant equipment, classifications of material or <i>Work</i> , the proper execution, progress or sequence of the <i>Work</i> , quantities and the interpretation of these <i>Specifications</i> or <i>Drawings</i> , the decision of the <i>Contract Administrator</i> , in consultation with the <i>City Engineer</i> , shall be final and binding, and shall be a condition precedent to any payment under the <i>Contract</i> .
4.0	CONTRACTOR		
4.1	Control of the Work	Add 4.1.0	The <i>Contractor</i> shall not commence the <i>Work</i> or procure any material therefore until it has received the <i>Notice to Proceed</i> from the <i>Owner</i> . Forthwith after the receipt of the <i>Notice to Proceed</i> , the <i>Contractor</i> shall at once begin and continuously carry on to completion (subject as herein provided) the <i>Work</i> and shall complete and give full possession thereof to the <i>Owner</i> before the date for <i>Total Performance</i> specified herein, unless a longer period

shall be allowed in writing by the *Contract Administrator*, in which case it shall be carried on to completion and possession given to the *Owner* within the additional time so allowed. No progress or interim estimate or certificate shall release the *Contractor* or its surety from any responsibility or shall be taken as evidence of any such release, or as an acceptance of any *Work* or material, or as a waiver of any condition herein.

The whole *Work* and every portion and detail thereof shall, at the time of completion, be put and left by the *Contractor* in good and satisfactory condition, finished in all respects and at the time must be fully up to the requirements of the *Drawings* and *Specifications* in every particular aspect; and all surplus and refuse material and rubbish must be removed by the *Contractor* from the vicinity of the *Work*; the *Site* must be left by the *Contractor* in a neat and tidy condition; all damages to adjacent property, including pavements, foot walks, boulevards, sod, trees, shrubs and plants, or other things injured or interfered with by the *Contractor*, or in any way due to its *Work*, must be made good by the *Contractor*; all wages must be paid, and every other requirement of the *Contract* must be complied with by the *Contractor*.

Add 4.1.3

The *Contractor* shall maintain all areas disturbed with competent temporary repair to the satisfaction of the *Contract Administrator*, in consultation with the *City Engineer*, until such areas are permanently repaired. In the event the *Contractor* fails or neglects to carry out such tasks for whatever reasons, the *City* may do the necessary repairs at the expense of the *Contractor*.

4.3 Protection of Work, Property, and the Public

Delete 4.3.1 and replace with

In performing the *Work*, the *Contractor* shall protect the *Work* and the *Owner's* property and other person's property from damage. The *Contractor* shall at the *Contractor's* own expense make good any such damage which arises as the result of the *Contractor's* operations.

Append to 4.3.4(1)

It shall be the responsibility of the *Contractor* to locate all existing mains and services, including but not limited to: water, gas, electricity, telephone, sewers, drains, catchbasin leads, and culverts to preserve and protect them from damage during the *Work*, and to arrange for their relocation if required. No payment will be made to the *Contractor* for the cost of finding these mains and services or the delay incurred by checking and

adjusting lines and/or grades to avoid conflict with these mains and services. The *Contractor* shall avoid interruptions to services and the use of “cut and replace” methodology except with the express written consent of the *Contract Administrator*, in consultation with the *City Engineer*.

The *Contractor* shall notify the *Contract Administrator* of any conflict between existing mains and services and the *Work* described in the *Contract Documents* for the *Contract Administrator* to revise the *Work* accordingly. The *Contractor* will be responsible for the cost of adjusting or relaying any previously completed existing work as a result of conflicting utilities. If relocation of existing mains and services is required by any direct conflict between these mains and services and the *Work* in the *Contract Documents* which, in the opinion of the *Contract Administrator*, cannot be avoided by adjustments in the location of the *Work*, the cost of the relocation shall be borne by the *Owner*.

Append to
4.3.4(2)

In performing *Work* on or near *Third-Party Utilities* or where it is necessary to cut, move or alter these *Third-Party Utilities*, the *Contractor* shall communicate and coordinate with the *Third-Party Utility* as it relates to schedule, timing, site safety and compliance in the utility alterations or relocations as part of performing the overall *Work*.

Add 4.3.4(4)

The *Contractor* shall submit a confirmation letter to the *Contract Administrator*, at least 1 week prior to any excavation *Work*, confirming that the *Contractor* has identified all the existing utilities within the proposed alignments and trenches, and no conflicts exist between the existing utilities and the proposed *Work*.

Add 4.3.7

Before commencing any construction *Work* as described in the *Drawings* and *Specifications*, the *Contractor* shall provide to the *Contract Administrator* photographs of pre-existing conditions of the area that will be disturbed during construction operations. Photographs must be obtained as follows:

- (1) Every 10m interval in easements;
- (2) Every 20m interval in paved areas;
- (3) Wherever any tree or structure may be damaged due to construction activity; and,
- (4) Any other location as directed by the *Contract Administrator*.

			<p>The photographs shall be taken with a digital camera 5 megapixels or better and catalogued in albums saved on flash drives.</p>
		Add 4.3.8	<p>The extents of rights-of-way to be provided by the <i>Owner</i> is shown on the <i>Contract Drawings</i>.</p> <p>Where any part of the <i>Work</i> is to be performed on <i>Third-Party Property</i>, the <i>Owner</i> shall arrange for and acquire required rights-of-way. The <i>Contractor</i> shall perform all such <i>Work</i> in accordance with all agreements between the <i>Owner</i> and each <i>Third-Party Property</i> owner.</p> <p>On completion of any <i>Work on a Third-Party Property</i>, the <i>Contractor</i> shall deliver to the <i>Contract Administrator</i>, a formal release in writing, in a form provided by the <i>Owner</i>, signed by the owner <i>Third-Party Property</i> on which the <i>Work</i> was performed, verifying that the <i>Contractor</i> has restored the <i>Third-Party Property</i> to that owner's satisfaction, and that the <i>Third-Party Property</i> owner is waiving all claims upon the <i>Contractor</i> or the <i>Owner</i> as a result of the <i>Work</i>.</p> <p>Where the <i>Contractor</i> makes private arrangements for the use of <i>Third-Party Property</i>, the <i>Contractor</i> shall obtain a signed document from the owner of the <i>Third-Party Property</i> granting such permission to the <i>Contractor</i> and provide a copy to the <i>Contract Administrator</i>.</p>
		Add 4.3.9	<p>If the <i>Contractor</i> does not make good any damage caused to a <i>Third-Party Property</i> in a timely and satisfactory manner, then at the discretion of the <i>Contract Administrator</i>, <i>Other Contractors</i> may be engaged by the <i>Owner</i> to make good the damage caused by the <i>Contractor</i>, with the costs of such repair work to be deducted from progress payments owing to the <i>Contractor</i> or otherwise recovered from the <i>Contractor</i>.</p>
4.4	Temporary Structures and Facilities	Append to 4.4.1	<p>The <i>Contractor</i> will submit designs and plans for temporary structures and facilities to the <i>Contract Administrator</i> for review and comment, but such review shall not relieve the <i>Contractor</i> of any responsibility. The <i>Contractor</i> shall make good at the <i>Contractor's</i> expense immediately all defects arising from the <i>Contractor's</i> faulty design, equipment or application thereof.</p>
		Add 4.4.3	<p>Temporary structures erected by the <i>Contractor</i> shall remain the <i>Contractor's</i> property and be removed from the <i>Site</i> on completion of the <i>Work</i>.</p>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

4.5	Errors, Inconsistencies or Omissions in the Contract Documents	Add 4.5.4	Any work or material not herein specified or shown on the <i>Drawings</i> , but which by fair implication, in the judgement of the <i>Contract Administrator</i> , should be included therein, shall be done or furnished by the <i>Contractor</i> as part of their <i>Contract</i> as though shown or included in the <i>Drawings</i> and <i>Specifications</i> .
4.6	Construction Schedule	Delete 4.6.1 and replace with	<p>The <i>Contractor</i> shall prepare and submit to the <i>Contract Administrator</i>, within 10 <i>Days</i> after issuance of the <i>Notice of Award</i>, a construction schedule (the "<i>Baseline Construction Schedule</i>") consistent with the <i>Substantial Performance</i> and <i>Total Performance</i> dates set out herein. This schedule is in addition to the <i>Preliminary Construction Schedule</i> provided in the <i>Contractor's</i> Tender, showing additional details and all dates on which each material component of the <i>Contractor's</i> proposed program of operations will be performed so as to attain <i>Substantial Performance</i> and <i>Total Performance</i> on the required dates. The <i>Contract Administrator</i> will review schedules and return reviewed copy within 10 <i>Days</i> after receipt. <i>Contractor</i> shall resubmit finalized schedules within 5 <i>Days</i> after return of reviewed copy. Instruct recipients to report any problems anticipated with the schedule to <i>Contractor</i> within 10 <i>Days</i>.</p> <p>The <i>Construction Schedule(s)</i> must be in conformance with the <i>Construction Schedule</i> requirements set out in the <i>Specifications</i>.</p> <p>The <i>Contractor</i> shall immediately advise the <i>Contract Administrator</i> of any deviations from, or proposed changes to, the <i>Construction Schedule</i>. If, in the opinion of the <i>Contract Administrator</i>, the <i>Construction Schedule</i> as submitted is inadequate to ensure the completion of the <i>Work</i> within the time limited therefore, or is otherwise not in accordance with the <i>Tender</i>, or if the <i>Work</i> is not being adequately or properly prosecuted in any respect, the <i>Contract Administrator</i>, without derogating from the <i>Owner's</i> rights under the <i>Contract</i>, shall have the right to require the <i>Contractor</i> to submit a new <i>Construction Schedule</i> providing for proper and timely completion of the <i>Work</i>, and the <i>Contractor</i> shall be entitled to no claim for extension of time on account of such requirement, and such new <i>Construction Schedule</i>, when accepted by the <i>Contract Administrator</i>, shall be a <i>Contract Document</i>.</p>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

	Append to 4.6.2	<i>Contractor</i> shall submit an <i>Adjusted Baseline Schedule</i> with each application for payment or as directed otherwise by the <i>Contract Administrator</i> .
	Delete 4.6.6 and replace with	<p>The time for the performance of the <i>Work</i> shall commence on the date specified in the <i>Notice to Proceed</i>, or if not so specified, on the date the <i>Notice to Proceed</i> is issued.</p> <p>Subject to a contrary provision in the <i>Contract Documents</i>, the <i>Owner</i> shall issue the <i>Notice to Proceed</i> within 14 Days of receipt of a complete set of accurate and compliant documentation from the <i>Contractor</i> as stipulated in the <i>Notice of Award</i>. Failure by the <i>Owner</i> to issue the <i>Notice to Proceed</i> within the 14 Days, shall entitle the <i>Contractor</i> to a claim for delay under GC 13.1.1.</p>
	Add 4.6.8	<p>If the alteration of a <i>Third-Party Utility</i> is required to complete the <i>Work</i>, the <i>Contractor</i> shall notify, coordinate and allow sufficient time for the companies or authorities to relocate their <i>Third-Party Utilities</i>. It is the <i>Contractor's</i> responsibility to ensure all <i>Work</i>, including <i>Third-Party Utility</i> relocations, is coordinated and completed in a <i>Reasonable Time</i> as part of the overall <i>Work</i>.</p> <p>In the event the <i>Contractor</i> has been diligent and made significant effort and attempts in coordinating with the <i>Third-Party Utility</i> companies or authorities and having their relocations accelerated, any and all costs incurred as a result of the <i>Third-Party Utility</i> companies' ability, or inability, to relocate the <i>Third-Party Utilities</i> are considered incidental and any such delays are considered <i>Delays</i> in accordance with GC 13.3.</p>
4.8	Workers	
	Add 4.8.0	<p>The <i>Contractor</i> agrees to employ appropriate trade people for the <i>Work</i>. Where the trades people are covered by collective agreements, the <i>Contractor</i> shall abide by the conditions of the collective agreements covering such trades people.</p> <p>The <i>Contractor</i> shall endeavour to avoid labour problems and minimize <i>Work</i> stoppages, jurisdictional or other labour disputes on the <i>Site</i>.</p>
	Add 4.8.2	<p>The <i>Contractor</i> shall ensure that all workers, including <i>Subcontractor</i> employees, are always fit for work within the public right-of-way. There will be no tolerance for the use of inappropriate language, harassing behaviours, influence of drugs and/or alcohol and all clothing shall be suitable for</p>

the *Site* and not contain inappropriate messaging. The *Contract Administrator* and/or their representative may request the removal of a worker by the *Superintendent*, if in their opinion the behaviour is not suitable of a *Contractor* representing the *Owner*.

Add 4.8.3

The *Contractor* shall provide disability awareness training for employees, including *Subcontractor* employees, if the *Site* is adjacent to health or community facilities catering to members of the public with mobility, visual or hearing challenges.

The *Contractor* shall provide cultural awareness training for employees, including *Subcontractor* employees, if the *Site* is reasonably suspected to have a high potential to be of cultural importance to First Nations.

Add 4.8.4

(1) Notwithstanding any other provision of any *Contract Document* but subject to GC.4.8.4(2), the *Contractor* shall pay all *Living Wage Employees* not less than the *Living Wage*.

(2) Notwithstanding GC.4.8.4(1), the *Contractor* has up to 6 months from the date on which any increase in the *Living Wage* is published by the *Living Wage Certifier* to increase wages for all *Living Wage Employees* such that all *Living Wage Employees* continue to be paid not less than the *Living Wage*.

(3) A breach by the *Contractor* of its obligations pursuant to this GC shall be deemed to constitute a failure by the *Contractor* to comply with the requirements of the *Contract* to a substantial degree and shall entitle the *Owner* to terminate the *Contract* in accordance with GC 15.

(4) The *Contractor* shall maintain up-to-date records and accounts which clearly document its satisfaction of the requirements of this GC 4.8.4 and shall make the same available to the *Owner* upon request. The *Owner* may request copies of all such records and accounts which shall be provided to the *Owner* by the *Contractor* (subject to reimbursement of the *Contractor's* reasonable copying costs and any other direct costs and expenses, if any) at any time prior to the expiry of 1 year after *Total Performance* or earlier termination of this *Contract*. Any records and accounts provided by the *Contractor* in accordance with this GC 4.8.4 shall be treated

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

by the *Owner* as confidential information.

The *Contractor* shall, at the direction of the *Owner*, post signs at sites that are owned by or leased to the *Owner*, including all *Streets*, sidewalks and other public rights of way, informing *Living Wage Employees* of the obligations of the *Contractor* and *Subcontractor* pursuant to this GC 4.8.4 and providing contact information to report any breaches thereof. The *Owner* shall supply the *Contractor* with all such signs and the *Contractor* shall return all such signs upon completion of the *Work* or otherwise at the request of the *Owner*.

- 4.10 Contractor to Provide Labour, Materials and Equipment Delete 4.10.1 and replace with

The *Contractor* at its own expense shall provide all necessary temporary buildings and storage grounds and shall furnish all necessary labour, materials and plant, including supervision, products, tools, construction machinery, water, heat, light, and power, together with all proper and required facilities for moving and transporting the same, so that the *Contract* and all *Work* required to be done under it can and will be carried on in a workmanlike manner, properly, satisfactorily, continuously and expeditiously, to completion, to the *Contract Administrator's*, in consultation with the *City Engineer*, satisfaction in all respects.

Should any plant, equipment, appliance, materials or workmanship which the *Contract Administrator* or *City Engineer* may deem to be inferior or unfit for use in or on the *Work* be brought on the *Site* or used, the same shall be wholly removed therefrom within 24 hours after notification to that effect from the *Contract Administrator*, and in the case of failure or neglect on the part of the *Contractor* to remove the same the *Contract Administrator* may cause the same to be taken away at the *Contractor's* expense, and deposited, wasted or otherwise disposed of in any locality, place or way the *Contract Administrator* considers convenient or proper, and the *Contractor* shall forthwith pay to the *Owner* on demand, all expenses incurred including storage, if any, or the same may be deducted or collected by the *Owner*. The *Contractor* shall, at their own expense, arrange for and provide adequate supplies of water, electricity or other source of power and light, etc., wherever required for the construction and maintenance of the *Work*.

Add 4.10.2

Where there are *Key Personnel* the *Contractor* shall:
(1) use best endeavours to retain *Key Personnel* for

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

the duration of the provision of the *Work*;

- (2) take reasonable steps to ensure that *Key Personnel* dedicate their time fully to the *Work* (unless otherwise agreed or approved by the Contract Administrator in writing);
- (3) promptly inform the Contract Administrator should any of the *Key Personnel* leave, or give notice of an intention to leave the *Contractor*, and obtain a substitute or substitutes; and

not reassign or allow the reassignment of the *Key Personnel* to other projects during the performance of the *Work* without the Contract Administrator's prior written consent (such consent not to be unreasonably withheld or delayed).

Add 4.10.3

If:

- (1) the *Contractor* wishes to reassign or to replace an individual designated as *Key Personnel*; or
- (2) an individual designated as *Key Personnel* gives notice of his or her intention to leave or is otherwise no longer able to perform the duties, including for reasons of illness, injury or personal hardship,

the *Contractor* shall provide a substitute with experience and qualifications equivalent or greater than the *Key Personnel* to be replaced, and shall provide documentation to the *Contract Administrator* to establish such experience and qualifications.

4.11 Subcontractors Add 4.11.0

The *Contractor* shall supply complete information to *Subcontractors* and equipment and material suppliers. Where *Specifications* and *Drawings* are required to provide complete information on any aspect of the *Work*, the *Contractor* shall supply them to the *Subcontractor* or supplier concerned.

In every subcontract, to the extent the *Builders Lien Act* is applicable, the *Contractor* shall specify that the *Contractor* or agent of the *Contractor* shall be the person responsible for payment certification under that subcontract for the purposes of the *Builders Lien Act* (and not the *Owner* or *Contract Administrator*).

Delete 4.11.2 and
replace with

The *Contractor* shall employ only the *Subcontractors* listed in Schedule 4 to the Contract, or others as approved in writing by the *Contract Administrator*, and shall not change or employ additional *Subcontractors* without the approval of the *Contract*

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

		<i>Administrator</i> , which approval shall not be unreasonably withheld.
	Add 4.11.7	The <i>Contractor</i> shall ensure that the requirements of GC 4.8.4 apply to all <i>Subcontractors</i> .
4.12 Tests and Inspections	Add 4.12.1	The <i>Contractor</i> shall be notified of all deficiencies discovered by the <i>Contract Administrator</i> or <i>City Engineer</i> upon completion of each inspection. The <i>Contractor</i> shall provide a schedule for correction or correct such deficiencies within 7 <i>Days</i> of the notice.
	Add 4.12.2	If any material, design or installation <i>Work</i> does not conform to any of the <i>Contract Documents</i> , the <i>Contract Administrator</i> and the <i>City Engineer</i> have the authority to stop <i>Work</i> and order the removal of unsatisfactory materials or require the <i>Contractor</i> to re-perform the <i>Work</i> in compliance with the <i>Contract Documents</i> . The <i>Contractor</i> will be held liable for all costs associated with the removal of and / or the reconstruction of <i>Work</i> which is not in accordance with the <i>Contract Documents</i> , as determined by the <i>Contract Administrator</i> or <i>City Engineer</i> , as applicable.
	Add 4.12.3	Where tests or inspections by designated testing laboratory reveal <i>Work</i> not in accordance with the <i>Contract Documents</i> , the <i>Contractor</i> shall pay costs for additional tests or inspections as the <i>Contract Administrator</i> or <i>City Engineer</i> may require verifying acceptability of corrected <i>Work</i> .
	Add 4.12.4.1	<p>The <i>Contract Administrator</i>, <i>City Engineer</i>, and <i>Site Inspectors</i> shall have free and uninterrupted access to any and all parts of the <i>Work</i> area and the plants that are producing the materials for the purpose of making inspections and taking samples of materials being used.</p> <p>The <i>Contractor</i> shall furnish labour and facilities to:</p> <p>(1) Provide access to <i>Work</i> to be inspected and tested.</p> <p>(2) Facilitate inspections and tests.</p> <p>Make good <i>Work</i> disturbed by inspection and test.</p>
	Add 4.12.4.2	Testing of materials, assembled components and systems to be carried out at the <i>Contractor's</i> cost by an independent third-party testing laboratory approved by the <i>Contract Administrator</i> .
	Add 4.12.10	The <i>Contractor</i> shall not schedule <i>Work</i> that will require inspection beyond an eight-hour <i>Day</i> , or forty hour week without the <i>Contract</i>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			<p><i>Administrator's</i> prior approval. Any extra cost incurred by the <i>Owner</i> in connection with inspections of Work scheduled outside the foregoing parameters, whether approved or not, may be deducted from the <i>Contractor's</i> subsequent progress payment.</p>
		Add 4.12.11	<p>Prior to the Work being inspected by the <i>City Engineer</i>, the <i>Contractor</i> shall make whatever preliminary tests are necessary to assure that the materials and equipment is in accordance with the <i>Drawings</i> and <i>Specifications</i>.</p>
4.13	Rejected Work	Add 4.13.4	<p>If the <i>Contractor</i> does not make good any rejected work in a timely and satisfactory manner, then at the discretion of the <i>Contract Administrator</i>, <i>Other Contractors</i> may be engaged by the <i>Owner</i> to make good the rejected work, with the costs of such repair work to be deducted from progress payments owing to the <i>Contractor</i> or otherwise recovered from the <i>Contractor</i>.</p>
4.16	Notice of Disruption	Add 4.16.2	<p>Notifications pursuant to GC.4.18.1 must be in compliance with the requirements of the <i>City of Vancouver Construction Specifications</i>.</p>
4.17	No Promotion of Relationship with the Owner	Add 4.17.1	<p>The <i>Contractor</i> shall not disclose or promote its relationship with the <i>Owner</i>, including by means of any verbal declarations, announcements, sales, marketing or other literature, letters, client lists, press releases, brochures or other written materials without the express prior written consent of the <i>Owner</i> (except as may be necessary for the <i>Contractor</i> to perform the <i>Contractor's</i> obligations under the terms of the <i>Contract</i>). The <i>Contractor</i> shall not use the <i>Owner's</i> logo or any of the <i>Owner's</i> official marks without the express prior written consent of the <i>Owner</i>.</p>
4.18	Hours of Work	Add 4.18.1	<p>The <i>Contractor</i> must comply at all times with all applicable requirements of the <i>City of Vancouver's Noise By-law</i>.</p> <p>The <i>Contractor</i> shall keep the <i>Contract Administrator</i> advised on the proposed hours of Work so that inspection can be co-ordinated. Work without inspection shall not be permitted.</p> <p>The <i>Owner's</i> employees work between the hours of 7:30 a.m. and 3:30 p.m. on all <i>weekdays except statutory holidays</i>. The <i>Contractor</i> shall not schedule any work to be performed by the <i>Owner's</i> crews outside these hours except by special arrangement agreed to by the <i>Contract</i></p>

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			<i>Administrator</i> or in case of emergency.
4.19	Assignment	Add 4.19.1	Neither party to the <i>Contract</i> shall assign the <i>Contract</i> or a portion thereof without the written consent of the other, which consent shall not be unreasonably withheld.
4.20	Approved Equals	Add 4.20.1	Contractor may request the Owner to approve alternate materials, products or equipment (" Approved Equals ") for items indicated in the Contractor documents, provided such Approved Equals comply in all respects with the applicable Specifications. Applications for Approved Equals must be in writing and supported by appropriate supporting information, data, specifications and documentation. The Owner is not obligated to review or accept any applications for an Approved Equal and may decide to accept an application for an Approved Equal in its sole discretion.
5.0	SHOP DRAWINGS		
5.1	Preparation of Shop Drawings	Delete 5.1.3 and replace with	The <i>Contract Administrator</i> or <i>City Engineer</i> may require that a <i>Shop Drawing</i> be stamped by a registered Professional Engineer with appropriate skill and knowledge indicating that the <i>Shop Drawing</i> has been prepared in compliance with applicable codes and design standards and good engineering practice.
		Delete 5.1.4 and replace with	If the <i>City Engineer</i> or <i>Contract Administrator</i> requires the review and stamping by a Professional Engineer of <i>Shop Drawings</i> that are of a type which, according to usual construction practice, are not so reviewed and stamped, then the cost of such review and stamping shall be paid by the <i>Owner</i> .
		Add 5.1.5	Manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data may be accepted in lieu of <i>Shop Drawings</i> , as determined by the <i>Contract Administrator</i> , in consultation with the <i>City Engineer</i> , and provided the following conditions are met: (1) Information is deleted which is not applicable to the project. (2) The standard information is supplemented with additional information applicable and specific to the <i>Work</i> .
5.2	Submission of Shop Drawings	Delete 5.2.1 and replace with	The <i>Contractor</i> shall submit <i>Shop Drawings</i> , product data and samples to the <i>Contract Administrator</i> in a timely way and in an orderly sequence so as to permit the <i>Contract Administrator</i> and <i>City</i>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

		<p><i>Engineer</i> a reasonable opportunity to review the provided information without causing a delay to the <i>Work</i> or to the work of <i>Other Contractors</i>. The <i>Contractor</i> shall submit a <i>Shop Drawing</i> schedule in accordance with the <i>Specifications</i> related to the <i>Construction Schedule</i>. The <i>Contractor</i> shall schedule submissions at least 10 <i>Days</i> before the date that reviewed submission will be needed. The <i>Contractor</i> shall submit the number of copies of <i>Shop Drawings</i> and product data which the <i>Contractor</i> requires for distribution plus two (2) copies which will be retained by the <i>Contract Administrator</i>.</p> <p><i>Shop Drawings</i> shall be prepared and submitted in compliance with the requirements of the <i>City of Vancouver Construction Specifications</i>.</p>
	Delete 5.2.4 and replace with	Unless otherwise noted, the <i>Shop Drawings</i> may be in CAD format, or other format at selection of the <i>Contractor</i> .
5.3	Review by Contract Administrator	<p>Delete 5.3.1 and replace with</p> <p>The <i>Contract Administrator</i>, in consultation with the <i>City Engineer</i>, will review <i>Shop Drawings</i> submitted by the <i>Contractor</i> and return them in accordance with an agreed-to schedule, if any, or otherwise with reasonable promptness so as not to cause delay to the <i>Work</i>. <i>Contractor</i> shall coordinate the timing of all submissions required pursuant to the <i>Contract Documents</i> with the performance of the <i>Work</i> to which the submission relates. Individual <i>Shop Drawings</i> will not be reviewed until all related drawings are available.</p> <p>Delete 5.3.2 and replace with</p> <p>The <i>Contractor</i> shall make any changes in <i>Shop Drawings</i> which the <i>Contract Administrator</i> or <i>City Engineer</i> may require consistent with the <i>Contract Documents</i> and resubmit unless otherwise directed by the <i>Contract Administrator</i> or <i>City Engineer</i>. When resubmitting, the <i>Contractor</i> shall notify the <i>Contract Administrator</i> in writing of any revisions other than those requested by the <i>Contract Administrator</i> or <i>City Engineer</i>.</p> <p>Delete 5.3.3 and replace with</p> <p>When a submitted <i>Shop Drawing</i> is acceptable to the <i>Contract Administrator</i>, in consultation with the <i>City Engineer</i>, as provided by this GC then the <i>Contract Administrator</i> shall date and mark the <i>Shop Drawing</i> as "Reviewed" and return it to the <i>Contractor</i>. The <i>Contract Administrator</i> shall date and mark the number of copies submitted.</p>
6.0	OTHER CONTRACTORS	

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

6.2	Coordination and Connection	Delete 6.2.1 and replace with	<p>The <i>Contractor</i> shall afford all facilities for the execution of any <i>Other Work</i> which may be undertaken by the <i>Owner</i> or by such parties as may be employed by them, so that such work may be properly and conveniently completed, and the <i>Contract Administrator</i> shall have full authority to make and enforce such regulations as the <i>Contract Administrator</i> may deem necessary for the conduct of the work; and the <i>Contractor</i> shall proceed in such manner and complete in such order such portions of the <i>Work</i> as the <i>Contract Administrator</i> may require, and the <i>Contract Administrator</i> shall be the sole judge as to what facilities are due and proper, and can be afforded without any undue interference with the execution of the <i>Contract</i>.</p> <p>The <i>Contractor</i> shall at all times give free access and every reasonable facility to the employees of the <i>Owner</i> and to <i>Other Contractors</i>, to such portion of the work and adjoining land as may be necessary to enable them to execute and maintain work of any description; such accommodation and access being regulated and directed by the <i>Contract Administrator</i> and no inconvenience or alleged inconvenience arising therefrom shall form any ground for claims, losses or damages, compensation or otherwise, by the <i>Contractor</i> against the <i>Owner</i>.</p>
7.0	CHANGES		
7.1	Changes	Delete 7.1.3 and replace with	Additional work that the <i>Owner</i> may wish performed that does not satisfy the requirements of subparagraphs (1) and (3) of GC 7.1.1 is extra Work (" <i>Extra Work</i> ") and not a <i>Change</i> . Pursuant to GC 8, <i>Extra Work</i> may be declined by the <i>Contractor</i> or may, upon agreement between the parties, be undertaken as <i>Extra Work</i> .
		Delete 7.1.4 and replace with	A variation between the actual quantity and the estimated <i>Tender Quantity</i> for that item set out in the <i>Schedule of Quantities and Prices</i> of not more than plus or minus the percentage set out in GC 9.4.1 shall not be a <i>Change</i> unless the variation is greater than such percentage, in which case the provisions of GC 9.4 shall apply.
7.2	Contemplated Change Order	Add 7.2.3	If the <i>Contemplated Change Order</i> is for work, which if executed and incorporated would impact a critical path element of the <i>Work</i> , then any delay in the <i>Contractor's</i> provision of a response to the <i>Contemplated Change Order</i> greater than 10 days, will be deemed a Delay by the <i>Contractor</i> as defined in GC 13.2.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

7.4	Optional Work	Delete 7.4.1 and replace with	<i>Optional Work</i> will only be included in the <i>Work</i> if the <i>Contract Administrator</i> so directs by <i>Change Order</i> , and in such event the <i>Contractor</i> shall perform the <i>Optional Work</i> as part of the <i>Work</i> , for the price tendered at the time of bid and with schedule extension as provided for in the <i>Contract Documents</i> (if any).
9.0	VALUATIONS OF CHANGES AND EXTRA WORK		
9.2	Valuation Method	Delete 9.2.1 and replace with	Adjustments to the <i>Contract Price</i> on account of <i>Changes</i> shall be valued by <i>Force Account</i> .
9.4	Quantity Variations	Delete 9.4.1 and replace with	If for any reason, including an addition or deletion under GC 7.1.1.a or GC 7.1.1.b respectively, the actual quantity of an item listed in the <i>Schedule of Quantities and Prices</i> constructed or provided by the <i>Contractor</i> varies more than plus or minus the <i>Variance Threshold Percentage</i> from the estimated quantity for that item as listed in the <i>Schedule of Quantities and Prices</i> (the "Tender Quantity"), then either the <i>Owner</i> or the <i>Contractor</i> may by written notice request a revised <i>Contract Price</i> in consideration of such change in quantities.
		Delete 9.4.3 and replace with	If notice is delivered to either party pursuant to GC 9.4.1, the <i>Contract Price</i> shall be revised as follows: <ul style="list-style-type: none"> (1) in the case where the actual quantity an of item constructed or provided is less than the quantity of an item listed in the <i>Schedule of Quantities and Prices</i> by more than the <i>Variance Threshold Percentage</i>, the <i>Contract Price</i> shall be decreased by an amount equal to the unit price of the applicable item as listed in the <i>Schedule of Quantities and Prices</i> multiplied by the quantity of unit that constitute the amount of the item constructed or provided less than the <i>Variance Threshold Percentage</i>; and (2) in the case where the actual quantity an of item constructed or provided is more than the quantity of an item listed in the <i>Schedule of Quantities and Prices</i> by more than the <i>Variance Threshold Percentage</i>, the <i>Contract Price</i> shall be increased by an amount equal to the unit price of the applicable item as listed in the <i>Schedule of Quantities and Prices</i> multiplied by the quantity of unit that constitute the amount of the item constructed or provided in excess of

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			the <i>Variance Threshold Percentage</i> .
		Delete 9.4.4	If either party requests a revision to the <i>Contract Price</i> pursuant to GC 9.4.1, the <i>Contractor</i> shall make available to the <i>Contract Administrator</i> all documentation reasonably required to verify that the actual amount of the applicable item constructed or provided by the <i>Contractor</i> is greater or less than, as the case may be, the quantity set out in the <i>Schedule of Quantities and Prices</i> by no less than the <i>Variance Threshold Percentage</i> .
		Delete 9.4.5	Delete 9.4.5
10.0	FORCE ACCOUNT		
10.1	Force Account Cost	Delete 10.1.1 and replace with	<p>Payment for <i>Work</i> based on <i>Force Account</i> shall be calculated as follows:</p> <p>(5) the costs of labour will be determined by the labour rates specified in Schedule 8 of the <i>Contract Documents</i> (Force Account Labour and Equipment Rates); and</p> <p>(6) the costs of equipment will be determined by the construction equipment rates specified in Schedule 8 of the <i>Contract Documents</i> (Force Account Labour and Equipment Rates);</p> <p>in each case, such costs shall be deemed to include all amounts on account of overhead, profit, administrative, and any other indirect expenses or allowances, provided in all cases that the foregoing represents in the aggregate no greater than 10% of the costs set out in Schedule 8.</p>
		Add 10.1.2	No compensation will be made for standby of the <i>Contractor's</i> labour or owned equipment, unless otherwise previously agreed to in writing. In the case of an occurrence of standby, the standby hours will be separated from the actual hours worked on the records.
		Add 10.1.3	In the completion of <i>Work</i> based on <i>Force Account</i> , the <i>Contractor</i> shall take all reasonable efforts to minimize the effects and costs of the <i>Work</i> based on <i>Force Account</i> , and this obligation shall be taken into account in the determination of the <i>Contractor's</i> entitlement to a <i>Contract</i> extension and reimbursement of costs. If in the opinion of the <i>Contract Administrator</i> , the <i>Contractor</i> is using an unsuitable methodology, the <i>Contractor</i> will be immediately advised that <i>Work</i> based on <i>Force Account</i> is to cease and will not recommence until the <i>Contractor</i> has presented an acceptable methodology.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

10.3	Submit Accurate Records	Append to 10.3.1	Neither the <i>Contract Administrator</i> nor their site representative's signature upon the submitted daily sheet forms any agreement for payment, only an agreement on the hours worked under <i>Force Account</i> .
12.0	HAZARDOUS MATERIALS		
12.1	Risk of Hazardous Materials	Add 12.1.4	The <i>Contractor</i> shall conduct no <i>Work</i> on materials that are potentially <i>Hazardous Materials</i> without prior testing. Responsibility for testing will be agreed upon prior to commencing <i>Work</i> .
12.3	Directions for Hazardous materials	Delete 12.3.2 and replace with	The <i>Work</i> shall be performed in full compliance with all <i>Laws</i> applicable to any <i>Hazardous Materials</i> encountered at the <i>Place of the Work</i> by an <i>Approved Abatement Contractor</i> .
13.0	DELAYS		
13.1	Delay by Owner or Contract Administrator	Add 13.1.2	No additional <i>Contract Time</i> and no additional reimbursement will be owed to the <i>Contractor</i> by the <i>Owner</i> , for instances where the delay by <i>Owner</i> or <i>Contract Administrator</i> is as a direct result of a preceding Delay by the <i>Contractor</i> .
13.3	Unavoidable Delay	Add 13.3.2	<p>A delay for <i>Abnormal Weather</i> will only be considered if the <i>Contractor</i> can show that one or more of the following apply:</p> <ol style="list-style-type: none"> (1) A weather condition, as determined by the <i>Contract Administrator</i>, that prevents the <i>Contractor</i> from proceeding with at least 60% of the normal labour and equipment force, for at least 5 hours on a component of the <i>Work</i>, which if delayed is on the critical path of the most up to date <i>Construction Schedule</i>, and as such will delay the completion of the <i>Work</i>; (2) The <i>Contractor</i> cannot reasonably complete other <i>Work</i> on the <i>Site</i> to advance the schedule; AND (3) The <i>Contractor</i> complies with the requirements of GC.13.6.3 <p>And, that the <i>Contractor</i> has pursued alternate construction methodologies to mitigate potential delays for contractual <i>Work</i> in advance of the expected seasonal weather.</p>
13.9	Liquidated Damages for Late Completion	Delete 13.9.1 and replace with	If the <i>Contractor</i> fails to meet the <i>Milestone Date</i> for <i>Substantial Performance</i> as set out herein (and as may be adjusted pursuant to the provisions of the <i>Contract Documents</i>), then the <i>Owner</i> may deduct

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

from any monies owing to the *Contractor* for the *Work*:

(1) as a genuine pre-estimate of the *Owner's* increased costs for the *Contract Administrator* and the *Owner's* own staff caused by such delay an amount of \$1500.00 per day or pro rata portion for each *Day* that actual *Substantial Performance* is achieved after the *Substantial Performance Milestone Date*; plus

(2) all direct out-of-pocket costs, such as costs for safety, security, or equipment rental, reasonably incurred by the *Owner* as a direct result of such delay.

If the monies owing to the *Contractor* are less than the total amount owing by the *Contractor* to the *Owner* under (1) and (2) then any shortfall shall immediately, upon written notice from the *Owner*, and upon *Substantial Performance*, be due and owing by the *Contractor* to the *Owner*.

Add 13.9.2

If the *Contractor* fails to meet the date agreed to for *Total Performance* or any other *Milestone Date*, the *Owner* may deduct monies as set out in GC 13.9.1.

**15.0 OWNERS RIGHTS
ON
CONTRACTORSS
DEFAULT**

15.0 Contractor Default Add 15.0.0

The *Owner*, without prejudice to any other right, may elect to terminate the *Contract* forthwith upon notice to the *Contractor* if:

- (1) the *Contractor* fails to comply with the *Notice to Proceed*;
- (2) the *Contractor* commits an act of bankruptcy or becomes a bankrupt or makes a general assignment for the benefit of the *Contractor's* creditors;
- (3) a receiver is appointed for the *Contractor's* business;
- (4) the *Contractor* fails, on reasonable notice from the *Contract Administrator*, in consultation with the *City Engineer*, to supply enough proper labour, equipment, or products;
- (5) the *Contractor* does not pay promptly the *Contractor's* employees, *Subcontractors* or suppliers;

(6) the *Contractor* does not comply with the requirements of the WorkSafeBC Regulations, or otherwise fails to meet the safety requirements of the *Contract*; or

(7) the *Contractor* persistently or substantially breaches any provision of this *Contract*.

On such termination, the *Contract Administrator*, in consultation with the *City Engineer*, may arrange for the performance of the *Work* by whatever method the *City Engineer* deems expedient but without undue delay or expense.

15.3 Termination

Append to
15.3.1(1)

which possession the *Contractor* hereby pledges to the *Contract Administrator* as agent for and on behalf of the *Owner*, as security for the performance of the *Contract* and the *Work*, provided that upon completion of the *Work*, the *Contract Administrator* shall return to the *Contractor* or its legal representative any such chattels so taken in possession in their original condition (ordinary wear and tear excepted) if not incorporated in the *Work*, without any compensation for use thereof.

Add 15.3.3

In case the *Work* or any part thereof is assumed from the *Contractor*, as herein provided, it shall in no way affect the relative obligations of the *Owner* and the *Contractor* or its sureties in respect of the *Contractor's* or their obligation, or in respect of the remainder of the *Work* (if any), as the *Contract Administrator*, in consultation with the *City Engineer*, may consider reasonable. The *Contractor* and its sureties in every case shall be liable for such damages, expenditures and extra expenditures, and for all additional cost of the *Work* which may be incurred by reason of termination of the *Contract* pursuant to this GC 15, together with the compensation for liquidated damages, if any, from the date fixed for the *Total Performance* of the *Work*, and the same may be deducted or collected by the *Owner* as provided by GC 18.11.

All the powers of the *Owner* with respect to the determination of any doubts, *Disputes* and differences, and the determination of the sum or sums, or balance of money to be paid to or received from the *Contractor*, and otherwise in respect of the *Contract* shall nevertheless continue in force.

Add 15.3.4

The fulfilment by the *Contractor* of any stipulation in the *Contract* may be enforced by legal proceedings and judgement, or order of Court,

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

without prejudice to any other remedy herein contained. Neither the *Owner* nor any of its officials, officers, employees or other agents shall be liable or accountable to the *Contractor* in any way for the manner in which, or the price at which the *Work*, or any portion thereof, may have been or may be done or completed by the *Owner*.

No proceeding taken pursuant to this GC 15 or pursuant to any other provision of the *Contract* shall at any time be deemed to be an assignment of the *Contract* or of any portion thereof, unless otherwise agreed to in writing.

15.4 Termination of Contract Without Default of Contractor Add 15.4.1

The *Contract Administrator* may, as agent for and on behalf of the *Owner*, at the *Contract Administrator's* discretion terminate the *Contract* at any time upon written notice to the *Contractor* notwithstanding the fact that the *Contractor* may not then be in default, in which event the *Owner* shall be liable to the *Contractor* only for *Work* done and materials delivered at or to the *Site* up to the date of the termination plus reasonable demobilization costs up to a maximum of \$[REDACTED].

Upon payment of the aggregate of the aforesaid sums, the *Owner*, the *Contract Administrator* and the *Contractor* shall be released from their liabilities or obligations under the *Contract* save and except that the liabilities and obligations of the *Contractor* shall continue with respect to: (i) deficiencies and warranties in the portion of the *Work* completed prior to termination; and (ii) the indemnification requirement set out in GC.22.

16.0 CONTRACTORS RIGHTS ON OWNERS DEFAULT

16.3 Notice of Default Delete 16.3.1 and replace with

If:

- (8) the *Contract Administrator* fails to issue a certificate in accordance with the provisions of GC 18.1.1; or
- (9) the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Contract Administrator* or awarded by arbitration or court; or
- (10) the *Owner* fails to provide the *Contract Documents* as required by GC 2.1.1;

then the *Contractor* may give written notice to the

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

Contract Administrator, with a copy to the *Owner*, that the *Owner* is in default and demand that the *Owner* correct the default within 20 *Days*, and if the *Owner* fails to make the correction then, without prejudice to any other right or remedy the *Contractor* may have, the *Contractor* may stop the *Work* or terminate the *Contract*.

17.0 DISPUTES

**17.9 Attornment to
Jurisdiction of
Courts of British
Columbia** Add 17.9

Notwithstanding any other provision of the *Contract*, the *Owner* and the *Contractor* irrevocably and unconditionally attorn to the jurisdiction of the courts of British Columbia, and courts to which appeals therefrom may be taken, in respect of any dispute or claim arising under or relating to the *Contract*.

18.0 PAYMENT

**18.1 Preparation of
the Payment
Certificat** Add 18.1

5 *Days* prior to the end of the calendar month, the *Superintendent* shall compile and submit a summary of the daily quantities for *Work* completed within the past month. This shall be included with other deliverables such as the *Adjusted Baseline Schedule*, *Quality Management* reports, and supporting documentation in GC 18.2.1.

18.4 Holdbacks Delete 18.4.1 and
replace with

Builders Lien Holdback: The *Owner* shall:

- (1) hold back 10%, or other percentage as required by the *Builders Lien Act*, of any amounts due to the *Contractor* as a builders lien holdback; and
- (2) if the *Place of the Work* is a highway, *City Street*, or right-of-way then, notwithstanding that a lien cannot be registered against the *Place of the Work*, hold back the percentage that would have been required if the *Builders Lien Act* did apply of any amounts due to the *Contractor* as a builders lien holdback, on the same conditions as though such hold back was a requirement of the *Builders Lien Act*, including making payment from such hold back directly to *Subcontractors*.

Add 18.4.6

Maintenance Security Hold Back: The *Owner* shall hold back 5%, of any amounts due to the *Contractor* as a maintenance security holdback, to cover the costs of corrections to defective *Work* that may be required.

The *Contractor* may substitute a letter of credit, in the amount of the *Maintenance Security Holdback*, in a form and from a financial institution acceptable to the *Owner*, for the *Maintenance Security*

18.5 Payment	Delete 18.5.1 and replace with	<p><i>Holdback.</i></p> <p>During progress of the <i>Work</i>, the <i>Contractor</i> may make application to the <i>Contract Administrator</i> for payment, in the form of an invoice accompanied by:</p> <ol style="list-style-type: none">(1) a <i>Payment Certificate</i> approved by the <i>Contract Administrator</i> as per GC 18.1,(2) a sworn declaration that all amounts relating to the <i>Work</i>, due and owing as of the end of the month to third parties including all <i>Subcontractors</i> and suppliers, have been paid, and(3) such other documentation reasonably required by the <i>Contract Administrator</i> as may be necessary to establish to the <i>Contract Administrator's</i> satisfaction the compliance by the <i>Contractor</i> with the conditions of the <i>Contract</i>. <p>All in a form acceptable to the <i>Contract Administrator</i>, on or before the last day of every month for any portion of the <i>Work</i> done to the date of the application.</p> <p>The net amount shown for payment, less any holdback required by the <i>Builders Lien Act</i> and less the aggregate of any previous payments, all in accordance with the <i>Contract</i> and with the <i>Builders Lien Act</i> (if and to the extent applicable), shall be due and payable to the <i>Contractor</i> 30 days following submission of an invoice to the <i>Owner</i>, in an acceptable format, accompanied by and consistent with the <i>Payment Certificate</i> approved by the <i>Contract Administrator</i>.</p> <p>The <i>Owner</i> will, in addition to other holdbacks as provided by the <i>Contract Documents</i>, be entitled to deduct and retain from payments otherwise due to the <i>Contractor</i>, a <i>Maintenance Security Holdback</i> as per GC 18.4. The balance of the <i>Maintenance Security Holdback</i> not required to correct defective <i>Work</i>, and remaining at the end of the <i>Warranty Period</i>, shall be paid without interest to the <i>Contractor</i>.</p> <p>On <i>Substantial Performance</i> being certified in accordance with the procedures set out in GC 18.6 and the value of the certified deficiencies being agreed upon, the <i>Contractor</i> may make application to the <i>Contract Administrator</i> for the balance of all monies then owing under this <i>Contract</i> to the <i>Contractor</i>, submitting also such documentation as</p>
--------------	--------------------------------	--

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

		is required by GC 18.6.
	Delete 18.5.3 and replace with	If for any reason the <i>Owner</i> disputes the net amount shown for payment on a <i>Payment Certificate</i> the <i>Owner</i> shall, within the time specified in this GC, pay to the <i>Contractor</i> any amount not disputed and also deliver to the <i>Contractor</i> and the <i>Contract Administrator</i> written reasons for any deductions.
	Add 18.5.4	<p>The dispute by the <i>Owner</i> of the correct amount owing shall be a <i>Dispute</i> and the written reasons for any deduction shall constitute a <i>Dispute Notice</i>.</p> <p>After 55 calendar days have elapsed from the date of the <i>Certificate of Substantial Performance</i> issued in accordance with GC 18.6 and upon the <i>Contract Administrator's</i> satisfaction that no encumbrance, lawful claim or lien exists, the <i>Owner</i> will, within a further 10 calendar days, make payment to the <i>Contractor</i> of all monies due under this <i>Contract</i> at the date of <i>Substantial Performance</i>, including the release of all remaining <i>Builders Lien Act</i> holdback amounts, if any, but retaining at least twice the estimated value of the certified deficiencies, and retaining the <i>Maintenance Security Holdback</i>.</p> <p>Upon the issuance of the <i>Certificate of Total Performance</i>, the <i>Owner</i> will make a final payment of all monies owing to the <i>Contractor</i> under the <i>Contract</i>, except for the <i>Maintenance Security Holdback</i>, which shall be released as per GC 18.5.1.</p>
	Add 18.5.5	Upon the issuance of the <i>Certificate of Total Performance</i> , the <i>Owner</i> will make a final payment of all monies owing to the <i>Contractor</i> under the <i>Contract</i> , except for the <i>Maintenance Security Holdback</i> , which shall be released as per GC 18.5.1.
	Add 18.5.6	Where payment is not made in accordance with the payment provisions contained in GC 18.5, the overdue amount shall bear interest at the lending rate of the Bank of Montreal for its prime commercial customers and such interest shall be calculated from and after the date upon which such payment was due and shall accrue until the date that payment of the overdue amount together with interest is made. This interest obligation on the <i>Owner</i> shall constitute the sole remedy of the <i>Contractor</i> for late payment.
18.6	Substantial Performance	<p>Add 18.6.3 (3)</p> <p>A completed set of legible, marked up as-constructed prints and survey point file containing all inverts, casting elevations and all other information required for the production of <i>Record</i></p>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

		<p><i>Drawings.</i> If additional information is required, the <i>Contract Administrator</i> will cause that information to be obtained, and in doing so, will deduct the costs to the <i>Owner</i> from the final progress payment.</p>
	Delete 18.6.4 and replace with	<p>The <i>Owner</i>, the <i>Contract Administrator</i> and the <i>Contractor</i> shall inspect the <i>Work</i> and any remaining deficiencies shall be detailed and included on the <i>Certificate of Substantial Performance</i>. The date of <i>Substantial Performance</i> shall be as stated in this Certificate. Upon issuance of the <i>Certificate of Substantial Performance</i> to the <i>Contractor</i>, the <i>Contract Administrator</i> shall set a reasonable date for the <i>Total Performance</i> of the <i>Work</i>.</p>
	Add 18.6.7	<p>For the purposes of the <i>Builders Lien Act</i> (to the extent applicable), the <i>Certificate of Substantial Performance</i> as described herein shall serve as the <i>Contract's</i> certificate of completion, and the date of <i>Substantial Performance</i> stated in the Certificate shall be deemed to be the date of the Certificate's issuance.</p>
18.10 Statutory Declarations	Add 18.10.1	<p>The <i>Contractor</i> shall submit with each of the <i>Contractor's</i> applications for payment such statutory declarations as may be required herein, which shall be sworn in duplicate by the <i>Contractor</i>, or by such person on behalf of the <i>Contractor</i> as the <i>Contract Administrator</i> may approve.</p> <p>(1) Prior to payment and as condition to any payment, the <i>Contract Administrator</i> may at any time require the <i>Contractor</i> to file with the <i>Contract Administrator</i> a statutory declaration showing that all wages for the various classes of labour, the hire of trucks, equipment, etc., employed in or about the <i>Site</i>, all products or other things supplied for use in or upon the <i>Work</i> and amounts due to <i>Subcontractors</i> and suppliers have been paid and satisfied and that there is no encumbrance, lawful claim or lien accruing for labour or services in connection with the <i>Work</i>.</p> <p>Should any amounts be due and unpaid for wages, equipment, hire, products and <i>Subcontractors</i> or suppliers as above listed or any encumbrance, lawful claim or lien accrue, the amounts shall be listed on a duly attested statement, in duplicate, and attached to the statutory declaration referred to above.</p> <p>The <i>Contract Administrator</i> may at any time, if the <i>Contract Administrator</i> deems it advisable,</p>

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

require from the *Contractor* a statement showing the rates of wages paid by the *Contractor* for the various classes of labour, the rates of hire of trucks and equipment employed and the prices and quantities of any products supplied for use in or upon the *Work* and may also require the statement to show in detail the names of unpaid employees, the rates of wages and amounts due to each, and the names of creditors, quantities, prices and amounts due to each. Such statement shall be duly attested in duplicate as above and be a condition precedent to the right of the *Contractor* to receive payment.

- (2) Prior to final payment and as a condition to issuance by the *Contract Administrator* of a *Certificate of Total Performance*, the *Contractor* shall file with the *Contract Administrator* a statutory declaration showing that all *Work* in respect of the *Contract* has been completed; all accounts, detailed in the first sentence of Section (1) of this General Condition have been paid and satisfied and there is no encumbrance, lawful claim or lien accruing for labour, products or services in connection with the *Work*; and payments already received and due under the final payment application are accepted by the *Contractor* as full compensation for everything furnished and done by the *Contractor* under the *Contract*.

The *Contractor's* payrolls, time-books, books of account, invoices, receipt and statements relating to its *Work* under the *Contract* shall be at all times open for inspection and extract by the *Contract Administrator* and the *Owner* and any authorized representative of them.

18.11 Money Due to Owner Add 18.11.1

All money payable to the *Owner* by the *Contractor* may be retained out of any money then due, or which may become due from them to the *Contractor* under this or any other contract with the *Owner*, or otherwise howsoever, or may be recovered from the *Contractor* and its sureties, or any of either of them, in any Court of competent jurisdiction, as a debt due to them; and the *Contract Administrator* shall have full power to withhold any estimate or certificate, if circumstances arise which may indicate to him or her the advisability of so doing, until the *Contract Administrator* is satisfied that the

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

Work and material so far done or furnished are in accordance with the Contract and that the Contractor is otherwise entitled thereto, though the sum to be retained may be unascertained.

19.0 TAXES, DUTIES AND GST

19.4 Non-Resident Withholding Tax Add 19.4.1

If the *Contractor* is, at any time, a non-resident of Canada, within the meaning of the *Income Tax Act* (Canada) as amended, then, and the *Contractor* hereby so agrees, the *Owner* may deduct from all money payable under the *Contract* and remit to the Receiver-General of Canada, the Government of Canada or the Canada Revenue Agency sums required to be withheld and remitted by the *Income Tax Act* (Canada), as amended.

The *Owner* will receive a further credit under the *Contract* for money withheld as of and from the date of the withholding (regardless of when or whether remitted) and no interest will be payable by the *Owner* on sums withheld, not remitted as aforesaid and later paid directly to the *Contractor*.

20. LAWS, NOTICES, PERMITS AND FEES

20.2 Permits Delete 20.2.1 and replace with

Except for *Owner Permits*, the *Contractor* shall obtain all permits, licenses, approvals and certificates which, as of the *Tender Closing Date*, are required for the performance of the *Work* (collectively the "*Contractor Permits*"). *Contractor Permits* shall include all municipal construction permits and approvals. The *Contractor* shall pay all *Contractor Permit* fees.

Delete 20.2.2 and replace with

Unless otherwise noted in the *Contract Documents*, the *Owner* shall obtain those permits, clearances and approvals that are required for operation of the completed project, including any permanent easements or other permanent property rights, land use approvals (such as zoning) or environmental approvals (such as Federal Department of Fisheries and Oceans) (collectively the "*Owner Permits*"). The *Owner* shall obtain all *Owner Permits* in a timely manner so as not to delay the progress of the *Work*.

Add 20.2.3

All *Work* within *City* properties shall be carried out and completed within the stated terms and conditions of any applicable permit, specification

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

			and bylaw.
	Add 20.2.4		It is the <i>Contractor's</i> responsibility to seek clarification and instruction from the <i>Contract Administrator</i> regarding construction activities that are not covered by the applicable permits, bylaws and <i>City</i> and <i>MMCD</i> Specifications. In the event of any variation between this manual and <i>City</i> bylaws, the bylaws shall prevail.
21.0	WORKERS COMPENSATION REGULATIONS		
21.0	Payment of WorkSafeBC Assessments	Add 21.0.0	The <i>Contractor</i> agrees that it shall at its own expense procure and carry or cause to be procured and carried and paid for, full WorkSafe BC coverage for itself and all workers, employees, servants and others engaged in or upon any <i>Work</i> or service which is the subject of this <i>Contract</i> . The <i>Contractor</i> agrees that the <i>Owner</i> has the unfettered right to set off the amount of the unpaid premiums and assessments for such WorkSafe BC coverage against any monies owing by the <i>Owner</i> to the <i>Contractor</i> . The <i>Owner</i> shall have the right to withhold payment under this <i>Contract</i> until the WorkSafe BC premiums, assessments or penalties in respect of <i>Work</i> done or service performed in fulfilling this <i>Contract</i> have been paid in full.
21.2	Contractor is "Prime Contractor"	Delete 21.2.1 and replace with	Unless otherwise specified in the <i>Contract Documents</i> or notified to the contrary by the <i>Contract Administrator</i> , the <i>Contractor</i> is the "Prime Contractor" for the purpose of all <i>Laws</i> relative to occupational health and safety, including the discharge of all duties of the "Prime Contractor" under the <i>Workers Compensation Act</i> (British Columbia), notwithstanding that the <i>Owner</i> , the <i>Contract Administrator</i> or <i>Other Contractors</i> may provide from time to time some of the services normally provided by such "Prime Contractor". In this GC.4.2 "Prime Contractor" has the definition ascribed to the term "prime contractor" under the <i>Workers Compensation Act</i> (British Columbia).
		Add 21.2.2	If the <i>Contractor</i> is the "Prime Contractor", the <i>Contractor</i> shall: (1) comply with all <i>Laws</i> , and all reasonable rules established by the <i>Owner</i> of which the <i>Contractor</i> is given timely notice through the <i>Contract Administrator</i> , relative to occupational health and safety; (2) initiate, maintain and supervise all safety

programs and measures in connection with the performance of the Work, which programs and measures shall respond fully to the requirements of all Laws relative to occupational health and safety, all to the satisfaction of the Contract Administrator;

- (3) conduct regular safety meetings at the Site, no less frequently than weekly, record minutes of such meetings and give copies of such minutes to the Contract Administrator on a weekly basis;
- (4) supply and maintain at the Site all safety equipment necessary to protect workers and others from accident or injury;
- (5) supply and maintain at the Site all personnel, equipment and supplies necessary for the provision of appropriate first-aid to any worker or person suffering an accident or injury at or about the Site, and establish an emergency procedure for prompt removal of any such person from the Site to a hospital, clinic or medical office for further treatment; and
- (6) prior to commencement of construction, the Contractor will:
 - a. complete and file a "Notice of Project" with the WorkSafeBC in compliance with Section 20.2 of the WorkSafeBC Rules, and
 - b. post the Notice of Project at the Site, and
 - c. provide a copy of the Notice of Project to the Owner and confirm in writing that the Notice of Project has been posted at the Site.

If, or for so long as the *Contractor* is not the "Prime Contractor", the *Contractor* shall:

- (1) comply with all Laws, and all reasonable rules established by the Owner of which the Contractor is given timely notice through the *Contract Administrator*, relative to occupational health and safety;
- (2) comply with all reasonable directions issued by the "Prime Contractor" regarding compliance with Laws, and rules established by the Owner, relative to occupational health and safety; and
- (3) attend all Site safety meetings convened by the "Prime Contractor".

Whether or not the *Contractor* is the “Prime Contractor”, it shall:

- (1) report immediately to the “Prime Contractor” (if not the Contractor) and the *City Engineer* all accidents and injuries of any kind or severity occurring on or about the Site and involving employees of the Contractor or any Subcontractor, or any other person of which the Contractor is aware, and arising out of or in connection with the Work;
- (2) confirm in writing each report made under subparagraph (1) above; and
- (3) respect and adhere to the *Owner’s* safety and training policies relative to the *Site* and the *Work*.

If the *Contract Administrator* determines that the *Contractor* is not in compliance with its obligations as “Prime Contractor”, if applicable, the *Owner* may, but is not obliged to, provide some or all of the services required to discharge those obligations. All costs incurred by the *Owner* in providing such services shall be paid by the *Contractor* to the *Owner*, and may be deducted from any amount then or thereafter becoming due to the *Contractor* under the *Contract*.

Add 21.2.3 Upon request of the *Contract Administrator* or the *Owner*, the *Contractor* will provide the *Owner* and the *Contract Administrator* with the *Contractor’s* or any *Subcontractors’* WorkSafeBC registration number.

Add 21.2.4 Concurrently with making any application for payment under this *Contract*, the *Contractor* will provide the *Owner* with written confirmation that the *Contractor* and all *Subcontractors* are registered in good standing with WorkSafeBC and that all assessments have been paid.

Add 21.2.5 The *Contractor* may or may not have received, as part of the *Contract Documents*, a “Pre-Contract Hazard Assessment” prepared by or for the *Owner* pursuant to the *Owner’s* statutory obligations under the WorkSafeBC/H&S Regulation (Section 119 of the WCA) as an “owner of a workplace”. Despite the *Owner’s* statutory obligations, the *Contractor* now acknowledges and agrees that the *Contractor* may not rely on the “Pre-Contract Hazard Assessment” and now agrees to assume by the terms of this *Contract* full responsibility for carrying out the *Owner’s* obligations under Section 119 of the WCA,

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

including without limitation and by way of example only, conducting all due diligence inquiries of all applicable *Owner* staff and departments in order to ascertain what, if any, information is known or has been recorded by *Owner* staff about the *Site* that is necessary to identify and eliminate or control hazards to the health or safety of persons at the *Site*. The *Owner* now agrees to make all reasonable efforts to assist the *Contractor* in obtaining timely access to *Owner* staff and *Owner* records for this purpose. The *Contractor* will immediately start conducting such due diligence inquiries and must complete and deliver written confirmation of the completion of such inquiries to the *Contract Administrator* prior to the *Owner* being obligated to issue the *Notice to Proceed*.

Add 21.2.6

The *Contractor* will indemnify the *Owner* and hold harmless the *Owner* from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to:

- (1) unpaid WorkSafeBC assessments of the *Contractor* or any other employer for whom the *Contractor* is responsible under this *Contract*;
- (2) the acts or omissions of any person engaged directly or indirectly by the *Contractor* in the performance of this *Contract*, or for whom the *Contractor* is liable pursuant to the *Contractor's* obligations as the Prime Contractor, and which acts or omissions are or are alleged by WorkSafeBC to constitute a breach of the WorkSafeBC/H&S Regulation or other failure to observe safety rules, regulations and practices of WorkSafeBC, including any and all fines and penalties levied by WorkSafeBC; or
- (3) any breach of the *Contractor's* obligations under this GC4.2.

22.1 Contractor to Indemnify

Delete 22.1 and replace with

The *Contractor* releases the *Owner*, its officers, officials, employees and agents from all costs, losses, damages and expenses, including those caused by personal injury, death, property damage, loss and economic loss arising out of, suffered or experienced by the *Contractor*, its *Subcontractors*, and their respective officers, employees and agents, or suffered or experienced by any other entity or person in connection with the performance of the *Work*.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

Despite the provision of insurance coverage by the *Owner*, the *Contractor* hereby agrees to indemnify and save harmless the *Owner*, its elected officials, officers, employees and authorized representatives and each of them from and against losses, claims, damages, actions, and causes of actions that the *Owner* may sustain, incur, suffer or be put to at any time either before or after the expiration or termination of the *Contract*, that arise out of the acts of the *Contractor*, its *Subcontractors*, or their respective officers, employees or agents under the *Contract*.

This indemnity will not affect or prejudice the *Owner* from exercising any other rights that may be available to it at law or in equity.

The release and indemnity set out in this GC will survive the expiry or sooner termination of the *Contract*.

22.2 **Owner to Indemnify** Deleted 22.2.2 and replace with

If the *Owner* performs work at the *Place of the Work* at the same time as the *Contractor* is performing the *Work*, then the *Owner* shall indemnify and hold harmless the *Contractor*, and the *Contractor's* agents and employees from and against claims, demands, losses, costs, damages, actions, suits or proceedings by third parties that arise out of, or are attributable to, the negligent acts or omissions of the *Owner*, the *Owner's* agents, or employees in the performance of that work.

22.4 **Patent Infringement** Add 22.4

Contractor hereby agrees to indemnify and save harmless the *Owner*, its elected officials, officers, employees and authorized representatives and each of them from and against losses, claims, damages, actions, and causes of actions that the *Owner* may sustain, incur, suffer or be put to at any time either before or after the expiration or termination of the *Contract*, that arise out of any actual or alleged infringement of any *Intellectual Property Rights* caused by the performance of the *Work* or the use of any process, work, material, matter, thing or method used or supplied by the *Contractor* or any *Subcontractor* in the performance of the *Work*.

24.0 **INSURANCE**

24.1 **Required Insurance** Delete 24.1.1 to 24.1.6 and replace with

(1) The *Contractor* shall obtain and maintain throughout the term of the *Contract* and the prosecution of the *Work*, all of the insurance policies described in Schedule 9 of the *Contract Documents*.

- (2) All insurance coverage described in Schedule 9 of the *Contract Documents* shall be issued by an insurance carrier or agent acceptable to the *Owner* and licensed to conduct business in the Province of British Columbia.
- (3) Upon request of the *City Engineer* or the *Owner*, the *Contractor* shall be required to deliver a Certificate of Insurance, and where required by the *Owner's* Director of Risk Management, certified copies of all policies and endorsements, evidencing the placement and endorsement of insurance in accordance with this GC 24.
- (4) Contractors and their *Subcontractors* shall be required to furnish evidence of the renewal of policies described in this GC by renewal certificate, endorsement or certified copy to be received by the *Owner* at least 15 calendar days prior to the expiry date of the policy.
- (5) If the *Contractor* fails to obtain and maintain insurance as required hereunder, or if the *Owner* does not approve any insurance policy or policies submitted to the *Owner* and the *Contractor* thereafter does not meet the requirements of the *Owner* as to terms and conditions of the insurance policy, the *Owner* shall have the right to place and maintain such insurance in the name of the *Contractor*. The cost thereof shall be payable by the *Contractor* to the *Owner* on demand, and the *Owner* may deduct the cost thereof from any monies which are due or may become due to the *Contractor*. If coverage should lapse, all *Work* by the *Contractor* shall be stopped until satisfactory evidence of renewal is produced.
- (6) Each policy described in Schedule 9 of the *Contract Documents* shall be required to be endorsed to provide the following notice for policy changes and cancellations to the *Owner*:
"It is understood and agreed that this policy will not be cancelled, reduced, materially altered or changed without the insurer giving at least 30 calendar days' prior written notice by registered mail to the City of Vancouver."
- (7) In addition to the requirements of Schedule 9 of the *Contract Documents*, each *Contractor* and each of its *Subcontractors* shall provide at its own cost any additional insurance which it is

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 1 - SUPPLEMENTAL GENERAL CONDITIONS

required by law to provide or which it considers necessary.

All deductibles shall be for the account of and be paid by the *Contractor* upon demand by the *Owner*. The *Owner* shall have the right to deduct amounts for which the *Contractor* is responsible under this GC 24 from any monies which are due or may become due to the *Contractor*.

25.0 MAINTENANCE PERIOD

25.1 Correction of Defects

Delete 25.1.1 and replace with

The *Contractor* shall, at the *Contractor's* own expense, promptly correct defects or deficiencies in the *Work* that appear prior to and during the period of two years from the date of the *Certificate of Substantial Performance*, or such longer periods as may be specified in the *Contract Documents* for certain products or *Work* (the "*Maintenance Period*"), including damage caused by backfill deficiency.

Add 25.1.4

Whether the *Contractor* should replace defective products or *Work*, or repair the same, shall be determined by the *Contract Administrator*. Should the *Contractor* fail to make good defects within 3 *Days* after being notified by the *Owner* to do so, the *Owner* at its option may do so and all costs, charges and expenses so incurred may be deducted or collected by the *Owner* as provided in GC 18.11, provided that the *Owner* shall first deduct such amounts from the *Maintenance Security Holdback*. If the *Owner* assesses the defects to be dangerous or determines that an emergency situation exists, the *Owner*, at the *Owner's* discretion will effect repairs immediately and all costs, charges and expenses so incurred may be deducted or collected by the *Owner* as provided in 18.11 - *Money Due to Owner*; provided that the *Owner* shall first deduct such amounts from the *Maintenance Security Holdback*.

The decision of the *Owner* shall be final as to the necessity of repairs or of any *Work* done or required to be done under the provisions of the *Contract* and for the amounts expended thereunder. If in the opinion of the *Contract Administrator*, it is in the *Owner's* best interests (taking into account effects on the *Owner's* overall schedule, the difference in value between the *Work* as performed and that called for by the *Contract Documents*, and other relevant factors) not to correct defective *Work* or *Work* not provided in the *Contract Documents*, the

Contract Administrator will assess the amount which should be deducted from the amount otherwise due to the *Contractor* and will assess the length of time by which the obligations should be extended in order to put the *Owner* in as close a position financially and in terms of the useful life of the *Work* as would have been the case had the *Contractor* performed the *Work* as called for by the *Contract Documents*. For further certainty, the *Contract Administrator* may extend the *Warranty Period* in appropriate circumstances to a minimum of twice the *Warranty Period* originally provided for under the *Contract Documents*, subject always to the above parameters.

END OF Supplementary General Conditions

**SCHEDULE 2
SPECIFICATIONS AND DRAWINGS**

The following is the list of Specifications and Drawings referred to in Article A-3:

[To be added.]

All are incorporated by reference in the form made available by the City during the ITT.

SCHEDULE 3
SCHEDULE OF QUANTITIES AND PRICES

When the Contract is finalized, this Schedule will be based on the breakdown of the tendered price in relation to the particular Work for which the Contract is awarded, as provided in the successful Tenderer's Form of Tender.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 4 - SUBCONTRACTORS AND SUPPLIES

SCHEDULE 4
SUBCONTRACTORS AND SUPPLIES

The following are Subcontractors that the Contractor will use for the Work:

Subcontractor	Address	Division/Section Of Work
[To be completed, based on Tender]		

The following are Suppliers that the Contractor will use for the Work:

Supplier	Manufacturer	Address	Item
[To be completed, based on Tender]			

**SCHEDULE 5
CONSTRUCTION SCHEDULE**

Insert the construction schedule provided in response to the Notice of Award, as accepted by the City.

SCHEDULE 6
PERFORMANCE AND LABOUR AND MATERIALS PAYMENT BONDS

Attach copies of performance bond and labour and material payment bond
provided after contract award.

(see attached)

SCHEDULE 7
INSURANCE CERTIFICATES

Attach copies of insurance certificates for the project provided after Contract award.

(see attached)

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 8 - FORCE ACCOUNT LABOUR AND EQUIPMENT RATES

SCHEDULE 8
FORCE ACCOUNT LABOUR AND EQUIPMENT RATES

When Contract is finalized, insert table of labour and equipment rates provided with successful Tenderer's Form of Tender.

**SCHEDULE 9
INSURANCE REQUIREMENTS**

1. All Risk Course of Construction Insurance

(a) Coverage

"All Risks" of physical loss or damage.

(b) Property Insured

(i) At Site

All materials, equipment and machinery, labour and supplies of any nature whatsoever, Work in progress, including property of the insured or of others for which the insured may have assumed responsibility, to be used in or incidental to the Site preparations, demolition or existing structures, erection and/or fabrication and/or reconstruction and/or repair of the project insured, commencing when the property becomes at the insured's risk, at the Site, and while there awaiting, during and subsequent to erection and/or fabrication and/or repair and/or testing.

(ii) Transit

Property to enter into and form a part of the project insured, from the commencement of loading at the original point of shipment anywhere in Canada or the continental United States of America, but excluding such property in the course of manufacturing or processing within buildings at the manufacturer's or supplier's site.

(iii) Off-Site

Off-Site coverage shall apply to property that is to be incorporated into and form a part of the project insured, anywhere in Canada or the Continental United States of America, but excluding such property while in transit or in the course of manufacturing or processing within buildings at the manufacturer's or supplier's site.

(c) Insureds

The Owner, the Contractor, and their respective officials, officers, employees and agents.

(d) Term

During the period of the construction operations and also during any period in which the property insured is being prepared for use and while partially used or occupied; provided all coverage shall cease when the Work has been formally accepted as complete by the Owner, whichever shall first occur.

(e) ***Limit and Deductibles at Site***

- (i) Limit of *Liability*: Full replacement value of the Work
- (ii) Deductible not to exceed \$5,000.

2. **“Wrap Up Liability Insurance”**

(a) ***Insureds***

The Owner, the Engineer, the Contractor, and all Subcontractors, and their respective officials, officers, employees and agents.

(b) ***Limits***

Bodily injury liability and property damage liability including aggregate products and completed operations: \$10,000,000 for each occurrence.

(c) ***Extensions of Coverage***

- (i) Broad form products and completed operations liability, including coverage for activities of the Contractor and Subcontractors during the completed operations period;
- (ii) Owner’s and contractor’s protective liability;
- (iii) Blanket contractual liability;
- (iv) Contingent employer’s liability;
- (v) Personal injury liability;
- (vi) non-owned automobile liability;
- (vii) Cross liability or severability of interest clause;
- (viii) Employees as additional insureds;
- (ix) Blasting, collapse, underpinning, shoring, pile driving, dredging or grading activities;
- (x) Loading and unloading of automobiles;
- (xi) Hoist liability;
- (xii) Unlicensed and specially licensed vehicles;
- (xiii) Operation of attached machinery;
- (xiv) Limited pollution liability arising out of hostile fire and sudden and accidental release of contaminants.

(d) ***Deductibles***

Deductible not to exceed \$5,000.

(e) ***Cross Liability***

The insurance shall apply to any action brought against any one of the insureds by any other insured in the same manner as though separate policies were issued to each.

(f) ***Term***

Period of construction or completion of the Work, whichever shall first occur, plus 24 months for completed operations liability thereafter.

(g) ***Waiver of Subrogation***

It is understood and agreed that in the event of a loss and upon payment of claim hereunder, the insurer will waive the any right of subrogation against the Owner, the Engineer and all architects, engineers or consultants engaged in or connected with the construction and Site preparation and related operations of the Work and any of their servants, agents, employees, and parent, subsidiary, affiliated or associated firms.

3. **Automobile Insurance**

A standard owner's form automobile policy for licensed vehicles providing third party liability and accident benefits insurance as provided by the Insurance Corporation of British Columbia (Autoplan) in accordance with applicable British Columbia law, with the minimum limits as follows:

Bodily injury and property damage (third party limit) inclusive limit: \$5,000,000.

4. **Contractor's Equipment Insurance**

"All Risk" insurance with insurers acceptable to the Owner, covering all construction equipment, owned or rented, or for which the Contractor or any of its Subcontractors may be responsible. In the event of loss or damage to the said construction equipment, or any part thereof, the Contractor or the Subcontractor, as the case may be, shall, if so requested by the Owner in writing, forthwith replace such damaged or destroyed construction equipment.

It is understood and agreed that in the event of a loss and upon payment of claim hereunder, the insurer will waive any right of subrogation against the Owner, the Engineer and all architects, engineers or consultants engaged in or connected with the construction and Site preparation and related operations of the Work and any of their servants, agents, employees, and parent, subsidiary, affiliated or associated firms.

5. **Contractor's Pollution Liability Insurance**

The Contractor will obtain or cause its Subcontractors to obtain contractor's pollution liability insurance including "Non Owned Disposal Sites" ("NODS") coverage for a limit

not less than \$2,000,000.00 per occurrence with a deductible not greater than \$50,000.00 covering third party bodily injury, property damage and clean-up costs arising out of a pollution event including but not limited to unexpected and unintentional spill, discharge, emission, dispersal, leakage, migration, release or escape of pollutants including Polychlorinated Biphenyl ("PCB"). Coverage will include the transportation, loading and unloading of materials. The coverage is to include the Contractor as a named insured.

6. Professional Liability Insurance

The Contractor's sub-contracting erection engineer will be required to obtain and carry a professional (errors and omissions) liability insurance policy with limits of not less than \$2,000,000 per occurrence (and aggregate coverage of not less than \$5,000,000) and a deductible of not more than \$50,000, protecting the sub-contracting engineer against all claims for loss or damage arising out of any wrongful act or error or omission of the erection engineer or its personnel in the performance of the Work.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 10 - PRE-CONTRACT HAZARD ASSESSMENT FORM

SCHEDULE 10
CITY PRE-CONTRACT HAZARD ASSESSMENT FORM

See attached.

CITY PRE-CONTRACT HAZARD ASSESSMENT FORM

Contract Title Contractor for Water Main Trenchless Crossing
Alberni Street @ Bute Street
PROJECT MANAGER (City employee) Kathryn McCreary
Contract NAME & # (IF KNOWN) PS 20210225

Purpose

This document shall be completed by the project manager, who shall list all the known worksite hazards and all the existing work process hazards that will be associated with the upcoming contract. The completed document shall then be provided to all potential contractors, as part of the tender package, so the project can be bid appropriately based on the known worksite hazards.

Definitions

Project Manager - the City employee designated to be the liaison with the contractor for the purpose of managing, overseeing, coordinating or in any other way administering the contract.

Instructions for Completion

The document must be completed in full. Choices for each entry are:

Y - Yes - the known worksite hazard or existing work process hazard does exist

N - No - the known worksite hazard or existing work process hazard does not exist*

NA - Not Applicable - worksite hazard or existing work process is not applicable for this contract type

TBD - a third party (environmental consultant) will address the issue (primarily for a hazardous materials assessment)

*based on reasonable estimation from all input by persons with expertise or relevant knowledge and understanding

Information from Hazardous Materials Assessments Provided by a Third Party

A hazardous materials assessment may be completed prior to the Project Manager completing the Owners List of Known Workplace Hazards. Any such assessment should be referenced by the Project Manager in this document and provided with the tender package. Hazardous materials may include asbestos, lead, crystalline silica, ammonia, PCB's, CFC's, moulds, mercury, ozone depleting substances (ODS), radioactive substances.

Assistance in Completing this Document

If you have questions while completing this document, or are unsure if the listed hazards apply, please seek assistance from Health and Safety (604.871.6078 or healthandsafety@vancouver.ca).

HAZARD OR ISSUE	Project Manager
1. Asbestos-containing Materials - disturbance or penetrations of flooring, walls, ceiling tiles, pipe lagging, ac pipe, transite siding, particularly in older facilities; e.g., furniture/fixture installation, carpeting/flooring services, and boiler repair/tune-up services.	Yes (Y) No (N) Not Applicable (NA) To Be Determined (TBD)
a) Asbestos containing materials (ACM) will be encountered	Y N NA <input checked="" type="radio"/> TBD
b) A hazardous materials assessment for asbestos is provided in the tender package	Y <input checked="" type="radio"/> NA TBD
c) A hazardous materials assessment for asbestos is the responsibility of the contractor	Y N NA <input checked="" type="radio"/> TBD

2. Lead-containing Materials - disturbance of lead-based paint, particularly in older facilities. Also present in certain electrical circuitry and metal alloys; .e.g., overhead bridge crane maintenance/repair, high-voltage cable splicing services, boiler repair/tune-up services, fixture installation services, and chiller maintenance/repair services.	Yes (Y) No (N) Not Applicable (NA) To Be Determined (TBD)
a) Inorganic lead-containing materials may be encountered	Y <input checked="" type="radio"/> NA TBD
b) A hazardous materials assessment for lead is provided in the tender package	Y <input checked="" type="radio"/> NA TBD
c) A hazardous materials assessment for lead is the responsibility of the contractor	Y <input checked="" type="radio"/> NA TBD

3. Other hazardous materials - may include ammonia, PCBs, CFCs, moulds, mercury, ozone depleting substances (ODS), radioactive substances, sewage, unknown contaminated materials, other: (list other here)_____	Yes (Y) No (N) Not Applicable (NA) To Be Determined (TBD)
a) A hazardous materials assessment for ammonia is provided in the tender package	Y <input checked="" type="radio"/> NA TBD
b) A hazardous materials assessment for (list the specific hazardous material) will be provided in the tender package	Y <input checked="" type="radio"/> NA TBD
c) A hazardous materials assessment for (list the specific hazardous materials) will be the contractors responsibility	Y <input checked="" type="radio"/> NA TBD

4. CONFINED SPACES - working in vaults, chambers, pits, tanks, etc.; e.g., construction, inspection and testing services, water/fuel storage tank clean-out services, and	Yes <input checked="" type="radio"/> No (N) or Not
--	--

utility corrosion inspection services.	Applicable (NA)
a) A hazard assessment (for entry and inspection only) from the City of Vancouver is provided in the tender package	Y <input checked="" type="radio"/> N NA
b) The City of Vancouver shall provide procedures to isolate adjacent piping, or to lock out equipment (complicated systems only)	Y <input checked="" type="radio"/> N NA
c) The contractor shall be responsible for isolation and lockout procedures in the confined space	<input checked="" type="radio"/> Y N NA

5. Lock Out - industrial equipment maintenance, power machinery repair services, pump maintenance/repair services, mechanical refrigeration systems, elevator repair, overhead bridge crane maintenance/repair services, cathodic protection services, hydraulic test systems repair/service, and air compressor rebuilding services.	Yes <input checked="" type="radio"/> (Y) No (N) or Not Applicable (NA)
a) Lockout will be required to isolate or prevent the unexpected release of energy (electrical, mechanical, hydraulic, chemical, thermal, kinetic, gravitational, pneumatic)	<input checked="" type="radio"/> (Y) N NA
b) Work will be performed on or near energized equipment, lines, or circuits	Y N <input checked="" type="radio"/> (NA)

If yes to a) or b) describe:

6. Fall Protection - tree pruning, window and ledge cleaning, window replacement, overhead bridge crane maintenance/repair services, roll-up door replacement, tent installation, awning/canopy installation, overhead air exchange installation, construction inspection and testing services.	Yes <input checked="" type="radio"/> (Y) No (N) or Not Applicable (NA)
a) Workers will be exposed to a potential fall in excess of 3 m (10 feet), or to a fall of less than 3 m which would likely result in a serious injury (ex. impalement on rebar)	<input checked="" type="radio"/> (Y) N NA
b) Scaffolding or ladders will be required to be secured to a building or structure	<input checked="" type="radio"/> (Y) N NA

7. Overhead and Underground Utilities - tree pruning services, tree removal, utility relocation or replacement, underground utility identification (digging with powered equipment), concrete sawing services, pole painting	Yes (Y) No (N) or Not Applicable (NA)
a) There will be electrical hazards associated with overhead power lines such as limits of	Y N <input checked="" type="radio"/> (NA)

approach and contact	
b) Necessary assurances (in writing) have (or will be) obtained by the City, through the utility company, for any work where minimum limits of approach cannot be maintained (provide documentation and review at pre job meeting with the successful contractor candidate)	Y N <input checked="" type="radio"/> NA
c) Necessary assurances must be obtained (in writing) by the successful contractor, through the utility company, for any work where minimum limits of approach will not be able to be maintained	Y N <input checked="" type="radio"/> NA
d) Underground or hidden utilities are located on the job site. Any excavation or drilling work in proximity to an underground utility service must be undertaken in conformity with the requirements of the owner of that utility service	<input checked="" type="radio"/> Y N NA

If yes to c), and the specific physical locations where minimum limits of approach will not be able to be maintained are known, how will this information be provided to the contractor?

8. CONSTRUCTION, EXCAVATION, SHORING AND DEMOLITION	Yes (Y) No (N) or Not Applicable (NA)
a) As Prime Contractor, the City of Vancouver project manager will submit the Notice of Project	Y <input checked="" type="radio"/> N NA
b) Workers will be required to enter an excavation over 1.2m (4 ft) in depth	<input checked="" type="radio"/> Y N NA

→ NOP - the contractor shall submit their own and cover their subcontractors.

9. CHEMICALS, SOLVENTS, FUMES, VAPORS, AND/OR DUSTS (existing work processes or known worksite hazard only) - ice rinks, swimming pools, cleaning solvents, adhesives, paints, coatings, binders; e.g., storage tank clean-out services, countertop installation (epoxies), and flooring	Yes (Y) No (N) or Not Applicable (NA)
a) The worksite has chemicals solvents, fumes, vapors or dusts that may affect the contractor	Y N <input checked="" type="radio"/> NA
b) Material Safety Data Sheets for chemicals currently in use at the worksite will be available, on request, to the contractor	Y N <input checked="" type="radio"/> NA

If yes to a), list the work processes and/or chemicals in use:

10. NOISE - (existing work processes only)	Yes (Y) No (N) or Not Applicable (NA)
a) Employees will be exposed to noise levels above 85dbA possibly.	Y N NA

OTHER HAZARDS (NOT IDENTIFIED ABOVE)
a)
b)
c)

KNOWN WORKPLACE HAZARDS LIST COMPLETED BY	
Project Manager Name (print): Kathryn McCreary	
Project Manager Signature: Kathryn McCreary	Date: April 30, 2021
Title: Waterworks Engineer	Phone: 604 829 9836

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

SCHEDULE 11
CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Contract Title _____

Project Manager (City Employee) _____

Contractor Representative _____

Contract Name and No. _____

PURPOSE

This document shall be completed by the contractor awarded the contract, who shall identify all the **known and potential work process hazards** associated with the contract. The contractor, who is responsible for all identified actions, shall provide a completed Pre-Contract Hazard Assessment Form to the Project Manager (City employee) for review and consultation before the contract work begins.

REFERENCE MATERIAL

In order to complete this document, the contractor should refer to a completed copy of any "List of Known Workplace Hazards," provided with **[complete]**. The contractor is also responsible to refer to any "Hazardous Materials Assessments," provided by the City with **[complete]**, and possibly referred to in such a "List of Known Workplace Hazards."

INSTRUCTIONS FOR COMPLETION

The document must be completed in full. Choices for each entry are:

Yes (Y) this work process or worksite hazard will exist for this contract and is the responsibility of the contractor

No (N) even though the work process or worksite hazard will exist, it will not be the responsibility of the contractor

Not Applicable (NA) the work process or worksite hazard is not applicable for this contract

Each grouping of safety hazards or issues in this document (bold text, capitalized) may list some examples of work tasks where the relevant hazard may be encountered. These examples are not conclusive; there may be other examples of work tasks that create such a hazard or issue.

INVITATION TO TENDER NO. PS20210225
CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

DOCUMENTATION AND TRAINING REQUIREMENTS

During the contract term, the contractor may be requested by the City of Vancouver, and shall provide documented evidence for items identified with a **(D)** in this document.

The summary table at the end of the document provides all potentially required documentation, and if applicable, the WCB OHS Regulation reference.

For any identified hazard marked with a **(T)**, the contractor is responsible to train its employees.

HAZARDOUS MATERIALS

The contractor is responsible for providing additional information on hazardous materials which may be encountered as part of the work process, yet not identified in the List of Known Workplace Hazards.

Hazard or Issue	Project Manager		
	<i>Yes (Y), No (N) or Not Applicable (NA)</i>		
1. Asbestos-containing Materials. Disturbance or penetrations of flooring, walls, ceiling tiles, pipe lagging, ac pipe, transite siding, particularly in older facilities; e.g., furniture/fixture installation, carpeting/flooring services, and boiler repair/tune-up services			
(a) We have reviewed the hazardous materials assessment for asbestos provided by the City of Vancouver (or third party) in [complete]	Y	N	NA
(b) We will provide a written hazardous materials assessment for asbestos	Y	N	NA
(c) We have a written Asbestos Program (D)	Y	N	NA
(d) As “prime contractor”, we will submit a Notice of Project Asbestos(NOP-A) to WorkSafeBC at least 24 hours in advance of the project start-up	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	<i>Yes (Y), No (N) or Not Applicable (NA)</i>		
2. Lead-containing Materials. Disturbance of lead-based paint, particularly in older facilities. Also present in certain electrical circuitry and metal alloys; .e.g., overhead bridge crane maintenance/repair, high-voltage cable splicing services, boiler repair/tune-up services, fixture installation services, and chiller maintenance/repair services			
(a) We have reviewed the hazardous materials assessment for lead provided by the City of Vancouver (or third party) in [complete]	Y	N	NA
(b) We will provide a written hazardous materials assessment for lead	Y	N	NA
(c) We have a written exposure control program for Lead (D)	Y	N	NA
3. Other Hazardous Materials. May include pcb's, cfc's, moulds, mercury, ozone depleting substances (ods), radioactive substances, sewage and unidentified contaminated hazardous materials, other: (list other here) <hr/> <hr/> <hr/>			
(a) We have reviewed the hazardous materials assessment for (insert hazardous material type here) provided by the City of Vancouver, or a third party, in [complete]	Y	N	NA
(b) We have reviewed the hazardous materials assessment for (insert hazardous material type here) provided by the City of Vancouver, or a third party, in [complete]	Y	N	NA
(c) We will provide a hazardous materials assessment for (insert hazardous material type here)	Y	N	NA
(d) We will provide a hazardous materials assessment for (insert hazardous material type here)	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	Yes (Y), No (N) or Not Applicable (NA)		
4. Confined Spaces. Working in vaults, chambers, pits, tanks, etc.; e.g., construction, inspection and testing services, water/fuel storage tank clean-out services, and utility corrosion inspection services.			
(a) We have reviewed the confined space hazard assessment provided by the City of Vancouver in [complete]	Y	N	NA
(b) We have a written confined space entry program (D)	Y	N	NA
(c) Our employees have received confined space training (T)	Y	N	NA
(d) We shall complete a confined space hazard assessment specific to the work to be performed (D)	Y	N	NA
(e) We shall develop site specific written safe operating procedures (including evacuation and rescue components) prior to starting work (D)	Y	N	NA
(f) We shall identify and record isolation points (D)	Y	N	NA
(g) We will develop alternate procedures (as per WCB OHS Regulation # 9.22) to be used to isolate adjacent piping containing harmful substances (D)	Y	N	NA
(h) We will provide for the services of rescue persons	Y	N	NA
If yes to (g), provide brief description: _____ _____ _____			
5. Lock Out. Industrial equipment maintenance, power machinery repair services, pump maintenance/repair services, mechanical refrigeration systems, elevator repair, overhead bridge crane maintenance/repair services, cathodic protection services, hydraulic test systems repair/service, and air compressor rebuilding services			

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	Yes (Y), No (N) or Not Applicable (NA)		
(a) We will be required to lock out in order to isolate or prevent the unexpected release of energy (electrical, mechanical, hydraulic, chemical, thermal, kinetic, gravitational, pneumatic)	Y	N	NA
(b) We will perform work on, or near, energized equipment, lines or circuits	Y	N	NA
<p>Note: If yes to (a) or (b) above, no work may be performed until reviewed by City of Vancouver project manager or project manager designate.</p> <p>If yes to (a) or (b) describe:</p> <hr/> <hr/> <hr/>			
<p>6A. Fall Protection. Tree pruning, window and ledge cleaning, window replacement, overhead bridge crane maintenance/repair services, roll-up door replacement, tent installation, awning/canopy installation, overhead air exchange installation, construction inspection and testing services.</p>			
(a) Our employees will be exposed to a potential fall in excess of 3 m (10 feet), or to a fall of less than 3 m which would likely result in a serious injury (ex. impalement on rebar)	Y	N	NA
(b) We will produce a written Fall Protection Plan for work that will occur more than 25 feet above grade, or, if written procedures (control zone) are to be used as the means of fall protection (D)	Y	N	NA
(c) Our employees who will be required to use fall protection have received training (T)	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager
	<i>Yes (Y), No (N) or Not Applicable (NA)</i>
If yes to (a), describe: <hr/> <hr/> <hr/>	
6B. Scaffolding and Ladders. Window replacement or cleaning, tree pruning, roll-up door replacement, tent installation, and awning/canopy installation	
(a) Our employees will use scaffolding or ladders for access to the work	Y N NA
(b) The scaffolding or ladders will be exposed to wet and/or slippery conditions	Y N NA
(c) We will ensure scaffolding or ladders are secured before accessing the worksite	Y N NA
(d) Scaffolding will be erected and dismantled only by qualified workers	Y N NA
7. Overhead Power Lines and Underground Utilities. Tree pruning services, tree removal, utility relocation or replacement, underground utility identification services, concrete sawing services, pole painting	
(a) There are electrical hazards associated with overhead power lines such as limits of approach and contact	Y N NA
(b) We will obtain necessary assurances, in writing, through the utility company, for any work where minimum limits of approach cannot be maintained	Y N NA
(c) Underground or hidden utilities may be on the job site and we shall contact the Project Manager and BC OneCall at least four business days prior to the start of any excavation work	Y N NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	Yes (Y), No (N) or Not Applicable (NA)		
(d) In the event of an inadvertent utility strike, we will have a written procedure for immediate notification of both the utility company and WorkSafeBC (D)	Y	N	NA
8. Construction, Excavation, shoring and Demolition			
(a) As “prime contractor”, we will submit a Notice of Project (NOP) to WorkSafeBC at least 24 hours in advance of the project start-up date	Y	N	NA
(b) Workers may be required to enter an excavation over 1.2m (4 ft) in depth	Y	N	NA
(c) We will develop site specific written safe operating procedures, including evacuation and rescue components, prior to starting any excavation work (D)	Y	N	NA
(d) Shoring will be installed in accordance with Part 20 of the WorkSafeBC OH&S Regulation	Y	N	NA
(e) We will provide safe means of entry and exit for excavations	Y	N	NA
(f) We will provide for the services of rescue persons and equipment (excavation rescue)	Y	N	NA
(g) We will develop a demolition/salvage plan (D)	Y	N	NA
(h) We will evaluate the demolition materials for reuse or recycling	Y	N	NA
(i) We will protect passers-by from potential hazards	Y	N	NA
9. Chemicals, Solvents, Fumes, Vapours and Dusts. Cleaning solvents, adhesives, paints, coatings, binders; e.g., storage tank clean-out services, countertop installation (epoxies), and flooring			
(a) We will complete a hazard assessment for chemicals we will use in our work, and if chemicals already exist at the workplace, our assessment will identify possible results of any reactions between our chemicals and those of the City's operations	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	Yes (Y), No (N) or Not Applicable (NA)		
10. Noise and Vibration. Includes installations and heavy equipment operation. Noise examples for 85 - 90 dbA (at noise source) include forklift, smoke alarm, table saw. Whole body vibration examples include truck or equipment operator and jackhammer operation			
(a) Our employees will be exposed to noise levels above 85dbA	Y	N	NA
(b) We have a written hearing conservation program (D)	Y	N	NA
(c) Our employees will be exposed to excessive levels of whole body vibration (WBV)	Y	N	NA
11. Occupational Health and Safety Program			
(a) We have a written Safety Program (D)	Y	N	NA
(b) We will make regular inspections of all workplaces	Y	N	NA
(c) We will immediately investigate any reported unsafe conditions and correct as required	Y	N	NA
(d) We will investigate all incidents and provide written incident reports to the Project Manager	Y	N	NA
(e) We will develop a written plan (D) identifying how risk to the public and workers will be minimized (may include the use of barriers and safe entry/exit points from the worksite)	Y	N	NA
12. First Aid			
(a) First aid equipment, supplies, facilities and services will be readily accessible during working hours	Y	N	NA
(b) We will complete a first aid assessment (D)	Y	N	NA
(c) We will post site drawings and signs indicating the location of, and how to summon, first aid	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	Yes (Y), No (N) or Not Applicable (NA)		
(d) We will develop an effective means of communication between the first aid attendant and the work areas	Y	N	NA
13. Fire Protection. Solvents, fuels, soldering, torch cutting, or heating devices; e.g., gasoline and diesel fuel delivery services, flooring services, fire suppression service, and water pipe repair services			
(a) We will weld, solder, or cut with a torch	Y	N	NA
(b) We will use or store flammable/combustible liquids	Y	N	NA
(c) We will use temporary heating devices	Y	N	NA
(d) We will provide water and/or fire extinguishers on the job site	Y	N	NA
14. Personal Protective Equipment (PPE)			
(a) We will ensure our workers have appropriate personal protective clothing and equipment (e.g., safety footwear, hi-vis vests, hardhats, eye protection, face protection, hearing protection, chemical gloves/clothing)	Y	N	NA
(b) We have a written PPE program (D)	Y	N	NA
15. Respiratory Protection			
(a) The work will involve materials or processes requiring respiratory protection	Y	N	NA
(b) We have a written respiratory protection program (D)	Y	N	NA
16. Tools Machinery and Equipment			
(a) We will use powder-actuated tools.	Y	N	NA
(b) Our employees who operate equipment have been trained and are qualified in use of that equipment. (T)	Y	N	NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager
	<i>Yes (Y), No (N) or Not Applicable (NA)</i>
If yes to (a), describe: <hr/> <hr/> <hr/>	
17. Cranes, Forklifts, and Manlifts. Heavy or oversized goods delivery, tree pruning, overhead bridge crane maintenance/repair, and roll-up door replacement	
(a) We will use a crane, forklift, manlift or other lifting equipment	Y N NA
(b) Our lifting and rigging equipment is certified where applicable, and inspected on a regular basis	Y N NA
(c) Our operators shall have a valid operators certificate (mobile crane or tower crane) or have received training (boom lift, scissor lift or forklift) (T)	Y N NA
(d) Only lifting attachments approved for use by the forklift manufacturer will be used	Y N NA
18. Rigging	
(a) We will lift or sling loads overhead	Y N NA
(b) We will inspect ropes, hooks and slings before use on each shift	Y N NA
19. Motor Vehicles and Heavy Equipment. Goods delivery, personnel transportation services, trailer relocation services, oil/water pump-out and recycling services, asphalt grinding and asphalt sealing services, weed/brush abatement and mowing services, landscape hydro-seed services, tree stump grinding, and concrete sawing and removal	
(a) We will use motor vehicles or heavy equipment at the work location	Y N NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager		
	<i>Yes (Y), No (N) or Not Applicable (NA)</i>		
(b) All operators have a valid provincial driver's license	Y	N	NA
(c) We will inspect vehicles, including safety features (e.g., ROPS)	Y	N	NA
20. Traffic Control			
(a) There will be uncontrolled movement of vehicular traffic at the worksite	Y	N	NA
(b) We will develop a written traffic control plan (D)	Y	N	NA
(c) We will put in place any required traffic control devices	Y	N	NA
(e) The traffic control devices conform to the Ministry of Transportation and Infrastructure (MoTI) "Traffic Control Manual for Work on Roadways"	Y	N	NA
We will provide Traffic Control Persons (TCP's) as required by law	Y	N	NA
21. Crystalline Silica Dust			
(a) Our work will involve jackhammering, rotohammering, drilling, grinding or other disturbance of concrete or stone, creating potential exposure to silica dust	Y	N	NA
22. Additional Concerns			
We foresee additional health and safety concerns associated with the work	Y	N	NA
If yes, describe: (a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____			

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

Hazard or Issue	Project Manager
	Yes (Y), No (N) or Not Applicable (NA)
Describe the control measures each of the concerns listed above: (a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____	

PRE CONTRACT HAZARD ASSESSMENT COMPLETED BY	
Contractor's Representative Name (print):	
Contractor's Representative Signature:	Date:
Title:	Phone:

CONTRACTOR'S DESIGNATE RESPONSIBLE FOR ONSITE SAFETY	
Name (print):	
Title:	Phone:

	Yes (Y), No (N) or Not Applicable (NA)
Summary of Documentation (D) to be Provided by the Contractor upon request by the City of Vancouver (documentation required as per Workers Compensation Board Occupational Health and Safety (WCB OHS) Regulation, the Workers' Compensation Act (WCA) or the City of Vancouver)	

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

	Yes (Y), No (N) or Not Applicable (NA)
(a) Safety Program (WCB OHS Regulation Parts 3.1-3.3)	Y N NA
(b) Asbestos Exposure Control Plan (WCB OHS Regulation Part 6.3)	Y N NA
(c) Lead (Pb) Exposure Control Plan (WCB OHS Regulation Part 6.60)	Y N NA
(d) Respiratory Protection Program (WCB OHS Regulation Part 8.5)	Y N NA
(e) Confined Space Entry Program (WCB OHS Regulation Parts 9.5 and 9.6)	Y N NA
(f) Plan for minimizing risk to public and to workers (City of Vancouver)	Y N NA
(g) Personal Protective Equipment (PPE) Program (WCB OHS Regulation Part 8.5)	Y N NA
(h) Hearing Conservation Program (WCB OHS Regulation Part 7.5)	Y N NA
(i) Confined Space Hazard Assessment (WCB OHS Regulation Part 9.9)	Y N NA
(j) Work Procedure, including evacuation and rescue, for confined space (WCB OHS Regulation Part 9.10 and 9.11)	Y N NA
(k) Identification of Isolation Points (confined space) (WCB OHS Regulation Part 9.19)	Y N NA
(l) Alternate procedures to isolate adjacent piping (confined space) (WCB OHS Regulation Part 9.22)	Y N NA
(m) Fall Protection Plan (WCB OHS Regulation Part 11.3)	Y N NA
(n) Traffic Control Plan (Ministry of Transportation and Infrastructure (MOTI) manual, as referenced in WCB OHS Regulation Part 18.3)	Y N NA
(o) In the event of a utility strike, a written procedure for notification of Utility Provider (WCB OHS Regulation Part 4.18) and WorkSafeBC (Workers' Compensation Act Part 3, Division 10, Sec. 172 (1)(c))	Y N NA
(p) Work Procedure (including evacuation and rescue) for excavations (City of Vancouver)	Y N NA
(q) Demolition/Salvage Plan (City of Vancouver in reference to WCB OHS Regulation Part 20.112)	Y N NA

INVITATION TO TENDER NO. PS20210225
 CONTRACTOR FOR WATER MAIN TRENCHLESS CROSSING ALBERNI @ BUTE STREET
 SCHEDULE 11 - CONTRACTOR PRE-CONTRACT HAZARD ASSESSMENT FORM

	Yes (Y), No (N) or Not Applicable (NA)
(r) First Aid Assessment (WCB OHS Regulation Part 3.16 (2))	Y N NA
Summary of Training Requirements (T) of Contractor Employees (for any persons completing this type of work throughout the duration of the contract)	
(a) Confined Space Entry (WCB OHS Regulation Part 9.8)	Y N NA
(b) Fall Protection (WCB OHS Regulation Part 11.2 (6))	Y N NA
(c) Equipment Operation (WCB OHS Regulation Part 4.3(1)(b)(i)(ii))	Y N NA
(d) Mobile Equipment (ex. boom lift, scissor lift, forklift) (WCB OHS Regulation Part 16.4)	