INVITATION TO TENDER 2024-01

WEST COAST ROAD SANITARY FORCEMAIN

MASTER MUNICIPAL CONSTRUCTION DOCUMENTS
Platinum Edition UNIT PRICE CONTRACT

April 4th, 2024

INVITATION TO TENDER 2024-01

WEST COAST ROAD SANITARY FORCEMAIN

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The complete Contract Documents consist of the following parts:

1. The Master Municipal Construction Documents (Tender Package) consisting of the following parts (**included in this tender package)**:

   - Invitation to Tender
   - Instructions to Tenderers, Part I
   - Form of Tender
     - Appendix 1 – Schedule of Quantities and Prices
     - Appendix 2 – Preliminary Construction Schedule
     - Appendix 3 – Experience of Superintendent
     - Appendix 4 – Comparable Work Experience
     - Appendix 5 – Subcontractors
     - Appendix 6 – Tenderer's Current Projects Underway
   - Agreement - Draft
     - Schedule 1 – Schedule of Contract Documents
     - Schedule 2 – List of Contract Drawings
     - Appendix 7 – Safety Covenant
     - Appendix 8 – Prime Contractor Agreement
   - Supplementary General Conditions
   - Supplementary Specifications
   - Geotechnical Report: Geotechnical Report – Rev A, West Coast Road Sanitary Forcemain, dated August 8th, 2023
   - Environmental Report, West Coast Road Sanitary Forcemain, dated September 29th, 2023
   - MoTI Permit To Construct # 2023-01418

2. Additional reference documentation consisting of the following parts **(not distributed in this tender package) available at www.sooke.ca**:

3. The balance of the Master Municipal Construction Documents, Platinum, 2009 edition. These documents are available in the "MMCD - General Conditions, Specifications and Standard Detail Drawings" **(not distributed in this tender package)**:

INVITATION TO TENDER 2024-01

WEST COAST ROAD SANITARY FORCEMAIN

The District of Sooke invites tenders for the West Coast Road Sanitary Forcemain project which includes the following generalized scope of work:

Work under this Contract includes, but is not limited to, all supervision, construction, equipment, labour, material, permits and related items required for the construction of approximately 1.7km of 350mm diameter HDPE forcemain to be installed and connected to the District's active sanitary sewage transmission system. The new forcemain will be routed along the west bound lane shoulder West Coast Road from roughly Tomminy Drive to the entrance into the Waste Water Treatment Plant (WWTP) at 7113 West Coast Road, and then continue along this access road to the WWTP.

The project is located within the District of Sooke but primarily on Ministry of Transportation and Infrastructure (MoTI) ROW. The contractor will be required to abide by all relevant MoTI and Sooke requirements.

During the course of construction, the Contractor will be required to maintain 2-way vehicle traffic on Highway 14 at all times and access to all properties located within the project limits.

This Tender is available by downloading it from Bids and Tenders

A geotechnical investigation was conducted including 11 boreholes evenly spaced along the alignment, and material/contaminant testing of the soil was also conducted at these locations. This information is included for contractor information.

This Tender is scheduled to close at:

Tender Closing Time:	**3:00 p.m. local time**
Tender Closing Date:	**Friday April 26th, 2024** *There will NOT be a Public Opening for this Tender*
Delivered to:	Tenders are to be submitted via email to engineering@sooke.ca
Tender Enquiries:	Shaun Swarbrick, P.Eng, Senior Associate, Civil Engineer Telephone: 250.507.5876 Email: shaun.swarbrick@stantec,com

INVITATION TO TENDER 2024-01

WEST COAST ROAD SANITARY FORCEMAIN

RECEIPT CONFIRMATION FORM

As receipt of this document, and to directly receive any further information, addendums, etc. regarding this competition, please return this form to:

Email: engineering@sooke.ca

Company Name: _____

Address: _____

City: _____

Province/State: _____ Postal/Zip Code: _____

Telephone No: _____ Fax No: _____

Contact Person: _____

Title: _____

Email: _____

DISTRICT OF SOOKE INVITATION TO

TENDER 2024-01

WEST COAST ROAD SANITARY FORCEMAIN INSTRUCTIONS TO

TENDERERS PART I

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INSTRUCTIONS TO TENDERERS - PART I

**(TO BE READ WITH "INSTRUCTIONS TO TENDERERS - PART II"
CONTAINED IN THE EDITION OF THE PUBLICATION
"MASTER MUNICIPAL CONSTRUCTION DOCUMENTS" AND APPLICABLE DISTRICT OF SOOKE
BYLAWS SPECIFIED IN ARTICLE 2.2 BELOW)**

Reference No.: **TENDER 2024-01**

Contract: **WEST COAST ROAD SANITARY FORCEMAIN**

Introduction **1**

1.1 These Instructions apply to and govern the preparation of tenders for this *Contract*. The *Contract* is generally for the following work:

The District of Sooke invites tenders for the West Coast Road Sanitary Forcemain project which includes the following generalized scope of work:

Work under this Contract includes, but is not limited to, all supervision, construction, equipment, labour, material, permits and related items required for the construction of approximately 1.7km of 350mm diameter HDPE forcemain to be installed and connected to the District's active sanitary sewage transmission system. The new forcemain will be routed along the west bound lane shoulder West Coast Road from roughly Tomminy Drive to the entrance into the Waste Water Treatment Plant (WWTP) at 7113 West Coast Road, and then continue along this access road to the WWTP.

The project is located within the District of Sooke but primarily on Ministry of Transportation and Infrastructure (MoTI) ROW. The contractor will be required to abide by all relevant MoTI and Sooke requirements.

During the course of construction, the Contractor will be required to maintain 2-way vehicle traffic on Highway 14 at all times and access to all properties located within the project limits.

1.2 Direct all tender inquiries regarding the *Contract*, to:
Shaun Swarbrick, P.Eng, Senior Associate, Civil Engineer
Telephone: 250.507.5876
Email: shaun.swarbrick@stantec.com

2 Tender Documents

2.1 The tender documents which a tenderer should review to prepare a tender consist of all of the *Contract Documents* listed in Schedule 1 entitled "Schedule of Contract Documents". Schedule 1 is attached to the Agreement which is included as part of the tender package. The *Contract Documents* include the Drawings listed in Schedule 2 to the Agreement, entitled "List of Drawings".

2.2 A portion of the Contract Documents is included by reference. Copies of these documents have not been included with the tender package. These documents are the Instructions to Tenderers - Part II, General Conditions, Specifications and Standard Detail Drawings contained in the publication entitled "Master Municipal Construction Documents - General Conditions, “Specifications and Standard Detail Drawings". Refer to Schedule 1 attached to the Agreement or, if no edition has been specified, then the applicable edition shall be the most recent edition as of the date of this *Contract*. All sections of this publication are by reference included in the *Contract Documents*.

2.3 Any additional information made available to Tenderers prior to the Tender Closing Time by the *Owner* or representative of the *Owner*, such as geotechnical reports or as-built plans, which is not expressly included in Schedule 1 or Schedule 2 to the Agreement, is not included in the *Contract Documents*. Such additional information is made available only for the assistance of tenderers who must make their own judgement about its reliability, accuracy or completeness and neither the *Owner* nor any representative of the *Owner* gives any guarantee or representation that the additional information is reliable, accurate or complete.

3 Submission of Tenders

3.1 Tenders must be submitted in a sealed opaque package, clearly marked on the outside with the above *Contract* Title and Reference No., and must be received on or before:

Tender Closing Time: **3:00 p.m. local time**

Tender Closing Date: **Friday April 26th 2024**
There will NOT be a Public Opening for this Tender

Delivered to: Tenders are to be submitted via email to engineering@sooke.ca

Submissions should state the Tender name, number, and “Submission” in the Subject Line. Submissions should be consolidated into **one (1) Adobe .PDF virus free file no larger than 10MB’s.**

Tenderers assume the entire risk when submitting a Tender via email. The District will not be liable for any delay or rejection for any reason, including but not limited to, technological delays or issues caused by any network or email program or rejected as suspected spam or virus or malware or email not being identified in the Subject Line as a "Submission". The City will not be liable for any damages associated with Tenders not being received or missed.

For purposes of this paragraph, "received" means the Form of Tender submission is visible to the *Owner's* staff in its entirety, and is either in printed form or is capable of immediate reproduction in printed form.

3.2 Late tenders will not be accepted or considered, and will be returned unopened.

3.3 Tender Submission

.1 Tenders **must** be submitted on the Tender Forms included in these tender documents. The addition to or changing of any words in these Tender Forms by the tenderer or the failure to comply with and complete all items may be cause for rejection without consideration of the tender.

.2 The Tender Submission **must** include acknowledgement of receipt of all issued addenda.

.3 The Tender Submission **must** include the specified financial security, in the form of the "Bid Security" as required in Section 5.2 of the Instructions to Tenderers Part II.

.4 The Form of Tender **must** bear the signature of a legal signing authority of the tenderer.

.5 Other than acknowledgement of receipt of addenda, or request for withdrawal or revision, documents submitted as part of a tender will **not** be considered if received by any of the Owner's facsimile machines.

.6 Except as expressly and specifically permitted in these Instructions to Tenderers, no Tenderers shall have any claim for any compensation of any kind whatsoever, as a result of participating in the tender, and by submitting a bid, each Tenderer shall be deemed to have agreed that it has no claim.

Additional Instructions to Tenderers **4**

Freedom of Information

4.1 The *Owner* is subject to the provisions of the Freedom of Information and Protection of Privacy Act. As a result, while Section 21 of the Act does offer some protection for third party business

interests, the *Owner* cannot guarantee that any information provided to the *Owner* can be held in confidence. All tenders, after closing time and date become the property of the *Owner*.

Cost of Tender Submission

4.2 The *Owner* shall not be liable for a Tenderer's cost of submitting a tender.

Evaluation Criteria

4.3 (a) The *Owner* reserves the right to waive informalities in or reject any or all tenders or accept the tender deemed most favourable in the interests of the *Owner*. Tenders will be evaluated on the combination of information provided in the Form of Tender and Appendices, which may offer the best value and not necessarily the lowest price. The *Owner* reserves the right to conduct pre-selection meetings with Tenderers. The *Owner* further reserves the right to conduct post-selection meetings in order to correct, change or adapt the selected Tender to the wishes of the *Owner*. **Acceptance of any tender may be subject to budgetary considerations and/or District of Sooke Council approval, and/or the approval of other jurisdictions having authority.**

Construction Association Policies

4.4

4.4.1 The *Owner* is not a member of the Public Construction Council of British Columbia, the British Columbia Construction Association or any other construction association.

4.4.2 The *Owner* does not adopt or agree to be bound by "The Procedures and Guidelines Recommended For Use on Publicly Funded Construction Projects" produced by the Public Construction Council of British Columbia, September 1989, or any other procedure/guideline recommended, adopted or produced by any construction association in the tendering and award of the *Contract* of this project.

Good Neighbour Policy

4.5

4.5.1 The *Owner's* Noise Bylaw shall be followed at all times during the performance of this contract.

Non Mandatory Site Meeting

4.6 A non-mandatory site meeting will be held for tenderer's benefit on April 10th (Wednesday) at 10am Local time. Tenderers will meet at the Sooke WWTP located at 7113 West Coast Road.

Addition\Deletion

4.7 Tenderers are advised that the *Owner* may, at its option, and subject to available funding and budgetary considerations, delete any *Work* described in the *Contract Documents* or may require that optional work be added to the scope of *Work*.

Omissions and Discrepancies

4.8 The Tenderer must carefully examine the *Contract Documents* and the site of the proposed works, judging for and satisfying themselves as to the probable conditions to be encountered. Should a Tenderer find omissions from or discrepancies in the *Contract Documents*, or be in doubt as their meaning, the Tenderer should notify the Owner no later than 5 days prior to the tender closing, who may cause to send a written instruction to all Tenderers in the form of an addendum, which shall become part of the contract and shall be covered in the contract price. The Tenderer may not claim, after the submission of a tender, that there was any misunderstanding with respect to the conditions imposed by the documents. No oral interpretations made to a Tenderer as to the meaning of the *Contract Documents* shall be considered binding. Every request for an interpretation shall be made in writing, forwarded to the office referred to in paragraph 3.1 of the Instructions to Tenderers – Part I.

Amendment of Tenders

4.9

4.9.1 Delete Paragraphs 12.1 of the Instructions to Tenderers, Part II and replace with the following paragraphs 4.9.2 and 4.9.3:

4.9.2 A Tenderer may, without prejudice to itself, withdraw or revise a tender after it has been deposited with the *Owner*, provided the request for withdrawal or revision is filed with the *Owner* in writing before the time set for the Tender closing. Non-facsimile request(s) should be submitted in a sealed opaque envelope clearly marked with the contract name and reference number to the office referred to in paragraph 3.1 of the Instructions to Tenderers - Part 1. In the case of revision(s), a revised price will not be accepted, only the addition to or deduction from the tender price will be accepted. Written withdrawals or revisions must be signed by the same person or persons who signed the original Form of Tender.

4.9.3 In the case of requests for withdrawal or revision, they will only be accepted if they are received by the *Owner's* Engineering Department via e-mail at engineering@sooke.ca before the scheduled tender closing time. Tenderers assume the entire risk that the facsimile and computer equipment and staff at the above office will receive the facsimile or e-mail containing the withdrawal or revision. The Owner assumes no risk or responsibility whatsoever that any e-mail will be received as required and shall not be liable to any Tenderer if for any reason an e-mail is not received

For purposes of this paragraph 4.9.3,"received" means the request for withdrawal or revision is visible to the *Owner's* staff in its entirety, and is either in printed form or is capable of immediate reproduction in printed form.

Sub-Surface Conditions

4.10 A geotechnical assessment has been completed and has been attached for information only. See the enclosed "Geotechnical Report – Rev A, West Coast Road Sanitary Forcemain", dated August 8th 2023.

Environmental Conditions

4.11 An environmental desktop study and soil sampling program was conducted and included for information only. See the enclosed report entitled "Environmental Desktop Review for Proposed West Coast Road Sanitary Forcemain Upgrades, Sooke, BC", dated September 29th 2023.

Archaeological Assessment

4.12 No detailed archaeological assessment has been conducted. No known sites are along the project alignment and the site has been previously disturbed numerous times. Contractor to abide by all relevant standards for protection of archaeological material if encountered.

Commencement and Completion of Work

4.13 The *Owner* requires that the *Work* under this *Contract* be completed as quickly as possible after *Contract* award, and within the following milestones:

Substantial Performance* of this *Contract* to be achieved within 120 *Calendar Days* from *Notice to Proceed

Form of Tender

DISTRICT OF SOOKE

Reference No.: **TENDER 2024-01**

Contract: **WEST COAST ROAD SANITARY FORCEMAIN**

TO OWNER:

1 I (WE), THE UNDERSIGNED:

1.1 have received and carefully reviewed all of the *Contract Documents*, including the Instructions to Tenderers, the specified edition of the "Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings" and the following Addenda:

_____
_____
_____
_____
_____
_____;
(ADDENDA, IF ANY) **(TENDERER TO COMPLETE)**

1.2 have full knowledge of the *Place of the Work*, and the *Work* required; and

1.3 have complied with the Instructions to Tenderers; and

2 ACCORDINGLY I (WE) HEREBY OFFER:

2.1 to perform and complete all of the *Work* and to provide all the labour, equipment and material as set out in the *Contract Documents*, in strict compliance with the *Contract Documents*; and

2.2 to achieve *Substantial Performance* of the *Work* within 120 *Days* from receipt of a Notice to Proceed; and

2.3 to do the *Work* for the price, which is the sum of the products of the actual quantities incorporated into the *Work* and the appropriate Lump Sums set out in Appendix 1, the "*Schedule of Quantities and Prices*", plus any lump sums or specific prices and adjustment amounts as provided by the *Contract Documents*. For the purposes of tender comparison, our offer is to complete the *Work* for the "*Tender Price*" as set out on

Tenderer's Initial	Owner's Initial

Appendix 1 of this Form of Tender. Our *Tender Price* is based on the estimated quantities listed in the *Schedule of Quantities and Prices*, and excludes *GST*.

3 I (WE) CONFIRM:

3.1 that we understand and agree that the quantities as listed in the *Schedule of Quantities and Prices* are estimated, and that the actual quantities will vary.

4 I (WE) CONFIRM:

4.1 that the following Appendices are attached to and form a part of this tender:

4.1.1 the Appendices as required by paragraph 5.3 of the Instructions to Tenderers - Part II; and

4.1.2 the ***Bid Security*** as required by paragraph 5.2 of the Instructions to Tenderers – Part II stated as:

A tender must be accompanied by the *Bid Security* in the form of:

a a Bid Bond issued by a surety licensed to carry on the business of suretyship in British Columbia in a form reasonably satisfactory to the *Owner*; or

b cash, bank draft or letter of credit in a form acceptable to the *Owner*;

in an amount equal to 10% of the *Tender Price*.

5 I (WE) AGREE:

5.1 that this tender will be irrevocable and open for acceptance by the *Owner* for a period of 60 calendar days from the day following the *Tender Closing Date and Time*, even if the tender of another tenderer is accepted by the *Owner*. If within this period the *Owner* delivers a written notice ("*Notice of Award*") by which the *Owner* accepts our tender we will:

5.1.1 within 10 *Days* of receipt of the written *Notice of Award* deliver to the *Owner*:

Tenderer's Initial	Owner's Initial

a a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the *Contract 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 *Owner*; and

b a Baseline *Construction Schedule*, as per Supplementary General Condition 4.6.1; and

c a "clearance letter" indicating that the tenderer is in WCB compliance; and

d a copy of the insurance policies as specified in GC 24 indicating that all such insurance coverage is in place;

e a Health and Safety Program Manual pertaining to the Work;

f a Construction Environmental Management Plan (CEMP) as specified in Supplementary Specification 01 57 01;

5.1.2 As per General Condition 4.6.6, the Owner shall issue the Notice to Proceed within 14 days of receipt and acceptance of the documentation required under item 5.1.1 above.

5.1.3 within 2 *Days* of receipt of written "*Notice to Proceed*", or such longer time as may be otherwise specified in the *Notice to Proceed*, commence the *Work*.

5.1.4 sign the *Contract Documents* as required by GC 2.1.2.

6 I (WE) AGREE:

6.1 that, if we receive written *Notice of Award* of this *Contract* and, contrary to paragraph 5 of this Form of Tender, we:

6.1.1 fail or refuse to deliver the documents as specified by paragraph 5.1.1 of this Form of Tender; or

6.1.2 fail or refuse to commence the *Work* as required by the *Notice to Proceed*,

Tenderer's Initial	Owner's Initial

then such failure or refusal will be deemed to be a refusal by me (us) to enter into the *Contract* and the *Owner* may, on written notice to me (us), award the *Contract* to another party. I (We) further agree that, as full compensation on account of damages suffered by the *Owner* because of such failure or refusal, the *Bid Security* shall be forfeited to the *Owner*, in an amount equal to the lesser of:

6.1.3 the face value of the *Bid Security*; and

6.1.4 the amount by which my (our) *Tender Price* is less than the amount for which the *Owner* contracts with another party to perform the *Work*.

7 I (WE) DECLARE THAT:

7.1 no person, firm or company other than the undersigned, has any interest in this tender or in the proposed *Contract* for which this tender is made;

7.2 this tender is made without any connection, knowledge, comparison of figures, or agreement with any other company, firm or person making a tender for the same work;

7.3 in tendering for this work, and when called upon to enter into an agreement with the *Owner*, I (we) will be bound to comply with all laws, statutes, and municipal bylaws pertaining to the work. The agreement will be governed by the laws of the province of British Columbia;

7.4 in submitting this tender I (we) did not rely upon any information provided by the *Owner*, or any of the *Owner's* employees or agents, relating to the conditions, contingencies, risks or other circumstances, local or otherwise, which might influence or affect the performance or the cost of the work, including, without limiting the nature of the ground, subsoil, substrata of the work site, the means of access to the work site, the quality, quantity, nature or location of the materials to be furnished or removed in performance of the work, and the conditions under which the labour force will be employed, except the extent that any such information is expressly set forth in the *Contract Documents*. I (we) have relied on our own examination of the work site and have informed ourselves as to all conditions, contingencies, risks, and circumstances, local or otherwise, which might influence or affect the performance or the cost of the work. I (we) accept the site prior to the signing of the *Contract*.

Tenderer's Initial	Owner's Initial

8 WE AGREE:

8.1 The work shall be completed entirely in 120 *Days* from *Notice to Proceed* (The Designated Completion Period);

8.2 There shall be no exclusion of time from the Designated Completion Period for any reason OTHER than delays clearly attributable to the OWNER, its agents, employees or any Authorized Representatives.

9 I (WE) DECLARE THAT:

9.1 I (we) recognize that the lowest or any tender will not necessarily be accepted; and

9.2 I (we) recognize that the *Owner* reserves the right to reject all tenders or to accept the tender which best suits its long term objectives; and

I (we) recognize that the *Owner* reserves the right to accept or reject all or part of this Tender at any time during the period specified by paragraph 5.1 of this Form of Tender.

10 I (WE) DECLARE THAT:

10.1 I (we) do not (or any related company) have any family, ownership, and operating relationships with the District of Sooke, or any elected official, staff or other officials holding public office in the District of Sooke and agree that the Owner reserves the right to reject any tender that may be perceived to be in a conflict of interest.

11 I (WE) DECLARE THAT:

11.1 In this tender:

(a) "Related Party of the Tenderer" means:
- an officer or director of the Tenderer;
- a shareholder of the Tenderer;
- a corporation with a shareholder or director who is also a shareholder or director of Tenderer;

(b) "Public Authority" has the same meaning as under the Community Charter.

11.2 I (we) hereby declare that neither the Tenderer nor a Related Party of the Tenderer:

Tenderer's Initial	Owner's Initial

(a) has had a bid bond or performance bond retained or claimed against;
(b) has breached a contract for works or services with the *Owner* or other Public Authority in British Columbia;
(c) has been engaged in a legal action against the *Owner* or another Public Authority in British Columbia, or the elected or appointed officers and employees of the *Owner* or that other Public Authority, in relation to;
- any other contract for works or services;
- any matter arising from the exercise of the *Owner's* or the other Public Authority's powers, duties or functions under the Community Charter, Local Government Act or other enactment;

(d) has been charged or convicted of an offence in relation to the performance of a contract for works or services with the *Owner* or other Public Authority;

within five years of the closing date of this Tender.

Tenderers who are unable to truthfully complete this declaration must provide full particulars of the relevant circumstances. Submission of a false declaration is grounds for rejection of a tender.

11.3 I (we) hereby declare that the *Owner* may in its absolute discretion reject a Tender submitted by a Tenderer if the Tenderer or a Related Party of the Tenderer:

(a) has had a bid bond or performance bond retained or claimed against;

(b) has breached a contract for work or services with the *Owner* or other Public Authority in British Columbia;

(c) has been engaged in a legal action against the *Owner* or another public authority in British Columbia, or the elected or appointed officers and employees of the *Owner* or that other public authority, in relation to:

- any other contract for works or services;
- any matter arising from the exercise of the *Owner's* or the other public authority's powers, duties or functions under the Community Charter, Local Government Act or other enactment;

(d) has been charged or convicted of an offence in relation to

Tenderer's Initial	Owner's Initial

the performance of a contract for works or services with the *Owner* or other Public Authority;

within five years of the closing date of this Tender.

11.4 I (we) hereby declare that in determining whether to reject a tender the *Owner* will consider whether:

(a) the legal action is likely to affect the Tenderers ability to work with the *Owner*, its consultants and representatives, and;

whether the *Owner's* or other public authority's experience with the Tenderer indicates that the *Owner* is likely to incur increased costs including but not limited to staff and legal costs in the administration of this contract if it is awarded to the Tenderer.

12 I (WE) AGREE THAT:

12.1 I (we) agree that if any director, officer or employee, agent or other representative of a Tenderer makes any representation or solicitation to the Mayor, any Councillor, officer or employee of the District of Sooke, other than those specifically designated in the Tender documents, with respect to this Tender, whether before or after the submission of the Tender, the City shall be entitled to reject or not accept the Tender.

Tenderer's Initial	Owner's Initial

MY (OUR) ADDRESS is as follows:

_____
(Full Legal Name of Corporation, Partnership or Individual)

_____
(address)

_____

_____
(city, province) (postal code)

Phone: _____

Fax: _____

E-mail: _____

This Tender is executed this ____ day of _____, 2020.

_____
(Printed Name)

_____
(Authorized Signatory)

Tenderer's Initial	Owner's Initial

Appendix 1

SCHEDULE OF QUANTITIES AND PRICES – GST EXCLUDED

(See paragraph 5.3.1 of the Instructions to Tender – Part II)

(All prices and *Quotations* including the *Contract Price* shall include all *Taxes*, but shall not include *GST*, *GST* shall be shown separately)

Section	Para.	Specification Title	Unit	Quantity	Unit Price	Amount
	01 - GENERAL ITEMS					
01 01 01	1.8.1	Mobilization & Demobilization	LS	1		
01 33 01	1.8.1	Project record documents	LS	1		
01 53 01	1.9.1	Temporary Facilities	LS	1		
01 55 00	1.5.1	Traffic control, vehicle access and parking	LS	1		
01 57 01	1.6.1	Environmental Protection	LS	1		
					Sub-Total Division 01:	**$**

Section	Para.	Specification Title	Unit	Quantity	Unit Price	Amount
	31 - EARTHWORKS					
31 15 60	1.5.1	Dust Control	each	1		
31 23 01		**Excavating, Trenching and Backfilling**				
	1.10.3	Over-excavation including backfilling (optional)	m^3	150		
	1.10.7	Cleaning and Reshaping Channels and Ditches	m	432		
31 23 17	1.6.3	Rock Removal – Trench Rock – OPTIONAL – Blasting permitted	m^3	15		
31 23 23	1.4.1	Controlled Density Fill - OPTIONAL	m^3	15		
31 24 13	1.8.4	Roadway Excavation, Embankment and Compaction - Remove Existing Asphalt or Concrete Pavement, Curbs and Gutters, Sidewalks, Utility Strips, Driveways	m^2	917		
					Sub-Total Division 31:	**$**

Tenderer's Initial | Owner's Initial

Section	Para.	Specification Title	Unit	Quantity	Unit Price	Amount
	32 - ROADS AND SITE IMPROVEMENTS					
32 01 16.7	1.5.1	Cold Milling - to maximum 50mm thickness, including disposal	m^2	383		
32 11 16.1	1.4.3	Granular Sub-Base - (specify) 150mm Thickness for Roads or Sidewalks	m^2	2405		
32 11 23	1.4.2	Granular Base - (specify) 300mm Thickness	m^2	2405		
32 12 13.1	1.5.1	Asphalt Tack Coat	m^2	1387		
32 12 16		**Hot-Mix Asphalt Concrete Paving**				
	1.5.1, 1.5.2	Asphalt Pavement -Lower Course # 1	m^2	917		
	1.5.1, 1.5.2	Asphalt Pavement -Upper Course # 1	m^2	1387		
	1.5.7	Saw Cut Asphalt or Concrete Pavements	m	1555		
	1.5.6	Hand Laid Asphalt Curb (specify)	m	5		
32 17 23	1.5.2	Permanent Painted Pavement Markings	LS	1		
32 91 21	1.4.1	Topsoil and Finish Grading - Imported Topsoil 100mm thickness	m2	564		
32 92 19	1.8.1	Hydraulic Seeding	m^2	564		
					Sub-Total Division 32:	**$**

Tenderer's Initial | Owner's Initial

Section	Para.	Specification Title	Unit	Quantity	Unit Price	Amount
	33 - UTILITIES					
33 11 01		**Waterworks**				
	1.8.1, 1.8.2	Watermain PVC - 200 mm diameter depth of main 1-2m Imported Backfill	m	4		
	1.8.13	Watermain Tie -In - Pipework by Contractor	LS	1		
33 34 01		**Sewage Forcemains**				
	1.8.2, 1.8.3	Forcemain Pipe HDPE DR26 350 mm diameter, for all depths of main Imported Backfill	Lin.m	1715		
	1.83	In-line Gate Valves - 350mm Diameter	Each	1		
	1.8.5	Air-Release /Air Vacuum or Combination Air Valves & Apparatus - See Details	ea	2		
	1.8.5	Blow-Off Assembly See Details	ea	2		
	1.8.6	Air Valve Chamber See Details	ea	2		
	1.8.7	Blow-Down Chamber See Details	ea	2		
	1.8.10	Forcemain Tie-In into existing West Coast Road Lift Station	ea	1		
	1.8.10	Forcemain Tie-In at WWTP	ea	1		
					Sub-Total Division 33:	**$**

Tenderer's Initial Owner's Initial

SUMMARY

Sub-Total Division 01:	**$**
Sub-Total Division 31:	**$**
Sub-Total Division 32:	**$**
Sub-Total Division 33:	**$**
Sub-Total	**$**
GST (5%):	**$**
GRAND TOTAL:	**$**

Tenderer's Initial | Owner's Initial

Appendix 2

PRELIMINARY CONSTRUCTION SCHEDULE

(See paragraph 5.3.2 of the Instructions to Tenderers - Part II)

The Preliminary Construction Schedule should be presented as a Gantt Chart and should include:

1. All major activities separately identified with expected duration and related milestone dates and,
2. All major activities listed in the anticipated order of completion and,
3. Clear definition of all related interdependencies between tasks.

Schedules created using third party software will be accepted.

ACTIVITY (with milestone dates)	CONSTRUCTION SCHEDULE (weeks)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Tenderer's Initial | Owner's Initial

Appendix 3

EXPERIENCE OF SUPERINTENDENT
(See paragraph 5.3.3 of the Instructions to Tenderers - Part II)

Name: _____

Experience:

1. Dates: _____

   Project Name: _____

   Responsibility: _____

   _____

   _____

   References: _____

2. Dates: _____

   Project Name: _____

   Responsibility: _____

   _____

   _____

   References: _____

3. Dates: _____

   Project Name: _____

   Responsibility: _____

   _____

   _____

   References: _____

Tenderer's Initial	Owner's Initial

Appendix 4

COMPARABLE WORK EXPERIENCE
(See paragraph 5.3.4 of the Instructions to Tenderers - Part II)

PROJECT	OWNER/ CONTRACT NAME	PHONE NUMBER	WORK DESCRIPTION	VALUE ($)

Tenderer's Initial | Owner's Initial

Appendix 5

SUBCONTRACTORS
(See paragraph 5.3.5 of the Instructions to Tenderers - Part II)

TENDER ITEM	TRADE	SUBCONTRACTOR NAME	PHONE NUMBER

Tenderer's Initial | Owner's Initial

Appendix 6

TENDERERS CURRENT PROJECTS UNDERWAY

PROJECT	OWNER/ CONTRACT NAME	PHONE NUMBER	WORK DESCRIPTION	VALUE ($)	% COMPLETE

Tenderer's Initial | Owner's Initial

Draft Agreement

Between Owner and Contractor

THIS AGREEMENT made in duplicate this _____ day of _____, 2024.

Reference No.: **TENDER 2024-01**

Contract: **WEST COAST ROAD SANITARY FORCEMAIN**

BETWEEN: **DISTRICT OF SOOKE**

(the "*Owner*")

AND: **TBD**

(the "*Contractor*")

The *Owner* and the *Contractor* agree as follows:

ARTICLE 1 **THE WORK - START/COMPLETION DATES**

1.1 The *Contractor* will perform all *Work* and provide all labour, equipment and material and do all things strictly as required by the *Contract Documents*.

1.2 The *Contractor* will commence the *Work* in accordance with the *Notice to Proceed*. The *Contractor* will proceed with the *Work* diligently, will perform the *Work* generally in accordance with the construction schedules as required by the *Contract Documents* and will achieve *Substantial Performance* of the *Work* within 120 *Calendar Days* of being issued a Notice to Proceed subject to the provisions of the *Contract Documents* for adjustments to the *Contract Time*.

1.3 Time shall be of the essence of the *Contract*

ARTICLE 2 **CONTRACT DOCUMENTS**

2.1 "*Contract Documents*" consist of the documents listed or referred to in Schedule 1, entitled "Schedule of Contract Documents", which is attached and forms a part of this Agreement, and includes any and all additional and amending documents issued in accordance with the provisions of the *Contract Documents*. All of the *Contract Documents* shall constitute the entire *Contract* between the *Owner* and the *Contractor*.

2.2 The *Contract* supersedes all prior negotiations, representations or agreements, whether written or oral, and the *Contract* may be amended only in strict accordance with the provisions of the *Contract Documents*.

ARTICLE 3 **CONTRACT PRICE**

3.1 The price for the *Work* ("*Contract Price*") shall be the sum in Canadian dollars of the following:

3.1.1 the product of the actual quantities of the items of *Work* listed in the *Schedule of Quantities and Prices* which are incorporated into or made necessary by the *Work* and the Lump Sums listed in the *Schedule of Quantities and Prices*; plus

3.1.2 all lump sums, if any, as listed in the *Schedule of Quantities and Prices*, for items relating to or incorporated into the *Work*; plus

3.1.3 any adjustments, including any payments owing on account of *Changes* and agreed to *Extra Work*, approved in accordance with the provisions of the *Contract Documents*.

3.2 The *Contract Price* shall be the entire compensation owing to the *Contractor* for the *Work* and this 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*.

ARTICLE 4 PAYMENT

4.1 Subject to applicable legislation and the provisions of the *Contract Documents*, the *Owner* shall make payments to the *Contractor*.

4.2 If the *Owner* fails to make payments to the *Contractor* as they become due in accordance with the terms of the *Contract Documents* then interest calculated at 2% per annum over the prime commercial lending rate of the Royal Bank of Canada on such unpaid amounts shall also become due and payable until payment. Such interest shall be calculated and added to any unpaid amounts monthly.

ARTICLE 5 RIGHTS AND REMEDIES

5.1 The duties and obligations imposed by the *Contract Documents* and the rights and remedies available hereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

5.2 Except as specifically set out in the *Contract Documents*, no action or failure to act by the *Owner*, *Contract Administrator* or *Contractor* shall constitute a waiver of any of the parties' rights or duties afforded under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach under the *Contract*.

ARTICLE 6 NOTICES

6.1 Communications among the *Owner*, the *Contract Administrator* and the *Contractor*, including all written notices required by the *Contract Documents*, may be delivered by hand, e-mail, fax, or by pre-paid registered mail to the addresses as set out below:

The *Owner*:
District of Sooke
2205 Otter Point Road
Sooke, BC V9Z1J2
Attention: Mr. Jeff Carter, Director of Operations
E-mail: jcarter@sooke.ca

The *Contractor*: **TBD**

The *Contract Administrator*:
Stantec Consulting Ltd.
400-655 Tyee Road
Victoria, BC V9W 4C7
Attention: Mr. Shaun Swarbrick, P.Eng, Senior Associate
E-mail: shaun.swarbrick@stantec.com

6.2 A communication or notice that is addressed as above shall be considered to have been received:

6.2.1 immediately upon delivery, if delivered by hand; or

6.2.2 immediately upon transmission if sent and received by fax or e-mail; or

6.2.3 after 5 *Days* from date of posting if sent by registered mail.

6.3 The *Owner* or the *Contractor* may, at any time, change its address for notice by giving written notice to the other at the address then applicable. Similarly if the *Contract Administrator* changes its address for notice then the *Owner* will give or cause to be given written notice to the *Contractor*.

6.4 The sender of a notice by fax or e-mail assumes all risk that the fax or e-mail will be received properly, and the provisions of paragraph 12.5 of the Instructions to Tenderers, Part II apply to the sender.

ARTICLE 7 GENERAL

7.1 This *Contract* shall be construed according to the laws of British Columbia.

7.2 The *Contractor* shall not, without the express written consent of the *Owner*, assign this *Contract*, or any portion of this *Contract*.

7.3 The headings included in the *Contract Documents* are for convenience only and do not form part of this *Contract* and will not be used to interpret, define or limit the scope or intent of this *Contract* or any of the provisions of the *Contract Documents*.

7.4 A word in the *Contract Documents* in the singular includes the plural and, in each case, vice versa.

7.5 This agreement shall ensure to the benefit of and be binding upon the parties and their successors, executors, administrators and assigns.

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year first written above.

***Contractor*:**

TBD

_____
(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP OR INDIVIDUAL)

_____
(AUTHORIZED SIGNATORY)

_____
(WITNESS)

***Owner*:**

District of Sooke

_____
(AUTHORIZED SIGNATORY)

_____
(WITNESS)

SCHEDULE 1

DISTRICT OF SOOKE

Schedule of Contract Documents

The following is an exact and complete list of the *Contract Documents*, as referred to in Article 2.1 of the *Agreement*.

NOTE: The documents noted with "*" are contained in the "Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings", 2009 PLATINUM edition. All sections of this publication are included in the *Contract Documents*.

a) Agreement;
b) Addenda;
c) Supplementary General Conditions;
d) General Conditions*;
e) Supplementary Specifications;
f) Specifications*;
g) Drawings listed in Schedule 2 to the Agreement;
h) Supplementary Detail Drawings;
i) Standard Detail Drawings*;
j) Executed Form of Tender;
k) Instructions to Tenderers;
l) All other Contract Drawings;

SCHEDULE 2

DISTRICT OF SOOKE

List of Contract Drawings

(Complete listing of all drawings, plans and sketches which are to form a part of this Contract, other than Standard Detail Drawings and Supplementary Standard Detail Drawings.)

TITLE	DRAWING NO.	SHEET NO.	DATE	REVISION DATE	REVISION NO.
Cover	C-000	-	March 28, 2024		0
Drawing Index, Legend and General Notes	C-001	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-101	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-102	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-103	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-104	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-105	-	March 28, 2024		0
West Coast Road Forcemain Plan - Profile	C-106	-	March 28, 2024		0
Details	C-501	-	March 28, 2024		0

Appendix 7

SAFETY COVENANT

BETWEEN:

_____ of
(Company Name (Print legibly)

_____
(Address)

_____
(City) (Postal Code)

_____
(Phone no.) (Fax no.)

hereinafter referred to as the "Contractor"

AND:

DISTRICT OF SOOKE

hereinafter called the "Owner"

WHEREAS:

The Contractor covenants and agrees that when performing any work for the Owner, whether directly as a contractor or indirectly as a sub-contractor, it will adhere to all of the requirements of the Occupational Health and Safety (OHS) Regulation, B.C. Reg. 296/97, as may be amended from time to time, that are applicable to the work being performed, and as well will comply with the provisions of the *Workers Compensation Act, R.S.B.C, 1996, c.492*, as amended (the 'Act').

Without limiting the generality of the foregoing, the Contractor agrees:

1) Before commencing any work for the Owner, the Contractor will consult the OHS Regulation and will determine which provisions of the OHS Regulation is applicable to the work that the Contractor is to perform. The Contractor will strictly comply with all applicable OHS Regulations when performing the work.

2) Before commencing any work for the Owner, the Contractor will review and familiarize itself with any existing policies or procedures developed by the Owner in relation to the work. If in the opinion of the Contractor, by following a policy or procedure that the Owner has established in relation to the work, the Contractor, or an employee of the Contractor or of the Owner, or any other worker, is put at increased risk, the Contractor must request a written change of policy or procedure from the Owner, applicable only to the work the Contractor is to perform, before proceeding with the work. The Owner reserves the right to refuse to amend its policies or procedures in response to any such request where the Owner, after such consultation with WorkSafe BC as the Owner considers necessary, determines that the Owner's policy or procedure does not increase the risk to any worker at the location of the work to be performed, and determines that the

Contractor's request is unreasonable, or is unnecessary for the protection of workers at the location of the work.

3) To have read every section of the OHS Regulation that pertains to the job at hand, to ensure that it understands the pertinent OHS Regulation and its application to the supervisor(s) and to all of the workers at the location of the work, and to ensure that each worker under the Contractor's supervision follows the applicable OHS Regulation. To assist Contractors with this task, the District of Sooke directs them to consult with WorkSafe BC directly, to access the WorkSafe BC Regulations and Policies available on the WorkSafe BC website.

4) To understand, comply with and, to the full extent of the Contractor's lawful authority, to enforce all of the following provisions of the OHS Regulation as they pertains to the job at hand and to the workers employed by the Contractor, and to provide to the owner, at any time upon request, evidence of compliance with the following:

a) Rights & Responsibilities – Occupational Health & Safety Program (Part 3, including investigations, inspections, written instructions, records and statistics, adequate supervision, complete understanding by the workforce of the right and responsibility to refuse unsafe work)
b) General Conditions (Regulation – Part 4)
c) Chemical and Biological Substances (Regulation – Part 5)
d) Substance Specific requirements (Regulation – Part 6)
e) Noise, Vibration, Radiation and Temperature (Regulation – Part 7)
f) Personal Protective Clothing and Equipment (Regulation - Part 8)
g) Confined Space Entry (Regulation – Part 9)
h) Lock-out (Regulation – Part 10)
i) Fall Protection (Regulation – Part 11)
j) Tools, Machinery and Equipment (Regulation – Part 12)
k) Ladders, Scaffolds and Temporary Work Platforms (Regulation – Part 13)
l) Cranes and Hoists (Regulation – Part 14)
m) Rigging (Regulation – Part 15)
n) Mobile Equipment (Regulation – Part 16)
o) Traffic Control (Regulation – Part 18)
p) Electrical Safety (Regulation – Part 19)
q) Construction, Excavation & Demolition (Regulation – Part 20)
r) Forestry Operations (Regulation – Part 26)
s) Evacuation and Rescue (Regulation – Part 32)
t) Occupational First Aid (Regulation – Part 33)
u) Coordination of Multiple Employer Workplaces (Regulation – Part 20, s. 20.3)

PROVISIONS OF THE *WORKERS COMPENSATION ACT* – PART 3 SPECIFIC TO CONTRACTORS ON A WORKSITE:

i. Division 3 – General duties of Employers, Workers and Others (Sections 115, 116, 117, 118, 119, 120, 121, 122, 123, 124);
ii. Division 4;
iii. Division 10.

5) The *Workers Compensation Act* stipulates that the Owner (the District of Sooke) is required to enforce any observed infraction of the Act or Regulation. The Contractor accepts that the District of Sooke will be conducting periodic checks of the Contractor during the Contractor's work for the District of Sooke and will be asking the Contractor to comply with the Act/Regulation in the event that any contravention is observed. If a contravention is observed and not corrected, the Contractor may be asked to leave the worksite and may result in termination of the contract for the work.

6) For the purposes of streamlining large construction projects and multiple employer worksites, the Owner reserves the right to designate a "prime contractor" amongst contractors who are working on a job-site together. A designated person employed by the "prime contractor" – appointed by the Owner - will act as the coordinator of the other contractors on that job-site and will ensure that each of the contractors on the job site are following all of the Act and WorkSafe BC Regulations as well as site-specific policies and procedures. This includes having in place an approved WorkSafe BC Safety Program and a list of the qualified persons amongst the other contractors who have been designated to be responsible for each of the other contractor's site health and safety activities.

7) In the event that a prime contractor has been designated, it is the responsibility of the Contractor to inquire who the "prime contractor" is for the worksite and to comply with the requirements for a multiple employer worksite where a prime contractor has been designated, as set out in the preceding section.

NOTE:

a) Payment of WorkSafe BC Assessments by any Contractor does not obviate the responsibility of the contractor to any of the foregoing.

b) The foregoing constitutes requirements of the Prevention Division of WorkSafe BC for any workplace in the Province of British Columbia and constitutes the Owner's expectations of contractors.

The Contractor covenants and agrees that when performing any work for the Owner, whether directly as a contractor or indirectly as a sub-contractor, it will adhere to all of the requirements of the B.C. Employment Standards Act (RSBC 1996), as may be amended from time to time, that are applicable to the work being performed, including but not limited to:

1) Section 36 (2); an employer must ensure that each employee has at least 8 consecutive hours free from work between each shift worked.

2) Section 39; despite any provision of this Part, an employer must not require or directly or indirectly allow an employee to work excessive hours or hours detrimental to the employee's health or safety.

THIS Covenant made the _____day of _____, 2024, in

_____ in the Province of British Columbia.
(City)

CONTRACTOR:

_____
Company Name

_____
Authorized Signatory

_____

Appendix 8

PRIME CONTRACTOR AGREEMENT

1. The Contractor shall, for the purposes of the Workers Compensation Act, and for the duration of the Work of this Contract:

   .1 be the "prime contractor" for the "Work site", and
   .2 do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with the Act and its regulations, as required to ensure the health and safety of all persons at the "Work site".

.2 The Contractor shall direct all Subcontractors, Sub-subcontractors, Other Contractors, employers, Workers and any other persons at the "Work site" on safety related matters, to the extent required to fulfill its "prime contractor" responsibilities pursuant to the Act, regardless of:

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

As per the requirements of the Workers Compensation Act Part 3, Division 3, Section 118(1-3) which states:

Coordination of multiple-employer Workplaces

118(1) In this section:

"multiple-employer Workplace" means a Workplace where Workers of 2 or more employers are Working at the same time;

"prime contractor" means, in relation to a multiple-employer Workplace,

(a) the directing contractor, employer or other person who enters into a written agreement with the owner of that Workplace to be the prime contractor for the purposes of this Part, or
(b) if there is no agreement referred to in paragraph (a), the owner of the Workplace.

(2) The prime contractor of a multiple-employer Workplace must

(a) ensure that the activities of employers, Workers and other persons at the Workplace relating to occupational health and safety are coordinated, and
(b) do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with this Part and the regulation in respect to the Workplace.

(3) Each employer of Workers at a multiple-employer Workplace must give to the prime contractor the name of the person the employer has designated to supervise the employer's Workers at that Workplace.

The Contractor covenants and agrees that when performing any work for the Owner, whether directly as a contractor or indirectly as a sub-contractor, it will adhere to all of the requirements of the B.C.

Employment Standards Act (RSBC 1996), as may be amended from time to time, that are applicable to the work being performed, including but not limited to:

3) Section 36 (2); an employer must ensure that each employee has at least 8 consecutive hours free from work between each shift worked.

4) Section 39; despite any provision of this Part, an employer must not require or directly or indirectly allow an employee to work excessive hours or hours detrimental to the employee's health or safety.

I fully understand and accept the responsibilities of the prime contractor designation in accordance with the Workers Compensation Act and the B.C. Employment Standards Act while contracted by the *District* on

project location: _____ and will abide by all Workers Compensation Board Regulation requirements.

Date: _____

Project: _____

Company Name: _____

Authorized Signatory: _____

Printed Name: _____

Witness Signatory: _____

Printed Name: _____

SUPPLEMENTARY GENERAL CONDITIONS

TO BE READ WITH "General Conditions"
CONTAINED IN THE PLATINUM EDITION (printed 2009) OF THE PUBLICATION
"MASTER MUNICIPAL CONSTRUCTION DOCUMENTS"

Reference No.: **TENDER 2024-01**

Contract: **WEST COAST ROAD SANITARY FORCEMAIN**

TABLE OF CONTENTS

DEFINITIONS **1.0**

1.67.1 ***(delete clause 1.67.1 and replace as follows)***
"Substantial Performance" means the stage of completion of all of the *Work*, as certified by the *Payment Certifier*, when:

a) the *Work* is ready for use or is being used for its intended purpose; **and**

b) the total of the incomplete, defective and deficient Work can be completed at an estimated cost of no more than:

3% of the first $500,000 of the *Contract Price*
2% of the next $500,000 of the *Contract Price*
1% of the balance of the *Contract Price*

1.79 ***(add new clause 1.79 as follows)***
"(amend clause X.XX as follows)" preceding a supplementary clause means this clause provides additional information or restrictions to the referenced clause in the Master Municipal Construction Documents, Volume II.

1.80 ***(add new clause 1.80 as follows)***
"(add new clause X.XX as follows)" preceding a supplementary clause means this clause provides additional requirements or information not found in the Master Municipal Construction Documents, Volume II.

1.81 ***(add new clause 1.81 as follows)***
"(delete clause X.XX and replace as follows)" preceding a supplementary clause means this clause replaces the referenced clause in the Master Municipal Construction Documents, Volume II, in its entirety.

1.82 ***(add new clause 1.82 as follows)***
"Payment Certifier" has the meaning set out in SGC 18.6.6.

1.83 ***(add new clause 1.83 as follows)***
"Provide" or "Provision of" means supply and placement of an item.

1.84 ***(add new clause 1.84 as follows)***
"Engineer" shall mean the *Owner's* engineer appointed to provide technical support during the course of the *Work.*

1.85 ***(add new clause 1.85 as follows)***
*"**Critical Path Method**"* (CPM) means the method of scheduling a project as follows:

The essential technique for using CPM is to construct a model of the project that includes:

(1) A list of all activities required to complete the project (typically categorized within a work breakdown structure),
(2) The time (duration) that each activity will take to completion, and
(3) The dependencies between the activities.

Using these values, CPM calculates the longest path of planned activities to the end of the project, and the earliest and latest that each activity can start and finish without making the project longer. This process determines which activities are "critical" (i.e., on the longest path) and which have "total float" (i.e., can be delayed without making the project longer). This determines the shortest time possible to complete the project. Any delay of an activity on the critical path directly impacts the planned project completion date (i.e. there is no float on the critical path). A project can have several, parallel, near critical paths. An additional parallel path through the network with the total durations shorter than the critical path is called a sub-critical or non-critical path.

DOCUMENTS **2.0**

Interpretation 2.2.4 ***(delete clause 2.2.4.1 and replace as follows)***

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

(a) Agreement
(b) Addenda
(c) Supplementary General Conditions
(d) General Conditions
(e) Supplementary Specifications
(f) Supplementary Specifications, District of Sooke Design Standards, 2010
(g) Specifications
(h) Drawings listed in Schedule 2 to the Agreement
(i) Supplementary Detail Drawings
(j) Standard Detail Drawings
(k) Executed Form of Tender
(l) Instructions to Tenderers
(m) All other Contract Documents

2.2.4.5 ***(add new clause* 2.2.4.5 *as follows)***

The *Contract Drawings* will be updated post Tender and will be Issued For Construction by the *Contract Administrator* prior to the commencement of the *Work.*

CONTRACTOR **4.0**

Protection of Work, Property and the Public 4.3.7 ***(add new clause 4.3.7 as follows)***

The *Contractor* shall locate, mark and protect from damage or disturbance, any and all stakes, survey pins, monuments and markers at the *Place of the Work.*

All survey stakes, pins, monuments or markers which, in the opinion of the *Owner*, have been damaged or disturbed shall be made good following construction by a registered B.C. Land Surveyor at the *Contractor's* expense.

Damage to Improvements and Utilities	4.3.8	***(add new clause 4.3.9 as follows)*** The *Contractor's* Work shall be confined to the *Owner's* premises, including statutory right-of-ways easements and construction permit limits, whenever possible. The *Contractor* shall not enter upon or place materials on other private premises except by written consent of the individual *Owners* and shall save the *Owner* harmless from all suits and actions of every kind and description that might result from use of private property.
Use of Working Site	4.3.9	***(add new clause 4.3.10 as follows)*** The *Contractor* shall confine his equipment, storage of materials and operation of Work to the limits indicated by law, permits, or direction of the *Contract Administrator*, and shall not unreasonably encumber the premises with his materials. The *Contractor* shall comply with the *Contract Administrator* instructions regarding signs, advertisements, fires and smoking. The working site shall at all times be kept free of rubbish and unnecessary hazards to persons, materials, and equipment.
Local, Emergency Traffic and Property Access	4.3.10	***(add new clause 4.3.11 as follows)*** Local traffic shall be provided access to private properties at all times. Emergency traffic such as Police, Fire, and Disaster Units shall be provided reasonable access at all times. The *Contractor* shall be liable for any damage which may result from his failure to provide such reasonable access.
Traffic Management Plan	4.3.11	***(add new clause 4.3.12 as follows)*** If required, the *Contractor* shall submit a Traffic Management Plan for Approval prior to start of construction in which the extent and duration of any road closures associated with the work are identified. Two-way traffic via one open lane each way shall be maintained on public roads at all times unless the *Contractor* has obtained the *Owner's* approval via a Road Closure Permit. The *Contractor* is cautioned that approval of full road closures is not guaranteed. Traffic control on all roads shall be in strict accordance with the Traffic Control Manual for Work on Roadways published by the Ministry of Transportation and Highways. The *Contractor* shall only use appropriately accredited personnel for Traffic Control.
Temporary Structures and Facilities	4.4.3	***(add new clause 4.4.3 as follows)*** The *Contractor* shall provide clean sanitary latrine accommodations for the use of his employees as may be necessary to comply with the requirements and regulations of the Ministry of Health and other bodies having jurisdiction. The *Contractor* shall permit no public nuisance.
Construction Schedule	4.6.1	***(delete clause 4.6.1 and replace as follows)*** The Contractor shall, within the time set out in the *Form of Tender*, prepare and submit to the *Contract Administrator* a schedule in the

form of a Gantt chart with precedence network (the "*Baseline Construction Schedule*") prepared using the *Critical Path Method* (CPM). The schedule shall:

.1 Show all significant construction activities, shop drawing submittals and procurement activities.

.2 Show the dependencies between activities so that it may be established what effect the progress of any one activity has on the schedule.

.3 Show completion time and all specific dates and sequencing requirements. Identify activities making up the critical path.

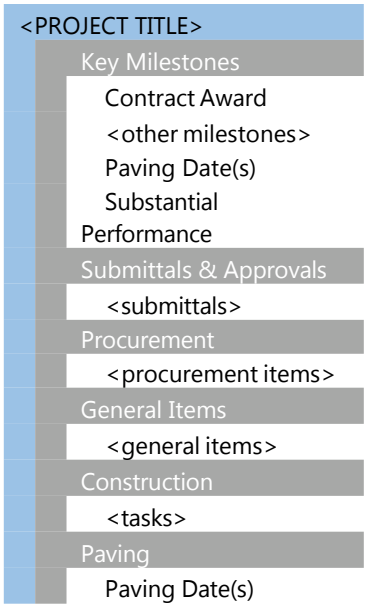
.4 Show anticipated dates for all activities related to Hot-Mix Asphalt Concrete Paving.

Unless specifically approved by the Contract Administrator, show activities on the schedule with a duration not longer than 10 working days or an assigned value not greater than $50,000 (except activities showing only submittal, fabrication or delivery of material or equipment). Divide activities which exceed these limits into more detailed components. Base the scheduled duration of each activity on the work being performed during the normal 40-hour work week with allowances made for legal holidays and normal weather conditions. The project calendar is to include legal holidays and company shutdowns.

For linear activities such as pipework, divide the activities which exceed these limits into more detailed sub-tasks between stations e.g. Stn 0+000 to Stn 0+200.

The schedule's minimum 2-level Work Breakdown Structure (WBS) is to follow the outline shown below.

WBS



The WBS heading is to be a summary bar with no dependencies to tasks.

The *Baseline Construction Schedule* shall indicate completion of the *Work* in compliance with the *Milestone Dates.* The *Contractor* shall ensure that the *Baseline Construction Schedule* is in more detail than the *Preliminary Construction Schedule* so as to enable the *Contract Administrator* to compare actual construction progress during the performance of the *Work* with the *Baseline Construction Schedule* as adjusted pursuant to GC 4.6.2.

4.6.8 ***(add new clause 4.6.8 as follows)***
The *Contractor* shall submit the *Adjusted Baseline Schedule* to the Contract Administrator with each Monthly Progress Claim.

4.6.9 ***(add new clause 4.6.9 as follows)***
When the project requires Hot-Mix Asphalt Concrete Paving, the *Contractor* shall submit the *Adjusted Baseline Schedule* to the Owner's Asphalt Paving Contractor – Tayco Paving Ltd. on a monthly basis.

Fair Wages 4.8.2 ***(add new clause 4.8.2 as follows)***
The *Contractor* attests to compliance with Section 5 of the Skills Development and Fair Wage Act in projects where the provincial contribution to a Municipal project exceeds $250,000.

Tests and Inspections 4.12.1 ***(delete clause 4.12.1 and replace as follows)***
The *Contractor* shall as part of the *Work* perform, or cause to be performed, all tests, inspections and approvals of the *Work* as specified in the *Contract Documents* or as required by the *Contract Administrator* as part of the *Quality Control*. Any reference in the specifications to inspection and testing shall mean that the *Work* described in the specification must be inspected and approved in a manner approved by the *Contract Administrator*. The *Contractor* shall only employ or engage, as an agent or consultant for testing, a person approved by the *Owner*. For compaction testing of import gravel, a minimum of 1 test per 20 lineal metres of pipe shall be completed and the tests provided to the Contract Administrator, and the costs for this shall be included in the costs of the pipe install./

Where the specification indicates that the *Contract Administrator* will arrange for testing, the *Contractor* continues to be solely responsible for testing of the *Work*. The *Contract Administrator* may perform additional tests for the *Owner's* sole benefit.

Truck Routes and Disposal Sites 4.17.1 ***(add new clause 4.17.1 as follows)***
In hauling of material to and from the work site, the routes to be followed by trucks shall be confined to designated arterial and collector roads as shown on the road classification plan as issued by the City. Where a dumpsite can only be accessed by way of a local road, the route shall be the shortest possible way from an arterial or collector road, and shall be agreed to by the *Contract Administrator* in advance of the work. The *Contractor* shall be responsible for road cleanup along all trucking routes used in association with the work. The cost of this cleanup shall be paid by the *Contractor* and considered incidental to the work. It should be noted that a "Soil Deposition Permit" is required for any dumpsite within the District of Sooke. The *Contractor* shall be responsible for obtaining and securing a legal dumpsite. All costs associated with that dumpsite shall be the responsibility of the *Contractor* and shall be considered incidental to the *Work.*

Disposal of Wood Debris, Organic Debris, and/or Waste Excavated Material	4.18.1	***(add new clause 4.18.1 as follows*)** Prior to disposal of any wood debris, organic debris and/or waste excavated material, the *Contractor* shall submit a disposal management strategy in accordance with all applicable Laws, Bylaws and Regulations to the *Contract Administrator* for approval. Subject to the *Contract Administrator's* approval, the *Contractor* shall ensure that all wood debris, organic debris and/or waste excavated material that is removed from the work site is managed in accordance with this approved disposal management strategy. The *Contractor* shall be required to employ acceptable methods of disposal, approved disposal site location(s), and shall be required to obtain and submit copies of all relevant permits and/or approvals prior to the disposal of any wood debris, organic debris and/or waste excavated material Regardless of the aforementioned, the *Owner* reserves the right to disallow any or all of the *Contractor*'s proposed disposal management strategy if it is determined that they will result in undesirable environmental impacts.
Hours of Work	4.19.1	***(add new clause 4.19.1 as follows)*** Work inside the *Owner's* Property shall be carried out between the hours of 7:00 a.m. and 10:00 p.m. Monday to Saturday or 8:00 a.m. and 10:00 p.m. on Sundays and Statutory Holidays, unless other arrangements are made between the *Owner* and the *Contractor.*
OTHER CONTRACTORS	**6.0**	
Coordination and Connection	6.2.2	***(add new clause 6.2.2 as follows)*** If the performance of any Contract for the project is likely to be interfered with by the simultaneous execution of some other Contract or Contracts, the *Contract Administrator* shall decide which *Contractor* shall cease Work temporarily and which *Contractor* shall continue, or whether the Work under the Contracts can be coordinated so the Contracts may proceed simultaneously. The *Owner* shall not be responsible for any damages suffered or extra costs incurred by the *Contractor*, resulting directly or indirectly from the award or performance or attempted performance of any other Contract or Contracts on the project, or caused by any decision or omission of the *Contract Administrator* respecting the order of precedence in the performance of the Contracts other than for the extension of time.
VALUATION OF CHANGES AND EXTRA WORK	**9.0**	
Valuation Method	9.2.1.3	***(add new clause 9.2.1.3 as follows)*** Should a lump sum method be used for determination of the value of a *Change*, the *Contractor* shall determine the value of the *Change* by calculating the cost for each item contained within the *Change* and applying a 10% mark up on all costs associated with the *Change* for Overhead and Profit. All costs are required to be supported by documentation satisfactory to the *Contract Administrator* and all applicable rates are to be satisfactory to the *Contract Administrator.*

FORCE ACCOUNT	**10.0**	
Force Account Costs	10.1.1.4	***(delete clause 10.1.1.4 and replace as follows)*** *Force Account Work* performed by a *Subcontractor* shall be paid for in the lesser of: (i) the amount as provided by subparagraphs (1), (2) and (3) of this GC, plus a markup of 5%, or (ii) the actual amount the *Contractor* pays the *Subcontractor* including a markup of 10% on such actual cost to cover all overhead and profit.
DELAYS	**13.0**	
Liquidated Damages for Late Completion	13.9.1.1	**(*delete clause 13.9.1.1 and replace as follows***) 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 $1,000 per day or pro rata portion for each calendar day that actual *Substantial Performance* is achieved after the *Substantial Performance Milestone Date*; plus
	13.9.2	***(add new clause 13.9.2 as follows)*** If the *Contractor* causes the scheduled date for paving to be missed as a result of an unapproved *Change* to the *Adjusted Baseline Schedule*, the *Contractor* shall be responsible for all direct and related costs to the *Owner* as a result of a *Contractor* caused *Delay* in paving. The *Owner* shall be responsible to demonstrate any related costs to the satisfaction of the *Contract Administrator*.
PAYMENT	**18.0**	
Supporting Documentation	18.2.3	***(add new clause 18.2.3 as follows)*** The *Contractor* shall provide to the *Contract Administrator* the *Adjusted Baseline Schedule* as a pre-condition of the issuance of each *Payment Certificate.*
Holdbacks	18.4.1	***(delete clause 18.4.1 and replace as follows)*** The *Owner* will retain a holdback but will not establish a Holdback Trust Account pursuant to Section 5 of the *Builders Lien Act.*
Substantial Performance	18.6.5	***(delete clause 18.6.5 and replace as follows)*** The *Owner* will release any builder's lien holdback on the 56th day following the date of *Substantial Performance*, or other date as required by law, but the *Owner* may holdback the amounts for any deficiencies or filed builders liens as provided in GC 18.4.2, GC 18.4.3 and 18.4.4, or the Maintenance Period Financial Security if not received by this date.
Payment Certifier	18.6.6	***(delete clause 18.6.6 and replace as follows)*** The *Contract Administrator*, as defined herein, shall be the *Payment Certifier* responsible under Section 7 of the *Builders Lien Act* for certifying *Substantial Performance* of the *Work* of the *Contractor*, but not the *Work* of *Subcontractor*s. The *Contractor* shall co-operate with and assist the *Contract Administrator* by providing information and assistance in as timely manner as the *Contract Administrator* considers necessary to carry out the duties of the *Payment Certifier* for the Contract. The *Contractor* shall be the *Payment Certifier* responsible under Section 7 of the *Builders Lien Act* for certifying *Substantial Performance* of the *Work* of each *Subcontractor*. Prior to certifying

completion for a *Subcontractor*, the *Contractor* shall consult with the *Contract Administrator* and obtain the *Contract Administrator's* comments on the status of completion by the *Subcontractor,* including any deficiencies or defects in the *Subcontractor's Work* noted by the *Contract Administrator*. The *Contractor* will indemnify and save the *Owner* harmless from any and all liability the *Owner* may have to anyone arising out of the certification by the *Contractor* of *Substantial Performance* for that *Subcontractor.*

Notwithstanding any other provision of the *Contract,* no payments will be due or owing to the *Contractor* so long as a Lien filed by anyone claiming under or through the *Contractor* remains registered against the Project or any lands, or interest therein, on which *Work* for the project was performed. Failure of the *Contractor* to remove all Liens promptly will entitle the *Owner* to damages.

WORKERS COMPENSATION REGULATIONS	**21.0**	
Contractor is "Prime Contractor"	21.2.2	***(add new clause 21.2.2 as follows)*** If the *Work* is being completed as part of a project for which the *Owner* already has a *Prime Contractor* designated then the *Contractor* will be responsible to ensure that they assume direction from the *Prime Contractor* as per the requirements of the Workers Compensation Act Part 3, Division 3, Section 118(1-3).
INSURANCE	**24.0**	
Required Insurance	24.1.7	***(add new clause 24.1.7 as follows)*** The *Contractor* shall ensure the following are additional named insured under this contract: • The District of Sooke • Stantec Consulting Ltd. • Highland Engineering Services Ltd.
MAINTENANCE PERIOD	**25.0**	
Correction of Defects	25.1.4	***(add new clause 25.1.4 as follows)*** The *Owner* is authorized to make repairs to defects or deficiencies if, ten days after giving written notice, the *Contractor* has failed to make or undertake with due diligence the required repairs. However, in the case of emergency where, in the opinion of the *Owner*, delay is not reasonable, repairs may be made without notice being sent to the *Contractor.* All expenses incurred by the *Owner* in connection with repairs made pursuant to GC 25 shall be paid by the *Contractor* and may be deducted from the Maintenance Period Financial Security, or other holdbacks. The *Contractor* shall promptly pay any shortfall.
Maintenance Period Financial Security	25.4.1	***(add new clause 25.4.1 as follows)*** within 10 days of the issue of the Certificate of Substantial Performance deliver to the Owner, a Maintenance Period Financial Security in the form of cash or a clean, irrevocable Letter of Credit in a form acceptable to the Owner in the amount of 5% of the Contract Price, issued

by a major Canadian chartered bank which has a branch in Sooke, payable to the Owner within the Maintenance Period.

SUPPLEMENTARY SPECIFICATIONS

TO BE READ IN CONJUNCTION WITH THE
"MASTER MUNICIPAL CONSTRUCTION DOCUMENTS"

Reference No.: **TENDER 2024-01**

Contract: **WEST COAST ROAD SANITARY FORCEMAIN**

General

1.1 a) Payments will be made on the basis of the unit prices bid in the Tender, and in accordance with Article 18 of the General Conditions.

b) The unit prices bid, unless specifically noted otherwise, shall include the supply of all *LABOUR*, *PLANT, MATERIAL* and *PRODUCT* equipment necessary to construct *THE WORK* in accordance with the specifications.

c) The prices bid for supply and installation shall be full compensation for supplying, hauling, installing, cleaning, testing, and placing in service together with all other work subsidiary and incidental thereto for which separate payment is not provided elsewhere.

d) Other materials on site, whether existing structures, vegetation, topsoil, gravel, sand or other excavated or piled materials, are the property of the *OWNER* or of the owner of the land on which *THE WORK* is located. Only those materials specifically noted in the specification or on drawings, as belonging to the *CONTRACTOR* shall become the *CONTRACTOR's* property.

e) Where there are excess excavated materials, unsuitable materials excavated or materials of any kind that are excavated but not used in *THE WORK*, such materials are not the property of the *CONTRACTOR* unless authorized in writing by the *CONTRACT ADMINISTRATOR* or specified to be disposed of by the *CONTRACTOR*.

Unit Price Contracts

2.1 a) Payments will be made on the basis of the following:

.1 Unit Price items in the Schedule of Quantities and Unit Prices.

.2 Changes in *THE WORK* for items not covered by unit prices, in accordance with Article 7 - *CHANGES IN THE WORK* of the General Conditions.

b) For each item in the Schedule of Quantities and Unit Prices, the *Contract Administrator* will, in cooperation with the *Contractor*, measure the quantity of the item completed at the end of the payment period and this will be shown as a percentage of the work completed against the appropriate value for the lump sum assigned to the respective line item.

Mobilization and Demobilization

3.1 a) Mobilization and demobilization shall include the *Contractor's* costs of mobilization at the beginning of the project; and the costs of demobilization at the end of the project.

b) Included in mobilization are such items as bonding, insurance, permits, moving personnel, materials and equipment to the site, setting up temporary facilities, First-Aid, Site Safety, temporary utilities and all preparation for performing *THE WORK*.

c) Included in demobilization are preparation and submission of operation and maintenance manuals, As-Constructed Record Drawings, comprehensive Bill Of Materials, removal of all personnel, materials and equipment; and cleanup of the site and *THE WORK*.

d) The lump sum price bid for this work shall be relative to the costs involved but shall not exceed ten percent of the Tender Price.

e) Payment will be made as follows, as approved by the *CONTRACT ADMINISTRATOR*:

I. 60% of the lump sum bid will be included in the first progress payment certificate;
II. 40% of the lump sum bid will be included in the final progress payment certificate.

The *CONTRACT ADMINISTRATOR* may at his discretion recommend partial payment if mobilization or demobilization is not complete.

Dust Control

4.1 During the performance of *THE WORK*, the *CONTRACTOR* is to at all times keep the worksite and such immediate surrounding areas which it may utilize free from waste materials, debris or rubbish and is to employ adequate dust control measures. Water shall be the only material acceptable for dust suppression. If accumulation of such materials, debris, rubbish or dust constitutes a nuisance or safety hazard or is otherwise objectionable in any way, as reasonably determined by the *OWNER* or *CONTRACT ADMINISTRATOR*, the *CONTRACTOR* is to promptly remove it. If any claim, suit, losses, or action is brought by a person affected by the transportation of materials, equipment, goods or wastes to and from the worksite, the *CONTRACTOR* shall defend, indemnify and hold harmless all indemnified parties.

Underground Utilities

5.1 It is the *CONTRACTOR'S* responsibility wherever necessary to determine location of existing pipes, valves, conduits, vaults, or other underground structures. Wherever it is necessary to explore and excavate to determine the location of the existing underground structures, the *CONTRACTOR,* at his own expense, shall make explorations and excavations for such purposes. The *CONTRACTOR* shall notify the *CONTRACT ADMINISTRATOR* or his representative of any conflicts.

The *CONTRACTOR* shall, at his own expense, provide for the uninterrupted flow of all watercourses, sewers, drains, and any other utility encountered during the work. Water control and siltation control shall be under the direction of a qualified environmental monitor engaged by the *CONTRACTOR*.

When any existing mains and/or service pipes, utility ducts, vaults or other utility structures are encountered, the *CONTRACTOR* shall support them to the satisfaction of the *CONTRACT ADMINISTRATOR* so as to protect them from injury. The *CONTRACTOR* shall, at his own expense, at once repair and make good any injury which may occur to any mains, service or utility pipes or ducts, or facilities, or to any electrical conductor, telephone, cable or natural gas facility or to any sidewalk, crosswalk as a result of this operation.

Support of power, telephone poles, underground mains, wiring and light standards required to complete the work, shall be the responsibility of the *CONTRACTOR* and completed in accordance with utility company standards. The *CONTRACTOR* shall schedule the work with the appropriate utility company in advance, so as not to delay the work. All costs associated with the work shall be considered incidental and no separate payment be made for this item.

Construction Surveys

6.1 The *CONTRACTOR* is responsible for all survey layout, including stakes, hubs, and grade control.

The *CONTRACTOR* shall survey and layout the work including, but not limited to, as-built invert elevations, offsets and stations of all grade changes, miscellaneous appurtenances, and all existing utilities exposed during construction.

The *CONTRACTOR* shall provide all stakes, hubs, nails, flagging, and including the supply of casual labour for checking of the work, as required by the *CONTRACT ADMINISTRATOR*.
The *CONTRACTOR* shall provide the *CONTRACT ADMINISTRATOR* with records of the actual surveys, and "as-built" information pick-up.

No separate or additional payment will be made for this work.

General Coordination

7.1 The *CONTRACTOR* shall work cooperatively with B.C. Hydro, Telus, Shaw and Fortis to locate private utility ducting.

No additional payment shall be made for this work.

Supplementary Specifications

8.1 The following Supplementary Specifications are complementary to the MMCD.

Section	Title
01 01 01	Mobilization and Demobilization
01 11 60	Work Sequencing
01 34 00	Shop Drawings and Product Data
01 40 00	Quality Control
01 55 00	Traffic Control, Vehicle Access & Parking
01 57 01	Environmental Protection
32 11 16	Crushed Granular Subbase
32 11 23	Granular Base
32 12 16	Hot Mix Asphalt Paving

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

1.0 GENERAL

.1 SS Section 01 01 01 refers to specific portions of the work not addressed elsewhere within the specifications. Section includes Mobilization and Demobilization.

1.1 MEASUREMENT AND PAYMENT

.1 Mobilization and demobilization shall include the *Contractor's* costs of mobilization at the beginning of the project; and the costs of demobilization at the end of the project.

.2 Included in mobilization are such items as bonding, insurance, permits, moving personnel, materials and equipment to the site, setting up temporary facilities and all preparation for performing the *Work*.

.3 Included in demobilization are preparation and submission of operation and maintenance manuals, removal of all personnel, materials and equipment, and cleanup of the site and the *Work*.

.4 The lump sum price bid for this work shall be relative to the costs involved but **shall not exceed ten percent (5%) of the Total Price (excluding GST)**.

.5 Payment will be made as follows, as approved by the *Contract Administrator*.

.1 60% of the quotation bid will be included in the first progress payment certificate;

.2 40% of the quotation bid will be included in the final progress payment certificate.

.3 The *Contract Administrator* may at his discretion recommend partial payment if mobilization or demobilization are not complete.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

Part 1 General

1.1 SECTION INCLUDES

.1 General information for requirements for connection to existing system, allowable laydown areas and other operational considerations during construction.

1.2 CONTRACTOR'S WORK SEQUENCING PLAN

.1 Coordinate the Work of this Work Package to avoid interference with the existing infrastructure, equipment, and system operation. Contractor is to provide a detailed tie-in and work sequencing plan within 4 weeks of project award.

.2 The connection and Work sequencing plan needs to address all aspects of the Work requirements when constructing, connecting to the existing system, testing, commissioning, and handover. Once submitted in draft, the plan will be reviewed by The District and Engineer, and if required the Contractor will revise the plan to meet District requirements.

.3 Scheduling of any connections to existing system is defined in clause 1.4. The allowable shut down periods defined include for all the time required to take the facilities out of service, drain, complete all upgrade works, start-up, and commissioning.

.4 A minimum of two (2) weeks' notice is required from the Contractor to The District for any connection requirements that would otherwise impact normal operations of the West Coast Road Lift Station, the WWTP or any other District owned/operated infrastructure.

.5 Any temporary works required for isolation are the responsibility of the Contractor including supply, installation, and removal activities.

.6 Any scaffolding required is the responsibility of the Contractor including supply, installation, and removal activities.

1.3 CONSTRUCTION / OPERATION WORK SEQUENCE DESCRIPTION

.1 This Specification Section provides general construction / operation Work sequences. They are provided to assist the Contractor to perform construction activities concurrent with activities by District staff within the Work limits and within the existing facilities. The Contractor may propose other Work sequences for acceptance by the Engineer. The Engineer reserves the right to reject any proposed Work sequence by the Contractor.

.2 General Construction Sequence:

.1 The responsibility for planning the sequence of the Work lies with the Contractor. Submit the sequence of the Work to The District and Engineer for approval including coordinating tie-ins and shutdowns of normally operating Systems.

.2 Ensure that all existing infrastructure, equipment, piping, etc. is well protected during the Work.

.3 The Work, as defined herein, will take place at The District's WWTP facilities, the District's West Coast Road Lift Station facility, and will need to remain operational throughout construction.

1.4 WORK SEQUENCING AND CONNECTION LIMITATIONS

.1 Uninterrupted treatment of wastewater and general operations at WWTP must always be maintained during construction with exceptions of approved shutdowns.

.2 This includes, but is not limited to:

.1 Access to the existing centrifuge room and electrical room at the west end of the site must be maintained throughout the project.

.2 Access for sludge storage bin removal vehicles must be maintained at all times. Pick ups occur approximately 3 times a week, although this is subject to variation.

.3 Shut down capability at the West Coast Road Lift Station is limited with regards to timing, as this is the primary sanitary lift station in the District. Night work should be considered for the connection and coordinated 2 weeks in advance with the District.

.4 Shut down capability at the WWTP connection is not possible, uninterrupted flow 24 hours per day. Bypass of the connection point is possible by closing onsite isolation valves and temporary piping up to a blind flange at the headworks. Plan for this tie in to be provided to the District/Contract Administrator 2 weeks in advance of the works. Any temporary piping or pumping to be provided by contractor under the scope of the contract.

1.5 CONTRACTOR LAYDOWN AND PARKING

.1 Limited space is available on site (i.e. within WWTP secured area) for contractor use for equipment storage, trailer laydown etc.

.2 Some limited onsite parking space is available at the WWTP site. Parking will be available on one side of the access road as long as access to the WWTP is maintained for maintenance vehicles and sludge bin removal vehicles.

1.6 BC HYDRO POLE HOLDS

.1 Contractor responsible for holding/supporting overground utility poles as required by BC Hydro/Telus/Shaw. These poles are shown and noted on the drawings.

.2 Any other permits or construction requirements from BC Hydro required when completing the works as indicated in the Contract Documents to be completed by the contractor and shall be considered part of the price provided.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

1.0 GENERAL

.1 This section specifies general requirements and procedures for Contractors submissions of shop drawings, product data, samples and mock-ups to Engineer for review.

.1 Additional specific requirements for submissions are specified in individual sections.

.2 Do not proceed with work until relevant submissions are reviewed by Engineer.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submissions.

.6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review of submission, unless Engineer gives written acceptance of specific deviations.

.8 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer.

.9 Notify Engineer, in writing, when resubmitting, of any revisions other than those requested by Engineer.

1.1 RELATED REQUIREMENTS

.1 Section 01 30 00 - Submittals.

1.2 SUBMISSION REQUIREMENTS

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow ten (10) days for Engineer’s review of each submission.

.3 Accompany submissions with transmittal letter, containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Identification and quantity of each shop drawing, product data and sample.

.5 Other pertinent data.

.4 Submissions shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractors authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents. Failure to include will result in drawings being stamped “Not Reviewed” and returned to the contractor.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring and control diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.6 After Engineer's review distribute copies as required.

1.3 PRODUCT DATA

1.3.1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts/curves and diagrams, for each product, system or piece of equipment used to illustrate standard manufactured products. Ensure that the exact model number is shown and highlighted on the shop drawings.

.2 Submit one (1) copy of product data. Contractor to make copies of all reviewed drawings including the review notes and stamped cover page for O&M manuals.

.3 Sheet size: 215 x 280 mm, maximum of three (3) modules.

.4 Delete information not applicable to project from all catalogue data and highlight on any tables the exact product supplied. Shop drawings will be returned “REJECTED” if it is not clearly marked on catalogue data which equipment and accessories are being supplied.

.5 Supplement standard information to provide details applicable to project.

.6 Cross-reference product data information to applicable portions of Contract Documents.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

1.0 GENERAL

1.1 REQUIREMENTS INCLUDED

.1 Inspection and testing, administrative and enforcement requirements.

.2 Testing and mix designs.

.3 Geotechnical testing of backfill materials and compaction testing.

1.2 INSPECTION SERVICES

.1 The Owner and the Engineer shall have access to the Work. If parts of the Work are in preparation at locations other than the Place of the Work, access shall be given to such work whenever it is in progress.

.2 Give timely notice (1-week advanced notice with 2 business days (48hrs) confirmation prior) requesting inspection if Work is designated for special tests, inspections or review by Engineer's instructions, or the law of the Place of the Work.

.3 If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or reviews before such is made, uncover such Work, have the inspections or tests satisfactorily completed and make good such Work at the Contractors expense.

.4 The Engineer may order any part of the Work to be examined if such work is suspected to be not in accordance with the Contract Documents. If, upon examination, such work is found not in accordance with the Contract Documents, correct such work and pay the cost of examination and correction. If such Work is found in accordance with the Contract Documents, the Owner shall pay the cost of examination and replacement.

1.3 QUALITY ASSURANCE TESTING BY OWNER

.1 Independent Inspection/Testing Agencies may be engaged by the Owner for the purpose of inspecting and/or testing portions of Work to confirm that specific requirements for materials and workmanship are being met. The Owner is not responsible for ensuring Contractors' Quality Control.

.2 Provide equipment required for executing inspection and testing by the appointed agencies.

.3 Employment of inspection/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.

.4 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Engineer at no cost to the Owner. Pay costs for retesting and re-inspection.

.5 Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.

.6 Cooperate to provide reasonable facilities for such access.

.7 Notify the appropriate agency and Engineer in advance of the requirement for tests, in order that attendance arrangements can be made.

.1 one (1) week advanced notice with two (2) business days (48hrs) confirmation prior.

.8 Submit samples and/or materials required for testing, as specifically requested in specifications or by the Engineer. Submit test results specifying that material requirements are being met. Submit with responsible promptness and in an orderly sequence so as not to cause delay in the Work.

.9 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.4 QUALITY CONTROL TESTING BY THE CONTRACTOR

.1 The Contractor shall retain the services of an independent testing agency under supervision of a registered professional engineer, and pay the cost of testing services for quality control including, but not limited to, the following:

.1 Concrete mix designs.

.2 Concrete testing.

.3 Any product testing that is required and is specified under various sections and specifications.

.4 Compaction testing shall be completed by the contractor at the contractor’s expense for quality control testing as prescribed in other areas of the contract documents.

.2 Testing shall be in accordance with pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials (ASTM), Canadian Standards Association (CSA), and the Hydraulic Institute.

.3 The Contractor shall promptly process and distribute all required copies of test reports and test information and related instructions to all of his Sub-Contractors and Suppliers to ensure that all necessary retesting and replacement of construction can proceed without delay.

.4 The Contractor shall promptly provide the Engineer with copies of all test results.

1.5.1 REJECTED WORK

.1 Remove defective Work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, which has been rejected by the Engineer as failing to conform to the Contract Documents. Replace or re-execute in accordance with the Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacement promptly.

.3 If in the opinion of the Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract Documents, the amount of which shall be determined by the Engineer.

1.6 TESTS AND MIX DESIGNS

.1 Furnish tests results and mix design as required by contract documents.

.2 The costs of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Engineer and may be authorized as recoverable.

1.7 MOCKUPS

.1 Prepare mock-ups for all piping, valves, fittings and pump to ensure proper and accurate fit and alignment of all components.

1.8 MILL TESTS

.1 Submit mill tests as required, or indicated on the drawings.

2.0 PRODUCTS

Not Used

3.0 EXECUTION

Not Used

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

1.0 GENERAL

.4 ***(Delete and replace as follows)***
Give minimum 72-hour notice to Owner prior to beginning construction and comply in all respects with their requirements. The Contractor will be responsible for any and all local permits required to execute the work.

.6 ***(Add)***
The Contractor is required to provide 24-hour written notice to all residents, homes and businesses including all units in a multifamily site for any service or vehicle access interruption.

.7 ***(Add)***
The Contractor shall prepare, or cause to be prepared, a Traffic Management Plan (TMP). The TMP shall be submitted to the Owner for approval and the approved TMP shall be implemented and maintained during the Work. The TMP shall meet all requirements of MoTI and specifically the requirements of Permit to Construct #202-01418 included in the Contract Documents.

.8 ***(Add)***
The following provisions must be included in the TMPs:

- .1 Road closures on Highway 14 will not be permitted.
- .2 Two-way traffic on Highway 14 must be maintained at all times.
- .3 Dynamic Message Boards are to be placed at the following locations:
  - a. Highway 14 – west of the WWTP
  - b. Highway 14 – east of Maple Avenue
- .4 Safe pedestrian movement must be maintained.
- .5 Pedestrian and cyclist traffic should be accommodated by maintaining the pedestrian walking areas and using fencing and other protection measures to segregate this traffic and the construction activities. If the Contractor deems it necessary to close a section of sidewalk and eliminate non-motorized traffic through the work section, then a Pedestrian Management Plan must be submitted to the Owner in accordance with part 1.11 of this Section.

.9 ***(Add)***
The TMPs shall:

- .1 Include an accurate road configuration, with road names, north arrow marker, speed limit and proposed extents of the Work.

.2 Indicate placement and distance of signs, delineators, cones, barricades, position of certified TCP's and traffic control equipment.

.3 Identify the number of lanes to be obstructed, along with taper lengths and widths of lanes.

.4 Identify impacts to driveways and bus stops, intersections, turning isles, sidewalks, and bike lanes. Include measures to facilitate and maintain access.

.5 Consider project specific restrictions (work hours etc.) as outlined in the Contract Documents.

.6 Include a map of full detour routes including the above requirements along each route.

.10 ***(Add)***
The Highway 14 TMP to be submitted as per Item 5.1.1.f of the Form of Tender. The Contractor will not be permitted to start any of the Work until the TMP has been approved by the Owner.

Other TMP's are to be submitted 15 Days prior to commencing Work at other locations.

.11 ***(Add)***
If required, the Contractor shall prepare, or cause to be prepared, a Pedestrian Management Plan (PMP). The PMP shall be submitted to the Owner for approval and the approved PMP shall be implemented and maintained during the Work.

1.4 Traffic Control

.4.8 ***(Delete and replace as follows)***
Maintain uninterrupted access / egress to / from all properties within or in the vicinity of the Work, unless authorized as part of the approved Traffic Management Plan or by the Contract Administrator.

.4.10 ***(Delete first paragraph and replace as follows)***
Provide Traffic Control Personnel (TCP), trained and certified by the BC Construction Safety Alliance (BCCSA), and properly equipped for the following situations:

1.5 Payment

.1 ***(Delete and replace as follows)***
Payment for all work performed under this Section will be on a lump sum basis. Payment shall be 30% upon preparing TMP(s) (and PMP(s)), securing permits and erecting traffic control devices; 60% distributed in monthly Progress Payments for traffic control persons and related control devices; and 10% upon Substantial Performance.

.2 ***(Add)***
Payment for supply, installation and maintenance of Dynamic Message Signs, also known as Changeable Message

Boards, to be on a per sign per calendar week basis, pro-rated based on Work Days. Payment shall be for the number of signs requested by the Owner in accordance with the TMP and related permits.

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern

1.6 PAYMENT

1.6.1 ***(Delete Clause 1.6.1 and replace as follows)***

Payment for all materials and work performed under this Section will be made at the respective lump sum bid for environmental protection.

3.0 EXECUTION

3.1 ***(Add clause 3.1 and replace as follows)***

Environmental Management Plan and Erosion and Silt Control shall include completion and submission of the Environmental Management Plan acceptable to the Owner and the Owner's Representative. Comply with all the requirements of the Environmental Management Plan including erosion and silt control, and all incidental work.

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

CRUSHED GRANULAR SUB-BASE

1.4 Measurement and Payment

.5 ***(Add clause 1.4.5 as follows)***
Payment for crushed gravel subbase will be for compacted and graded 75mm minus crushed gravel to thicknesses as per the contract documents per square metre as per the Schedule of Quantities and Prices.

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

GRANULAR BASE

1.4 Measurement and Payment

.5 ***(Add clause 1.4.5 as follows)***
Payment for gravel subbase will be for compacted and graded 19mm minus crushed gravel to thicknesses as per the contract documents per square metre as per the Schedule of Quantities and Prices.

END OF SECTION

These Supplementary Specifications must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II, Platinum Edition 2009, including all updates and revisions. In instances where clauses within the Supplementary Specifications and MMCD documents disagree/differ the Supplementary Specifications shall govern.

HOT-MIX ASPHALT CONCRETE PAVING

1.5 Measurement and Payment

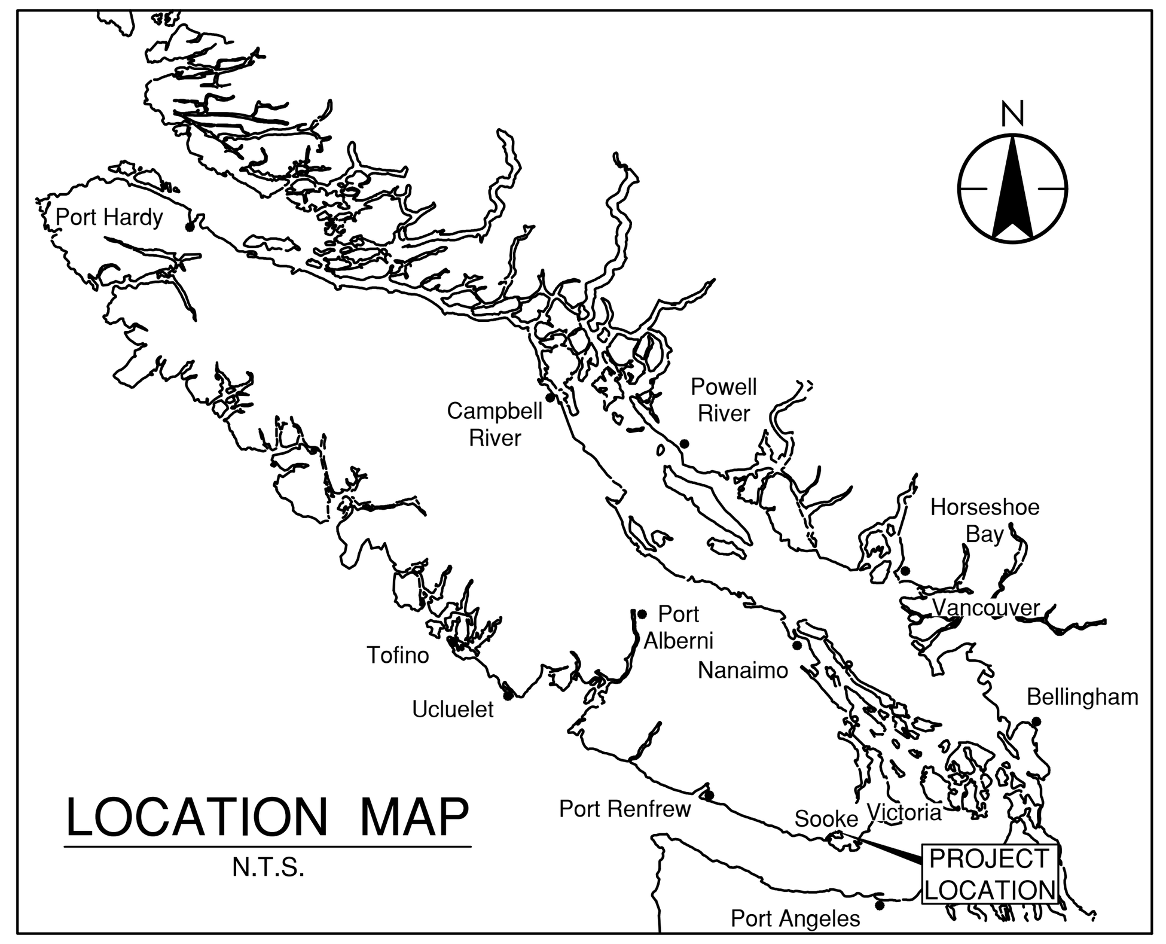
.1 ***(Revise this clause)***
Payment will be on a square metre basis for the thicknesses as per the contract documents for the area as outlined in the Schedule of Quantities.

END OF SECTION

SUPPLEMENTARY DOCUMENTS FOR CONTRACTOR INFORMATION

DRAWINGS

DISTRICT OF SOOKE



WEST COAST ROAD SANITARY FORCEMAIN

SHEET LIST

SHEET	TITLE
C-000	COVER
C-001	DRAWING INDEX, LEGEND AND GENERAL NOTES
C-101	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-102	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-103	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-104	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-105	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-106	WEST COAST ROAD FORCEMAIN PLAN - PROFILE
C-501	DETAILS

ISSUED FOR TENDER

2024.03.28

PROJECT NUMBER: 111720115

KEY PLAN
SCALE: 1:5000

LEGEND

PROPOSED		EXISTING
	ASPHALT	
	GRAVEL	
	CONCRETE PAD	
	NO POST BARRIER	
	PROPERTY LINE	
	TOP OF BANK	
	BOTTOM OF BANK	
	U/G HYDRO	UE
	O/H HYDRO	
	VEGETATION LINE	
	FENCE	X
S	SANITARY MAIN	S
SFM	SANITARY FORCEMAIN	SFM
	SANITARY MANHOLE	
	SANITARY FLUSHOUT	
	SANITARY AIR RELEASE	
	WATERMAIN	W
	CULVERT DRAIN	
	STORM CATCHBASIN	
	STORM MANHOLE	
	WALL	
	OPEN DITCH / CREEK	
	WATER METER	
	WATER VALVE	
	FIRE HYDRANT	
	UTILITY POLE	
	JUNCTION BOX	
	GUY WIRE	
	POWER BOX	
	LAMP POLE	
	TELECOM MANHOLE	

GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO DISTRICT OF SOOKE BYLAWS AND MMCD STANDARDS AND DRAWINGS, PLATINUM ADDITION.
2. PVC SEWER GRAVITY MAINS TO BE TO LATEST EDITION OF ASTM D2412, CLASS DR35. PVC SEWER FORCEMAINS TO BE TO LATEST EDITION OF AWWA C905 DR18 CLASS 235. HDPE FORCEMAINS TO BE TO LATEST EDITION OF AWWA C906 DR17 CLASS 125 PE4710 IPS.
3. PROVIDE MINIMUM 1.0m COVER FOR MAINS UNLESS OTHERWISE NOTED.
4. CONTRACTOR SHALL BE REGISTERED WITH WORKSAFE BC.
5. ALL PERMITS TO BE OBTAINED BY THE CONTRACTOR.
6. ALL DIMENSIONS ARE IN METRES AND DECIMALS THEREOF, UNLESS OTHERWISE SPECIFIED.
7. ELEVATIONS ARE GEODETIC DATUM.
8. LOCATION OF UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED BY USE OF A PIPE LOCATOR AND MANUAL DIGGING WHERE REQUIRED. EXISTING SERVICE LOCATIONS ARE SHOWN TO INDICATE THE EXISTENCE OF THE SPECIFIED SERVICE ONLY AND ARE NOT NECESSARILY COMPLETE OR SHOWN IN THE CORRECT LOCATION. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF EXISTING UTILITIES AT ALL CROSSINGS AND CONNECTIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE ENGINEER. PROTECT SERVICES AS REQUIRED.
9. CONTRACTOR TO EXPOSE SANITARY SERVICE CROSSINGS AND IDENTIFY CONFLICTS TO ENGINEER.
10. NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILE.
11. ALL PIPE BEDDING TO BE IN ACCORDANCE WITH MMCD GRADATION TABLES.
12. GRANULAR ROADBASE SHALL BE USED UNDER OR WITHIN 1.5m OF ALL ROADS AND DRIVEWAYS (MATCH EXISTING THICKNESS, MINIMUM 150mm).
13. PROVIDE A MINIMUM 1.0m COVER ON MUNICIPAL JURISDICTION ROADS AND HIGHWAYS FOR SANITARY MAINS.
14. MAINTAIN A MINIMUM OF 3m HORIZONTAL CLEAR SEPARATION AND 450mm CLEAR VERTICAL SEPARATION BETWEEN WATER MAINS EXCEPT WHERE NOTED AND APPROVED BY THE DISTRICT OF SOOKE AND ISLAND HEALTH. WHERE THE ABOVE-NOTED SEPARATIONS CANNOT BE ACHIEVED, NOTIFY THE ENGINEER. THE WATER MAIN JOINTS SHALL BE WRAPPED WITH DENSOTAPE FOR 4.0m EITHER SIDE OF THE SEWER MAIN. ISLAND HEALTH APPROVAL IS REQUIRED FOR ANY REDUCTION IN THE SEPARATION.
15. FOR CROSSING OF EXISTING WATER MAINS WHERE THE WATER MAIN DOES NOT HAVE THE REQUIRED 450mm VERTICAL SEPARATION, WRAP WATER MAIN JOINTS WITH PETROLATUM TAPE 3.0m EITHER SIDE OF THE CROSSING. WHERE A VERTICAL SEPARATION OF 150mm CANNOT BE ACHIEVED, SPECIAL MITIGATIVE SEWER MEASURES SHALL BE APPROVED BY THE DISTRICT OF SOOKE AND ISLAND HEALTH.
16. MINIMUM VERTICAL SEPARATION BETWEEN SANITARY FORCEMAIN AND STORM DRAIN OR OTHER SANITARY MAINS SHALL BE 200mm. AREA TO BE BACKFILLED WITH GRANULAR PIPE BEDDING MATERIAL IN THE PIPE ZONE. WHERE THE ABOVE-NOTED SEPARATIONS CANNOT BE ACHIEVED, NOTIFY THE ENGINEER.
17. VERTICAL AND HORIZONTAL ALIGNMENT FOR PVC MAINS TO BE ACHIEVED BY DEFLECTING THE PIPE AT THE PIPE JOINTS. DEFLECTIONS SHALL NOT EXCEED MANUFACTURERS RECOMMENDATIONS, EXCEPT WHERE BENDS ARE SPECIFICALLY IDENTIFIED ON THE DESIGN DRAWINGS.
18. ALL JOINTS ON PVC SANITARY FORCEMAIN TO BE RESTRAINED.
19. REFER TO DRAWINGS FOR SITE SPECIFIC NOTES, COMMENTS AND DETAILS.
20. ENSURE CONTINUOUS AND SAFE ACCESS FOR VEHICLES AND PEDESTRIANS TO ALL LOTS/PROPERTIES DURING CONSTRUCTION.
21. ALL DRIVEWAYS DISTURBED DURING CONSTRUCTION TO BE REPLACED TO ORIGINAL CONDITION. CONTRACTOR TO PERFORM SITE VISIT TO DETERMINE WHICH DRIVEWAYS MUST BE REPLACED WITH CONCRETE OR ASPHALT PRIOR TO TENDER.
22. QUANTITIES FOR SURFACE RESTORATION ASSOCIATED WITH THE SANITARY SEWER INSTALLATION HAVE BEEN CALCULATED ASSUMING THE LIMIT OF EXCAVATION NOTED ON THE DRAWINGS. CONTRACTOR MAY ONLY EXCAVATE OUTSIDE THE LIMIT OF EXCAVATION NOTED ON THE DRAWINGS WITH THE ENGINEER'S WRITTEN PERMISSION. CONTRACTOR TO PROVIDE ADEQUATE TRENCH SHORING TO ENSURE TRENCHING REMAINS WITHIN THE LIMITS SPECIFIED. UNAUTHORIZED EXCAVATION OUTSIDE THE APPROVED LIMITS RESULTING IN ADDITIONAL SURFACE RESTORATION WILL NOT BE COMPENSATED.
23. CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION SURVEY LAYOUT. STANTEC WILL PROVIDE DIGITAL FILE FOR LAYOUT PURPOSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM LOCAL MONUMENTS/CONTROL PRIOR TO TENDER AND CONSTRUCTION. SURVEY MONUMENTS AND COORDINATES ARE AVAILABLE AT THIS LOCATION. DIGITAL DRAWINGS ARE AVAILABLE FOR CONTRACTOR USE. ALL LAYOUT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AT THE CONTRACTORS EXPENSE.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING: BC ONE CALL 1-800-474-6886. (*6886) PRIOR TO ANY EXCAVATION.
25. ANY REPAIRS AND ASSOCIATED COST TO EXISTING UTILITIES AND ASPHALT REQUIRED DUE TO DAMAGE BY CONTRACTOR SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR. ALL RESIDENCES POTENTIALLY AFFECTED BY CONSTRUCTION ACTIVITIES SHALL BE NOTIFIED IN WRITING A MINIMUM OF SEVEN DAYS PRIOR TO START OF CONSTRUCTION.
26. ALL EXISTING AMENITIES DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO EXISTING OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE ENGINEER.
27. THE CONTRACTOR SHALL REPLACE ALL DAMAGED OR DISTURBED SURVEY MONUMENTS BY A B.C.L.S. AT CONTRACTOR'S EXPENSE.
28. CONTRACTOR TO RECORD ALL SERVICE CROSSINGS DURING CONSTRUCTION, INCLUDING RESIDENTIAL AND COMMERCIAL SANITARY TIE-IN LOCATIONS FOR REPLACEMENT.
29. CONTRACTOR TO REMOVE ALL REDUNDANT/ ABANDONED VALVE BOXES PRIOR TO PAVING. RISERS TO BE FILLED FULL OF CLEAN SAND.
30. ALL SIGNS AND PAVEMENT MARKINGS TO CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA (LATEST EDITION). LONGITUDINAL PAINT LINES ARE TO BE PAINT. MARKINGS, SYMBOLS AND TRANSVERSE PAINT LINES ARE TO BE THERMOPLASTIC, UNLESS OTHERWISE NOTED.
31. SUPPORT UTILITY POLES DURING CONSTRUCTION. ABIDE BY REQUIREMENTS OF UTILITY PROVIDER.
32. WHERE EXISTING AC PIPING IS ENCOUNTERED OR CROSSED WITH THE NEW SANITARY MAIN TRENCH, THE EXISTING AC PIPE IS TO BE REPLACED FOR 1.0m BEYOND EITHER SIDE OF THE SANITARY TRENCH WITH PVC PIPE WITH WATERTIGHT COUPLINGS.
33. EXISTING AC PIPING TO BE ABANDONED IN PLACE AND CAPPED WATERTIGHT WITH CONCRETE PLUG AND CAP AT ALL TIE IN LOCATIONS. CONTRACTOR IS RESPONSIBLE FOR THE COST OF, AND DISPOSAL OF, ALL AC PIPE REQUIRED TO BE REMOVED FOR CROSSING, TIE-INS, OR AS REQUIRED TO COMPLETE THE WORK. CONTRACTOR TO FOLLOW ALL APPLICABLE HANDLING AND SAFETY REQUIREMENTS FOR ASBESTOS PIPE THAT ARE IN PLACE AT THE TIME.

ENVIRONMENTAL NOTES:

1. USE BEST MANAGEMENT PRACTICES DURING CONSTRUCTION. ADJUST WORK ACTIVITIES DURING PERIODS OF HEAVY RAIN TO MINIMIZE SEDIMENTS ENTERING STORM DRAINAGE SYSTEM. SOME BMP'S TO CONSIDER INCLUDE:
   - CHECK ALL EQUIPMENT FOR FLUID LEAKS PRIOR TO ENTERING THE WORK AREA.
   - NO EQUIPMENT RE-FUELING TO OCCUR IN THE WORK AREA UNLESS SPILL PROTECTION MEASURES ARE IN PLACE.
   - A SPILL KIT IS TO BE MAINTAINED WITHIN THE WORK AREA AND TREATED BEFORE DISCHARGED TO THE DRAINAGE SYSTEM. THIS MAY INCLUDE ON-SITE DETENTION AND /OR CATCH BASIN FILTRATION.
   - PROVIDE TARPS FOR EXTENDED EXPOSED AREAS AND/OR MATERIAL STOCKPILES.
   - ENSURE ALL CATCH BASINS ARE PUMPED AND CLEANED AS REQUIRED DURING CONSTRUCTION AND AT THE END OF THE CONSTRUCTION PERIOD.

Revision	By	Appd	YYYY.MM.DD

Issued	By	Appd	YYYY.MM.DD
FOR TENDER	SS	AG	2024.03.28
FOR GRANT	SS	AG	2022.07.20

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PERMIT TO PRACTICE #1002862

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West Coast Road Sanitary Forcemain

Sooke BC

File Name: 20015_INDEX	HL	EM	AG	2020.02.17
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title

DRAWING INDEX, LEGEND AND GENERAL NOTES

Project No. 111720115

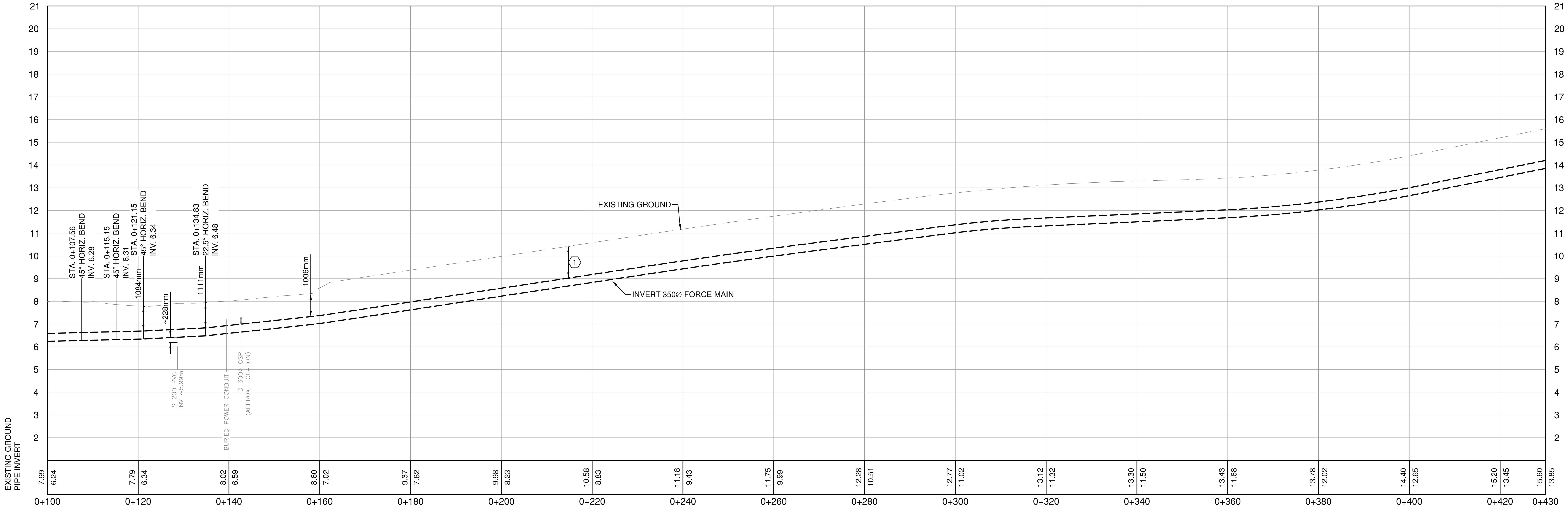
Scale AS SHOWN

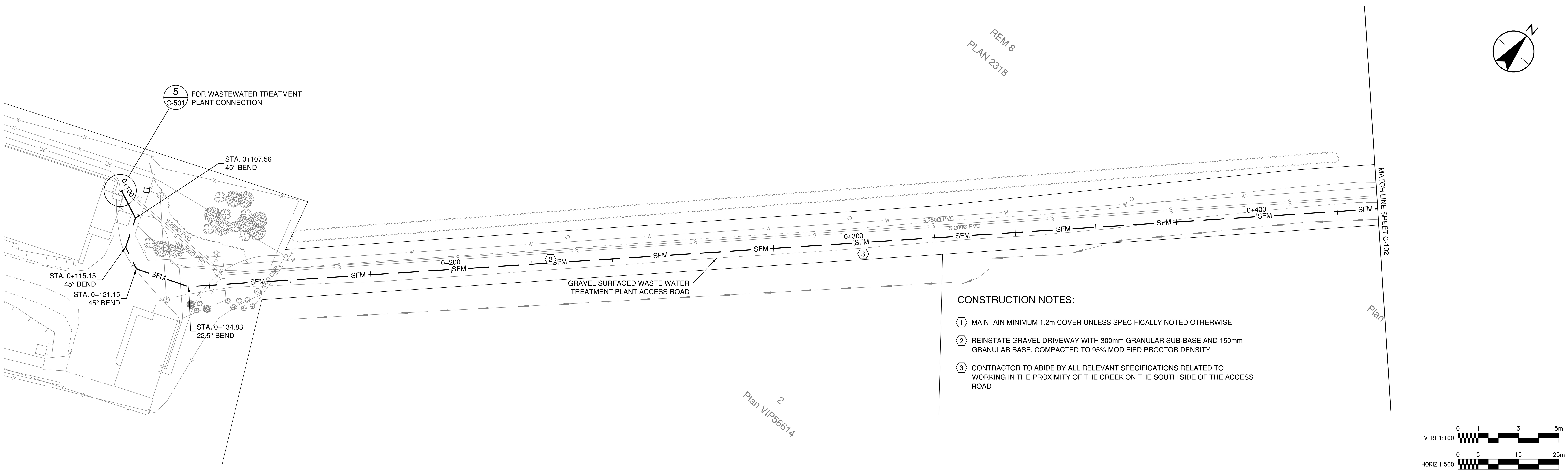
Revision 0

Sheet of

Drawing No. C-001

ORIGINAL SHEET - ISO A1





CONSTRUCTION NOTES:

1. MAINTAIN MINIMUM 1.2m COVER UNLESS SPECIFICALLY NOTED OTHERWISE.
2. REINSTATE GRAVEL DRIVEWAY WITH 300mm GRANULAR SUB-BASE AND 150mm GRANULAR BASE, COMPACTED TO 95% MODIFIED PROCTOR DENSITY
3. CONTRACTOR TO ABIDE BY ALL RELEVANT SPECIFICATIONS RELATED TO WORKING IN THE PROXIMITY OF THE CREEK ON THE SOUTH SIDE OF THE ACCESS ROAD

Revision	By	Appd	YYYY.MM.DD

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File Name: 20015_SHEETS

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HL	EM	AG	2020.02.17

Title

WEST COAST ROAD FORCEMAIN PLAN - PROFILE

Project No. 111720115

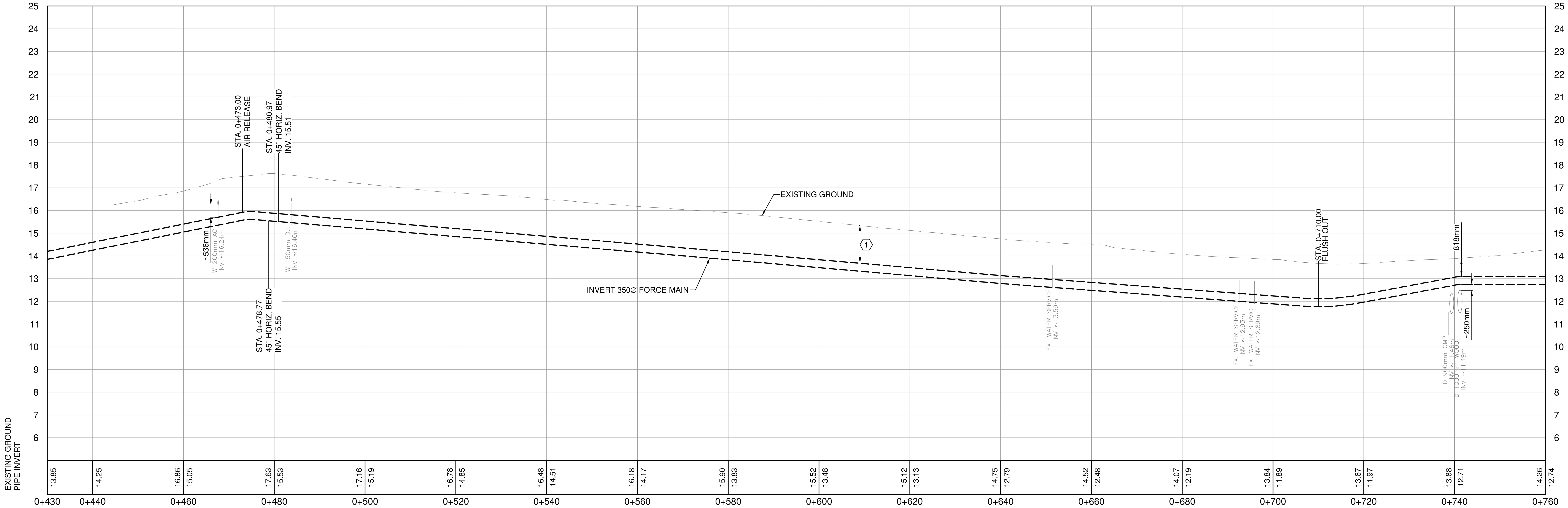
Scale AS SHOWN

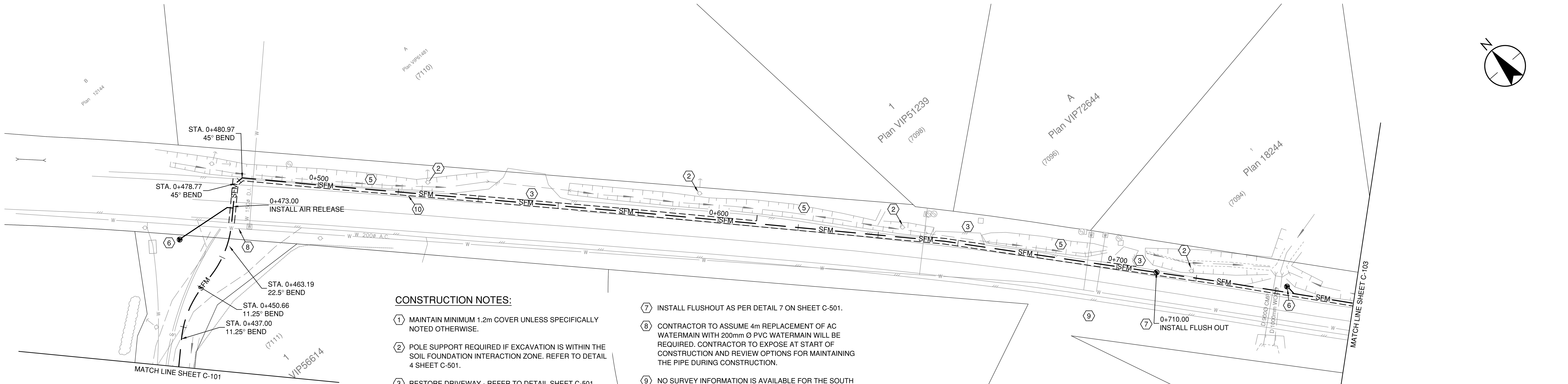
Revision 0

Sheet of

Drawing No. C-101

ORIGINAL SHEET - ISO A1





CONSTRUCTION NOTES:

1. MAINTAIN MINIMUM 1.2m COVER UNLESS SPECIFICALLY NOTED OTHERWISE.
2. POLE SUPPORT REQUIRED IF EXCAVATION IS WITHIN THE SOIL FOUNDATION INTERACTION ZONE. REFER TO DETAIL 4 SHEET C-501.
3. RESTORE DRIVEWAY - REFER TO DETAIL SHEET C-501.
4. REPAVE HIGHWAY SHOULDER TO PAINTED LINE DELINEATING TRAVEL LANE FROM SHOULDER.
5. REINSTATE DITCH TO EXISTING CONDITIONS. RESHAPE DITCH AS REQUIRED TO PROVIDE ADEQUATE COVER ON PIPE
6. INSTALL AIR RELEASE VALVE. EXACT LOCATION OF GOOSENECK TO BE CONFIRMED IN FIELD. REFER TO DETAIL 8 SHEET C-501.
7. INSTALL FLUSHOUT AS PER DETAIL 7 ON SHEET C-501.
8. CONTRACTOR TO ASSUME 4m REPLACEMENT OF AC WATERMAIN WITH 200mm Ø PVC WATERMAIN WILL BE REQUIRED. CONTRACTOR TO EXPOSE AT START OF CONSTRUCTION AND REVIEW OPTIONS FOR MAINTAINING THE PIPE DURING CONSTRUCTION.
9. NO SURVEY INFORMATION IS AVAILABLE FOR THE SOUTH SIDE OF WEST COAST ROAD WHICH IS NOT RELEVANT TO THE SCOPE OF WORK.
10. ANY EXCAVATION OR PAVEMENT RESTORATION OUTSIDE OF THE SAWCUT LINE DEFINED LIMIT WILL NOT BE COMPENSATED WITHOUT PRIOR AUTHORIZATION BY ENGINEER.

VERT 1:100 — 0 1 3 5m
HORIZ 1:500 — 0 5 15 25m

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Title

WEST COAST ROAD FORCEMAIN PLAN - PROFILE

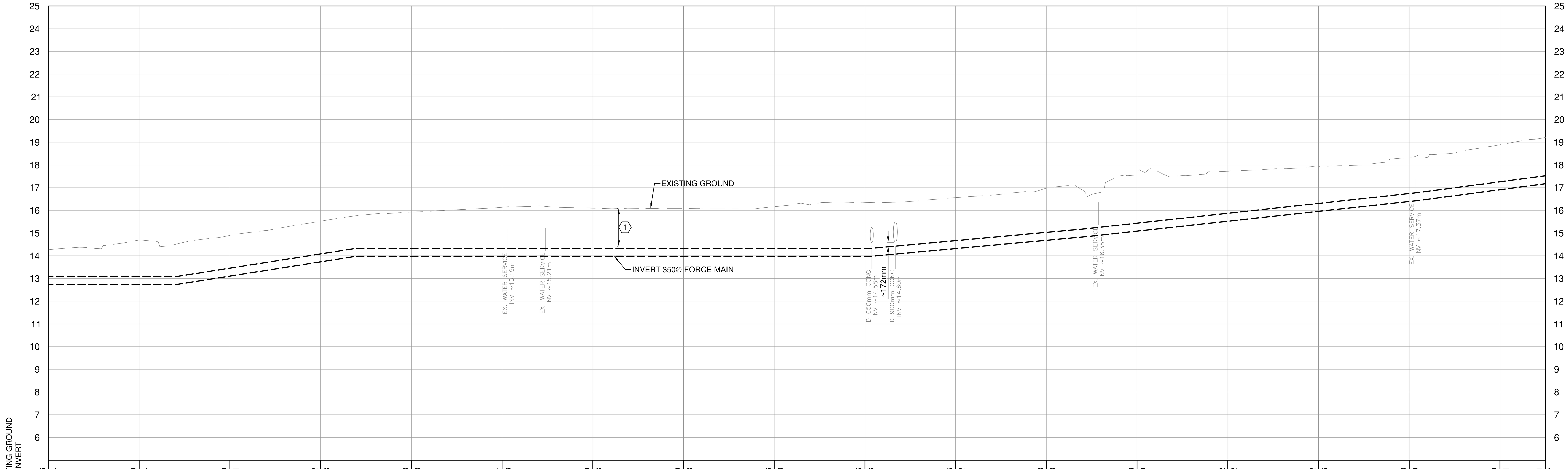
Project No. 111720115

Scale AS SHOWN

Revision 0 Sheet of

Drawing No. C-102

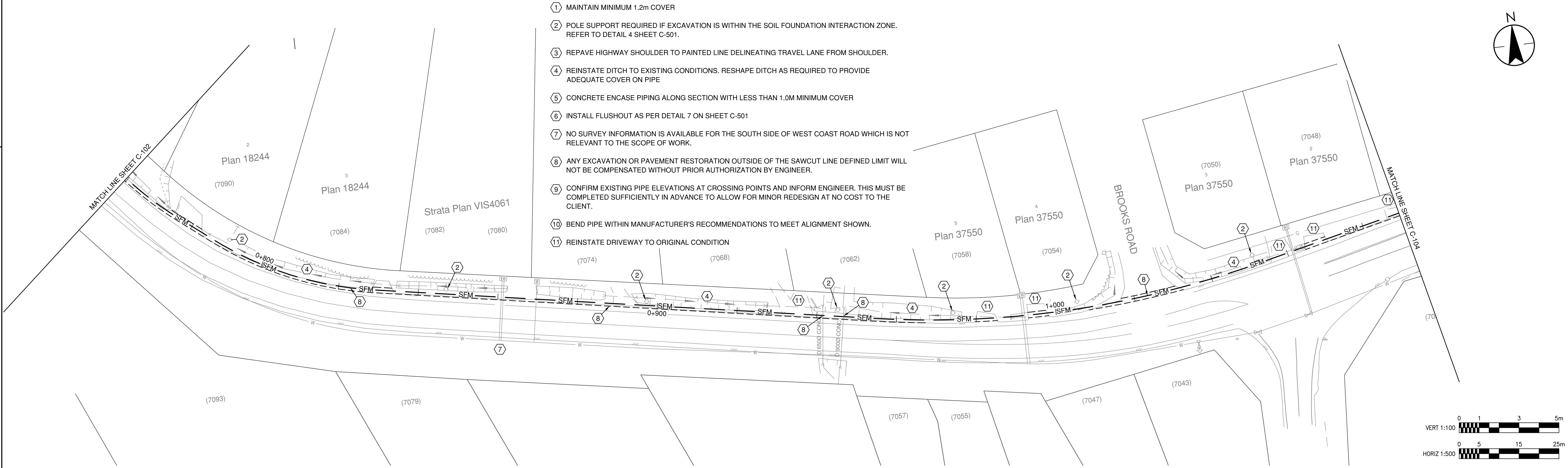
ORIGINAL SHEET - ISO A1



Station	Existing Ground	Pipe Invert
0+760	14.26	12.74
0+780	14.69	12.74
0+800	14.90	13.11
0+820	15.52	13.73
0+840	15.93	13.98
0+860	16.14	13.98
0+880	16.10	13.98
0+900	16.09	13.98
0+920	16.16	13.98
0+940	16.35	13.98
0+960	16.56	14.32
0+980	16.98	14.68
1+000	17.63	15.09
1+020	17.72	15.52
1+040	17.92	15.96
1+060	18.33	16.39
1+080	18.89	16.91
1+090	19.21	17.17

CONSTRUCTION NOTES:

1. MAINTAIN MINIMUM 1.2m COVER
2. POLE SUPPORT REQUIRED IF EXCAVATION IS WITHIN THE SOIL FOUNDATION INTERACTION ZONE. REFER TO DETAIL 4 SHEET C-501.
3. REPAVE HIGHWAY SHOULDER TO PAINTED LINE DELINEATING TRAVEL LANE FROM SHOULDER.
4. REINSTATE DITCH TO EXISTING CONDITIONS. RESHAPE DITCH AS REQUIRED TO PROVIDE ADEQUATE COVER ON PIPE
5. CONCRETE ENCASE PIPING ALONG SECTION WITH LESS THAN 1.0M MINIMUM COVER
6. INSTALL FLUSHOUT AS PER DETAIL 7 ON SHEET C-501
7. NO SURVEY INFORMATION IS AVAILABLE FOR THE SOUTH SIDE OF WEST COAST ROAD WHICH IS NOT RELEVANT TO THE SCOPE OF WORK.
8. ANY EXCAVATION OR PAVEMENT RESTORATION OUTSIDE OF THE SAWCUT LINE DEFINED LIMIT WILL NOT BE COMPENSATED WITHOUT PRIOR AUTHORIZATION BY ENGINEER.
9. CONFIRM EXISTING PIPE ELEVATIONS AT CROSSING POINTS AND INFORM ENGINEER. THIS MUST BE COMPLETED SUFFICIENTLY IN ADVANCE TO ALLOW FOR MINOR REDESIGN AT NO COST TO THE CLIENT.
10. BEND PIPE WITHIN MANUFACTURER'S RECOMMENDATIONS TO MEET ALIGNMENT SHOWN.
11. REINSTATE DRIVEWAY TO ORIGINAL CONDITION



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Title
WEST COAST ROAD
FORCEMAIN PLAN - PROFILE

Project No. 111720115

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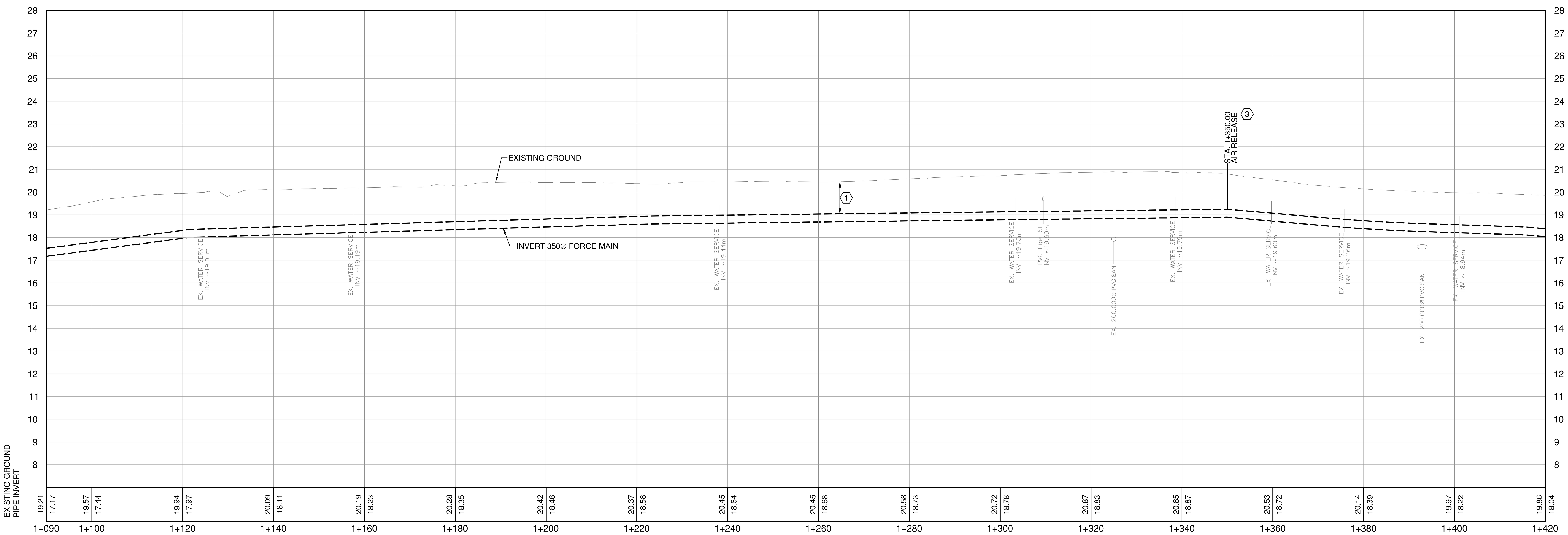
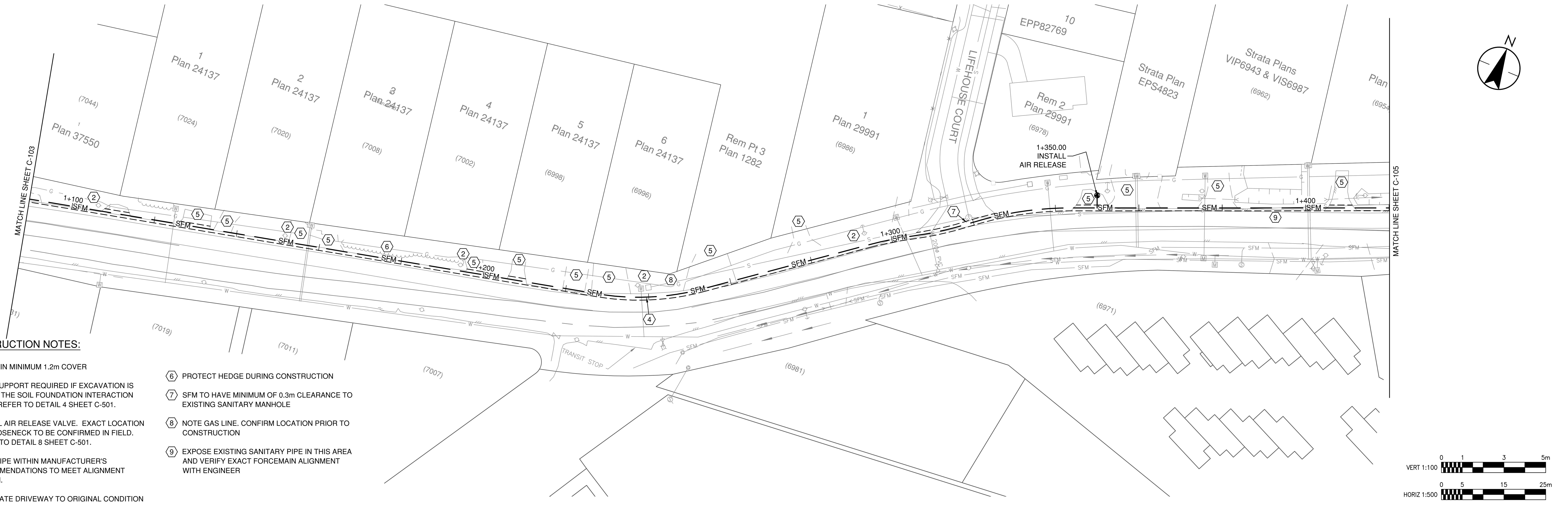
Revision 0

Sheet of

Drawing No. C-103





CONSTRUCTION NOTES:

1. MAINTAIN MINIMUM 1.2m COVER
2. POLE SUPPORT REQUIRED IF EXCAVATION IS WITHIN THE SOIL FOUNDATION INTERACTION ZONE. REFER TO DETAIL 4 SHEET C-501.
3. INSTALL AIR RELEASE VALVE. EXACT LOCATION OF GOOSENECK TO BE CONFIRMED IN FIELD. REFER TO DETAIL 8 SHEET C-501.
4. BEND PIPE WITHIN MANUFACTURER'S RECOMMENDATIONS TO MEET ALIGNMENT SHOWN.
5. REINSTATE DRIVEWAY TO ORIGINAL CONDITION
6. PROTECT HEDGE DURING CONSTRUCTION
7. SFM TO HAVE MINIMUM OF 0.3m CLEARANCE TO EXISTING SANITARY MANHOLE
8. NOTE GAS LINE. CONFIRM LOCATION PRIOR TO CONSTRUCTION
9. EXPOSE EXISTING SANITARY PIPE IN THIS AREA AND VERIFY EXACT FORCEMAIN ALIGNMENT WITH ENGINEER

Issued	By	Appd	YYYY.MM.DD
FOR TENDER	SS	AG	2024.03.28
FOR GRANT	SS	AG	2022.07.20

Revision | By | Appd | YYYY.MM.DD

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Consultant

Stantec

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www.stantec.com

Client/Project Logo

District of Sooke

Client/Project
District of Sooke

West Coast Road Sanitary Forcemain

Sooke BC

File Name: 20015_SHEETS	HL	EM	AG	2020.02.17
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
WEST COAST ROAD FORCEMAIN PLAN - PROFILE

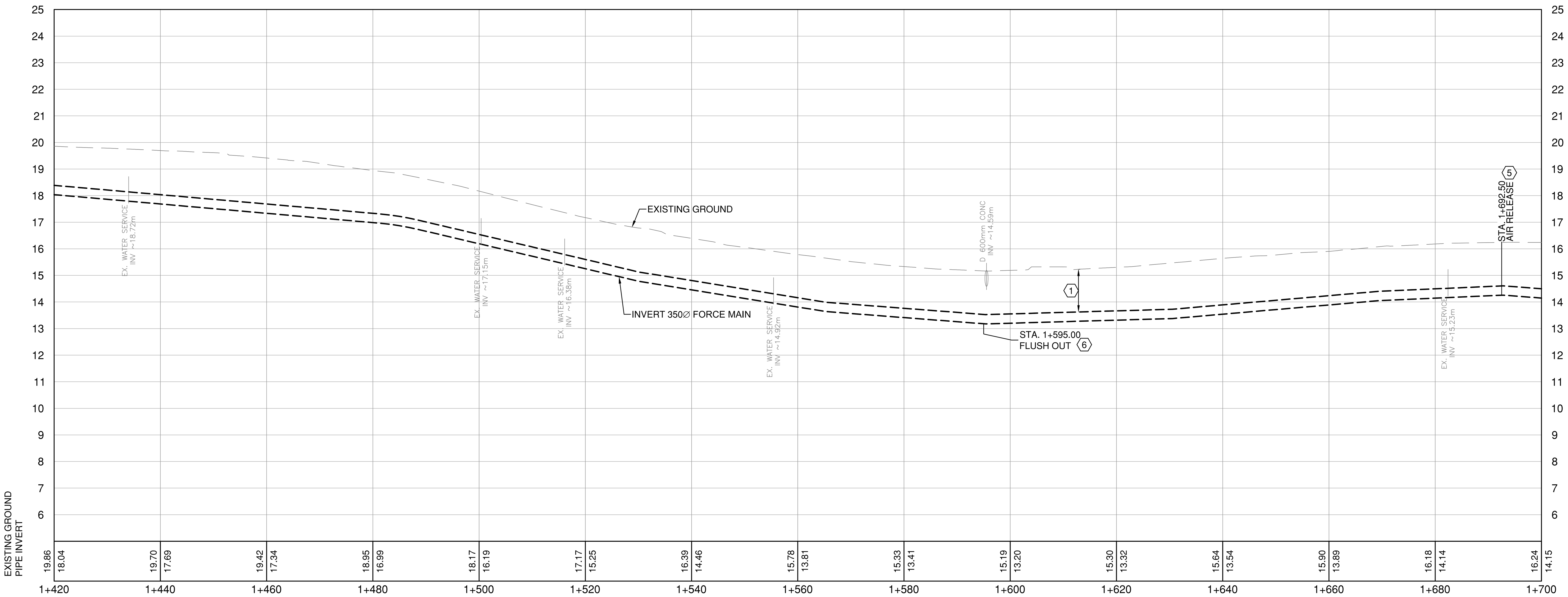
Project No. 111720115

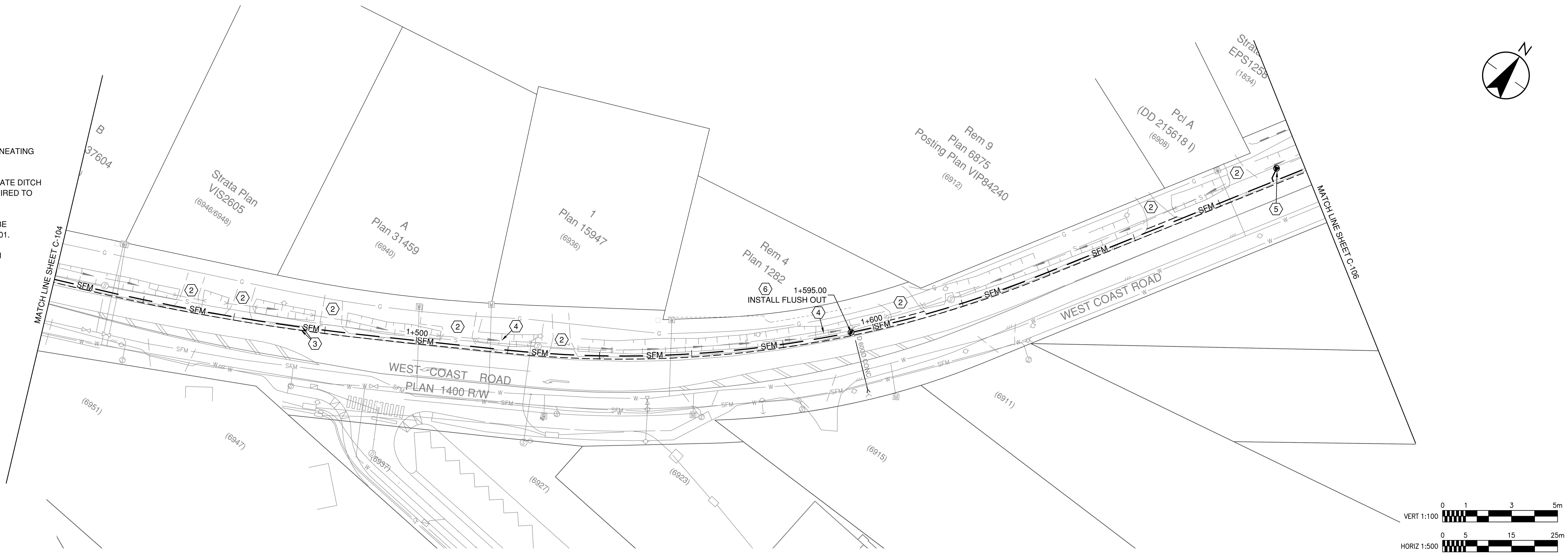
Scale AS SHOWN

Revision 0 | Sheet of

Drawing No. C-104

ORIGINAL SHEET - ISO A1





CONSTRUCTION NOTES:

1. MAINTAIN MINIMUM 1.2m COVER
2. REINSTATE DRIVEWAY TO ORIGINAL CONDITION
3. REPAVE HIGHWAY SHOULDER TO PAINTED LINE DELINEATING TRAVEL LANE FROM SHOULDER.
4. REINSTATE DITCH TO EXISTING CONDITIONS. REINSTATE DITCH TO EXISTING CONDITIONS. RESHAPE DITCH AS REQUIRED TO PROVIDE ADEQUATE COVER ON PIPE
5. INSTALL AIR RELEASE VALVE. EXACT LOCATION TO BE CONFIRMED IN FIELD. REFER TO DETAIL 8 SHEET C-501.
6. INSTALL FLUSHOUT AS PER DETAIL 7 ON SHEET C-501

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	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title

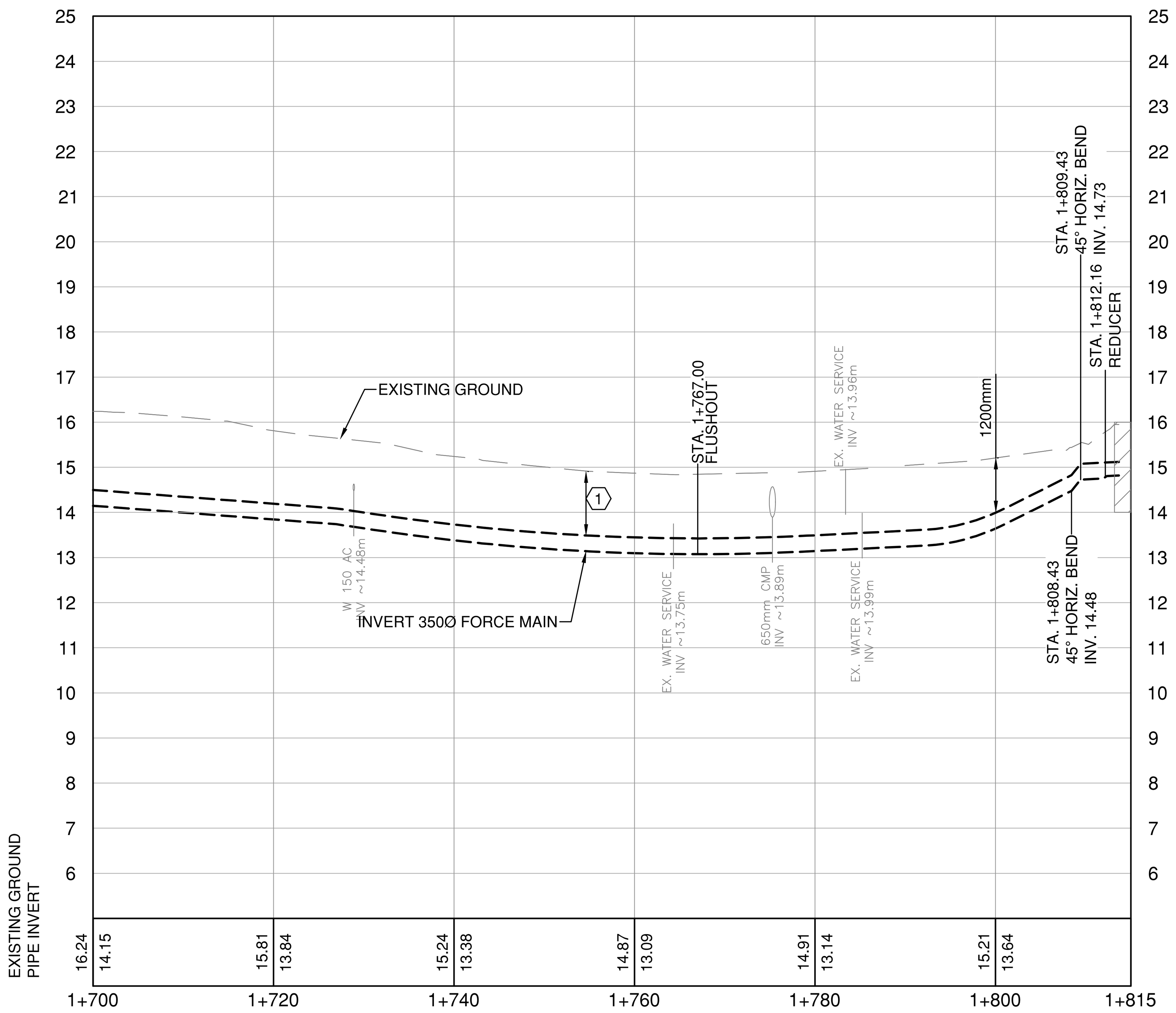
WEST COAST ROAD
FORCEMAIN PLAN - PROFILE

Project No. 111720115

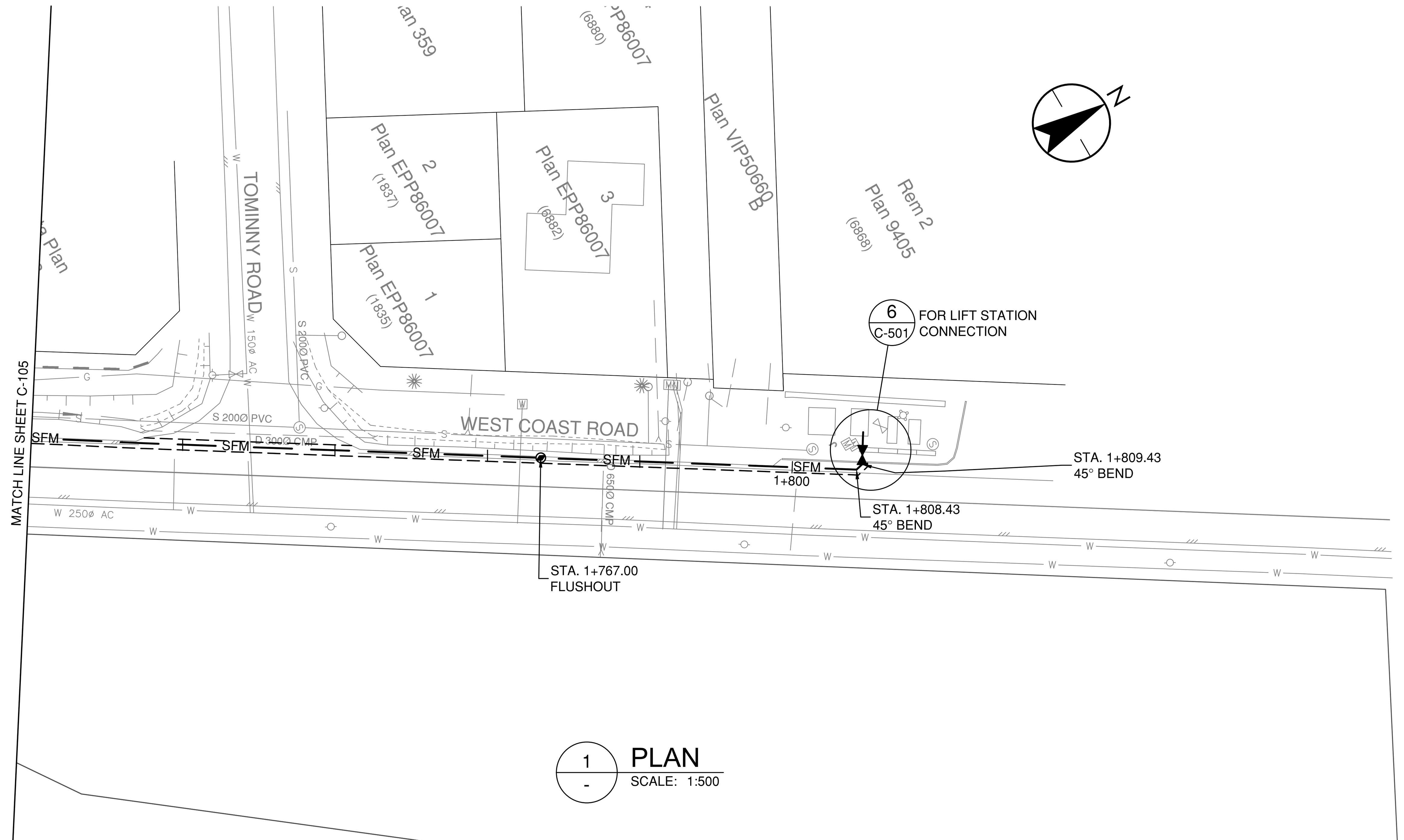
Scale AS SHOWN

Revision 0 | Sheet of | Drawing No. C-105

ORIGINAL SHEET - ISO A1



2 PROFILE
SCALE: H 1:500 V 1:100



CONSTRUCTION NOTES:

(1) MAINTAIN MINIMUM 1.2m COVER

1 PLAN
SCALE: 1:500

VERT 1:100 — 0 1 3 5m
HORIZ 1:500 — 0 5 15 25m

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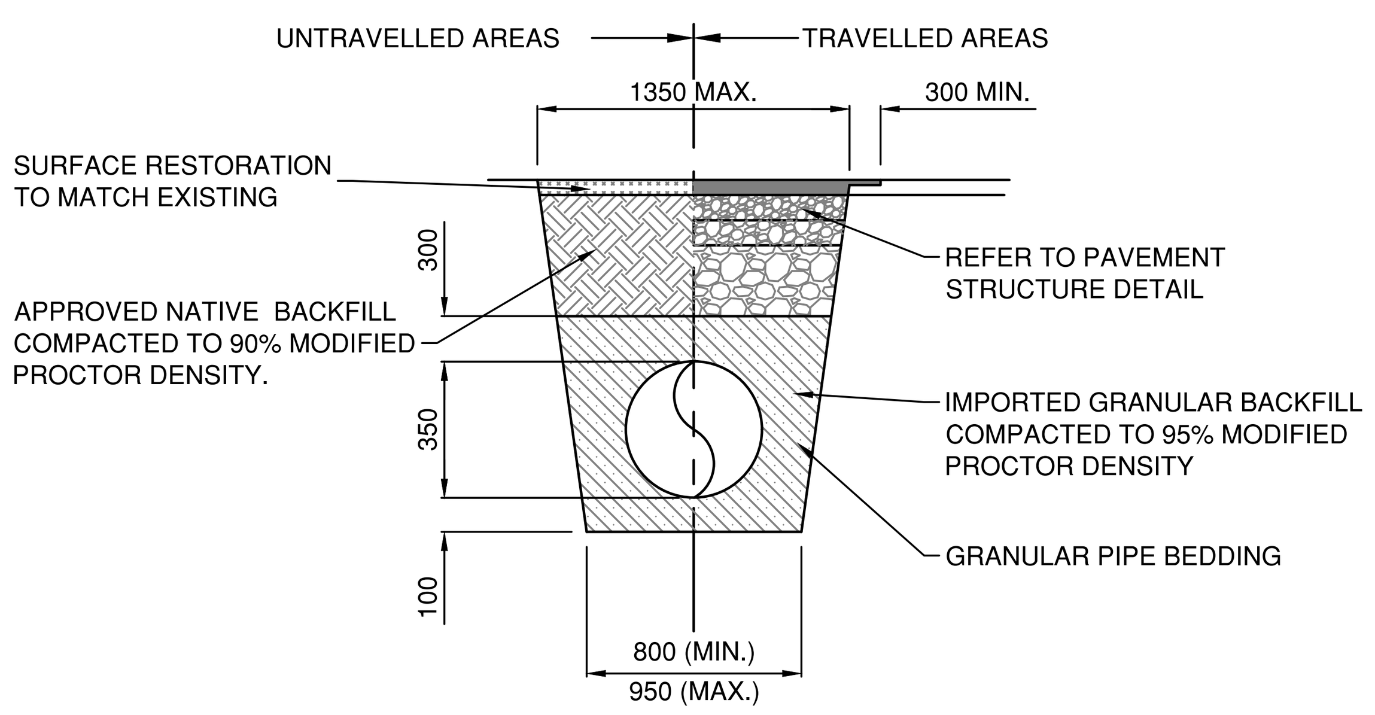
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

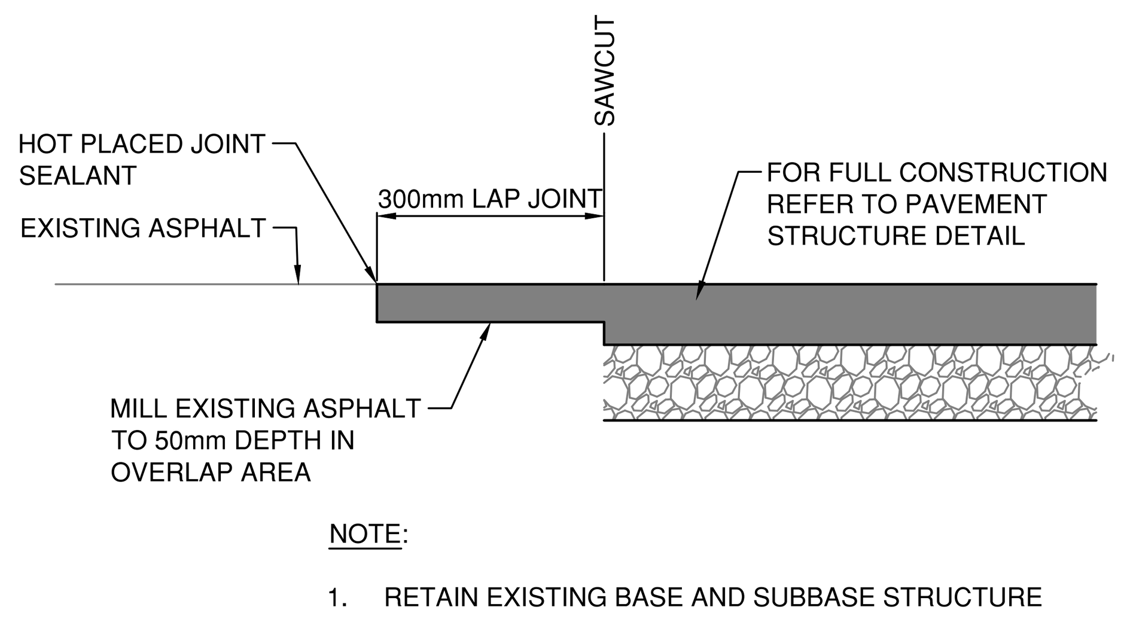
Title
WEST COAST ROAD FORCEMAIN PLAN - PROFILE

Project No. 111720115
Scale AS SHOWN
Revision 0
Sheet of
Drawing No. C-106

ORIGINAL SHEET - ISO A1



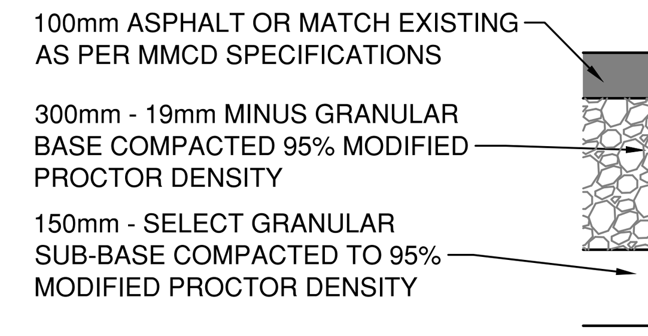
1 / - **STANDARD TRENCH DETAIL**
SCALE: N.T.S.



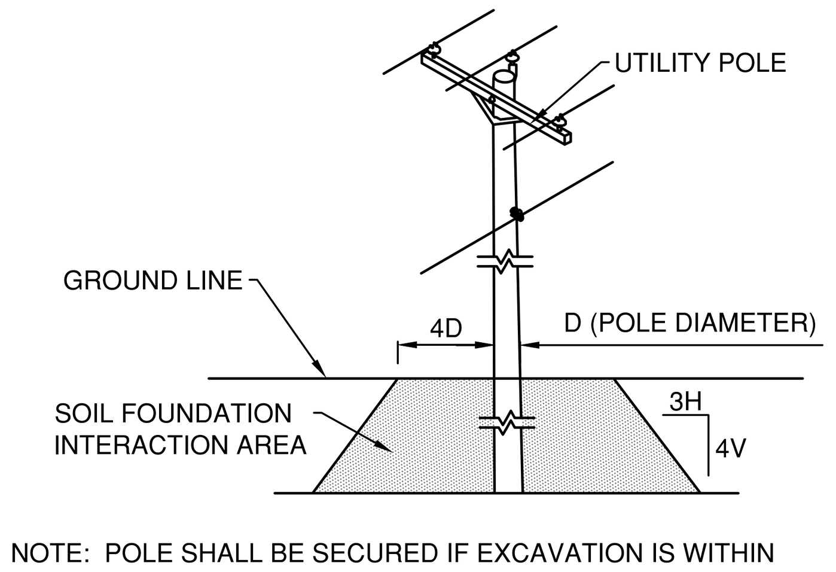
NOTE:

1. RETAIN EXISTING BASE AND SUBBASE STRUCTURE

2 / - **TYPICAL ASPHALT MILL DETAIL**
SCALE: NTS



3 / - **PAVEMENT STRUCTURE**
SCALE: NTS

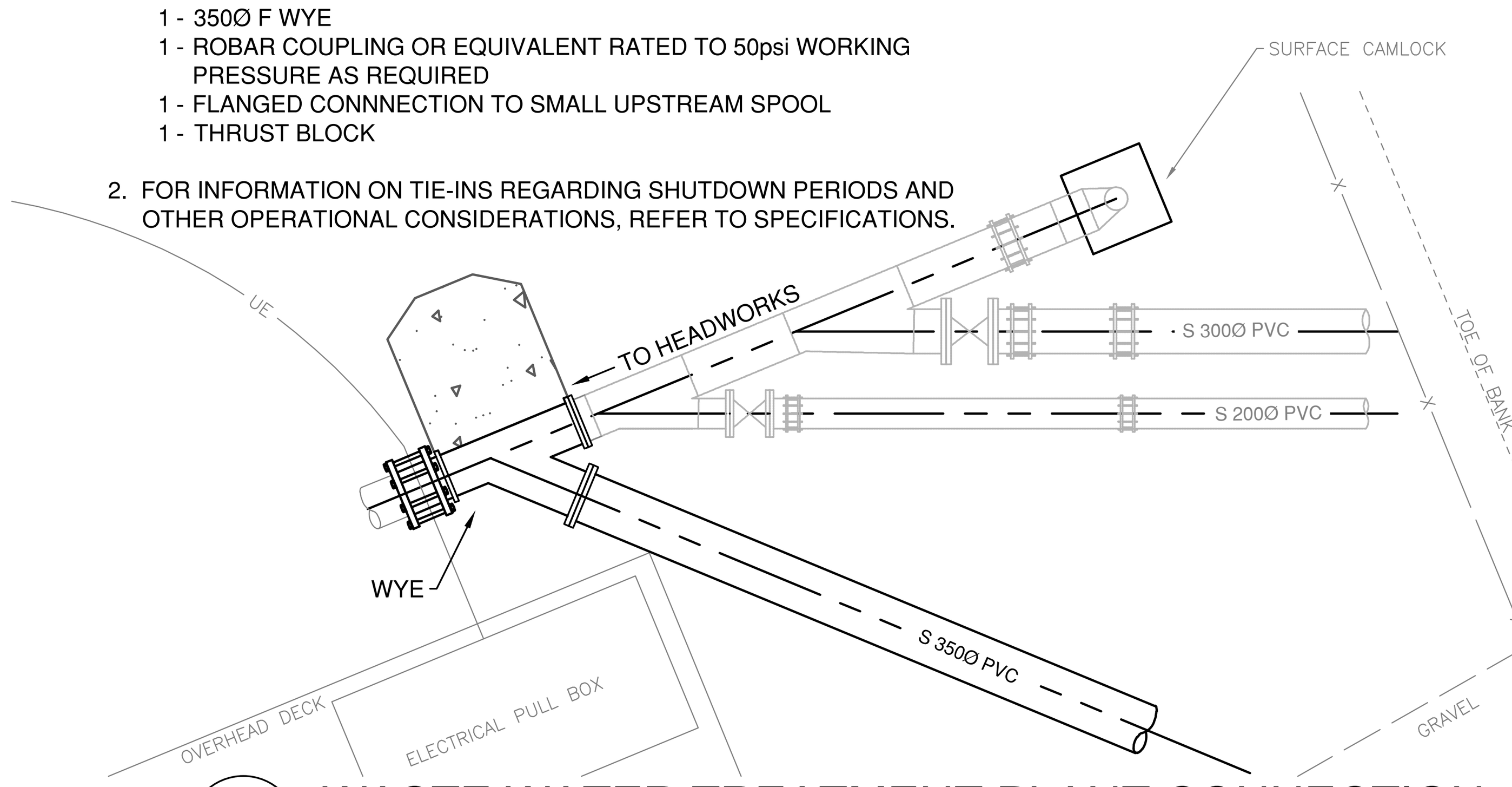


NOTE: POLE SHALL BE SECURED IF EXCAVATION IS WITHIN THE SOIL FOUNDATION INTERACTION AREA.

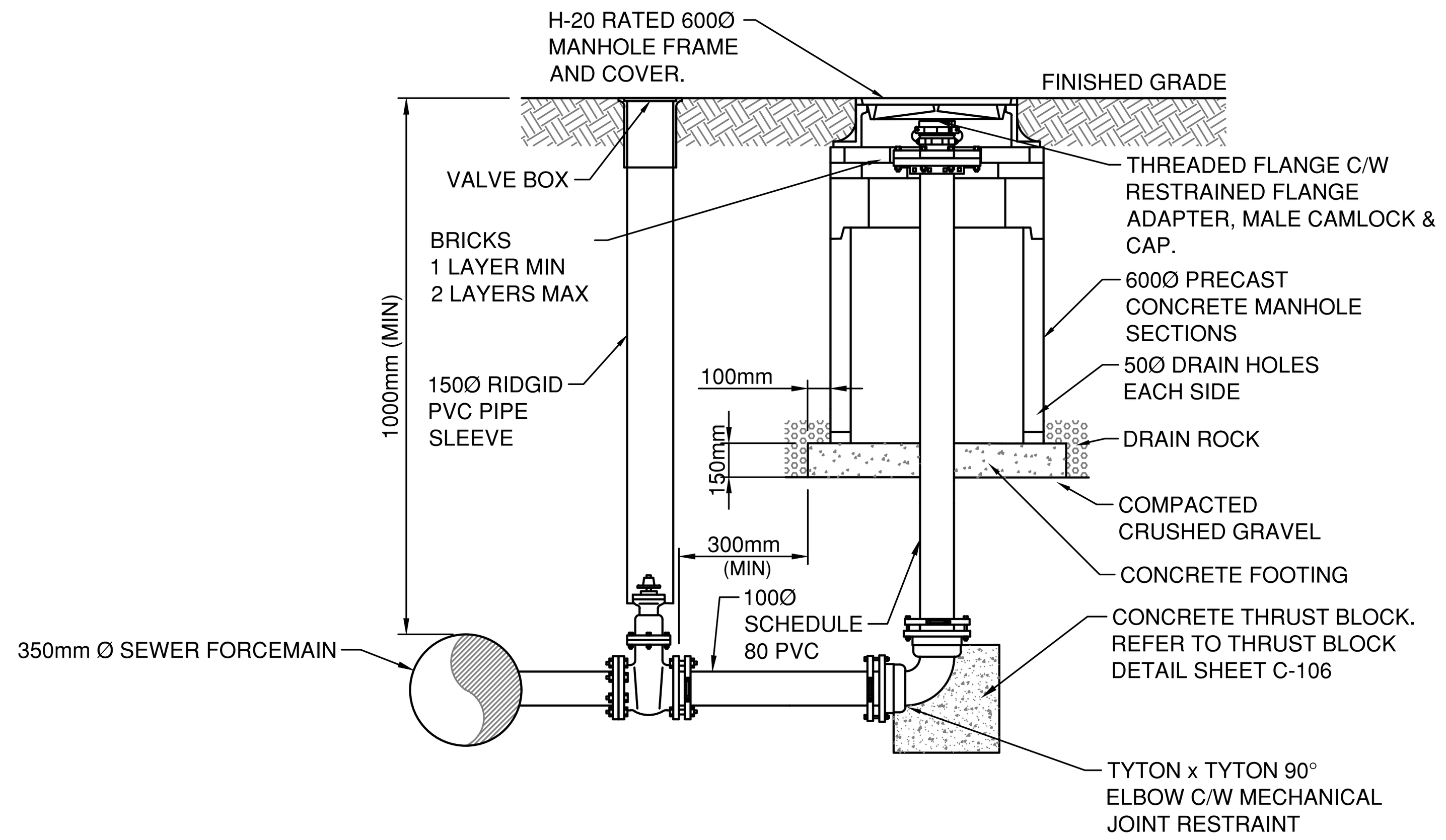
4 / - **SOIL FOUNDATION INTERACTION DETAIL**
SCALE: NTS

NOTES:

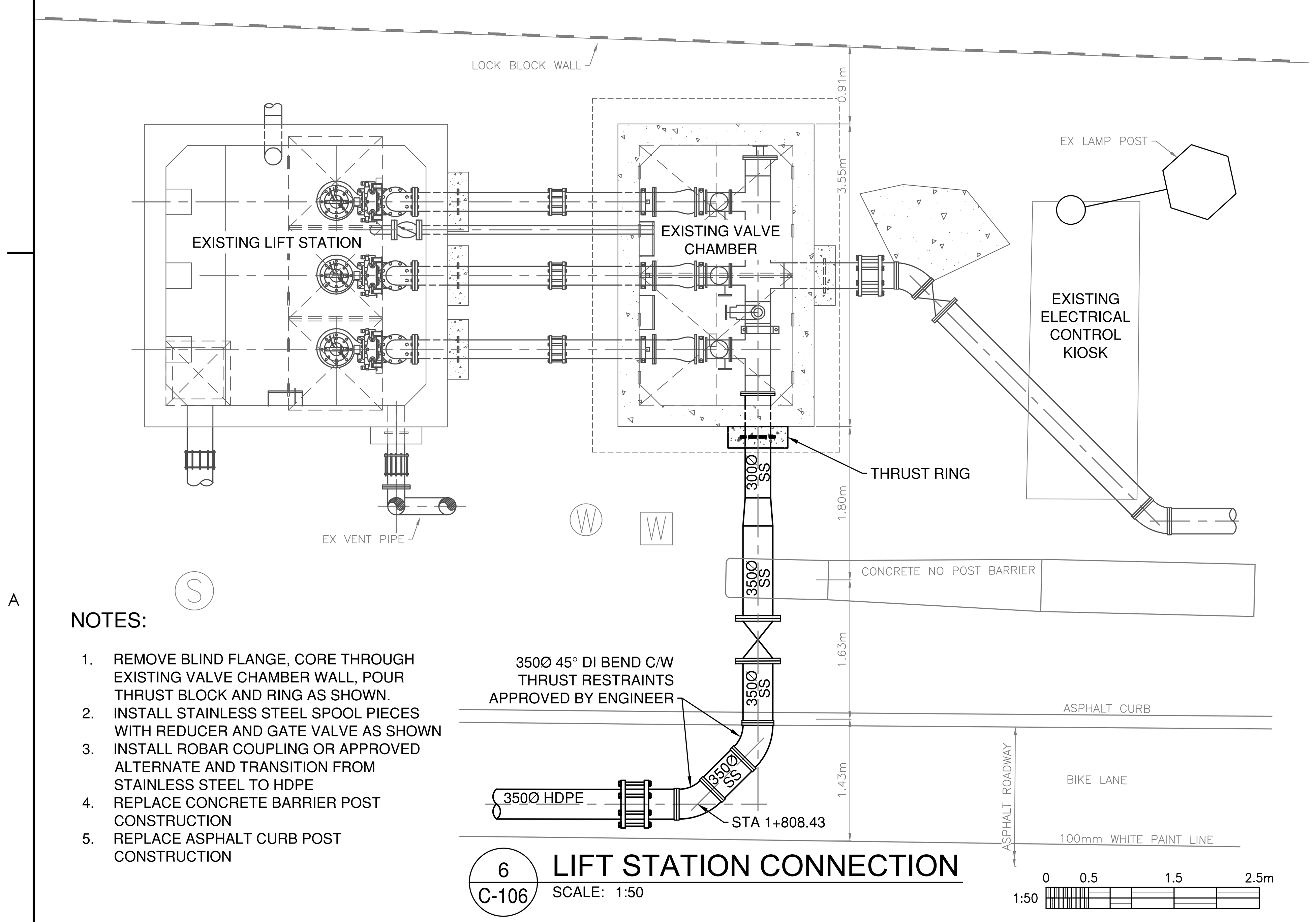
1. MAKE CONNECTION TO EXISTING WITH:
   1 - 350Ø F WYE
   1 - ROBAR COUPLING OR EQUIVALENT RATED TO 50psi WORKING PRESSURE AS REQUIRED
   1 - FLANGED CONNNECTION TO SMALL UPSTREAM SPOOL
   1 - THRUST BLOCK
2. FOR INFORMATION ON TIE-INS REGARDING SHUTDOWN PERIODS AND OTHER OPERATIONAL CONSIDERATIONS, REFER TO SPECIFICATIONS.



5 / C-101 **WASTE WATER TREATMENT PLANT CONNECTION**
SCALE: 1:50



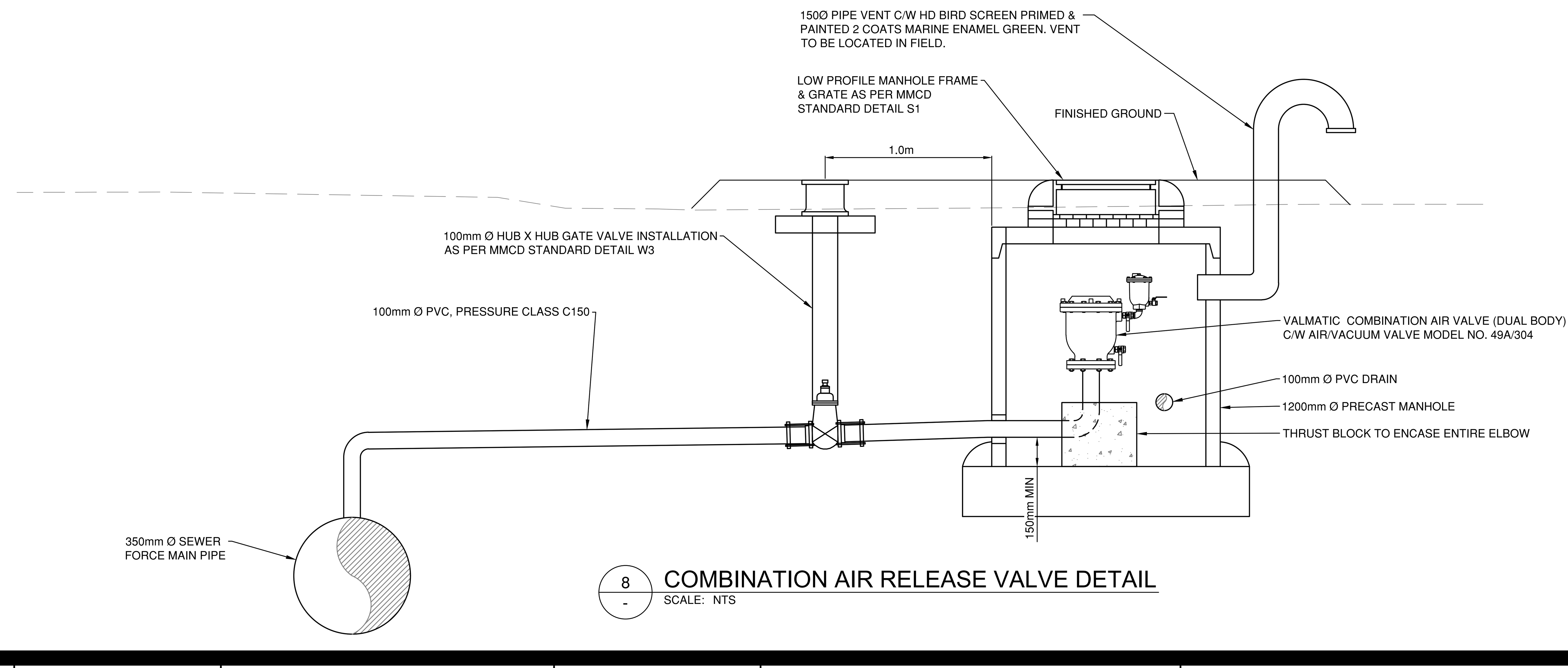
7 / - **FLUSH OUT ASSEMBLY DETAIL**
SCALE: NTS



NOTES:

1. REMOVE BLIND FLANGE, CORE THROUGH EXISTING VALVE CHAMBER WALL, POUR THRUST BLOCK AND RING AS SHOWN.
2. INSTALL STAINLESS STEEL SPOOL PIECES WITH REDUCER AND GATE VALVE AS SHOWN
3. INSTALL ROBAR COUPLING OR APPROVED ALTERNATE AND TRANSITION FROM STAINLESS STEEL TO HDPE
4. REPLACE CONCRETE BARRIER POST CONSTRUCTION
5. REPLACE ASPHALT CURB POST CONSTRUCTION

6 / C-106 **LIFT STATION CONNECTION**
SCALE: 1:50



8 / - **COMBINATION AIR RELEASE VALVE DETAIL**
SCALE: NTS

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FOR TENDER	SS	AG	2024.03.28
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File Name: 20015_DETAILS | HL | EM | AG | 2020.02.17
Dwn. | Dsgn. | Chkd. | YYYY.MM.DD

Title
DETAILS

Project No. 111720115
Scale AS SHOWN
Revision 0
Sheet of XX
Drawing No. C-501

GEOTECHNICAL REPORT

Stantec

GEOTECHNICAL REPORT – REV A
West Coast Road Sanitary Forcemain

August 8, 2023

Prepared for:
District of Sooke

Prepared by:
Stantec Consulting Ltd.
500-4515 Central Boulevard
Burnaby BC V5H 0C6

Project Number:
111720115

Revision	Date	Description
A	August 8, 2023	Issued for review

The conclusions in the Report titled Preliminary Geotechnical Report Sooke Forcemain Project are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from District of Sooke (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

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1 Introduction

The District of Sooke has retained Stantec Consulting Ltd. (Stantec) to provide geotechnical engineering consulting services for the proposed Westcoast Road Sanitary Forcemain project (herein referred to as 'the Project') in Sooke, BC. This Geotechnical Report presents the results of the geotechnical exploration program, the subsurface conditions encountered, and provides discussion and recommendations for design and construction of the project.

The geotechnical scope of work for the Project includes:

- Desktop review of available information
- Geotechnical site exploration (including in-situ and laboratory testing)
- Summary of subsurface conditions (soil and groundwater)
- Geotechnical analyses and recommendations for design and construction

The purpose of the geotechnical site exploration was to obtain subsurface soil and groundwater conditions to inform geotechnical engineering recommendations and to allow for environmental sampling along the proposed alignment. The results of the environmental scope of work are provided under separate cover.

This report should be read in conjunction with the Statement of General Conditions, which are included in **Appendix A**.

1.1 Project Understanding

Stantec understands the proposed forcemain will be 350 mm in diameter, approximately 1.7 km long, and generally installed approximately 2.0 m to 2.5 m below the existing ground surface. The forcemain will be either HDPE or PVC. Associated structures include two air release valves and two flush out assemblies. The proposed forcemain is located along West Coast Road (Highway 14) which is managed by the BC Ministry of Transportation and Infrastructure (MOTI) and Sooke Wastewater Treatment Plant Access Road which is own by the District of Sooke.

1.2 Design Codes, Standards, and Guidelines

The geotechnical design recommendations provided in this report are in accordance with the following design codes, standards, and guidelines:

- MOTI Utility Policy Manual, 2019
- MOTI Design Build Standard Specifications (DBSS) for Highway Construction, 2018
- Master Municipal Construction Document (MMCD), Volume II, Platinum Edition, 2009
- Canadian Foundation Engineering Manual (CFEM), 2006

2 Site Description and Geology

2.1 Physical Setting

We have reviewed Stantec drawing package "West Coast Road Sanitary Forcemain, Issued for Permitting Review" (including sheets C-001, C-101 through C-106, and C-501), dated April 12, 2023. The proposed alignment follows an existing gravel access road from the Sooke Wastewater Treatment Plant northeast to West Coast Road (BC Highway 14) for approximately 350 m, then east along West Coast Road (Highway 14) for approximately 1350 m (1.7 km total). The ground surface elevation along the proposed alignment ranges from approximately El. 8.0 m to El. 21.0 m.

The topographic description of the roads along the proposed alignment are summarized in Table 1.

Table 1 Physical Description of Proposed Alignment

Location	From	To	Ground Surface Elevation Range (m)	Ground Slope (%) (direction of slope from high to low)
Sooke Wastewater Treatment plant Access Road	Sooke Wastewater Treatment Plant (Sta. 0+100)	West Coast Road (Highway 14) (Sta. 0+470)	8.0 to 17.5	0.0% to 4.0% (northeast to southwest)
West Coast Road (Highway 14)	Sooke Wastewater Treatment plant Access Road (Sta. 0+470)	80 m northeast of Tominny Road (Sta. 1+800)	13.5 to 21.0	0.0% to 5.0% (varies)

2.2 Geological Setting

The publicly available surficial geology map "Open file 1993025 - Surficial geology of the Sooke area" (Blyth and Rutter, 1993) indicates the proposed alignment is underlain by two surficial geology units:

- **Unit sgF^{G} (Sta. 0+100 and 0+590):** Fluvial sediment deposited in association with glacier ice; generally consists of gravel and sand.
- **Unit dMbr (Sta. 0+590 to 1+800):** Diamicton (till) deposited directly by glaciers; generally consists of well compacted material with variable structure and texture; includes moraine, till plain and drumlin features.

The extents of these units may vary due to the large scale of the mapping (1:50,000).

3 Subsurface Exploration

3.1 Field Program

A geotechnical site exploration was carried out between July 10 and July 13, 2023 consisting of ten solid-stem auger boreholes. The approximate locations of the boreholes are shown on Figure 1 in **Appendix B.** A BC One Call was completed before mobilizing to the site. Prior to drilling, the presence of existing underground utilities near the proposed borehole locations was verified by a subcontracted utility locator (ScanPlus Locating Ltd.) using ground penetrating radar (GPR) and electromagnetic (EM) induction equipment. Traffic control was carried out by a subcontracted traffic control contractor (KMF Traffic Solutions Ltd.) in accordance with MOTI permits.

Boreholes were advanced by a subcontracted drilling contractor (Grassroots Drilling Inc.) using solid-stem auger drilling methods with 140 mm outside diameter augers. Boreholes BH23-01 and BH23-08 were advanced to the target depth of 4.6 m, while all other boreholes encountered early practical equipment refusal on inferred very dense/hard soil, cobbles, boulders, or potentially bedrock:

- Boreholes BH23-02, BH23-04, BH23-05, BH23-09 and BH23-10 encountered practical equipment refusal because the drill rig was unable to further rotate the augers without significant over-rotation, indicating refusal was likely due to very dense/hard soils.
- Boreholes BH23-03, BH23-06, and BH23-07 encountered practical equipment refusal because the drill rig was unable to further advance the augers while grinding on an obstruction, indicating refusal was likely due to cobbles, boulders, or potentially bedrock. After early refusal was encountered in borehole BH23-03, a second borehole was attempted approximately 1 m offset to the northeast and refusal was encountered at a similar depth.

Dynamic Cone Penetration Tests (DCPT) were advanced prior to drilling at each of the borehole locations to assess the compactness and consistency of the subsurface soils. A DCPT utilizes a 63.5 kg hammer, free-falling from 760 mm height on top of an anvil, connected to 45 mm diameter AWJ steel rods with a disposable 60 mm diameter cone at the bottom. With each blow the cone penetrated the ground, and the “blow counts” were recorded for each 300 mm of penetration. The DCPT was generally terminated when the blow counts exceeded 50 blows per 300 mm of penetration, or after 10 consecutive blows with no movement. The DCPT blow counts are presented on the borehole records in **Appendix C**.

Coordinates were measured upon completion of each borehole using a handheld GPS device with approximately +/- 3 m accuracy. The approximate ground elevation for each borehole was estimated to the nearest 0.5 m using the publicly available District of Sooke GIS contour data. A summary of the boreholes is presented in Table 2.

Table 2 Summary of Borehole Locations

Borehole ID	UTM Coordinates		Approximate Ground Elevation (m)	Borehole Termination Depth Below Ground Surface (m)
	Northing	Easting		
BH23-01	5357275	444678	8.0	4.6
BH23-02[1]	5357366	444775	12.0	4.3
BH23-03[2]	5357469	444891	17.0	2.0
BH23-04[1]	5357380	445006	14.5	3.5
BH23-05[1]	5357242	445154	16.0	3.4
BH23-06[2]	5357215	445319	18.0	1.2
BH23-07[2]	5357258	445539	20.5	1.5
BH23-08	5357340	445699	20.0	4.6
BH23-09[1]	5357427	445850	16.0	1.5
BH23-10[1]	5357623	445983	19.0	2.1

[1] Boreholes encountered practical equipment refusal due to inferred very dense/hard soils.

[2] Boreholes encountered practical equipment refusal due to inferred cobble, boulder, or potentially bedrock.

A Stantec geotechnical engineer coordinated the exploration work, positioned the boreholes, classified the soils encountered, maintained a detailed field records of the boreholes, collected soil samples for laboratory testing, and observed and recorded pertinent site features. Soil descriptions presented on the borehole records are based on the soil samples collected in the field, and are in general accordance with the American Society for Testing and Materials (ASTM) standards D2487 and D2488 for the Unified Soil Classification System (USCS) and the information presented on the "Symbols and Terms Used in Borehole and Test Pit Records" in **Appendix C**.

3.2 Laboratory Testing Program

Geotechnical laboratory testing on disturbed soil samples was performed in Stantec's laboratory in accordance with ASTM standards, including:

- Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216)
- Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve (ASTM D1140)
- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis (ASTM D6913)
- Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (ASTM D4318)

The results of the laboratory testing program are summarized on the borehole logs in **Appendix C** and the detailed test reports are presented in **Appendix D**.

4 Subsurface Conditions

4.1 General

The subsurface conditions encountered in the boreholes were generally consistent with the published geological information discussed above. The soils consisted of asphalt or fill soils at the ground surface, overlying variable fill soils, underlain by clay interlayered with clayey sand. Detailed descriptions of the subsurface soil and groundwater conditions are provided in the borehole records in **Appendix C**. A general description of the subsurface conditions is provided in the following subsections.

4.2 Asphalt

Asphalt ranging between 100 mm and 300 mm thick was encountered at the ground surface in boreholes BH23-04 through BH23-10 located along West Coast Road (Highway 14).

4.3 Fill

A layer of fill between 0.3 m and 0.9 m thick was encountered at the ground surface in boreholes BH23-01, BH23-02, and BH23-03 located along the existing Sooke Wastewater Treatment Plan Access Road. A layer of fill between 0.1 m and 0.2 m thick was also encountered beneath the asphalt in boreholes BH23-05 and BH23-07 located along West Coast Road (Highway 14). The fill generally consisted of gravel with sand and traces of silt.

4.4 Silty Sand (SM)

Silty sand with variable gravel content was encountered beneath the fill in boreholes BH23-01, BH23-03, BH23-05, and BH23-07; and beneath the asphalt in boreholes BH23-04, BH23-06, BH23-08, and BH23-09. The silty sand ranged from 0.4 m to 1.4 m thick extending from 0.15 m to 1.5 m below the ground surface and was assessed to be loose to compact based on the DCPT blow counts. Particle size distributions and fines content tests conducted on samples of the silty sand indicate the fines content ranged from 24% to 50%.

4.5 Clay (CL), Clayey Sand (SC)

Medium plasticity clay and clayey sand was encountered in all ten boreholes. The clay or clayey sand layers were encountered beneath the fill in borehole BH23-02, the asphalt in borehole BH23-10, and beneath the silty sand in all remaining boreholes. All ten boreholes were either terminated in these layers.

The clay was assessed to be hard based on the DCPT blow counts and the sand and gravel content in the clay varied throughout the boreholes. Measured moisture content of samples of the clay ranged from 14% to 33%. Particle size distributions and fines content tests conducted on samples of the clay indicate the fines content ranged from 54% to 95%. The results of five Atterberg Limits tests on samples of the clay are summarized in Table 3.

Table 3 Summary of Atterberg Limits

Borehole ID	Sample Depth (m)	Liquid Limit (LL)	Plastic Limit (PI)	Plasticity Index (PI)
BH23-01	2.4 to 2.6	45	18	27
BH23-02	3.5 to 3.7	41	16	25
BH23-04	1.8 to 2.0	38	16	22
BH23-08	3.7 to 3.9	24	14	10
BH23-10	4.3 to 4.5	31	15	16

The clayey sand had variable gravel content throughout the boreholes and was assessed to be hard based on the DCPT blow counts. A fines content test conducted on one sample of the clayey sand indicated the fines content was approximately 46%.

4.6 Groundwater

The groundwater level was measured in the open boreholes upon drilling completion. Groundwater was encountered in borehole BH23-01 at a depth of 3.7 m. No groundwater was observed in any of the other boreholes.

4.7 Potential Variation in Subsurface Conditions

The subsurface soil and groundwater conditions described above and shown on the borehole records are representative only at the borehole locations at the time of the exploration. Conditions can vary between boreholes and at the time of construction. It is anticipated that the groundwater level will fluctuate with seasonal weather trends and precipitation events, as well as in response to any pumping or construction activity in adjacent sites.

5 Discussion and Recommendations

5.1 Pipe Support and Settlement

The subsurface soils at the anticipated forcemain invert depths consisted of hard clay (CL) with variable sand and gravel content in boreholes BH23-01, BH23-02, BH23-04, BH23-05, BH23-08, and BH23-10. In boreholes BH23-03, BH23-06, BH23-07, and BH23-09 practical equipment refusal was encountered prior to reaching the anticipate forcemain invert depths. At these four locations, the borehole was terminated in either the hard clay (CL) or hard clayey sand (SC). It is recommended that test pits are completed at these locations prior to construction to confirm if bedrock is present where shallow auger refusal was encountered.

The proposed forcemain could be grade supported along the proposed alignment. No soft or compressible soil was encountered below the anticipated pipe depths at the borehole locations.

Based on the findings of the subsurface exploration and analyses, we anticipate post-construction settlement of the grade supported forcemain is expected to be negligible, provided that the subgrade is prepared as discussed herein.

5.2 Excavations, Shoring, and Dewatering

The results of our subsurface exploration indicate that the proposed forcemain can be installed in open cut excavations for the full length of the alignment, provided there is sufficient right-of-way. It is understood the depth to the pipe invert ranges from 2.0 m to 2.5 m below the existing grade.

The early refusal of eight of the geotechnical boreholes indicates the presence of very dense/hard soils, cobbles, boulders, or possibly bedrock along sections of the alignment at or above the proposed forcemain invert depth, which could inhibit excavation.

All excavations should be completed in accordance with WorkSafe BC regulations. The excavation cut slopes and temporary trench support should be reviewed by the Contractor daily (or at shorter frequencies as required) for signs of instability. The Geotechnical Engineer should be notified immediately, and the excavation should be backfilled, if any noticeable displacement of the excavation walls or adjacent ground is noticed.

5.2.1 SLOPED EXCAVATIONS

Sloped excavations may be considered for the installation of the proposed forcemain if sufficient right-of-way is available. Unless approved by a professional geotechnical engineer, temporary excavations within the fill soils and underlying sandy silt greater than 1.2 m and up to a maximum depth of 3 m must be sloped at 1.5H:1V (horizontal to vertical) or flatter. The native hard clay and hard clayey sand could be cut at 1H:1V to a maximum depth of 3 m.

Sandbags or other physical barriers should be installed adjacent to the trench to direct surface runoff away from the excavation. The cut slopes should be regularly reviewed by the geotechnical engineer and daily by the Contractor for signs of instability. If groundwater seepage occurs through the sides of the excavation, the slopes may undergo sloughing, in which case additional maintenance and

monitoring would be necessary. If localized instability is noted during excavation, the side slopes should be flattened as required to maintain safe working conditions.

5.2.2 SHORED EXCAVATIONS

We anticipate temporary shoring such as shoring cages will likely be used to limit excavation volumes and reduce the construction footprint along roadways if there is not enough space for sloped cuts.

The upright portions of any temporary excavation support should be continuous to mitigate soils passing between or through the supports. The existing asphalt pavement should be neatly cut and removed prior to the installation of the temporary excavation shoring supports.

Local slumping of the trench walls behind the temporary shoring, particularly from cuts in fill and granular soils, should be anticipated, including excavations adjacent to the existing utility trenches which may include granular and/or poor-quality backfill soils.

Voids between the temporary shoring and the trench wall should be filled immediately with granular soil. Granular backfill should be kept at the site for this purpose prior to the start of the excavation. As an alternative, control density fill, CDF (high-slump, low-strength concrete) could be used to fill the voids.

We anticipate that the traffic lanes along and immediately adjacent to the forcemain will be closed during construction. A minimum setback distance of 3.0 m is recommended to be maintained for vehicle traffic. A minimum setback distance of 2.0 m for soil stockpiles or heavy construction traffic from the edge of trench excavations is also recommended.

5.2.3 GROUNDWATER CONTROL

As previously discussed, groundwater was encountered in borehole BH23-01 at a depth of 3.7 m below the existing ground surface. We anticipate conventional sumps and pumps will likely be sufficient to control surface run-off or groundwater seepage during periods of precipitation and to maintain adequately dry conditions of the excavation.

5.3 Pipe Bedding and Surround

The forcemain should be placed on a minimum 150 mm thick layer of imported pipe bedding fill placed over undisturbed native soil or compacted subgrade fill to conform to industry standards, as per the MOTI Utility Policy Manual (2019). Any native subgrade soil that becomes softened due to construction activities and/or exposure to excess moisture or precipitation should be excavated at the direction of the Geotechnical Engineer and replaced with imported granular material prior to placement of the pipe bedding layer.

For pipe cushioning, we recommend that the granular bedding and surround material should extend at least 250 mm beyond both sides of the pipe and up to at least 300 mm above the top of the pipe. Backfill for over-excavation, pipe bedding, surround materials should meet MMCD requirements for imported granular pipe bedding (MMCD, Section 31 05 17, Item 2.7).

5.4 Trench Backfill and Pavement Restoration

Pavement structure restoration along West Coast Road (Highway 14) should comply with the MOTI Utility Policy Manual (2019), and the MOTI DBSS (2018) specifications.

The existing asphalt thickness ranged from 100 mm to 300 mm at the borehole locations completed along Highway 14. As per the MOTI requirements, the asphalt restoration should be reinstated to match the existing thickness, with the recommended minimum pavement structures provided in Table 4, based on the MOTI Utility Policy Manual (2019), and the MOTI DBSS (2018) specifications.

Table 4 Minimum Pavement Structure

Description	Minimum Pavement Structure	
	Access Road	**West Coast Road (Highway 14)**
Asphalt Pavement – Fine Mix (MOTI DBSS Table 502-C-1)	-	50 mm
Asphalt Pavement – Medium Mix (MOTI DBSS Table 502-C-1)	-	50 mm
Intermediate Graded Base (IGB) (MOTI DBSS Table 202-C)	300 mm	300 mm
Select Granular Sub-Base (SGSB) (MOTI DBSS Table 202-C)	-	600 mm

The new asphalt pavement should be keyed at least 300 mm into the adjacent existing pavement sections (i.e., minimum overlap at the joints) and longitudinal joints.

6 Geotechnical Field Review During Construction

Stantec should be retained to provide geotechnical field review during construction. Geotechnical field reviews are required to verify that the subsurface conditions encountered are consistent with our design recommendations and that the work is being carried out in accordance with the specifications.

Site review and testing of backfill gradation and compaction should be carried out during construction. The tests should consist of quality control (QC) testing by the Contractor's testing firm and periodic quality assurance (QA) testing by Stantec.

7 Closure

This report was prepared for the exclusive use of the District of Sooke and its agents for specific application to the geotechnical scope of work for the Westcoast Road Sanitary Forcemain project. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Stantec.

Use of this report is subject to the Statement of General Conditions included in **Appendix A**. It is the responsibility of the District of Sooke, who is identified as “the Client” within the Statement of General Conditions, and their agents to review the conditions and notify Stantec should any of them not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report
- Basis of the report
- Standard of care
- Interpretation of site conditions
- Varying or unexpected site conditions
- Planning, design, or construction

We trust that this report meets your present requirements. If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Reviewed by:

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APPENDICES

Appendix A Statement of General Conditions

Stantec

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the site-specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

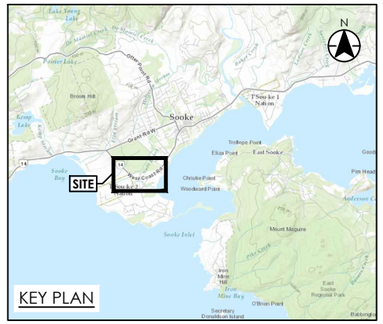
STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behaviour. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec cannot be responsible for site work carried out without being present.

Appendix B Figures



LEGEND

- PROPOSED FORCEMAIN
- LOT LINE
- BOREHOLE LOCATION

SCALE IN METRES

0 50 100 150 200 250

1:5000

Stantec

Sources

Project Information

Project No.:	111720115
Scale:	1:5000
Date:	2023-AUG-03
Drawn by:	G. HUYNH
Checked by:	G. LI

Project Location

WEST COAST ROAD (HIGHWAY 14)
SOOKE, BC

Client/Project

DISTRICT OF SOOKE

WEST COAST ROAD SANITARY FORCEMAIN

TITLE

APPROXIMATE BOREHOLE LOCATION PLAN

Figure No.

1

ORIGINAL SHEET - ANSI B

Appendix C Borehole Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis

Rootmat	vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	mixture of soil and humus capable of supporting vegetative growth
Peat	mixture of visible and invisible fragments of decayed organic matter
Till	unstratified glacial deposit which may range from clay to boulders
Fill	material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure

Desiccated	having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	having cracks, and hence a blocky structure
Varved	composed of regular alternating layers of silt and clay
Stratified	composed of alternating successions of different soil types, e.g. silt and sand
Layer	> 75 mm in thickness
Seam	2 mm to 75 mm in thickness
Parting	< 2 mm in thickness

Terminology describing soil types

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris)

Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on Page 2. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

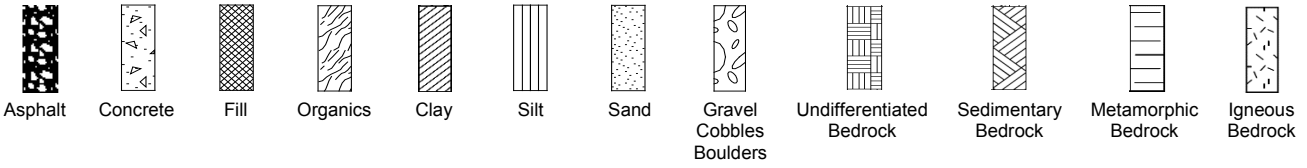
Terminology describing consistency of cohesive soils

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kg/cm^2 or kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

AS, BS, GS	Auger sample; bulk sample; grab sample
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
SO	Sonic tube
SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby Tube or thin wall tube
SV	Shear vane
RC *HQ, NQ, BQ, etc.*	Rock Core; samples obtained with the use of standard size diamond coring bits.

WATER LEVEL

Measured: in standpipe, piezometer, or well

Inferred: seepage noted, or; measured during or at completion of drilling

RECOVERY FOR SOIL SAMPLES

The recovery is recorded as the length of the soil sample recovered in the direct push, split spoon sampler, Shelby Tube, or sonic tube.

N-VALUE

Numbers in this column are the field results of the Standard Penetration Test (SPT): the number of blows of a 140-pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50 for 75 mm or 50/75 mm). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60-degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Total Core Recovery (TCR) denotes the sum of all measurable rock core recovered in one drill run. The value is noted as a percentage of recovered rock core based on the total length of the drill run.

Solid Core Recovery (SCR) is defined as total length of solid core divided by the total drilled length, presented as a percentage. Solid core is defined as core with one full diameter.

Rock Quality Designation (RQD) is a modified core recovery that incorporates only pieces of solid core that are equal to or greater than 10 cm (4") along the core axis. It is calculated as the total cumulative length of solid core (> 10 cm) as measured along the centerline of the core divided by the total length of borehole drilled for each drill run or geotechnical interval, presented as a percentage. RQD is determined in accordance with ASTM D6032.

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock quality

Rock Mass Quality	Rock Quality Designation Number (RQD)	Alternate (Colloquial) Rock Mass Quality	
Very Poor Quality	0-25	*Very Severely Fractured*	*Crushed*
Poor Quality	25-50	*Severely Fractured*	*Shattered or Very Blocky*
Fair Quality	50-75	*Fractured*	*Blocky*
Good Quality	75-90	*Moderately Jointed*	*Sound*
Excellent Quality	90-100	*Intact*	*Very Sound*

Terminology describing rock strength

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

Terminology describing rock with respect to discontinuity and bedding spacing

Spacing (mm)	Discontinuities Spacing	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

BOREHOLE RECORD

BH23-01

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **8m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357275.0N 444678.0E | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **3.7 m on July 11, 2023**

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS	BACKFILL/ MONITOR WELL/ PIEZOMETER	ELEVATION (m)
0	8.0									8
	7.7	FILL: gravel with sand, trace silt		GS	1			Drill out 1.2 m of compacted fill, no blow counts		
		Brown mottled with grey SILTY SAND (SM) - trace fine gravel - moist		GS	2		56	Sieve at 0.6 m G S Fines 2% 50% 48%		
1	6.9	Hard brown lean CLAY (CL) - trace to with sand - trace fine gravel, 19 mm Ø max - medium plastic - dry to moist		GS	3		42 50 60			7
2							54	Auger drill over spun from 1.5 m to 3.0 m		6
				GS	4		49 41			
3							35 37	Auger drill over spun from 3.0 m to 4.6 m		5
		- SANDY lean CLAY below 3.7m		GS	5		46	Percent Passing #200: 66%		
4	3.4						46	DCPT refusal at 4.5 m due to no movement for 10 blows		4
		End of Borehole at 4.6 m - reached target depth - water measured at 3.7 m upon drilling completion on July 11, 2023 - sloughed to 4.0 m								
5										3
6										2
7										1
8										0
9										-1
10										-2

10 blows/0 mm →

▽ Water Level Observed During Drilling

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 4.6 m | Page 1 of 1

Stantec

BOREHOLE RECORD

BH23-02

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **12m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357366.0N 444775.0E | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	12.0	FILL: gravel with sand, trace silt		GS	1			Drill out 1.5 m of compacted fill, no blow counts
1	11.1	Hard brown mottled with grey lean CLAY (CL) with sand and gravel - fine sand, coarse gravel, 23 mm Ø max - trace sand and gravel after 1.5 m - moist		GS	2		32 41	Auger drill over spun from 1.5 m to 3.0 m
2				GS	3		51 45 58	Percent Passing #200: 95%
3				GS	4		41 32	
4	7.7			GS	5		30	DCPT refusal at 4.3 m
5		End of Borehole at 4.3m - auger refusal at 4.3m - no ground water observed						
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/100mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

12 11 10 9 8 7 6 5 4 3 2

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 4.3 m | Page 1 of 1

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BOREHOLE RECORD

BH23-03

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **17m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357469.0N 444891.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	17.0							
		FILL: gravel with sand, trace silt		GS	1			Drill out 0.6 m of compacted fill, no blow counts
	16.4	Compact brown mottled with grey SILTY SAND (SM) - trace coarse gravel - trace organics at 1.1 m - trace clay - moist		GS	2		10	Percent Passing #200: 50%
1	15.8			GS	3			DCPT refusal at 1.2 m due to no movement after 10 blows
		Hard brown lean CLAY (CL) - with to trace sand - trace gravel - moist		GS	4			
2	15.0	End of Borehole at 2.0 m - refusal at 2.0 m due to inferred cobble/boulder/bedrock - no ground water obsereved - second borehole was attempted 1 m to the northeast of BH23-03, refusal encountered at similar depth						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

10 blows/0 mm >>

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

17 16 15 14 13 12 11 10 9 8 7

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 2 m | Page 1 of 1

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BOREHOLE RECORD

BH23-04

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **14.5m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357380.0N 445006.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	14.5							
	14.4	ASPHALT						150 mm of asphalt
		Loose to compact dark brown SILTY SAND (SM) - trace to with organics - trace to with fine gravel, 11 mm Ø max - moist		GS	1		7 19 41	
1	13.6	Hard grey lean CLAY (CL) with sand - trace fine gravel - medium plasticity - moist - trace sand below 1.5m		GS	2		40	Percent Passing #200: 75%
							44	Auger drill over spun from 1.5 m to 3.0 m
2				GS	3		49 51 46	
3				GS	4		51 81	DCPT refusal at 3.3 m
	11.0			GS	5			
4		End of Borehole at 3.5 m - auger refusal at 3.5 m - no ground water observed - sloughed to 2.9 m						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ■

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/22mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

14 13 12 11 10 9 8 7 6 5

5 6 7 8 9 10

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 3.5 m | Page 1 of 1

BOREHOLE RECORD

BH23-05

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **16m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357242.0N 445154.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	16.0							
	15.7	ASPHALT						300 mm of asphalt
	15.6	FILL: gravel with sand, trace silt						
		Loose brown SILTY SAND (SM) - coarse sand - trace to with fine gravel - moist		GS	1		5	
1	15.1						38	
		Hard brown lean CLAY (CL) - trace coarse sand - trace fine gravel - medium plasticity - moist		GS	2		66	
							62	
2				GS	3		39	
							33	
	13.3			GS	4		43	Auger drill over spun at 2.7 m DCPT refusal at 3.0 m
3 ▽		Hard brown CLAYEY SAND (SC) with gravel - fine sand, coarse fine gravel, 15 mm Ø max - moist to wet		GS	5			Percent Passing #200: 46%
	12.6							50 blows/152mm >>
4		End of Borehole at 3.4 m - auger refusal at 3.4 m - no ground water observed - sloughed to 2.4 m						
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

16 15 14 13 ▽ 12 11 10 9 8 7 6

▽ Water Level Observed During Drilling

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 3.4 m | Page 1 of 1

Stantec

BOREHOLE RECORD

BH23-06

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **18m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357215.0N 445319.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) or TCR %	SAMPLES: N-VALUE or RQD %	OTHER TESTS / REMARKS
0	18.0							
	17.8	ASPHALT						200 mm of asphalt
		Brown SILTY SAND (SM) with gravel - moist						No DCPT due to shallow cobble/boulder
1	16.8			GS	1			Sieve at 0.8 m G S Fines 34% 38% 28%
		End of Borehole at 1.2 m - auger refusal at 1.2 m due to inferred cobble/boulder/bedrock - no ground water observed						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

0 1 2 3 4 5 6 7 8 9 10

18 17 16 15 14 13 12 11 10 9 8

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 1.2 m | Page 1 of 1

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BOREHOLE RECORD

BH23-07

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **20.5m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357258.0N 445539.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	20.5							
	20.4	ASPHALT						150 mm of asphalt
	20.2	FILL: gravel with sand, trace silt						
		Loose dark brown SILTY SAND (SM) - trace to with coarse gravel - trace to with organics - moist		GS	1		5 8	
	19.6			GS	2			Percent Passing #200: 60%
1	19.3	Hard brown lean CLAY (CL) with sand - trace gravel - occasional blue clay - trace oxidization - moist		GS	3		38	DCPT refusal at 1.2 m
	19.0	Hard brown CLAYEY SAND (SC) - trace fine gravel - occasional cobbles up to 85 mm - moist						
2		End of Borehole at 1.5 m - auger refusal at 1.5 m due to inferred cobble/boulder/bedrock - no ground water observed						
3								
4								
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/100mm >>

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 20 19 18 17 16 15 14 13 12 11

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 1.5 m | Page 1 of 1

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BOREHOLE RECORD

BH23-08

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **20m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357340.0N 445699.0E | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	20.0							
	19.9	ASPHALT						100 mm asphalt
		Loose to compact dark brown SILTY SAND (SM) with gravel - fine sand, coarse gravel, 23 mm Ø max - trace to with organics - moist		GS	1		16 7	Sieve at 0.6 m G S Fines 23% 40% 37%
1				GS	2		6 22	
	18.5	Hard brown lean CLAY (CL) with sand - trace to with gravel, 30 mm Ø max - medium plasticity - moist					57	
2				GS	3		75 64	
				GS	4		84 100	DCPT refusal at 2.9 m
3								
				GS	5			
4								
	15.4			GS	6			
		End of Borehole at 4.6 m - reached target depth - no ground water observed						
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

20 19 18 17 16 15 14 13 12 11 10

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 4.6 m | Page 1 of 1

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BOREHOLE RECORD

BH23-09

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **16m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357427.0N 445850.0E | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	16.0							
	15.9	ASPHALT						150 mm of asphalt
		Compact brown SILTY SAND (SM) with gravel - fine sand, coarse gravel, 23 mm Ø max - trace clay - moist		GS	1		28	Percent Passing #200: 24%
1				GS	2		18	
	14.7						27	
	14.5	Hard brown mottled with grey CLAYEY SAND (SC) with gravel - fine sand, coarse gravel, 28 mm Ø max - moist					58	DCPT refusal at 1.5 m
2		End of Borehole at 1.5 m - auger refusal at 1.5 m - no ground water observed						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/100mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

16 15 14 13 12 11 10 9 8 7 6

3 4 5 6 7 8 9 10

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 1.5 m | Page 1 of 1

BOREHOLE RECORD

BH23-10

CLIENT: **District of Sooke** | BH COORDINATES [UTM 10] | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | 5357623.0N 445983.0E | BH ELEVATION: **19m**

LOCATION: **Sooke Wastewater Treatment Plant** | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	19.0							
	18.9	ASPHALT						150 mm of asphalt Drill out 1.2 m, no DCPT blow counts
	18.6	Dark brown CLAYEY SAND (SC) with gravel - fine sand, coarse gravel, 37mm Ø max - trace to with organics - moist		GS	1			
1				GS	2			Percent Passing #200: 54%
		Hard brown SANDY lean CLAY (CL) - trace fine gravel, 12 mm Ø max - medium plasticity - moist - with sand below 1.2 m		GS	3		49 45	
2	16.9							DCPT refusal at 2.1 m
		End of Borehole at 2.1 m - auger refusal at 2.0m - no ground water observed						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/127mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

19 18 17 16 15 14 13 12 11 10 9

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By: GL

Drilling Method: Solid Stem Auger | Reviewed By: JN

Completion Depth: 2.1 m | Page 1 of 1

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Appendix D Laboratory Testing

Stantec

Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 26, 2023
Tested By:	FF

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Canada V5H 0C6
Tel: (604) 436-3014

LABORATORY
3711 North Fraser Way
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Canada V5J 5J2
Tel: (604) 436-3014

Sample : BH23-01_GS-4

LIQUID LIMIT

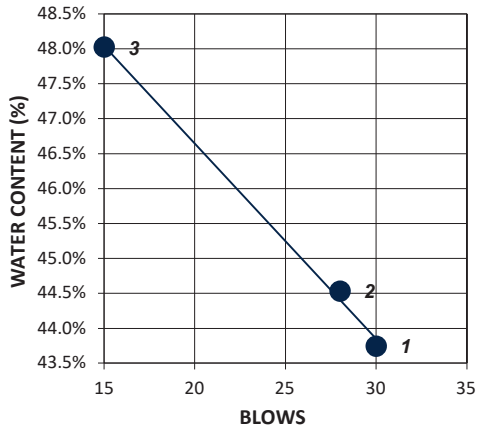
Trial	1	2	3
No. of Blows	30	28	15
Tare No.	X27	HI	G36
Wt. Sa. (wet+tare)(g)	6.85	7.65	7.96
Wt. Sa. (dry+tare)(g)	5.16	5.69	5.80
Wt. Tare (g)	1.28	1.30	1.30
Wt. Dry Soil (g)	3.9	4.4	4.5
Wt. Water (g)	1.7	2.0	2.2
Water Content (%)	43.7%	44.5%	48.0%

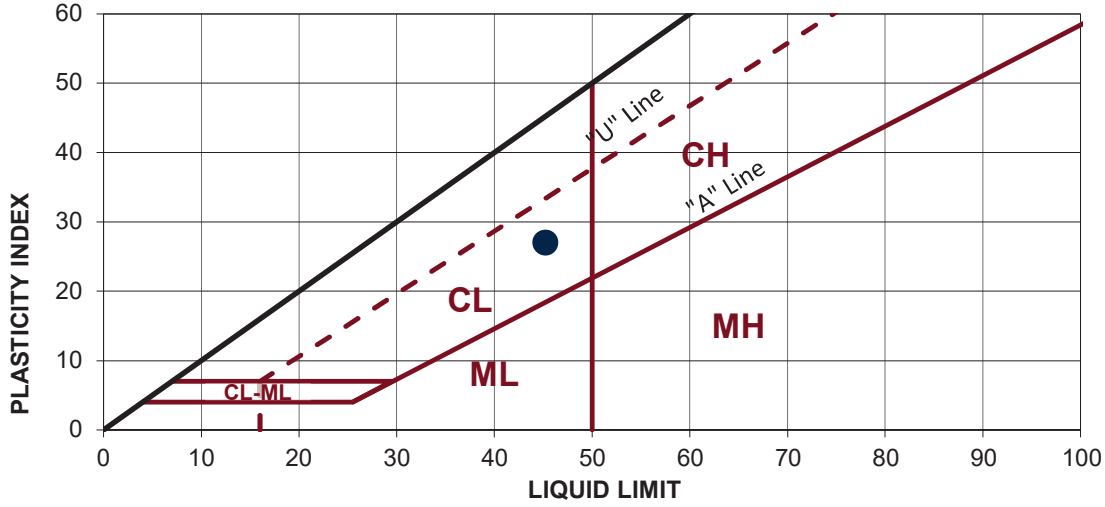
PLASTIC LIMIT

Trial	1	2
Tare No.	6	T3
Wt. Sa. (wet+tare)(g)	38.32	29.92
Wt. Sa. (dry+tare)(g)	35.59	28.57
Wt. Tare (g)	20.89	21.11
Wt. Dry Soil (g)	14.7	7.5
Wt. Water (g)	2.7	1.4
Water Content (%)	18.6%	18.2%

RESULTS

LL	**45**
PL	**18**
PI	**27**
Natural MC (%)	
21.3%	





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Stantec

Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 28, 2023
Tested By:	PR

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Tel: (604) 436-3014

Sample : BH23-02_GS-4

LIQUID LIMIT

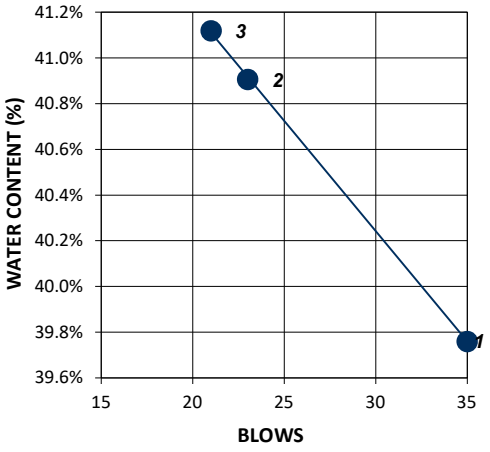
Trial	1	2	3
No. of Blows	35	23	21
Tare No.	102	A7	3A
Wt. Sa. (wet+tare)(g)	12.15	11.49	12.65
Wt. Sa. (dry+tare)(g)	9.06	8.53	9.34
Wt. Tare (g)	1.29	1.29	1.30
Wt. Dry Soil (g)	7.8	7.2	8.0
Wt. Water (g)	3.1	3.0	3.3
Water Content (%)	39.8%	40.9%	41.1%

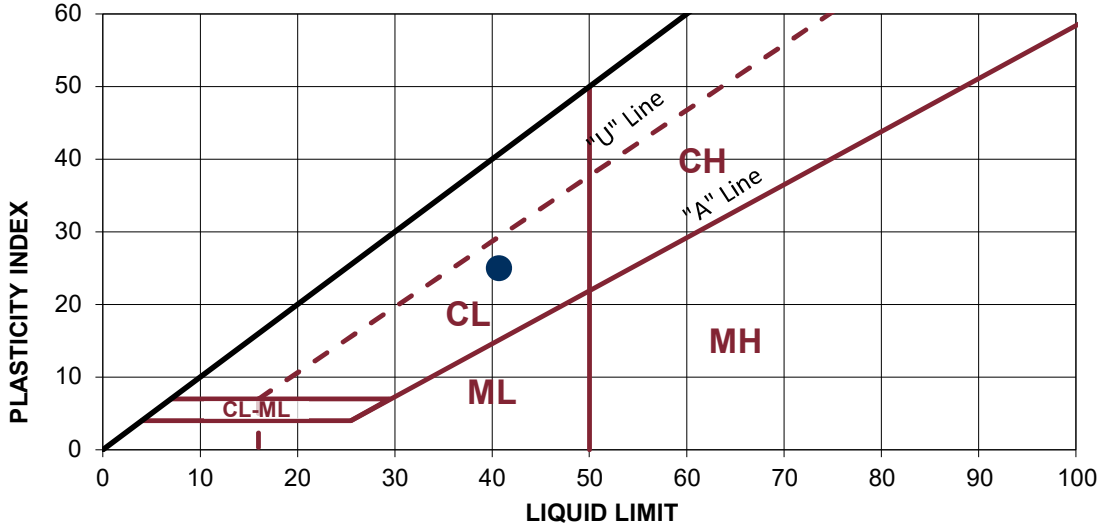
PLASTIC LIMIT

Trial	1	2
Tare No.	8	13
Wt. Sa. (wet+tare)(g)	115.90	114.61
Wt. Sa. (dry+tare)(g)	114.41	113.30
Wt. Tare (g)	105.10	104.98
Wt. Dry Soil (g)	9.3	8.3
Wt. Water (g)	1.5	1.3
Water Content (%)	16.1%	15.7%

RESULTS

LL	**41**
PL	**16**
PI	**25**
Natural MC (%)	
26.8%	





Comments:

Reviewed By: _____

Stantec

Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 26, 2023
Tested By:	FF

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Sample : BH23-04_GS-3

LIQUID LIMIT

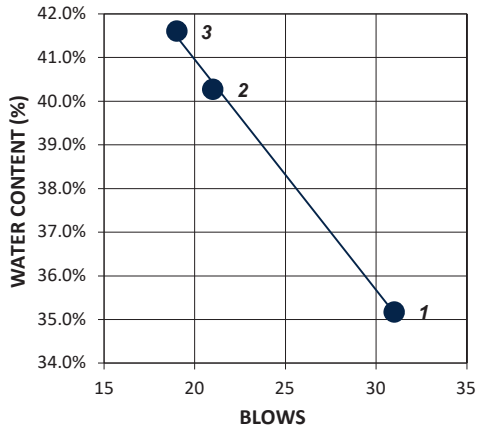
Trial	1	2	3
No. of Blows	31	21	19
Tare No.	A24	Z17	S7
Wt. Sa. (wet+tare)(g)	11.79	7.63	6.65
Wt. Sa. (dry+tare)(g)	9.05	5.81	5.08
Wt. Tare (g)	1.28	1.29	1.29
Wt. Dry Soil (g)	7.8	4.5	3.8
Wt. Water (g)	2.7	1.8	1.6
Water Content (%)	35.2%	40.3%	41.6%

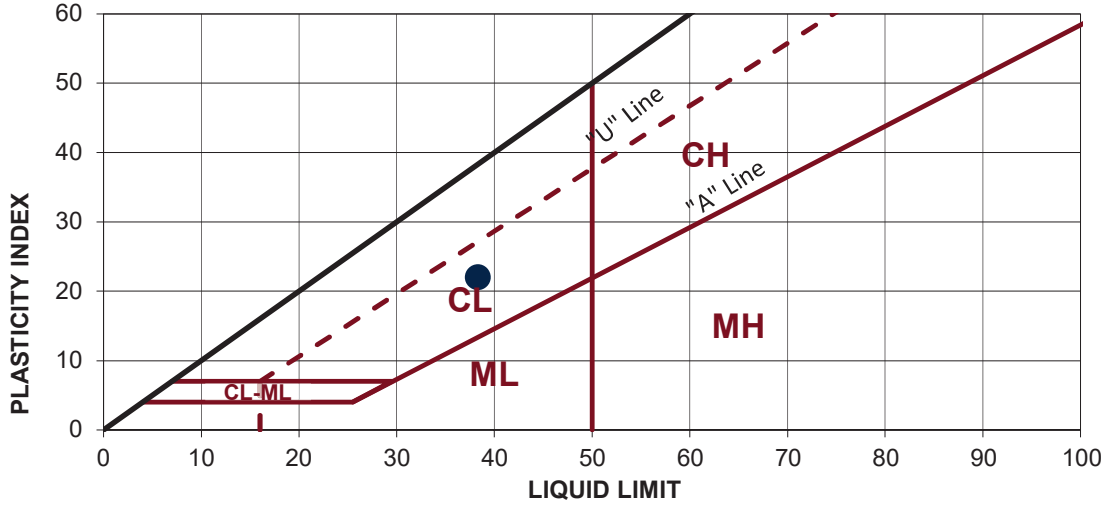
PLASTIC LIMIT

Trial	1	2
Tare No.	4	7
Wt. Sa. (wet+tare)(g)	35.05	29.48
Wt. Sa. (dry+tare)(g)	33.12	28.31
Wt. Tare (g)	20.97	20.88
Wt. Dry Soil (g)	12.1	7.4
Wt. Water (g)	1.9	1.2
Water Content (%)	16.0%	15.7%

RESULTS

LL	38
PL	16
PI	22
Natural MC (%)	
19.1%	





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Stantec

Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 28, 2023
Tested By:	PR

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Burnaby, BC
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Tel: (604) 436-3014

Sample : BH23-08_GS-5

LIQUID LIMIT

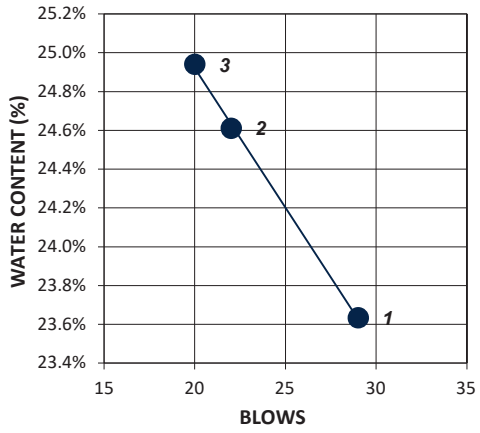
Trial	1	2	3
No. of Blows	29	22	20
Tare No.	CR	C12	CRD58
Wt. Sa. (wet+tare)(g)	12.34	13.54	12.72
Wt. Sa. (dry+tare)(g)	10.23	11.12	10.44
Wt. Tare (g)	1.31	1.30	1.30
Wt. Dry Soil (g)	8.9	9.8	9.1
Wt. Water (g)	2.1	2.4	2.3
Water Content (%)	23.6%	24.6%	24.9%

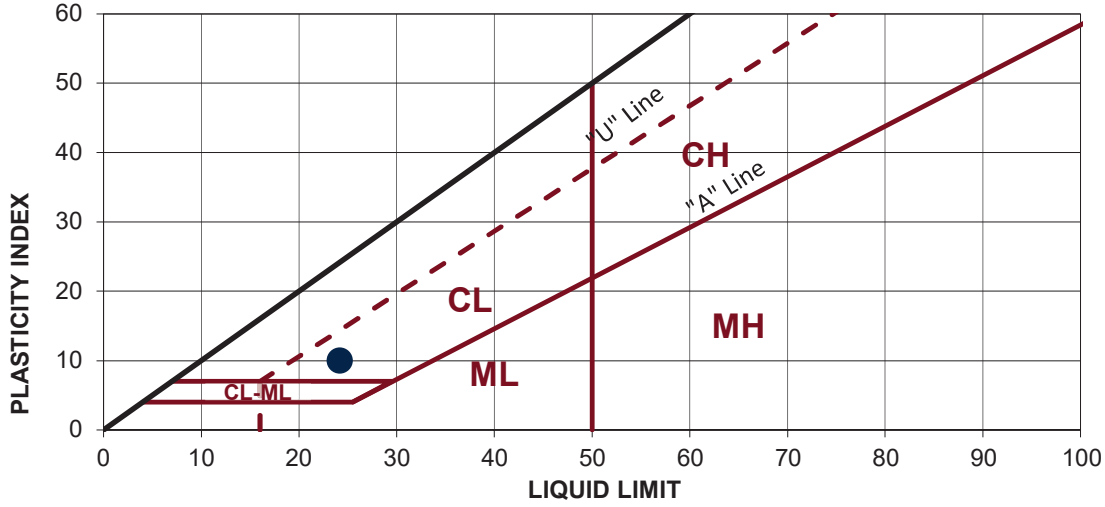
PLASTIC LIMIT

Trial	1	2
Tare No.	10	6
Wt. Sa. (wet+tare)(g)	114.18	116.15
Wt. Sa. (dry+tare)(g)	113.02	114.76
Wt. Tare (g)	104.69	104.72
Wt. Dry Soil (g)	8.3	10.0
Wt. Water (g)	1.2	1.4
Water Content (%)	14.0%	13.9%

RESULTS

LL	**24**
PL	**14**
PI	**10**
Natural MC (%)	
15.6%	





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Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 27, 2023
Tested By:	PR

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Burnaby, BC
Canada V5J 5J2
Tel: (604) 436-3014

Sample : BH23-10_GS-1

LIQUID LIMIT

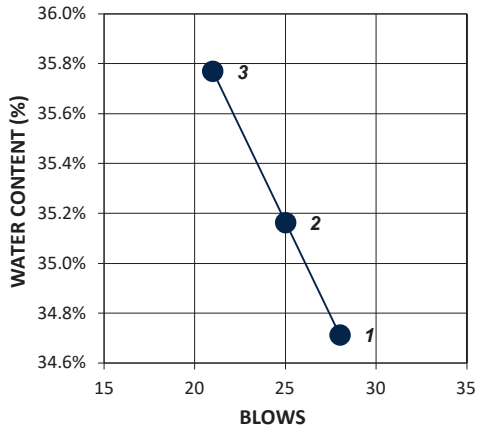
Trial	1	2	3
No. of Blows	28	25	21
Tare No.	KK5	C145	W-2
Wt. Sa. (wet+tare)(g)	11.58	12.51	10.66
Wt. Sa. (dry+tare)(g)	8.94	9.60	8.20
Wt. Tare (g)	1.33	1.31	1.33
Wt. Dry Soil (g)	7.6	8.3	6.9
Wt. Water (g)	2.6	2.9	2.5
Water Content (%)	34.7%	35.2%	35.8%

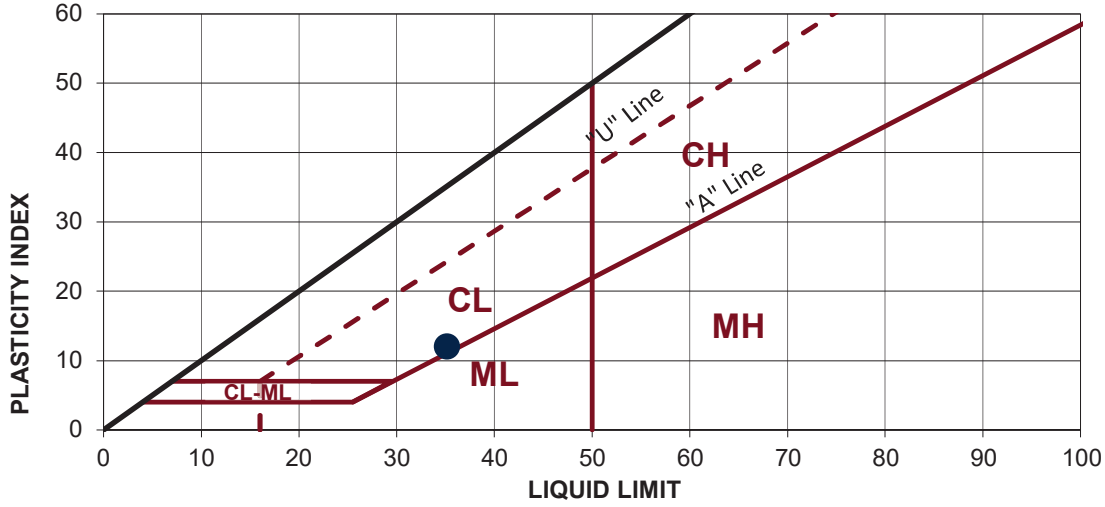
PLASTIC LIMIT

Trial	1	2
Tare No.	T-2	5
Wt. Sa. (wet+tare)(g)	31.83	30.28
Wt. Sa. (dry+tare)(g)	29.75	28.60
Wt. Tare (g)	20.93	21.10
Wt. Dry Soil (g)	8.8	7.5
Wt. Water (g)	2.1	1.7
Water Content (%)	23.5%	22.5%

RESULTS

LL	**35**
PL	**23**
PI	**12**
Natural MC (%)	
16.6%	





Comments:

Reviewed By:

Digitally signed by Hustler, Greg
Date: 2023.08.01 11:52:46 -07'00'

Stantec

Atterberg Limits
ASTM D4318
Method A- Multi-Point

Client:	District of Sooke
Project Name:	Sooke Forcemain Project
Project No:	111720115.300.100
Date Received:	July 13, 2023
Date Tested:	July 27, 2023
Tested By:	PR

OFFICE
4515 Central Blvd.
Suite 500
Burnaby, BC
Canada V5H 0C6
Tel: (604) 436-3014

LABORATORY
3711 North Fraser Way
Suite 400
Burnaby, BC
Canada V5J 5J2
Tel: (604) 436-3014

Sample : BH23-10_GS-3

LIQUID LIMIT

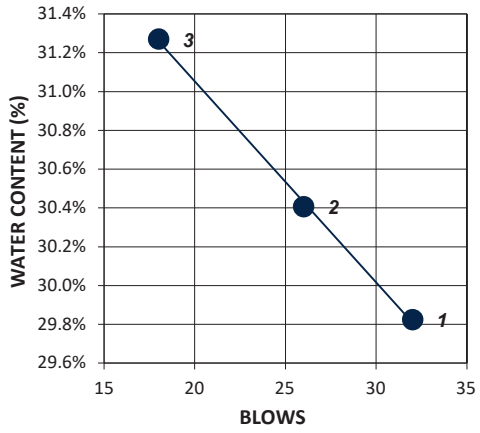
Trial	1	2	3
No. of Blows	32	26	18
Tare No.	B2	VI	S3
Wt. Sa. (wet+tare)(g)	12.77	11.36	11.58
Wt. Sa. (dry+tare)(g)	10.15	9.01	9.13
Wt. Tare (g)	1.34	1.29	1.28
Wt. Dry Soil (g)	8.8	7.7	7.8
Wt. Water (g)	2.6	2.3	2.5
Water Content (%)	29.8%	30.4%	31.3%

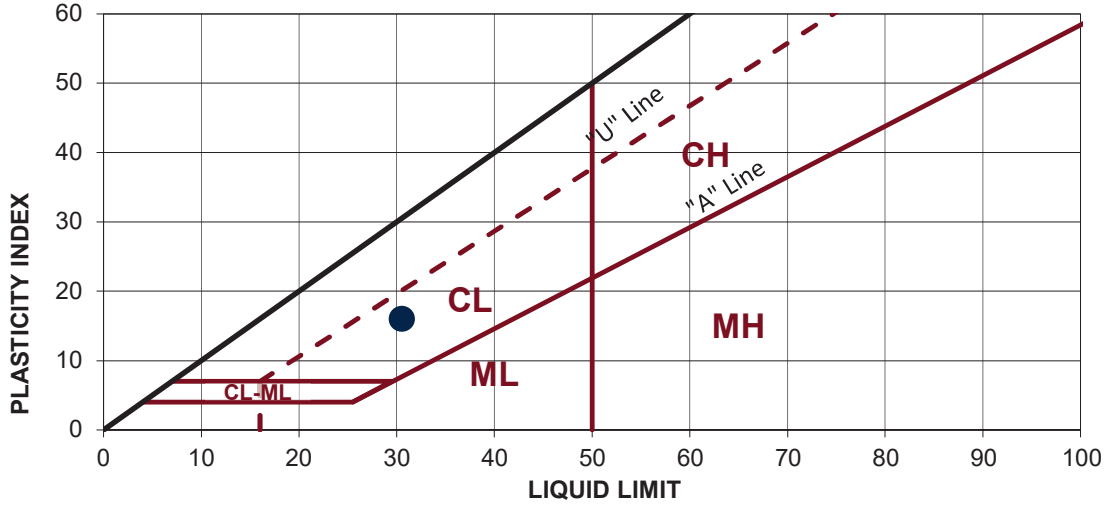
PLASTIC LIMIT

Trial	1	2
Tare No.	T11	12
Wt. Sa. (wet+tare)(g)	31.87	31.18
Wt. Sa. (dry+tare)(g)	30.45	29.83
Wt. Tare (g)	20.96	21.02
Wt. Dry Soil (g)	9.5	8.8
Wt. Water (g)	1.4	1.3
Water Content (%)	14.9%	15.3%

RESULTS

LL	31
PL	15
PI	16
Natural MC (%)	
15.3%	





Comments:

Reviewed By:

Digitally signed by Hustler, Greg
Date: 2023.08.01 11:52:56 -07'00'

Stantec

Grain Size Analysis

ASTM D6913

Client: District of Sooke
Project Name: Sooke Forcemain Project
Project No: 111720115.300.100

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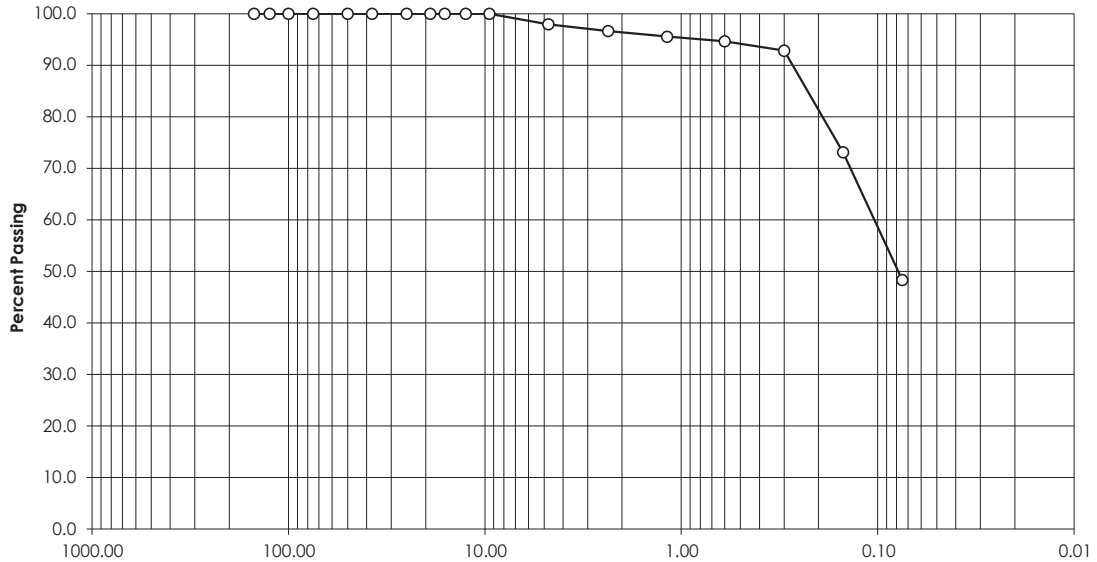
Tel: (604) 436-3014

SAMPLE No.: BH23-01, GS-2, 0.6m - 0.8m
SOURCE: -
TESTED BY: PR

DATE RECEIVED: July 13, 2023
DATE TESTED: July 25, 2023
SAMPLE DESCRIPTION: silty SAND, (SM)



Sieve (mm)	Sample % Passing	Specifications Lower	Specifications Upper
150.0	**100.0**	-	-
125.0	**100.0**	-	-
100.0	**100.0**	-	-
75.0	**100.0**	-	-
50.0	**100.0**	-	-
37.5	**100.0**	-	-
25.0	**100.0**	-	-
19.0	**100.0**	-	-
16.0	**100.0**	-	-
12.5	**100.0**	-	-
9.5	**100.0**	-	-
4.75	**98.0**	-	-
2.36	**96.7**	-	-
1.18	**95.6**	-	-
0.600	**94.7**	-	-
0.300	**92.8**	-	-
0.150	**73.1**	-	-
0.075	**48.3**	-	-

Cobble:	-	D_{10}:	-
Gravel:	2.0%	D_{30}:	-
Sand:	49.6%	D_{60}:	0.11
Fines:	48.4%	C_u:	-
		C_c:	-

Comments:

Reviewed by:

Digitally signed by Hustler, Greg
Date: 2023.08.01 11:55:29 -07'00'

Stantec

Grain Size Analysis

ASTM D6913

Client: District of Sooke
Project Name: Sooke Forcemain Project
Project No: 111720115.300.100

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LABORATORY
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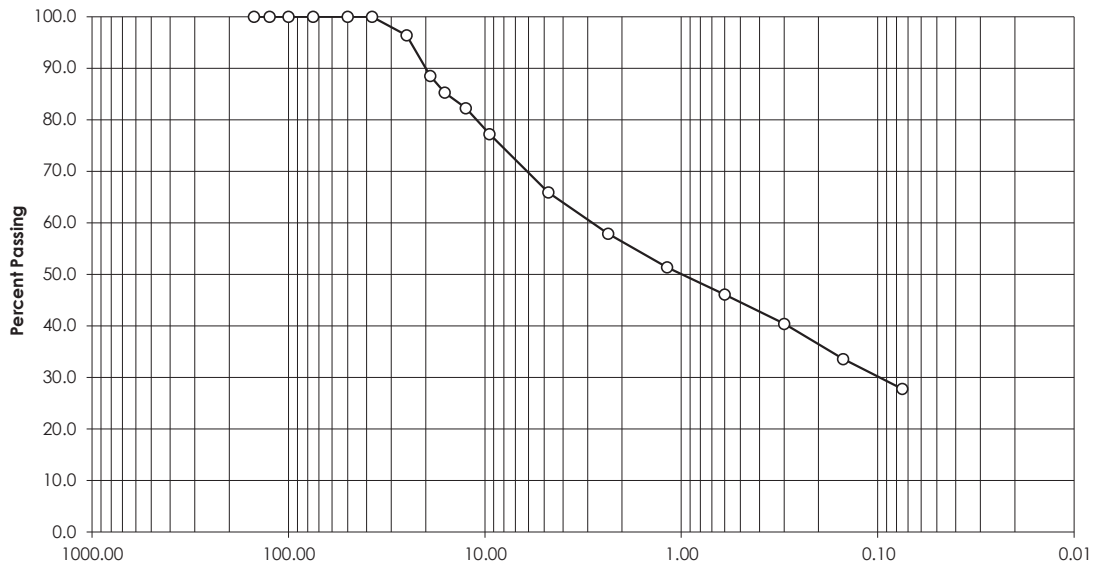
Burnaby, BC
Canada V5J 5J2
Tel: (604) 436-3014

SAMPLE No.: BH23-06, GS-1, 0.9m - 1.1m
SOURCE: -
TESTED BY: FF

DATE RECEIVED: July 13, 2023
DATE TESTED: July 26, 2023
SAMPLE DESCRIPTION: silty SAND with gravel, (SM)



Sieve (mm)	Sample % Passing	Specifications Lower	Specifications Upper
150.0	**100.0**	-	-
125.0	**100.0**	-	-
100.0	**100.0**	-	-
75.0	**100.0**	-	-
50.0	**100.0**	-	-
37.5	**100.0**	-	-
25.0	**96.4**	-	-
19.0	**88.5**	-	-
16.0	**85.3**	-	-
12.5	**82.3**	-	-
9.5	**77.2**	-	-
4.75	**65.9**	-	-
2.36	**57.9**	-	-
1.18	**51.4**	-	-
0.600	**46.1**	-	-
0.300	**40.4**	-	-
0.150	**33.6**	-	-
0.075	**27.8**	-	-

Cobble:	-	D_{10}:	-
Gravel:	34.1%	D_{30}:	0.11
Sand:	38.1%	D_{60}:	3.03
Fines:	27.8%	C_u:	-
		C_c:	-

Comments: The available minimum test sample size did not meet the requirement of ASTM D6913/D6913M - 17, section 10.2. Nominal Maximum Size Opening of 25.4mm requires 3kg minimum test sample size.

Reviewed by:

Digitally signed by Hustler, Greg
Date: 2023.08.01 11:55:40 -07'00'

Stantec

Grain Size Analysis

ASTM D6913

Client: District of Sooke
Project Name: Sooke Forcemain Project
Project No: 111720115.300.100

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LABORATORY
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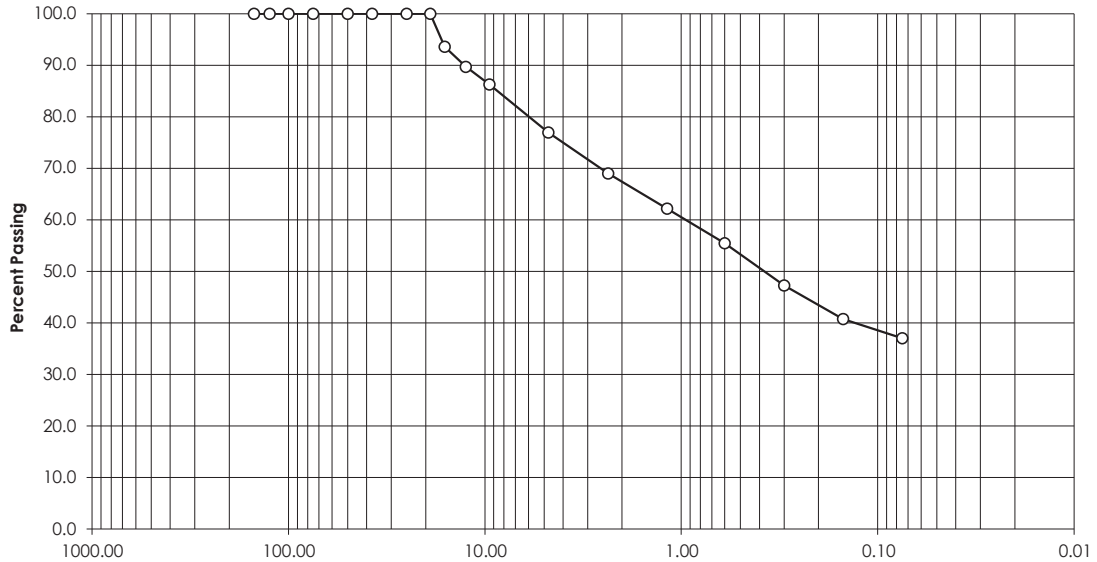
Burnaby, BC
Canada V5J 5J2
Tel: (604) 436-3014

SAMPLE No.: BH23-08, GS-1, 0.6m - 0.8m
SOURCE: -
TESTED BY: PR

DATE RECEIVED: July 13, 2023
DATE TESTED: July 27, 2023
SAMPLE DESCRIPTION: silty SAND with gravel, (SM)



Sieve (mm)	Sample % Passing	Specifications Lower	Specifications Upper
150.0	**100.0**	-	-
125.0	**100.0**	-	-
100.0	**100.0**	-	-
75.0	**100.0**	-	-
50.0	**100.0**	-	-
37.5	**100.0**	-	-
25.0	**100.0**	-	-
19.0	**100.0**	-	-
16.0	**93.6**	-	-
12.5	**89.7**	-	-
9.5	**86.3**	-	-
4.75	**77.0**	-	-
2.36	**69.0**	-	-
1.18	**62.2**	-	-
0.600	**55.5**	-	-
0.300	**47.3**	-	-
0.150	**40.8**	-	-
0.075	**37.1**	-	-

Cobble:	-	D_{10}:	-
Gravel:	23.0%	D_{30}:	-
Sand:	39.9%	D_{60}:	1.00
Fines:	37.1%	C_U:	-
		C_C:	-

Comments: The available minimum test sample size did not meet the requirement of ASTM D6913/D6913M - 17, section 10.2. Nominal Maximum Size Opening of 19.0mm requires 1.3kg minimum test sample size.

Reviewed by:

Digitally signed by Hustler, Greg
Date: 2023.08.01 11:55:48 -07'00'

ENVIRONMENTAL ASSESSMENT

Stantec Consulting Ltd.
400-655 Tyee Road, Victoria, BC V9A 6X5

September 29, 2023
File: 111720115

Attention: Jeff Carter, Director of Operations
District of Sooke
2205 Otter Point Road
Sooke BC, V9Z 1J2

Dear Mr. Carter,

Reference: Environmental Desktop Review for Proposed West Coast Road Sanitary Forcemain Upgrades, Sooke, BC

INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by District of Sooke (the District) to provide soil sampling support for forcemain upgrades (the "Project") for an alignment along a portion of West Coast Road and the roadway leading to the Sooke Waste Treatment Facility, located in Sooke, British Columbia (BC), herein referred to as the "Site". The scope of work for this program was outlined in Stantec's proposal submitted June 15, 2023.

The location of the Site is presented on the attached Figure 1, and a Site Plan indicating the investigation locations is presented on the attached Figure 2.

BACKGROUND

The Project is located in a residential area within the District of Sooke. It was reported to Stantec that soil at the Site will be excavated during the planned forcemain upgrades and may require off-site relocation or disposal. The anticipated maximum depth of excavation for the forcemain upgrades at the Site is 1.5 meters below ground surface (mbgs).

As part of preparation for Project construction, Stantec conducted a desktop review for the District to identify areas of potential environmental concern (APEC) and associated potential contaminants of concern (PCOCs) that may be present at or near the Site which may affect soil quality.

DESKTOP REVIEW AND SITE VISIT

Stantec conducted a desktop review that included collecting information on the Site and adjacent land uses, reviewing surficial and bedrock geology maps of the Site area, ordering a BC Ministry of Environment and Climate Change Strategy (ENV) Site Registry search, historical and current aerial photograph review, a civic directory search, and an initial site visit.

Site Description

The Site comprised the current and planned forcemain alignments along a portion of West Coast Road from Maple Avenue South to the Sooke Waste Treatment Facility (SWTF). West Coast Road and Maple Avenue South were comprised of residential, small-scale agriculture and commercial land use (including a marina and boat repair shop), and the SWTF is considered a public utility right-of-way (ROW). The land use areas are presented on Figure 2 in Attachment 1.

Surficial and Bedrock Geology

Based on the available BC Soil Survey Report No. 44[1] soil map, the surficial soils at the Site were expected to consist of well-drained loam of the Somenos Soil Association and based on iMapBC's Geology Bedrock[2] map, the Site was underlain by the Island Plutonic Suite which is comprised of granodioritic intrusive rock.

BC ENV Site Registry

A search of the BC ENV Site Registry was completed on July 6, 2023 using iMapBC. No registered sites were identified within 500 m from the Site.

Historical Aerial Photographs

Historical aerial photographs covering the Site and surrounding properties were obtained for 1946, 1951, 1955, 1962, 1972, 1977, 1984, 1990, and 2005 from the University of British Columbia Geographic Information Centre (UBC GIC). Aerial imagery for 2006, 2011, 2013, 2016, 2018, 2019, 2020, 2022, and 2023 were reviewed on Google Earth. The aerial photographs were reviewed with the objective of identifying past activities associated with the Site and/or surrounding areas that may be of potential environmental concern. Land use in the area appears to have been undeveloped forested, agricultural, or residential during the reviewed time periods. No areas of potential environmental concern were identified through the review of the historical aerial photographs.

Civic Directory Search

The Vancouver Public Library was retained to complete a historical civic directory search for the roadways associated with the Site. It was reported back that the Vancouver Public Library did not have listings available for Sooke, BC.

Site Visit

The Site was assessed by Baillie Holmes, MASc. on July 7, 2023. Stantec travelled the extent of the planned forcemain upgrade alignments, and readily visible and publicly accessible portions of adjoining and neighboring properties, to identify potential sources of environmental contamination. Photographs of the Site and surrounding area are provided in Attachment 2.

The Site consisted of a paved roadway for West Coast Road and a gravel driveway for the access road to the SWTF. The access road to the SWTF was bounded to the northwest by agricultural land (Woodside

[1] BC Ministry of Environment. 1985. *Soils of Southern Vancouver Island, Report No. 44, British Columbia Soil Survey*.
[2] iMapBC. Available at: https://maps.gov.bc.ca/ess/hm/imap4m/

Farm) and residential homes to the southeast. Woodside Farm may use, or has used, herbicides and pesticides as part of its operation. Due to its proximity to the Site, this property was considered an APEC to the Project.

Drainage consisted of ditching on sides of the roadway within the Site area. Adjacent properties to West Coast Road were generally single family residences, with a few commercial and utility properties as follows:

- A boat maintenance shop was located at 6864 West Coast Road, which was positioned north adjacent and upgradient of the Site. Boat repair is a specified BC *Contaminated Sites Regulation* (CSR) Schedule 2 activity; therefore, this proximal facility was considered an APEC to the Project.
- Resorts and marinas were observed from 6929 to 6971 West Coast Road, located south adjacent and downgradient of the Site. Storage of oil and gas may be associated with the marina but were not directly observed; as well, the marina facilities these were located approximately 150 m from the Site, down a steep gradient with an elevation change of approximately 10 m. Due to the distance of the marinas and their downgradient location with respect to the Site, these properties were not considered an environmental risk to the Site.
- The SWTF was located southwest adjacent to the Site. The SWTP treats municipal sewage waste, which is considered a BC CSR Schedule 2 activity; therefore, the SWTP was considered an APEC to the Project.

No other properties were identified during the site visit that were considered to be potential environmental concerns to the Project.

SUMMARY OF APECS

The Desktop Review identified a total of four APECs either on or in proximity to the Site. The locations of these APECs are provided as Figure 2 in Attachment 1.

APEC 1 – Fill of Unknown Source and Road Salt Application

The planned forcemain upgrades are planned to occur within or immediately adjacent to paved roadways that were constructed prior to the 1950s (West Coast Road and Maple Avenue South). The roadways were built with fill of an unknown source and quality. Additionally, the likely application of road salt to the roadways over the years may have affected soil quality within the Project alignment. Potential contaminants of concern (PCOCs) include: light and heavy extractable petroleum hydrocarbons (LEPH and HEPH), polycyclic aromatic hydrocarbons (PAHs), volatile petroleum hydrocarbons (VPH), benzene, toluene, ethylbenzene, xylenes (BTEX), sodium and chloride ions, and metals.

APEC 2 – Boat Manufacturer at 6864 Westcoast Road

Adjacent to the planned forcemain upgrade is a boat manufacturer. The manufacturer is located upgradient of the presumed groundwater flow gradient. There is potential for paint, lacquers, thinners, oils, grease and other associated chemicals to have been spilled and mobilized through the soil and local groundwater table towards the Site. PCOCs include: LEPH, HEPH, VPH, BTEX, PAH, volatile organic compounds (VOC), and metals.

APEC 3 – Woodside Farm at 7149 West Coast Road

Woodside Farm to the northwest of the access road to the SWTP has been in operations since 1851 and may use or has used herbicides and pesticides in the past. Due to the proximity to the Site and its duration as a farm, this property is considered and APEC to the Project. PCOCs include: herbicides and pesticides.

APEC 4 – Sooke Waste Treatment Facility

At the end of Maple Avenue South is the SWTF. Waste treatment facilities are considered a Schedule 2 activity. There is potential for metals and nutrient contamination within the soil or groundwater within the proximity of the facility. PCOCs include: BTEX, LEPH, HEPH, PAHs, VPH, metals, sodium and chloride ions, nutrients, and/or VOC.

RECOMMENDED SAMPLING PROGRAM

Based on the findings of the Desktop Review and the planned depth of the proposed forcemain, 10 borehole locations to a maximum depth of 4.6 mbgs were proposed for soil sampling to investigate the identified APECs at the Site. PCOCs identified to be investigated include: BTEX, LEPH, HEPH, PAHs, VPH, VOCs, metals, sodium and chloride ions, nutrients, and/or pesticides/herbicides.

SCOPE OF WORK

The following tasks were completed as part of this environmental sampling and characterization program:

- Completed a risk management strategy (RMS 1) safety review prior to field activities.
- Identified and obtained the necessary permits and approvals required to conduct the environmental field programs.
- Conducted a BC 1 Call search request and reviewed results in conjunction with obtained utility maps received directly from the District.
- Retained KMF Traffic Solutions Ltd. (KMF) to provide traffic control for work along roadways. KMF was on-site from July 11 to 13, 2023.
- Retained Scanplus Locating Ltd. (Scanplus) to identify the locations of subsurface utilities and clear the areas of the planned boreholes in relation to those utilities. Utility locates were completed July 10, 2023.
- Advanced a total of 10 boreholes using a solid stem auger operated by Grassroots Drilling Ltd. (Grassroots) to a maximum depth of 4.6 mbgs from July 11 to 13, 2023. Stantec collected soil samples from each investigative location and recorded soil conditions including soil colour, type, relative moisture level, and headspace vapour levels (HSVLs).
- Boreholes were backfilled with drill cuttings and bagged 10/20 sand and completed with an asphalt cold patch at grade, where required.
- Stantec submitted 11 representative soil samples (including one blind field duplicate for quality assurance purposes) to Canadian Association for Laboratory Accreditation (CALA) certified CARO Labs (CARO) in Richmond, BC for analysis of one or more of the identified PCOCs.
- Tabulation of analytical data results from CARO and comparison to applicable BC CSR soil standards
- Preparation of this letter report summarizing the work completed at the Site.

Soil sampling was completed using generally accepted environmental practices in accordance with the provincial BC ENV *Field Sampling Manual*[3], BC CSR protocols, procedures, and guidelines, and Stantec's standard field procedures.

REGULATORY FRAMEWORK

Contaminated sites in BC are governed by the *Environmental Management Act* (EMA) and administered by BC ENV. The BC CSR is the enabling regulation under the EMA that outline procedures for the investigation and reporting of contaminated sites and includes numerical standards for soil and groundwater quality for specific land and water uses.

The applicable numerical soil standards are set out in CSR Schedule 3.1– Part 1 (matrix-specific), Part 2 (human health), and Part 3 (ecological health), and are based on land use and potential contaminant receptors.

As the Site consists of roadways, they are considered industrial land use in the context of the CSR; therefore, CSR Industrial Land Use (IL) standards were deemed applicable to the Site. The CSR IL standards are also useful for comparison and characterization of soil intended for disposal (i.e., soils exceeding the CSR IL standards are considered "waste" and must be disposed at an appropriately licensed disposal/treatment facility).

For the purposes of characterizing the soil to determine appropriate off-Site disposal and relocation options, the analytical results were also compared to the CSR Residential Low Density land use (RLLD) standards.

In accordance with the BC CSR, and considering the groundwater uses at and near the Site, the following site-specific factors for the Schedule 3.1 – Part 1 IL standards were considered applicable at the Site:

- Intake of contaminated soil (mandatory for all sites in the province)
- Groundwater used for drinking water - based on potential future use (cannot be excluded in the absence of the hydrogeological and geochemical testing, which was beyond the scope of this program)
- Toxicity to soil invertebrates and plants (mandatory for all sites in the province)
- Groundwater flow to surface water used by freshwater aquatic life – based on two unnamed creeks which flow under the Site near 7096 West Coast Road and 7110 West Coast Road (adjacent to the Site)
- Groundwater flow to surface water used by marine aquatic life – based on the proximity of the Sooke Basin (approximately 115 m southeast of the Site at its nearest point)
- Groundwater used for irrigation – based on the proximity of agricultural land use near the Site
- Groundwater used for livestock watering – not applicable if no livestock watering within 500 m of the Site

For the purposes of assessing soil for potential off-site relocation, the following site-specific factors were included, in addition to those listed above, in the Schedule 3.1 – Part 1 RLLD standards:

- Groundwater used for irrigation purposes

[3] 2020 B.C. Field Sampling Manual. Available at: https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual

As per Section 11(3) of the BC CSR, a site is not a contaminated site if concentrations do not exceed natural background concentrations. The BC ENV has established regional background concentrations for some naturally occurring metals. The methodology and results are outlined in the BC ENV *Protocol 4 for Contaminated Sites: Establishing Local Background Concentrations in Soil*[4]. Analyzed soil samples were evaluated using the Protocol 4 concentrations to determine whether the reported concentrations were greater than the background concentrations and, as such, represent actual contamination; or less than the background concentration and, as such, represent naturally occurring or ambient metals concentrations in the area (regardless of whether they exceed the applicable CSR standards). The Site is located within Region 1 (Vancouver Island) under Protocol 4.

In addition to the BC CSR, the *Hazardous Waste Regulation* (HWR; BC Regulation 63/88 including amendments up to BC Regulation 76/2022), issued under the EMA, is the governing legislation for the management of waste materials, including contaminated soils, water, and sediments at a contaminated site. Of importance to this project, the HWR outlines testing protocols for hazardous waste and provides standards to identify hazardous waste. The HWR includes a standard for waste oil that is defined by a total concentration of petroleum hydrocarbons by weight of 3% or higher. Furthermore, the HWR provides Leachate Quality Standards (LQS) in Table 1 in Attachment 3 of Schedule 4 of the regulation. It is common industry practice to screen soil concentrations to 20x the respective LQS to evaluate the potential for leachate to be a concern and therefore whether further leachate testing should be completed. The Toxicity Characteristic Leaching Procedure (TCLP) test is commonly requested by landfill operators/waste disposal contractors to assess if the leachate from a contaminated material exceeds the HWR standards and is therefore considered to be leachable toxic waste (i.e., hazardous waste), as defined by the HWR. Such designation would require additional handling and documentation procedures and such material can only be accepted by appropriately licensed disposal/treatment facilities.

Relocation of soil to a different property from where it is excavated (except for disposal to a licensed landfill or remediation facility) may require the submission of Soil Relocation Notification to BC ENV in adherence with the recently introduced Stage 14 Amendments to the BC CSR. Soil volumes greater than 30 m^3 planned for relocation to a property that is not a licensed landfill or remediation facility will fall under the Protocol 19 requirements for investigation, analysis and interpretation, and assessment for soil relocation activities.

METHODS

The soil sampling program was conducted on July 11 to 13, 2023. A Stantec representative collected soil samples in general accordance with Stantec's standard operating procedures, the BC ENV Field Sampling Manual, and BC ENV protocols, procedures, and guidelines. HSVL were measured with an RKI Eagle II® gas detector calibrated using hexane and isobutylene gas.

Soil samples were collected directly from the sides of the borehole using a post hole spoon. The sampling tool was decontaminated between sample location using a mixture of Alconox™ and distilled water solution. A portion of the soil sample from each sample location was placed into a sealable plastic bag and HSVLs were recorded. Samples were placed in laboratory-supplied clean jars, vials, and bags as appropriate for the intended analysis. A new pair of nitrile gloves were used between each sample collection. After field collection, samples were placed into an ice-chilled cooler, and were delivered to the CARO analytical

[4] BC ENV. 2023. Protocol 4 For Contaminated Sites: Establishing Local Background Concentrations in Soil. Dated March 20, 2023.

laboratory depot in Richmond, BC for analysis within the recommended hold times. The samples were delivered with a completed chain-of-custody form.

OBSERVATIONS

Stantec collected 29 soil samples, including two blind field duplicate samples, at the Site from July 11 to 13, 2023. The boreholes from which the samples were obtained were advanced to depths ranging from 1.2 to 4.6 mbgs based on the planned forcemain upgrades depth (i.e., 1.5 mbgs). Boreholes BH23-02 to BH23-07, and BH23-09 to BH23-10 were limited to a depth of 1.2 to 4.3 mbgs as auger refusal was encountered at these varying depths.

Details of the soil stratigraphy and sample intervals encountered are summarized in the attached borehole logs presented as Attachment 3. HSVL measured in all of the collected samples were less than the equipment detection limit.

ANALYTICAL RESULTS

A total of 11 representative soil samples, including one blind field duplicate, were submitted for laboratory analysis of the identified PCOCs.

The reported concentration of chloride in sample BH23-03-SA02 (209 mg/kg at 1.5 - 1.8 mbgs), BH23-08-SA01 (228 mg/kg at 0.6 - 0.9 mbgs), and BH23-09-SA01 (101 mg/kg at 0.5 - 0.8 mbgs) were above the BC CSR IL standard and CSR RLLD standard.

The reported concentration of chloride in sample BH23-10-SA2 (62 mg/kg at 0.9 - 1.2 mbgs) was above the BC CSR RLLD standard but was below the BC CSR IL standard.

The remaining reported concentrations of analyzed PCOCs in the analyzed samples were less than BC CSR IL and RLLD standards. Further, on comparing the reported parameter concentrations against 20x the HWR LQS (not included in Table 1), reported concentrations did not exceed 20x the HWR LQS and therefore TCLP testing was not performed.

The analytical results are presented in the attached Table 1 in Attachment 4 and summarized on Figures 3 in Attachment 1.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Samples were collected and field headspace screening was conducted using a calibrated RKI Eagle II organic vapour meter equipped with combustible gas sensors and photoionization detector (PID), as per standard Stantec procedures and BC ENV guidance. To prevent cross-contamination, new, disposable nitrile gloves were used to collect each sample. Soil samples were transferred into clean, laboratory-supplied glass containers then stored (while in Stantec custody) in an ice-chilled cooler and/or refrigerated prior to delivery to the laboratory.

The Relative Percent Difference (RPD) is defined as the absolute value of the variation between a sample and its duplicate when compared to the concentration of the original. The RPD for two data points is equal to the difference divided by the mean multiplied by 100%. The RPD is calculated by the following equation:

$$RPD = \left[\frac{|S1 - S2|}{S3}\right] \times 100$$

Where:

RPD = relative percent difference
S1 = original soil sample concentration
S2 = duplicate soil sample concentration
S3 = average concentration = *(S1 + S2)/2*

To check laboratory analytical methods and sample precision, one duplicate sample were collected. RPD was assessed as per the BC ENV Field Sampling Manual Guidance for Duplicate Sampling[5]. The RPD between original samples and field duplicates were calculated where the analytical results were at least five times the value of the reportable detection limit and calculated RPDs were compared to the Data Quality Objectives (DQOs) recommended by the BC ENV. RPD calculations for soil samples are presented in the attached Table 1.

As shown in Table 1, the calculable RPDs for soluble parameters and metals were less than the BC ENV recommended maximum for metals and general inorganics of 45%. RPDs were not calculated for BTEX, PAH, L/HEPHs, and several metals parameters due to reported concentrations being less than the laboratory reporting limit or less than five times the detection limit.

After reviewing the handling of samples from the field to the lab, Stantec determined that procedures were properly followed according to laboratory and chain-of-custody protocols. Laboratory QA data was reviewed, and CARO reported the following:

Work Order 23G1805

- Chrysene in BH23-05-SA3 was raised due to matrix interference. The raised detection limit was below the applicable BC CSR standards and is not expected to impact the overall findings of this program.
- The laboratory reported that surrogate recovery of captan in laboratory-controlled sample (B3G2019-BLK1) was outside of control limits. The lab noted that the data was accepted based on acceptable recovery of other surrogates. Therefore, the surrogate recovery outside the control limits is not expected to impact the overall findings of this program.
- The laboratory reported that the concentration of strontium in laboratory-controlled sample (B3G1963-BLK1) was above the reporting limits. However, the data was accepted based on performance of other batch QC. Hence, the analyte concentration above the reporting limit is not expected to impact the overall findings of this program.

A review of the field procedures, lab QA/QC data, and field duplicate analyses indicated that the analytical data is representative and meets the objectives of the current scope of work, subject to the discussion

[5] Ministry of Environment and Climate Change Strategy. 2020. Part D1: Soil, Section 5, in *British Columbia Field Sampling Manual*. The Province of British Columbia.

presented above, and is therefore acceptable. A copy of the laboratory analytics can be reviewed in Attachment 5.

CONCLUSIONS AND RECOMMENDATIONS

The presence of sodium and/or chloride in roadways is not considered contamination as long as it remains in place due to the beneficial use of road salt. However, should soils require removal and concentrations of sodium and/or chloride are present in concentrations exceeding the applicable BC CSR standards, the soils are considered contaminated and require appropriate disposal at a licensed facility.

The soil at BH23-03, BH23-08 and BH23-09 had reported chloride concentrations exceeding the BC CSR IL standard; therefore, soil excavated in these areas at the depths indicated below, will require management and if removed from Site will require relocation to an appropriately sited receiving property (i.e., a property where drinking water use and irrigation water use does not apply) or disposed of at a licensed facility as exceeding IL standards (i.e., considered IL+):

- from grade to the bottom limit of the excavation at and near BH23-08 and BH23-09 (i.e., West Coast Road adjacent the marina section)
- from grade to the bottom limit of the excavation at and near BH23-03 (i.e., the intersection of West Coast Road and Maple Avenue)

Soil from 0.9 – 1.2 mbgs at BH23-010 was identified to have a chloride concentration exceeding the CSR RLLD standards (i.e., considered RL+) and the soil below surface grade at BH23-01, BH23-02, BH23-04, BH23-05, BH23-06, and BH23-07 had reported concentrations that meet the CSR RLLD standards (i.e., considered RL-). These soils meet the CSR IL standards and can therefore be reused on the Site if deemed suitable for construction purposes. Otherwise, Stantec recommends that these soils be relocated to a property that can accept soil of such quality in accordance with the EMA/CSR or disposed at a facility that can accept the reported soil quality.

The remaining reported concentrations of analyzed PCOCs in the analyzed samples were less than BC CSR IL and RLLD standards.

Further, based on a review of the reported concentrations, leachate testing is not expected to be required for disposal of Site soils at a licensed disposal/treatment facility.

It should be noted that relocation of soil to a different property from where it is excavated (except for disposal to a licensed landfill or remediation facility) may require the submission of Soil Relocation Notification to BC ENV in adherence with the recently introduced Stage 14 Amendments to the BC CSR. Stantec recommends that a qualified environmental professional should be retained during the project to provide guidance on when BC ENV notifications are required.

Further soil characterization sampling may be completed during the excavation work to further refine the delineation of the extents of contaminated soils.

Reference: **Environmental Desktop Review for Proposed West Coast Road Sanitary Forcemain Upgrades, Sooke, BC**

As these soil recommendations are based on the discrete samples collected and analyzed, it is possible that other types of exceedances of applicable standards exist on the Site. If indications of contamination are observed (e.g., staining, sheen, debris, and/or odor), or indications the existing force main has leaked within the trench during excavation and construction, such suspect contaminated soils should be segregated and further characterized before determining suitability for reuse, or appropriate relocation, or disposal. A qualified environmental professional should be engaged to provide further instructions regarding the disposal of the soil on the Site. The information and conclusions presented in this letter are subject to the attached Statement of Limitations.

CLOSURE

We trust the information provided is sufficient for your needs at this time. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Regards,

Stantec Consulting Ltd.

Reviewed by

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Attachments:
Statement of Limitations
Attachment 1: Figures
Attachment 2: Photograph Log
Attachment 3: Borehole Logs
Attachment 4: Tables
Attachment 5: Laboratory Certificates of Analyses

STATEMENT OF LIMITATIONS

This letter documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This letter provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the Client or third parties in the preparation of this letter has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this letter can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may alter the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this letter consist of Stantec's professional opinion as of the time of the writing of this letter and are based solely on the scope of work described in the letter, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This letter should not be construed as legal advice.

This letter has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities, or claims, howsoever arising, from third party use of this letter.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this letter, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this letter is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Reference: **Environmental Desktop Review for Proposed West Coast Road Sanitary Forcemain Upgrades, Sooke, BC**

Should additional information become available which differs significantly from our understanding of conditions presented in this letter, Stantec specifically disclaims any responsibility to update the conclusions in this letter.

This letter was prepared by Sarah Kuipers, P.Eng. and reviewed by Jeremiah Gladu, P.Ag., CSAP.

ATTACHMENT 1

FIGURES

DRAFT

Notes

1. Coordinate System: NAD 1983 UTM Zone 10N
2. Base map provided by ESRI Web Mapping Service (WMS)

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Project Information

Project No:	111720115
Scale:	1:30,000
Date:	2023-JUL-13
Drawn by:	G. HUYNH
Checked by:	P. JOHNSON

Project Location

WEST COAST ROAD (HIGHWAY 14)
SOOKE, BC

Client / Project

DISTRICT OF SOOKE

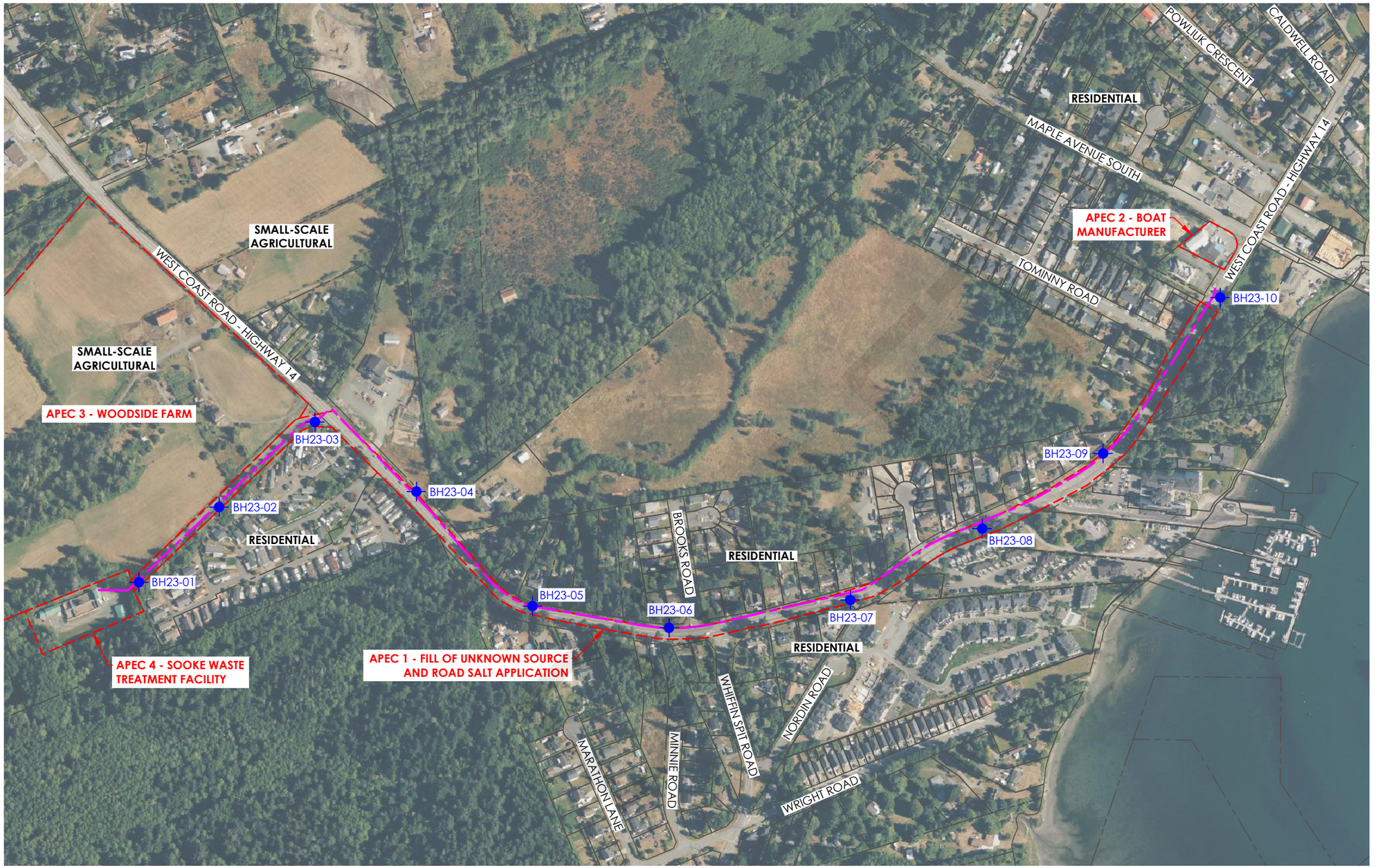
PROPOSED WEST COAST FORCE MAIN UPGRADES - SOIL SAMPLING AND CHARACTERIZATION PROGRAM

Title — Figure No.

SITE LOCATION PLAN **1**

S:\1232\projects\111720115\drawings\soil_sampling_characterization_prgm\111720115_001_site_location_plan.mxd
2023-08-08 By: ghuynh

ORIGINAL SHEET ANSI A



Stantec

ORIGINAL SHEET - ANSI B

Sources

Project Information

Project No.:	111720115
Scale:	1:5000
Date:	2023-AUG-08
Drawn by:	G. HUYNH
Checked by:	P. JOHNSON

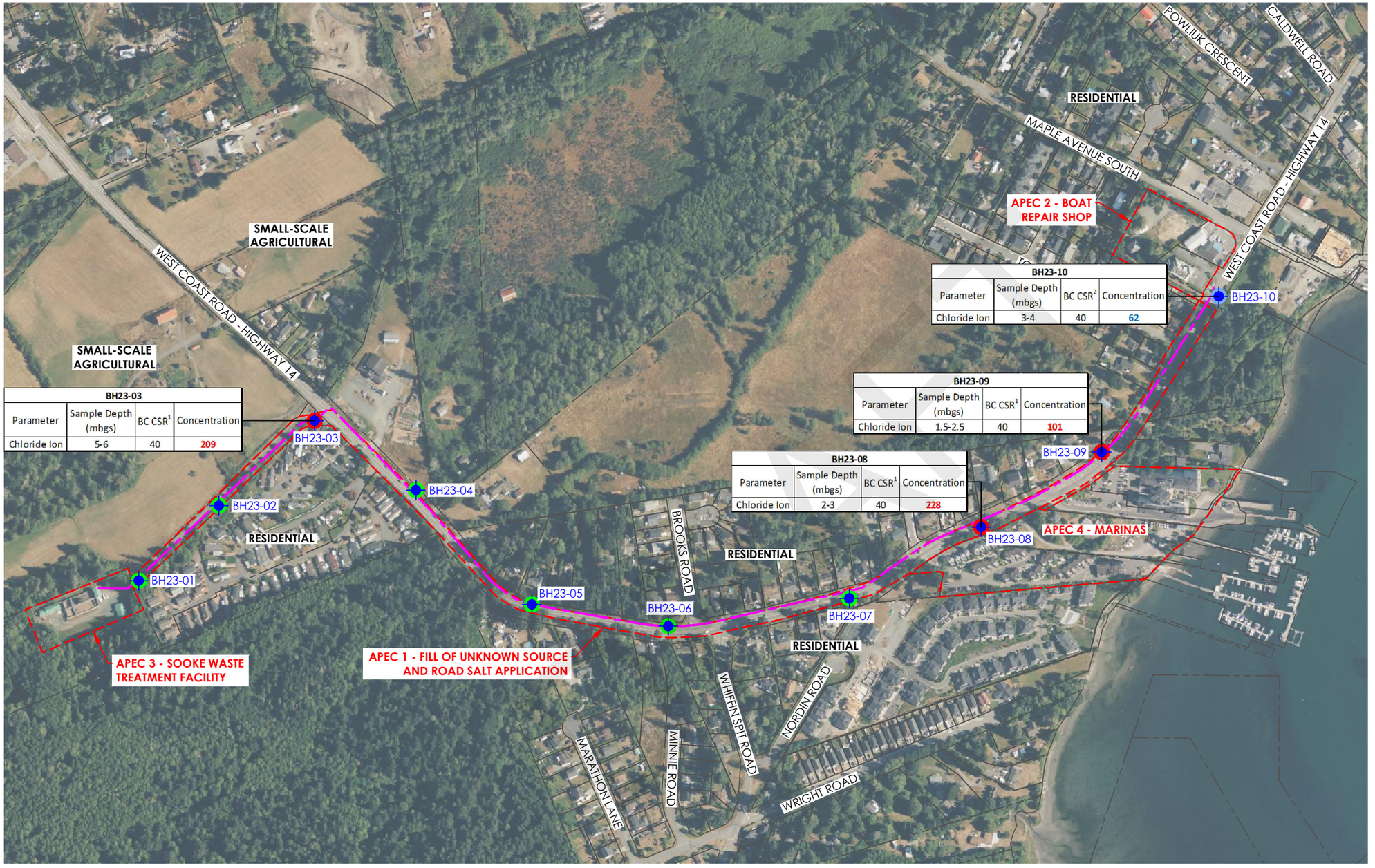
Project Location
WEST COAST ROAD (HIGHWAY 14)
SOOKE, BC

Client/Project
DISTRICT OF SOOKE

PROPOSED WEST COAST FORCE MAIN UPGRADES
SOIL SAMPLING AND CHARACTERIZATION PROGRAM

TITLE
SITE AND SURROUNDING LAND USE

Figure No.
2



N

LEGEND

- PROPOSED FORCEMAIN
- LOT LINE
- AREA OF POTENTIAL ENVIRONMENTAL CONCERN (APEC)
- BOREHOLE LOCATION
- SOIL ANALYTICAL RESULTS LESS THAN APPLICABLE STANDARDS
- SOIL ANALYTICAL RESULTS GREATER THAN APPLICABLE BC CSR IL STANDARDS
- SOIL ANALYTICAL RESULTS GREATER THAN BC CSR RLLD STANDARDS FOR INFORMATIONAL PURPOSES ONLY

NOTES:

1 MOST STRINGENT INDUSTRIAL LAND USE APPLICABLE TO BC CSR STANDARDS IN mg/kg
2 MOST STRINGENT RESIDENTIAL LOW DENSITY LAND USE APPLICABLE TO BC CSR STANDARDS IN mg/kg

SCALE IN METRES
0 50 100 150 200 250
1:5000

Stantec

ORIGINAL SHEET - ANSI B

Sources

Project Information
Project No.: 111720115
Scale: 1:5000
Date: 2023-AUG-08
Drawn by: G. HUYNH
Checked by: P. JOHNSON

Project Location
WEST COAST ROAD (HIGHWAY 14)
SOOKE, BC

Client/Project
DISTRICT OF SOOKE

PROPOSED WEST COAST FORCE MAIN UPGRADES
SOIL SAMPLING AND CHARACTERIZATION PROGRAM

TITLE
SOIL ANALYTICAL RESULTS

Figure No.
3

ATTACHMENT 2
PHOTOGRAPHIC LOG

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Photographic Log

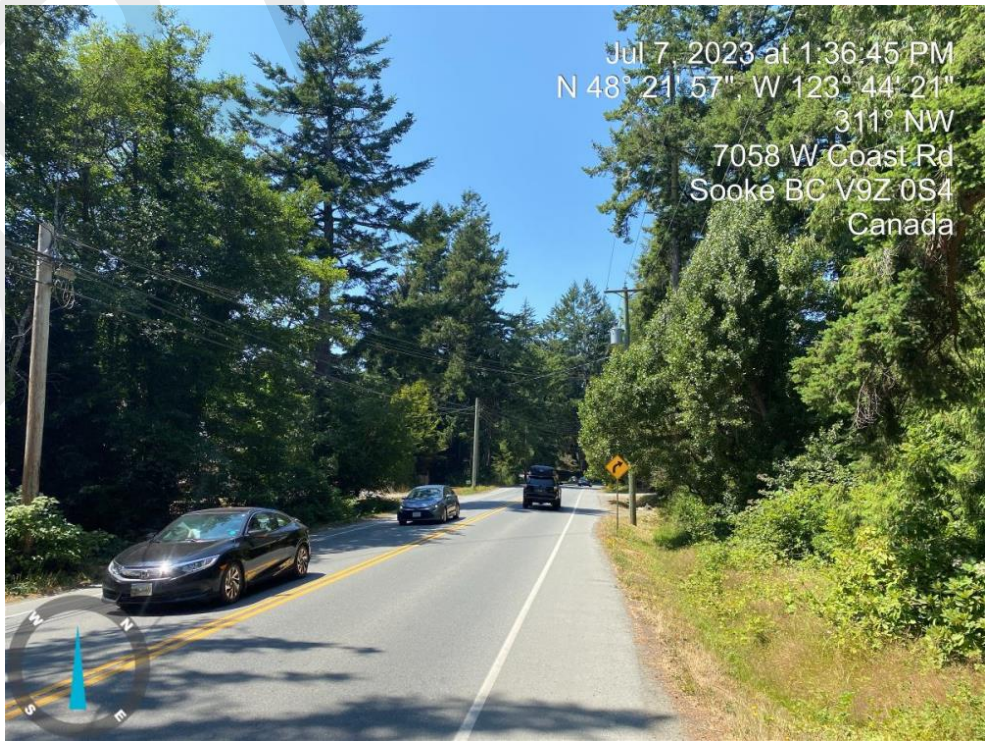
Client:	**District of Sooke**	**Project:**	**111720115**
Site Name:	**Environmental Desktop Review and Soil Characterization**	**Site Location:**	**Sooke, BC**

Photograph ID: 1	
Photo Location: West Coast Road, Sooke, BC	
Direction: North	
Survey Date: 7/7/2023	
Comments: View of commercial properties proximal to 6882 West Coast Road. Municipal sewer pump station is on the left of the image.	

Photograph ID: 2	
Photo Location: West Coast Road, Sooke, BC	
Direction: West	
Survey Date: 7/7/2023	
Comments: Boat repair shop at 6864 West Coast Road located north and adjacent to the Site.	

Client:	**District of Sooke**	**Project:**	**111720115**
Site Name:	**Environmental Desktop Review and Soil Characterization**	**Site Location:**	**Sooke, BC**

Photograph ID: 3	
Photo Location: West Coast Road, Sooke, BC	
Direction: East	
Survey Date: 7/7/2023	
Comments: Resort and marina at 6926 West Coast Road located south and adjacent to the Site.	

Photograph ID: 4	
Photo Location: West Coast Road, Sooke, BC	
Direction: Northwest	
Survey Date: 7/7/2023	
Comments: View of a residential area of West Coast Road located west of 7058 West Coast Road.	

Client:	**District of Sooke**	**Project:**	**111720115**
Site Name:	**Environmental Desktop Review and Soil Characterization**	**Site Location:**	**Sooke, BC**

Photograph ID: 5	
Photo Location: West Coast Road, Sooke, BC	
Direction: West	
Survey Date: 7/7/2023	
Comments: View of a residential area (left) of West Coast Road and a church property (right).	

Photograph ID: 6	
Photo Location: West Coast Road, Sooke, BC	
Direction: Southwest	
Survey Date: 7/7/2023	
Comments: Gravel access road leading to the Sooke Waste Treatment Facility.	

Client:	**District of Sooke**	**Project:**	**111720115**
Site Name:	**Environmental Desktop Review and Soil Characterization**	**Site Location:**	**Sooke, BC**

Photograph ID: 7

Photo Location:
West Coast Road, Sooke, BC

Direction:
South

Survey Date:
7/11/2023

Comments:
Location of BH23-10 (white spray paint), with located subsurface utilities (yellow spray paint).

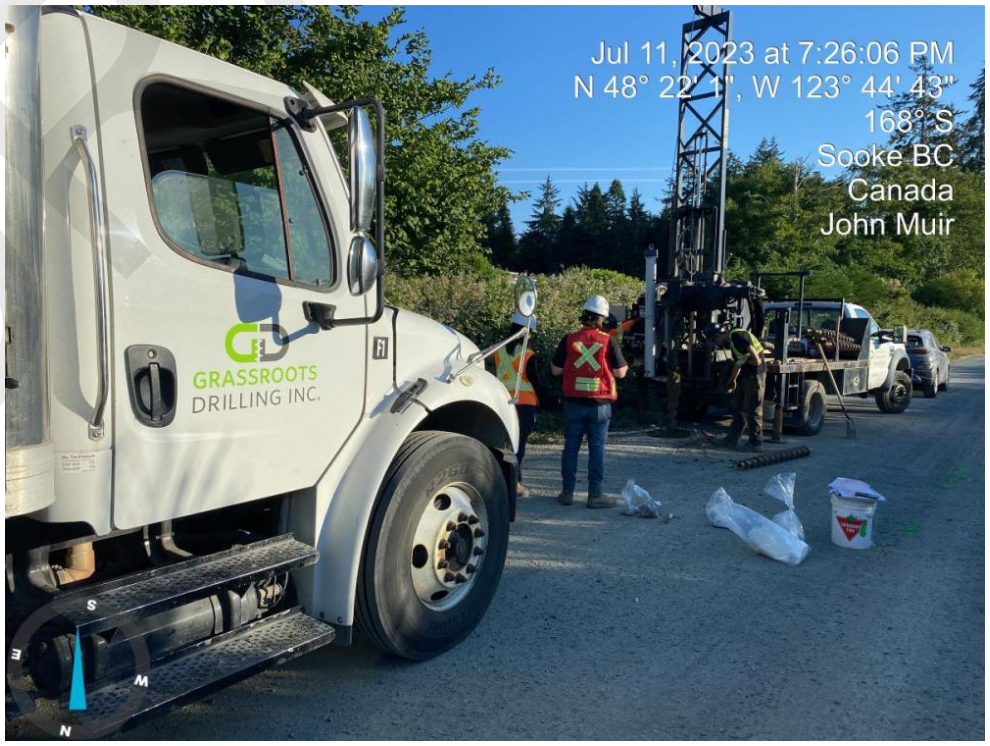
Photograph ID: 8

Photo Location:
West Coast Road, Sooke, BC

Direction:
South

Survey Date:
7/11/2023

Comments:
Advancing BH23-02 using a truck-mounted solid stem auger.



Client:	**District of Sooke**	**Project:**	**111720115**
Site Name:	**Environmental Desktop Review and Soil Characterization**	**Site Location:**	**Sooke, BC**

Photograph ID: 9

Photo Location:
West Coast Road, Sooke, BC

Direction:
South

Survey Date:
7/11/2023

Comments:
Sampling soil from the auger at BH23-01. Soil consisted of silty sand.

Photograph ID: 10

Photo Location:
West Coast Road, Sooke, BC

Direction:
West

Survey Date:
7/12/2023

Comments:
Removing asphalt to advance BH23-04.

ATTACHMENT 3

ANALYTICAL TABLES

Table 1
Summary of Soil Analytical Results
Environmental Desktop Review for Proposed West Coast Road Forcemain Upgrades
District of Sooke

Sample Location					BH23-01	BH23-02	BH23-03	BH23-04	BH23-05	BH23-06	BH23-07	BH23-08	BH23-09				BH23-10
Sample Date					11-Jul-23	11-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	11-Jul-23	11-Jul-23	11-Jul-23			11-Jul-23
Sample ID					BH23-01-SA2	BH23-02-SA1	BH23-03-SA2	BH23-04-SA2	BH23-05-SA3	BH23-06-SA1	BH23-07-SA3	BH23-08-SA1	BH23-09-SA1	QC23-02			BH23-10-SA2
Sample Depth					1.2 - 1.5 m	0.9 - 1.2 m	1.5 - 1.8 m	1.2 - 1.5 m	2.1 - 2.4 m	0.5 - 0.8 m	1.2 - 1.5 m	0.6 - 0.9 m	0.5 - 0.8 m	0.5 - 0.8 m			0.9 - 1.2 m
Sampling Company					STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC			STANTEC
Laboratory					CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO			CARO
Laboratory Work Order					23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805			23G1805
Laboratory Sample ID				BC ENV	23G1805-02	23G1805-05	23G1805-19	23G1805-28	23G1805-26	23G1805-23	23G1805-22	23G1805-14	23G1805-11	23G1805-13			23G1805-10
Sample Type	Units	CSR-Schedule 3.1RLLD	CSR-Schedule 3.1-IL	Protocol 4										Field Duplicate	RPD (%)		
General Chemistry																	
% Solids	%	n/v	n/v	n/v	87.0	84.3	84.5	87.5	82.7	94.5	89.0	83.3	87.4	89.9	3%		85.4
pH, lab	S.U.	n/v	n/v	n/v	6.43	5.95	5.21	7.07	7.04	7.33	5.76	4.59	5.53	5.54	0%		5.67
Soluble Parameters																	
Percent Saturation	%	n/v	n/v	n/v	67.4	84.1	85.3	84.6	72.6	52.8	56.7	72.6	41.2	35.3	15%		64.9
Chloride (ion)	mg/kg	600_{N3}[A] 40_{N3}[C] 350_{N3}[D] 100_{N3}[E] $1,000,000_{>N3}$[F]	600_{N3}[I] $2,500_{N3}$[K] 100_{N3}[L] >1,000,000$_{N3}$[M]	n/v	<25	<25	**209**[CEL]	<25	<25	<25	32	**228**[CEL]	**101**[CEL]	**74**[C]	nc		**62**[C]
Sodium (ion)	mg/kg	200_{N6}[D] $15,000_{N6}$[E] $1,000,000_{>N6}$[F]	$1,000_{N6}$[K] $15,000_{N6}$[L] >1,000,000$_{N6}$[M]	n/v	<5.0	8.4	32.8	15.5	7.2	29.0	24.7	144	62.7	49.6	23%		26.8
Nutrients																	
Calcium	mg/kg	n/v	n/v	n/v	1600	-	-	-	-	-	-	-	-	-	-		-
Magnesium	mg/kg	n/v	n/v	n/v	735	-	-	-	-	-	-	-	-	-	-		-
Potassium	mg/kg	n/v	n/v	n/v	75	-	-	-	-	-	-	-	-	-	-		-
Sodium	mg/kg	n/v	n/v	n/v	80	-	-	-	-	-	-	-	-	-	-		-
Ammonia (as N)	mg/kg	n/v	n/v	n/v	18	-	-	-	-	-	-	-	-	-	-		-
Nitrate (as N)	mg/kg	50,000[N]	400,000[N]	n/v	13	-	-	-	-	-	-	-	-	-	-		-
Phosphorus	mg/kg	n/v	n/v	n/v	6	-	-	-	-	-	-	-	-	-	-		-
Metals																	
Aluminum	mg/kg	40,000[G]	250,000[N]	55,000[P]	21,100	29,900	32,500	20,800	24,700	21,400	22,700	19,900	33,400	27,300	20%		30,800
Antimony	mg/kg	250^{G} 20^{H}	40,000[N] 40^{O}	4.0_{a}[P]	0.20	0.23	0.17	0.17	0.12	<0.10	0.14	0.13	0.20	0.15	nc		0.22
Arsenic	mg/kg	10^{ABCE} 25^{D} 20^{F}	10^{UL} 40^{K} 400^{M}	4.0_{a}[P]	5.75	5.36	5.02	5.46	4.93	2.85	3.12	2.70	6.60	4.63	35%		5.24
Barium	mg/kg	$3,500^{A}$ $1,500^{B}$ 700^{D} 350^{E} $8,500^{F}$	$3,500^{I}$ $1,500^{JK}$ 350^{L} >1,000,000[M]	250^{P}	78.1	113	71.8	70.7	48.3	43.0	53.2	60.7	114	86.0	28%		95.3
Beryllium	mg/kg	1.0/500$_{PH2}$[A] $85/350,000_{PH3}$[BF] $8.5/35,000_{PH5}$[C] 150^{D} 1.0/2,500$_{PH1}$[E]	1.0/500$_{PH2}$[I] $85/350,000_{PH3}$[J] 350^{K} 1.0/2,500$_{PH1}$[L] $15,000^{M}$	0.70[P]	0.35	0.48	0.41	0.35	0.32	0.34	0.32	0.42	0.40	0.31	nc		0.40
Boron	mg/kg	$8,500^{G}$	>1,000,000[N]	1.0_{a}[P]	4.0	3.0	2.4	5.1	3.7	2.9	2.0	<2.0	3.3	2.6	nc		2.3
Cadmium	mg/kg	1.0/50$_{PH7}$[A] 1.0/200$_{PH8}$[B] 1.0/70$_{PH10}$[C] 30^{D} 1.0/70$_{PH6}$[E] 20^{F}	1.0/50$_{PH7}$[I] 1.0/200$_{PH8}$[J] 75^{K} 1.0/70$_{PH6}$[L] $3,500^{M}$	0.95^{P}	0.052	<0.040	0.041	0.051	0.074	0.070	<0.040	0.042	0.058	0.054	nc		<0.040
Chromium	mg/kg	60_{N6}/300,000$_{N6}$[A] 60_{N6}/>1,000,000$_{N6}$[BE] 200_{N4}[D] 100_{N4}[F]	60_{N6}/300,000$_{N6}$[I] 60_{N6}/>1,000,000$_{N6}$[JL] 250_{N4}[K] $20,000_{N4}$[M]	65^{P}	56.6	56.5	65	49.1	58.5	41.8	48.2	29.1	43.1	36.6	16%		56.1
Cobalt	mg/kg	25^{ABCEF} 45^{D}	25^{UL} 200^{K} $2,000^{M}$	30^{P}	15.9	18.8	23.6	15.7	19.6	18.5	15.6	6.69	14.6	12.4	16%		13.2
Copper	mg/kg	75/7,500$_{PH32}$[A] 75/1,500$_{PH33}$[B] 75/15,000$_{PH34}$[C] 150^{D} 250/100,000$_{PH30}$[E] $3,500^{F}$	75/7,500$_{PH32}$[I] 75/1,500$_{PH33}$[J] 300^{K} 250/100,000$_{PH30}$[L] $700,000^{M}$	100^{P}	43.3	40.4	66.8	47.6	66.0	71.4	52.2	41.8	42.6	35.6	18%		34.0
Iron	mg/kg	$35,000^{G}$	$150,000^{N}$	$70,000^{P}$	34,200	38,100	42,500	33,800	38,900	38,600	32,600	21,100	33,800	27,900	19%		35,900
Lead	mg/kg	200/90,000$_{PH12}$[A] 120/15,000$_{PH13}$[BF] 350/150,000$_{PH15}$[C] 550^{D} 120/8,500$_{PH11}$[E]	200/90,000$_{PH12}$[I] 120/15,000$_{PH13}$[J] $1,000^{K}$ 120/8,500$_{PH11}$[L] $4,000^{M}$	40^{P}	4.38	5.07	3.87	4.48	3.15	1.53	3.04	4.71	4.77	3.83	22%		4.30
Lithium	mg/kg	30^{G}	450^{N}	n/v	16.0	14.2	13.1	16.9	14.7	8.87	10.5	8.10	20.5	16.0	25%		17.8
Manganese	mg/kg	$2,000^{CDE}$ $6,000^{F}$	$2,000^{KL}$ >1,000,000[M]	$5,000^{P}$	577	623	667	619	706	794	489	240	442	392	12%		415
Mercury	mg/kg	40^{D} 10^{F}	75^{K} $2,000^{M}$	0.15^{P}	<0.040	0.047	<0.040	0.043	<0.040	<0.040	<0.040	0.040	0.059	0.041	nc		<0.040
Molybdenum	mg/kg	650^{AB} 3.0^{C} 80^{D} 15^{E} 200^{F}	650^{U} 150^{K} 15^{L} $35,000^{M}$	1.0_{a}[P]	0.26	0.31	0.52	0.38	0.28	0.17	0.23	0.43	0.59	0.50	17%		0.46
Nickel	mg/kg	90/9,500$_{PH17}$[A] 70/500$_{PH18}$[B] 70/1,500$_{PH20}$[C] 150^{D} 70/500$_{PH16}$[E] 450^{F}	90/9,500$_{PH17}$[I] 70/500$_{PH18}$[J] 250^{K} 70/500$_{PH16}$[L] $80,000^{M}$	50^{P}	52.0	43.0	42.1	50.1	43.0	26.5	31.9	20.9	59.3	44.1	29%		35.8
Selenium	mg/kg	1.0^{ABC} 1.5^{D} 1.0_{N2}[E] 200^{F}	1.0^{U} 2.0^{K} 1.0_{N2}[L] $35,000^{M}$	4.0_{a}[P]	<0.20	<0.20	0.22	<0.20	<0.20	<0.20	<0.20	0.29	0.53	0.32	nc		0.34
Silver	mg/kg	200^{G} 20^{H}	$35,000^{N}$ 40^{O}	1.0_{a}[P]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	0.13	nc		<0.10
Strontium	mg/kg	$9,500^{G}$	$150,000^{N}$	100^{P}	42.7	29.3	29.0	43.5	38.6	33.7	26.8	12.3	23.2	20.1	14%		25.7
Thallium	mg/kg	9.0^{H}	25^{O}	n/v	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	nc		<0.10
Tin	mg/kg	$25,000^{G}$ 50^{H}	>1,000,000[N] 300^{O}	4.0_{a}[P]	0.37	0.45	0.46	0.42	0.37	0.36	0.39	0.45	0.35	0.29	nc		0.45
Tungsten	mg/kg	15^{G}	200^{N}	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.28	nc		<0.20
Uranium	mg/kg	150^{AB} 15^{C} 500^{D} 30_{N2}[E] 100^{F}	150^{U} $2,000^{K}$ 30^{L} $20,000^{M}$	n/v	0.430	0.504	0.394	0.398	0.302	0.285	0.328	0.349	0.450	0.355	24%		0.498
Vanadium	mg/kg	350^{C} 150^{D} 100^{E} 200^{F}	300^{K} 100^{L} $35,000^{M}$	200^{P}	84.2	93.3	121	82.2	102	112	96.0	57.7	88.4	73.8	18%		101
Zinc	mg/kg	150/3,000$_{PH26}$[A] 150/200$_{PH27}$[B] 150/9,000$_{PH29}$[C] 450^{D} 200/5,500$_{PH25}$[E] $10,000^{F}$	150/3,000$_{PH26}$[I] 150/200$_{PH27}$[J] 450^{K} 200/5,500$_{PH25}$[L] >1,000,000[M]	150^{P}	61.6	51.5	53.0	60.9	62.6	50.6	41.9	28.8	53.5	46.1	15%		50.8
BTEX and Petroleum Hydrocarbons																	
Benzene	mg/kg	2.5^{A} 6.5^{B} 100^{D} 0.035^{E} 150^{F}	2.5^{I} 6.5^{J} 250^{K} 0.035^{L} $6,500^{M}$	n/v	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	nc		<0.030
Toluene	mg/kg	0.50^{A} 200^{B} 150^{D} 6.0_{N2}[E] $3,500^{F}$	0.50^{I} 200^{J} 450^{K} 6.0_{N2}[L] $550,000^{M}$	n/v	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	nc		<0.200
Ethylbenzene	mg/kg	200^{ABD} 15^{E} $4,000^{F}$	200^{IJ} 650^{K} 15^{L} $700,000^{M}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Xylenes, Total	mg/kg	20^{AB} 150^{D} 6.5^{E} $8,500^{F}$	20^{IJ} 600^{K} 6.5^{L} >1,000,000[M]	n/v	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	nc		<0.100
Methyl tert-butyl ether (MTBE)	mg/kg	$4,000^{G}$	$20,000^{N}$	n/v	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	nc		<0.040
Styrene	mg/kg	$8,500^{G}$ 5.0^{H}	>1,000,000[N] 50^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
VH (C6-C10)	mg/kg	n/v	n/v	n/v	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	nc		<20
Volatile Petroleum Hydrocarbons (VPH)	mg/kg	200_{S3}[GH]	200_{S3}[NO]	n/v	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	nc		<20
EPH C10-C19	mg/kg	n/v	n/v	n/v	<50	<50	<50	<50	<50	<50	<50	<50	<50	73	nc		<50
Light Extractable Petroleum Hydrocarbons	mg/kg	$1,000_{S2}$[GH]	$2,000_{S2}$[NO]	n/v	<50	<50	<50	<50	<50	<50	<50	<50	<50	73	nc		<50
EPH C19-C32	mg/kg	n/v	n/v	n/v	<50	<50	91	<50	83	<50	290	200	150	480	nc		57
Heavy Extractable Petroleum Hydrocarbons	mg/kg	$1,000_{S1}$[GH]	$5,000_{S1}$[NO]	n/v	<50	<50	91	<50	83	<50	290	200	150	480	nc		57
Semi-Volatile Organic Compounds																	
Acenaphthene	mg/kg	950^{G}	$15,000^{N}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Acenaphthylene	mg/kg	n/v	n/v	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.238	0.076	<0.050	0.069	nc		<0.050
Anthracene	mg/kg	2.5^{D} $10,000^{F}$	30^{K} >1,000,000[M]	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.272	0.071	<0.050	0.058	nc		<0.050
Benzo(a)anthracene	mg/kg	50_{S4}[G] 1.0^{H}	500_{S4}[N] 10^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.425	0.173	<0.050	0.074	nc		<0.050
Benzo(a)pyrene	mg/kg	20^{D} 5.0^{F}	70^{K} 50^{M}	n/v	<0.050	<0.050	<0.050	<0.050	0.053	<0.050	0.675	0.248	0.066	0.137	nc		0.073
Benzo(b)fluoranthene	mg/kg	n/v	n/v	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.396	0.140	<0.050	0.056	nc		<0.050
Benzo(b)pyridine (Quinoline)	mg/kg	2.5^{G}	10^{N}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Benzo(b+j)fluoranthene	mg/kg	50_{S4}[G] 1.0^{H}	500_{S4}[N] 10^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.592	0.213	0.057	0.102	nc		<0.050
Benzo(k)fluoranthene	mg/kg	50_{S4}[G] 1.0^{H}	500_{S4}[N] 10^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.370	0.122	<0.050	0.071	nc		<0.050
Benzo[ghi]fluoranthene	mg/kg	n/v	n/v	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.479	0.138	0.062	0.136	nc		0.058
Chloronaphthalene, 2-	mg/kg	$1,500^{G}$	$20,000^{N}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Chrysene	mg/kg	200^{G}	$4,500^{N}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.052 TS	<0.050	0.493	0.214	0.056	0.132	nc		<0.050
Dibenzo(a,h)anthracene	mg/kg	5.0_{S4}[G] 1.0^{H}	50_{S4}[N] 10^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.090	<0.050	<0.050	<0.050	nc		<0.050
Fluoranthene	mg/kg	50^{D} $1,500^{F}$	200^{K} $300,000^{M}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.31	0.266	0.100	0.197	nc		0.052
Fluorene	mg/kg	600^{G}	$9,500^{N}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Indeno(1,2,3-cd)pyrene	mg/kg	50_{S4}[G] 1.0^{H}	500_{S4}[N] 10^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.393	0.107	<0.050	0.087	nc		<0.050
Methylnaphthalene, 1-	mg/kg	250^{G}	$1,000^{N}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Methylnaphthalene, 2-	mg/kg	60^{G}	950^{N}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Naphthalene	mg/kg	75^{AB} 0.60^{D} 100^{E} 850^{F}	75^{U} 20^{K} 100^{L} $150,000^{M}$	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	nc		<0.050
Phenanthrene	mg/kg	$1,500^{G}$ 5.0^{H}	$300,000^{N}$ 50^{O}	n/v	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.391	0.074	<0.050	0.083	nc		<0.050
Pyrene	mg/kg	$1,000^{G}$ 10^{H}	$200,000^{N}$ 100^{O}	n/v	<0.050	<0.050	<0.050	<0.050	0.055	<0.050	1.73	0.516	0.119	0.257	nc		0.072

See notes on last page.

Table 1
Summary of Soil Analytical Results
Environmental Desktop Review for Proposed West Coast Road Forcemain Upgrades
District of Sooke

Sample Location					BH23-01	BH23-02	BH23-03	BH23-04	BH23-05	BH23-06	BH23-07	BH23-08	BH23-09			BH23-10
Sample Date					11-Jul-23	11-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	12-Jul-23	11-Jul-23	11-Jul-23	11-Jul-23		11-Jul-23
Sample ID					BH23-01-SA2	BH23-02-SA1	BH23-03-SA2	BH23-04-SA2	BH23-05-SA3	BH23-06-SA1	BH23-07-SA3	BH23-08-SA1	BH23-09-SA1	QC23-02		BH23-10-SA2
Sample Depth					1.2 - 1.5 m	0.9 - 1.2 m	1.5 - 1.8 m	1.2 - 1.5 m	2.1 - 2.4 m	0.5 - 0.8 m	1.2 - 1.5 m	0.6 - 0.9 m	0.5 - 0.8 m	0.5 - 0.8 m		0.9 - 1.2 m
Sampling Company					STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC		STANTEC
Laboratory					CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO	CARO		CARO
Laboratory Work Order					23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805	23G1805		23G1805
Laboratory Sample ID					23G1805-02	23G1805-05	23G1805-19	23G1805-28	23G1805-26	23G1805-23	23G1805-22	23G1805-14	23G1805-11	23G1805-13		23G1805-10
Sample Type	Units	CSR-Schedule 3.1RLLD	CSR-Schedule 3.1-IL	BC ENV Protocol 4										Field Duplicate	RPD (%)	
Volatile Organic Compounds																
Bromodichloromethane	mg/kg	100[G]	550[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Bromoform (Tribromomethane)	mg/kg	300[G]	4,000[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Carbon Tetrachloride (Tetrachloromethane)	mg/kg	150[G] 5.0[H]	5,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Chlorobenzene (Monochlorobenzene)	mg/kg	850[G] 1.0[H]	150,000[N] 10[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Chloroform (Trichloromethane)	mg/kg	400[G] 5.0[H]	70,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dibromochloromethane	mg/kg	85[G]	400[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Dibromomethane (Methylene Bromide)	mg/kg	n/v	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Dichlorobenzene, 1,2-	mg/kg	3,500[G] 1.0[H]	650,000[N] 10[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichlorobenzene, 1,3-	mg/kg	1,000[G] 1.0[H]	200,000[N] 10[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichlorobenzene, 1,4-	mg/kg	4,500[G] 1.0[H]	800,000[N] 10[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloroethane, 1,1-	mg/kg	8,500[G] 5.0[H]	>1,000,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloroethane, 1,2-	mg/kg	75[G] 5.0[H]	350[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloroethene, 1,1-	mg/kg	2,000[G] 5.0[H]	350,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloroethene, cis-1,2-	mg/kg	85[G] 5.0[H]	15,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloroethene, trans-1,2-	mg/kg	850[G] 5.0[H]	150,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloropropane, 1,2-	mg/kg	600[G] 5.0[H]	10,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Dichloropropane, 1,3-	mg/kg	300[G]	4,500[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Ethylene Dibromide (Dibromoethane, 1,2-)	mg/kg	3.5[G]	15[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Methylene Chloride (Dichloromethane)	mg/kg	250[G] 5.0[H]	40,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Tetrachloroethane, 1,1,2,2-	mg/kg	35[G]	150[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Tetrachloroethene (PCE)	mg/kg	2.5[AB] 15[D] 250[F]	2.5[U] 30[K] 40,000[M]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Trichloroethane, 1,1,1-	mg/kg	85,000[G] 5.0[H]	>1,000,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Trichloroethane, 1,1,2-	mg/kg	150[G] 5.0[H]	30,000[N] 50[O]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.050
Trichloroethene (TCE)	mg/kg	0.30[AB] 15[D] 20[F]	0.30[U] 25[K] 3,500[M]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.040
Trichlorofluoromethane (Freon 11)	mg/kg	4,500[G]	70,000[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Vinyl Chloride	mg/kg	0.95[G]	45[N]	n/v	-	-	-	-	-	-	-	-	-	-	-	<0.100
Pesticides & Herbicides																
Alachlor	mg/kg	100[G]	600[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Aldrin	mg/kg	0.40[G]	2.0[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Atrazine + metabolites	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Azinphos-methyl (Guthion)	mg/kg	45[G]	700[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
BHC, alpha-	mg/kg	1.0[G]	5.0[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
BHC, beta-	mg/kg	4.0[G]	20[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
BHC, delta-	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Bromacil	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Bromoxynil	mg/kg	300[G]	4,500[N]	n/v	-	<0.0200	-	-	-	-	-	-	-	-	-	-
Butachlor	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Captan	mg/kg	2,000[G]	15,000[N]	n/v	-	<0.0200	-	-	-	-	-	-	-	-	-	-
Chlordane (Total)	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Chlorothalonil (Bravo)	mg/kg	250[G]	3,500[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	15[G]	250[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Cyanazine (Bladex)	mg/kg	8.5[G]	40[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
DDD (Total)	mg/kg	n/v	n/v	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
DDVP (Dichlorvos)	mg/kg	8.0[G]	100[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Deltamethrin	mg/kg	n/v	n/v	n/v	-	<0.0500	-	-	-	-	-	-	-	-	-	-
Diazinon	mg/kg	10[G]	150[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Diclofop-methyl	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Dieldrin	mg/kg	0.45[G]	2.0[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Dimethoate	mg/kg	3.0[G]	45[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Disulfoton (Di-Syston)	mg/kg	0.60[G]	9.5[N]	n/v	-	<0.0200	-	-	-	-	-	-	-	-	-	-
Diuron	mg/kg	30[G]	450[N]	n/v	-	<0.0200	-	-	-	-	-	-	-	-	-	-
Endosulfan	mg/kg	250[G]	40,000[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Endosulfan Sulfate	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	4.5[G]	70[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Endrin Aldehyde	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Endrin Ketone	mg/kg	n/v	n/v	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Fenchlorphos (Ronnel)	mg/kg	800[G]	10,000[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Heptachlor	mg/kg	1.5[G]	7.5[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Heptachlor Epoxide	mg/kg	0.20[G]	3.0[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Lindane (Hexachlorocyclohexane, gamma)	mg/kg	10[G]	250[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Linuron	mg/kg	30[G]	450[N]	n/v	-	<0.0400	-	-	-	-	-	-	-	-	-	-
Malathion	mg/kg	300[G]	4,500[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Methoxychlor (4,4'-Methoxychlor)	mg/kg	80[G]	1,000[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Methyl Parathion	mg/kg	4.0[G]	60[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Metolachlor (Dual)	mg/kg	2,500[G]	35,000[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Metribuzin (Sencor)	mg/kg	400[G]	6,000[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Parathion (Ethyl Parathion)	mg/kg	95[G]	1,500[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Pentachloronitrobenzene (Quintozine)	mg/kg	25[G]	150[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Permethrin	mg/kg	800[G]	10,000[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Phorate (Thimet)	mg/kg	3.0[G]	45[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Prometon	mg/kg	250[G]	3,500[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Prometryn	mg/kg	60[G]	950[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Simazine	mg/kg	60[G]	250[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Sulfotep (Tetraethyldithiopyrophosphate)	mg/kg	8.0[G]	100[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Tebuthiuron	mg/kg	1,000[G]	15,000[N]	n/v	-	<0.0200	-	-	-	-	-	-	-	-	-	-
Temephos	mg/kg	300[G]	4,500[N]	n/v	-	<0.0500	-	-	-	-	-	-	-	-	-	-
Terbufos	mg/kg	0.40[G]	6.0[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-
Triallate	mg/kg	200[G]	3,000[N]	n/v	-	<0.0050	-	-	-	-	-	-	-	-	-	-
Trifluralin	mg/kg	100[G]	2,000[N]	n/v	-	<0.0100	-	-	-	-	-	-	-	-	-	-

See notes on last page.

Table 1
Summary of Soil Analytical Results
Environmental Desktop Review for Proposed West Coast Road Forcemain Upgrades
District of Sooke

Notes:

CSR-Schedule 3.1RLLD	CSR Schedule 3.1 - Part 1,2 & 3 (Contaminated Sites Regulation [B.C. Reg. 375/96, April 1, 1997: includes amendments up to July 7, 2021 by B.C. Reg. 179/2021])
A	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Groundwater flow to surface water used by aquatic life (freshwater)
B	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Groundwater flow to surface water used by aquatic life (marine)
C	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Groundwater used for irrigation
D	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Toxicity to soil invertebrates and plants (applicable to all sites)
E	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Groundwater used for drinking water
F	Part 1 Matrix Standard - Residential Low Density Land Use (RLLD) - Intake of contaminated soil (applicable to all sites)
G	Part 2 Generic Human Health Standard - Residential Low Density Land Use (RLLD)
H	Part 3 Generic Ecological Standard - Residential Low Density Land Use (RLLD)
CSR-Schedule 3.1-IL	CSR Schedule 3.1 - Part 1,2 & 3 (Contaminated Sites Regulation [B.C. Reg. 375/96, April 1, 1997: includes amendments up to July 7, 2021 by B.C. Reg. 179/2021])
I	Part 1 Matrix Standard - Industrial Land Use (IL) - Groundwater flow to surface water used by aquatic life (freshwater)
J	Part 1 Matrix Standard - Industrial Land Use (IL) - Groundwater flow to surface water used by aquatic life (marine)
K	Part 1 Matrix Standard - Industrial Land Use (IL) - Toxicity to soil invertebrates and plants (applicable to all sites)
L	Part 1 Matrix Standard - Industrial Land Use (IL) - Groundwater used for drinking water
M	Part 1 Matrix Standard - Industrial Land Use (IL) - Intake of contaminated soil (applicable to all sites)
N	Part 2 Generic Human Health Standard - Industrial Land Use (IL)
O	Part 3 Generic Ecological Standard - Industrial Land Use (IL)
BCMOE Protocol 4	Ministry of Environment and Climate Change Strategy - Protocol 4 for Contaminated Sites, Establishing Background Concentrations in Soil, Prepared pursuant to Section 64 of the Environmental Management Act, version 12 (May 13, 2021)
P	Table 1. Regional Background Soil Quality Estimates for Inorganic Substances (Region 1 - Vancouver Island)
(A)	Values in the brackets indicate that greater than 50% of values were less than the mean detection concentration (MDC) for the substance, consequently tabled regional estimate is one-half the MDC.
6.5[A]	Concentration exceeds the indicated standard.
6.5[A]	Concentration exceeds the indicated BC CSR RLLD standard, provided for informational purposes only.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
a	Values indicate that greater than 50% of values were less than the mean detection concentration (MDC) for the substance, consequently tabled regional estimate is one-half the MDC.
N2	Soil standards protective of groundwater used for drinking water are the same regardless of land use.
N3	Chloride ion standards apply to soluble chloride.
N4	Standard applies to total chromium (all species).
N5	Standard applies to hexavalent chromium (Cr6+)
N6	Standard applies to trivalent chromium (Cr3+)
N9	Sodium ion standards apply to soluble sodium.
PH1	Beryllium standards vary with soil pH from 1-2,500 ug/g for groundwater used for drinking water for all land use types. For pH < 5.5 standard = 1 ug/g; For pH 5.5-< 6.0 standard = 1.5; For pH 6.0-< 6.5 standard = 4 ug/g; For pH 6.5->7.0 standard = 20 ug/g; For pH 7.0->7.5 standard = 150 ug/g; For pH 7.5->8.0 standard = 1,000 ug/g; For pH ≥ 8.0 standard = 2,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 6.
PH2	Beryllium standards vary with soil pH from 1-500 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 6.5 standard = 1 ug/g; For pH 6.5-<7.0 standard = 4 ug/g; For pH 7.0-<7.5 standard = 30 ug/g; For pH 7.5-<8.0 standard = 250 ug/g; For pH ≥ 8.0 standard = 500 ug/g. Consult CSR Schedule 3.1.1, Matrix 6.
PH3	Beryllium standards vary with soil pH from 85-350,000 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH < 5.0 standard = 85 ug/g; For pH 5.0 -<5.5 standard = 100 ug/g; For pH 5.5-<6.0 standard = 200 ug/g; For pH 6.0 -<6.5 standard = 550 ug/g; For pH 6.5-<7.0 standard = 2,500 ug/g; For pH 7.0-<7.5 standard = 20,000 ug/g; For pH 7.5-<8.0 standard = 150,000 ug/g; For pH ≥ 8.0 standard = 350,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 6.
PH5	Beryllium standards vary with soil pH from 8.5-35,000 ug/g for groundwater used for irrigation. For pH < 5.0 standard = 8.5 ug/g; For pH 5.0 -<5.5 standard = 10 ug/g; For pH 5.5-<6.0 standard = 20 ug/g; For pH 6.0 -<6.5 standard = 55 ug/g; For pH 6.5-<7.0 standard = 250 ug/g; For pH 7.0-<7.5 standard = 2,000 ug/g; For pH 7.5-<8.0 standard = 15,000 ug/g; For pH ≥ 8.0 standard = 35,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 6.
PH6	Cadmium standards vary with soil pH from 1-70 ug/g for groundwater used for drinking water for all land use types. For pH < 7.0 standard = 1 ug/g; For pH 7.0->7.5 standard = 4.5 ug/g; For pH 7.5->8.0 standard = 30 ug/g; For pH ≥ 8.0 standard = 70 ug/g. Consult CSR Schedule 3.1.1, Matrix 7.
PH7	Cadmium standards vary with soil pH from 1-50 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 7.0 standard = 1 ug/g; For pH 7.0->7.5 standard = 3 ug/g; For pH 7.5->8.0 standard = 20 ug/g; For pH ≥ 8.0 standard = 50 ug/g. Consult CSR Schedule 3.1.1, Matrix 7.
PH8	Cadmium standards vary with soil pH from 1-200 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH < 5.5 standard = 1 ug/g; For pH 5.5-<6.0 standard = 1.5 ug/g; For pH 6.0 -<6.5 standard = 2 ug/g; For pH 6.5-<7.0 standard = 3.5 ug/g; For pH 7.0-<7.5 standard = 15 ug/g; For pH 7.5-<8.0 standard = 95 ug/g; For pH ≥ 8.0 standard = 200 ug/g. Consult CSR Schedule 3.1.1, Matrix 7.
PH10	Cadmium standards vary with soil pH from 1-70 ug/g for groundwater used for irrigation. For pH < 7.0 standard = 1 ug/g; For pH 7.0->7.5 standard = 4.5 ug/g; For pH 7.5->8.0 standard = 30 ug/g; For pH ≥ 8.0 standard = 70 ug/g. Consult CSR Schedule 3.1.1, Matrix 7.
PH11	Lead standards vary with soil pH from 120-8,500 ug/g for groundwater used for drinking water for all land use types. For pH < 5.5 standard = 120 ug/g; For pH 5.5-<6.0 standard = 150 ug/g; For pH 6.0 -<6.5 standard = 800 ug/g; For pH 6.5-<7.0 standard = 3,500 ug/g; For pH 7.0-<7.5 standard = 7,500 ug/g; For pH ≥ 7.5 standard = 8,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 18.
PH12	Lead standards vary with soil pH from 200-90,000 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 5.0 standard = 200 ug/g; For pH 5.0 -<5.5 standard = 350 ug/g; For pH 5.5-<6.0 standard = 1,500 ug/g; For pH 6.0 -<6.5 standard = 8,500 ug/g; For pH 6.5-<7.0 standard = 35,000 ug/g; For pH 7.0->7.5 standard = 80,000 ug/g; For pH ≥ 7.5 standard = 90,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 18.
PH13	Lead standards vary with soil pH from 120-15,000 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH < 5.5 standard = 120 ug/g; For pH 5.5-<6.0 standard = 300 ug/g; For pH 6.0 -<6.5 standard = 1,500 ug/g; For pH 6.5-<7.0 standard = 6,500 ug/g; For pH ≥ 7.0 standard = 15,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 18.
PH15	Lead standards vary with soil pH from 350-150,000 ug/g for groundwater used for irrigation. For pH < 5.0 standard = 350 ug/g; For pH 5.0 -<5.5 standard 650 350 ug/g; For pH 5.5-<6.0 standard = 3,000 ug/g; For pH 6.0 -<6.5 standard = 15,000 ug/g; For pH 6.5-<7.0 standard = 65,000 ug/g; For pH ≥ 7.0 standard = 150,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 18.
PH16	Nickel standards vary with soil pH from 70-500 ug/g for groundwater used for drinking water for all land use types. For pH < 7.5 standard = 70 ug/g; For pH 7.5-<8.0 standard = 250 ug/g; For pH ≥ 8.0 standard = 500 ug/g. Consult CSR Schedule 3.1.1, Matrix 24.
PH17	Nickel standards vary with soil pH from 90-9,500 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 5.0 standard = 90 ug/g; For pH 5.0 -<5.5 standard = 100 ug/g; For pH 5.5-<6.0 standard = 150 ug/g; For pH 6.0 -<6.5 standard = 200 ug/g; For pH 6.5-<7.0 standard = 300 ug/g; For pH 7.0->7.5 standard = 900 ug/g; For pH 7.5-<8.0 standard = 5,000 ug/g; For pH ≥ 8.0 standard = 9,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 24.
PH18	Nickel standards vary with soil pH from 70-500 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH < 7.5 standard = 70 ug/g; For pH 7.5-<8.0 standard = 250 ug/g; For pH ≥ 8.0 standard = 500 ug/g. Consult CSR Schedule 3.1.1, Matrix 24.
PH20	Nickel standards vary with soil pH from 70-1,500 ug/g for groundwater used for irrigation. For pH <7.0 standard = 70 ug/g; For pH 7.0->7.5 standard = 100 ug/g; For pH 7.5-<8.0 standard = 650 ug/g; For pH ≥ 8.0 standard = 1,500 ug/g Consult CSR Schedule 3.1.1, Matrix 24.
PH25	Zinc standards vary with soil pH from 200-5,500 ug/g for groundwater used for drinking water for all land use types. For pH < 5.0 standard = 200 ug/g; For pH 5.0 -<5.5 standard = 250 ug/g; For pH 5.5-<6.0 standard = 300 ug/g; For pH 6.0 -<6.5 standard = 450 ug/g; For pH 6.5-<7.0 standard = 600 ug/g; For pH 7.0->7.5 standard = 1,000 ug/g; For pH 7.5-<8.0 standard = 3,000 ug/g; For pH ≥ 8.0 standard = 5,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 40.
PH26	Zinc standards vary with soil pH from 150-3,000 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 6.0 standard = 150 ug/g; For pH 6.0 -<6.5 standard = 250 ug/g; For pH 6.5-<7.0 standard = 350 ug/g; For pH 7.0->7.5 standard = 600 ug/g; For pH 7.5-<8.0 standard = 1,500 ug/g; For pH ≥ 8.0 standard = 3,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 40.
PH27	Zinc standards vary with soil pH from 150-200 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH <8.0 standard = 150 ug/g; For pH ≥ 8.0 standard = 200 ug/g. Consult CSR Schedule 3.1.1, Matrix 40.
PH29	Zinc standards vary with soil pH from 150-9,000 ug/g for groundwater used for irrigation. For pH < 6.0 standard = 150 ug/g; For pH 6.0 -<6.5 standard = 300 ug/g; For pH 6.5-<7.0 standard = 400 ug/g; For pH 7.0->7.5 standard = 2,000 ug/g; For pH 7.5-<8.0 standard = 5,000 ug/g; For pH ≥ 8.0 standard = 9,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 40.
PH30	Copper standards vary with soil pH from 250-100,000 ug/g for groundwater used for drinking water for all land use types. For pH < 5.0 standard = 250 ug/g; For pH 5.0 -<5.5 standard = 500 ug/g; For pH 5.5-<6.0 standard = 2,000 ug/g; For pH 6.0 -<6.5 standard = 10,000 ug/g; For pH 6.5-<7.0 standard = 50,000 ug/g; For pH ≥ 7.0 standard = 100,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 11.
PH32	Copper standards vary with soil pH from 75-7,500 ug/g for groundwater flow to surface water used by aquatic life (freshwater) for all land use types. For pH < 5.5 standard = 75 ug/g; For pH 5.5-<6.0 standard = 100 ug/g; For pH 6.0 -<6.5 standard = 700 ug/g; For pH 6.5-<7.0 standard = 3,000 ug/g; For pH 7.0-<7.5 standard = 6,500 ug/g; For pH ≥ 7.5 standard = 7,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 11.
PH33	Copper standards vary with soil pH from 75-1,500 ug/g for groundwater flow to surface water used by aquatic life (marine) for all land use types. For pH < 6.0 standard = 75 ug/g; For pH 6.0 -<6.5 standard = 150 ug/g; For pH 6.5-<7.0 standard = 650 ug/g; For pH ≥ 7.0 standard = 1,500 ug/g. Consult CSR Schedule 3.1.1, Matrix 11.
PH34	Copper standards vary with soil pH from 75-15,000 ug/g for groundwater used for irrigation. For pH < 5.5 standard = 75 ug/g; For pH 5.5-<6.0 standard = 300 ug/g; For pH 6.0 -<6.5 standard = 1,500 ug/g; For pH 6.5-<7.0 standard = 6,500 ug/g; For pH ≥ 7.0 standard = 15,000 ug/g. Consult CSR Schedule 3.1.1, Matrix 11.
S1	HEPHs - Heavy Extractable Petroleum Hydrocarbons in soil. Consult BC Environmental Laboratory Manual for more detail.
S2	LEPHs - Light Extractable Petroleum Hydrocarbons in soil. Consult BC Environmental Laboratory Manual for more detail.
S3	VPHs - Volatile Petroleum Hydrocarbons in soil. Consult BC Environmental Laboratory Manual for more detail.
S4	Standard refers to benzo(a)pyrene (BaP Toxicity Equivalency Quotient (TEQ). Consult Schedule 3.1.2, note 7.
TS	The reporting limit for this analyte has been raised to account for matrix interference.
RPD	Relative Percent Difference.
61%	RPD exceeds data quality objective of 50%.
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.

ATTACHMENT 2

BOREHOLE LOGS

BOREHOLE RECORD

BH23-01

CLIENT: **District of Sooke**
PROJECT: **Sooke Forcemain Project**
LOCATION: **Sooke Wastewater Treatment Plant**
DATE BORED: **July 11, 2023**

BH COORDINATES [UTM 10] 5357275.0N 444678.0E
PROJECT NO. : **111720115**
BH ELEVATION: **8m**
DATUM: **Geodetic**
WATER LEVEL: **3.7 m on July 11, 2023**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	8.0							
	7.7	FILL: gravel with sand, trace silt		GS	1			Drill out 1.2 m of compacted fill, no blow counts
		Brown mottled with grey SILTY SAND (SM) - trace fine gravel - moist		AU	SA1			No Analysis HSVL 0/0 ppmv
1	6.9			GS	2			Sieve at 0.6 m G S Fines 2% 50% 48%
		Hard brown lean CLAY (CL) - trace to with sand - trace fine gravel, 19 mm Ø max - medium plastic - dry to moist					56	
				GS	3		42	PHC, Salinity, Metals, Nutrients HSVL 0/0 ppmv
2				AU	SA2		50	No Analysis HSVL 0/0 ppmv
				AU	SA3		60	Auger drill over spun from 1.5 m to 3.0 m
							54	
				GS	4		49	
3							41	
							35	Auger drill over spun from 3.0 m to 4.6 m
							37	
		- SANDY lean CLAY below 3.7m		GS	5		46	Percent Passing #200: 66%
4				AU	SA4		46	No Analysis SVL 0/0 ppmv
	3.4							DCPT refusal at 4.5 m due to no movement for 10 blows
		End of Borehole at 4.6 m - reached target depth - water measured at 3.7 m upon drilling completion on July 11, 2023 - sloughed to 4.0 m						
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

10 blows/0 mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)
8 7 6 5 4 3 2 1 0 -1 -2

▽ Water Level Observed During Drilling

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Grassroots Drilling Ltd.
Drilling Method: Solid Stem Auger
Completion Depth: 4.6 m

Logged By:
Reviewed By:
Page 1 of 1

BOREHOLE RECORD

BH23-02

Stantec

CLIENT: **District of Sooke**
PROJECT: **Sooke Forcemain Project**
LOCATION: **Sooke Wastewater Treatment Plant**
DATE BORED: **July 11, 2023**

BH COORDINATES [UTM 10] 5357366.0N 444775.0E
WATER LEVEL: **N/A**

PROJECT NO. : **111720115**
BH ELEVATION: **12m**
DATUM: **Geodetic**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	12.0	FILL: gravel with sand, trace silt						Drill out 1.5 m of compacted fill, no blow counts
				GS	1			
	11.1			AU	SA1			PHC, Salinity, Metals, Herb/Pest HSVL 0/0 ppmv
1		Hard brown mottled with grey lean CLAY (CL) with sand and gravel - fine sand, coarse gravel, 23 mm Ø max - trace sand and gravel after 1.5 m - moist		GS	2			
								Auger drill over spun from 1.5 m to 3.0 m
2				AU	SA2/ QC1		32	No Analysis SVL 0/0 ppmv
							41	
				GS	3			Percent Passing #200: 95%
3							51	
							45	
							58	
				GS	4		41	
				AU	SA3		32	No Analysis SVL 0/1 ppmv
4				GS	5		30	
	7.7							DCPT refusal at 4.3 m
		End of Borehole at 4.3m - auger refusal at 4.3m - no ground water observed						
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

50 blows/100mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)
12 11 10 9 8 7 6 5 4 3 2

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Grassroots Drilling Ltd.
Drilling Method: Solid Stem Auger
Completion Depth: 4.3 m

Logged By:
Reviewed By:
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BOREHOLE RECORD

BH23-03

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **17m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357469.0N 444891.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	17.0							
		FILL: gravel with sand, trace silt		GS	1			Drill out 0.6 m of compacted fill, no blow counts
	16.4			AU	SA1			No Analysis HSVL 0/0 ppmv
1		Compact brown mottled with grey SILTY SAND (SM) - trace coarse gravel - trace organics at 1.1 m - trace clay - moist		GS	2		10	Percent Passing #200: 50%
	15.8			GS	3			DCPT refusal at 1.2 m due to no movement after 10 blows
		Hard brown lean CLAY (CL) - with to trace sand - trace gravel - moist		AU	SA2			PHC, Salinity, Metals HSVL 0/1 ppmv
2	15.0			GS	4			
		End of Borehole at 2.0 m - refusal at 2.0 m due to inferred cobble/boulder/bedrock - no ground water obsereved - second borehole was attempted 1 m to the northeast of BH23-03, refusal encountered at similar depth						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

10 blows/0 mm >>

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 17 16 15 14 13 12 11 10 9 8 7

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By:

Drilling Method: Solid Stem Auger | Reviewed By:

Completion Depth: 2 m | Page 1 of 1

BOREHOLE RECORD

BH23-04

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **14.5m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357380.0N 445006.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	14.5							
	14.4	ASPHALT		GS	1			150 mm of asphalt
		Loose to compact dark brown SILTY SAND (SM) - trace to with organics - trace to with fine gravel, 11 mm Ø max - moist		AU	SA1		7	No Analysis HSVL 0/0 ppmv
1	13.6	Hard grey lean CLAY (CL) with sand - trace fine gravel - medium plasticity - moist - trace sand below 1.5m		AU	SA2		19 41	PHC, Salinity, Metals HSVL 0/0 ppmv
				GS	2		40	Percent Passing #200: 75%
2				GS	3		44 49	Auger drill over spun from 1.5 m to 3.0 m
				AU	SA3		51 46	No Analysis HSVL 0/0 ppmv
3				GS	4		51 81	DCPT refusal at 3.3 m
	11.0			GS	5			
4		End of Borehole at 3.5 m - auger refusal at 3.5 m - no ground water observed - sloughed to 2.9 m						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

50 blows/22mm >>

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

14 13 12 11 10 9 8 7 6 5

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By:

Drilling Method: Solid Stem Auger | Reviewed By:

Completion Depth: 3.5 m | Page 1 of 1

BOREHOLE RECORD

BH23-05

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **16m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357242.0N 445154.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	16.0							
	15.7	ASPHALT						300 mm of asphalt
	15.6	FILL: gravel with sand, trace silt		AU	SA1			No Analysis HSVL 0/1 ppmv
		Loose brown SILTY SAND (SM) - coarse sand - trace to with fine gravel - moist		GS	1		5	
1	15.1			AU	SA2		38	No Analysis HSVL 0/1 ppmv
		Hard brown lean CLAY (CL) - trace coarse sand - trace fine gravel - medium plasticity - moist		GS	2		66	
							62	
2				GS	3		39	
				AU	SA3		33	PHC, Salinity, Metals HSVL 0/1 ppmv
	13.3			GS	4		43	Auger drill over spun at 2.7 m DCPT refusal at 3.0 m
3		Hard brown CLAYEY SAND (SC) with gravel - fine sand, coarse fine gravel, 15 mm Ø max - moist to wet		GS	5			Percent Passing #200: 46%
	12.6							50 blows/152mm >>
		End of Borehole at 3.4 m - auger refusal at 3.4 m - no ground water observed - sloughed to 2.4 m						
4								
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

16 15 14 13 12 11 10 9 8 7 6

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By:

Drilling Method: Solid Stem Auger | Reviewed By:

Completion Depth: 3.4 m | Page 1 of 1

BOREHOLE RECORD

BH23-06

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **18m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357215.0N 445319.0E | DATUM: **Geodetic**

DATE BORED: **July 12, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) or TCR %	SAMPLES: N-VALUE or RQD %	OTHER TESTS / REMARKS
0	18.0							
	17.8	ASPHALT						200 mm of asphalt
		Brown SILTY SAND (SM) with gravel - moist		AU	SA1			No DCPT due to shallow cobble/boulder PHC, Salinity, Metals HSVL 0/0 ppmv
1	16.8			GS	1			Sieve at 0.8 m G 34% S 38% Fines 28%
		End of Borehole at 1.2 m - auger refusal at 1.2 m due to inferred cobble/boulder/bedrock - no ground water observed						

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 18 17 16 15 14 13 12 11 10 9 8

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By:

Drilling Method: Solid Stem Auger | Reviewed By:

Completion Depth: 1.2 m | Page 1 of 1

BOREHOLE RECORD

BH23-07

CLIENT: **District of Sooke**
PROJECT: **Sooke Forcemain Project**
LOCATION: **Sooke Wastewater Treatment Plant**
DATE BORED: **July 12, 2023**

BH COORDINATES [UTM 10] 5357258.0N 445539.0E
WATER LEVEL: **N/A**

PROJECT NO. : **111720115**
BH ELEVATION: **20.5m**
DATUM: **Geodetic**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	20.5							
	20.4	ASPHALT						150 mm of asphalt
	20.2	FILL: gravel with sand, trace silt		AU	SA1		5	No Analysis HSVL 0/1 ppmv
		Loose dark brown SILTY SAND (SM) - trace to with coarse gravel - trace to with organics		GS	1			No Analysis HSVL 0/0 ppmv
	19.6	- moist		AU	SA2		8	
1				GS	2			Percent Passing #200: 60%
	19.3	Hard brown lean CLAY (CL) with sand - trace gravel - occasional blue clay - trace oxidization - moist		AU	SA3		38	DCPT refusal at 1.2 m
				GS	3			
	19.0	Hard brown CLAYEY SAND (SC) - trace fine gravel - occasional cobbles up to 85 mm - moist						PHC, Salinity, Metals HSVL 0/1 ppmv
2		End of Borehole at 1.5 m - auger refusal at 1.5 m due to inferred cobble/boulder/bedrock - no ground water observed						
3								
4								
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80
50 blows/100mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 20 19 18 17 16 15 14 13 12 11

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Grassroots Drilling Ltd.
Drilling Method: Solid Stem Auger
Completion Depth: 1.5 m

Logged By:
Reviewed By:
Page 1 of 1

BOREHOLE RECORD

BH23-08

CLIENT: **District of Sooke** | BH COORDINATES | PROJECT NO. : **111720115**

PROJECT: **Sooke Forcemain Project** | [UTM 10] | BH ELEVATION: **20m**

LOCATION: **Sooke Wastewater Treatment Plant** | 5357340.0N 445699.0E | DATUM: **Geodetic**

DATE BORED: **July 11, 2023** | WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	20.0							
	19.9	ASPHALT						100 mm asphalt
		Loose to compact dark brown SILTY SAND (SM) with gravel - fine sand, coarse gravel, 23 mm Ø max - trace to with organics - moist		AU	SA1		16	PHC, Salinity, Metals HSVL 0/0 ppmv
				GS	1		7	Sieve at 0.6 m G S Fines 23% 40% 37%
1				AU	SA2		6	No Analysis HSVL 0/0 ppmv
				GS	2		22	
	18.5							
		Hard brown lean CLAY (CL) with sand - trace to with gravel, 30 mm Ø max - medium plasticity - moist					57	
2				AU	SA3		75	No Analysis HSVL 0/0 ppmv
				GS	3		64	
							84	
				GS	4		100	DCPT refusal at 2.9 m
3								
				GS	5			
4				AU	SA4			No Analysis HSVL 0/0 ppmv
				GS	6			
	15.4							
		End of Borehole at 4.6 m - reached target depth - no ground water observed						
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT/DCPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

20 19 18 17 16 15 14 13 12 11 10

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Grassroots Drilling Ltd. | Logged By:

Drilling Method: Solid Stem Auger | Reviewed By:

Completion Depth: 4.6 m | Page 1 of 1

BOREHOLE RECORD

BH23-09

CLIENT: **District of Sooke**
PROJECT: **Sooke Forcemain Project**
LOCATION: **Sooke Wastewater Treatment Plant**
DATE BORED: **July 11, 2023**

BH COORDINATES [UTM 10] 5357427.0N 445850.0E
WATER LEVEL: **N/A**

PROJECT NO. : **111720115**
BH ELEVATION: **16m**
DATUM: **Geodetic**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	16.0							
	15.9	ASPHALT		AU	SA1			150 mm of asphalt
		Compact brown SILTY SAND (SM) with gravel - fine sand, coarse gravel, 23 mm Ø max - trace clay - moist		GS	1		28	Percent Passing #200: 24% PHC, Salinity, Metals HSVL 0/0 ppmv
1				GS	2		18	
				AU	SA2		27	No Analysis HSVL 0/0 ppmv
	14.7							
	14.5	Hard brown mottled with grey CLAYEY SAND (SC) with gravel - fine sand, coarse gravel, 28 mm Ø max - moist					58	DCPT refusal at 1.5 m
2		End of Borehole at 1.5 m - auger refusal at 1.5 m - no ground water observed						

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

50 blows/100mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Grassroots Drilling Ltd.
Drilling Method: Solid Stem Auger
Completion Depth: 1.5 m

Logged By:
Reviewed By:
Page 1 of 1

BOREHOLE RECORD

BH23-10

CLIENT: **District of Sooke**
PROJECT: **Sooke Forcemain Project**
LOCATION: **Sooke Wastewater Treatment Plant**
DATE BORED: **July 11, 2023**

BH COORDINATES [UTM 10] 5357623.0N 445983.0E
WATER LEVEL: **N/A**

PROJECT NO. : **111720115**
BH ELEVATION: **19m**
DATUM: **Geodetic**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0	19.0							
	18.9	ASPHALT		AU	SA1			150 mm of asphalt Drill out 1.2 m, no DCPT blow counts
	18.6	Dark brown CLAYEY SAND (SC) with gravel - fine sand, coarse gravel, 37mm Ø max - trace to with organics - moist		GS	1			
1				GS	2			Percent Passing #200: 54% No Analysis HSVL 0/0 ppmv
				AU	SA2			
		Hard brown SANDY lean CLAY (CL) - trace fine gravel, 12 mm Ø max - medium plasticity - moist - with sand below 1.2 m		GS	3		49	
2	16.9						45	PHC, Salinity, Metals, VOC HSVL 0/0 ppmv DCPT refusal at 2.1 m
		End of Borehole at 2.1 m - auger refusal at 2.0m - no ground water observed						
3								
4								
5								
6								
7								
8								
9								
10								

UNDRAINED SHEAR STRENGTH, Cu (kPa)
LABORATORY TEST ▲ FIELD VANE TEST ◆
POCKET PEN. ★ POCKET SHEAR VANE ◘
50 kPa 100 kPa 150 kPa 200 kPa
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
SPT/DCPT (N-value) BLOWS/0.3m ●
Water Content (%) and Blow Count
10 20 30 40 50 60 70 80

50 blows/127mm

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m): 19 18 17 16 15 14 13 12 11 10 9

BACKFILL SYMBOL
ASPHALT GROUT CONCRETE
BENTONITE DRILL CUTTINGS SAND SLOUGH

Drilling Contractor: Grassroots Drilling Ltd.
Drilling Method: Solid Stem Auger
Completion Depth: 2.1 m

Logged By:
Reviewed By:
Page 1 of 1

ATTACHMENT 4

LABORATORY CERTIFICATES OF ANALYSES

CERTIFICATE OF ANALYSIS

REPORTED TO	Stantec Consulting Ltd. (Victoria) 400 - 655 Tyee Road Victoria, BC V9A 6X5		
ATTENTION	Baillie Holmes	**WORK ORDER**	23G1805
PO NUMBER	111720115	**RECEIVED / TEMP**	2023-07-14 11:00 / 13.7°C
PROJECT	111720115	**REPORTED**	2023-09-19 15:16
PROJECT INFO		**COC NUMBER**	B129107

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at rpshyk@caro.ca

Authorized By:

Regan Pshyk
Account Manager

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-01-SA2 (23G1805-02) | Matrix: Soil | Sampled: 2023-07-11 17:55					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	< 50	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	< 50	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*75*	*60-140*	%	*2023-07-20*	
Fertility / Nutrient Parameters					
Calcium, Available	**1600**	5	mg/kg dry	2023-09-16	
Magnesium, Available	**735**	5	mg/kg dry	2023-09-16	
Potassium, Available	**75**	5	mg/kg dry	2023-09-16	
Sodium, Available	**80**	5	mg/kg dry	2023-09-16	
Ammonia, Available (as N)	**18.0**	1.0	mg/kg dry	2023-09-16	
Nitrate, Available (as N)	**13.0**	1.0	mg/kg dry	2023-09-16	
Phosphorus, Available	**6**	2	mg/kg dry	2023-09-16	
General Parameters					
Moisture	**13.0**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**6.43**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*108*	*50-140*	%	*2023-07-20*	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-01-SA2 (23G1805-02) | Matrix: Soil | Sampled: 2023-07-11 17:55, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Surrogate: Chrysene-d12	*81*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*110*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*66*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*105*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**67.4**	1.0	%	2023-07-17	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	< 5.0	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**21100**	40	mg/kg dry	2023-07-19	
Antimony	**0.20**	0.10	mg/kg dry	2023-07-19	
Arsenic	**5.75**	0.30	mg/kg dry	2023-07-19	
Barium	**78.1**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.35**	0.10	mg/kg dry	2023-07-19	
Boron	**4.0**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.052**	0.040	mg/kg dry	2023-07-19	
Chromium	**56.6**	1.0	mg/kg dry	2023-07-19	
Cobalt	**15.9**	0.10	mg/kg dry	2023-07-19	
Copper	**43.3**	0.40	mg/kg dry	2023-07-19	
Iron	**34200**	20.0	mg/kg dry	2023-07-19	
Lead	**4.38**	0.20	mg/kg dry	2023-07-19	
Lithium	**16.0**	0.10	mg/kg dry	2023-07-19	
Manganese	**577**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.26**	0.10	mg/kg dry	2023-07-19	
Nickel	**52.0**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**42.7**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.37**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.430**	0.050	mg/kg dry	2023-07-19	
Vanadium	**84.2**	1.0	mg/kg dry	2023-07-19	
Zinc	**61.6**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-01-SA2 (23G1805-02) | Matrix: Soil | Sampled: 2023-07-11 17:55, Continued					
Volatile Organic Compounds (VOC), Continued					
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*113*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*105*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*105*	*60-140*	%	*2023-07-21*	
BH23-02-SA1 (23G1805-05) | Matrix: Soil | Sampled: 2023-07-11 18:50					
Acid Herbicides					
MCPP	< 0.010	0.010	mg/kg dry	2023-07-25	
Bromoxynil	< 0.010	0.010	mg/kg dry	2023-07-25	
Clopyralid	< 0.010	0.010	mg/kg dry	2023-07-25	
Picloram	< 0.010	0.010	mg/kg dry	2023-07-25	
2,4,5-T	< 0.010	0.010	mg/kg dry	2023-07-25	
Fenoprop	< 0.010	0.010	mg/kg dry	2023-07-25	
Chloramben	< 0.010	0.010	mg/kg dry	2023-07-25	
Triclopyr	< 0.010	0.010	mg/kg dry	2023-07-25	
MCPA	< 0.010	0.010	mg/kg dry	2023-07-25	
Dinoseb	< 0.010	0.010	mg/kg dry	2023-07-25	
2,4-DB	< 0.010	0.010	mg/kg dry	2023-07-25	
Bentazon	< 0.010	0.010	mg/kg dry	2023-07-25	
Dichlorprop (2,4-DP)	< 0.010	0.010	mg/kg dry	2023-07-25	
MCPB	< 0.010	0.010	mg/kg dry	2023-07-25	
Dicamba	< 0.010	0.010	mg/kg dry	2023-07-25	
2,4-D	< 0.010	0.010	mg/kg dry	2023-07-25	
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	< 50	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	< 50	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*79*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**15.7**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.95**	0.10	pH units	2023-07-21	
Pesticides, Herbicides, and Fungicides					
Alachlor	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Aldrin	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Atrazine and metabolites	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Azinphos-methyl	< 0.0100	0.0100	mg/kg dry	2023-07-21	
alpha-BHC	< 0.0050	0.0050	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-02-SA1 (23G1805-05) | Matrix: Soil | Sampled: 2023-07-11 18:50, Continued					
Pesticides, Herbicides, and Fungicides, Continued					
beta-BHC	< 0.0050	0.0050	mg/kg dry	2023-07-21	
delta-BHC	< 0.0050	0.0050	mg/kg dry	2023-07-21	
gamma-BHC (Lindane)	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Bromacil	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Bromoxynil	< 0.0200	0.0200	mg/kg dry	2023-07-21	
Butachlor	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Captan	< 0.0200	0.0200	mg/kg dry	2023-07-21	
Chlordane (cis + trans)	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Chlorothalonil	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Chlorpyrifos	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Cyanazine	< 0.0100	0.0100	mg/kg dry	2023-07-21	
DDT, Total	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Deltamethrin	< 0.0500	0.0500	mg/kg dry	2023-07-21	
Diazinon	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Dichlorvos	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Diclofop-methyl	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Dieldrin	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Dimethoate	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Disulfoton	< 0.0200	0.0200	mg/kg dry	2023-07-21	
Diuron	< 0.0200	0.0200	mg/kg dry	2023-07-21	
Endosulfan I + II	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Endosulfan sulfate	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Endrin	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Endrin aldehyde	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Endrin ketone	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Fenchlorphos (Ronnel)	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Heptachlor	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Heptachlor epoxide	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Linuron	< 0.0400	0.0400	mg/kg dry	2023-07-21	
Malathion	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Methoxychlor	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Methyl parathion	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Metolachlor	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Metribuzin	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Parathion	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Pentachloronitrobenzene	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Permethrin	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Phorate	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Prometon	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Prometryne	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Simazine	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Sulfotep	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Tebuthiuron	< 0.0200	0.0200	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-02-SA1 (23G1805-05) | Matrix: Soil | Sampled: 2023-07-11 18:50, Continued					
Pesticides, Herbicides, and Fungicides, Continued					
Temephos (Abate)	< 0.0500	0.0500	mg/kg dry	2023-07-21	
Terbufos	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Triallate	< 0.0050	0.0050	mg/kg dry	2023-07-21	
Trifluralin	< 0.0100	0.0100	mg/kg dry	2023-07-21	
Surrogate: Tributyl Phosphate	*77*	*50-140*	%	*2023-07-21*	
Surrogate: 4-chloro-3-nitrobenzotrifluoride	*70*	*50-140*	%	*2023-07-21*	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*116*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*84*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*119*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*63*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*105*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**84.1**	1.0	%	2023-07-17	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**8.4**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**29900**	40	mg/kg dry	2023-07-19	
Antimony	**0.23**	0.10	mg/kg dry	2023-07-19	
Arsenic	**5.36**	0.30	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-02-SA1 (23G1805-05) | Matrix: Soil | Sampled: 2023-07-11 18:50, Continued					
Strong Acid Leachable Metals, Continued					
Barium	**113**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.48**	0.10	mg/kg dry	2023-07-19	
Boron	**3.0**	2.0	mg/kg dry	2023-07-19	
Cadmium	< 0.040	0.040	mg/kg dry	2023-07-19	
Chromium	**56.5**	1.0	mg/kg dry	2023-07-19	
Cobalt	**18.8**	0.10	mg/kg dry	2023-07-19	
Copper	**40.4**	0.40	mg/kg dry	2023-07-19	
Iron	**38100**	20.0	mg/kg dry	2023-07-19	
Lead	**5.07**	0.20	mg/kg dry	2023-07-19	
Lithium	**14.2**	0.10	mg/kg dry	2023-07-19	
Manganese	**623**	0.40	mg/kg dry	2023-07-19	
Mercury	**0.047**	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.31**	0.10	mg/kg dry	2023-07-19	
Nickel	**43.0**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**29.3**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.45**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.504**	0.050	mg/kg dry	2023-07-19	
Vanadium	**93.3**	1.0	mg/kg dry	2023-07-19	
Zinc	**51.5**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*113*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*103*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*106*	*60-140*	%	*2023-07-21*	
BH23-10-SA2 (23G1805-10) | Matrix: Soil | Sampled: 2023-07-11 20:45					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**57**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-10-SA2 (23G1805-10) | Matrix: Soil | Sampled: 2023-07-11 20:45, Continued					
BCMOE Aggregate Hydrocarbons, Continued					
HEPHs	**57**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*90*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**14.6**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.67**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	**0.073**	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	**0.058**	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	**0.052**	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Pyrene	**0.072**	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*110*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*83*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*115*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*61*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*103*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**64.9**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**62**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**26.8**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**30800**	40	mg/kg dry	2023-07-19	
Antimony	**0.22**	0.10	mg/kg dry	2023-07-19	
Arsenic	**5.24**	0.30	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-10-SA2 (23G1805-10) | Matrix: Soil | Sampled: 2023-07-11 20:45, Continued					
Strong Acid Leachable Metals, Continued					
Barium	**95.3**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.40**	0.10	mg/kg dry	2023-07-19	
Boron	**2.3**	2.0	mg/kg dry	2023-07-19	
Cadmium	< 0.040	0.040	mg/kg dry	2023-07-19	
Chromium	**56.1**	1.0	mg/kg dry	2023-07-19	
Cobalt	**13.2**	0.10	mg/kg dry	2023-07-19	
Copper	**34.0**	0.40	mg/kg dry	2023-07-19	
Iron	**35900**	20.0	mg/kg dry	2023-07-19	
Lead	**4.30**	0.20	mg/kg dry	2023-07-19	
Lithium	**17.8**	0.10	mg/kg dry	2023-07-19	
Manganese	**415**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.46**	0.10	mg/kg dry	2023-07-19	
Nickel	**35.8**	0.60	mg/kg dry	2023-07-19	
Selenium	**0.34**	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**25.7**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.45**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.498**	0.050	mg/kg dry	2023-07-19	
Vanadium	**101**	1.0	mg/kg dry	2023-07-19	
Zinc	**50.8**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Bromodichloromethane	< 0.100	0.100	mg/kg dry	2023-07-21	
Bromoform	< 0.100	0.100	mg/kg dry	2023-07-21	
Carbon tetrachloride	< 0.050	0.050	mg/kg dry	2023-07-21	
Chlorobenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Chloroform	< 0.050	0.050	mg/kg dry	2023-07-21	
Dibromochloromethane	< 0.100	0.100	mg/kg dry	2023-07-21	
1,2-Dibromoethane	< 0.100	0.100	mg/kg dry	2023-07-21	
Dibromomethane	< 0.100	0.100	mg/kg dry	2023-07-21	
1,2-Dichlorobenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
1,3-Dichlorobenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
1,4-Dichlorobenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
1,1-Dichloroethane	< 0.050	0.050	mg/kg dry	2023-07-21	
1,2-Dichloroethane	< 0.050	0.050	mg/kg dry	2023-07-21	
1,1-Dichloroethylene	< 0.050	0.050	mg/kg dry	2023-07-21	
cis-1,2-Dichloroethylene	< 0.050	0.050	mg/kg dry	2023-07-21	
trans-1,2-Dichloroethylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Dichloromethane	< 0.100	0.100	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-10-SA2 (23G1805-10) | Matrix: Soil | Sampled: 2023-07-11 20:45, Continued					
Volatile Organic Compounds (VOC), Continued					
1,2-Dichloropropane	< 0.050	0.050	mg/kg dry	2023-07-21	
1,3-Dichloropropene (cis + trans)	< 0.050	0.050	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
1,1,2,2-Tetrachloroethane	< 0.050	0.050	mg/kg dry	2023-07-21	
Tetrachloroethylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
1,1,1-Trichloroethane	< 0.050	0.050	mg/kg dry	2023-07-21	
1,1,2-Trichloroethane	< 0.050	0.050	mg/kg dry	2023-07-21	
Trichloroethylene	< 0.040	0.040	mg/kg dry	2023-07-21	
Trichlorofluoromethane	< 0.100	0.100	mg/kg dry	2023-07-21	
Vinyl chloride	< 0.100	0.100	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*101*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*91*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*92*	*60-140*	%	*2023-07-21*	
BH23-09-SA1 (23G1805-11) | Matrix: Soil | Sampled: 2023-07-11 21:37					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**150**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	**150**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*81*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**12.6**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.53**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	**0.066**	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	**0.057**	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	**0.062**	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-09-SA1 (23G1805-11) | Matrix: Soil | Sampled: 2023-07-11 21:37, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	**0.056**	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	**0.100**	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Pyrene	**0.119**	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*95*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*78*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*95*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*55*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*91*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**41.2**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**101**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**62.7**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**33400**	40	mg/kg dry	2023-07-19	
Antimony	**0.20**	0.10	mg/kg dry	2023-07-19	
Arsenic	**6.60**	0.30	mg/kg dry	2023-07-19	
Barium	**114**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.40**	0.10	mg/kg dry	2023-07-19	
Boron	**3.3**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.058**	0.040	mg/kg dry	2023-07-19	
Chromium	**43.1**	1.0	mg/kg dry	2023-07-19	
Cobalt	**14.6**	0.10	mg/kg dry	2023-07-19	
Copper	**42.6**	0.40	mg/kg dry	2023-07-19	
Iron	**33800**	20.0	mg/kg dry	2023-07-19	
Lead	**4.77**	0.20	mg/kg dry	2023-07-19	
Lithium	**20.5**	0.10	mg/kg dry	2023-07-19	
Manganese	**442**	0.40	mg/kg dry	2023-07-19	
Mercury	**0.059**	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.59**	0.10	mg/kg dry	2023-07-19	
Nickel	**59.3**	0.60	mg/kg dry	2023-07-19	
Selenium	**0.53**	0.20	mg/kg dry	2023-07-19	
Silver	**0.18**	0.10	mg/kg dry	2023-07-19	
Strontium	**23.2**	0.20	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-09-SA1 (23G1805-11) | Matrix: Soil | Sampled: 2023-07-11 21:37, Continued					
Strong Acid Leachable Metals, Continued					
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.35**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.450**	0.050	mg/kg dry	2023-07-19	
Vanadium	**88.4**	1.0	mg/kg dry	2023-07-19	
Zinc	**53.5**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*96*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*86*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*87*	*60-140*	%	*2023-07-21*	
QC23-02 (23G1805-13) | Matrix: Soil | Sampled: 2023-07-11 21:37					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	**73**	50	mg/kg dry	2023-07-20	
EPHs19-32	**480**	50	mg/kg dry	2023-07-20	
LEPHs	**73**	50	mg/kg dry	N/A	
HEPHs	**480**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*86*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**10.1**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.54**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	**0.069**	0.050	mg/kg dry	2023-07-20	
Anthracene	**0.058**	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	**0.074**	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	**0.137**	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	**0.056**	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	**0.102**	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	**0.136**	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	**0.071**	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
QC23-02 (23G1805-13) | Matrix: Soil | Sampled: 2023-07-11 21:37, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Chrysene	**0.132**	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	**0.197**	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	**0.087**	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	**0.083**	0.050	mg/kg dry	2023-07-20	
Pyrene	**0.257**	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*94*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*79*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*94*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*56*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*94*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**35.3**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**74**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**49.6**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**27300**	40	mg/kg dry	2023-07-19	
Antimony	**0.15**	0.10	mg/kg dry	2023-07-19	
Arsenic	**4.63**	0.30	mg/kg dry	2023-07-19	
Barium	**86.0**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.31**	0.10	mg/kg dry	2023-07-19	
Boron	**2.6**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.054**	0.040	mg/kg dry	2023-07-19	
Chromium	**36.6**	1.0	mg/kg dry	2023-07-19	
Cobalt	**12.4**	0.10	mg/kg dry	2023-07-19	
Copper	**35.6**	0.40	mg/kg dry	2023-07-19	
Iron	**27900**	20.0	mg/kg dry	2023-07-19	
Lead	**3.83**	0.20	mg/kg dry	2023-07-19	
Lithium	**16.0**	0.10	mg/kg dry	2023-07-19	
Manganese	**392**	0.40	mg/kg dry	2023-07-19	
Mercury	**0.041**	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.50**	0.10	mg/kg dry	2023-07-19	
Nickel	**44.1**	0.60	mg/kg dry	2023-07-19	
Selenium	**0.32**	0.20	mg/kg dry	2023-07-19	
Silver	**0.13**	0.10	mg/kg dry	2023-07-19	
Strontium	**20.1**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
QC23-02 (23G1805-13) | Matrix: Soil | Sampled: 2023-07-11 21:37, Continued					
Strong Acid Leachable Metals, Continued					
Tin	**0.29**	0.20	mg/kg dry	2023-07-19	
Tungsten	**0.28**	0.20	mg/kg dry	2023-07-19	
Uranium	**0.355**	0.050	mg/kg dry	2023-07-19	
Vanadium	**73.8**	1.0	mg/kg dry	2023-07-19	
Zinc	**46.1**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*99*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*90*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*92*	*60-140*	%	*2023-07-21*	
BH23-08-SA1 (23G1805-14) | Matrix: Soil | Sampled: 2023-07-11 22:31					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**200**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	**200**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*77*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**16.7**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**4.59**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	**0.076**	0.050	mg/kg dry	2023-07-20	
Anthracene	**0.071**	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	**0.173**	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	**0.248**	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	**0.140**	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	**0.213**	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	**0.138**	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	**0.122**	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	**0.214**	0.050	mg/kg dry	2023-07-20	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-08-SA1 (23G1805-14) | Matrix: Soil | Sampled: 2023-07-11 22:31, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluoranthene	**0.266**	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	**0.107**	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	**0.074**	0.050	mg/kg dry	2023-07-20	
Pyrene	**0.516**	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*113*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*87*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*122*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*62*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*104*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**72.6**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**228**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**144**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**19900**	40	mg/kg dry	2023-07-19	
Antimony	**0.13**	0.10	mg/kg dry	2023-07-19	
Arsenic	**2.70**	0.30	mg/kg dry	2023-07-19	
Barium	**60.7**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.42**	0.10	mg/kg dry	2023-07-19	
Boron	< 2.0	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.042**	0.040	mg/kg dry	2023-07-19	
Chromium	**29.1**	1.0	mg/kg dry	2023-07-19	
Cobalt	**6.69**	0.10	mg/kg dry	2023-07-19	
Copper	**41.8**	0.40	mg/kg dry	2023-07-19	
Iron	**21100**	20.0	mg/kg dry	2023-07-19	
Lead	**4.71**	0.20	mg/kg dry	2023-07-19	
Lithium	**8.10**	0.10	mg/kg dry	2023-07-19	
Manganese	**240**	0.40	mg/kg dry	2023-07-19	
Mercury	**0.040**	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.43**	0.10	mg/kg dry	2023-07-19	
Nickel	**20.9**	0.60	mg/kg dry	2023-07-19	
Selenium	**0.29**	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**12.3**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.45**	0.20	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-08-SA1 (23G1805-14) | Matrix: Soil | Sampled: 2023-07-11 22:31, Continued					
Strong Acid Leachable Metals, Continued					
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.349**	0.050	mg/kg dry	2023-07-19	
Vanadium	**57.7**	1.0	mg/kg dry	2023-07-19	
Zinc	**28.8**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*122*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*108*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*107*	*60-140*	%	*2023-07-21*	
BH23-03-SA2 (23G1805-19) | Matrix: Soil | Sampled: 2023-07-12 17:50					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**91**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	**91**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*83*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**15.5**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.21**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-20	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-03-SA2 (23G1805-19) | Matrix: Soil | Sampled: 2023-07-12 17:50, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Pyrene	< 0.050	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*108*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*70*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*115*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*62*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*101*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**85.3**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**209**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**32.8**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**32500**	40	mg/kg dry	2023-07-19	
Antimony	**0.17**	0.10	mg/kg dry	2023-07-19	
Arsenic	**5.02**	0.30	mg/kg dry	2023-07-19	
Barium	**71.8**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.41**	0.10	mg/kg dry	2023-07-19	
Boron	**2.4**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.041**	0.040	mg/kg dry	2023-07-19	
Chromium	**65.0**	1.0	mg/kg dry	2023-07-19	
Cobalt	**23.6**	0.10	mg/kg dry	2023-07-19	
Copper	**66.8**	0.40	mg/kg dry	2023-07-19	
Iron	**42500**	20.0	mg/kg dry	2023-07-19	
Lead	**3.87**	0.20	mg/kg dry	2023-07-19	
Lithium	**13.1**	0.10	mg/kg dry	2023-07-19	
Manganese	**667**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.52**	0.10	mg/kg dry	2023-07-19	
Nickel	**42.1**	0.60	mg/kg dry	2023-07-19	
Selenium	**0.22**	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**29.0**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.46**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-03-SA2 (23G1805-19) | Matrix: Soil | Sampled: 2023-07-12 17:50, Continued					
Strong Acid Leachable Metals, Continued					
Uranium	**0.394**	0.050	mg/kg dry	2023-07-19	
Vanadium	**121**	1.0	mg/kg dry	2023-07-19	
Zinc	**53.0**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*106*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*95*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*94*	*60-140*	%	*2023-07-21*	
BH23-07-SA3 (23G1805-22) | Matrix: Soil | Sampled: 2023-07-12 19:16					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**290**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	**290**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*89*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**11.0**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**5.76**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-20	
Acenaphthylene	**0.238**	0.050	mg/kg dry	2023-07-20	
Anthracene	**0.272**	0.050	mg/kg dry	2023-07-20	
Benz(a)anthracene	**0.425**	0.050	mg/kg dry	2023-07-20	
Benzo(a)pyrene	**0.675**	0.050	mg/kg dry	2023-07-20	
Benzo(b)fluoranthene	**0.396**	0.050	mg/kg dry	2023-07-20	
Benzo(b+j)fluoranthene	**0.592**	0.050	mg/kg dry	2023-07-20	
Benzo(g,h,i)perylene	**0.479**	0.050	mg/kg dry	2023-07-20	
Benzo(k)fluoranthene	**0.370**	0.050	mg/kg dry	2023-07-20	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Chrysene	**0.493**	0.050	mg/kg dry	2023-07-20	
Dibenz(a,h)anthracene	**0.090**	0.050	mg/kg dry	2023-07-20	
Fluoranthene	**1.31**	0.050	mg/kg dry	2023-07-20	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-07-SA3 (23G1805-22) | Matrix: Soil | Sampled: 2023-07-12 19:16, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-20	
Indeno(1,2,3-cd)pyrene	**0.393**	0.050	mg/kg dry	2023-07-20	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-20	
Phenanthrene	**0.391**	0.050	mg/kg dry	2023-07-20	
Pyrene	**1.73**	0.050	mg/kg dry	2023-07-20	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-20	
Surrogate: Acenaphthene-d10	*99*	*50-140*	%	*2023-07-20*	
Surrogate: Chrysene-d12	*85*	*50-140*	%	*2023-07-20*	
Surrogate: Naphthalene-d8	*100*	*50-140*	%	*2023-07-20*	
Surrogate: Perylene-d12	*60*	*50-140*	%	*2023-07-20*	
Surrogate: Phenanthrene-d10	*100*	*55-140*	%	*2023-07-20*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**56.7**	1.0	%	2023-07-17	
Chloride, Saturated Paste	**32**	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**24.7**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**22700**	40	mg/kg dry	2023-07-19	
Antimony	**0.14**	0.10	mg/kg dry	2023-07-19	
Arsenic	**3.12**	0.30	mg/kg dry	2023-07-19	
Barium	**53.2**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.32**	0.10	mg/kg dry	2023-07-19	
Boron	**2.0**	2.0	mg/kg dry	2023-07-19	
Cadmium	< 0.040	0.040	mg/kg dry	2023-07-19	
Chromium	**48.2**	1.0	mg/kg dry	2023-07-19	
Cobalt	**15.6**	0.10	mg/kg dry	2023-07-19	
Copper	**52.2**	0.40	mg/kg dry	2023-07-19	
Iron	**32600**	20.0	mg/kg dry	2023-07-19	
Lead	**3.04**	0.20	mg/kg dry	2023-07-19	
Lithium	**10.5**	0.10	mg/kg dry	2023-07-19	
Manganese	**489**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.23**	0.10	mg/kg dry	2023-07-19	
Nickel	**31.9**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**26.8**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.39**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.328**	0.050	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-07-SA3 (23G1805-22) | Matrix: Soil | Sampled: 2023-07-12 19:16, Continued					
Strong Acid Leachable Metals, Continued					
Vanadium	**96.0**	1.0	mg/kg dry	2023-07-19	
Zinc	**41.9**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*115*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*102*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*102*	*60-140*	%	*2023-07-21*	
BH23-06-SA1 (23G1805-23) | Matrix: Soil | Sampled: 2023-07-12 19:45					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	< 50	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	< 50	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*84*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**5.5**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**7.33**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-21	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-06-SA1 (23G1805-23) | Matrix: Soil | Sampled: 2023-07-12 19:45, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-21	
Surrogate: Acenaphthene-d10	*89*	*50-140*	%	*2023-07-21*	
Surrogate: Chrysene-d12	*61*	*50-140*	%	*2023-07-21*	
Surrogate: Naphthalene-d8	*91*	*50-140*	%	*2023-07-21*	
Surrogate: Perylene-d12	*53*	*50-140*	%	*2023-07-21*	
Surrogate: Phenanthrene-d10	*94*	*55-140*	%	*2023-07-21*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**52.8**	1.0	%	2023-07-17	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**29.0**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**21400**	40	mg/kg dry	2023-07-19	
Antimony	< 0.10	0.10	mg/kg dry	2023-07-19	
Arsenic	**2.85**	0.30	mg/kg dry	2023-07-19	
Barium	**43.0**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.34**	0.10	mg/kg dry	2023-07-19	
Boron	**2.9**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.070**	0.040	mg/kg dry	2023-07-19	
Chromium	**41.8**	1.0	mg/kg dry	2023-07-19	
Cobalt	**18.5**	0.10	mg/kg dry	2023-07-19	
Copper	**71.4**	0.40	mg/kg dry	2023-07-19	
Iron	**38600**	20.0	mg/kg dry	2023-07-19	
Lead	**1.53**	0.20	mg/kg dry	2023-07-19	
Lithium	**8.87**	0.10	mg/kg dry	2023-07-19	
Manganese	**794**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.17**	0.10	mg/kg dry	2023-07-19	
Nickel	**26.5**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**33.7**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.36**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.285**	0.050	mg/kg dry	2023-07-19	
Vanadium	**112**	1.0	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-06-SA1 (23G1805-23) | Matrix: Soil | Sampled: 2023-07-12 19:45, Continued					
Strong Acid Leachable Metals, Continued					
Zinc	**50.6**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*114*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*103*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*102*	*60-140*	%	*2023-07-21*	
BH23-05-SA3 (23G1805-26) | Matrix: Soil | Sampled: 2023-07-12 21:30					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	**83**	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	**83**	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*89*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**17.3**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**7.04**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(a)pyrene	**0.053**	0.050	mg/kg dry	2023-07-21	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Chrysene	< 0.052	0.050	mg/kg dry	2023-07-21	RA1
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-21	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-05-SA3 (23G1805-26) | Matrix: Soil | Sampled: 2023-07-12 21:30, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Pyrene	**0.055**	0.050	mg/kg dry	2023-07-21	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-21	
Surrogate: Acenaphthene-d10	*103*	*50-140*	%	*2023-07-21*	
Surrogate: Chrysene-d12	*108*	*50-140*	%	*2023-07-21*	
Surrogate: Naphthalene-d8	*96*	*50-140*	%	*2023-07-21*	
Surrogate: Perylene-d12	*54*	*50-140*	%	*2023-07-21*	
Surrogate: Phenanthrene-d10	*95*	*55-140*	%	*2023-07-21*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**72.6**	1.0	%	2023-07-17	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**7.2**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**24700**	40	mg/kg dry	2023-07-19	
Antimony	**0.12**	0.10	mg/kg dry	2023-07-19	
Arsenic	**4.93**	0.30	mg/kg dry	2023-07-19	
Barium	**48.3**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.32**	0.10	mg/kg dry	2023-07-19	
Boron	**3.7**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.074**	0.040	mg/kg dry	2023-07-19	
Chromium	**58.5**	1.0	mg/kg dry	2023-07-19	
Cobalt	**19.6**	0.10	mg/kg dry	2023-07-19	
Copper	**66.0**	0.40	mg/kg dry	2023-07-19	
Iron	**38900**	20.0	mg/kg dry	2023-07-19	
Lead	**3.15**	0.20	mg/kg dry	2023-07-19	
Lithium	**14.7**	0.10	mg/kg dry	2023-07-19	
Manganese	**706**	0.40	mg/kg dry	2023-07-19	
Mercury	< 0.040	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.28**	0.10	mg/kg dry	2023-07-19	
Nickel	**43.0**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**38.6**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.37**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.302**	0.050	mg/kg dry	2023-07-19	
Vanadium	**102**	1.0	mg/kg dry	2023-07-19	
Zinc	**62.6**	2.0	mg/kg dry	2023-07-19	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-05-SA3 (23G1805-26) | Matrix: Soil | Sampled: 2023-07-12 21:30, Continued					
Volatile Organic Compounds (VOC)					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*118*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*101*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*105*	*60-140*	%	*2023-07-21*	
BH23-04-SA2 (23G1805-28) | Matrix: Soil | Sampled: 2023-07-12 22:52					
BCMOE Aggregate Hydrocarbons					
VHs (6-10)	< 20	20	mg/kg dry	2023-07-21	
VPHs	< 20	20	mg/kg dry	N/A	
EPHs10-19	< 50	50	mg/kg dry	2023-07-20	
EPHs19-32	< 50	50	mg/kg dry	2023-07-20	
LEPHs	< 50	50	mg/kg dry	N/A	
HEPHs	< 50	50	mg/kg dry	N/A	
Surrogate: 2-Methylnonane (EPH/F2-4)	*82*	*60-140*	%	*2023-07-20*	
General Parameters					
Moisture	**12.5**	1.0	% wet	2023-07-19	
pH (1:2 H2O Solution)	**7.07**	0.10	pH units	2023-07-21	
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Acenaphthylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry	2023-07-21	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Chrysene	< 0.050	0.050	mg/kg dry	2023-07-21	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluoranthene	< 0.050	0.050	mg/kg dry	2023-07-21	
Fluorene	< 0.050	0.050	mg/kg dry	2023-07-21	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-04-SA2 (23G1805-28) | Matrix: Soil | Sampled: 2023-07-12 22:52, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Naphthalene	< 0.050	0.050	mg/kg dry	2023-07-21	
Phenanthrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Pyrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Quinoline	< 0.050	0.050	mg/kg dry	2023-07-21	
Surrogate: Acenaphthene-d10	*104*	*50-140*	%	*2023-07-21*	
Surrogate: Chrysene-d12	*61*	*50-140*	%	*2023-07-21*	
Surrogate: Naphthalene-d8	*108*	*50-140*	%	*2023-07-21*	
Surrogate: Perylene-d12	*56*	*50-140*	%	*2023-07-21*	
Surrogate: Phenanthrene-d10	*93*	*55-140*	%	*2023-07-21*	
Salinity Parameters (Sat. Paste Extract)					
Saturation	**84.6**	1.0	%	2023-07-17	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2023-07-20	
Sodium, Saturated Paste	**15.5**	5.0	mg/kg dry	2023-07-18	
Strong Acid Leachable Metals					
Aluminum	**20800**	40	mg/kg dry	2023-07-19	
Antimony	**0.17**	0.10	mg/kg dry	2023-07-19	
Arsenic	**5.46**	0.30	mg/kg dry	2023-07-19	
Barium	**70.7**	1.0	mg/kg dry	2023-07-19	
Beryllium	**0.35**	0.10	mg/kg dry	2023-07-19	
Boron	**5.1**	2.0	mg/kg dry	2023-07-19	
Cadmium	**0.051**	0.040	mg/kg dry	2023-07-19	
Chromium	**49.1**	1.0	mg/kg dry	2023-07-19	
Cobalt	**15.7**	0.10	mg/kg dry	2023-07-19	
Copper	**47.6**	0.40	mg/kg dry	2023-07-19	
Iron	**33800**	20.0	mg/kg dry	2023-07-19	
Lead	**4.48**	0.20	mg/kg dry	2023-07-19	
Lithium	**16.9**	0.10	mg/kg dry	2023-07-19	
Manganese	**619**	0.40	mg/kg dry	2023-07-19	
Mercury	**0.043**	0.040	mg/kg dry	2023-07-19	
Molybdenum	**0.38**	0.10	mg/kg dry	2023-07-19	
Nickel	**50.1**	0.60	mg/kg dry	2023-07-19	
Selenium	< 0.20	0.20	mg/kg dry	2023-07-19	
Silver	< 0.10	0.10	mg/kg dry	2023-07-19	
Strontium	**43.5**	0.20	mg/kg dry	2023-07-19	
Thallium	< 0.10	0.10	mg/kg dry	2023-07-19	
Tin	**0.42**	0.20	mg/kg dry	2023-07-19	
Tungsten	< 0.20	0.20	mg/kg dry	2023-07-19	
Uranium	**0.398**	0.050	mg/kg dry	2023-07-19	
Vanadium	**82.2**	1.0	mg/kg dry	2023-07-19	
Zinc	**60.9**	2.0	mg/kg dry	2023-07-19	
Volatile Organic Compounds (VOC)					

TEST RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Analyzed	Qualifier
BH23-04-SA2 (23G1805-28) | Matrix: Soil | Sampled: 2023-07-12 22:52, Continued					
Volatile Organic Compounds (VOC), Continued					
Benzene	< 0.030	0.030	mg/kg dry	2023-07-21	
Ethylbenzene	< 0.050	0.050	mg/kg dry	2023-07-21	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-07-21	
Styrene	< 0.050	0.050	mg/kg dry	2023-07-21	
Toluene	< 0.200	0.200	mg/kg dry	2023-07-21	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-07-21	
Surrogate: Toluene-d8	*108*	*60-140*	%	*2023-07-21*	
Surrogate: 4-Bromofluorobenzene	*96*	*60-140*	%	*2023-07-21*	
Surrogate: 1,4-Dichlorobenzene-d4	*98*	*60-140*	%	*2023-07-21*	

Sample Qualifiers:

RA1 The Reporting Limit for this sample has been raised due to matrix interference.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analysis Description	Method Ref.	Technique	Accredited	Location
Acid Herbicides in Soil in Soil	EURLRP QuEChERS	LC-MS/MS		Richmond
Available NH4-N and NO3-N in Soil	Carter 4	Nitrate and Exchangeable Ammonium Nitrogen		Sublet
BTEX in Soil	EPA 5035A/5030B / EPA 8260D	Methanol Extract, Purge&Trap / GC-MSD (SIM)	✓	Richmond
Cations, Available in Soil	MSSMA 4.51	1N Ammonium Acetate Extraction, Atomic Spectroscopy		Sublet
EPH in Soil	EPA 3570* / BCMOE EPHs*	Shaker Extraction (Hexane-Acetone 1:1) / Gas Chromatography (GC-FID)	✓	Richmond
HEPHs in Soil	BCMOE LEPH/HEPH	Calculation		N/A
LEPHs in Soil	BCMOE LEPH/HEPH	Calculation		N/A
Metals in Sat. Paste Extract in Soil	EPA 6020B	Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Moisture in Soil	ASTM D2974-87*	Gravimetry (Dried at 105C)		N/A
Pesticides in Soil	EPA 3570* / EPA 8270D*	Shaker Extraction (DCM) / GC-MSD (SIM)	✓	Richmond
pH in Soil	Carter 16.2 / SM 4500-H+ B (2021)	1:2 Soil/Water Slurry / Electrometry	✓	Richmond
Phosphorus, Available in Soil	UBCPLMM 6.1	Bray Extraction, Colorimetric		Sublet
Polycyclic Aromatic Hydrocarbons in Soil	EPA 3570* / EPA 8270D	Shaker Extraction (Hexane-Acetone 1:1) / GC-MSD (SIM)	✓	Richmond
SALM in Soil	BCMOE SALM V.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Saturated Paste Extraction in Soil	Carter 18.2.2 / Carter 15.2.1	Saturated Paste Extraction / Calculation		Richmond
Saturated Paste, Chloride mg/kg in Soil	SM 4500-Cl- D* (2021)	Potentiometric Titration	✓	Richmond
VH in Soil	EPA 5035A/5030B / BCMOE VHs	Methanol Extract, Purge&Trap / Purge&Trap or Headspace, Gas Chromatography (GC-FID)	✓	Richmond
Volatile Organic Compounds in Soil	EPA 5035A/5030B / EPA 8260D	Methanol Extract, Purge&Trap / GC-MSD (SIM)	✓	Richmond
VPHs in Soil	BCMOE VPH	Calculation: VH - (Benzene + Toluene + Ethylbenzene + Xylenes + Styrene)		N/A

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
% wet	Percent (as received basis)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/kg dry	Milligrams per kilogram (dry weight basis)
pH units	pH < 7 = acidic, ph > 7 = basic
ASTM	ASTM International Test Methods
BCMOE	British Columbia Environmental Laboratory Manual, British Columbia Ministry of Environment
Carter	Soil Sampling and Methods of Analysis, 2nd Edition (2007), Carter/Gregorich
EPA	United States Environmental Protection Agency Test Methods
MSSMA	Manual on Soil Sampling and Methods of Analysis, J.A. McKeague
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association
UBCPLMM	Methods Manual, Pedology Laboratory, 1977/1981, L.M. Lavkulich, UBC Department of Soil Science

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:rpshyk@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Acid Herbicides, Batch B3G2492										
Blank (B3G2492-BLK1)				Prepared: 2023-07-25, Analyzed: 2023-07-25						
MCPP	< 0.010	0.010	mg/kg wet							
Bromoxynil	< 0.010	0.010	mg/kg wet							
Clopyralid	< 0.010	0.010	mg/kg wet							
Picloram	< 0.010	0.010	mg/kg wet							
2,4,5-T	< 0.010	0.010	mg/kg wet							
Fenoprop	< 0.010	0.010	mg/kg wet							
Chloramben	< 0.010	0.010	mg/kg wet							
Triclopyr	< 0.010	0.010	mg/kg wet							
MCPA	< 0.010	0.010	mg/kg wet							
Dinoseb	< 0.010	0.010	mg/kg wet							
2,4-DB	< 0.010	0.010	mg/kg wet							
Bentazon	< 0.010	0.010	mg/kg wet							
Dichlorprop (2,4-DP)	< 0.010	0.010	mg/kg wet							
MCPB	< 0.010	0.010	mg/kg wet							
Dicamba	< 0.010	0.010	mg/kg wet							
2,4-D	< 0.010	0.010	mg/kg wet							
LCS (B3G2492-BS1)				Prepared: 2023-07-25, Analyzed: 2023-07-25						
MCPP	0.045	0.010	mg/kg wet	0.0500		90	70-130			
Bromoxynil	0.045	0.010	mg/kg wet	0.0496		90	70-130			
Clopyralid	0.045	0.010	mg/kg wet	0.0500		90	70-130			
Picloram	0.055	0.010	mg/kg wet	0.0500		109	70-130			
2,4,5-T	0.051	0.010	mg/kg wet	0.0498		102	70-130			
Fenoprop	0.053	0.010	mg/kg wet	0.0500		105	70-130			
Chloramben	0.049	0.010	mg/kg wet	0.0500		97	70-130			
Triclopyr	0.051	0.010	mg/kg wet	0.0500		103	70-130			
MCPA	0.051	0.010	mg/kg wet	0.0500		101	70-130			
Dinoseb	0.063	0.010	mg/kg wet	0.0500		127	70-130			
2,4-DB	0.058	0.010	mg/kg wet	0.0500		115	70-130			
Bentazon	0.050	0.010	mg/kg wet	0.0500		100	70-130			
Dichlorprop (2,4-DP)	0.057	0.010	mg/kg wet	0.0500		113	70-130			
MCPB	0.052	0.010	mg/kg wet	0.0500		103	70-130			
Dicamba	0.047	0.010	mg/kg wet	0.0500		94	70-130			
2,4-D	0.055	0.010	mg/kg wet	0.0500		110	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Acid Herbicides, Batch B3G2492, Continued										
LCS Dup (B3G2492-BSD1)				Prepared: 2023-07-25, Analyzed: 2023-07-25						
MCPP	0.046	0.010	mg/kg wet	0.0500		93	70-130	3		
Bromoxynil	0.044	0.010	mg/kg wet	0.0496		89	70-130	1		
Clopyralid	0.046	0.010	mg/kg wet	0.0500		91	70-130	2		
Picloram	0.057	0.010	mg/kg wet	0.0500		115	70-130	5		
2,4,5-T	0.050	0.010	mg/kg wet	0.0498		101	70-130	1		
Fenoprop	0.053	0.010	mg/kg wet	0.0500		106	70-130	1		
Chloramben	0.050	0.010	mg/kg wet	0.0500		100	70-130	3		
Triclopyr	0.046	0.010	mg/kg wet	0.0500		91	70-130	12		
MCPA	0.048	0.010	mg/kg wet	0.0500		95	70-130	6		
Dinoseb	0.062	0.010	mg/kg wet	0.0500		125	70-130	2		
2,4-DB	0.049	0.010	mg/kg wet	0.0500		98	70-130	17		
Bentazon	0.050	0.010	mg/kg wet	0.0500		101	70-130	< 1		
Dichlorprop (2,4-DP)	0.058	0.010	mg/kg wet	0.0500		117	70-130	3		
MCPB	0.053	0.010	mg/kg wet	0.0500		106	70-130	3		
Dicamba	0.049	0.010	mg/kg wet	0.0500		98	70-130	4		
2,4-D	0.057	0.010	mg/kg wet	0.0500		114	70-130	3		
BCMOE Aggregate Hydrocarbons, Batch B3G1622										
Blank (B3G1622-BLK1)				Prepared: 2023-07-17, Analyzed: 2023-07-21						
VHs (6-10)	< 20	20	mg/kg wet							
LCS (B3G1622-BS2)				Prepared: 2023-07-17, Analyzed: 2023-07-21						
VHs (6-10)	270	20	mg/kg wet	342		80	70-130			
Duplicate (B3G1622-DUP1)			**Source: 23G1805-02**	Prepared: 2023-07-17, Analyzed: 2023-07-21						
VHs (6-10)	< 20	20	mg/kg dry		< 20				30	
BCMOE Aggregate Hydrocarbons, Batch B3G1981										
Blank (B3G1981-BLK1)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
EPHs10-19	< 50	50	mg/kg wet							
EPHs19-32	< 50	50	mg/kg wet							
Surrogate: 2-Methylnonane (EPH/F2-4)	*58.6*		*mg/kg wet*	71.9		*81*	*60-140*			
LCS (B3G1981-BS2)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
EPHs10-19	2300	50	mg/kg wet	2770		82	70-130			
EPHs19-32	3300	50	mg/kg wet	3980		82	70-130			
Surrogate: 2-Methylnonane (EPH/F2-4)	*59.3*		*mg/kg wet*	79.1		*75*	*60-140*			
Duplicate (B3G1981-DUP1)			**Source: 23G1805-05**	Prepared: 2023-07-19, Analyzed: 2023-07-20						
EPHs10-19	< 50	50	mg/kg dry		< 50				40	
EPHs19-32	< 50	50	mg/kg dry		< 50				40	
Surrogate: 2-Methylnonane (EPH/F2-4)	*80.8*		*mg/kg dry*	91.3		*89*	*60-140*			
General Parameters, Batch B3G1753										
Duplicate (B3G1753-DUP1)			**Source: 23G1805-23**	Prepared: 2023-07-19, Analyzed: 2023-07-19						
Moisture	99.0	1.0	% wet		5.5			178.9	40	
General Parameters, Batch B3G2169										
Reference (B3G2169-SRM1)				Prepared: 2023-07-21, Analyzed: 2023-07-21						
pH (1:2 H2O Solution)	7.07	0.10	pH units	7.05		100	95-105			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3G2169, Continued										
Reference (B3G2169-SRM2)				Prepared: 2023-07-21, Analyzed: 2023-07-21						
pH (1:2 H2O Solution)	7.10	0.10	pH units	7.05		101	95-105			
General Parameters, Batch B3G2241										
Duplicate (B3G2241-DUP1)		**Source: 23G1805-26**		Prepared: 2023-07-21, Analyzed: 2023-07-21						
pH (1:2 H2O Solution)	6.98	0.10	pH units		7.04			< 1	4	
Reference (B3G2241-SRM1)				Prepared: 2023-07-21, Analyzed: 2023-07-21						
pH (1:2 H2O Solution)	7.06	0.10	pH units	7.05		100	95-105			
Reference (B3G2241-SRM2)				Prepared: 2023-07-21, Analyzed: 2023-07-21						
pH (1:2 H2O Solution)	7.07	0.10	pH units	7.05		100	95-105			
Pesticides, Herbicides, and Fungicides, Batch B3G2019										
Blank (B3G2019-BLK1)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Alachlor	< 0.0050	0.0050	mg/kg wet							
Aldrin	< 0.0050	0.0050	mg/kg wet							
Atrazine and metabolites	< 0.0050	0.0050	mg/kg wet							
Azinphos-methyl	< 0.0100	0.0100	mg/kg wet							
alpha-BHC	< 0.0050	0.0050	mg/kg wet							
beta-BHC	< 0.0050	0.0050	mg/kg wet							
delta-BHC	< 0.0050	0.0050	mg/kg wet							
gamma-BHC (Lindane)	< 0.0050	0.0050	mg/kg wet							
Bromacil	< 0.0050	0.0050	mg/kg wet							
Bromoxynil	< 0.0200	0.0200	mg/kg wet							
Butachlor	< 0.0050	0.0050	mg/kg wet							
Captan	< 0.0200	0.0200	mg/kg wet							
Chlordane (cis + trans)	< 0.0050	0.0050	mg/kg wet							
Chlorothalonil	< 0.0050	0.0050	mg/kg wet							
Chlorpyrifos	< 0.0100	0.0100	mg/kg wet							
Cyanazine	< 0.0100	0.0100	mg/kg wet							
DDT, Total	< 0.0100	0.0100	mg/kg wet							
Deltamethrin	< 0.0500	0.0500	mg/kg wet							
Diazinon	< 0.0100	0.0100	mg/kg wet							
Dichlorvos	< 0.0100	0.0100	mg/kg wet							
Diclofop-methyl	< 0.0050	0.0050	mg/kg wet							
Dieldrin	< 0.0050	0.0050	mg/kg wet							
Dimethoate	< 0.0100	0.0100	mg/kg wet							
Disulfoton	< 0.0200	0.0200	mg/kg wet							
Diuron	< 0.0200	0.0200	mg/kg wet							
Endosulfan I + II	< 0.0050	0.0050	mg/kg wet							
Endosulfan sulfate	< 0.0050	0.0050	mg/kg wet							
Endrin	< 0.0050	0.0050	mg/kg wet							
Endrin aldehyde	< 0.0050	0.0050	mg/kg wet							
Endrin ketone	< 0.0050	0.0050	mg/kg wet							
Fenchlorphos (Ronnel)	< 0.0100	0.0100	mg/kg wet							
Heptachlor	< 0.0050	0.0050	mg/kg wet							
Heptachlor epoxide	< 0.0050	0.0050	mg/kg wet							
Linuron	< 0.0400	0.0400	mg/kg wet							
Malathion	< 0.0100	0.0100	mg/kg wet							
Methoxychlor	< 0.0050	0.0050	mg/kg wet							
Methyl parathion	< 0.0100	0.0100	mg/kg wet							
Metolachlor	< 0.0100	0.0100	mg/kg wet							
Metribuzin	< 0.0100	0.0100	mg/kg wet							
Parathion	< 0.0100	0.0100	mg/kg wet							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Pesticides, Herbicides, and Fungicides, Batch B3G2019, Continued										
Blank (B3G2019-BLK1), Continued				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Pentachloronitrobenzene	< 0.0500	0.0500	mg/kg wet							
Permethrin	< 0.0050	0.0050	mg/kg wet							
Phorate	< 0.0100	0.0100	mg/kg wet							
Prometon	< 0.0100	0.0100	mg/kg wet							
Prometryne	< 0.0050	0.0050	mg/kg wet							
Simazine	< 0.0100	0.0100	mg/kg wet							
Sulfotep	< 0.0100	0.0100	mg/kg wet							
Tebuthiuron	< 0.0200	0.0200	mg/kg wet							
Temephos (Abate)	< 0.0500	0.0500	mg/kg wet							
Terbufos	< 0.0100	0.0100	mg/kg wet							
Triallate	< 0.0050	0.0050	mg/kg wet							
Trifluralin	< 0.0100	0.0100	mg/kg wet							
Surrogate: Tributyl Phosphate	*0.0603*		*mg/kg wet*	0.0758		*80*	*50-140*			
Surrogate: 4-chloro-3-nitrobenzotrifluoride	*0.0678*		*mg/kg wet*	0.0737		*92*	*50-140*			
LCS (B3G2019-BS1)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Alachlor	0.0829	0.0050	mg/kg wet	0.0770		108	50-140			
Aldrin	0.0872	0.0050	mg/kg wet	0.0763		114	50-140			
Atrazine and metabolites	0.164	0.0050	mg/kg wet	0.153		107	50-140			
Azinphos-methyl	0.0751	0.0100	mg/kg wet	0.0793		95	50-140			
alpha-BHC	0.0779	0.0050	mg/kg wet	0.0763		102	50-140			
beta-BHC	0.0754	0.0050	mg/kg wet	0.0763		99	50-140			
delta-BHC	0.0773	0.0050	mg/kg wet	0.0763		101	50-140			
gamma-BHC (Lindane)	0.0758	0.0050	mg/kg wet	0.0763		99	50-140			
Bromacil	0.0674	0.0050	mg/kg wet	0.0763		88	50-140			
Bromoxynil	0.0410	0.0200	mg/kg wet	0.0824		50	50-140			
Butachlor	0.0841	0.0050	mg/kg wet	0.0763		110	50-140			
Captan	0.126	0.0200	mg/kg wet	0.0824		154	50-140			SPK
Chlordane (cis + trans)	0.164	0.0050	mg/kg wet	0.153		107	50-140			
Chlorothalonil	0.0654	0.0050	mg/kg wet	0.0760		86	50-140			
Chlorpyrifos	0.0824	0.0100	mg/kg wet	0.0763		108	50-140			
Cyanazine	0.0827	0.0100	mg/kg wet	0.0763		108	50-140			
DDT, Total	0.282	0.0100	mg/kg wet	0.252		112	50-140			
Deltamethrin	0.761	0.0500	mg/kg wet	0.862		88	50-140			
Diazinon	0.0685	0.0100	mg/kg wet	0.0770		89	50-140			
Dichlorvos	0.0428	0.0100	mg/kg wet	0.0715		60	50-140			
Diclofop-methyl	0.0898	0.0050	mg/kg wet	0.0809		111	50-140			
Dieldrin	0.0745	0.0050	mg/kg wet	0.0763		98	50-140			
Dimethoate	0.0694	0.0100	mg/kg wet	0.0770		90	50-140			
Disulfoton	0.0884	0.0200	mg/kg wet	0.0760		116	50-140			
Diuron	0.0807	0.0200	mg/kg wet	0.0801		101	50-140			
Endosulfan I + II	0.163	0.0050	mg/kg wet	0.153		107	50-140			
Endosulfan sulfate	0.0803	0.0050	mg/kg wet	0.0763		105	50-140			
Endrin	0.0874	0.0050	mg/kg wet	0.0763		115	50-140			
Endrin aldehyde	0.0809	0.0050	mg/kg wet	0.0762		106	50-140			
Endrin ketone	0.0697	0.0050	mg/kg wet	0.0763		91	50-140			
Fenchlorphos (Ronnel)	0.0722	0.0100	mg/kg wet	0.0755		96	50-140			
Heptachlor	0.0651	0.0050	mg/kg wet	0.0763		85	50-140			
Heptachlor epoxide	0.0839	0.0050	mg/kg wet	0.0763		110	50-140			
Linuron	0.104	0.0400	mg/kg wet	0.0763		137	50-140			
Malathion	0.0838	0.0100	mg/kg wet	0.0763		110	50-140			
Methoxychlor	0.0907	0.0050	mg/kg wet	0.0763		119	50-140			
Methyl parathion	0.0937	0.0100	mg/kg wet	0.0793		118	50-140			
Metolachlor	0.0792	0.0100	mg/kg wet	0.0763		104	50-140			
Metribuzin	0.0843	0.0100	mg/kg wet	0.0763		110	50-140			
Parathion	0.0857	0.0100	mg/kg wet	0.0770		111	50-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Pesticides, Herbicides, and Fungicides, Batch B3G2019, Continued										
LCS (B3G2019-BS1), Continued				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Pentachloronitrobenzene	0.0759	0.0500	mg/kg wet	0.0761		100	50-140			
Permethrin	0.0882	0.0050	mg/kg wet	0.0770		114	50-140			
Phorate	0.0809	0.0100	mg/kg wet	0.0793		102	50-140			
Prometon	0.0548	0.0100	mg/kg wet	0.0763		72	50-140			
Prometryne	0.0738	0.0050	mg/kg wet	0.0763		97	50-140			
Simazine	0.0746	0.0100	mg/kg wet	0.0770		97	50-140			
Sulfotep	0.0750	0.0100	mg/kg wet	0.0793		95	50-140			
Tebuthiuron	0.0477	0.0200	mg/kg wet	0.0763		63	50-140			
Temephos (Abate)	0.644	0.0500	mg/kg wet	0.761		85	50-140			
Terbufos	0.0792	0.0100	mg/kg wet	0.0763		104	50-140			
Triallate	0.0796	0.0050	mg/kg wet	0.0793		100	50-140			
Trifluralin	0.0742	0.0100	mg/kg wet	0.0763		97	50-140			
Surrogate: Tributyl Phosphate	*0.0711*		*mg/kg wet*	0.0761		*93*	*50-140*			
Surrogate: 4-chloro-3-nitrobenzotrifluoride	*0.0768*		*mg/kg wet*	0.0740		*104*	*50-140*			
Polycyclic Aromatic Hydrocarbons (PAH), Batch B3G1981										
Blank (B3G1981-BLK1)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Acenaphthene	< 0.050	0.050	mg/kg wet							
Acenaphthylene	< 0.050	0.050	mg/kg wet							
Anthracene	< 0.050	0.050	mg/kg wet							
Benz(a)anthracene	< 0.050	0.050	mg/kg wet							
Benzo(a)pyrene	< 0.050	0.050	mg/kg wet							
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg wet							
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg wet							
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg wet							
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg wet							
2-Chloronaphthalene	< 0.050	0.050	mg/kg wet							
Chrysene	< 0.050	0.050	mg/kg wet							
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg wet							
Fluoranthene	< 0.050	0.050	mg/kg wet							
Fluorene	< 0.050	0.050	mg/kg wet							
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg wet							
1-Methylnaphthalene	< 0.050	0.050	mg/kg wet							
2-Methylnaphthalene	< 0.050	0.050	mg/kg wet							
Naphthalene	< 0.050	0.050	mg/kg wet							
Phenanthrene	< 0.050	0.050	mg/kg wet							
Pyrene	< 0.050	0.050	mg/kg wet							
Quinoline	< 0.050	0.050	mg/kg wet							
Surrogate: Acenaphthene-d10	*0.689*		*mg/kg wet*	0.725		*95*	*50-140*			
Surrogate: Chrysene-d12	*0.530*		*mg/kg wet*	0.725		*73*	*50-140*			
Surrogate: Naphthalene-d8	*0.717*		*mg/kg wet*	0.725		*99*	*50-140*			
Surrogate: Perylene-d12	*0.454*		*mg/kg wet*	0.725		*63*	*50-140*			
Surrogate: Phenanthrene-d10	*0.713*		*mg/kg wet*	0.725		*98*	*55-140*			
LCS (B3G1981-BS1)				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Acenaphthene	0.625	0.050	mg/kg wet	0.803		78	50-140			
Acenaphthylene	0.629	0.050	mg/kg wet	0.803		78	50-140			
Anthracene	0.640	0.050	mg/kg wet	0.803		80	50-140			
Benz(a)anthracene	0.418	0.050	mg/kg wet	0.803		52	50-140			
Benzo(a)pyrene	0.529	0.050	mg/kg wet	0.803		66	50-140			
Benzo(b)fluoranthene	0.495	0.050	mg/kg wet	0.803		62	50-140			
Benzo(b+j)fluoranthene	0.970	0.050	mg/kg wet	1.61		60	50-140			
Benzo(g,h,i)perylene	0.581	0.050	mg/kg wet	0.803		72	50-140			
Benzo(k)fluoranthene	0.717	0.050	mg/kg wet	0.803		89	50-140			
2-Chloronaphthalene	0.670	0.050	mg/kg wet	0.803		83	50-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Polycyclic Aromatic Hydrocarbons (PAH), Batch B3G1981, Continued										
LCS (B3G1981-BS1), Continued				Prepared: 2023-07-19, Analyzed: 2023-07-20						
Chrysene	0.433	0.050	mg/kg wet	0.803		54	50-140			
Dibenz(a,h)anthracene	0.673	0.050	mg/kg wet	0.803		84	50-140			
Fluoranthene	0.713	0.050	mg/kg wet	0.803		89	50-140			
Fluorene	0.637	0.050	mg/kg wet	0.803		79	50-140			
Indeno(1,2,3-cd)pyrene	0.662	0.050	mg/kg wet	0.803		82	50-140			
1-Methylnaphthalene	0.719	0.050	mg/kg wet	0.799		90	50-140			
2-Methylnaphthalene	0.737	0.050	mg/kg wet	0.803		92	50-140			
Naphthalene	0.725	0.050	mg/kg wet	0.803		90	50-140			
Phenanthrene	0.653	0.050	mg/kg wet	0.812		80	50-140			
Pyrene	0.713	0.050	mg/kg wet	0.803		89	50-140			
Quinoline	0.937	0.050	mg/kg wet	0.812		115	50-140			
Surrogate: Acenaphthene-d10	*0.798*		*mg/kg wet*	0.803		*99*	*50-140*			
Surrogate: Chrysene-d12	*0.507*		*mg/kg wet*	0.803		*63*	*50-140*			
Surrogate: Naphthalene-d8	*0.825*		*mg/kg wet*	0.803		*103*	*50-140*			
Surrogate: Perylene-d12	*0.458*		*mg/kg wet*	0.803		*57*	*50-140*			
Surrogate: Phenanthrene-d10	*0.739*		*mg/kg wet*	0.803		*92*	*55-140*			
Duplicate (B3G1981-DUP1)		**Source: 23G1805-05**		Prepared: 2023-07-19, Analyzed: 2023-07-20						
Acenaphthene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Acenaphthylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Anthracene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benz(a)anthracene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benzo(a)pyrene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benzo(b)fluoranthene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benzo(b+j)fluoranthene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benzo(g,h,i)perylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Benzo(k)fluoranthene	< 0.050	0.050	mg/kg dry		< 0.050				50	
2-Chloronaphthalene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Chrysene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Dibenz(a,h)anthracene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Fluoranthene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Fluorene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	mg/kg dry		< 0.050				50	
1-Methylnaphthalene	< 0.050	0.050	mg/kg dry		< 0.050				50	
2-Methylnaphthalene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Naphthalene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Phenanthrene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Pyrene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Quinoline	< 0.050	0.050	mg/kg dry		< 0.050				50	
Surrogate: Acenaphthene-d10	*0.934*		*mg/kg dry*	0.920		*101*	*50-140*			
Surrogate: Chrysene-d12	*0.679*		*mg/kg dry*	0.920		*74*	*50-140*			
Surrogate: Naphthalene-d8	*1.08*		*mg/kg dry*	0.920		*117*	*50-140*			
Surrogate: Perylene-d12	*0.527*		*mg/kg dry*	0.920		*57*	*50-140*			
Surrogate: Phenanthrene-d10	*0.860*		*mg/kg dry*	0.920		*93*	*55-140*			
Matrix Spike (B3G1981-MS1)		**Source: 23G1805-05**		Prepared: 2023-07-19, Analyzed: 2023-07-20						
Acenaphthene	0.749	0.050	mg/kg dry	0.953	< 0.050	79	50-140			
Acenaphthylene	0.729	0.050	mg/kg dry	0.953	< 0.050	76	50-140			
Anthracene	0.774	0.050	mg/kg dry	0.953	< 0.050	81	50-140			
Benz(a)anthracene	0.596	0.050	mg/kg dry	0.953	< 0.050	62	50-140			
Benzo(a)pyrene	0.630	0.050	mg/kg dry	0.953	< 0.050	66	50-140			
Benzo(b)fluoranthene	0.626	0.050	mg/kg dry	0.953	< 0.050	66	50-140			
Benzo(b+j)fluoranthene	1.24	0.050	mg/kg dry	1.91	< 0.050	65	50-140			
Benzo(g,h,i)perylene	0.497	0.050	mg/kg dry	0.953	< 0.050	52	50-140			
Benzo(k)fluoranthene	1.07	0.050	mg/kg dry	0.953	< 0.050	113	50-140			
2-Chloronaphthalene	0.785	0.050	mg/kg dry	0.953	< 0.050	82	50-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Polycyclic Aromatic Hydrocarbons (PAH), Batch B3G1981, Continued										
Matrix Spike (B3G1981-MS1), Continued		**Source: 23G1805-05**		Prepared: 2023-07-19, Analyzed: 2023-07-20						
Chrysene	0.620	0.050	mg/kg dry	0.953	< 0.050	65	50-140			
Dibenz(a,h)anthracene	0.567	0.050	mg/kg dry	0.953	< 0.050	60	50-140			
Fluoranthene	0.889	0.050	mg/kg dry	0.953	< 0.050	93	50-140			
Fluorene	0.747	0.050	mg/kg dry	0.953	< 0.050	78	50-140			
Indeno(1,2,3-cd)pyrene	0.575	0.050	mg/kg dry	0.953	< 0.050	60	50-140			
1-Methylnaphthalene	0.832	0.050	mg/kg dry	0.949	< 0.050	88	50-140			
2-Methylnaphthalene	0.842	0.050	mg/kg dry	0.953	< 0.050	88	50-140			
Naphthalene	0.809	0.050	mg/kg dry	0.953	< 0.050	85	50-140			
Phenanthrene	0.793	0.050	mg/kg dry	0.963	< 0.050	82	50-140			
Pyrene	0.867	0.050	mg/kg dry	0.953	< 0.050	91	50-140			
Quinoline	1.10	0.050	mg/kg dry	0.963	< 0.050	114	50-140			
Surrogate: Acenaphthene-d10	*0.936*		*mg/kg dry*	0.953		*98*	*50-140*			
Surrogate: Chrysene-d12	*0.699*		*mg/kg dry*	0.953		*73*	*50-140*			
Surrogate: Naphthalene-d8	*0.959*		*mg/kg dry*	0.953		*101*	*50-140*			
Surrogate: Perylene-d12	*0.527*		*mg/kg dry*	0.953		*55*	*50-140*			
Surrogate: Phenanthrene-d10	*0.865*		*mg/kg dry*	0.953		*91*	*55-140*			
Salinity Parameters (Sat. Paste Extract), Batch B3G1678										
Blank (B3G1678-BLK1)				Prepared: 2023-07-17, Analyzed: 2023-07-17						
Saturation	50.0	1.0	%							
Reference (B3G1678-SRM1)				Prepared: 2023-07-17, Analyzed: 2023-07-17						
Saturation	27.7	1.0	%	34.2		81	60-140			
Salinity Parameters (Sat. Paste Extract), Batch B3G1718										
Blank (B3G1718-BLK1)				Prepared: 2023-07-18, Analyzed: 2023-07-18						
Sodium, Saturated Paste	< 5.0	5.0	mg/kg dry							
Duplicate (B3G1718-DUP1)		**Source: 23G1805-11**		Prepared: 2023-07-18, Analyzed: 2023-07-18						
Sodium, Saturated Paste	66.3	5.0	mg/kg dry		62.7			5	26	
Reference (B3G1718-SRM1)				Prepared: 2023-07-18, Analyzed: 2023-07-18						
Sodium, Saturated Paste	1360	5.0	mg/kg dry	1180		115	60-140			
Salinity Parameters (Sat. Paste Extract), Batch B3G2067										
Blank (B3G2067-BLK1)				Prepared: 2023-07-20, Analyzed: 2023-07-20						
Chloride, Saturated Paste	< 25	25	mg/kg dry							
Duplicate (B3G2067-DUP1)		**Source: 23G1805-11**		Prepared: 2023-07-20, Analyzed: 2023-07-20						
Chloride, Saturated Paste	116	25	mg/kg dry		101				24	
Reference (B3G2067-SRM1)				Prepared: 2023-07-20, Analyzed: 2023-07-20						
Chloride, Saturated Paste	2310	25	mg/kg dry	2520		92	70-130			
Strong Acid Leachable Metals, Batch B3G1963										
Blank (B3G1963-BLK1)				Prepared: 2023-07-19, Analyzed: 2023-07-19						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B3G1963, Continued										
Blank (B3G1963-BLK1), Continued				Prepared: 2023-07-19, Analyzed: 2023-07-19						
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20.0	20.0	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Strontium	0.27	0.20	mg/kg dry							BLK
Thallium	< 0.10	0.10	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
LCS (B3G1963-BS1)				Prepared: 2023-07-19, Analyzed: 2023-07-19						
Aluminum	894	40	mg/kg dry	1000		89	80-120			
Antimony	9.79	0.10	mg/kg dry	10.0		98	80-120			
Arsenic	90.8	0.30	mg/kg dry	100		91	80-120			
Barium	9.4	1.0	mg/kg dry	10.0		94	80-120			
Beryllium	9.15	0.10	mg/kg dry	10.0		91	80-120			
Boron	91.3	2.0	mg/kg dry	100		91	80-120			
Cadmium	9.40	0.040	mg/kg dry	10.0		94	80-120			
Chromium	9.1	1.0	mg/kg dry	10.0		91	80-120			
Cobalt	9.22	0.10	mg/kg dry	10.0		92	80-120			
Copper	9.31	0.40	mg/kg dry	10.0		93	80-120			
Iron	926	20.0	mg/kg dry	1000		93	80-120			
Lead	9.55	0.20	mg/kg dry	10.0		96	80-120			
Lithium	8.92	0.10	mg/kg dry	10.0		89	80-120			
Manganese	9.33	0.40	mg/kg dry	10.0		93	80-120			
Mercury	0.922	0.040	mg/kg dry	1.00		92	80-120			
Molybdenum	9.24	0.10	mg/kg dry	10.0		92	80-120			
Nickel	9.32	0.60	mg/kg dry	10.0		93	80-120			
Selenium	95.9	0.20	mg/kg dry	100		96	80-120			
Silver	9.95	0.10	mg/kg dry	10.0		99	80-120			
Strontium	9.25	0.20	mg/kg dry	10.0		92	80-120			
Thallium	9.54	0.10	mg/kg dry	10.0		95	80-120			
Tin	9.39	0.20	mg/kg dry	10.0		94	80-120			
Tungsten	9.90	0.20	mg/kg dry	10.0		99	80-120			
Uranium	9.83	0.050	mg/kg dry	10.0		98	80-120			
Vanadium	9.1	1.0	mg/kg dry	10.0		91	80-120			
Zinc	88.8	2.0	mg/kg dry	100		89	80-120			
Duplicate (B3G1963-DUP1)		**Source: 23G1805-02**		Prepared: 2023-07-19, Analyzed: 2023-07-19						
Aluminum	22500	40	mg/kg dry		21100			6	40	
Antimony	0.21	0.10	mg/kg dry		0.20				30	
Arsenic	5.87	0.30	mg/kg dry		5.75			2	30	
Barium	84.3	1.0	mg/kg dry		78.1			8	40	
Beryllium	0.35	0.10	mg/kg dry		0.35				30	
Boron	4.3	2.0	mg/kg dry		4.0				30	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B3G1963, Continued										
Duplicate (B3G1963-DUP1), Continued		**Source: 23G1805-02**		Prepared: 2023-07-19, Analyzed: 2023-07-19						
Cadmium	0.057	0.040	mg/kg dry		0.052				30	
Chromium	58.1	1.0	mg/kg dry		56.6			3	30	
Cobalt	16.9	0.10	mg/kg dry		15.9			6	30	
Copper	45.4	0.40	mg/kg dry		43.3			5	30	
Iron	36400	20.0	mg/kg dry		34200			6	30	
Lead	4.60	0.20	mg/kg dry		4.38			5	40	
Lithium	16.4	0.10	mg/kg dry		16.0			3	30	
Manganese	600	0.40	mg/kg dry		577			4	30	
Mercury	< 0.040	0.040	mg/kg dry		0.040				40	
Molybdenum	0.28	0.10	mg/kg dry		0.26				40	
Nickel	55.3	0.60	mg/kg dry		52.0			6	30	
Selenium	< 0.20	0.20	mg/kg dry		< 0.20				30	
Silver	< 0.10	0.10	mg/kg dry		< 0.10				40	
Strontium	45.6	0.20	mg/kg dry		42.7			6	40	
Thallium	< 0.10	0.10	mg/kg dry		< 0.10				30	
Tin	0.50	0.20	mg/kg dry		0.37				40	
Tungsten	< 0.20	0.20	mg/kg dry		< 0.20				40	
Uranium	0.457	0.050	mg/kg dry		0.430			6	30	
Vanadium	91.1	1.0	mg/kg dry		84.2			8	30	
Zinc	64.2	2.0	mg/kg dry		61.6			4	30	
Reference (B3G1963-SRM1)				Prepared: 2023-07-19, Analyzed: 2023-07-19						
Aluminum	12200	40	mg/kg dry	12100		101	70-130			
Antimony	0.65	0.10	mg/kg dry	0.634		102	70-130			
Arsenic	88.5	0.30	mg/kg dry	83.6		106	70-130			
Barium	40.9	1.0	mg/kg dry	41.4		99	70-130			
Beryllium	0.37	0.10	mg/kg dry	0.377		99	70-130			
Chromium	69.4	1.0	mg/kg dry	66.0		105	70-130			
Cobalt	11.3	0.10	mg/kg dry	10.8		105	70-130			
Copper	21.8	0.40	mg/kg dry	20.3		107	70-130			
Iron	21100	20.0	mg/kg dry	20400		104	70-130			
Lead	17.0	0.20	mg/kg dry	16.7		102	70-130			
Lithium	17.0	0.10	mg/kg dry	16.8		101	70-130			
Manganese	331	0.40	mg/kg dry	319		104	70-130			
Mercury	0.109	0.040	mg/kg dry	0.114		96	70-130			
Molybdenum	0.57	0.10	mg/kg dry	0.607		94	70-130			
Nickel	34.1	0.60	mg/kg dry	32.5		105	70-130			
Silver	1.58	0.10	mg/kg dry	1.55		102	70-130			
Strontium	21.7	0.20	mg/kg dry	22.5		96	70-130			
Thallium	< 0.10	0.10	mg/kg dry	0.0765		93	70-130			
Uranium	1.20	0.050	mg/kg dry	1.15		104	70-130			
Vanadium	38.4	1.0	mg/kg dry	36.3		106	70-130			
Zinc	43.0	2.0	mg/kg dry	39.7		108	70-130			
Volatile Organic Compounds (VOC), Batch B3G1622										
Blank (B3G1622-BLK1)				Prepared: 2023-07-17, Analyzed: 2023-07-21						
Benzene	< 0.030	0.030	mg/kg wet							
Bromodichloromethane	< 0.100	0.100	mg/kg wet							
Bromoform	< 0.100	0.100	mg/kg wet							
Carbon tetrachloride	< 0.050	0.050	mg/kg wet							
Chlorobenzene	< 0.050	0.050	mg/kg wet							
Chloroform	< 0.050	0.050	mg/kg wet							
Dibromochloromethane	< 0.100	0.100	mg/kg wet							
1,2-Dibromoethane	< 0.100	0.100	mg/kg wet							
Dibromomethane	< 0.100	0.100	mg/kg wet							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B3G1622, Continued										
Blank (B3G1622-BLK1), Continued				Prepared: 2023-07-17, Analyzed: 2023-07-21						
1,2-Dichlorobenzene	< 0.050	0.050	mg/kg wet							
1,3-Dichlorobenzene	< 0.050	0.050	mg/kg wet							
1,4-Dichlorobenzene	< 0.050	0.050	mg/kg wet							
1,1-Dichloroethane	< 0.050	0.050	mg/kg wet							
1,2-Dichloroethane	< 0.050	0.050	mg/kg wet							
1,1-Dichloroethylene	< 0.050	0.050	mg/kg wet							
cis-1,2-Dichloroethylene	< 0.050	0.050	mg/kg wet							
trans-1,2-Dichloroethylene	< 0.050	0.050	mg/kg wet							
Dichloromethane	< 0.100	0.100	mg/kg wet							
1,2-Dichloropropane	< 0.050	0.050	mg/kg wet							
1,3-Dichloropropene (cis + trans)	< 0.050	0.050	mg/kg wet							
Ethylbenzene	< 0.050	0.050	mg/kg wet							
Methyl tert-butyl ether	< 0.040	0.040	mg/kg wet							
Styrene	< 0.050	0.050	mg/kg wet							
1,1,2,2-Tetrachloroethane	< 0.050	0.050	mg/kg wet							
Tetrachloroethylene	< 0.050	0.050	mg/kg wet							
Toluene	< 0.200	0.200	mg/kg wet							
1,1,1-Trichloroethane	< 0.050	0.050	mg/kg wet							
1,1,2-Trichloroethane	< 0.050	0.050	mg/kg wet							
Trichloroethylene	< 0.040	0.040	mg/kg wet							
Trichlorofluoromethane	< 0.100	0.100	mg/kg wet							
Vinyl chloride	< 0.100	0.100	mg/kg wet							
Xylenes (total)	< 0.100	0.100	mg/kg wet							
Surrogate: Toluene-d8	*4.01*		*mg/kg wet*	4.00		*100*	*60-140*			
Surrogate: 4-Bromofluorobenzene	*3.68*		*mg/kg wet*	3.98		*92*	*60-140*			
Surrogate: 1,4-Dichlorobenzene-d4	*3.64*		*mg/kg wet*	4.00		*91*	*60-140*			
LCS (B3G1622-BS1)				Prepared: 2023-07-17, Analyzed: 2023-07-21						
Benzene	1.47	0.030	mg/kg wet	2.01		73	60-140			
Bromodichloromethane	1.56	0.100	mg/kg wet	2.01		78	60-140			
Bromoform	1.63	0.100	mg/kg wet	2.01		81	60-140			
Carbon tetrachloride	1.46	0.050	mg/kg wet	2.01		72	60-140			
Chlorobenzene	1.59	0.050	mg/kg wet	2.01		79	60-140			
Chloroform	1.65	0.050	mg/kg wet	2.01		82	60-140			
Dibromochloromethane	1.58	0.100	mg/kg wet	2.01		79	60-140			
1,2-Dibromoethane	1.58	0.100	mg/kg wet	2.01		79	60-140			
Dibromomethane	1.70	0.100	mg/kg wet	2.01		84	60-140			
1,2-Dichlorobenzene	1.51	0.050	mg/kg wet	2.01		75	60-140			
1,3-Dichlorobenzene	1.47	0.050	mg/kg wet	2.01		73	60-140			
1,4-Dichlorobenzene	1.55	0.050	mg/kg wet	2.01		77	60-140			
1,1-Dichloroethane	1.65	0.050	mg/kg wet	2.01		82	60-140			
1,2-Dichloroethane	1.64	0.050	mg/kg wet	2.01		82	60-140			
1,1-Dichloroethylene	1.49	0.050	mg/kg wet	2.01		74	60-140			
cis-1,2-Dichloroethylene	1.59	0.050	mg/kg wet	2.01		79	60-140			
trans-1,2-Dichloroethylene	1.71	0.050	mg/kg wet	2.01		85	60-140			
Dichloromethane	1.61	0.100	mg/kg wet	2.01		80	60-140			
1,2-Dichloropropane	1.58	0.050	mg/kg wet	2.01		79	60-140			
1,3-Dichloropropene (cis + trans)	2.65	0.050	mg/kg wet	4.02		66	60-140			
Ethylbenzene	1.40	0.050	mg/kg wet	2.01		70	60-140			
Methyl tert-butyl ether	1.74	0.040	mg/kg wet	2.00		87	60-140			
Styrene	1.41	0.050	mg/kg wet	2.01		70	60-140			
1,1,2,2-Tetrachloroethane	1.67	0.050	mg/kg wet	2.01		83	60-140			
Tetrachloroethylene	1.55	0.050	mg/kg wet	2.01		77	60-140			
Toluene	1.45	0.200	mg/kg wet	2.01		72	60-140			
1,1,1-Trichloroethane	1.58	0.050	mg/kg wet	2.01		79	60-140			
1,1,2-Trichloroethane	1.58	0.050	mg/kg wet	2.01		79	60-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B3G1622, Continued										
LCS (B3G1622-BS1), Continued				Prepared: 2023-07-17, Analyzed: 2023-07-21						
Trichloroethylene	1.47	0.040	mg/kg wet	2.01		73	60-140			
Trichlorofluoromethane	1.43	0.100	mg/kg wet	2.01		71	50-150			
Vinyl chloride	1.45	0.100	mg/kg wet	2.01		72	50-150			
Xylenes (total)	4.43	0.100	mg/kg wet	6.03		74	60-140			
Surrogate: Toluene-d8	*3.21*		*mg/kg wet*	4.00		*80*	*60-140*			
Surrogate: 4-Bromofluorobenzene	*3.34*		*mg/kg wet*	3.98		*84*	*60-140*			
Surrogate: 1,4-Dichlorobenzene-d4	*3.71*		*mg/kg wet*	4.00		*93*	*60-140*			
Duplicate (B3G1622-DUP1)		**Source: 23G1805-02**		Prepared: 2023-07-17, Analyzed: 2023-07-21						
Benzene	< 0.030	0.030	mg/kg dry		< 0.030				50	
Bromodichloromethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
Bromoform	< 0.100	0.100	mg/kg dry		< 0.100				50	
Carbon tetrachloride	< 0.050	0.050	mg/kg dry		< 0.050				50	
Chlorobenzene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Chloroform	< 0.050	0.050	mg/kg dry		< 0.050				50	
Dibromochloromethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
1,2-Dibromoethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
Dibromomethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
1,2-Dichlorobenzene	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,3-Dichlorobenzene	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,4-Dichlorobenzene	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,1-Dichloroethane	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,2-Dichloroethane	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,1-Dichloroethylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
cis-1,2-Dichloroethylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
trans-1,2-Dichloroethylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Dichloromethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
1,2-Dichloropropane	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,3-Dichloropropene (cis + trans)	< 0.050	0.050	mg/kg dry		< 0.050				50	
Ethylbenzene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry		< 0.040				50	
Styrene	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,1,2,2-Tetrachloroethane	< 0.050	0.050	mg/kg dry		< 0.050				50	
Tetrachloroethylene	< 0.050	0.050	mg/kg dry		< 0.050				50	
Toluene	< 0.200	0.200	mg/kg dry		< 0.200				50	
1,1,1-Trichloroethane	< 0.050	0.050	mg/kg dry		< 0.050				50	
1,1,2-Trichloroethane	< 0.050	0.050	mg/kg dry		< 0.050				50	
Trichloroethylene	< 0.040	0.040	mg/kg dry		< 0.040				50	
Trichlorofluoromethane	< 0.100	0.100	mg/kg dry		< 0.100				50	
Vinyl chloride	< 0.100	0.100	mg/kg dry		< 0.100				50	
Xylenes (total)	< 0.100	0.100	mg/kg dry		< 0.100				50	
Surrogate: Toluene-d8	*3.57*		*mg/kg dry*	3.61		*99*	*60-140*			
Surrogate: 4-Bromofluorobenzene	*3.46*		*mg/kg dry*	3.60		*96*	*60-140*			
Surrogate: 1,4-Dichlorobenzene-d4	*3.37*		*mg/kg dry*	3.61		*93*	*60-140*			
Matrix Spike (B3G1622-MS1)		**Source: 23G1805-02**		Prepared: 2023-07-17, Analyzed: 2023-07-21						
Benzene	3.44	0.030	mg/kg dry	3.63	< 0.030	95	60-140			
Bromodichloromethane	3.73	0.100	mg/kg dry	3.63	< 0.100	103	60-140			
Bromoform	4.16	0.100	mg/kg dry	3.63	< 0.100	115	60-140			
Carbon tetrachloride	3.07	0.050	mg/kg dry	3.63	< 0.050	85	60-140			
Chlorobenzene	3.51	0.050	mg/kg dry	3.63	< 0.050	97	60-140			
Chloroform	3.75	0.050	mg/kg dry	3.63	< 0.050	103	60-140			
Dibromochloromethane	4.08	0.100	mg/kg dry	3.63	< 0.100	112	60-140			
1,2-Dibromoethane	4.18	0.100	mg/kg dry	3.63	< 0.100	115	60-140			
Dibromomethane	4.21	0.100	mg/kg dry	3.63	< 0.100	116	60-140			
1,2-Dichlorobenzene	3.66	0.050	mg/kg dry	3.63	< 0.050	101	60-140			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Stantec Consulting Ltd. (Victoria)	**WORK ORDER**	23G1805
PROJECT	111720115	**REPORTED**	2023-09-19 15:16

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B3G1622, Continued										
Matrix Spike (B3G1622-MS1), Continued	**Source: 23G1805-02**			Prepared: 2023-07-17, Analyzed: 2023-07-21						
1,3-Dichlorobenzene	3.37	0.050	mg/kg dry	3.63	< 0.050	93	60-140			
1,4-Dichlorobenzene	3.64	0.050	mg/kg dry	3.63	< 0.050	100	60-140			
1,1-Dichloroethane	3.74	0.050	mg/kg dry	3.63	< 0.050	103	60-140			
1,2-Dichloroethane	4.16	0.050	mg/kg dry	3.63	< 0.050	115	60-140			
1,1-Dichloroethylene	3.33	0.050	mg/kg dry	3.63	< 0.050	92	60-140			
cis-1,2-Dichloroethylene	3.67	0.050	mg/kg dry	3.63	< 0.050	101	60-140			
trans-1,2-Dichloroethylene	3.53	0.050	mg/kg dry	3.63	< 0.050	97	60-140			
Dichloromethane	3.90	0.100	mg/kg dry	3.63	< 0.100	107	60-140			
1,2-Dichloropropane	3.75	0.050	mg/kg dry	3.63	< 0.050	103	60-140			
1,3-Dichloropropene (cis + trans)	6.43	0.050	mg/kg dry	7.26	< 0.050	89	60-140			
Ethylbenzene	3.15	0.050	mg/kg dry	3.63	< 0.050	87	60-140			
Methyl tert-butyl ether	4.32	0.040	mg/kg dry	3.61	< 0.040	119	60-140			
Styrene	3.41	0.050	mg/kg dry	3.63	< 0.050	94	60-140			
1,1,2,2-Tetrachloroethane	4.60	0.050	mg/kg dry	3.63	< 0.050	127	60-140			
Tetrachloroethylene	3.26	0.050	mg/kg dry	3.63	< 0.050	90	60-140			
Toluene	3.39	0.200	mg/kg dry	3.63	< 0.200	92	60-140			
1,1,1-Trichloroethane	3.39	0.050	mg/kg dry	3.63	< 0.050	93	60-140			
1,1,2-Trichloroethane	4.28	0.050	mg/kg dry	3.63	< 0.050	118	60-140			
Trichloroethylene	3.36	0.040	mg/kg dry	3.63	< 0.040	92	60-140			
Trichlorofluoromethane	3.14	0.100	mg/kg dry	3.63	< 0.100	86	50-150			
Vinyl chloride	3.16	0.100	mg/kg dry	3.63	< 0.100	87	50-150			
Xylenes (total)	10.1	0.100	mg/kg dry	10.9	< 0.100	93	60-140			
Surrogate: Toluene-d8	*4.40*		*mg/kg dry*	3.61		*122*	*60-140*			
Surrogate: 4-Bromofluorobenzene	*4.39*		*mg/kg dry*	3.60		*122*	*60-140*			
Surrogate: 1,4-Dichlorobenzene-d4	*4.65*		*mg/kg dry*	3.61		*129*	*60-140*			

QC Qualifiers:

BLK	Analyte concentration in the Method Blank is above the Reporting Limit (RL).
SPK	The recovery of this analyte was outside of established control limits.

MOTI PERMIT TO CONSTRUCT

BRITISH COLUMBIA | Ministry of Transportation

Permit/File Number: 2023-01418
Office: Saanich Area Office

PERMIT TO CONSTRUCT, USE, AND MAINTAIN WORKS WITHIN THE RIGHT-OF-WAY OF A PROVINCIAL PUBLIC HIGHWAY

PURSUANT TO TRANSPORTATION ACT AND/OR THE INDUSTRIAL ROADS ACT AND/OR THE MOTOR VEHICLE ACT AND/OR AS DEFINED IN THE NISGA'A FINAL AGREEMENT AND THE NISGA'A FINAL AGREEMENT ACT.

BETWEEN:

The Minister of Transportation and Infrastructure

Saanich Area Office
240-4460 Chatterton Way
Victoria, British Columbia V8X 5J2
Canada

("The Minister")

AND:

District of Sooke
2205 Otter Point Road
Sooke, British Columbia V9Z1J2
Canada

("The Permittee")

WHEREAS:

A. The Minister has the authority to grant permits for the auxiliary use of highway right of way, which authority is pursuant to both the Transportation Act and the Industrial Roads Act, the Motor Vehicle Act, as defined in the Nisga'a Final Agreement and the Nisga'a Final Agreement Act;

B. **The Permittee has requested the Minister to issue a permit pursuant to this authority for the following purpose:**

The installation, operation, and maintenance of a sewer forcemain located along the northern shoulder of Highway 14 to 7113 West Coast Road. All works to be completed as shown on the attached drawing.

C. The Minister is prepared to issue a permit on certain terms and conditions;

ACCORDINGLY, the Minister hereby grants to the Permittee a permit for the Use (as hereinafter defined) of highway right of way on the following terms and conditions:

1. That the construction and maintenance of the said works is carried out to the satisfaction of the Regional Executive Director.
2. That, before opening up any highway or interfering with any public work, intimation in writing of the intention to do so must be given to the District Official at least seven days before the work is begun.
3. That any person appointed by the Regional Executive Director for the purpose shall have free access to all parts of the works for the purpose of inspecting the same.
4. That the construction of the said works shall be commenced on or before the October 12, 2023 and shall be prosecuted with due diligence and to the satisfaction of the Regional Executive Director and shall be completed on or before the October 12, 2024.
5. (a) The highway must at all times be kept open to traffic. The roadway must be completely restored for traffic as soon as possible. At all times the permittee must safeguard the traveling public.

   (b) That, unless with the consent of the Regional Executive Director no more than forty-five (45) metres of pipe-track or other excavation in any public highway is to be kept open at one time.

   (c) All excavation work must be carried out in accordance with the BC Occupational Health and Safety Regulation. Care shall be

taken to protect adjacent property.

(d) That all excavations shall be carefully back-filled with suitable material, which is to be tamped into place, and that the permittee shall restore the surface of the road and shoulders and ditches at their own expense. All surplus material is to be removed from the Provincial Crown lands, or deposited where and as required by the District Official of the Ministry of Transportation and Infrastructure. The permittee is financially responsible for any maintenance works required on said ditch for a period of one year. The Ministry will carry out the necessary remedial work and invoice the permittee monthly.

(e) The pipeline crossing installation is to be placed by drilling and (or) jacking in such a manner as to afford minimum grade settlement. No water jetting will be permitted. That where, in the opinion of the District Official, an excavation or opening for a pipeline crossing installation could be made which would not be detrimental to the highway or its users, permission will be granted for said works. On throughways, freeways, and main highways no open cuts will be allowed.

(f) That all pipelines in excess of a nominal diameter of 5 cm., whether gas, oil, water, pressure sewers, conduits, etc., shall be installed where indicated by the District Official, encased in a steel casing-pipe or conduit-pipe of sufficient strength to withstand all stresses and strains resulting from the location, such casing to extend the full width of the highway right-of-way if deemed necessary to the District Official. The ends of the casing-pipe shall be suitably sealed and, if required, properly vented above the ground with vent-pipes not less than 5 cm. in diameter, and extending not less than 1.2 metres above ground surface. Vent-pipes shall be connected 30 cm. from the ends of the casing-pipe, and the top of each vent shall be fitted with a turn-down elbow, properly screened and equipped with identification markers.

All pipelines of non-rigid material, i.e., plastic or copper, of any diameter, shall be cased, or embedded in sand.

The inside diameter of the casing-pipe shall be at least 25 percent larger than the outside diameter of the pipeline. The casing-pipe shall be installed with an even bearing throughout its length, and in such a manner so as to prevent leakage, except through the vents.

The top of the casing-pipe, or the pipeline where casing is not required, shall be located as directed by the District Official, and shall in no case be less than 1.2 metres below the surface of the highway and not less than 1.0 metres below the highway ditches. Pipelines must not obstruct drainage structures or ditches or interfere with traffic on the highway or with highway maintenance.

6. That where the work for which permission is hereby granted comes in contact with any bridge, culvert, ditch, or other existing work, such existing work must be properly maintained and supported in such manner as not to interfere with its proper function during the construction of the new work, and on the completion of the new work the bridge, culvert, ditch, or other existing work interfered with shall be completely restored to its original good condition.

7. That when necessary all excavations, materials, or other obstructions are to be efficiently fenced, lit, and watched, and at all times every possible precaution is to be taken to ensure the safety of the public.

8. The Permittee shall indemnify and save harmless the Ministry, its agents and employees, from and against all claims, liabilities, demands, losses, damages, costs and expenses, fines, penalties, assessments and levies made against or incurred, suffered or sustained by the Ministry, its agents and employees, or any of them at any time or times, whether before or after the expiration or termination of this permit, where the same or any of them are based upon or arise out of or from anything done or omitted to be done by the Permittee, its employees, agents or Subcontractors, in connection with the permit.

9. That the permission herein granted to use and maintain the works is only granted for such times as the land or public work in, upon, or over which the said works are constructed is under the jurisdiction of the Minister of Transportation and Infrastructure. This permission is not to be construed as being granted for all time, and shall not be deemed to vest in the permittee any right, title or interest whatsoever in or to the lands upon which the works are constructed. Should the lands affected at any time be included within that of an incorporated municipality or city, this permission shall become void, unless the works are on a highway duly classified as an arterial highway pursuant to Section 45 of the Transportation Act.

10. That after receiving notice in writing of the intention on the part of the Provincial Government to construct, extend, alter, or improve any public work, the person or persons responsible for the maintenance of the works for which permission is hereby granted shall within six weeks move or alter such work at their own expense to such new positions or in such manner as may be necessitated by the construction, extension, alteration, or improvement proposed to be carried out by the Provincial Government.

11. That while reasonable care will be taken on the part of the Provincial Government to do as little damage as possible to any private work in the carrying-out of the construction, extension, alterations, improvement, repair, or maintenance of any public work adjacent thereto, the Provincial Government can accept no responsibility for any kind of such damage.

12. That the permission hereby granted to construct, use, and maintain work is granted without prejudice to the provisions of the Transportation Act, or other Acts governing Crown lands and public works or their use by the public.

13. That this permission shall be in force only during such time as the said works are operated and maintained by the applicants, to the entire satisfaction of the Regional Executive Director.

14. That the Ministry will not be responsible for grade changes on accesses caused by reconstruction of any Provincial highway.

15. This permit is valid only for the specific works stated herein. Any alterations or additions must be covered by a separate permit.

16. This permit may be canceled, at the discretion of the Minister, without recourse, should the permittee fail to comply with all the terms of the permit. Thirty days' notice will be given before cancellation.

17. When the requirements of the Ministry necessitate use of the said lands for Provincial purposes, at the discretion of the Minister, this permit may be canceled.

18. That these works shall be identified with this permit number in a manner satisfactory to the District Official of the Ministry of Transportation and Infrastructure.

19. As a condition of this permit, the permittee unconditionally agrees with the Ministry of Transportation and Infrastructure that the permittee is the prime contractor or will appoint a qualified prime contractor, as described in Section 118 of the Workers Compensation Act, for the purposes of the work described by this permit, at the work location described in this permit, and that the permittee or designated prime contractor will observe and perform all of the duties and obligations which fall to be discharged by the prime contractor pursuant to the Workers Compensation Act and the Occupational Health and Safety Regulation.

20. The permittee is advised and acknowledges that the following hazards may be present at the work location and need to be considered in co-ordinating site safety: overhead hazards, particularly electrical or telecommunications lines; buried utilities, particularly electrical, telecommunication, and gas lines; traffic, danger trees, falling rocks, and sharp or infectious litter.

21. Any works within the Ministry right-of-way that fall within the scope of "engineering" under the Engineers and Geoscientists Act will be performed by a Professional Engineer, and shall comply with this Ministry's "Professional Assurance Guidelines". The Guidelines can be viewed on the Ministry's website at https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/technical-circulars/2023/t01-23.pdf

22. The permittee is responsible for preventing the introduction and spread of noxious weeds on the highway right-of-way as defined by the British Columbia Weed Control Act and Weed Control Regulation.

23. The field supervisor for the Permittee and Contractor is to have a copy of this permit on site during field operations and be aware of all Permittee conditions.

24. The Permittee shall ensure that any subcontractor performing works covered by this permit shall adhere to all conditions specified herein.

25. The Permittee shall ensure that employees and contractors do not park within the highway right of way. Loading and unloading of equipment within the highway right of way is prohibited.

26. The rights granted under this permit are for an indefinite period.

27. This permit in no way grants exclusive use to the Permittee for any portion of the right of way.

28. The Permittee must contact the Maintenance Contractor, Emcon South Island at 1-866-353-3136 at least 48 prior to the commencement of works.

29. Whenever possible, the Permittee shall ensure that employees and contractors do not park within the highway right of way or load/unload equipment within the highway right of way. If the work affects the travelled portion of the highway right of way, a Traffic Control Plan is required as per below.

    The Permittee must contact Kristine.Ethier@gov.bc.ca a minimum of 10 days prior to the commencement of the work to notify the start date and to submit a H1080 Works Notification/Lane Closure Request Form and Traffic Control Plan. Form and plan to be accepted by the Designated Ministry Official prior to the commencement of work.

    The Permittee is to ensure that the construction area is properly signed in accordance with the current Traffic Control Manual for Work on Roadways and certified traffic control persons provided during construction.

    Necessary lane or road closures shall require Ministry approval prior to public advertisement. All necessary traffic control shall be the responsibility of the Permittee.

    Properly equipped trained and experienced traffic control person(s) are required to control traffic during periods of alternating traffic or at any time where equipment, work crews, or materials interfere with the traffic flow.

    The Permittee shall, at their cost, supply, erect, and maintain standard traffic control devices in accordance with the Ministry of Transportation and Infrastructure Traffic Control Manual for Works on Roadways.

30. This permit is for work within highway right of way only and the Permittee is responsible for ensuring that all works are contained to the highway right of way.

31. Permittee will be responsible to notify and gain approval of utility companies in advance of works.

32. The Permittee is to ensure that no damage is done to any existing underground or overhead services and must contact the electrical, telephone, and natural gas utility and any private landowner having works under permit to verify the location of utility

works that may be affected prior to opening up any portion of the public road right of way.

33. Permittee is to call BC OneCall at 1-800-474-6886 or by cellular at *6886 prior to the commencement of work.

34. It is the Permittee's responsibility to obtain permission from the Ministry of Environment, pursuant to Section 11 of the Water Sustainability Act for works in and around any natural watercourse, as and if required.

35. Excavations across entrances, whether private or otherwise, must be backfilled and thoroughly compacted by the end of the current working day. The surface must be restored, whether paved or gravel, to its original condition within 48 hours.

36. Affected property owners must be notified at least 48 hours in advance before excavating a driveway.

37. Permittee is responsible for maintaining future depth coverage of works due to natural settlement and erosion of ground. The Permittee shall be held responsible for necessary road repair resulting from settlement within the project area for a period of two (2) years.

38. Reinstatement in a timely and professional manner of drainage, roadway, and roadside facilities is required within two (2) days of disturbing the facilities.

39. No storage or staging of equipment within highway right of way or gravel reserves.

40. If any BCLS survey posts are removed, moved, or damaged during construction they must be replaced by a registered B.C. Land Surveyor at the expense of the Permittee.

41. The Permittee shall be held responsible for any damage to the highway resulting from the permitted work. All highway drainage works are to be restored to their original or better condition.

42. Machines with steel tracks or flat steel pads are not allowed within constructed public road right of way at any time.

43. It is the responsibility of the Permittee to ensure that all equipment and vehicles crossing Provincial highways or side roads have the proper approvals and insurance as required and issued by the Commercial Vehicle Safety and Enforcement Division. For permits or inquiries please contact the Provincial Permit Centre at 1-800-559-9688.

44. Permittee is to adhere to all seasonal load restrictions, where applicable. Current seasonal load restrictions can be viewed at http://www.th.gov.bc.ca/bchighways/loadrestrictions/loadrestrictions.htm

45. No gates are to be placed within Ministry of Transportation and Infrastructure public road right of way.

46. This permit is for a pipeline crossing only and does not include any permanent or temporary accesses onto Provincial road right of way.

47. Pipelines crossing under unconstructed road allowances, rights of way, crown deleted roads etc. must meet constructed road crossing specifications as if it were constructed road. The intent is that the area will be used as road in the future and pipeline must be engineered to road crossing specifications.

48. The Ministry of Transportation and Infrastructure may upon giving notice, require removal of the pipeline from the right of way for any reason and solely at the Permittee's expense. The Minister may order the removal or alteration of utility installations if necessary, for the protection of the highway or highway users.

49. The Permittee shall ensure all equipment working on, or hauling material onto and from the site, does not damage or deposit material onto any part of an existing road or right of way. Materials spilled onto the public road right of way or driveways opened to public traffic shall be cleaned up immediately. The Permittee has the full responsibility to repair any damage to existing highways, local roads, driveways, and environmental media (i.e. soil, groundwater, sediment, soil vapour, surface water) caused by its construction equipment and/or operations pursuant to BC's Environmental Management Act.

50. Unless specifically addressed elsewhere in this permit, all utilities and appurtenances shall be installed in accordance with the BC Supplement to TAC Geometric Design Guide and Utility Policy Manual.

51. Permittee is responsible for the supply of all labour, equipment, and materials in connection with the work.

52. Permittee is responsible for all future maintenance of the work for the duration of permit. This permit is not transferable and valid only for the Permittee.

53. Installation of the pipeline shall not occur during hours of darkness or during periods of severe weather.

    The Permittee must ensure that all works are safely visible to traffic and appropriate measures are in place as per the current Traffic Control Manual for Work on Roadways.

    The public road must be clear of any equipment or activity that may impede winter road maintenance on Ministry maintained roads during winter snowstorms.

54. This permit does not allow for an open cut trench through public road right of way. No work shall impact the travelled portion of the highway.

55. The Permittee is to advertise on the local radio stations at least one (1) week prior to construction start up twice per day. The Ministry of Transportation and Infrastructure must be notified of 1) start-up of construction 2) expected travel delays and, 3) immediately once work has been completed and is open to two-way traffic.

Only one half of the road is to be opened at a time and no work or excavation is to be open during hours of darkness. Permission of the open cut is granted, provided all requirements of this permit are met.

Permittee is responsible for maintaining future depth coverage of works due to natural settlement and erosion of ground. The Permittee shall be held responsible for necessary pavement and road repair resulting from settlement within the excavated area for a period of two (2) years.

The Permittee will be responsible for maintenance of the road surface at the crossing for a period of two (2) years subsequent to the installation.

Pavement must be cut by hand or approved mechanical means in straight lines parallel to the trench centerline.

All cuts in existing pavement are to have smooth vertical edges and cut pavement faces are to be thoroughly painted with COLAs or RM-20 asphalt primer to ensure a good bond between the new pavements.

Distance from a pavement edge to the cut of the trench must be at least 150mm or sufficient distance to ensure the pavement will not be undermined by sloughing.

Trenches must be backfilled or adequately covered at the end of the work day.

Trench shoring must conform to all safety standards and is to be used where soil conditions warrant. Extreme care must be taken to avoid sloughing of the trench sides to minimize damage to the subgrade beyond the limits of excavation.

Any trench must be backfilled with granular material that meets Ministry standards as set out in Section 202 (Table 202-C) of the Standard Specifications for Highway Construction and all subsequent interim revisions and updates, in accordance with the following minimum requirements:

(a) Sub-base material must meet or exceed specified requirements for Select Granular Sub Base aggregates.

(b) Crushed Base Course depth is to match existing depth, but must not be less than 300 mm compacted thickness and consist of "25 mm minus" WGB crushed aggregate.

Backfill must be placed in layers not exceeding 150 mm compacted thickness and shall be compacted with approved tamping equipment to a minimum of 95 percent Proctor density to within 300 mm of the surface and 100 percent for the final 300 mm.

When backfilling, native materials excavated from the trench may be placed in the trench to a depth of 300mm below the existing pavement, in lifts not exceeding 150mm and each lift is to be thoroughly compacted, adding water as necessary.

56. Where re-establishing the road structure, place, compact, and add water as necessary in lifts of 100mm each of 25mm well graded base course aggregate, meeting the requirements of Section 202 of the current Ministry of Transportation and Infrastructure Standard Specifications for Highway Construction to a minimum depth of 200mm.

The last (50 or 100)mm is to be filled with (Class II medium mix asphalt concrete pavement or class 1 medium mix asphalt concrete pavement) meeting all requirements of Section 502 of the current Ministry of Transportation and Infrastructure - Standard Specifications for Highway Construction. The pavement is to be placed and compacted in (1 lift or 2 lifts) of (25mm or 50mm) and compacted to 97% Standard Marshall. The finished grade of the new pavement is to be consistent with the grade of the existing pavement to ensure a smooth ride for the travelling public.

The finished grade is to be consistent with the grade of the existing surface to ensure a smooth ride for the traveling public.

Any settlement which occurs within two (2) years after the completion of the work is to be corrected by the placement of additional asphalt concrete mix, as described above, by the Permittee at their expense. If base failure or inadequate compaction is suspect, the District Official may require removal of asphalt and gravel and require additional compaction at the cost of the Permittee.

The Permittee is granted a period not to exceed two (2) days to maintain the crossing location daily as a gravel surface. This surface must be flush with the existing pavement at all times and is the responsibility of the Permittee to ensure this standard is met.

When a gravel shoulder is used as a traffic lane, the shoulder must be maintained in a smooth, dust free condition at all times and restored once works are complete. District Official may require the gravel shoulder be restored at the Permittee's expense. Use of the gravel shoulder as a traffic lane shall be restricted to the workday only and will not continue over weekends or at night.

No frozen material or clay shall be used in the backfill.

Except where trenching is well clear of the road shoulder, all excavated material must be removed from the site immediately. Stockpiling of native material adjacent to the trench is not permitted. No excavated materials shall be stockpiled on the travelled

portion of the road.

No dirt, sand, or liquid/solid waste materials to be stored on the road, road shoulder, or ditch. Any road debris shall be removed, washed/swept from the road daily and to Ministry standards.

The Permittee must adhere to the Worker's Compensation Board Occupational Health & Safety Regulations for Construction, Excavation, and Demolition.

All backfill material is to be similar or better than the material excavated at any given elevation. The moisture content shall be adjusted to optimum for compaction.

The Permittee is to submit Engineered Record Design Drawings to the Ministry within one month of completion of the work to confirm the placement of the line.

57. All crossings shall be marked with conspicuous signs showing depth to pipe crown.

58. Markers shall be required at each end of roadway crossings, and at 200 meter intervals along the pipeline as permitted within the public road right of way, indicating the location and source of information for the pipeline.

59. Minimum ground cover under design ditch inverts to pipe crown shall be no less than 1.0 meter.

60. Any area of right of way disturbed during the permitted works including road shoulders, fill slopes, cut slopes, ditch, and the utility corridor, is to be restored to their original grade and compaction and left in a neat, tidy, and free draining condition. All slash, logs, or brushing debris is to be burned or hauled clear of the right of way. All rocks or debris greater than 5cm in size are to be disposed of clear of the right of way and areas where the soil has been disturbed are to be restored and re-seeded with a pre-approved grass mixture to reduce the potential of erosion and the growth of noxious weeds. Sites are to be reseeded to standards set out in Section 757, Standard Specifications for Highway Construction. All unsuitable material and inorganic debris shall be removed from the project area.

61. The layout shown on the attached drawing is a condition of this permit, and any change in layout without the prior consent in writing of the Designated Ministry Official shall render the permit void. Any change in land use shall render this permit void

62. Any change of ownership must be submitted to the Ministry in writing complete with company name, incorporation number, contact information, and the Ministry of Transportation and Infrastructure file number.

63. The terms of the permit are applicable to the Permittee. Should the Permittee change names, a new permit must be initiated within 1 month of the official name change.

64. All work is to be carried out to the satisfaction of the District Official. The Ministry reserves the right to have repairs carried out (if the Permittee fails to comply with the clauses above) and to bill the applicant for the full cost of any such repairs or clean up if found necessary.

65. Where the pipeline is proposed to be installed parallel and adjacent to, but outside of Ministry right of way, consideration shall be given to Ministry concerns with respect to future road widening at a minimum of 10 meters from edge of right of way to edge of right of way. Minimum setback from road right of way is 4.5 metres.

66. Pavement edges must be cut, made true and straight, cleaned, and primed before installing a final patch.

Asphalt concrete must be restored to the same thickness as the existing surface or to a minimum of 75 mm thickness, whichever is greater. Asphaltic concrete must meet Ministry standards as set out in Section 502, Standard Specifications for Highway Construction.

Asphalt concrete is to be laid in two or more lifts or layers. Each lift is to be thoroughly compacted before successive lifts are applied.

The Permittee will ensure that the permanent pavement patch is to Ministry standards for one year from the date that the patch is installed.

67. In accordance with Sections 000.03 Non-Ministry Developments on Ministry Land or That are Intended to Become Ministry Assets and 165.20 Archaeological and Paleontological Discoveries of the Design Build Standard Specification for Highway Construction - In the event that any item of archaeological, heritage, historical, cultural or scientific interest is found on the project site, the following Chance Find Procedure shall apply:

Such item(s) shall remain the property of the Province and the Permittee shall, on making or being advised of such a find, immediately cease operations in the affected area, minimize activities which create ground disturbance in and adjacent to the affected area, and notify the District Official and the Archaeology Branch of the British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Work shall not resume within 30 m of the discovery site until an appropriate directive has been received from that agency.

To protect archaeological and paleontological sites that are situated within or adjacent to a project site, the Permittee may be required to use a variety of mitigative measures, including but not limited to drainage or erosion control, slope stabilization measures, or erecting fences or other suitable barriers to protect archaeological or paleontological sites that are situated within

or adjacent to a project site. These measures, with any negotiated extensions of time for completion of the Works they require, will be determined and adopted at the discretion of the District Official. The costs associated with such mitigative measures will be borne by the Permittee.

A buffer zone, in which no land alteration or other activity is permitted, may be required to ensure adequate site protection. The width of this buffer zone shall be determined by the District Official in consultation with a representative of the Archaeology Branch of the British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development. The Permittee shall be responsible for the actions of employees and subcontractors with respect to site vandalism and the unlicensed collection of artifacts from Designated archaeological sites in and around the work location.

The Permittee shall ensure that all workers and Subcontractors are fully aware of these requirements and processes.

68. Gooseneck vents are to be made visible to the Ministry for vegetation clearing purposes.

69.

The rights granted to the Permittee in this permit are to be exercised only for the purpose as defined in Recital B on page 1.

Dated at Victoria, British Columbia, this 12 day of October, 2023

Ryan Pinches

On Behalf of the Minister