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Cowichan Valley Regional District
Meade Creek Recycling Facility

TENDER DOCUMENT –
April 6, 2017
CVRD Ref. No. ES-016-17
KWL Project No. 2212.061-600

Prepared for:

Cowichan Valley Regional District

1. Documents that are provided include:

2. Standard Documents not included, but referred to as part of the Tender Documents (available in the "MMCD – General Conditions, Specifications and Standard Detail Drawings")

   - Instructions to Tenderers, Part II
   - General Conditions
   - Specifications
   - Standard Detail Drawings

1.0 OVERIEW

The work of this contract generally comprises the following:

- Demolition of existing site buildings and structures;
- Decommission of existing septic system and utilities;
- Landfill closure including removal of residual ash, consolidate into existing stockpile and capped;
- Clearing, grubbing and rough grading including removal and replacement of unsuitable material and import fill;
- Construction of access road and drop off area;
- Construction of a recycling facility including installation of lock block walls and concrete pads;
- Construction of site servicing including water, sanitary sewer and storm water management;
- Construction of fire protection system;
- Construction of Recycling Building including architectural and structural components, HVAC, plumbing and electrical;
- Construction of Scale House including architectural and structural components, HVAC, plumbing and electrical;
- Installation of weigh scale system;
- Installation of site lighting; and
- Site landscaping.

Tender Documents are available for purchase during normal business hours at:

Address: **Cowichan Valley Regional District**
175 Ingram Street,
Duncan, BC V9L 1N8

on payment of a non-refundable amount of $250 including GST payable to:

Cowichan Valley Regional District.

The Tender Documents are also available for viewing on line at the following websites:

- CVRD website *http://www.cvrd.bc.ca/1486/Tenders-RFPs*
- BC Bid *http://www.bcbid.gov.bc.ca/*
- Civic Info *https://www.civicinfo.bc.ca/bids*
- BidCentral *http://www.bidcentral.ca/*
-

Key Dates

Pre-Tender Site Meeting (Mandatory):..... Thursday, April 13, 2017, 1:00 p.m. local time

Tender Closing: ..... Monday, May 1, 2017, 2:00 p.m. local time

Assumed Notice to Proceed:..... Monday, May 23, 2017

Substantial Performance: ..... Friday, March 31, 2018

Sealed tenders clearly marked:

MEADE CREEK RECYCLING FACILITY
Reference No. ES-016-17

will be received at:

Cowichan Valley Regional District (CVRD)

Address: **Cowichan Valley Regional District**
175 Ingram Street
Duncan, B.C. V9L 1N8

Attn. Mr. Anthony Jeffery, Purchaser

Each tender must be accompanied by a bid security conforming to MMCD Platinum Edition *Instructions to Tenderers - Part II* in the amount of 10% of the tendered price. The lowest or any tender will not necessarily be accepted.

Tenders will be opened in public at the *Tender Closing* time and location noted above.

For more information, please contact:

Tauseef Waraich, M.Sc., P.Ag
Manager, Recycling & Waste Management Division
Cowichan Valley Regional District
175 Ingram Street, Duncan, BC V9L 1N8
Email: twaraich@cvrd.bc.ca
Tel: 250.746.2530
Toll Free: 1.800.665.3955
Fax: 250.746.2543

(FOR USE WHEN UNIT PRICES FORM THE BASIS OF PAYMENT TO BE USED ONLY WITH THE GENERAL CONDITIONS AND OTHER STANDARD DOCUMENTS OF THE UNIT PRICE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.)

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

Owner: COWICHAN VALLEY REGIONAL DISTRICT

Contract: MEADE CREEK RECYCLING FACILITY

Reference No. ES-016-17
(Owner's Contract Reference Number)

1. Introduction

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

2.

2.1.

- Demolition of existing site buildings and structures;
- Landfill closure including removal of residual ash, consolidate into existing stockpile and capped;
- Clearing, grubbing and rough grading including removal and replacement of unsuitable material and import fill;
- Construction of access road and drop off area;
- Construction of a recycling facility including installation of lock block walls and concrete pads;
- Construction of site servicing including water, sanitary sewer and storm water management;
- Construction of fire protection system;
- Construction of Recycling Building including architectural and structural components, HVAC, plumbing and electrical;
- Construction of Scale House including architectural and structural components, HVAC, plumbing and electrical;
- Installation of weigh scale system;
- Installation of site lighting; and
- Site landscaping.

2.2. Direct all inquiries regarding the *Contract*, to:

2.3. Tauseef Waraich, M.Sc., P.Ag
Manager, Recycling & Waste Management Division.

2.4. Address :
Cowichan Valley Regional District
175 Ingram Street, Duncan, BC V9L 1N8
Email: twaraich@cvrd.bc.ca
Tel: 250.746.2530
Toll Free: 1.800.665.3955
Fax: 250.746.2543

3. Tender Documents

3.1. 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 *Contract Drawings*".

3.2. Portions of the Contract Documents are 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. They are those contained in the publication entitled 'Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings'. Refer to Schedule 1 to the Agreement or, if not specified in Schedule 1, then the applicable edition shall be the most recent edition as of the date of the *Tender Closing Date.* All sections of this publication are by reference included in the *Contract Documents*.

3.3. 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 judgment about its reliability, accuracy, completeness and relevance to the *Contract*, and neither the *Owner* nor any representative of the *Owner* gives any guarantee or representation that the additional information is reliable, accurate, complete or relevant.

4. Submission of Tenders

4.1. Tenders must be submitted in a sealed envelope, marked on the outside with the above *Contract* Title and Reference No., and must be received by the office of:

COWICHAN VALLEY REGIONAL DISTRICT

5.

5.1. on or before:

Tender Closing Time:	as stated under Key Dates on the Invitation to Tender
Tender Closing Date:	as stated under Key Dates on the Invitation to Tender

6.

6.1. at: **COWICHAN VALLEY REGIONAL DISTRICT**
175 Ingram Street,
Duncan, BC V9L 1N8
Attn. Mr. Anthony Jeffrey, Purchaser

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

7. Supplemental Instructions to Tenderers

7.1. **<u>Mandatory Pre-Tender Site Meeting</u>**

Contractor wishing to tender MUST attend a site meeting as stated under Key Dates on the Invitation to Tender. All tenderers will be responsible for recording their presence at the site meeting by signing an attendance sheet provided by the Owner's representative. Tender will only be accepted from those that have attended and signed the Mandatory Pre-Tender Site meeting attendance sheet.

8. 8.1. **Rights of the Owner**

The Owner:

(i) reserves the right to reject any or all bids;

(ii) reserves the right to accept or reject a bid from a tenderer who is currently or has previously been in litigation, arbitration or mediation with the Owner and/or its agents.

(iii) reserves the right to accept or reject a bid from a tenderer who provides subcontractors and/or suppliers who currently or have previously been in litigation, arbitration or mediation with the Owner and/or its agents.

(iv) reserves the right to waive informalities, irregularities, technicalities and minor non-compliances;

(v) may cancel this tender at any time prior to or after Closing;

(vi) reserves the right, in the event that only one bid is received, to terminate this tender process;

(vii) may reject any bid that is unsigned, improperly signed, conditional, illegible, contains arithmetical errors, erasures or irregularities of any kind; and

(viii) reserves the right to change the scope of work and retender the Project.

(ix) reserves the right to delete any of the items listed in the Schedule of Quantities and Payment in the Form of Tender to a total value of 25% of the bid price (excluding taxes) to meet the available budget.

In the event of a discrepancy between a unit price and an extension of price, the unit price will govern.

9. 9.1. **Costs of Preparation and Limitation of Liability**

All costs incurred by the bidder in the preparation and submission of their tender will be at their own expense. The Owner or its agents will not be liable to any bidder for any claims, whether for costs, expenses, losses or damages, or for loss of anticipated profits, incurred by the bidder in preparing and submitting their tender. The Owner will not be liable for damages in connection with this Tender, for:

- any breach that may arise between the Bidder and the Owner; or
- any negligence or other tort committed by the Owner

10. 10.1 **Pre Work Site Inspection**

.1 Prior to commencing any construction, the Contractor shall undertake a photographic/video record of the project site with specific emphasis on the condition of the roads accessing the site.

.2 A complete copy of the photographic/video record is to be provided to the Contract Administrator after the inspection and shall become the record of condition of the project prior to construction.

.3 The pre-construction inspection will be undertaken with the Contract Administrator's representative present.

11. 11.1 **Control, Construction and Record Survey**

.1 Digital survey control and digital construction details for layout will be provided by the Contract Administrator to the Contractor.

.2 Layout required for the work is the responsibility of the Contractor. The Contractor shall ensure that sufficient layout and checks are undertaken to perform the work.

.3 The Contractor shall provide quantity surveys during the course of construction. The Contractor shall provide the Contract Administrator all survey information gathered by the Contractor in order to verify quantities.
.4 A record survey of infrastructure ultimately installed shall be maintained by the contractor and submitted to the Contract Administrator no later than Substantial Performance.
.5 As part of the record survey the contractor shall provide invert elevations and locations of all structures, fittings, appurtenances, service connections, valves and tie-ins.

12. 12.1 **Assumed Notice of Award**

.1 The Assumed Notice of Award date as detailed in the Invitation to Tender is an assumed date that shall be used to equitably adjust the Contract Time. It is intended that the duration of the contract will remain unchanged, whereas contract start and Milestone/Substantial Performance dates will be changed accordingly.

Should the Notice of Award be issued on a day other than the Assumed Notice of Award date the Contract shall be equitably adjusted by Change Order to account for the difference in dates

13. 13.1 **Liquidated Damages to Late Completion**

The Meade Creek Recycling Facility will be relocated to a temporary location during the construction period. The lease of the temporary location terminates In April 2018. If the Contractor fails to meet the Substantial Completion Date as set out in the Form of Tender, in addition to the conditions outlined under GC 13.9, the Owner may also deduct from any monies owing to the Contractor for Work for:

- costs incurred by the Owner for the extension of the land lease to allow continuous operation of the temporary recycling facility until Substantial Completion is attained by the Contractor.

14. 14.1 **Construction Management Plan**

The Contractor shall submit, in a form acceptable to the Contract Administrator and in accordance with Contract Specifications, upon acceptance of the Tender prior to receiving Notice to Proceed, a Construction Management Plan for approval. The Construction Management Plan shall include the following:

.1 Detailed construction schedule, including proposed work hours.
.2 Detailed method statement outlining the proposed methodology for the work, source of materials, and disposal facilities.
.3 Environmental management plan, including construction debris control strategy and sediment and erosion control plan.
.4 Communication strategy outlining proposed method for dealing with affected residents, logging road users, affected authorities and Utility companies during construction. Communication strategy must include name of Contractor's site representative and local phone number where representative may be reached 24 hours of the day, and sample "Notice of Construction".
.5 Site Safety and Security Strategy.

15. 15.1 **Sustainability Plan**

The CVRD is committed to the goal of Zero Waste, with the focus on enhancing recycling and sustainable practices in their operations. To meet this strategic goal, the Contractor shall submit, in a form acceptable

to the Contract Administrator, upon acceptance of the Tender prior to receiving Notice to Proceed, a Sustainability Plan for approval. The plan shall outline the Contractor's specific actions to carry out the works as outlined in the Contract Drawings and Documents in a sustainable approach to minimize impacts to the surrounding environment and deposit of waste to the landfill.

16. 16.1 **Permits**

.1 The Contractor is responsible to notify the applicable authorities and obtain the necessary permits and approval required to carry out the work outlined in the Contract Drawings and Documents. Costs associated with obtaining the required permits will be incidental to the payment of work under this Contract.

.2 Contractor to comply with existing CVRD soil disposal bylaw for disposal of soil within the Regional District.

***To Owner*:**

WE, THE UNDERSIGNED:

1

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)

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.

ACCORDINGLY, WE HEREBY OFFER:

2

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

2.2 to achieve Substantial Performance of the Work on or before the date of Substantial Performance as stated under 'Key Dates' on the 'Invitation to Tender'

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 unit prices 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 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*.

WE CONFIRM:

3

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.

WE CONFIRM:

4

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.

WE AGREE:

5

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 **15** *Days* of receipt of the written *Notice of Award* deliver to the *Owner*:

Tenderer's Initials_____

a) a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the *Contract Price*, covering the performance of the *Work* including the *Contractor*'s obligations during the *Maintenance Period,* 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*;

b) a *Baseline Construction Schedule*, as provided by GC 4.6.1;

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 and any Supplementary GCs indicating that all such insurance coverage is in place and;

5.1.2 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*; and

5.1.3 sign the Contract Documents as required by GC 2.1.2.

WE AGREE: **6** 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*,

then such failure or refusal will be deemed to be a refusal by us to enter into the *Contract* and the *Owner* may, on written notice to us, award the *Contract* to another party. 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 our *Tender Price* is less than the amount for which the *Owner* contracts with another party to perform the *Work*.

OUR ADDRESS IS:

_____

_____

_____

Phone: ____ ____ - _____

Fax: ____ ____ - _____

Attention: _____

Tenderer's Initials_____

This Tender is executed this

_____ day of _____, 2017.
Contractor:

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

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY)

Tenderer's Initials_____

Appendix 1
SCHEDULE OF QUANTITIES AND PRICES
(See paragraph 5.3.2 of the Instructions to Tenderers - Part II)

(All prices and *Quotations* including the *Contract Price* shall NOT include GST.)

SUMMARY SHEET

Division 01:	General Requirements	$ _____
Division 02:	Existing Condition	$ _____
Division 03:	Concrete	$ _____
Division 13	Special Construction	$ _____
Division 21	Fire Suppression	$ _____
Division 26	Electrical	$ _____
Division 31	Earthworks	$ _____
Division 32	Roads and Site Improvements	$ _____
Division 33:	Utilities	$ _____
Division 41:	Equipment	$ _____
	Indeterminate Work	$ _____

TOTAL TENDER PRICE **$ _____**

(Total Tender Price excludes GST)

Tenderer's Initials_____

Master Municipal Specifications Platinum Edition 2009	FORM OF TENDER COWICHAN VALLEY REGIONAL DISTRICT MEADE CREEK RECYCLING FACILITY Reference Number: ES-016-17	

Appendix 1
SCHEDULE OF QUANTITIES AND PRICES
(See paragraph 5.3.2 of the Instructions to Tenderers - Part II)
(All prices and *Quotations* including the *Contract Price* shall NOT include GST.)

Division	Section	Descriptions	Unit	Unit Price $	Quantity	Total $
01	**GENERAL REQUIREMENTS**					
	01 33 01	Project Record Documents	L.S.		1	
	01 42 00	Reference Specifications	*Incidental*		-	
	01 51 01	Temporary Utilities and Lighting	*Incidental*		-	
	01 52 01	Temporary Structures	*Incidental*		-	
	01 53 01	Temporary Facilities	*Incidental*		-	
	01 55 00	Traffic Control, Vehicle Access and Parking	*Incidental*		-	
	01 57 01	Environmental Protection	L.S.		1	
	01 58 01	Project Identification	*Incidental*		-	
	01 71 13s	Mobilization & Demobilization - max 2% of total Contract Price	L.S.		1	
	GC	Bonding & Insurance - max 1 % of total Contract Price	L.S.		1	
				Subtotal Division 01 - General Requirements		**$**
02	**EXISTING CONDITIONS**					
	02 41 16	**Demolition**				
		Site Demolition	L.S.		1	
		Building Demolition	L.S.		1	
		Weigh Scale Decommission and Removal	L.S.		1	
		Decommission Existing Septic System	L.S.		1	
	02 61 00	**Landfill Closure**				
		Ash Residuals Excavation and Relocation	cu m		4800	
		Landfill Cap	sq.m.		5520	
		Landfill Cap Tie In	lm		290	
		Abandon Existing Monitoring Well	each		9	
		New Monitoring Well	each		4	
				Subtotal Division 03 - Concrete		**$**
03	**CONCRETE**					
	03 20 01	**Concrete Reinforcement**	*Incidental*		-	
	03 30 53	**Cast-In-Place Concrete**				
		200mm Thick Concrete Pad	sq m		320	
		150mm Thick Concrete Walkway	sq m		12	
		Reinforced Lock Block Wall	sq m		1,040	
		Non Mountable Concrete Curb	lm		430	
				Subtotal Division 03 - Concrete		**$**

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(See paragraph 5.3.2 of the Instructions to Tenderers - Part II)
(All prices and *Quotations* including the *Contract Price* shall NOT include GST.)

Division	Section	Descriptions	Unit	Unit Price $	Quantity	Total $
13	**SPECIAL CONSTRUCTION**					
		Architectural and Structural				
		Scale House Complete	L.S.		1	
		Recycling Building Complete	L.S.		1	
		Mechanical				
		Scale House HVAC	L.S.		1	
		Recycling Building HVAC	L.S.		1	
		Scale House Plumbing	L.S.		1	
		Recycling Building Plumbing	L.S.		1	
		Signage				
		Entrance Sign	L.S.		1	
		Wayfinding Sign	L.S.		1	
		Site Traffic Signs and Posts	each		16	
		Outdoor Product Signs and Posts	each		14	
		Indoor Product Signs and Concrete Base	each		16	
				Subtotal Division 13 - Special Construction		**$**
21	**FIRE SUPPRESSION**					
	21 31 26	**Underground Fire Suppression Tanks**				
		40,000L FRP Underground Fire Suppression Storage Tank, and Accessories	L.S.		1	
				Subtotal Division 21 - Fire Suppression		**$**
26	**ELECTRICAL**					
		Electrical - General				
		Power Supply	L.S.		1	
		Scale House Electrical	L.S.		1	
		Recycling Building Electrical	L.S.		1	
		Site Lighting	L.S.		1	
		Buried Conduit and Cables	L.S.		1	
		Closed Circuit Monitoring System	L.S.		1	
		Intercom System	L.S.		1	
				Subtotal Division 26 - Electrical		**$**

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(All prices and *Quotations* including the *Contract Price* shall NOT include GST.)

Division	Section	Descriptions	Unit	Unit Price $	Quantity	Total $
31	**EARTHWORKS**					
	31 11 01	**Clearing and Grubbing**				
		Clearing and Grubbing - Site	sq m		13,880	
		Clearing - Ash Stockpiles	sq m		6,845	
	31 22 01	**Site Grading**				
		Strip Topsoil - Site	cu m		4,670	
	31 24 13	**Roadway Excavation, Embankment and Compaction**				
		Common Excavation	cu m		560	
		Import Fill	cu m		15,650	
				Subtotal Division 31 - Earthworks		**$**
32	**ROADS AND SITE IMPROVEMENTS**					
	32 11 16.1	**Granular Sub-Base**				
		200mm Thick - 75 mm minus select granular sub-base	sq m		9,310	
	32 11 23	**Granular Base**				
		150 mm Thick - 19 mm minus crushed gravel	sq m		9,300	
	32 12 16	**Hot Mix Asphalt Concrete Paving**				
		100 mm Thick Asphalt	sq m		9,300	
		100 mm Thick Stamped Asphalt	sq m		540	
	32 17 23	**Painted Pavement Marking**				
		Pavement Marking	L.S.		1	
	32 31 13	**Chain Link Fences and Gates**				
		Chain Link Fences	lm		815	
		Chain Link Single Swing Gate	each		2	
		Chain Link Rolling Gates	each		1	
		Chain Link Double Gates	each		1	
	32 92 20	**Hydraulic Seeding**				
		Seeding	sq m		5,520	
		Landscaping				
		Site Landscaping	L.S.		1	
		Rain Garden	L.S.		1	
		Irrigation System	L.S.		1	
		Landscape Maintenance	L.S.		1	
		Miscellaneous Items				
		Bollards	each		12	

FORM OF TENDER
COWICHAN VALLEY REGIONAL DISTRICT
MEADE CREEK RECYCLING FACILITY
Reference Number: ES-016-17

Appendix 1
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(See paragraph 5.3.2 of the Instructions to Tenderers - Part II)
(All prices and *Quotations* including the *Contract Price* shall NOT include GST.)

Division	Section	Descriptions	Unit	Unit Price $	Quantity	Total $
		Railing	lm		340	
		Subtotal Division 32 - Roads and Site Improvements				**$**
33	**UTILITIES**					
	33 11 01	**Waterworks**				
		Watermains - 50 mm dia. PVC C900 DR18	lm		65	
		Watermains - 25 mm dia. Polyethylene	lm		130	
		Watermains - 19 mm dia. Polyethylene	lm		150	
		Tie-in to Existing Well	L.S.		1	
		Existing Well Upgrading	L.S.		1	
		Irrigation System Connection	L.S.		1	
		150mm dia. PVC Sleeve	lm		55	
		Backflow Prevention/Solenoid Valve	L.S.		1	
		Dry Hydrant Assembly	L.S.		1	
	33 30 01	**Sanitary Sewers**				
		Sanitary Sewer - 100 mm dia. PVC DR 35	lm		112	
		Sanitary Sewer Service Connection	each		2	
		2500 Imp Gal Concrete Sanitary Sewer Holding Tank	L.S.		1	
	33 40 01	Storm Sewers				
		Storm Sewer - 300 mm dia. PVC DR 35	lm		15	
		Storm Sewer - 250 mm dia. PVC DR 35	lm		200	
		Storm Sewer - 200 mm dia. PVC DR 35	lm		145	
		Storm Sewer Service connection	each		2	
	33 44 01	**Manholes and Catchbasins**				
		1050 mm dia. Manhole	each		8	
		Catch Basin incl. 200mm dia. lead	each		6	
		Double Catch Basin incl. 200mm dia. lead	each		2	
		Oil and Water Separator System	L.S.		1	
	33 47 00	**Ponds and Reservoir**				
		Detention Pond	L.S.		1	
	33 49 00	**Storm Drainage Structures**				
		3.5m Wide Infiltration Ditch	lm		250	
		5m Wide Infiltration Gallery	lm		55	
		Subtotal Division 33 - Utilities				**$**

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Division	Section	Descriptions	Unit	Unit Price $	Quantity	Total $
41	**EQUIPMENT**					
	41 14 36	**Weigh Scale**				
		Weigh Scale Systm with Traffic Signals	LS		1	
				Subtotal - Equipment		**$**
	INDETERMINATE ITEMS					
	31 24 13	**Roadway Excavation, Embankment and Compaction**				
		Removal of Unsuitable Materials	cu m		50	
				Subtotal - Indeterminate Work		**$**
				Subtotal of all Divisions		**$**
				TOTAL		**$**

(Price Excludes GST)

ACTIVITY	Wk 2	Wk 4	Wk 6	Wk 8	Wk 10	Wk 12	Wk 14	Wk 16	Wk 18	Wk 20	Wk 22	Wk 24	Wk 26	Wk 28	Wk 30	Wk 32
Assumed Notice to Proceed	★															
																★

Tenderer's Initials_____

Appendix 4
COMPARABLE WORK EXPERIENCE
(See paragraph 5.3.5 of the Instructions to Tenderers - Part II)

Name: _____

Experience:

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

References: _____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

References: _____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

References: _____

Tenderer's Initials_____

Appendix 4
COMPARABLE WORK EXPERIENCE
(See paragraph 5.3.5 of the Instructions to Tenderers - Part II)

Project	Owner / Contact Name	Phone Number	Work Description	Value ($)

Tenderer's Initials_____

Appendix 5
SUBCONTRACTORS
(See paragraph 5.3.5 of the Instructions to Tenderers - Part II)

Tender Item	Trade	Subcontractor Name	Phone Number

Tenderer's Initials_____

(FOR USE WHEN UNIT PRICES FORM THE BASIS OF PAYMENT TO BE USED ONLY WITH THE GENERAL CONDITIONS AND OTHER STANDARD DOCUMENTS OF THE UNIT PRICE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.)

BETWEEN *OWNER* AND *CONTRACTOR*

This agreement made in duplicate this

_____ day of _____, 2017.

Contract Title: **MEADE CREEK RECYCLING FACILITY**

Reference No. **ES-016-17**

BETWEEN:

The **COWICHAN VALLEY REGIONAL DISTRICT**
175 Ingram Street
Duncan, BC V9L 1N8

(the "*Owner*")

AND:

_____

_____

_____
(NAME AND OFFICE ADDRESS OF CONTRACTOR)

(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* on or before ###, 2017., 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 The "*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

1.1.1 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 unit prices listed in the *Schedule of Quantities and Prices*; plus

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

1.1.3 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 thereunder 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, or by fax, or by pre-paid registered mail to the addresses as set out below:

The *Owner*:

COWICHAN VALLEY REGIONAL DISTRICT
175 Ingram Street
Duncan, BC V9L 1N8

Phone: **250. 746.2530**
Fax: **250.746.2543**
Attention: _____

The *Contractor*:

_____

_____

_____

Phone: _____
Fax: _____
Attention: _____

The *Contract Administrator*:

Kerr Wood Leidal Associates Ltd.
Elizabeth Lau, P.Eng.
201 – 3045 Douglas Street
Victoria BC V8T 4N2

Phone: **250-595-4223**
Email: **elau@kwl.ca**
Attention: **Elizabeth Lau, P.Eng.**

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

1.1.4 immediately upon delivery, if delivered by hand; or

1.1.5 immediately upon transmission if sent by fax and received in hard copy; or

1.1.6 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 assumes all risk that the fax is received in hard copy.

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:

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

_____
(Authorized Signatory)

_____
(Authorized Signatory)

Owner:

COWICHAN VALLEY REGIONAL DISTRICT
(Full Legal Name of Corporation, Partnership or Individual)

_____
(Authorized Signatory)

_____
(Authorized Signatory)

(INCLUDE IN LIST **ALL** DOCUMENTS INCLUDING, IF ANY, SUPPLEMENTARY GENERAL CONDITIONS, SUPPLEMENTARY SPECIFICATIONS, SUPPLEMENTARY STANDARD DETAIL DRAWINGS.)

Schedule 1
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", Platinum edition dated 2009. All sections of this publication are included in the *Contract Documents.*

8.1 Agreement, including all Schedules;

8.2 Supplementary General Conditions, Part I and Part II;

8.3 General Conditions*;

8.4 Supplementary Specifications, Part I, Part II and Part III;

8.5 Specifications*;

8.6 Supplementary Standard Detail Drawings, Part I and Part II

8.7 Standard Detail Drawings*;

8.8 Executed Form of Tender, including all Appendices;

8.9 *Contract Drawings* listed in Schedule 2 to the Agreement –"List of *Contract Drawings*";

8.10 Instructions to Tenderers - Part I;

8.11 Instructions to Tenderers - Part II*;

8.12 The following Addenda:

_____

_____

_____

_____

_____

(ADDENDA, IF ANY)

Schedule 2 - Schedule of Contract Drawings

(COMPLETE LISTING OF ALL DRAWINGS, PLANS AND SKETCHES WHICH ARE TO FORM A PART OF THE CONTRACT, OTHER THAN STANDARD DETAIL DRAWINGS AND SUPPLEMENTARY STANDARD DETAIL DRAWINGS).

Title	Drawing No.
Cover Sheet	G001
CIVIL	
Existing Site and Demolition Plan	C101
Site Layout	C102
Profile - Service Road Sta 0+000 To 0+270	C103
Profile - Service Road Sta 0+270 To Sta 0+432	C104
Site Grading Plan	C105
Site Grading - Wall Profiles	C106
Site Servicing Plan	C107
Plan Profile - Service Road Drainage	C108
Plan Profile - Pond Inlet 1 And Upper Pad	C109
Plan Profile - Sanitary Sewer	C110
Storage Pond - Plan and Profiles	C111
Storage Pond - Sections	C112
Signage and Pavement Marking Plan	C113
Cross Sections – Plan	C301
Cross Sections - Sections	C302
Details	C501
Details	C502
Details	C503
Details	C504
MECHANICAL	
Plumbing Floor Plans	M1.00
Specifications and Equipment Lists	M2.00
Main Floor and Section	M3.00

ELECTRICAL	
Electrical Site Plan	E01
Power and Lighting Layout and Details	E02
Recycling Building Electrical Power and Lighting	E03
Details	E04
ARCHITECTURAL	
Assemblies	A0.00
Site Plan	A1.00
Scale House Plans	A2.00
Recycling Building Slab and Foundation	A2.10
Recycling Building Plans	A2.11
Scale House Building Elevations	A3.00
Recycling Centre Elevations	A3.10
Scale House Building Sections	A4.00
Recycling Building Sections	A4.10
Plan Details	A5.00
Scale House Details	A5.01
Recycling Building Details	A5.10
Window and Door Schedules	A6.00
Scale House Millwork	A7.00
STRUCTURAL	
General Notes	S1.0
General Notes	S1.1
Recycling Building	S2.0
Scale House Plans and Sections	S2.1
Sections and Details	S3.0
Typical Detail	S3.1
Building Sections	S3.2

LANDSCAPING	
Planting	L1
Planting	L2
Landscape Irrigation	L3
Landscape Details	L4
Planting Specifications	L5
GEOTECHNICAL	
Site Plan - Existing Conditions	G100
Landfill closure Plan and Sections	G101
Details	G102

The following Supplemental Updates are MMCD issued updates. Contained within each MMCD issued Supplemental Update are a number of specific sections of the contract affected by changes. The specific sections providing change include the following:

1. Supplementary General Conditions
2. Supplementary Specifications
3. Supplementary Standard Details Drawings
4. Supplementary Form

A complete list of all the specific Supplementary General Conditions providing change complete with each change are detailed below. These specific sections, complete with each change, are to form part of the contract.

Detailed descriptions for each change are not included in this document however the detailed descriptions can be found on the MMCD website under Platinum Edition Documents. Bidder are deemed to have visited the MMCD website and have reviewed and understand the detailed descriptions.

Reference: MMCD Supplemental Update 2009 -11-19

Supplementary General Conditions

GC 7.1.3S	2009-007
GC 3.4.5S	2009-010

Reference: MMCD Supplemental Update 2010-03-25

Supplementary General Conditions

GC 2.2.4(i)S	2010-001
GC 4.6.2S	2010-002
GC 4.6.6S	2010-004
GC 9.4S	2010-005
GC 12.2.2S	2010-006
GC 13.9.1S	2010-007
GC 24.1.5S	2010-008

Reference: MMCD Supplemental Update 2010-05-18

GC 1.39.1S 2010-011 Notation about HST

Reference: MMCD Supplemental Update PVC C900 Pipe Specification Clarification

Letter **-** Thickened bell end defined and required

Reference: MMCD Supplemental Update 2011-08-04

Supplementary General Conditions

GC 7.1.3S	2011-009
GC 1.30S	2011-010
IT 17.1S	2011-011
IT 4S	2011-012
Section 3 6.5.1S	2011-013 Volume 1 - Users Guide
Section 3 6.5.1S	2011-014 [Electronic Edition] - Volume1 - Users Guide
Section 3 9.7.1S	2011-015 Volume 1 - Users Guide
Section 4 6.8.1S	2011-016 Volume 1 - Users Guide
33 11 01 – 2.2.2.2S	2011-017

Reference: MMCD Supplemental Update 2012-05-30

Supplementary General Conditions

GC 13.9.1(1)S	2012-001

Reference: MMCD Supplemental Update 2012-08-07

Supplementary General Conditions

GC 9.4.3	2012-023
GC 17.5.2.2	2012-024
GC 11.1.1 (4)	2012-025

Reference: MMCD Supplementary Update 2013-06-13

Supplementary General Conditions

GC 18.2.2	2013-01 (date noted as 2013-06-18)
GC 18.6.3(1)	2013-02 (date noted as 2013-06-18)
GC 24.1(2)	2013-04
GC 24.1(2)	2013-05
GC 24.1(5)	2013-06
GC 24.1.5	2013-07
GC 4.7.1	2013-19

Supplementary Form

Form 15	Statutory Declaration 2013-03

Reference: MMCD Supplementary Update 2014-02-28

Supplementary General Conditions

GC 1.21	2014-01
GC 6.3.2	2014-02
GC 6.3.4	2014-03
GC 4.11.2	2014-06

Reference: MMCD Supplementary Update 2014-07-15

Supplementary General Conditions

No Listing

Reference: MMCD Supplemental Update 2014-09-19

Supplementary General Conditions

No Listing

Reference: MMCD Supplemental Update 2015-11-02

Supplementary General Conditions

No Listing

LAST REVISED APRIL 20, 2016

Supplementary Specification:	**GC 2.2.4S**		
Affected Document(s):	Volume II	**Change Type:**	Revised
Section:	General Conditions	**Reference:**	GC 2.0
Change Summary:			
Currently:	If there is any inconsistency or conflict between the provisions of the C*ontract Documents,* then: (1) 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) 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 Documents		
Should Be:	If there is any inconsistency or conflict between the provisions of the C*ontract Documents,* then: (1) 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 i. Part II – Project Specific ii. Part I – Issued by MMCD (d) General Conditions (e) Supplementary Specifications i. Part III – Payment ii. Part II – Project Specific iii. Part I – Issued by MMCD (f) Specifications (g) Drawings listed in Schedule 2 to the Agreement (h) Supplementary Standard Detail Drawings i. Part II – Project Specific ii. Part I – Issued by MMCD (i) Standard Detail Drawings (j) Executed Form of Tender (k) Instructions to Tenderers (l) All other Contract Documents		

Supplementary Specification:	**GC 4.3.7S Pre-Work Site Inspection**		
Affected Document(s):	Volume II	**Change Type:**	New
Section:	General Conditions	**Reference:**	GC 4.3 - Protection of Work, Property and the Public
Change Summary:	Add in Pre Work Site Inspection		
Currently:	Not Applicable		
Should Be:	**4.3.7S** Prior to mobilization and commencement of any construction the Contractor shall: (1) undertake a photographic/video record inspection of the project site with specific emphasis on the condition of the creek, roads, adjacent properties and infrastructure. (2) provide a complete copy of the photographic/video record to the Contract Administrator after the inspection which shall become the record of condition of the project prior to construction. (3) undertake the photographic/video record inspection with the Contract Administrator's representative present		

Supplementary Specification:	**GC 4.12.11S – Tests and Inspections**		
Affected Document(s):	Volume II	**Affected Document(s):**	Volume II
Section:	General Conditions	**Section:**	General Conditions
Change Summary:	Add in testing and inspecting requirements for Quality Control by the Contractor		
Currently:	Not Applicable		
Should Be:	**4.12.11S** (1) All testing and inspections as part of Quality Control by the Contractor shall meet the bylaw requirements of the Owner or Regulatory Agency where the Works are undertaken in terms of type of test, frequency and number of tests required. (2) Testing shall be undertaken by an accredited materials testing company customarily undertaking such work. Testing will be overseen by a P.Eng. registered in BC and shall be an employee of the materials testing company. (3) For placement of gravels, the contractor shall provide tests such as: (a) Prior to delivery of gravels to the Work Place the Contractor shall select		

a pit/gravel source and provide the Contract Administrator a current copy (no older than 2 days) of the sieve results, detailing pit name/location/ownership and materials selected for use under the Contract

(b) Ongoing sieve analysis of materials as delivered to the work site at a frequency meeting the Owners minimum requirements.

(c) Compaction testing at the work site including testing of each lift and at a frequency meeting the Owners or Regulatory Agency's minimum requirements.

(4) If the Owner or Regulatory agency does not specifically detail tests, frequency and number, then the following as minimum shall apply:

For subgrade construction:

- Moisture - density relationship (Standard Proctor) - ASTM D698; - one test for each soil type incorporated into the subgrade.
- Moisture and density tests:
  - Trench backfill - one test per lift per *150* lineal metres of trench and one test per lift around manholes, valves, catch basins, etc.
  - Subgrade construction and preparation - three tests per *300* lineal metres of road per lift, to include dry density and moisture content.
  - Engineered fill placement and preparation - three tests per *300* lineal metres of road per lift, to include dry density and moisture content.

For sub-base and base course construction:
(including subgrade enhancement using sub-base material)

- Gradation analysis - one test per 500 m3 or 1100 tonnes of material delivered to the site with a minimum of 1 test per day of placement.
- Moisture - density relationship (Standard Proctor) - ASTM D698; - one test per
- Compaction testing - three tests per *150* lineal metres of road per lift, to include dry density and moisture content.

For hot mix asphalt pavement production and placement:

- Asphalt content and gradation of extracted aggregate - one test per production period, where a production period is defined as that part of the working day either before or after 12:00 Noon local time. In a full working day, the times of test shall be not less than two hours apart.
- Marshall analysis of hot mix asphalt - one per work week per mix type; additional tests shall be performed when any of the specified Marshall properties are not met in the initial analysis.
- Asphalt cement tests - one complete analysis per project or one every two work weeks, whichever is the lesser in timing; plus, one penetration (ASTM D5) test per work week from product obtained from the Contractor's asphalt cement storage tanks.
- Density, air voids and pavement thickness tests - 3 cores (100 mm dia.) per *1500* m2 of paved area per lift, *with a minimum of 3 cores for each production day.* Air void tests shall be performed in accordance with ASTM D3203.

For concrete production and placement:

	• All test results shall be submitted to the Contract Administrator.

Supplementary Specification:	**GC 13.9S Liquidated Damages for Late Completion**		
Affected Document(s):	Volume II	**Change Type:**	New
Section:	General Conditions	**Reference:**	GC 13.9 – Liquidated Damages for Late Completion
Change Summary:	Add in additional costs incurred from extension of land lease for the temporary recycling facility		
Currently:	Not Applicable		
Should Be:	**13.9.1(3)S** Increased costs incurred by Owner for the extension of land lease to continue operation of the temporary recycling facility.		

Supplementary Specification:	**GC 18.2.3S Supporting Documentation**		
Affected Document(s):	Volume II	**Change Type:**	New
Section:	General Conditions	**Reference:**	GC 18.2 – Supporting Documentation
Change Summary:	Add in Updated Monthly Construction Schedule		
Currently:	Not Applicable		
Should Be:	**18.2.3S** The Contractor shall provide to the Contract Administrator an updated Baseline Construction Schedule.		

Supplementary Specification:	**GC 24.1.1(2)S – Required Insurance**		
Affected Document(s):	Volume II	**Change Type:**	New
Section:	General Conditions	**Reference:**	GC 24.1
Change Summary:	Amend the following sentence under 24.1.1(2) as follows:		
Currently:	**24.1.1(2)** …….. "The policy shall include the *Owner* and the *Contract Administrator* as additional insured's with cross liability clause." ……..……		
Should Be:	**24.1.1(2)S** …….. "The policy shall include the *Owner, Contract Administrator and Consultants* as additional insured's with cross liability clause."		

	……

Supplementary Specification:	**GC 24.1.1(3)S - Required Insurance**		
Affected Document(s):	Volume II	**Change Type:**	New
Section:	General Conditions	**Reference:**	GC 24.1
Change Summary:	Amend the following sentence under 24.1.1(3) as follows:		
Currently:	**24.1.1(3)** "……..Coverage to include the *Owner* as an additional insured.		
Should Be:	**24.1.1(3)S** "……..Coverage to include the *Owner and Contract Administrator and Consultants* as additional insured's."		

The following Supplemental Updates are MMCD issued updates. Contained within each MMCD issued Supplemental Update are a number of specific sections of the contract affected by changes. The specific sections providing change include the following:

1. Supplementary General Conditions
2. Supplementary Specifications
3. Supplementary Standard Details Drawings
4. Supplementary Form

A complete list of all the Supplementary Specifications specific sections providing change complete with each change are detailed below. These specific sections, complete with each change, are to form part of the contract.

Detailed descriptions for each change are not included in this document however the detailed descriptions can be found on the MMCD website under Platinum Edition Documents. Bidder are deemed to have visited the MMCD website and have reviewed and understand the detailed descriptions.

Reference: MMCD Supplemental Update 2009 -11-19

Supplementary Specifications

31 22 01 - 3.3.1S -	2009-001
31 37 10 - 2.1.1.1.1S -	2009-002
32 17 23 - 2.1.7S -	2009-003
32 31 13 - 3.3S; 3.4S; 3.5S -	2009-004
~~*33 30 01 - 1.6.5S -*~~	~~*2009-005*~~ *PAYMENT not applicable*
33 34 01 - 3.15.2S -	2009-006
03 30 20 - 2.1.5.1S -	2009-008
33 30 01 - 2.1.3.4S -	2009-009
~~*33 11 01 - 1.8.14S -*~~	~~*2009-011*~~ *PAYMENT not applicable*
~~*33 11 01 1.8.13S -*~~	~~*2009-012*~~ *PAYMENT not applicable*

Reference: MMCD Supplemental Update 2010-03-25

Supplementary Specifications

Concordance Update	
Schedule 17.5.3S -	2010-003
01 55 00 - 1.4.10.3S -	2010-009
01 57 01 - 1.2.2.2S -	2010-010

Reference: MMCD Supplemental Update PVC C900 Pipe Specification Clarification

Letter **-** Thickened bell end defined and required

Reference: MMCD Supplemental Update 2011-08-04

Supplementary Specifications

31 05 17 – 2.7.1S –	2011-001
32 91 19 – 3.5.4S –	2011-002
32 92 19 – 3.3.1S –	2011-004
32 92 20 – 3.3.5S –	2011-004
32 93 01 – 3.11.2S –	2011-005
32 93 01 – 3.11.3S –	2011-006
32 92 20 – 3.8.1S –	2011-007
32 92 20 – 3.8.2S –	2011-008
IT 17.1S -	2011-011
IT 4S -	2011-012
Section 3 6.5.1S -	*2011-013* ***Volume 1 - Users Guide***
Section 3 6.5.1S	*[Electronic Edition]- 2011-014* ***Volume1 - Users Guide***
Section 3 9.7.1S -	*2011-015* ***Volume 1 - Users Guide***
Section 4 6.8.1S -	*2011-016* ***Volume 1 - Users Guide***
33 11 01 – 2.2.2.2S -	2011-017

Reference: MMCD Supplemental Update 2011-08-08

Supplementary Specifications

33 49 23S –	2011-018

Reference: MMCD Supplemental Update 2012-05-30

Reference: MMCD Supplemental Update 2012-06-08

Supplementary General Conditions (NOTE: MMCD has detailed these items as GCs however they are Supplementary Specifications. Remove GC from the start of each section number.

i.e.: GC 33 01 30.1-2012-003 Becomes 33 01 30.1-2012-003

GC 33 01 30.1 -	2012-003
GC 33 01 30.1 -	2012-004
GC 33 01 30.1 -	2012-005
GC 33 01 30.1 -	2012-006
~~*GC 33 01 30.1 -*~~	~~*2012-007*~~ *Not applicable.*
GC 32 17 23 -	2012-008
GC 32 17 23 -	2012-009
GC 01 42 00 -	2012-010
GC 03 30 53 -	2012-011
GC 03 30 53 -	2012-012
GC 31 23 23 -	2012-013
GC 31 23 23 -	2012-014
GC 32 13 13 -	2012-015
GC 32 13 16.1-	2012-016
GC 32 13 16.1-	2012-017
GC 33 11 01-	2012-018
GC 33 44 01-	2012-019

Supplementary Specifications

01 42 00 – 1.1.26 -	2012-002

Reference: MMCD Supplementary Update 2013-06-13

Supplementary Form

Form 15 – Statutory Declaration 2013-03

Reference: MMCD Supplemental Update 2014-02-28

Supplementary Specifications

33 11 01	2014-04
33 11 01	2014-05

(NOTE: MMCD has detailed the following item as GC however it is a Supplementary Specifications. Remove GC from the start of each section number.

~~GC~~ 33 44 01	2014-07
~~GC 33 44 01~~	~~2014-08~~ *PAYMENT not applicable*
~~GC 33 44 01~~	~~2014-09~~ *PAYMENT not applicable*

Reference: MMCD Supplemental Update 2014-07-15

Supplementary Specifications

33 44 01	2014-10
33 44 01	2014-11
33 44 01	2014-12
33 44 01	2014-13
33 44 01	2014-14
33 44 01	2014-15

Reference: MMCD Supplemental Update 2014-09-19

Supplementary Specifications

33 11 01	2014-16
33 11 01	2014-17

Reference: MMCD Supplemental Update 2015-11-02

Supplementary Specifications

31 05 17	2015-01
31 05 17	2015-02
31 05 17	2015-03
31 23 01	2015-04
31 24 13	2015-05
32 11 16	2015-06

LAST REVISED APRIL 20, 2016

The following Supplemental Updates are MMCD issued updates. Contained within each MMCD issued Supplemental Update are a number of specific sections of the contract affected by changes. The specific sections providing change include the following:

1. Supplementary General Conditions
2. Supplementary Specifications
3. Supplementary Standard Details Drawings
4. Supplementary Form

A complete list of all the Supplementary Standard Details Drawings specific sections providing change complete with each change are detailed below. These specific sections, complete with each change, are to form part of the contract.

Detailed descriptions for each change are not included in this document however the detailed descriptions can be found on the MMCD website under Platinum Edition Documents. Bidder are deemed to have visited the MMCD website and have reviewed and understand the detailed descriptions.

Reference: MMCD Supplemental Update 2012-08-07

Standard Details Drawings

S6 -	2012-022

Reference: MMCD Supplementary Update 2013-06-13

Supplementary Standard Details Drawings

Standard Details Drawings -	2013-08
Standard Details Drawings -	2013-09
Standard Details Drawings -	2013-10
Standard Details Drawings -	2013-11
Standard Details Drawings -	2013-12
Standard Details Drawings -	2013-13
Standard Details Drawings -	2013-14
Standard Details Drawings -	2013-15
Standard Details Drawings -	2013-16
Standard Details Drawings -	2013-17
Standard Details Drawings -	2013-18

The following Supplemental Updates are project specific updates. Contained within each project specific Supplemental Update are a number of specific sections of the contract affected by changes. The specific sections providing change include the following:

1. Supplementary Specifications

A complete list of all the Supplementary Specifications specific sections providing change complete with each change are detailed below. These specific sections, complete with each change, are to form part of the contract.

Supplementary Specification:	**01 11 00S – Summary of Work**		
Affected Document(s):	Volume II	Change Type:	New Section
Section:	01 11 00	Reference:	New Section
Change Summary:	Add in new Supplementary Specification Section detailing project background, scope of work, and details related to construction of the waste transfer station		
Currently:	Not applicable		
Should Be:	Refer to Supplementary Specification Section 01 11 00S		

Supplementary Specification:	**01 33 01 – Project Record Documents-1.7.5S**		
Affected Document(s):	Volume II	Change Type:	New Item
Section:	01 33 01	Reference:	1.7 Recording Actual Site Conditions
Change Summary:	Add in requirement for digital record survey		
Currently:	Not Applicable		
Should Be:	**1.7.5S** .1 In addition to the items in 1.7.2 a digital record survey of infrastructure ultimately installed shall be maintained by the contractor and submitted to the Contract Administrator no later than Substantial Performance. .2 The submission to the Contract Administrator shall be in a digital format readily transferable into AutoCAD, and as accepted by the Contract Administrator. .3 As part of the record survey the contractor shall provide all buried changes or improvements including invert elevations, locations of all structures, pipes, rock horizons found/blasted, fittings, appurtenances, mitres, manholes, service connections, valves, fittings, and tie-ins. .4 As part of the record survey the contractor shall provide all surface changes or improvements including, landscaping, road changes or improvements, driveway changes or improvements, utility changes or improvements, relocated or new signage, relocated or new fencing, road markings and all other relocated or new traffic safety devices.		

Supplementary Specification:	**01 53 01 – Temporary Facility-1.10S**		
Affected Document(s):	Volume II	Change Type:	New Item
Section:	01 53 01	Reference:	1.0 GENERAL
Change Summary:	Add in requirement for provision of water facilities during construction		
Currently:	Not Applicable		
Should Be:	**1.10S – Water Facilities** .1 The Contractor shall protect existing well from contamination and damages during construction. .2 The existing well will not be available for construction use. The Contractor shall make provision to provide the water required for the construction activities.		

Supplementary Specification:	**01 57 01 – Environmental Protection-1.2.4S**		
Affected Document(s):	Volume II	Change Type:	New Item
Section:	01 57 01	Reference:	1.2 Temporary Erosion and Sediment Controls
Change Summary:	Add in new subsection 1.2.4s Drainage into neighbouring property		
Currently:	Not Applicable		
Should Be:	**1.2.4S** The natural drainage pattern of the site is flowing westward to the adjacent property towards Meade Creek. Contractor shall provide temporary stormwater management and sediment control plan to limit the stormwater flow generated from the site during the construction period to current quantity and quality.		

Supplementary Specification:	**Section 01 60 01 – Description of Payment Items**		
Affected Document(s):	Volume II	Change Type:	New Section
Section:	01 60 01	Reference:	New Section
Change Summary:	Add in new Supplementary Specification Section detailing general description of payment items outlined in Schedule 1 of the Form of Tender		
Currently:	Not applicable		
Should Be:	Refer to Supplementary Specification Part III Payment		

Supplementary Specification:	**SECTION – DIVISION 02 EXISTING CONDITIONS**		
Affected Document(s):	N/A	Change Type:	New Section
Section:	Section 02 41 16 Section 02 61 00	Reference:	New Section
Change Summary:	Add in Division 02 EXISTING CONDITIONS		
Currently:	Not Applicable		
Should Be:	This shall include all specification sections included in Division 2, as attached to the Contract Specifications and shall include: SECTION 02 41 16 DEMOLITION SECTION 02 61 00 LANDFILL CLOSURE		

Supplementary Specification:	**SECTION – DIVISION 26 ELECTRICAL**		
Affected Document(s):	N/A	Change Type:	New Specification Section
Section:	DIVISION 26	Reference:	New Section
Change Summary:	Add in Division 26 ELECTRICAL SPECIFCATIONS		
Currently:	Not Applicable		
Should Be:	This shall include all specification sections included in Division 26, as attached to the Contract Specifications and shall include: SECTION 26 05 01 – ELECTRICAL GENERAL REQUIREMENTS SECTION 26 05 28 – GROUNDING - SECONDARY SECTION 26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS SECTION 26 10 00 – ELECTRICAL SERVICE ENTRANCE AND DISTRIBUTION SECTION 26 24 17 – PANELBOARDS SECTION 26 27 26 – WIRING DEVICES SECTION 26 50 00 – LIGHTING SECTION 27 10 00 – STRUCTURED CABLING SECTION 27 30 00 – VOICE COMMUNICATIONS SECTION 28 20 00 – VIDEO SURVEILLANCE SECTION 28 30 00 – SECURITY DETECTION, ALARM AND MONITORING		

Supplementary Specification:	**SECTION – DIVISION 21 FIRE SUPPRESSION**		
Affected Document(s):	N/A	Change Type:	New Specification Section
Section:	21 41 26	Reference:	New Section
Change Summary:	Add in Division 21 FIRE SUPPRESSION		
Currently:	Not Applicable		
Should Be:	This shall include all specification sections included in Division 21, as attached to the Contract Specifications and shall include: SECTION 21 41 26 UNDERGROUND FIRE SUPPRESSION TANKS		

Supplementary Specification:	**SECTION – DIVISION 41 EQUIPMENT**		
Affected Document(s):	N/A	Change Type:	New Specification Section
Section:	41 14 36	Reference:	New Section
Change Summary:	Add in Division 41 EQUIPMENT		
Currently:	Not Applicable		
Should Be:	This shall include all specification sections included in Division 41, as attached to the Contract Specifications and shall include: SECTION 41 14 36 WEIGH SCALES		

DESCRIPTION OF PAYMENT ITEMS

The basis of measurement and payment for items included in the Form of Tender Appendix 1- Schedule of Quantities and Prices are described below. The specific payment descriptions below supersede the payment clauses in the MMCD Platinum Edition Volume II and any MMCD issued Supplemental Updates that may detail payment clauses.

The descriptions of work to be done under Form of Tender - Appendix 1- Schedule of Quantities and Prices are general descriptions of the work only in order to break down and assess the Tender Price. These descriptions are not intended to include all details of requirements and responsibilities of the Contractor to complete the Works in accordance with the Contract. Payment for work not shown specifically in Form of Tender Appendix 1 - Schedule of Quantities and Prices but required to complete the Works will be considered incidental. It is the Tenderer's responsibility to ensure that the Tender Sum submitted with his Tender is sufficient to complete all of the Works based upon the whole of the Contract Documents.

The price bid for each item shall be full compensation for all labour, equipment, materials and incidentals necessary to complete the supply, installation and construction of each item in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for Lump Sum prices as shown in the Form of Tender Appendix A - Schedule of Quantities and Prices, unless specifically detailed otherwise in the Description of Payment Items, will be based on the Contract Administrator's estimated percentage of the work completed. As the project nears Substantial Performance, payment will only be made to an amount sufficient to retain 200% of the estimated deficiency value.

MEASUREMENT AND PAYMENT

The unit price bid for each item shall be full compensation for all labour, equipment, materials, cut and waste, working clearance, testing, incidentals and miscellaneous materials, fitting appurtenances necessary to complete the supply, installation and construction of each item as specified to the lines, grades and cross-section in accordance with the Contract Documents, Specifications, Drawings, Standard Detail Drawings, Instructions to Tenderers and as directed by the Contract Administrator. Costs of bonds, insurance, Workers Compensation contribution, superintendence, overheads, profits and other incidentals are deemed to have been included in pay items of Schedule of Quantities and Prices. No payment will be made for unauthorized work or work beyond limits shown on Contract Drawings.

Where as builts, measurements, survey information, test results and other information specified are required from the contractor and is outstanding at the date of request for Substantial Performance, the Works shall be considered incomplete and not ready for use or purpose intended. This will delay Substantial Performance.

If a Lump Sum Payment is shown in Appendix A - Schedule of Quantities and Prices, unless specifically detailed otherwise in the Description of Payment Items, payment shall be based on the Contract Administrator's estimated percentage of the Contract completed, rounded to the nearest five (5) percent.

The following shall apply with all Lump Sum Payments:

a. Payment will be made up to a maximum of 85% of the Lump Sum value prior to Substantial Performance.

b. At determination of Substantial Performance the remaining Lump Sum payable will be assessed according to General Conditions 18.6 – Substantial Performance.

DIVISION 1 - GENERAL REQUIREMENTS

01 33 01 – Project Record Documents

Payment for all work performed under this section will be at the lump sum rate as shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 42 00 – Reference Specifications – Site and Infrastructure

Payment for all work performed under this section will incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 51 01 – Temporary Utilities and Lighting

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 52 01 – Temporary Structures

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 53 01 – Temporary Facilities

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 55 00 – Traffic Control, Vehicle Access and Parking

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 57 01 - Environmental Protection

Payment for all work performed under this section will be at a lump sum rate as shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 58 01 – Project Identification

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

01 71 13 – Mobilization and Demobilization

Payment for mobilization and demobilization shall be made at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices. Fifty percent (50%) of the lump sum price will be paid on the first progress payment certificate due after the Contractor has established the operation and facilities specified. Another 25 % will be paid upon Substantial Performance of the contract and the remaining 25% will be paid upon Total Performance of the contract including removal of equipment and cleanup of the work areas to the satisfaction of the Contract Administrator. Total lump sum price shall not exceed 2% of the total contract price.

GC – Bonding and Insurance

Payment for bonding and insurance shall be made at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices. Payment will be made at the lump sum price tendered in the Schedule of Quantities and prices on the first progress payment subsequent to submission of

documentation of Bonding and Insurance. Total lump sum price shall not exceed 1% of the total contract price.

DIVISION 02 – EXISTING CONDITIONS\

02 41 00 –Demolition

1. Site Demolition

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the demolition and removal of all existing surface structures located on site including concrete pads, retaining walls, asphalt pavement, fences and gates, concrete barriers, water and sewer pipes, septic field and tank in accordance with the Contract Documents, Contract Drawings and as directed by the Contract Administrator. This item shall also include separating and diverting any salvageable materials, removal of the demolished structures and materials to the approved disposal sites and depositing the unassembled weigh scale to the CVRD facility. The tendered price shall include all costs associated to secure the necessary permit and approval from the applicable authorities.

Payment for all work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

2. Building Demolition

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the demolition of existing buildings, salvaging any materials of value and removal of all demolished materials and deposited at approved disposal sites in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. The tendered price shall include all costs associated to secure the necessary permit and approval from the applicable authorities.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

3. Decommission and Removal of Existing Weigh Scale

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to decommission the existing weigh scale and removal of wiring, junction boxes, electrical components and structural members in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. The lump sum bid price shall also include loading, transporting and unloading the unassembled weigh scale to the CVRD Bings Creek Recycling Centre at 3900 Drinkwater Road, Duncan.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

4. Decommission Existing Septic System

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to locate and decommission the existing septic system, pump out and empty the existing tank and demolish in place, backfill and removal of all appurtenances in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

5. Ash Residuals Excavation and Relocation

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the excavation of ash residuals from stockpiles Ash-2 and Ash-3 and relocation and

placement at Stockpile Ash-3, rough grading and compaction of ash residuals in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Quantities will be based on a comparison between the soil surface after completion of stripping as determined by field surveys, and the bottom of the excavated ash stratum.

Quantities will be based on in-situ volumes with no factors for swelling.

6. Landfill Cap

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the landfill cap including granular materials, geosynthetic clay liner and topsoil over the compacted ash residue in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

Measurement for the landfill cap will be made over the surface of the capped Ash stockpile area.

7. Landfill Cap Tie In

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of granular materials and geosynthetic clay liner to tie the landfill cap to the unlined infiltration ditch in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

Measurement for the landfill cap tie in will be made horizontally along the unlined infiltration ditch.

8. Abandon Existing Monitoring Wells

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for abandonment of existing monitoring wells in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

9. New Monitoring Wells

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for installation of new monitoring wells in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

DIVISION 03 - CONCRETE

03 20 01 – Concrete Reinforcement

1. Concrete Reinforcement

Payment for all work performed under this section will be incidental to payment for work described in other sections unless specifically shown otherwise in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

03 30 53 - Cast in Place Concrete

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of cast in place concrete of the structure type indicated in the Form of Tender Appendix 1 – Schedule of Quantities and Prices in accordance with the in accordance with the Contract Documents, Contract Drawings and as directed by the Contract Administrator.

Payment for work performed under this Section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

1. 200mm Thick Concrete Pad

This item shall include, but not necessarily be limited to:

- Supply and installation of all form work, reinforcement, curing, mortar, drain holes, footings, construction/expansion joints, bond breaks, finishing, form removal and cleanup.
- All other work, materials and incidentals necessary to complete the installation as shown on Contract Documents and as specified in this Section.
- Payment for excavation, supply and placement of fills and subgrade preparation will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- Payment for granular base, granular sub-base and drain rock will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- Quantities will be based on the units listed in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- If the Form of Tender Appendix 1 – Schedule of Quantities and Prices is based on dimensions, then the volume quantities will be calculated from actual dimensions measured in the field up to but not exceeding the neat line dimensions calculated from the components' design dimensions.

2. 150mm Thick Concrete Walkway

This item shall include, but not necessarily be limited to:

- Supply and installation of all form work, reinforcement, curing, mortar, drain holes, footings, construction/expansion joints, bond breaks, finishing, form removal and cleanup.
- All other work, materials and incidentals necessary to complete the installation as shown on Contract Documents and as specified in this Section.
- Payment for excavation, supply and placement of fills and subgrade preparation will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- Payment for granular base, granular sub-base and drain rock will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- Quantities will be based on the units listed in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.
- If the Form of Tender Appendix 1 – Schedule of Quantities and Prices is based on dimensions, then the volume quantities will be calculated from actual dimensions measured in the field up to but not exceeding the neat line dimensions calculated from the components' design dimensions.

3. Reinforced Lock Block Wall

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for excavation, subgrade preparation, supply and installation of reinforced concrete lock block wall and geogrid in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment for excavation, subgrade preparation, supply and placement of granular base, geogrid reinforcement and retained structural fill will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.

Payment for work performed under this Section will be at the price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices

Measurement for payment will be along the face of the lock block retaining wall.

4. Non Mountable Concrete Curb

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for supply and installation of bollards indicated in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement will be based on horizontal length along the ground surface.

DIVISION 13 – SPECIAL CONSTRUCTION

ARCHITECTURAL AND STRUCTURAL

1. Scale House Complete

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of all architectural and structural components of type indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to:

- Supply and install of foundation concrete as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install walls and frames as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install windows and doors as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install thermal and moisture protection including but not be limited to, wall and ceiling insulation treatments, building penetrations, vapour barriers, roof membranes, and flashing.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the millwork.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the interior finishes.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the roof.as outlined in the Drawings and Specifications including testing and commissioning.

- Supply and install miscellaneous architectural finishes including perforated metal panels, gypsum wall board, tile and associated system components as outlined in the Drawings and Specifications including testing and commissioning.

Payment for work performed under this Section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

2. Recycling Building Complete

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of all architectural and structural components of type indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to:

- Supply and install of foundation concrete as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install walls and frames as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install windows and doors as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install thermal and moisture protection including but not be limited to, wall and ceiling insulation treatments, building penetrations, vapour barriers, roof membranes, and flashing.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the millwork.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the interior finishes.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install the roof.as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and install miscellaneous architectural finishes including perforated metal panels, gypsum wall board, tile and associated system components as outlined in the Drawings and Specifications including testing and commissioning.

Payment for work performed under this Section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

1. Scale House HVAC

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the heating, ventilation and air condition system indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. This item shall include ducting, duct supports, acoustic duct lining, filters, louvers, dampers, registers, grilles, fans, testing, commissioning and all other associated items.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

2. Recycling Building HVAC

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the heating, ventilation and air condition system indicated for the Recycling Building in accordance with the Contract Documents, Contract Drawings, and as directed

by the Contract Administrator. This item shall include ducting, duct supports, acoustic duct lining, filters, louvers, dampers, registers, grilles, fans, testing, commissioning and all other associated items.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

3. Scale House Plumbing

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the plumbing system indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

4. Recycling Building Plumbing

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the plumbing indicated for the Recycling Building in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

SIGNAGE

1. Entrance Sign

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the entrance sign and concrete foundation in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

2. Wayfinding Sign

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the entrance sign and concrete foundation in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

3. Site Traffic Signs and Posts

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the traffic sign, post, fastening and concrete base in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be based on each sign and post and base installed.

4. Outdoor Product Sign

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the outdoor product sign and post in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be based on each sign and post installed.

5. Indoor Product Sign

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of the indoor product sign, post and portable concrete base in

accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.

Payment will be based on each sign, post and based installed.

DIVISION 21 – FIRE SUPPRESSION

21 31 26 - Underground Fire Suppression Tank

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of a complete underground storage tank of the type in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. Works shall include foundation preparation, foundation, piping, instrumentation & controls, storage tank, concrete pedestal, sealed shop drawings, disinfection, warranty, and commissioning & testing.

Payment for work performed under this section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

DIVISION 26 - ELECTRICAL

1. Power Supply

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation on site power supply system in accordance with the Contract Documents, Contract Drawings and as directed by the Contract Administrator. Works shall include relocating existing pole, supply and install meter base, distribution equipment and coordination with BC Hydro to provide electrical service to the site.

Payment for work performed under this section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

2. Scale House Electrical

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of all electrical components of type indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to:

- Supply and install power distribution to equipment as outlined in the Drawings and Specifications including testing and commissioning.
- Supply and installation of interior, exterior and emergency lighting system components, occupancy sensors, switches, receptacles, building wiring, hand dryers and other bathroom electrical as outlined in the Drawings and Specifications including testing and commissioning.

Payment for work performed under this Section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

3. Recycling Building Electrical

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of all electrical components of type indicated for the Scale House in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to:

- Supply and install power distribution to equipment as outlined in the Drawings and Specifications including testing and commissioning.

- Supply and installation of interior, exterior and emergency lighting system components, occupancy sensors, switches, receptacles, building wiring, hand dryers and other bathroom electrical as outlined in the Drawings and Specifications including testing and commissioning.

Payment for work performed under this Section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

4. Site Lighting

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for the supply and installation of of site lighting in accordance with the Contract Documents, Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator. Work shall include supply and install of light fixtures, bases, poles, pole bases, conduits, power feeds and all other associated work required to complete the site lighting as detailed in the Contract Drawings and Specifications.

Payment for work performed under this Section will be incidental to the lump sum price shown in Division 13 of the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Payment for excavation, disposal of waste, supply and placement of specified granular materials including bedding and backfill, finish grading and all other associated work required to accommodate the lighting construction under this Contract will be considered incidental unless specifically listed elsewhere in the Form of Tender Appendix 1 – Schedule of Quantities and Prices.

5. Buried Conduit and Cables

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to supply and install buried conduit, cable, conductors and associated items in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator and including testing and commissioning.

Payment for work performed under this Section will be incidental to the linear meter price shown in Division 13 of the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

6. Closed Circuit Monitoring System

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to supply and install CCTV system and associated items in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator and including testing and commissioning.

Payment for work performed under this Section will be incidental to the lump sum price shown in Division 13 of the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

7. Intercom System

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to supply and install an intercom system and associated items in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator and including testing and commissioning.

Payment for work performed under this Section will be incidental to the lump sum price shown in Division 13 of the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

DIVISION 31 - EARTH WORKS

31 11 01 - Clearing and Grubbing

1. Clearing and Grubbing - Site

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the clearing and grubbing of the site outside the ash stockpile areas indicated in the Drawings in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the square meter price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

This item shall include, but not necessarily be limited to, removal of all branches, stumps, timber, brush and vegetation and disposal at an approved site.

Measurement for this item will be made over the surface of the cleared and grubbed area.

2. Clearing – Ash Stockpiles

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the clearing of the ash stockpile areas indicated in the Drawings in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the square meter price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

This item shall include, but not necessarily be limited to, removal of all branches, shrubs, stumps and timber and disposal at an approved site.

Measurement for this item will be made over the surface of the cleared and grubbed area.

31 22 01 - Site Grading

1. Strip Topsoil - Site

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete site grading in accordance with the Contract Documents and as directed by the Contract Administrator.

This item shall include, but not necessarily be limited to, excavation, loading, hauling, and stockpiling on-site at locations approved by the Contract Administrator.

Payment for work performed under this section will be at cubic meter prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement for Quantities will be based on a comparison between the original common soil surface as determined by field surveys, and the bottom of the stripped topsoil.

31 24 13 - Roadway Excavation, Embankment and Compaction

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for roadway excavation, embankment and compaction of the type indicated in accordance with the Contract Documents and as directed by the Contract Administrator. Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Limitations:

- Payment for clearing and grubbing will be made under pay item 31 11 01 - Clearing and Grubbing.

- Payment for topsoil stripping including stockpiling will be made under pay item 31 22 01 - Site Grading.
- No payment will be made for:
    - Extra handling of windrowed materials blended on embankment slopes.
    - Removal and correction of soft or unstable material put in place by Contractor.
    - All costs incurred as a result of unauthorized excavation beyond neat lines or limits of excavation shown on Standard Detail Drawings, or, where applicable, Contract Drawings including remedial backfilling will be the Contractor's responsibility.

1. Common Excavation

This item shall include, but not necessarily be limited to:

- excavation of common soil below top soil stripping to approved subgrade,
- compaction and preparation of subgrade
- proof roll compaction of subgrade at fill locations,
- onsite redistribution of excavated materials at designated fill locations to design elevations and grades, and
- compaction of redistributed materials.

Measurement of Quantities will be based on a comparison between the original common soil surface as determined by field surveys, and the bottom of the common soil stratum up to but not exceeding the design grade for the common soil.

Quantities will be based on in-situ volumes with no factors for swell.

2. Import Fill

This item shall include, but not necessarily be limited to import and compaction of pit run to design grades at base of SGSB.

Measurement will be based on loose truck box volumes.

DIVISION 32 - ROADS AND SITE IMPROVEMENTS

32 11 16.1 - Granular Sub-Base

1. 200mm Thick 75 mm Minus Select Granular Sub-Base (SGSB)

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for supply and installation of specified granular sub-base to the lines, grades and cross-section in accordance with the Contract Documents, Drawings and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to supply, placement, adjustment of moisture content, compaction, and grading.

Limit of payment for granular sub-base will be placed to neat lines, to thickness specified, as per the Contract Drawings.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement for quantities will be for the area placed to neat lines, to thickness specified as per the Contract Drawings.

32 11 23 - Granular Base

1. 150mm Thick 19 mm Minus Crushed Base

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for supply and installation of specified granular base to the neat lines, grades and cross sections in accordance with the Contract Documents, Drawings and as directed by the Contract Administrator. This item shall include, but not necessarily be limited to supply, placement, adjustment of moisture content, compaction, and grading.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement for quantities will be for the area placed to neat lines, to thickness specified as per the Contract Drawings.

32 12 16 - Hot Mix Asphalt Concrete Paving

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for hot-mix asphalt concrete paving of the type indicated in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Limitations:

- No payment will be made until all test results have been submitted by the contractor and approved by the Contract Administrator.
- If any test results indicate failure to meet the specification, then additional review time may be required by the Contract Administrator. The Contractor shall have no claim for a delay in payment.
- The Contract Administrator may order cores to be taken from finished paving to determine finished paving thicknesses. If the average thickness of cores indicates that the pavement thickness varies from the specified thickness, the Contract Administrator may do one of the following:
    - If the thickness is less than specified, the Contract Administrator, at his/her sole discretion, may require either (a) milling and overlay to be placed in deficient areas with no additional payment for the overlay and any other work necessary to place the overlay, or (b) calculate the amount of asphalt concrete deficiency and reduce the payment item amount pro-rata accordingly.
    - If the thickness is greater than specified, the Contract Administrator may accept the work with no adjustment to area or price.
- No additional payment will be made for work described in this Section for surface restoration if payment is already under work described in other Sections.
- Payment for all asphalt concrete work placed by hand will only be made for such work specifically ordered by the Contract Administrator.

Measurement for quantities will be for the area placed to neat lines, to thickness specified as per the Contract Drawings.

1. 100 mm Thick Asphalt

This item shall include, but not necessarily be limited to, supply and install hot mix asphalt concrete pavement as indicated on the Contract Drawings.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

2. 100mm Coloured Stamped Asphalt

This item shall include, but not necessarily be limited to, supply and install colour stamped hot mix asphalt concrete pavement as indicated on the Contract Drawings.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

3. Saw Cutting Existing Pavement

This item shall include, but not necessarily be limited to: saw cutting existing asphalt concrete or Portland cement concrete pavement.

Saw cutting asphalt concrete or Portland cement concrete pavement will only be made for permanent reinstatements and other specific work shown on the Contract Drawings or as directed by the Contract Administrator, and will not include saw cutting prior to trench excavation for pipe laying work.

Payment for work performed under this section will incidental to unit paving prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

32 17 23 – Painted Pavement Marking

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to supply and install painted pavement marking in accordance with the Contract Documents, Contract Drawings and as directed by the Contract Administrator.

Payment for work performed under this section will be at the lump sum price shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

32 31 13 - Chain Link Fences and Gates

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for chain link fences and gates of the type indicated in accordance with the Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

1. Chain Link Fence

This item shall include, but not necessarily be limited to supply and installation of all fencing materials, and installation.

Measurement for quantities will be based on horizontal length along the ground surface.

2. Chain Link Gates

This item shall include, but not necessarily be limited to, supply of all gate materials and installation.

Measurement will be based on each type of gate installed.

32 92 19 – Hydraulic Seeding

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for hydraulic seeding of the type indicated in accordance with the Contract Documents Contract Drawings, and as directed by the Contract Administrator. Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

This item shall include, but not necessarily be limited to:

- providing the necessary equipment,
- supply and application of hydraulic mulch,
- grass seed, and
- maintenance to meet Conditions of Total Performance.

Areas of overseeding onto existing grass or sod will not be measured for payment.

Measurement for quantities will only be made for surface area actually seeded.

Landscaping

1. Landscaping

This item shall include all costs for all labor, materials, tools and equipment necessary to install the landscape features in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator. This shall include, but not be limited to, subgrade preparation, grading, supply and placement of growing medium, seeding, planting and supply and installation of bike racks.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

2. Rain Garden

This item shall include all costs for all labor, materials, tools and equipment necessary to install the rain garden features in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

3. Irrigation System

This item shall include all costs for all labor, materials, tools and equipment necessary to supply and install the irrigation system in the landscaped areas in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

4. Landscape Maintenance

This item shall include all costs for all labor, materials, tools and equipment required to maintain the landscaping and green roof in accordance with the Drawings and Specifications.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

Miscellaneous Items

1. Bollards

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for supply and installation of bollards indicated in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

2. Railing

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary for supply and installation of bollards indicated in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment for work performed under this section will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement will be based on horizontal length along the ground surface.

DIVISION 33 UTILITIES

33 11 01 – Waterworks

1. **Watermain – 50 mm dia. PVC C900 DR 18**
2. **Watermain – 25 mm dia. Polyethylene**
3. **Watermain – 19 mm dia. Polyethylene**

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of waterworks components of type indicated to the lines, grades and cross-section in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

Payment for waterworks components will be made separately for the various components consistent with nature of component, pipe materials, and diameters as shown on Contract Drawings and described under the individual payment this item in Form of Tender Appendix 1 -Schedule of Quantities and Prices.

Payment for waterworks components include, but not limited to:

- trench excavation, disposal of surplus excavated material supply and installation of all pipe, bolts, gaskets, restraints, tie rods, installation of test points
- bedding, imported or native backfill as shown on the Drawings
- cleaning, flushing, pressure and leakage testing, disinfection, bacterial testing
- all trench backfill to sub-grade elevation
- corrosion protection coating to AWWA standards of all buried metal components (including all valves, fittings, stainless steel and copper/brass) shall be incidental to all works; no additional payment will be made for corrosion protection coatings.

Payment for watermain will be at the units and corresponding prices shown in the Form of Tender Appendix 1 - Schedule of Quantities and Prices.

Measurement for watermains will be made horizontally along centerline of watermain, through valves and fittings, with no deduction for length of valves and fittings, over surface after work has been completed.

Payment for inline gate valves including valve boxes, crosses, tees, bends, reducers, blind flanges, couplings and caps will be incidental to the watermain line items in Appendix A - Schedule of Quantities and Prices. Chambers if required are to be incidental to the watermain line items unless specified otherwise under this section or as shown in Appendix A - Schedule of Quantities and Prices.

Payment for test points all related fittings and appurtenances will be for each item installed and identified in Appendix A - Schedule of Quantities and Prices. Chambers if required are to be incidental to each item.

4. **Tie in to Existing Well**

Payment for tie-ins to existing well to be lump sum as shown in Appendix A - Schedule of Quantities and Prices. Payment for tie-ins to existing well includes all pipes, valves, fittings, incidentals, testing, commissioning and any other necessary tie-in work including capping of mains to complete tie-ins as shown on Contract Drawings, Contract Documents and as directed by the Contract Administrator.

5. **Existing Well Upgrade**

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to adjust the existing well casing to meet finished grade and installed a surface seal over the

casing meeting current Groundwater Protection regulations. Payment for existing well upgrade includes all pipes, valves, fittings, incidentals, testing, commissioning and any other necessary work to be carried out by a qualified well driller in accordance with the Contract Drawings.

Payment for existing well upgrade to be lump sum as shown in Appendix A - Schedule of Quantities and Prices.

6. Irrigation System Connection

Payment for the irrigation system connection includes all pipes, valves, fittings, incidentals and any other necessary tie-in work to complete the tie-in as shown on Contract Drawings, Contract Documents and as directed by the Contract Administrator. This item shall include, but not limited, to all trenching, backfilling, and supply and installation of bedding, fittings, valve, testing and commissioning.

Payment for tie-in to be lump sum as shown in Appendix A - Schedule of Quantities and Prices.

7. 150mm dia. PVC Sleeve

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to supply and install PVC sleeve for future installation irrigation pipe in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

Measurement for sleeve will be made horizontally along centerline of pipe over surface after work has been completed.

8. Backflow Prevention/Solenoid Control Valve

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the supply and installation of backflow prevention/solenoid control valve in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Trenching, bedding, backfill and concrete chamber are to be incidental to this item unless specified otherwise under this section.

Payment for the backflow prevention/solenoid control valve to be lump sum as shown in Appendix A - Schedule of Quantities and Prices.

9. Dry Hydrant Assembly

Price bid for this item for shall be full compensation for all labour and materials including all related piping, fittings and appurtenances, concrete work necessary for the complete installation of the dry hydrant assembly including the injector nozzle as in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment for the dry hydrant assembly to be lump sum as shown in Appendix A - Schedule of Quantities and Prices.

33 30 01 Sanitary Sewer

1. 100mm dia. PVC SDR 28 Sanitary Sewer

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the supply and installation of sanitary sewer components of type indicated to the lines and grades in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation of bedding, sewers, drains, vents and related materials in accordance with the Drawings and Specifications. This shall include, but not be limited to, trenching, backfilling, supply and installation of sanitary pipes,

couplings, manholes, testing, commissioning and any additional work required in the installation of the sewers.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

Measurement for sanitary sewer will be made horizontally along centerline of sewermain, over surface after work has been completed.

2. Sanitary Sewer Service Connection

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the supply and installation of sanitary sewer connection of type indicated in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation of bedding, pipes, couplings, inspection chamber, testing, commissioning and any additional work required in the installation of the sewers service connection.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

3. Sewage Holding Tank

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the supply and installation of sewage holding tank in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs for excavating, backfilling, and supply and installation of bedding materials, sewers connection, risers and chambers, and works related materials in accordance with the Drawings and Specifications.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

33 40 01 Storm Sewers

1. 300mm dia. PVC SDR 35 Storm Sewer

2. 250mm dia. PVC SDR 35 Storm Sewer

3. 200mm dia. PVC SDR 35 Storm Sewer

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of storm sewer components of type indicated to the lines, grades and cross-section in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation storm pipes, couplings, testing, commissioning and any additional work required in the installation of the storm sewer.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

Measurement for storm sewer will be made horizontally along centerline of storm sewermain, over surface after work has been completed.

4. Storm Sewer Service Connection

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the supply and installation of storm sewer connection of type indicated in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation of bedding, pipes, couplings, inspection chamber, testing, commissioning and any additional work required in the installation of the sewers service connection.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

33 44 01 Manholes and Catchbasins

1. 1050 mm dia. Manhole

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of sewer manholes of type indicated in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation manholes, benching and any additional work required in the installation of the storm sewer.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

2. Catch Basin incl. 200mm dia. Lead

3. Double Catch Basin incl. 200mm dia. Lead

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of stormwater catch basin of type indicated in accordance with the Contract Drawings/Standard Detail Drawings and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, and supply and installation catch basin, lead and any additional work required in the installation of the storm sewer.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

4. Oil Water Separator System

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of oil water separator of type indicated to the lines, grades and cross-section in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, trenching, backfilling, supply and installation of bedding, inlet and outlet connections, and any additional work required in the installation of the oil water separator.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

33 47 00 Ponds and Reservoir

1. Detention Pond

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of detention in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

Payment for the excavation of the pond is included under the Common Excavation item. This item shall include all costs, but not limited to, construction of the berms, grading, shaping, supply and installation of outlet structure, inlet and outlet endwalls, and any additional work required in the installation of the detention pond.

Payment will be made at the lump sum price quoted in the Schedule of Quantities and Prices.

33 49 00 Storm Drainage Structure

1. 3.5m Wide Infiltration Swale

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of infiltration swale at the toe of the ash stockpile in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, excavation, grading and shaping of the swale, supply and placement of geotextile, granular materials, and required compaction and finishing required for the installation of the infiltration swale.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

Measurement for infiltration swale will be made horizontally along centerline of swale, over surface after work has been completed.

2. 5.0m Wide Infiltration Gallery

The price bid for this item shall be full compensation for all labour, materials, tools and equipment necessary to complete the installation of infiltration gallery in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, excavation, grading and shaping of the swale, supply and placement of geotextile, granular materials, and required compaction and finishing required for the installation of the infiltration gallery.

Payment will be made at the unit price quoted in the Schedule of Quantities and Prices.

Measurement for infiltration gallery will be made horizontally along centerline of swale, over surface after work has been completed.

41 14 36 Weigh Scale System

1. Complete Weigh Scale System with Accessories and Traffic Signals

The price bid for this item shall be full compensation for all products, materials, labour, materials, tools and equipment necessary to complete the installation of two (2) weigh scales complete with weigh bridge, concrete foundations, drains, load cells, cables, electrical components, monitor and associated equipment, two (2) Red/Green traffic signal with controller and electrical components in accordance with the Contract Drawings, Contract Documents and as directed by the Contract Administrator.

This item shall include all costs, but not limited to, excavation, grading, supply and placement of equipment and materials, testing and calibrations required for the installation a complete weigh scale system.

Payment will be made at the lump sum quoted in the Schedule of Quantities and Prices.

INDETERMINATE WORK

31 24 13 - Roadway Excavation, Embankment and Compaction

1. **Removal of Unsuitable Materials:**

   This item applies to removal of unsuitable materials (as determined by the Contract Administrator) revealed during exaction to subgrade. It shall include, but not necessarily be limited to:

   - excavation, loading, hauling and disposal of unsuitable materials off-site.
   - supply, placement, water conditioning, and compaction of 75 mm minus Pit Run.

   Measurement:

- Quantities will be based on a comparison between the original common soil surface as determined by field surveys, and the bottom of the common soil stratum up to but not exceeding the design grades for the finished design grade for the common soil.
- Quantities will be based on in-situ volumes with no factors for swell.

Table of Contents

PART 1 GENERAL

1.1 Scope

.1 The work of this Contract consists of the supply and installation of materials, including all labour, equipment, plant and tools related to construction of the Meade Creek Recycling Faciity all in accordance with the Contract drawings and specifications, and for the prices tendered in the Schedule of Quantities and Prices.

.2 The components of the work are generally described as follows:

.1 Demolition of existing site buildings and structures;

.2 Decommission existing septic system and utilities;

.3 Decommission existing weigh scale system, remove and transport unassembled to the CVRD Bings Creek Recycling Centre;

.4 Landfill closure including excavation of existing ash residuals, relocating and consolidating with the existing stockpile at the northern portion of the site;

.5 Shaping and compacting the consolidated ash stockpile, supply and construct landfill cap over the stockpile and constructing infiltration ditch at toe of the stockpile;

.6 Mass grading of site;

.7 Construction of asphaltic paved access and service road and drop off area;

.8 Construction of reinforced lock block retaining walls;

.9 Construction of the approximately 275 sq.m. Recycling Building including finishing;

.10 Construction of the approximately 40 sq.m. Scale House including finishing and millwork;

.11 Supply and installation of plumbing and HVAC for the Scale House and Recycling Buildings;

.12 Supply and installation of power supply and distribution to site;

.13 Supply and installation of electrical equipment including lighting and electrical distribution in the Scale House and Recycling Buildings;

.14 Supply and installation of site lighting and distribution;

.15 Supply and installation of security surveillance camera system and intercom system;

.16 Supply and installation of sanitary sewer services, manholes and sewage holding tank;

.17 Supply and construction of new tie in to existing well, water services, underground fire water storage tank and dry hydrants;

.18 Supply and construction of site drainage including storm sewers; catch basins; manholes; rain garden; infiltration gallery and swale; detention pond with inlet and outlet structures;

.19 Supply and installation of landscaping;

.20 Supply and installation of weigh scales and their appurtenances;

.21 Site finishing;

.22 Supply and installation of site, traffic and product signage and painted pavement markings; and

.23 All incidental works required to complete the site as detailed in the Contract Drawings and Documents.

1.2 Limits of Work Sites

.1 The work site is limited to within the property as shown on the Drawings. Use of areas outside the work site limits for construction, staging or laydown must be approved by the Contract Administrator.

1.3 Drawings

.1 The Contractor shall examine all drawings in advance of construction and shall advise the Contract Administrator of any apparent errors, discrepancies or inconsistencies, in order that the Contract Administrator can provide instructions clarifying the design.

.2 The Contractor shall also advise the Contract Administrator of any discrepancies or apparent inconsistencies between the drawings and the specifications, in order that the Contract Administrator may clarify the intent of the Contract.

1.4 Sequence of Construction

.1 The Contractor shall carry out the work of this Contract such that all aspects of the work are completed under conditions necessary for construction, installation or application of materials as required by the manufacturer or by the Contract.

.2 Schedule the work such that disruption of normal traffic and inconvenience to adjacent properties area are kept to a minimum.

.3 The Contractor is responsible for construction staging and coordination with the Regional District and relevant third parties as required to perform the work. Prior to construction, the Contractor shall submit a Construction Staging Plan to the Contract Administrator for review and approval.

1.5 Materials and Equipment Supplied by the Contractor

.1 The Contractor shall furnish all materials and shall:

.1 Find, load, haul, unload, store and care for all such materials, the cost of which shall be included in the tendered price;

.2 Pay all freight, duty, royalties, sales tax and other charges on the materials he furnished under this contract; and

.3 Be responsible for the proper handling of all pipe, fittings, and appurtenances; any damage which may be done in handling, shipping, storage, or in any other way prior to acceptance after installation and testing shall be made good by the Contractor at his expense.

.2 All materials incorporated into the work shall conform to this contract and to the latest edition of the appropriate specification of the ASTM, or to other standards expressly specified. Workmanship shall be first class and in accordance with the best shop practice.

.3 Materials incorporated in the work and not specifically covered in the specifications shall be new, of good quality, and acceptable to the Contract Administrator.

.4 All items supplied by the Contractor shall be as specified. If the Contractor wishes to supply and install items other than specified, he shall apply for and must receive written permission from the Contract Administrator before incorporating such items into the work.

.5 Descriptive literature and price schedules covering such alternative items shall be supplied to the Contract Administrator at least 10 working days in advance of the required approval.

.6 Equipment supplied by the Contractor shall include installation, operating and maintenance manuals.

1.6 Costs for Testing, Engineering and Inspection

.1 The Owner may employ an independent testing firm to conduct quality control tests to determine compliance of the work with the Contract Documents. Should material or workmanship be found to be unacceptable, the full cost of further testing relating to the deficiency shall be charged to the Contractor.

.2 The Contractor shall have no claim for delays, interruptions, double-handling of materials, rejection of materials, or any other cause brought about by such tests, including awaiting the outcome of such tests.

.3 Provide adequate notice to the Contract Administrator to permit testing to be conducted at appropriate times in an efficient manner.

.4 Unless otherwise specified, the costs of testing will be assumed by others.

.5 Provide material samples to the Contract Administrator in such quantities as required for testing for conformance with the specification. Make good, at least to original standard, area from where samples are taken.

1.7 Existing Geotechnical Report

.1 Refer to report in Appendix A.

Revision History

Rev. No.	Date	By	Chk'd	Issued For	Comment
A					
B					
C					
D					

END OF SECTION

INDEX

PART 1 GENERAL

1.1 Work Included

.1 This section includes all requirements for labour, materials, and equipment and costs necessary for the followings:

- Demolition, removal and disposal of all existing surface structures located on site including weigh scale, concrete pads, retaining walls, asphalt pavement, fences and gates and concrete barrier;
- Removal and disposal of all existing underground infrastructure including water and sewer pipes, septic field and tank in accordance with the Contract Documents, Contract Drawings, and as directed by the Contract Administrator.
- Demolition of existing office building;
- Demolition of existing recycling building;
- Decommission and remove existing weigh scale and its components and transport the scale unassembled to CVRD Bings Creek Recycling Centre.
- Separating and diverting any salvageable materials to approved facilities or for reusing;
- Removal of the unsalvageable demolished structures and materials to approved disposal sites.
- Obtain any required permits for the demolitions.

1.2 References

.1 “Meade Creek Ash Landfill Preliminary Geotechnical Assessment”, Thurber Engineering Ltd., August 18, 2016.

.2 “Meade Creek Recycling Facility Environmental Summary”, Thurber Engineering Ltd., August 23, 2016.

.3 Meade Creek Ash Landfill Closure Plan, Thurber Engineering Ltd., March 6, 2017

1.3 Related Work

.1	Environmental Protection	Section 01 57 01
.2	Dust Control	Section 31 15 60

1.4 Project/Site Conditions

.1 It shall be the Contractor’s sole responsibility to review the existing site condition and prepare a construction plan to meet all environmental conditions in accordance with all applicable codes.

.2 Refer to the geotechnical report for geotechnical conditions of the site.

.3 Refer to the environmental report for environmental conditions of the site.

.4 Buildings to be demolished will be vacated by Owner and their use discontinued before start of Work.

.5 Existing steel bins on site will be removed by Owner before start of Work.

.6 Storage of removed items or materials on-site will not be permitted without advance written approval from Owner.

.7 Contractor to schedule and coordinate activities with other trades.

1.5 Submittals

.1 Provide a detailed schedule of demolition activities indicating the following:

- Detailed sequence of demolition and removal work, including start and end dates for each activity.
- Dates for shutoff, capping, and continuation of utility services.

.2 Provide demolition plan including the followings:

- Proposed dust-control measures.
- Proposed noise-control measures.
- Proposed measures if hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

.3 As per WorkSafe BC regulation G20.112 Hazardous Materials – Asbestos, provide Inspection Report to be completed by a qualified person to identify any asbestos-containing materials, lead, or other heavy metal or toxic, flammable or explosive materials that will need to be handled, disturbed and removed as part of the demolition work.

.4 Contractor Waste Management and Recycling Plan including the followings:

- Review Contract Documents and site conditions and estimate total Project C&D materials to be generated, names of landfills where Project C&D materials would be disposed of.
- Indicate types and quantities of materials under the Work that are anticipated to be feasible for on-site processing, and source-separation for re-use or recycling. Indicate procedures that will be implemented in this program to effect jobsite source-separation, such as, identifying a convenient location where dumpsters would be located, signage to identify materials to be placed in dumpsters, etc.,
- List of reuse and recycling organizations and companies that separated salvageable materials will be deposited.

.5 Waste and Recycling Management Plan to be approved by Contract Administrator prior to start of work.

.6 Provide Reuse, Recycling and Disposal Report at completion of the demolition phase. Report to include the followings:

- On-site crushing of asphalt and concrete for use off-site;
- Reuse of building materials or salvageable items;
- Source-separated recycling facilities;
- Mixed debris recycling facilities;

- Recycling of material, including soils, as landfill alternative daily cover;
- Disposal of soils or other materials at a landfill or approved disposal sites.

.7 Provide Health and Safety Management Plan;

.8 Provide Sediment Control Plan.

.9 Provide Emergency Response Plan.

PART 2 PRODUCTS

.1 NOT USED

PART 3 EXECUTION

3.1 Examination

.1 Verify that utilities have been disconnected and capped.

.2 Survey existing conditions and correlate with requirements indicated to determine extent of demolition and recycling required.

.3 Retained a qualified environmental consultant to test existing building materials to determine presence of asbestos.

.4 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

.5 Retain a licensed and qualified civil or structural engineer to provide any required analysis, including calculations, necessary to ensure the safe execution of the demolition work.

.6 Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 Preparation

.1 Conduct demolition operations and remove C&D materials to ensure minimum interference with roads and other adjacent occupied and utilized facilities.

.2 Do not close or obstruct streets or access to adjacent occupied or utilized facilities without permission from authorities having jurisdiction.

.3 Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.

.4 Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

.5 Protect existing infrastructure and appurtenances that are designated to remain in place.

.6 Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of buildings to be demolished and adjacent buildings to remain.

.7 Strengthen or add new supports when required during progress of demolition

3.3 Explosive

.1 Use of explosive will not be permitted.

3.4 Environmental Control

.1 Implement environmental protection and mitigation measures in accordance with local, provincial and federal regulations

.2 Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters.

- Prevent oil and petroleum products or other hazardous substances from entering the ground, drainage areas, or local bodies of water;
- Store and service construction equipment at areas designated for collection of oil wastes.

3. Implement dust control measures including the followings

- Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
- Store volatile liquids, including fuels and solvents, in closed containers.
- Properly maintain equipment to reduce gaseous pollutant emissions.

.3 Implement salvage, reuse and recycling procedures including the followings:

- Identify re-use, salvage, and recycling facilities;
- Identify materials that are feasible for salvage, determine requirements for site storage and transportation of materials to a salvage facility.
- Implement source separation.

3.5 Building Demolition

.1 Disconnect all existing utilities to the buildings.

.2 Locate existing onsite septic system and decommission in accordance with best management practices including pumping out and emptying the septic tank completely, demolishing the tank in place and backfill with sand or gravel.

.3 Demolish buildings completely and remove from the site. Use methods required to complete Work within limitations of governing regulations and as follows:

.4 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

.5 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.

.6 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation

.7 Break up and remove concrete slabs in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.

.8 Remove all disconnected and abandoned utilities.

3.6 Below-Grade Construction Demolition

.1 Demolish foundation walls and other below-grade construction, as follows:

- Completely remove below-grade construction, including foundation walls and footings.
- Break up and completely remove below-grade concrete slabs, in small sizes, suitable for acceptance at recycling or disposal facilities.

3.7 Weigh Scale Removal

.1 Decommission the existing weigh scale including removal of wiring, junction boxes, electrical components and structural members in accordance with the Contract Documents, Contract Drawings.

.2 Care to taken to avoid damaging the components of the weigh scale to allow for salvaging the equipment by CVRD.

.3 The weigh scale to remain unassembled and all its components to be loaded and hauled to the CVRD Bings Creek Recycling Centre at 3900 Drinkwater Road, Duncan.

.4 Unload the unassembled weigh scale and its components at a located designated by the Owner at the Bings Creek Recycling Centre.

3.8 Damages:

.1 Promptly repair damages to adjacent facilities caused by demolition operations.

3.9 Handling Of Demolished Materials

- Promptly re-use, salvage, recycle, or dispose of demolished materials. Do not allow demolished materials to accumulate or be stored on-site for more than 7 days.
- Burning of demolished materials will not be allowed.
- Transport demolished materials off property and legally reuse, salvage, recycle, or dispose of materials.

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PART 1 GENERAL

1.1 Current Site Conditions

.1 Three distinct ash stockpiles are located within the Meade Creek project site.

.2 Stockpile noted as Ash-1, the largest pile, is located in the northern portion of the site and will remain in place.

.3 Stockpile noted as Ash-2 is second smallest and is located to the west of the existing recycling facility.

.4 Stockpile noted as Ash-3 is the smallest and is located near the west property line.

.5 All residuals in stockpiles Ash-2 and Ash-3 will be excavated and relocated to stockpile Ash-1.

.6 A cap consisting of granular materials, a geomembrane and vegetative cover will placed over the consolidated Ash-1 stockpile.

1.2 Work Included

.1 This section includes all requirements for labour, materials, and equipment and costs necessary for the followings:

- Consolidate the three existing ash stockpiles and any ash residuals noted in other areas during the construction into one single location as shown on the Drawings;
- Grading and compacting of the consolidated ash residuals;
- Supply and install landfill cap materials over the single consolidated ash stockpile;
- Tie the landfill cap into the proposed infiltration ditch running at the toe of the single consolidated ash stockpile.
- Abandon existing monitoring wells.

1.3 References

.1 “Meade Creek Ash Landfill Preliminary Geotechnical Assessment,” Thurber Engineering Ltd., August 18, 2016

.2 Meade Creek Recycling Facility Environmental Summary, Thurber Engineering Ltd., August 23, 2016.

.3 Meade Creek Ash Landfill Closure Plan, Thurber Engineering Ltd., March 6, 2017.

1.4 Related Work

.1	Environmental Protection	Section 01 57 01
.2	Aggregates and Granular Materials	Section 31 05 17
.3	Clearing and Grubbing	Section 31 11 01
.4	Dust Control	Section 31 15 60
.5	Roadway Excavation, Embankment and Compaction	Section 31 24 13

1.5 Project/Site Conditions

.1 It shall be the Contractor's sole responsibility to review the existing site condition and prepare a construction plan to meet all environmental conditions in accordance with all applicable codes.

.2 Refer to the geotechnical report for geotechnical conditions of the site.

.3 Refer to the environmental report for environmental conditions of the site.

.4 Contractor to schedule and coordinate activities with other trades.

1.6 Submittals

.1 Prior to start of the landfill closure work, Contractor to prepare and submit the followings:

- Health and Safety Management Plan
- Sediment and Control Plan
- Emergency Response Plan

1.7 Inspection and Testing

.1 Visual inspections will be completed during the ash removal from Stockpiles Ash 2 and Ash 3 to verify that only contaminated ash residues are being excavated and relocated to Stockpile Ash-1.

.2 Confirmatory soil samples will be collected for analysis to ensure only ash contaminated material is being excavated and relocated and verify that all contaminants are removed completely from Ash-2 and Ash-3 stockpiles. Contractor shall cooperate with the soil sampling and expect reasonable delay for the analysis results to confirm the ash relocation work. No compensation will be made for any required temporary stoppage of the ash relocation of work while waiting for the results of the soil sampling analysis. Contractor is expected to relocate work force to other areas of the site if a temporary stoppage is required.

PART 2 PRODUCTS

.1 Granular materials for the landfill cap as indicated on the Contract Drawings.

.2 Geosynthetic Clay Liner (GSE Bentoliner CNSL) or equivalent.

PART 3 EXECUTION

3.1 Preparation and Installation

.1 Verify that utilities have been disconnected and capped.

.2 Survey existing conditions and correlate with requirements indicated to determine extent of consolidation required.

.3 Inspect stockpile Ash-1 surface to ensure that all trees, shrubs, stumps and timbers have been fully removed and prepare a well graded ash surface prior to start of the consolidation process. Stripping of roots and organic layer is not required.

.4 Separate large and bulky debris such as tired, car bodies, metals, white goods, propane tanks and wire cables from the ash residuals prior to relocation and consolidation, remove and to offsite disposal or recycling facility.

.5 Place relocated ash residuals in maximum 300mm thick lifts and compact using tracked bulldozed with multiple passes.

.6 Compact lower sand layer with hand held compaction equipment. Inspect sand layer surface to ensure that no significant protrusions are present.

.7 Install geosynthetic clay liner in accordance with manufacturer's specifications.

.8 Using hand held compaction equipment to compact sand and gravel overlying the geosynthetic clay liner with multiple passes. Care to be taken when working above the liner to protect its integrity.

.9 Apply vegetative cover in accordance with Landscaping Drawings and specifications.

.10 Abandon existing monitoring wells as per specifications detailed in *BC Groundwater Protection Regulations*.

3.2 Handling Of Ash Materials

- Control dust generation to minimize health and safety impacts. Refer to WorkSafe BC Guidelines for specifications and use of personal protective equipment.

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PART 1 GENERAL

1.1 Work Included

.1 This section includes all requirements for labour, materials, and equipment and costs necessary for and incidental to the design, supply, erection and testing of a 40,000 L single wall FRP underground fire suppression storage tank, complete with concrete deadman, access ladder, access hatch, access frame, inlet and outlet, vents, piping and pipe supports.

.2 Supply and install all inlet and outlet piping as indicated on the drawings.

.3 Connection of the float level switches supplied by the electrical trade, including coordination with the electrical trade.

1.2 References

.1 Governing Standards, as applicable:

.1 ANSI/AWWA D120 - Thermosetting Fiberglass-Reinforced Plastic Tanks.

.2 American Concrete Institute (ACI) standard ACI 318, Building Code Requirements for Structural Concrete.

.3 National Fire Code of Canada

.4 Tank manufacturer shall be recognized by Underwriters Laboratories of Canada as a manufacturer of tanks listed to the ULC S615 standard.

1.3 Equipment Delivery

.1 Coordinate equipment delivery with other trades. Note that the following items may involve long delivery and therefore should be ordered immediately after Contract award and expedited efficiently:

.1 FRP storage tank, complete with all cores and fittings as shown on the drawings.

1.4 Shop drawings

.1 Refer to MMCD General Conditions, Clause 5 for shop drawing requirements.

1.5 Related Work

.1	Excavation, Trenching and Backfilling	Section 31 23 01
.2	Waterworks	Section 33 11 01
.3	Electrical	Division 26

1.6 Cooperation with Other Trades

.1 Care shall be taken in laying out the mechanical work and buried piping to accommodate the space requirements and routing for other installations. Particular attention must be given to length of connection piping and location of electrical works as shown on the drawings.

.2 The mechanical trade shall make piping connections for the following equipment supplied by the electrical sub trade:

.1 Float switches, and connection piping/conduit.

PART 2 PRODUCTS

2.1 Protection of Materials and Equipment

.1 In addition to the responsibilities outlined in the General Conditions, for care of property and materials, the Contractor shall ensure that the mechanical components shall be given the following attention:

.1 After delivery, before and after installation, protect equipment and materials against theft, injury or damage from all causes.

.2 All materials and equipment stored on site shall be adequately supported above the ground on suitable timber blocks.

.3 Tanks must be shipped on support saddles provided by the supplier, and positioned to the manufacturer's recommendations. Strap tanks to freight vehicle to the manufacturers recommendations.

.4 Tanks must be moved only in accordance with the manufacturer's recommendations, and may not be dropped, rolled or dragged into position.

.5 Protect equipment outlets, pipe and duct openings with temporary plugs, caps and canvas.

.6 Install so that connecting of piping and accessories can be made readily so that all parts are easily accessible for inspection, maintenance and repair.

2.2 FRP Storage Tanks

.1 Storage tanks shall be 40,000 litre (10,600 US Gal) fibre reinforced plastic (FRP) single wall tanks suitable for buried installation as indicated by the drawings. Tanks shall be approximately 2.49 m in diameter and 9.34m long.

.2 Tanks shall be ULC listed and include 30 year warranty.

.3 Acceptable tank manufacturer are:

.1 ZCL Composites,
(Tel:1-800-661-8265; Email:info@zcl.com; Web: http://www.zcl.com)

.2 or Approved Equal.

.4 Fittings and manways shall be located as indicated on the drawings, and shall be completed in the shop. Field-coring shall not be permitted.

.5 Tank shall be manufactured with structural ribs which are fabricated as in integral part of the tank wall.

.6 Tank shall be manufactured with a laminate consisting of resin and glass fiber reinforcement only. No sand/silica fillers or resin extenders shall be used.

.7 Cores and fittings in the FRP tank shall be appropriately sized for the pipe sizes and locations shown on the drawings.

.8 Tank Anchoring

.1 Anchor straps shall be as supplied by tank manufacturer and designed for a maximum load of 25,000 lbs (11340 kg).

.2 Galvanized turnbuckles shall be supplied by the tank manufacturer.

.3 Prefabricated concrete anchors shall be supplied by the tank manufacturer, designed to the ACI 318 standard, manufactured with 4,000 psi concrete and shall have adjustable anchor points.

.9 Access:

.1 All access openings shall be complete with riser, lid and necessary hardware.

.2 Attached access risers shall be PVC or FRP as supplied by tank manufacturer.

.3 Access risers shall be attached to access openings during installation utilizing adhesive or FRP bonding kits as supplied by the tank manufacturer.

.10 Piping and Fittings:

.1 Tank shall be equipped with factory-installed threaded fittings, or pipe stubs.

.2 PVC piping shall at a minimum meet the requirements of ANSI Schedule 40.

.3 All flanged nozzles shall be flanged and flat-faced, and conform to Class 150 bolting patterns as specified in ANSI/ASME/ B16.5.

.4 Carbon steel and stainless steel NPT fittings shall withstand a minimum of 150 foot-pounds (203 NM) of torque and 1,000 foot-pounds (1356 NM) of bending, both with a 2:1 safety factor.

.11 Ladders:

.1 Ladders shall be the standard FRP ladder as supplied by tank manufacturer.

.12 Internal Piping

.1 All internal piping shall be supplied by tank manufacturer.

.2 All FRP nozzles for fire pump supply shall have an anti-vortex plate factory installed.

.13 Suction/Fill tubes:

.1 Vertical draft/fill tubes shall be a minimum of PVC SCH 40 or FRP.

.2 Vertical draft /fill tubes shall be factory installed.

.3 Vertical draft /fill tubes shall terminate 4 inches (102 mm) above the bottom of tank.

.4 Vertical draft tubes shall have anti-vortex plate factory installed.

2.3 Storage Tank Installation

.1 General

.1 Supply all equipment, materials, and install all necessary fittings to complete pressure testing to the satisfaction of the Contract Administrator.

.2 The Contractor shall notify the Contract Administrator 48 hours prior to the arrival of the storage tank on site. The Contract Administrator shall provide a visual inspection of the tank onsite for fractures, delaminations, extensive scratches, gouging and cracks. Further, the Contract Administrator shall further inspect all backfill materials at that time.

.3 Any damage occurring to the tank during transport or installation shall be repaired to the satisfaction of the Contract Administrator.

.4 The Contractor shall obtain the approval of the Contract Administrator prior to proceeding with installation of the tank.

.2 Leak Testing

.1 Supply all equipment, materials, and install all necessary fittings to complete pressure testing to the satisfaction of the Contract Administrator.

.2 Provide all temporary caps, flanges, valves, and thrust blocks required for testing.

.3 The Contractor shall notify and obtain the approval of the Contract Administrator prior to proceeding with initial testing of the tank. Upon successful completion of the initial tests, the Contract Administrator is to be contacted to witness final test.

.4 The purpose of the test is to detect any damaged material that may have been installed, and to ensure that all fittings are watertight.

.5 If leaks develop or excessive pipe movement is noted, make all necessary corrections and new tests until all defects or deficiencies have been remediated. Corrections for the proper functioning of the installation shall be made to the satisfaction of the Owner before final acceptance of the facility.

.6 Provide a written report to the Owner summarizing the results of the leakage testing. The report will include the type of test, duration, and presence of any leakage.

.7 The tank shall be tested prior to installation via a Soap Bubble Test as follows:
- Position and clean the tank so that the entire exterior is visible.
- Apply air pressure of 35 kPa (5 psi) to the tank and hold.
- Wet the entire exterior surface of the tank with soap and water solution using a soft cloth or paint brush. During freezing conditions a suitable anti-freeze (such as windshield washer fluid) may be added to the mixture.
- The tank shall be inspected for the formation of bubbles.
- Upon permission of the Contract Administrator, release pressure and reinstall core plugs.

.8 The tank shall be tested after installation via a Hydrostatic Leak Test.

.9 Installation

.1 The site shall be excavated to the distances and lines on the drawings, and all loose soil shall be removed to the satisfaction of the Contract Administrator.

.2 The Base of the excavation shall be level and free of water during installation.

.3 Care shall be taken during placement of the tanks on prepared bed, and tanks shall be properly levelled and spaced.

.4 Backfill shall be carried out in 300 mm lifts, taking care to fill all voids under the tanks, and ensuring that the tank is level.

.5 Deflection measurements shall be taken in accordance with the manufacturer's recommendations. Results shall be recorded and provided to the Owner.

.6 Tanks may be ballasted with water during excavation, though the level of liquid ballast shall not exceed the level of backfill by more than 600 mm.

.7 Tanks shall be leak tested in the presence of the Contract Administrator once backfill is complete.

2.4 Warranty

.1 Install tank in accordance with warranty requirements of tank manufacturer. Warranty requirements require completion of an installation checklist and inspection report. The Contractor shall fulfill all requirements noted and assist the Contract Administrator in recording the required information.

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PART 1 General

1.1 References

.1 Canadian Standards Association (CSA International)
- .1 CSA C22.1, Canadian Electrical Code, Part 1 (Current Edition), Safety Standard for Electrical Installations.
- .2 CAN/CSA-C22.3 No.7, Underground Systems
- .3 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .4 CSA Z462 – Workplace Electrical Safety

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
- .1 IEEE SP1122, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

.3 Electrical Contractor's Association of British Columbia Seismic Restraint Standards Manual – Guideline for Electrical Systems

1.2 Definitions

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 **Certification agency**: an organization accredited by the Standards Council of Canada under the Standards Council of Canada Act as an organization engaged in conformity assessment.

.3 **Certification mark**: a stamp, mark, seal, label, tag, or other identification of a certification agency, certifying that the regulated product to which it is affixed or attached meets the standard that the product must meet for certification.

.4 **Certified equipment**: Regulated products which meet the standards that the product must meet for certification and are identified as such by a certification mark.

.5 **Provide**: Supply and install.

1.3 Design Requirements

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.3 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.4 Work Included

.1 All design services, labour, materials, equipment, testing and commissioning services, and supervision required to provide a complete electrical system as listed herein and shown on the drawings.

.2 Work includes, but is not limited to the following general areas:
- .1 Meade Creek Recycling Centre, Logging Truck Road, Cowichan B.C.

.3 This includes, but is not limited to the following:
- .1 Service entrance
- .2 Main Distribution Centre
- .3 Metering
- .4 Secondary Feeders and Ducts
- .5 Secondary Distribution Panels
- .6 Motor Controls
- .7 Lighting
- .8 Receptacles
- .9 Heating
- .10 CCTV system
- .11 Structured cabling
- .12 Security System
- .13 Intercom System
- .14 Testing and Commissioning

1.5 Work Not Included

.1 The following work will be by others. The Contractor shall coordinate with the following work and cooperate where required:
- .1 Installation & commissioning of weight scales

1.6 Contract Drawings

.1 The electrical drawings do not show structural details.

.2 Accurate dimensions shall be taken from structural, architectural or civil drawings or by measurement of the buildings and site. The electrical drawings show approximate location of apparatus, equipment and wiring. The arrangement is diagrammatic in some areas. The exact location of apparatus, equipment and wiring shall be determined in the field in accordance with good practice and shall be approved by the Engineer prior to installation.

.3 Check the location of all items fed by conduit embedded in or below the floor slab. Ensure that the conduit is located correctly.

.4 Ensure adequate clearance in front of all electrical panels and equipment.

.5 Check all equipment against the Single Line Diagram to ensure that the voltage is correct.

.6 The drawings show sufficient detail to indicate the scope of work. Minor changes may be made after award of contract, and after receipt of shop drawings. Changes made as a result of receiving the Contractor's shop drawings shall not be considered extra work.

.7 The Engineer reserves the right to change the location of equipment, switches, outlets, etc., to within 3000 mm of points indicated on drawings without involving an extra, providing the electrical trade is advised of the change in time to avoid removal of material already installed.

.8 Obtain ruling, prior to tender closing, from Engineer, on any discrepancy between specification and drawings. If this is not done, the expensive alternative will be assumed.

.9 Arrange wiring and apparatus to conform to architectural and structural details, in approved manner.

1.7 Submittals

.1 Submittals: in accordance with Division 1 Submittal Procedures.

.2 All design documentation including calculations and drawings required for construction shall be sealed by a Professional Engineer registered in the Province of British Columbia.

.3 Review and approval of the Contractor's documents by the Owner's Representative does not relieve the Contractor of responsibility for completeness, accuracy, details, and conformance with codes and standards.

.4 Where the Owner's Representative determines in document review that the proposed design/equipment does not meet the specification or that insufficient information is presented, the Contractor shall be requested to and shall re-submit the document(s) with the additional information requested by the Owner's Representative.

.5 Shop drawings:
- .1 Each individual shop drawing shall include identification as to the exact piece of equipment that it represents pertaining to the project. The Contractor shall use drawing detail numbers and equipment name where identified on the drawings, to clarify shop drawing identification.
- .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Submit copies of drawings and product data to authority having jurisdiction where required.
- .6 If changes are required, notify Engineer of these changes before they are made.

.6 Manufacturer's Field Reports: submit to Engineer, manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL – MANUFACTURER's FIELD SERVICES.

1.8 As-Built Drawings

.1 The Contractor shall maintain one set of white prints on the job site for the Contractor's recording all work, as provided. As-built mark-ups shall include installation locations, sizes, gauges, and equipment part numbers to completely represent the installation. The site as-built mark-ups shall be completed daily. The as-built mark-ups shall be turned over to the Engineer at job completion, prior to request for final payment.

.2 As built mark-ups shall be to the same standard and detail as the contract drawings. Mark-ups shall be to scale, or dimensions shall be noted. They shall show all changes made in the Contract including site changes, addendums and change orders.

.3 The Contractor shall submit as built mark-up drawings to the Engineer for inspection, when the Engineer is on site to inspect the Contractor's work.

.4 If the Engineer finds that the final as built mark-ups do not accurately reflect the work done, they shall be returned to the Contractor for revision. If the Contractor does not resubmit adequate and correct drawings within 7 days, the Engineer will mark up as built prints to final and correct state. The Engineer's cost for this work will be deducted from the Contractor's final payment.

1.9 Quality Assurance

.1 Quality Assurance: in accordance with Division 1 Quality Control procedures.

.2 Qualifications: electrical work to be carried out by qualified, licensed electricians who hold a valid BC Electrical Contractor license or apprentices in accordance with authorities having jurisdiction and as per the conditions of Provincial Act respecting manpower vocational training and qualification.

- .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
- .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.10 System Startup

.1 Instruct operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant will aspects of its care and operation.

1.11 Operating and Maintenance (O+M) Manuals

.1 Provide digital O+M manuals to the engineer for review. Once reviewed and approved by the engineer provide 4 copies of maintenance manuals.

.2 O+M Manuals to include following:

- .1 Equipment shop drawings,
- .2 Schematic and line diagrams,
- .3 Normal operating parameters such as operating voltage and ampacity,
- .4 Safety precautions.
- .5 Procedures to be followed in event of equipment failure.
- .6 Items of instruction as recommended by manufacturer of each system or item of equipment.
- .7 Contractor's contact information inclusive of telephone number and email address,
- .8 Guarantee,
- .9 Copy of permits and final inspection reports by the Authorities Having Jurisdiction,
- .10 Copy of any applicable special inspection reports.

.3 It is intended that the O+M manuals be complete at the site start up date with the exception of minor revisions for parameter adjustments made during commissioning. The Contractor shall make sufficient allowance for timing and work to provide completed O+M manuals prior to job completion. All costs to turn over the O+M manuals as specified are the Contractor's.

.4 All O+M copies shall bound in separate hard back binders and include table of contents, and all sections be separated by tab dividers labelled to follow the table of contents.

1.12 Guarantee

.1 Unless otherwise stated in Division 1, the Contractor shall guarantee their work, equipment and materials supplied for a period of one year after final completion. They shall repair, replace or otherwise make good any part or all of the electrical installation should any failure, malfunction

or deficiency become known during that period. This work shall be done at no cost to the Owner.

PART 2 Products

2.1 Materials and Equipment

.1 Provide new, certified equipment, free of defects. Factory seconds will not be accepted. Where certified material and equipment is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

2.2 Equals and Substitutions

.1 Where equipment and materials is specified by manufacturer, "or approved equal" is implied unless specifically noted otherwise. Submit full technical data with request for approval of equals, a minimum of 5 days prior to tender closing.

.2 Contractors who supply approved equals shall furnish revised wiring and mounting details where required. The Contractor shall pay for all additional Engineering costs related to installation of substituted equipment.

.3 As built drawings shall show the revised wiring, mounting and other details.

2.3 Warning Signs

.1 Warning Signs: in accordance with requirements of authority having jurisdiction.

.2 Decal signs, minimum size 175 x 250 mm.

2.4 Wiring Terminations

.1 Ensure lugs, terminals, screws used for termination of wiring are designed for the type and size of conductor being terminated.

2.5 Equipment Identification

.1 Identify electrical equipment with nameplates as follows:
- .1 Nameplates: plastic laminate
  - .1 3mm thick plastic engraving sheet, black face, white core,
  - .2 lettering accurately aligned and engraved into core, Minimum 3mm high lettering, or as shown on drawings.
  - .3 mechanically attached with self tapping screws. Ensure that enclosure environmental rating is maintained.

.2 Labels: embossed plastic labels with 6mm high letters unless specified otherwise.

.3 Nameplates for terminal cabinets and junction boxes to indicate system and voltage characteristics.

.4 Disconnects, starters and contactors: indicate equipment being controlled, voltage. phases, and circuit number.

.5 Terminal cabinets and pull boxes: indicate system, voltage, and phases.

.6 Transformers: indicate capacity, primary and secondary voltages.

2.6 Conduit and Conductor Identification

.1 Identify all conduit and conductors with permanent indelible identifying markings, numbered on both ends of phase conductors of feeders, branch circuit wiring, and instrumentation and control wiring. Identification to be machine-printed, hand-printed identification will not be accepted.

.2 Conduits and cables shall be labelled at least once on every building floor.

.3 Maintain phase sequence and colour coding throughout.

.4 Colour coding: to CSA C22.1.

2.7 Finishes

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.2 Paint outdoor electrical equipment "equipment green" finish.

.3 Paint indoor switchgear and distribution enclosures light gray.

PART 3 Execution

3.1 Site Inspection

.1 Examine construction sites prior to submitting tender and ascertain all conditions affecting work. Base tender on site conditions. Advise Engineer of any potential problems observed during the site visit, within 24 hours of visit.

3.2 Permits, Licenses, and Fees

.1 Submit drawings to all inspection authorities for approval.

.2 Apply and pay for all required permits, licenses and fees. Supply inspection certificates to the Owner at the end of the job. Work shall not be considered complete until these certificates are submitted to the Owner.

3.3 Safety

.1 Contractor shall be responsible for the safety of all personnel, theirs and others, working on the electrical equipment.

.2 Contractor shall establish lock out procedures and enforce these procedures.

.3 Contractor shall provide training and instruction as required for their personnel, and others working on the electrical equipment.

.4 Contractor shall obtain assistance from outside agencies or specialists, where required, to insure a safe operating workplace.

.5 The workplace shall be kept neat and tidy during construction. Tools will not be left exposed while not in use, and material shall not be allowed to accumulate in the work area.

3.4 Installation

.1 Complete installation in accordance with CSA C22.1, and the requirements of the local authority having jurisdiction.

.2 Complete installation of underground systems in accordance with CSA C22.3 No.7.

.3 Install all materials and equipment in accordance with the manufacturer's recommendations.

3.5 Excavation, Backfilling, Cutting, And Patching

.1 All excavation, backfill, cutting, and patching required for electrical installation will be by the General Contractor.

3.6 Nameplates and Labels

.1 Ensure manufacturer's nameplates, certification labels and identification nameplates are visible and legible after equipment is installed.

3.7 Conduit and Cable installation

.1 Install conduit and sleeves prior to pouring of concrete.
- .1 Sleeves through concrete: Thermoplastic elastomer, sized for free passage of conduit, and protruding 50mm.

.2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.8 Co-ordination of Protective Devices

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.9 Field Quality Control

.1 Load Balance:
- .1 Measure phase current to panelboards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps where applicable to within 2% of rated voltage of equipment.

3.10 Making Good

.1 Repair, replace, or otherwise make good any damage or destruction caused to the structures and equipment, or work of other trades on this project.

3.11 Protection of Work

.1 The Contractor shall properly cover and protect from damage and weather, all equipment and material related to their work.

3.12 Seismic Restraint

.1 Provide seismic restraints for electrical equipment as detailed in the Electrical Contractor's Association of British Columbia Seismic Restraint Standards Manual – Guideline for Electrical Systems. Where the guidelines do not provide detail for specific equipment, obtain seismic restraint details from a Professional Engineer registered in British Columbia who specializes in such designs. The Contractor shall provide and install the engineered seismic restraint system as designed and the aforementioned Engineer shall provide Schedule S-B and S-C to Engineer of Record at project completion to demonstrate compliance.

.2 Submit sealed documents pertaining to seismic restraint systems to Engineer. Include copies in the O+M manual inserted in the corresponding equipment section.

3.13 Clean Up

.1 Upon completion of the work, the Contractor shall remove all tools, debris, and surplus material, and shall leave the area neat and clean to the Owner's satisfaction.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

3.14 Inspection of Work

.1 On this project the Electrical Engineer, Owner and Electrical Safety Branch will be inspecting electrical work at various stages of construction.

.2 The electrical contractor and/or general contractor shall notify the Electrical Engineer a minimum of two weeks prior to rough-in completion and wall boarding in order to schedule rough-in inspection. Failure to request rough-in inspection may result in the stopping of work on site by the local building inspector. This is due to the current BC Building Code requirement for field review by the Electrical Engineer.

.3 Provide minimum two weeks advance notice of request for substantial completion and final inspection.

END OF SECTION

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PART 1 General

1.1 Related Sections

.1 Section 26 05 01 – Electrical General Requirements

1.2 Scope of Work

.1 Establish station ground electrode.

.2 Ground all equipment in accordance with the Canadian Electrical Code.

.3 Ensure any distribution transformer neutrals are grounded as required.

.4 Ensure all metal enclosures for electrical equipment are bonded to ground.

PART 2 Products

2.1 Materials and Equipment

.1 Rod electrodes: copper clad steel 19 mm dia by 3 m long.
  .1 Provide Slacan No.22109 Ground electrode inspection box with each ground rod.

.2 Grounding conductors: bare stranded copper, soft annealed, size as per Canadian Electrical Code requirements.

.3 Insulated grounding conductors: green, type RW90.

.4 Ground bus: copper, complete with insulated supports, fastenings, connectors.

PART 3 Execution

3.1 Installation General

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories.

.2 All conduits, except primary and secondary service ducts, to include bonding conductor.

.3 Install connectors in accordance with manufacturer's instructions.

.4 Protect exposed grounding conductors from mechanical damage.

.5 Make buried connections, and connections to conductive water piping, electrodes, using high-compressions clamps.

.6 Use mechanical connectors for grounding connections to equipment provided with lugs.

.7 Soldered joints not permitted.

.8 Install ground conductor to outdoor lighting standards.

.9 Connect building structural steel and metal siding to ground.

.10 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

3.2 Electrodes

.1 Establish a ground electrode in accordance with Canadian Electrical Code. If soil conditions are such that ground rods cannot be installed, upon receiving a written request, the Engineer may permit the use of a plate electrode.

.2 Bond separate, multiple electrodes together.

.3 Use copper conductors for connections to electrodes.

3.3 System and Circuit Grounding

.1 Install system and circuit grounding connections to neutral of wye connected secondary system, neutral of 120/208V systems, and neutral on control transformers.

3.4 Equipment Bonding

.1 Bond items of electrical equipment in electrical room to ground bus with individual bare stranded copper connections.
- .1 #3/0 bare copper from service switch neutral lug terminating on the grounding pad and extending to two new ground rods spaced 3 m apart outside the building.
- .2 #3/0 bare copper to MCC and variable frequency drives ground bus.
- .3 #1 bare copper bonding conductor to service equipment enclosures such as CT cabinet, ATS enclosure and pullboxes, etc.
- .4 #1 bare copper bonding conductor running the length of the cable tray and bonded to non-current carrying metallic parts of all equipment and structure to main ground bus.
- .5 #6 bare copper grounding conductor to surge suppressor.

3.5 Grounding Bus

.1 Install copper grounding bus mounted on insulated supports on wall of electrical room.

3.6 Communication Systems

.1 Install separate ground electrode for each antenna and bond to system ground electrode.

3.7 Field Quality Control

.1 Perform tests in accordance with Section 26 05 00 16010 – Electrical General Requirements.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 The electrode under test shall include the complete system ground.

.5 The results of the test will be evaluated by the Engineer and a decision made as to whether additional ground rods and conductor will be extra to the contract. The Contractor shall quote unit prices for rods and conductors.

.6 The Contractor shall co-operate with the Engineer in scheduling this test. The date shall be selected 10 working days in advance

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PART 1 GENERAL

1.1 Wiring Method

.1 Wiring method shall be concealed non-metallic sheath cable where permitted by code, wire in conduit elsewhere.

.2 Wiring shall be concealed in all areas except in electrical rooms, mechanical rooms and elevator equipment rooms, where it shall be surface run.

.3 Wiring method shall be surface run conduit and wire, except where specifically noted otherwise herein or on the drawings.

.4 All conduit and wiring is not shown on the drawings. The Contractor shall provide conduit and wiring as per circuit numbers shown. He/she shall install this in accordance with good practice with no conflicts with other trades.

1.2 Ground Conductor

.1 Provide separate ground conductor in all non-metallic conduit and duct, except for primary underground duct and telephone service duct.

PART 2 PRODUCTS

2.1 Conduit

.1 Provide rigid PVC duct (DB2) CSA 22.2 No. 211.1 - M1984 (R2003) where direct buried or encased in concrete for conduit size 53mm and more. Use approved jointing cement. Run ground conductor.

.2 Provide galvanized steel electrometallic tubing (EMT) where conduit is surface run. EMT shall be installed with watertight fittings for outdoor applications.

.3 Provide rigid PVC conduit CSA 22.2 No. 211.2-06 (2016) where rigid PVC is surface run, direct buried or encased in concrete for conduit size less than 53mm. Use approved jointing cement. Run ground conductor.

.4 Provide rigid hot dipped galvanized steel in areas where exposed to mechanical damage.

.5 Areas where conduit is exposed to mechanical damage are as follows:

.1 Surface mounted outdoors, from 600 mm below ground to 1600 mm above ground.

2.2 Telephone Service Duct

.1 Provide 53mm orange PVC in accordance with telephone utility requirements.

2.3 Secondary Distribution Duct

.1 Provide 103 mm-PVC where direct buried or encased in concrete.

.2 Adapt to rigid galvanized steel where exposed to mechanical damage.

2.4 Wire

.1 Provide stranded copper conductor unless otherwise noted.

.2 Provide solid copper conductor for lighting and receptacle circuits.

.3 Provide minimum #12 AWG for lighting, heating and receptacle circuits.

.4 Provide RW90 X-LINK polyethylene insulated wire unless otherwise noted.

.5 Wiring at 120/208 volts shall be 300 volt-insulated.

.6 Wiring at 600 volts shall be 1000 volt-insulated.

2.5 Waterstop Sealant

.1 Provide GE RTV 108 general purpose silicone rubber adhesive sealant.

2.6 Duct Seal

.1 Provide Iberville Duct Sealant DUCT-1.

2.7 Flame Stop Sealant

.1 Provide Thomas & Betts flame-safe firestop compound.

2.8 Junction Boxes

.1 Provide hinged Nema 4 enclosure with latching handle. Enclosures shall be steel, phosphatized and finished with a recoatable powder inside and out of ANSI 61 smooth Gray. Enclosures shall be complete with back panel and terminal blocks as necessary to make all connections within.

.2 Junction boxes with multiple voltages within shall be provided with partitions to maintain separation of control wiring, 120V wiring and 600V wiring.

.3 Enclosures shall be sized to suit conductors and joints within. Provide Hammond Eclipse Series or approved equal.

PART 3 EXECUTION

3.1 Conduit

.1 Exposed conduit shall be parallel or perpendicular to building lines.

.2 Support conduit to eliminate visible deflection.

.3 All G.F.I. protected circuits shall be in rigid PVC conduit.

.4 Conduit installed in areas where building finish is painted, shall be painted to match, with two coats of same colour, type and quality.

.5 Conduit entering, or passing through an electrical enclosure or kiosk shall have locknut and washer on both sides of the enclosure or kiosk panel. Connection shall be to standard of the enclosure.

.6 Holes in enclosures, for conduit, shall be made with a knockout.

.7 Seal with fire stop sealant all points where wiring or conduit passes through fire separations.

3.2 Rigid Steel Conduit to PVC Conduit Adapter

.1 Provide PVC female adapter fitting. Rigid Steel conduit shall be threaded into female adapter at points of transition.

3.3 Duct

.1 Connections shall be watertight.

.2 Slope to provide drainage.

.3 Provide drainage tapoffs complete with check valves as required by Electrical Utility and Telephone Co.

3.4 Waterstop Sealant Installation

.1 After all wiring is installed seal all underground conduit ends.

.2 Apply with pump or gun.

3.5 Spare Conductors

.1 Unused wiring in conduits or cable shall be clearly identified as spare with each conductor numbered individually.

3.6 Direct Buried Conduit

.1 Bury all wiring to minimum depths noted in Canadian Electrical Code unless otherwise noted.

.2 Mark location with warning tape 'Danger - Buried Cable' in trench 200 mm below grade.

3.7 Equipment Mounting

.1 Use 19 mm good one side (G1S), exterior grade plywood where required to mount electrical equipment.

.2 Paint plywood with three coats minimum, one primer and two of the base colour. Base colour shall match the surrounding wall or be white if the wall is unpainted.

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PART 1 GENERAL

1.1 Service - General

.1 Provide service in accordance with requirements and standards of the electrical power utility (the Utility). On this project this is BC Hydro

.2 All materials and equipment shall be approved by the above named Utility.

.3 All costs by the Utility will be paid by the Owner.

.4 Co-ordinate all work by the Utility.

.5 Provide a 100 Amp, 600 Volt, 3 phase, 4 wire, underground dip service.

.6 Provide all civil work for underground service including trenching, backfilling, pull boxes, drainage, concrete pads and mechanical protection of duct where required. Provide secondary duct, pilasters, service disconnect switches, instrument transformer enclosure, and all associated accessories where required.

1.2 Approved Manufacturers

.1 All distribution equipment shall be of one approved manufacturer.

Approved manufacturers are:

.1 Cutler Hammer;

.2 Schneider; and

.3 Siemens.

1.3 Service Drawings

.1 The scope of work is generally outlined in the tender drawings; however, the Utility may have drawings/standards that apply to the service work which contain significantly more detail. The Contractor shall do the work in accordance with these detailed Utility drawings/standards. If the Contractor is unfamiliar with the Utility's drawings/standards they shall acquire these prior to tender close, and base their price on them.

1.4 Inspection of Service Installation

.1 The Utility will inspect the service work to insure compliance with their standards.

1.5 Work by Electrical Utility

.1 The Utility will supply and install:

.1 Secondary service conductor;

.2 Utility meters; and

.2 The Utility will supply for installation by Contractor:

.1 Fibreglass form for pilaster

.2 Metering transformers

PART 2 PRODUCTS

2.1 Electrical Service Kiosk - General

.1 Provide a free standing electrical service kiosk complete with 22kAIC service rated main breaker, CT cabinet, meter base & anti-condensation heater and thermostat.

.2 Kiosk shall be of marine grade welded aluminum construction reinforced where necessary to provide adequate strength. Finish unit with RAL 6005 green powdercoat.

.3 Configuration shall be as per single line diagram.

.4 The revenue metering compartment shall be sized to accommodate the utilities current and potential transformers and shall have provision for sealing and shall be complete with approved meter base. Obtain CT's and PT's from Utility and mount in designated area. Revenue metering transformer connections will be by the Utility.

.5 The customer metering compartment shall be complete with ammeter and switch, voltmeter and switch, current transformers, potential transformers and all interconnecting wiring. Ammeter and voltmeter shall be standard panel type, 85 mm-size, 2 % accuracy class.

.6 Main breaker shall be size and number of poles as shown on drawings, minimum 22,000 AIC rating.

2.2 Secondary Duct

.1 See section 16100.

2.3 Drainage

.1 Provide drainage of duct system in accordance with Utility standards.

2.4 Pilaster

.1 Pour concrete pilaster at Primary Dip Pole. The Utility will supply fibreglass form for pilaster. Concrete shall be as per BC Hydro specifications.

.2 Run rigid steel conduit 150 mm up pole from pilaster. Cap and seal conduit. Utility will do all other work on the dip pole.

2.5 Panels

.1 Provide surface or flush mounted 500 mm wide panelboards, complete with circuit breakers with characteristics as noted on panel schedules.

.2 Panels shall be complete with main breakers as noted on panel schedules.

.3 Acceptable Panel manufacturers are:

.1 Cutler Hammer;

.2 Siemens; and

.3 Square D.

.4 Breakers shall be minimum 14,000 AIC bolt on type or stab-lock type. Breakers feeding transformers shall have instantaneous trip at 12 times breaker ratings.

.5 Panels shall be fitted with trim, latch, lock and two keys. Mount top of trim 1700 mm above finished floor.

.6 Provide typed, as-built panel schedule inside panel door.

2.6 C.T. Cabinet

.1 Provide and install Electrical Utility approved cabinets.

.2 Confirm dimensions with the Utility prior to ordering.

2.7 Transformers

.1 Transformers installed indoors in non-hazardous areas shall be Hammond Type K (three phase) dry type air cooled of voltage and KVA rating as shown on Single Line Diagram.

.2 Transformers shall have full capacity primary taps; 4 – 2.5%

2.8 Backfill Materials

.1 Trench backfill materials shall consist of granular material, which is free from stones larger than 150 mm, and relatively free from organic material. It shall contain no frozen soil, roots, or other objectionable material in quantities that might cause damage, excessive settlement or inadequate compaction.

.2 Where native material is unacceptable for backfill purposes, the Engineer will direct the Contractor to dispose of the unsuitable material in designated on-site disposal areas, and to provide imported granular backfill. This imported backfill shall be an acceptable pitrun material free form stones larger than 150 mm organic, stumps, logs, peat, clay, silt and any material which cannot be compacted.

.3 All duct, conduit and cable shall have a minimum of 75 mm of screened sand above and below.

PART 3 EXECUTION

3.1 Balancing of Load

.1 The contractor shall connect all new feeders to the panels so that the load is equally balanced on the 3 phases. Upon completion, he/she shall submit ampere readings from all 3 phases to the Engineer for his/her approval.

3.2 Panel Boards

.1 Install 4 x 27C spare conduits from flush mount panels to ceiling space to allow for additional circuits to be pulled in and connected to future breakers in panel spaces.

END OF SECTION

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PART 1 General

1.1 References

.1 Canadian Standards Association (CSA International)
.1 CSA C22.2 No.29, Panelboards and enclosed Panelboards.

1.2 Related Sections

.1 Section 26 05 01– Electrical General Requirements

1.3 Submittals

.1 Submittals: in accordance with Section 26 05 01.

.2 Submittal drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

PART 2 Products

2.1 Panelboards

.1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.

.2 250V panelboards: bus and breakers rated for 22,000 A (symmetrical) interrupting capacity or as indicated.

.3 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.

.4 Two keys for each panelboard and key panelboards alike.

.5 Copper bus with neutral of same ampere rating as mains.

.6 Mains: suitable for bolt-on or snap-on breakers.

.7 Trim with concealed front bolts and hinges.

.8 Trim and door finish: baked grey enamel.

2.2 Breakers

.1 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual operation.

.2 Plug-in moulded case circuit breakers: quick- make, quick-break type, for manual operation.

.3 Common-trip breakers: with single handle for multi-pole applications.

2.3 Equipment Identification

.1 Provide equipment identification in accordance with Section 26 05 00– Electrical General Requirements.

.2 Nameplate for each panelboard engraved as indicated.

.3 Nameplate for each circuit in distribution panelboards engraved as indicated.

.4 Complete circuit directory with typewritten legend showing location and load of each circuit.

PART 3 EXECUTION

3.1 Installation

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Mount panelboards to height specified in Section 26 05 00– Electrical General Requirements, or as indicated.

.3 Connect loads to circuits.

.4 Connect neutral conductors to common neutral bus.

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PART 1 GENERAL

1.1 Related Work

.1 Section 16100, Basic Materials and Methods.

PART 2 PRODUCTS

2.1 Pull and Junction Boxes

.1 Provide pull and junction boxes appropriately sized where required.

.2 Provide CSA approved, pressed steel construction, hot dip galvanized, except larger boxes may be enamelled, complete with grounding lugs, and screw-on or hinged cover and sized per Canadian Electrical Code requirements, where conduit is concealed.

.3 Provide cast FS type boxes of same material as conduit, where conduit is surface run.

.4 Provide labelled terminals in all control junction boxes with more than four (4) junctions.

.5 For control and instrumentation, provide labelled DIN rail mounted terminals in all control junction boxes with more than four (4) junctions. Terminal strips shall be laid out and labeled in accordance with schematics and wiring diagrams. Junction box shall be NEMA4 or NEMA4X.

.6 Junction Boxes installed in chemical dosing rooms and wet areas shall be NEMA4X.

2.2 Outlets and Switchboxes

.1 Size boxes to suit the number of conductors and connections required therein.

.2 Use gang boxes as required for the number of switches. Check latest architectural drawings for door swings; counter heights and locations, shelf locations, etc., prior to installing boxes. Use maximum 3 gang boxes; where more than 3 gang is required “group” single, double and 3 gang boxes.

.3 Unless otherwise noted or specified herein, all outlets shall be installed flush.

.4 Care shall be taken to ensure that either the switch and receptacles boxes or suitable extensions and/or plaster covers extend to the outside of and are set flush with the final wall finish.

.5 Provide switch and receptacle boxes suitable for installation required.

.6 In areas where conduit is surface run provide type F.S. boxes, constructed of same material as conduit.

.7 Provide Hubbell thermoplastic Self Clamp & Thread series boxes for use with non-metallic sheathed cable.

2.3 Receptacles

.1 Receptacles and matching plugs shall be in accordance with CSA configuration for non-locking receptacles unless otherwise noted.

.2 15A duplex receptacles shall be specification grade Leviton Cat. No. 5262-W, complete with stainless steel coverplate.

.3 Ground Fault Interrupter type duplex receptacles shall be Leviton Cat. No. W799-W.

.4 Weatherproof ground fault interrupter type duplex receptacles shall be Leviton Cat. No. W7599-W, complete with Leviton fiberglass flip-cap cover 6196 for standard box or 6196-FS for FS box.

.5 20A duplex receptacles shall be specification grade Leviton Cat. No. 5362-W, complete with stainless steel coverplate.

2.4 Light Switches

.1 Single pole light switches shall be specification grade Leviton Cat. No. 1201-2W.

.2 Three way light switches shall be specification grade, Leviton Cat. No. 1203-2W.

2.5 Wiring Connections

.1 Use insulated twist on type for #10 AWG and smaller conductors.

.2 Use bolted type for #8 and larger. Use Burndy Compression fittings for connecting spade type terminals to wiring.

2.6 Cover Plates

.1 Plates in finished areas shall be plain stainless steel, satin finished, with bevelled edges and not less than 1 mm thick.

.2 Plates shall be specification grade nylon in Scalehouse.

.3 Exterior surface plates for receptacles shall be gasketed weatherproof polycarbonate.

PART 3 EXECUTION

3.1 Mounting of Wiring Devices

.1 Location of switches, thermostats, etc., shall be grouped inside doors in a coordinated manner on vertical or horizontal centre lines.

.2 Receptacles shall be installed vertically, as noted on the drawings. Generally, outlets shall be installed 500 mm above finished floor. Where they occur over

counters, work tables, etc., they shall be installed approximately 150 mm above the tops of such surfaces, except that where "splashbacks" are fitted, receptacles shall be entirely within or without these backs.

.3 Switches shall be mounted at 1200 mm in all areas. Refer to architectural drawings for final location of door frames, hinges, etc. Switches shall generally be located on the strike side of the door.

.4 Engineer may relocate switches and receptacles up to 3000 mm at no extra cost, provided the relocation is done prior to rough-in.

.5 Ensure that there is insulation and vapour barrier behind boxes mounted in exterior walls, to prevent condensation through boxes.

.6 Pull boxes and junction boxes shall be located above removable ceilings or in electrical rooms, utility rooms, or storage areas.

.7 Where pull boxes are flush mounted, overlapping covers with flush head cover retaining screws, prime coated and painted to match wall or ceiling finish shall be provided.

.8 Where control devices for lighting, etc. and outlets for duplex receptacles, etc. are indicated adjacent to one another or where they appear in the same approximate position on different drawing sheets, they shall be grouped together and provided with a common coverplate.

.9 All the foregoing notwithstanding, devices shall be located to suit the architectural details of the area involved.

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PART 1 General

1.1 References

.1 Canadian Standards Association (CSA International)
- .1 CSA C22.2 No. 250, Luminaires
- .2 CSA C22.2 No.141, Unit Equipment for Emergency Lighting.

1.2 Related Sections

.1 Section 26 05 01– Electrical General Requirements

1.3 Submittals

.1 Submittals: in accordance with Section 26 05 01.

.2 Submit manufacturer's catalogue data including complete catalogue number, photometric data, ballast data, wiring diagrams, dimensions, and descriptive literature. Catalogue cuts for each fixture shall be clearly identified with the designated fixture type identifier indicated on the drawings.

PART 2 Products

2.1 General

.1 Furnish lighting fixtures of the type indicated in the luminaire schedule, complete with lamps, sockets, wiring, and mounting hardware.

.2 Luminaire catalogue designation numbers listed in the luminaire schedule are for reference purposes only for the intended product to be provided. All part numbers are to be accurately confirmed with the other information presented. Confirm all mounting requirements for the luminaires in conjunction with the drawings and other sections of the specifications. Where additional components become necessary for the installation requirements they are to be provided regardless of whether those items are specifically listed in the attached luminaire schedule

.3 Lighting fixtures shall be structurally well designed and constructed, using new parts and materials of the highest commercial grade available.

.4 Verify all ceiling types and finishes before ordering fixtures and provide fixtures suitable for mounting in or on ceilings being installed in each area, as specified. Where fixture types specified are not suitable for ceiling being installed, obtain written instructions from the Contract Administrator before ordering fixtures.

.5 Luminaires of the same or similar type shall be the product of one manufacturer

.6 The luminaire schedule indicates the minimum acceptable quality of fixture for the project, including material quality, finish, size etc. Fixtures of lower quality will not be accepted.

2.2 Luminaire Schedule

.1 See Luminaire Schedule on the Drawings.

2.3 Emergency Lighting

.1 Battery operating emergency lighting:
- .1 Supply voltage: 120V, ac.
- .2 Operating time: 30 min.
- .3 Battery: sealed, maintenance free.
- .4 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus 10% input variations.
- .5 Solid state transfer circuit.
- .6 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .7 Signal lights: solid state, for 'AC Power ON'.
- .8 Lamp heads: integral on unit, 345 degrees horizontal and 180 degrees vertical adjustment.
- .9 Lamp type: LED.
- .10 Cabinet: suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.

PART 3 Execution

3.1 Installation

.1 Complete installation in accordance with manufacturer's recommendations.

.2 Provide complete and proper support for all fixtures, fixture hangers, etc., including headers in ceiling space, where required, for proper support of outlet boxes and fixture hanger assemblies.

.3 Protect all hangers, supports, fastenings or accessory fittings against corrosion.

.4 Use self aligning seismically rated ball joint hangers for rod suspended fixtures. Ceiling canopies or hood assemblies intended to cover the suspension attachments shall be installed to fit tightly to the ceiling without restricting the alignment of the hanger. Support fixtures by hangers and mounting arrangements which will not cause the fixture frame, housing, sides or lens frame to be distorted; or prevent complete alignment of several fixtures in a row.

3.2 Pole-mount Lighting Installation (Types E and F)

.1 Install in accordance with manufacturer's instructions on 7m galvanized, square, tapered, powder coated pole (semi-gloss textured black) with type C concrete base as shown.

.2 Spacing: as per the Drawings.

END OF SECTION

INDEX

PART 1 GENERAL

1.1 Scope of Work

.1 Provide telephone system adequate for intended building use.

.2 Provide computer data system suitable for the intended building use.

.3 Co-ordinate all work by Telus.

1.2 Standards

.1 The workmanship and installation shall conform with the current guidelines contained in the Telephone System Manual of Telus, the Canadian Electrical Code, CAN/CSA T529-M95 and T530-M90 Standards, EIA/TIA 568A Standards and BICSI-TDM.

.2 If unfamiliar with these standards, obtain copy prior to tender close.

.3 Installation of equipment shall be by qualified cabling companies who are trained and authorized by the manufacturers they represent.

.4 All telephone and data wiring shall be minimum CAT 6.

1.3 Charges

.1 Telus Connection fee and monthly rental costs will be paid by the Owner.

PART 2 PRODUCTS

2.1 Conduit

.1 Provide 53mm orange DB2 conduit for telephone service entry.

.2 Provide conduit system for telephones. Run 53 mm EMT from telephone demarcation to IT/Data closet.

.3 Provide Telus approved string in conduits for pulling cables.

.4 Provide 21mm conduit from each data outlet to accessible ceiling space, where no accessible ceiling space is available conduit shall be run to the IT/Data Closet.

2.2 Equipment Mounting

.1 Provide plywood backboards for equipment mounting. Backboards for telephone are to Telus Standards and backboards for data are to be 19 mm (¾") thick, 1220 mm (4' - 0") wide, G1S, floor to ceiling, preferably adjacent to the Telus panels.

.2 Provide freestanding open frame 24" wide data rack complete with cable management.

.3 Provide rack mounted Bix Blocks for all telephone and data cabling terminations.

2.3 Cable Distribution System

.1 Provide J hooks for the telephone and data communication cables. Plenum cables shall be used to meet Code requirements. The cables shall be wrapped using

UNIRAP VELCRO FASTENERS and aligned with the main axis of the building. Within partition, perimeter and column walls provide conduits for wiring to wall outlets, minimum size 19 mm (¾") (1" for 2 data cables).

.2 Conduits, if provided, shall have the carrying capacity to "conductor fill" as per CAN/SCA T530-M90 Table 4.4-1.

.3 Install wall outlet coverplates complete with modular jacks for data and telephone cabling systems at each workstation over a 100 mm x 100 mm (4" x 4") terminal box with a single gang mud ring. Data jacks shall be Category 6 RJ45 modular jacks on in all 4 positions of the coverplate.

2.4 Horizontal Cabling System

.1 Install four twisted pair, 24-gauge solid copper wire, Category 6, insulated and unshielded, enclosed in a FT6 rated covering from the appropriate telecommunication room to modular jack outlets at each work station.

2.5 Transmission and Electrical Characteristics of Category 6 Data Cable (4 Pair)

.1 Cable transmission characteristics shall meet or exceed the specifications set out in Section 10 of the EIA/TIA Standard 568A.

PART 3 EXECUTION

3.1 Telephone System Inspection

.1 Telus will inspect the telephone service conduit to insure compliance with Telus standards.

3.2 Co-ordination

.1 Co-ordinate service installation work with Telus.

3.3 Installation Details

.1 Cable shall not be installed at a distance:

.1 Less than 300 mm from LED lighting;

.2 Less than 1 metre from electric motors; or

.3 At a separation distance from source of 600V or less according to Table 4.8-5 of the CAN/SCA T530-M90 Standards.

.2 When the electric power cable is not in a metallic conduit, data cable shall not be run in parallel with it for more than 10 metres if their separation is less than 300mm.

.3 Where certain areas have many electromagnetic sources, a metallic conduit acting as a shield for the cable run can be used to minimize electrical interference. The metallic conduit must be solidly grounded.

.4 The cable shall be continuous without joints or splices from the wall coverplates to the patch panels in telecommunication room.

.5 If the cable is in a conduit the maximum number of bends between draw-in points shall not contain more than two (2) 90° bends.

.6 Where no conduits are employed, all cables shall be neatly bundled into cable harness, neatly run, properly dressed, supported and secured with appropriate nylon J-hooks or velcro straps. Do not use plastic tyraps. Cable bundles must not be stressed or over clinched. Ensure that cable bend radii are no less than six times the cable diameter for copper cable and ten times the cable diameter for optical fiber.

.7 The maximum cable length for each run shall be limited to 90 metres.

.8 Allow an extra 3 metres of cable on each run at the workstation end and extra 2 metres at the patch panel end. Extra cable shall be neatly coiled and properly supported.

.9 Telephone and data cables may be pulled-in simultaneously and may share the same conduit. If possible, use different coloured sheath for voice and data cabling, ex: Blue/Black for data and Grey for voice.

.10 All unused telephone and data cable shall be neatly coiled and fastened with velcro straps at the end of the cable in ceiling space. Allow 10 extra metres of cable at the end of each run.

.11 When cables are terminated in Pac-Poles, allow an extra 3 metres of cable on each run at workstation end. Extra cable is to be neatly coiled and properly supported in ceiling space.

3.4 Cable Terminations and Terminal Systems

.1 Termination of all cables shall be as specified in the EIA/TIA 568 Standards pin configuration 568A RJ45 modular jacks. In telecommunication room, terminate all cables on RJ45 modular jacks in patch panels mounted data rack. At the workstation, terminate all cables on the appropriate type of modular outlets (wall, surface, modular furniture, etc.). Use Category 6 jacks for data and voice.

.2 Voice riser cables shall be terminated in IDC (insulation displacement connector) wiring blocks with IDC patching capability on either end, such as 110 or BIX1A. Appropriate mounting hardware (racks) shall be supplied and blocks or racks shall be mounted on plywood backboard.

.3 Layout rackl mounted cross-connect systems from left to right and from top to bottom an terminate data cabling on the punch-down rail so that only ½" (13 mm) of each cable pair is exposed from the cable.

.4 Use appropriate mounting frames and cable management devices (e.g. "D" rings, panel cable supports, etc.) For vertical and horizontal cable installation and jumper channeling.

.5 All data communication connectors including telecommunication outlets, patch panels, transition connectors and cross-connect blocks shall be certified to 200 MHz and within the limits set in the EIA/TIA Standard 1152.

3.5 Numbering and Labeling

.1 Each cable shall be clearly marked with a permanent identifier at each end of the cable.

.2 Label cross-connect ports consecutively starting from left to right and then from top to bottom. Workstation address shall correspond to cross-connect number.

.3 The wall outlets shall be clearly and permanently marked at coverplates with icon identification for both service types as well as with clear identification of cable/termination numbers.

3.6 Main Distribution Terminal

.1 Use rack mounted cross-connect hardware.

.2 Layout for copper cross-connect system shall be from left to right and from top to bottom.

.3 Segregate voice and data fields for ease of maintenance and administration.

3.7 Testing

.1 All cables shall be tested for continuity, crosstalk, attenuation as well as a TDR test. All data cables shall be tested individually to within the limits as specified in TIA/EIA Bulletin TSB 155-A.

3.8 Guarantee

.1 All cabling and workmanship shall be guaranteed for a minimum of five years or as provided by the manufacturers if the guarantee period is longer than five years from the final acceptance of the project.

.2 The Contractor must pre-register this project with the manufacturer for the warranty period, in accordance with the manufacturer's requirements.

.3 Install voice riser cables from Telus point of demarcation to the first telecommunication closet required in this contract.

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PART 1 GENERAL

1.1 Scope of Work

.1 The scope of work is outlined in the tender drawings. Telus will issue detail drawings to the Contractor. He/she shall do the work in accordance with these detailed drawings and the standards of Telus. If the Contractor is unfamiliar with these standards he/she shall acquire these standards prior to tender close, and base his/her price on these standards.

.2 Provide telephone service as shown.

.3 Arrange for installation of telephone connection to building.

.4 Co-ordinate all work by Telus.

1.2 Standards

.1 Perform work in accordance with requirements of Telus.

.2 If unfamiliar with these standards, obtain copy prior to tender close.

1.3 Charges

.1 Telus Connection fee and monthly rental costs will be paid by the Owner.

PART 2 PRODUCTS

2.1 Conduit

.1 Provide a 100 mm "orange" PVC conduit from telephone demarcation location, underground and up utility pole across Teleglobe Canada Road. Conduit shall be DBII underground and rigid PVC where exposed.

.2 Provide Telus approved string in conduits for pulling cables.

2.2 Main Telephone Cabinet

.1 Mount 1200 mm x 2400 mm sheet of 19 mm plywood for main telephone demarcation in location shown on the drawings. Provide receptacle on separate circuit on plywood panel for sole use of Telus. Pain plywood with 3 coats minimum, 1 primer and 2 base colour. Base colour shall match the surrounding wall or be white if the wall is unpainted.

.2 Telus will supply main telephone cabinet for mounting by Contractor.

.3 Provide #8 AWG ground wire in 25 mm rigid PVC conduit from telephone cabinet to MDC ground bus.

2.3 Wall Boxes

.1 Wall boxes shall comprise outlet boxes, plaster rings and single gang telephone cover plates.

PART 3 EXECUTION

3.1 Telephone System Inspection

.1 Telus will inspect the telephone system conduit to insure compliance with Telus standards.

3.2 Co-ordination

.1 Co-ordinate all work with Telus. Notify Telus installations crews that the building is ready for service two weeks prior to sheeting in of walls.

END OF SECTION

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PART 1 SCOPE OF WORK

1.1 Introduction

The Contractor shall provide, install, and program a functionally complete burglar alarm system per Manufacturer's guidelines, codes, described, and these specifications.

1.2 Work Included

.1 Installation of Closed Circuit Television system including all equipment and wiring required to create a complete system as per these specifications and the contract drawings Documentation to be submitted by Contractor after award of contract

.2 **System Wiring**

All system wiring shall be installed in conduit.
CAT6 cabling and patch cables shall be **Orange** in color for all security cameras and associated equipment.
All security appliances shall be tied to patch panel in IT/Data room.
All wiring shall be installed in accordance with the Canadian Electric Code (CEC)

.3 **System programming**

The Contractor shall complete the initial programming of the network video recorder in accordance with these specifications.
The Contractor shall adjust cameras (aim and focus) and verify with the owner or owner's representative that the field of view is acceptable.
The Contractor shall not data lock any of the security equipment to prevent the owner authorized vendor from editing or revising the programming.

1.3 Documentation to be Submitted to the Engineer, by Contractor, After Award of Contract

.1 Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include point-to-point drawings of systems and wiring diagrams of individual devices.

1.4 Documentation to be Submitted to the Engineer, by Contractor, Upon Completion of System Installation

.1 Record Drawings: Upon completion of installation, the Contractor shall prepare Record Drawings of the system. These Record Drawings shall be modified AutoCAD (Revision 2014 or greater) drawings of the project indicating exact device locations. Record Drawings shall be submitted to the Engineer for approval prior to the system acceptance walk through.

.2 Operation and maintenance manuals: One (1) set of operating manuals shall be provided explaining the operation and maintenance of the system. Additionally, final point-to-point wiring diagrams of each device shall be included in the Maintenance Manuals

.3 Required security paperwork:

NVR installation and operation manual
Hardware manuals, to include cameras and power supplies
Wiring notes with equipment locations

1.5 On-site Security Personnel Training

Upon completion of the installation, the Contractor shall furnish training in the complete operation of the system to persons to be determined at installation.

1.6 System Approvals

.1 The system shall be the standard product of one manufacturer, and the manufacturer shall have been in business manufacturing similar products for at least 5 years.

.2 After-sales support: The Contractor shall be a factory-authorized and trained dealer of the system and shall be factory-trained and certified to maintain/repair the system after system acceptance.

1.7 Quality assurance

All equipment, systems, and materials furnished and installed under this section shall be installed in accordance with the applicable standards of:

Canadian Electrical Code
Approvals and Listings: CSA, ULC
Local Authorities Having Jurisdiction

1.8 Guarantee of Work

All components, parts, and assemblies supplied by the Manufacturers and installed by the Contractor shall be warranted against defects in material and workmanship for a period of at least 12 months (parts and labor), commencing upon date of acceptance by Owner. A qualified factory-trained service representative shall provide warranty service.

1.9 On-site Security Personnel Training

During the warranty period the Contractor shall be responsible for maintenance and repair of the system including the repair of workmanship defects, free of charge (parts and labor) and shall correct any system defect within six (6) hours of receipt of call from Owner.

PART 2. CLOSED CIRCUIT TELEVISION (CCTV)

2.1 CTTV Descriptions

The following specifications are provided to establish minimum installation and operational requirements for the proposed video surveillance system. The Owner and Engineer will consider and must approve reasonable alternatives that are proposed for any element or component or the proposed system

2.2 CTTV Requirements

.1 The CCTV equipment shall be installed in accordance with the Canadian Electric Code and the Local Authority Having Jurisdiction.

.2 The CCTV equipment hardware shall be installed in accordance with ULC requirements.

2.3 Cameras

CCTV cameras shall come complete with all materials required for mounting as required for each location.

Camera resolution shall be minimum 1080p (1920 x 1080).
Operating temperature shall be -20°C to +60°C.
Camera shall be suitable for indoor or outdoor operation as required.
Camera shall be capable of colour capture using IR at 0lux lighting level or 0.025lux with out IR.
Outdoor cameras shall be supplied complete with heaters to prevent icing.

Pre-Approved cameras include:

1. A. American Dynamics Illustra 600 series
2. B. Pelco ICS150-CDV4A
3. C. Bosch VDC495V03-20

2.4 Network Video Recorder (NVR) Description American Dynamics VideoEdge

.1 Pre-Approved NVR is American Dynamics VideoEdge NVR (ADVER12R5N2B).

.2 The NVR shall provide mass video storage capability by providing 12TB of storage with two (2) spare storage bays for future growth.

.3 NVR shall be provided with a minimum of 16 IP camera licenses.

PART 3 EXECUTION

3.1 Installation

Install all equipment and materials in accordance with the “current” recommendations of the manufacturer. The work shall also be in accordance with:

Installation criteria defined in these specifications and in the construction documents.
Approved submittals.
Applicable requirements of the referenced standards.

3.2 Programming

Programming of the system shall include the following tasks: Supervision of subcontractors.

.1 Programming system configuration parameters (hardware and software, camera location/number, communication parameters).

.2 Other programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

3.3 Testing

Operational Testing: The contractor shall perform thorough operational testing and verify that all system components are fully operational.

Hard-copy System Printout: The contractor shall submit a hard-copy system printout of all components tested and certify 100 percent operation indicating all devices/panels/units have passed the test criteria set forth by the manufacturer.

Acceptance Test Plan Form: An acceptance test plan form shall be prepared/provided by the contractor prior to the acceptance walk through.

3.4 Commissioning

The Contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personal needed to conduct an efficient commissioning process.

3.5 Training

Up to three hours of on-site training shall be provided which shall include proper installation and programming of all related hardware and software and training of departmental end-user.

END OF SECTION

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PART 1 GENERAL

1.1 Scope of Work

.1 Introduction

The Contractor shall provide, install, and program a functionally complete burglar alarm system per Manufacturer's guidelines, codes, described, and these specifications.

.2 Work included under this section

A. Installation of security system including

B. System wiring

- Wire gauge and shielding shall follow the manufacturer's installation guidelines.
- All wiring shall be installed in accordance with the Canadian Electrical Code (CEC).
- All wiring shall be concealed where possible. All exposed wiring shall be installed in EMT conduit.
- Cables penetrating floors and firewalls must be routed through a metallic sleeve and properly fire stopped to meet national and local fire codes. All walls and floors shall maintain their existing fire rating.

C. System programming

- The Contractor shall complete the programming of security system
- The Contractor shall not data lock the alarm control panel to prevent the Owner or any authorized vendor from editing or revising the programming.

.3 Related work specified under other sections of these specifications (Related sections)

A. This work shall be done in strict accordance with these Contract Documents prepared for CVRD, Owner.

B. The Contractor shall perform all work described in this document and not expressly mentioned in the specifications, but obviously necessary for the proper execution of the same. It is not the intent to delineate or describe every detail and feature of work. No additions to the contract sum will be approved for any materials, equipment, and/or labor to perform work hereunder unless it can be clearly shown to be beyond the scope and intent of the drawings and specifications and essential to the proper prosecution of the work.

C. Work under this contract consists of the complete installation and includes, but is not necessarily limited to, the furnishing of all labor, superintendence, material, tools, and equipment necessary to complete all the work as specified

hereinafter.

1.2 General Conditions

.1 Documentation to be submitted by Contractor after award of contract

.1 Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include point-to-point drawings of systems and wiring diagrams of individual devices.

.2 Permits: The Contractor shall be responsible for identifying requirements for permits from all building, police, and fire authorities for the installation of the system(s) specified herein and shall assist the owner in obtaining the relevant permits.

.2 Documentation to be submitted by Contractor upon completion of system installation

A. "As-builts" Upon completion of installation, the Contractor shall prepare "as-built" drawings of the system. These "As-builts" shall be AutoCAD (Revision 2013 or greater) drawings of the system indicating exact device locations, panel terminations, cable routes, and wire numbers as tagged and color-coded on the cable tag.

Additionally, final point-to-point wiring diagrams of each type of device (in AutoCAD) shall be included in the "as-builts."

"As-builts" shall be submitted to the Owner for approval prior to the system acceptance walk through.

B. Operation and maintenance manuals: operating manuals shall be provided explaining the operation and maintenance of the system as per Division 1.

C. Paperwork to be placed inside of alarm panel:

- Panel programming and installation manual
- Power supply manuals
- System operation manual
- Component manuals to include, keypads, motion detectors, door contacts, etc.
- All wiring notes

.3 On-site security personnel training

Upon completion of the installation, the Contractor shall furnish training in the complete operation of the system.

.4 System approvals

.1 The system shall be the standard product of one manufacturer, and the manufacturer shall have been in business manufacturing similar products for at least 15 years.

.2 After-sales support: The Contractor shall be a factory-authorized and trained dealer of the system and shall be factory-trained and certified to maintain/repair the system after system acceptance.

.5 Quality assurance

A. All equipment, systems, and materials furnished and installed under this section shall be installed in accordance with the applicable standards of:

1. National codes: CEC and NFPA
2. Approvals and Listings: CSA, ULc EIA/TIA Telecommunications wiring standards
3. Local Authorities having jurisdiction

.6 Guarantee of Work

All components, parts, and assemblies supplied by the Manufacturers and installed by the Contractor shall be warranted against defects in material and workmanship for a period of at least 12 months (parts and labor), commencing upon date of project substantial performance. A qualified factory-trained service representative shall provide warranty service.

.7 Service/Maintenance

.1 During the warranty period the Contractor shall be responsible for maintenance and repair of the system including the repair of workmanship defects, free of charge (parts and labor).

.2 The installer shall correct any system defect within six (6) hours of receipt of call from Owner.

.3 The Contractor shall offer extended service/maintenance agreements up to four years after the warranty expires. The agreement shall be renewable monthly, quarterly, or yearly.

PART 2. SECURITY SYSTEM

2.1 Security Systems

.1 Security System Description

MAXSYS Control Panel PC4020

.2 Security System Feature/Capability

The following indicates system capabilities and capacities:

A. 16 on-board zones

B. Expandable up to 128 zones using hardwire, wireless modules and addressable zones

C. Supports up to 16 hardwired keypads

D. 8 partitions

E. Expandable to 64 wireless zones

F. 1,500 user codes (4 or 6 digit)

G. 3,000 event buffer

H. 9 account and 3 phone numbers

I. Built-in telephone line and siren supervision

J. Auto SIA and Contact ID formats

K. Supports GSM and T-Link™ alarm communicators

L. Standby power capable of maintaining system operation for a minimum of 12 hours and the ability to transmit a trouble signal before failure.

.3 Security System Interface Requirements

A. All Installations: The security system shall be installed in accordance with the Canadian Electrical Code and the Local Authority Having Jurisdiction.

B. The security control hardware shall be installed in accordance with CSA & ULc requirements.

2.2 Security System Materials

.1 Security System Hardware Description

A. Security System: The security system shall be provided, at a minimum, with the following components. Additional accessories shall be provided based on the quantities and features required for the application.

1. MAXSYS Control Panel PC4020 with enclosure.
   - System Accessories:
     a) AC power supply
     b) Minimum: 7 amp hour battery back up
     c) Panel tamper switch
2. MAXSYS Programmable-Message LCD Keypad, LCD4501
3. Bravo 201 PIR Motion Detectors, BV-201
4. 2-Way Wireless Indoor Siren, DSC WT4901
5. Honeywell 959 XTP Overhead Door Contact
6. Honeywell 947-75T 3/4” Diameter Steel Door Recessed Contact
7. Honeywell 940 Magnetic Door Contact and Window Contact

2.3 Security System Equipment Locations

See Scope and Drawings.

PART 3 EXECUTION

3.1 Installation

Install all equipment and materials in accordance with the "current" recommendations of the manufacturer. The work shall also be in accordance with:

A. Installation criteria defined in these specifications and in the construction documents.

B. Approved submittals.

C. Applicable requirements of the referenced standards.

3.2 Supervision

The contractor shall provide the following services as part of the contract:

A. Supervision of sub-contractors.

B. Coordination of other contractors for system related work (electrical contractor, finish hardware contractor, door contractor, architect, and general contractor).

C. Attending construction meetings.

D. Keeping updated drawings at the site.

E. Meeting construction deadlines per schedule.

3.3 Programming

Programming of the system shall include the following tasks:

A. Programming system configuration parameters (hardware and software, door location/number, communication parameters).

B. Programming operational parameters such as arm/disarm combinations, entry/exit delay times, and communication failure/restore times.

C. Other programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

3.4 Testing

A. Operational Testing: The contractor shall perform thorough operational testing and verify that all system components are fully operational.

B. Hard-copy System Printout: The contractor shall submit a hard-copy system printout of all components tested and certify 100 percent operation indicating all devices/panels/units have passed the test criteria set fourth by the manufacturer.

C. Acceptance Test Plan Form: An acceptance test plan form shall be

prepared/provided by the contractor prior to the acceptance walk through.

This form shall include separate sections for each device/panel/unit as well as a column indicating the manufacturer's performance allowance/margin, a column indicating the result of the testing performed by the contractor (pass/fail), and an empty column for recording finding during the walk-through.

3.5 Commissioning

The Contractor shall certify completion in writing and schedule the commissioning walk-through. The contractor shall provide all the tools and personal needed to conduct an efficient commissioning process.

3.6 Training

Up to one hour of on-site training shall be provided which shall include training on the use of the system to the departmental end-user.

END OF SECTION

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PART 1 GENERAL

1.1 Work Included

.1 This section includes all requirements for labour, materials, and equipment and costs necessary for and incidental to the design, supply, erection and testing of two (2) commercial truck weigh scales, complete with concrete foundation, scale platforms, load cells, electrical, controls, monitor and equipment and red/green traffic signals.

1.2 References

.1 National Institute of Standards and Technology Handbook 44 (NIST HB-44).

.2 Measurement Canada Certification.

.3 Geotechnical Assessment: "Meade Creek Ash Landfill Preliminary Geotechnical Assessment", Thurber Engineering Ltd., August 18, 2016.

1.3 System Description

.1 Supply and install two (2) concrete deck full pit truck scales with manholes, railings and associated electronic controls.

.2 The scale shall be a Mettler-Toledo, Inc. Model VTC101 PDX Digital Scale or approved alternate.

.3 Concrete foundation to be designed and constructed by the Contractor.

.4 Supply and install two (2) Red/Green traffic signals, mounting arm, mounting plate and accessories.

.5 Supply and install two (2) Red/Green traffic signals shall be manufactured by Fortan Traffic System or approved alternate.

1.4 Submittals

.1 Provide detailed shop drawings, material specifications, and standard colour samples for approval in accordance with the Contract Documents.

.2 Shop drawings shall cover the scales, anchorage, accessories, appurtenances and coatings.

.3 Measurement Canada Certificate.

.4 Provide sealed drawings for the reinforced concrete foundation including reinforcing, all anchorage for the scale, all pipe penetrations and a concrete mix design. Drawings shall be prepared under the supervision and sealed by a Professional Engineer registered in B.C. The drawings shall clearly state design criteria including seismic, wind and snow loads that the designs meet.

1.5 Quality Assurance

.1 The scale manufacturer shall be a specialist in the design, fabrication, and erection of commercial truck scales.

.2 The manufacturer shall be quality certified.

.3 The Contractor shall provide manufacturer's certificates assuring that the scales and materials supplied conform to these specifications.

.4 All welding shall be completed in accordance with the American Welding Society (AWS) D1.1 Structural Welding Code.

.5 All welding shall be performed by welding operators who have been certified to the AWS D1.1 Structural Welding Code.

1.6 Delivery, Storage, and Handling

.1 Contractors shall familiarize themselves with the site location, access limitations, traffic conditions and potential service interruptions and plan the material deliveries and work schedule accordingly.

.2 All plates, supports, members, and miscellaneous parts shall be packaged for shipment in such a manner to prevent abrasion or scratching of the finish coating.

.3 In preparation for transport, all materials shall be marked or tagged with part number for ease of field assembly.

.4 Provide touch-up paint with instructions for application by erection personnel.

.5 Contractor shall be responsible for providing adequate storage, protection and security of equipment delivered to site until the project achieves Substantial Completion.

1.7 Project/Site Conditions

.1 It shall be the Contractor’s sole responsibility to design the scale system and concrete pit for all environmental conditions in accordance with all applicable codes.

.2 Refer to the geotechnical report for geotechnical conditions of the site.

.3 The contractor shall be responsible for preparation of the scale site, laydown areas, any required access improvements and coordination of such with other trades.

.4 Contractor to schedule and coordinate activities with other trades.

1.8 Warranty

.1 The scale manufacturer shall warrant the scale assembly including all load cells, weighbridge structure, load cell system, scale instrument, cables, lightning protection from failures due to a defect in manufacturing, workmanship, lightning, or surge voltages for a period of ten (10) years from date of commissioning.

.2 The warranty shall support 100% coverage of repair parts, labor, travel time, and mileage from the closest service location, or at the manufacturer’s sole discretion, replacement of the product under warranty. The full cost of warranty as specified herein shall be supported by the manufacturer and not in part by any other 3rd party or service provider.

PART 2 PRODUCTS

2.1 Manufacturers

.1 Approved scale system suppliers are as follows:

.1 Mettler-Toledo, Inc

.2 Other suppliers may be approved during the tender period

.2 Approved traffic signal system suppliers are as follows:

.1 Fortran Traffic Systems

.2 Other suppliers may be approved during the tender period

2.2 Scale Design Criteria

.1 The scale shall have a clear and unobstructed weighing surface of not less than 40 feet long and 11 feet wide.

.2 The scale shall be fully electronic in design and shall not incorporate any mechanical weighing elements, check rods, or check stays.

.3 The scale shall be designed to perform as a single weighing platform and shall be of flat-top design. Side rail support beams are not acceptable.

.4 The scale shall have a gross weighing capacity of 100 tons.

.5 The scale shall have a Concentrated Load Capacity (CLC) of 80,000 pounds.

.6 The scale shall be designed to accept vehicles that generate up to 60,000 pounds per tandem axle.

.7 The scale shall be calibrated to a minimum of 100,000 kg by 5 kg increments.

.8 The scale weighing related electronics shall be comprised solely of load cells, load cell cables and digital weight display.

.9 The load cells and load cell mounting hardware shall be constructed of stainless steel. The cables shall be stainless steel sheathed. Load cells which are not stainless steel and hermetically sealed shall not be accepted.

.10 The scale shall be certifiable and a type approved by Measurement Canada.

2.3 Scale Foundation

.1 The foundation and approach shall be adequate to support vehicles that generate up to 60,000 pounds per tandem axle without movement or deflection in the foundation or weighbridge.

.2 The foundation shall meet all local requirements and the minimum specifications as stated in this section and as shown on the Contract Drawings.

.3 The foundation shall extend the full length and width of the scale platform.

.4 The foundation shall be constructed to provide positive drainage away from its center.

.5 The foundation shall be located on a competent subbase as determined by the scale and foundation designs.

.6 A concrete foundation shall be designed and constructed by the scale supplier to support the scales and to resist settlement. The foundation sub-base and foundation shall be designed and built by Contractor. Sealed drawings shall be provided as per Part 1.4 of this Section.

2.4 Weigh Bridge

.1 The prefabricated scale modules shall be designed to enable field pouring of the concrete without additional field forming.

.2 The scale weighbridge shall be capable of weighing trucks that have dual-tandem axle weights (4 feet minimum between dual axles and at least 10 feet from next axle) of up to 60,000 pounds, and shall have a Concentrated Load Capacity (CLC) of 80,000 pounds.

.3 The concrete deck shall be supported by an integral steel structure of sufficient design and construction to meet the loading and life cycle testing as specified in Section 1 of this specification.

.4 There shall be no bolted connections between the load cell and weighbridge assemblies.

.5 There shall be no field welding required for the installation of the scale.

2.5 Surface Preparation and Finish

.1 The weighbridge shall be shot blasted to a minimum SSPC-SP6 specification prior to painting.

.2 All exterior surfaces of the scale shall have a two component, high build epoxy finish, impregnated with aluminum flake for increased corrosion resistance and UV protection, providing total Dry Film Thickness of 5-7 mils; International/Akzo Nobel Intergard 7562 or equivalent.

.3 The finish shall be force cured in order to reduce risk of contamination and ensure durability of the surface.

2.6 Load Cell Specification

.1 Each load cell shall have a minimum capacity of 50 metric tons (110,000 pounds) with 300% ultimate overload rating.

.2 All Load cells shall be certified by NTEP and meet the specifications as set forth by NIST HB-44 for Class IIIL devices. The manufacturer shall provide a Certificate of Conformance to these standards upon request.

.3 All load cells shall be certified to meet the specifications set forth by the International Organization of Legal Metrology (OIML) in document R60 for C3 load cells, which requires 60% tighter accuracy tolerances than NIST HB-44 for Class IIIL devices. The manufacturer shall provide a Certificate of Conformance to these standards upon request.

.4 Load cells shall be digital with an integral microprocessor and analog-to-digital conversion function located within the load cell housing.

.5 Load cells shall output only converted digital information without load correction for load position to the scale instrument. Analog output of signals from the load cell is not acceptable due to susceptibility of signal interference.

.6 The load cell assembly shall be constructed so as to perform as a rocker pin and shall have no positive fixed mechanical connectors, such as bolts or links that are required in mounting the load cell to the weighbridge or foundation base plates.

.7 The load cell shall be of stainless steel construction and hermetically sealed with a minimum NEMA 6P / IP68 (submersible) and IP69K rating.

.8 The load cell shall contain integral Transient Voltage Surge Suppressors (TVSS) for all input and communication lines. Each TVSS shall contain self-resetting thermal breakers to protect the load cell components from voltage and current surges.

.9 The load cell shall come equipped with a neoprene rubber boot to keep debris from contaminating the lower bearing surface.

.10 The load cell shall have a positive-lock quick connector integral to its housing for connecting and disconnecting the load cell interface cable at the load cell. The connector shall be of glass-to-metal, pin-type construction to maintain a hermetic seal.

.11 The load cell shall have the following specifications:

.1 Vmin: 5.0 pounds maximum

.2 Hysteresis: ± 0.025% of full scale

.3 Non-Linearity: ± 0.015% of full scale

.4 Creep (30 minutes): ± 0.017% of applied load

.5 Temperature range: -10°C + 40°C

.12 The load cell interface cable shall be stainless steel sheathed for environmental and rodent protection. Neoprene covered load cell cable shall not be permitted. Load cell cables which are hard wired directly to the load cell are not acceptable.

.13 Load cells shall be Mettler-Toledo, Inc. POWERCELL® PDX® load cell or approved equivalent.

2.7 Scale Instruments

.1 The scale instrument shall be designed for use in vehicle scale weighing applications. It shall be capable of performing basic weighing operations including but not limited to:

.1 Inbound/outbound two-weighment operations.

.2 Single weighment operations where vehicle tare weights are known either through preset tares which are stored in the scale instrument memory or manually entered tare values which are entered through the keyboard.

.3 Transient vehicle weighing operations where the transaction is to be completed but the record will not be added to memory accumulators or totals.

.2 The instrument shall, as a minimum, utilize a 128 x 64 dot vacuum florescent display with graphic capability to present the transactional information along with weight to the operator. During normal weighing operations the display will incorporate the following elements:

.1 Weight (21mm high characters)

.2 Time and Date

.3 Center of Zero

.4 Mode of Operation (Gross or Net)

.5 Weighing Unit (lb or kg)

.3 The scale instrument shall have the following keyboard operations:

.1 0-9 Numeric Keys

.2 . (Decimal Point)

.3 Clear

.4 Tare

.5 Zero

.6 Print

.7 Four Application-Specific Assignable Soft Keys with icons for easy operator use to identify TempID and VehID, etc.

.8 Five Scale-Function Soft Keys

.9 Screen Navigation Keys for Up, Down, Left, and Right Commands

.10 Enter

.4 The operator shall be capable of entering alphanumeric characters through the terminal without the need for an external keyboard. However, the scale instrument shall, as an accessory, be capable of being interfaced to a standard USB-style computer keyboard without modifications to the scale instrument hardware or software for the purpose of entering alphanumeric information, as well as emulation of application and scale instrument soft-key functionality, if required.

.5 The scale instrument shall have the following operational parameters:

.1 Capable of communicating with up to 6 pairs of digital load cell assemblies.

.2 Ability to digitally average the weight information sent from the load cells and updating the instrument's weight display 15 times per second.

.3 Capable of being programmed for sign-corrected net weighing so that all net weights are positive.

.4 Have a transaction counter to automatically assign sequence numbers to transactions.

.5 Have automatic zero capture on power-up selectable to capture zero at 2% or 10% of the full-scale capacity.

.6 Have adjustable digital filtering.

.7 Have adjustable automatic zero maintenance selectable for □ 0.5, □ 1, or □ 3 displayed increments.

.8 Have push-button zero selectable for □ 2% or □ 20% of full-scale capacity.

.9 Tare, Zero, and Print functions shall be inhibited while the weight display is changing. Motion detection shall be selectable for □ 0.5, □ 1.0, □ 2.0, or □ 3.0 increments.

.10 Only receives digital information from the load cell assemblies. There shall be no analog-to-digital conversion function in the scale instrument.

.11 Capable of providing load correction for load position.

.6 The scale instrument shall be NTEP certified and meet or exceed the specifications set forth by NIST HB-44 for Class II, III, and IIIL Devices. The manufacturer upon request shall provide a Certificate of Conformance to these standards.

.7 The scale instrument shall be housed in a metal enclosure that is suitable for desk or wall mounting.

.8 The scale instrument shall have flexible storage capability with a minimum of 256 Mbytes of flexible memory in which to store pertinent vehicle, transactional, and commodity information. The scale instrument shall be capable of storing the weight

information automatically or enabling the operator to assign a memory location to the weight manually. The scale instrument will run SQL or equivalent database application to enable possible integration into higher level databases.

.9 The scale instrument shall have subtotal and total weight accumulators.

.10 The operator shall be able to enter up to 12 digits of alphanumeric ID through the instrument keyboard.

.11 The scale instrument shall have gross/net weight switching.

.12 The scale instrument shall be capable of being programmed and calibrated in pounds or kilograms.

.13 The scale instrument shall have the following data communications capabilities:

.1 One com port RS232

.2 One com port RS232, RS422, or RS485

.3 One TCP/IP 10 Base-T Ethernet

.4 One Web server

.5 One Shared Data server

.14 The scale instrument shall output the following information:

.1 Gross, Tare, and Net Weight

.2 ID

.3 Transaction Counter

.4 Time and Date

.5 Variable Application-Specific Information

.6 Standard Reports Generated by the Scale Instrument

.15 The scale instrument shall be UL/cUL listed.

.16 Scale instrument shall have the ability to connect with external PC software to allow configuration, data backup and restore, security unlock capabilities, FTP access to log files so as to significantly reduce service cost and downtime during any repair and maintenance of the scale.

.17 The scale instrument shall be a Mettler-Toledo, Inc. Model IND560 or approved equivalent.

2.8 Lighting Protection

.1 A lightning protection system shall be provided with the scale.

.2 Major scale components including load cells and scale instrument shall be included in the lightning protection system.

.3 Grounding of all scale components including load cells, scale instrument, and accessories shall be to one common point. Systems with multiple ground points are not acceptable.

.4 An AC line surge protector shall conveniently plug into a common electrical outlet and have a receptacle.

.5 Each AC line surge protector required shall have one isolated, grounding, hospital-grade duplex receptacle, and an internal 15-amp circuit breaker.

.6 Verification of the lightning protection system's performance shall be available in writing from a third-party verification laboratory upon request. Proposals submitted without confirming the availability of 3rd party confirmation that the load cells, cables and instrument as a system have been able to withstand the equivalent of a lightning strike with 38,000 amperes will be rejected.

2.9 Printer Specifications – Document Printer

.1 The printer shall be housed in a suitable enclosure for desktop mounting.

.2 The printer shall interface with the scale instrument using a singular cable with quick connectors on each end and shall not require any modifications to the instrument or printer.

.3 The printer shall have a serial interface capable of communicating with the instrument using an RS232C interface with selectable transmission rates from 300 to 9,600 baud. Transmission must be on demand.

.4 The printer shall have a nine-pin dot matrix print head with a minimum rated life of 200 million characters.

.5 The printer shall be capable of printing at a minimum speed of 300 characters per second.

.6 The printer shall have a minimum buffer memory capable of storing at least 28,000 characters.

.7 All materials, components, and electrical design shall comply with UL and CSA standards and requirements.

2.10 Printer Specifications – Ticket Printer

.1 The printer shall be housed in a suitable enclosure for desktop mounting.

.2 The printer shall interface with the scale instrument using a singular cable with quick connectors on each end and shall not require any modifications to the instrument or printer.

.3 The printer shall be capable of printing 3.1 lines per second.

.4 The printer shall have an easily replaceable ink ribbon cartridge that shall be rated for a minimum life of 1.2 million characters.

.5 The printer shall be capable of accepting forms up to 0.25 mm thick, original plus 2.

.6 The printer shall provide friction-feed paper advance.

.7 The printer shall have a minimum buffer memory capable of storing at least 2000 bytes.

.8 The printer shall be capable of printing all information sent from the scale instrument, including:

.1 Gross, Tare, and Net Weights

.2 Time and Date

.3 Transaction Counter Number

.4 12-Digit Alphanumeric ID

.9 All materials, components, and electrical design shall comply with UL and CSA standards and requirements.

2.11 Accessories

.1 Appurtenances

.1 The Contractor shall furnish and install the appurtenances as shown in the contract drawings and as specified below. Unless otherwise noted, standard appurtenances shall be as follows:

.2 Cable

.1 The scales shall be provided with 15 metres of cabling

.3 Access Hatch

.1 Access hatches to the standards of WorkSafe BC to be located at either end of the scale.

.2 The hatch cover shall be hinged and have provisions for locking.

.3 The hatch cover shall be sealed with an EPDM or Nitrile gasket.

.4 Ladder

.1 Provide access ladder and platform to the standards of WorkSafe BC.

.2 Ladders shall be equipped with a hinged lockable entry device.

2.12 Red/Green Traffic Signal

.1 Red/Green traffic signal to meet the following latest specifications:

.1 Institute of Traffic Engineers (ITE)

.2 Ministry of Transportation and Infrastructure.

PART 3 EXECUTION

3.1 Examination

.1 All installation shall be inspected, calibrated and tested by service technicians from the Manufacturer. The erection contractor shall provide assistance to the inspector in the form of equipment and labour to complete the testing and calibrations.

3.2 Erection

.1 Field erection of scale shall be in strict accordance with the manufacturer's recommendations.

.2 Touch-up coating shall be done in accordance with the scale manufacturer's recommendations where and as directed.

.3 All surface areas shall be inspected by the Engineer and any repairs indicated made good.

.4 All electrical work shall comply with the latest edition of the Canadian Electrical Code.

.5 Traffic signal to be installed as per Ministry of Transportation and Infrastructure Standard Specifications.

3.3 Testing

.1 Scale shall be set up by service technicians from the manufacturer equipped with a heavy duty test truck and perform the field accuracy testing.

.2 Scales to be approved, inspected and certified by Measurement Canada or an Authorized Service Provider.

.3 Service technician from the Manufacturer to inspect operation of scale at 6 and 12 months after the installation to recalibrate as required.

REVISION HISTORY

Rev. No.	Date	By	Chk'd	Issued For	Comment
A					

END OF SECTION

THURBER ENGINEERING LTD.

MEADE CREEK ASH LANDFILL
PRELIMINARY GEOTECHNICAL ASSESSMENT

Report

to

Kerr Wood Leidal

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. D. McINTYRE

Aug. 18, 2016

Jay McIntyre, M.Eng., P.Eng.
Review Engineer

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K. B. STERNE
13514

8/16

Date: August 18, 2016
File: 12102

Kevin Sterne, M.Sc., P.Eng.
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THURBER ENGINEERING LTD.

MEADE CREEK ASH LANDFILL
PRELIMINARY GEOTECHNICAL ASSESSMENT

Report

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Kerr Wood Leidal

Jay McIntyre, M.Eng., P.Eng.
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1. INTRODUCTION

This report provides geotechnical recommendations for the upgrade of an existing recycling facility at 8855 Youbou Road which is located approximately 2 km west of Cowichan Lake, BC in the Cowichan Valley Regional District (CVRD). The general site location is shown on Figure 1 in Appendix A. The subject property at 8855 Youbou Road was the site of a municipal solid waste incinerator which was operated by the CVRD under Pollution Control Permit No. PA-2844 from 1974 until the incinerator operations ceased in 1998. The site is currently used as a municipal recycling drop off and transfer facility known as the "Meade Creek Recycling Centre and Garbage Drop-off Depot" which was established in 1999 after the incinerator operations ceased. Approximately 15,000 m^3 of ash was generated by the incineration operations at the site which is currently situated in three vegetation-covered stockpiles within the former gravel pit areas of the site.

It is a condition of this report that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions. The CVRD and the MoE are approved users of this report.

2. BACKGROUND INFORMATION

2.1 Site Description and History

The property consists of a single rectangular lot of approximately 2.3 ha in size as shown on Figure 2 in Appendix A (reproduced from the Active Earth Closure Plan Report dated February 2012). The legal description for the property is PID 004-289-161, Lot 1, Block 488, Plan 43751, Cowichan Lake District.

2.2 Previous Site Investigations

Several environmental investigations have been conducted on the site. Borehole and test pit logs were obtained from the following reports:

- "Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC, Stage 1 & 2 Preliminary Site Investigation Report" prepared by SLR Consulting Ltd., dated May 2010.
- "Detailed Site Investigation, Meade Creek Recycling Centre" prepared by Active Earth Engineering Ltd., dated March 2011.
- "Screening Level Risk Assessment, Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC" prepared by Active Earth Engineering Ltd., dated January 2012.

The subsurface conditions presented in these reports have been used for the geotechnical assessment provided herein. No additional subsurface investigations have been carried out by Thurber at this time. Drawing 12102-2 in Appendix B shows the locations of all previous exploration locations at the facility. Copies of test pit logs and borehole logs from the previous investigations are provided in Appendix C.

3. PROJECT DESCRIPTION

The proposed upgrade concepts for the recycling facility prepared by KWL are shown on Figures 3a and 3b in Appendix A. Key components of the upgraded facility include:

- Closure of the existing ash stockpile on site (this is addressed in a separate environmental report).
- Demolition of existing structures and weigh scale.
- Construction of lock block retaining walls for grade separation and placement of recycling bins. Concrete pads for rolloff bins will be constructed in front of the lower level of the walls.
- Asphalt pavements for the recycling truck access route and for private vehicle within the facility.

4. SUBSURFACE CONDITION

4.1 Soil Conditions

The available test pits, boreholes and monitoring wells indicate that the subsurface conditions generally consist of variable fill materials (predominantly ash) overlying native sand and gravel. The native overburden deposits extend to more than 20 m below the ground surface.

The fill materials range in thickness from about 0.2 m to 5.2 m and are described below:

Silt and Sand: contains some ash, metal debris, plastic, glass, fabric, ceramics, some organics and roots, some wood debris, charcoal, and concrete debris.

Ash and Charcoal: contains some silt, and some metal debris, glass, plastic, trace organics and wood waste, asphalt shingles, pieces of pipe. At one location, a propane tank and steel wheel rims were encountered in the test pit.

The native soil consists of a sand and gravel deposit with cobbles and boulders.

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4.2 Groundwater Conditions

Groundwater in the monitoring wells was generally encountered at a depth of about 20 m below the ground surface. However, a shallower perched water table was identified in the southern portion of the site at about 5 m below grade. Shallow water was also encountered in a few test pits excavated in the south-west portion of the site at depths from 0.8 m to 1.4 m.

The groundwater flow direction was inferred to be northwesterly towards Meade Creek.

5. PRELIMINARY GEOTECHNICAL ASSESSMENT

5.1 General

The native granular soils are considered suitable material for support of building foundations, retaining walls, and pavement construction. The native granular soils are also suitable for re-use as site grading fills, where required. The fill materials (ash, charcoal, silt and sand) are highly variable in composition and prone to settlement if additional loads are applied to the surface of the fills (e.g. grade raising or foundation loads) or if the fill was to become saturated.

Specific assessments and recommendations for the proposed new facility are provided in the following sections.

5.2 Pavement Structure

5.2.1 Native Sand and Gravel Subgrade

Where the pavement structure is constructed above native sand and gravel subgrades, we recommend that the following pavement structure thicknesses be used:

TABLE 1 – RECOMMENDED PAVEMENT THICKNESSES

Asphalt Concrete	100
Crushed Base Course	150
Crushed Granular Sub-Base	200

All materials should conform to MMCD specifications for aggregate gradations, placement and compaction. The granular sub-grade should be surface compacted prior to placement of pavement structure materials.

5.2.2 Existing Ash Subgrade

If all or some of the existing ash fill is to be left in place beneath new asphalt pavement areas, we recommend that an additional 400 mm of crushed granular sub-base be placed in these areas.

It should be noted that settlement could occur in the underlying ash fill and cause some pavement distress or premature failures. The following site preparation options could be implemented to improve the settlement performance in these areas:

- Where the thickness of ash fill beneath the pavement structure is less than about 2 m, the upper 1 m of fill should be temporarily removed, and the subgrade compacted with at least 6 passes of a vibratory steel drum roller having a weight of at least 10 tonnes. The excavated ash fill can then be re-used and placed in maximum 300 mm thick lifts and compacted as described above. A non-woven geotextile should be placed on the surface of the ash to prevent contamination of the overlying granular fill.

- Where the thickness of ash is more than 2 m, consideration could be given to densifying the fill using Rapid Impact Compaction (RIC). Prior to densification, a 300 mm thick lift of granular fill should be placed over the ash to control dust during compaction. Alternatively, if the risk of settlement is acceptable to the Owner, the upper 1 m of fill in these deeper fill area could be improved as described in the first bullet above. A non-woven geotextile should be placed on the surface of the ash to prevent contamination of the granular fill.

- Non-woven geotextile reinforcement could also be placed within the lower 400 mm of SGSB to improve performance (see attached Figure 4).

If the site grade is to be raised over existing ash fill, large settlements could occur. The existing ash fill could either be entirely removed from these areas and backfilled with compacted granular fill, or the existing fill should be densified using RIC.

5.3 Retaining Walls

It is anticipated that lock-block retaining walls would be used for the grade separation between the truck access route and the upper recycling area. These walls are typically constructed vertically in such facilities; we therefore recommend that all ash be sub-excavated from beneath the bearing areas of these walls as any settlement could result in rotation of the walls.

Design recommendations for retaining walls will be provided when the preferred option has been selected and details of the walls (heights, locations, etc.) are known.

5.4 Buildings and Weigh Scale

5.4.1 Foundation Design

All foundations for new buildings and the weigh scale should be founded on native sand and gravel, or on compacted granular fill placed above the native sand and gravel deposit. Granular fill placed beneath foundations or floor slabs should be placed in maximum 300 mm thick lifts and compacted to at least 96% of Modified Proctor maximum dry density (MPMDD).

It is anticipated that the new building and weigh scale will be relatively light structures. As such, a serviceability limit state bearing reaction of 200 kPa can be used for less than 25 mm of settlement. For ultimate limit state design, a bearing resistance of 300 kPa can be used. Footings should be founded at a depth of at least 500 mm below finished grade for frost protection and to achieve the specified bearing resistance.

The native sand and gravel deposit could be potentially liquefiable below the water table. The existing subsurface borehole information does not provide any information on the density of the deposit, hence a preliminary liquefaction assessment cannot be made. However, as the regional water table is deep (approximately 20 m below general site grade), the impact of any potentially liquefaction below this depth should not result in collapse of the structure. Post-seismic settlements would occur and should be reasonably uniform beneath these small structures.

For seismic design, the site can be classified as Site Class D based on the thick deposit of granular soils that underlie this site.

5.4.2 Floor Slabs

At least 150 mm of crushed gravel having a maximum size of 19 mm and less than 5% passing the 0.075 mm sieve opening should be placed immediately beneath the slab on grade. The fill should be compacted to at least 96% of MPMDD.

A conventional vapour barrier should be placed beneath the lower floor slab.

5.4.3 Drainage

As this building site will generally be underlain by coarse granular soils (assuming any ash fill is removed from beneath all structures) and the regional water table is deep, it is not considered necessary to install perimeter drains around the building. The site should be graded so that surface water is directed away from the building.

It is noted that a perched water table was identified in the south-west portion of the site. If structures are located in this area, then standard perimeter drains should be installed around the building.

5.5 Concrete Slabs for Rolloff Bins

Concrete slabs will be installed at the base of the walls for support of the rolloff bins. If native granular soils are encountered at design subgrade elevation, a 150 mm thick layer of 19 mm crushed road base fill should be placed immediately beneath the slabs and compacted to at least 96% of MPMDD. The subgrade surface should be compacted with a vibratory roller prior to placement of the road base fill.

If ash fill is exposed in the subgrade beneath the concrete slabs, it would be preferable to remove the ash and replace it with compacted granular fill to limit possible cracking of the slabs. If the ash fill must be left beneath the slabs, then the subgrade preparation should be similar to that discussed above for the asphalt pavement; a 600 mm thick layer of compacted gravel should be placed above the ash fill before the crushed road base fill is placed. The ash fill should be compacted (using RIC, or sub-excavated and replaced in compacted lifts) or geotextile reinforcement should be added to the compacted gravel layer as discussed for the asphalt pavements. It should be noted that some cracking of these slabs could still occur even with the geotextile reinforcement.

6. SUMMARY

The assessment and recommendations provided in this report are based on the results of previous environmental investigations at the site. No additional subsurface investigation has been completed at this time for the upgraded facility.

Once the preferred option has been selected and preliminary site grading plans have been prepared, we should review the plans and the recommendations provided herein. Revisions to these recommendations may be necessary.

A test pit investigation will be implemented following our review of the grading plans and design details. The results will be presented in a Detailed Design Report. This report will also include recommendations for site grading (material types and compaction), retaining wall design parameters (incuding foundation preparation and backfill materials), final pavement structure design, and foundation design for structures.

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STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept respons bility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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APPENDIX A

Figure 1 Site Location Map

Figure 2 Surrounding Land Use Plan (from Active Earth Closure Plan Report, February 2012)

Figure 3a Proposed Recycling Facility Option A Layout by KWL (August 2016**)**

Figure 3b Proposed Recycling Facility Option B Layout by KWL (August 2016**)**

Figure 4 Pavement Design Section for Ash Subgrades

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MEADE CREEK RECYCLING FACILTY UPGRADE
SITE LOCATION MAP

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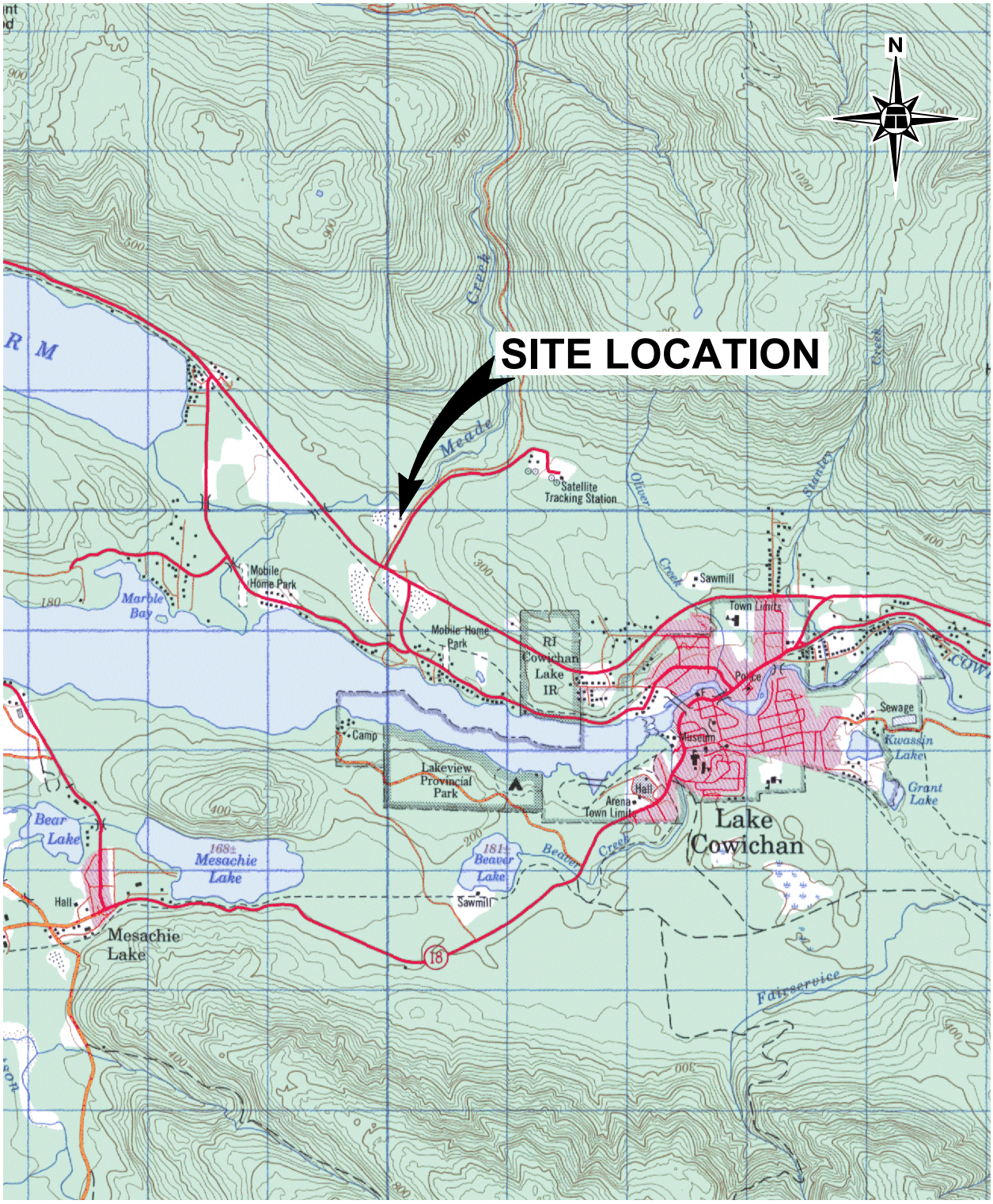

Note: Base image from NTS Map Sheet 92 / C16.

FIGURE 1

Client: Kerr Wood Leidal
File No.: 12102
E-File: TED04597.dwg

Date: July 12, 2016

LEGEND

GROUNDWATER FLOW DIRECTION

SURFACE WATER FLOW DIRECTION

REFERENCE DRAWING: SLR – DRAWING NO. 2 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

0 60 120
METRES

SCALE 1:4000

Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE:

SURROUNDING LAND USE PLAN
MEADE CREEK RECYCLING CENTRE

DWN BY: GM	DWG NAME:	DATE: 2012-01-26	FIGURE 2
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN

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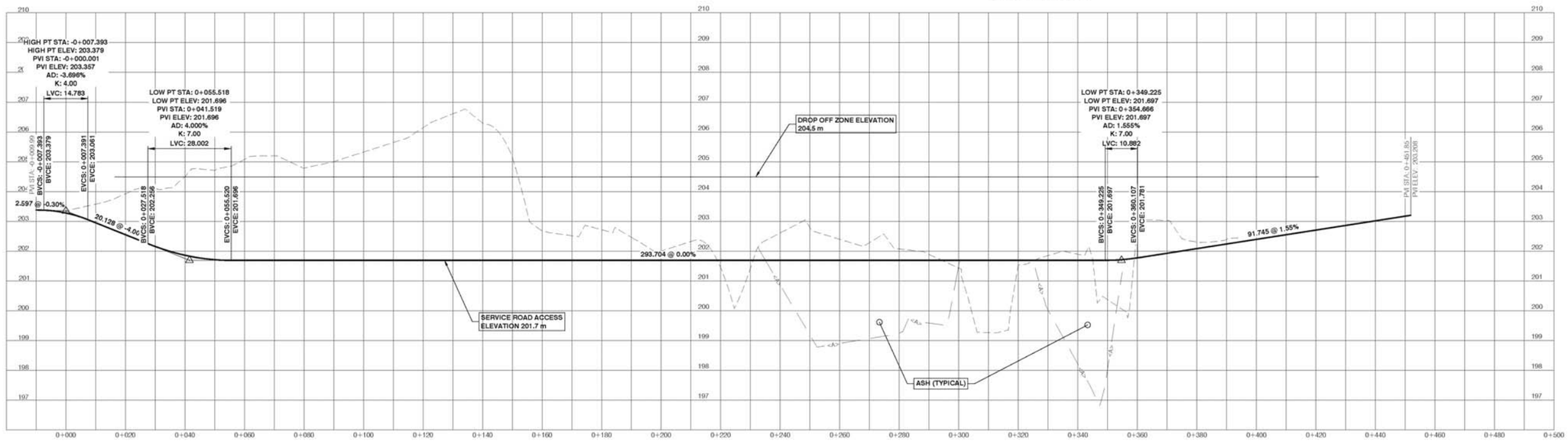

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KERR WOOD LEIDAL
consulting engineers

Seal:

Rev	Date	Des	Dwn	Chk	Description of Revision
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Rev	Date	Des	Dwn	Chk	Description of Revision

FIGURE 3a - Option A

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Drawing No:
Rev:
Group:

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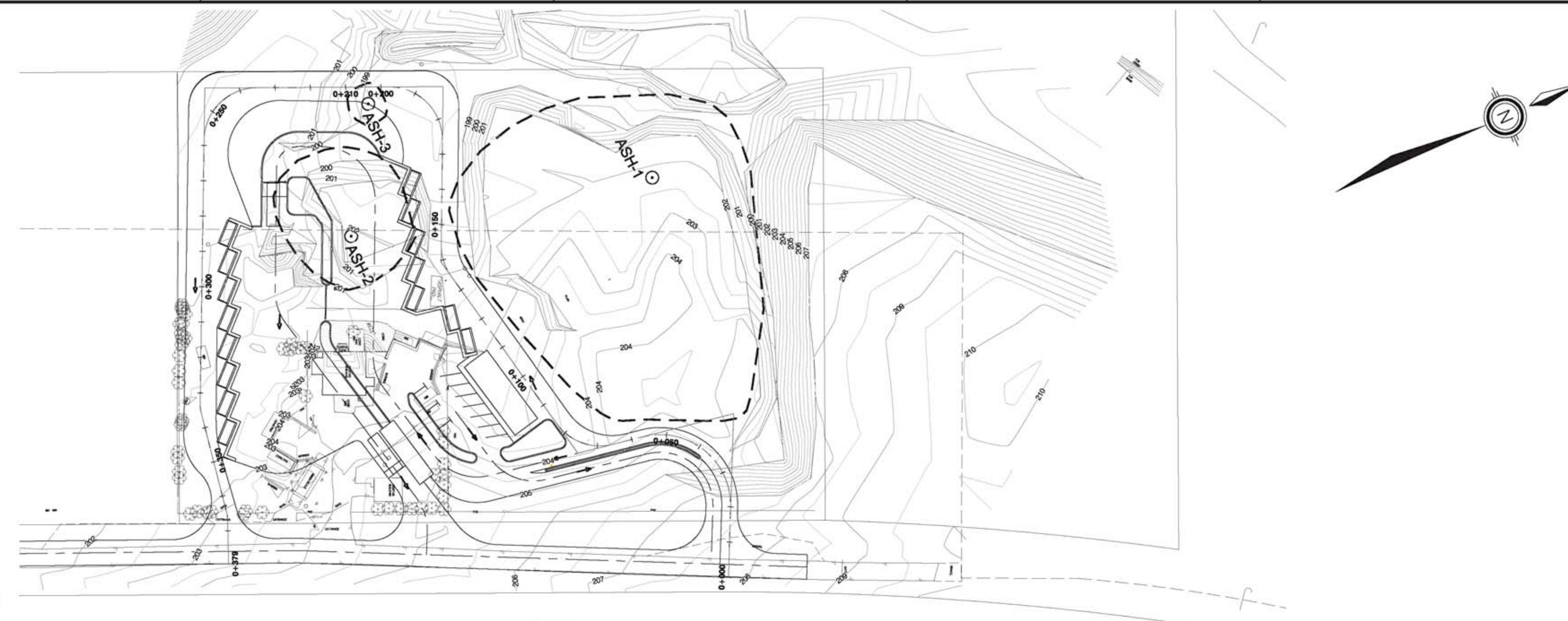

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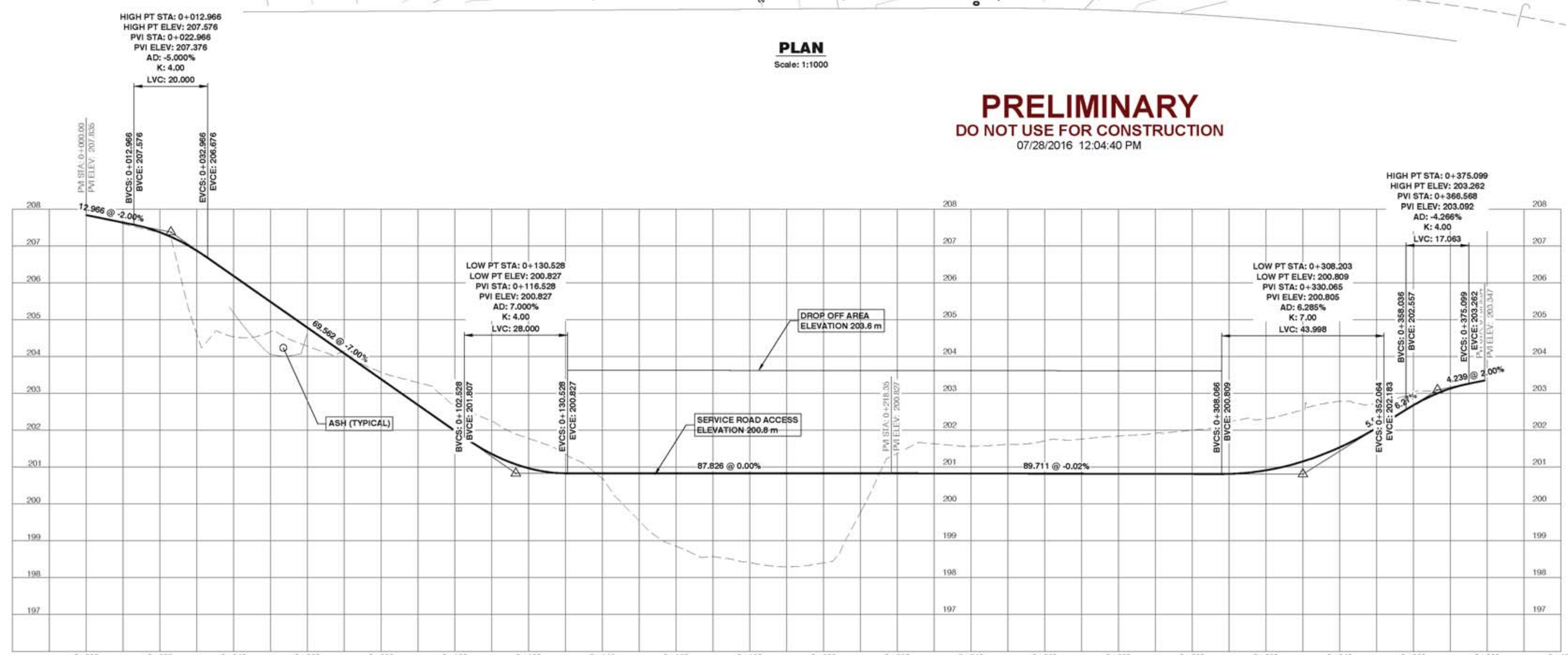

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Seal:

Rev	Date	Des	Dwn	Chk	Description of Revision
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Rev	Date	Des	Dwn	Chk	Description of Revision

FIGURE 3b - Option B

Project No.
Group #####
Drawing No.
Rev.

Q:\2200-2299\2212-061\501-Drawings\a Production Dwgs\Option-B Profile.dwg

THURBER

MEADE CREEK RECYCLING FACILTY UPGRADE
PROPOSED PAVEMENT STRUCTURE FOR ASH SUBGRADE

Not to Scale

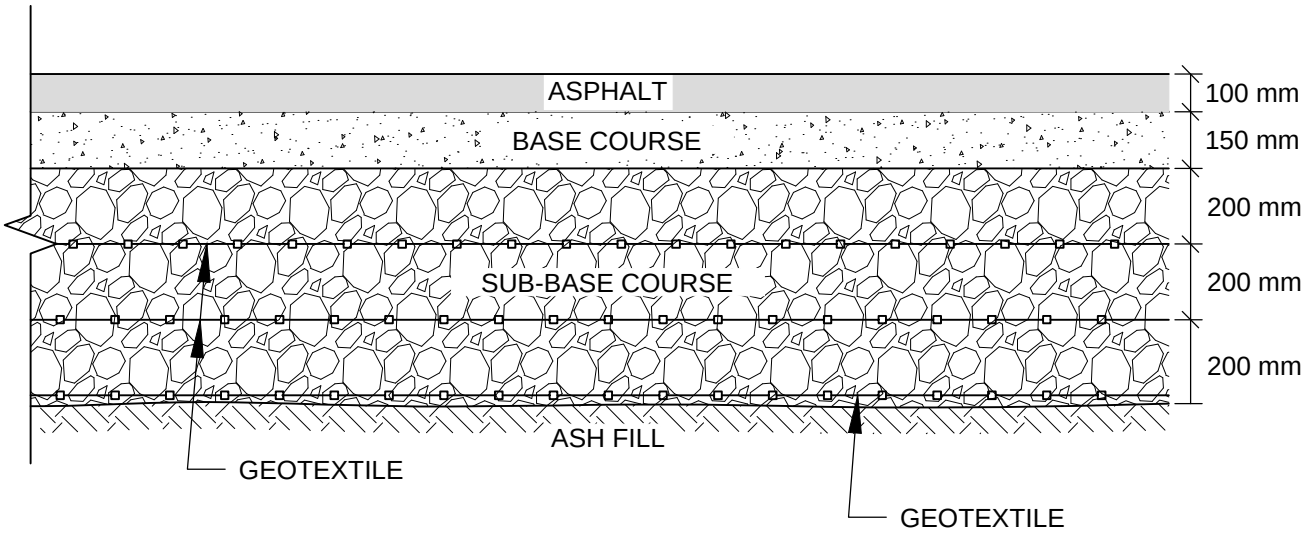


FIGURE 4

Client: Kerr Wood Leidal
File No.: 12102
E-File: TED04597.dwg

Date: July 13, 2016

THURBER

THURBER

APPENDIX B

Drawing No. 12102-2 Locations of Historic Boreholes and Test Pits

Plotted: July 13, 2016

TED04596.dwg

N

DRAFT FOR DISCUSSION PURPOSES ONLY
JULY 13, 2016

TP11-1 (0.4 m)
TP11-2 (0.2 m)
BH10 (4.3 m)
MW11-8
TP3 (>4 m)
TP2 (>4 m)
TP11-4 (0.5 m)
ASH-1
SV-11-1D (3.2 m)
BH8 (1.2 m)
BH9
BH11 (3.4 m)
MW11-2
TP6 (>3.2 m)
TP11-12 (2.9 m)
TP1 (2.0 m)
TP11-6 (3.5 m)
TP4 (>4 m)
TP5 (>3.2 m)
TP11-3 (0.6 m)
BH6
TP11-10 (0.2 m)
TP11-5 (0.3 m)
MW11-3S
MW11-3D
TP11-11 (0.5 m)
TP10 (>2.2 m)
TP11-7 (0.5 m)
TP8 (>4.1 m)
TP11-13 (4.6 m)
SV-11-2 (>1 m)
TP11-9 (0.6 m)
BH7 (5.2 m)
ASH-2
TP7 (>4.2 m)
TP9 (>4.1 m)
BH1
MW11-6S
MW11-6D
BH3
BH2
MW11-7D
TP11-8 (0.6 m)
BH5
MW11-7S
MW11-5
BH4

TELEGLOBE CANADA ROAD

NOTES:

1. All Monitoring Well, Borehole, Test Pit and Soil Vapour locations are approximate only.
2. Digital base plan from Cowichan Valley Regional District.

0 10 20 30 40 50 60m
SCALE 1:1000

LEGEND

- TP11-10 (0.2 m) — 2011 Test Pit by Active Earth (no ash in fill materials) — depth of fill material
- TP11-3 (0.6 m) — 2011 Test Pit by Active Earth (ash in fill materials) — depth of fill material
- TP6 (>3.2 m) — 2010 Test Pit by SLR Environmental (ash in fill materials) — depth of fill material
- SV-11-2 (>1 m) — 2011 Soil Vapour Hole by Active Earth (ash in fill materials) — depth of fill material
- BH8 (1.2 m) — 2010 Borehole by SLR Environmental (ash in fill materials) — depth of fill material
- MW11-7D — 2011 Monitoring Well by Active Earth
- BH4 — 2010 Monitoring Well by SLR Environmental
- BH2 — 2010 Borehole by SLR Environmental
- ASH-1 — 2012 Hand Auger Sample by Active Earth

THURBER ENGINEERING LTD.

KERR WOOD LEIDAL

HISTORIC BOREHOLE & TEST PIT LOCATION PLAN

MEADE CREEK RECYCLING FACILITY UPGRADE — LAKE COWICHAN, B.C.

DESIGNED	DRAWN	APPROVED	DATE	SCALE	PROJECT No.	DWG. NO.	REV.
KBS	RRS		JULY 13, 2016	1:1000	12102	-2	-

THURBER

APPENDIX C

Historic Borehole and Test Pit Logs

Active Earth Engineering Ltd

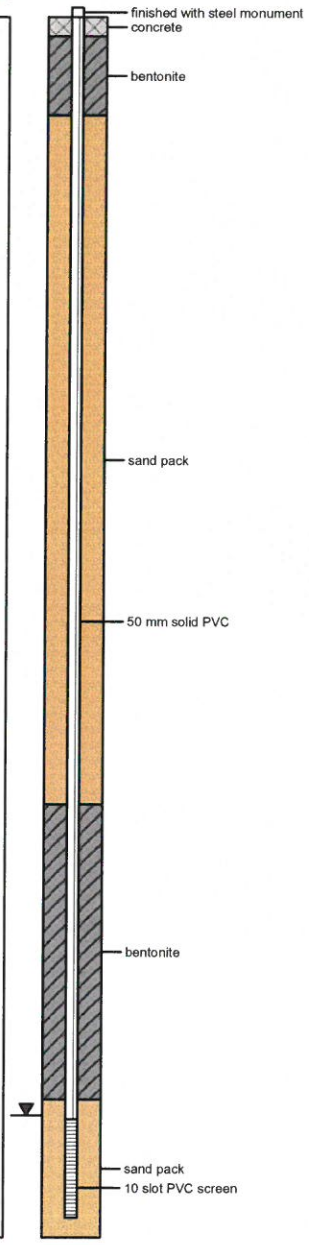
MW 11-2

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 14, 2011	Company Rep.	: SB
Date Completed	: February 14, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				GRAVEL, sandy, some cobbles, trace silt, medium brown, moist				
1								
2								
3								
4								
5								
6								
7								
8		GW						
9								
10								
11								
12								
13								
14								
15								
16								
17				wet below 16.6 m				
18								
19				End of hole				
20								



03-25-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\MW 11-2-m.bor

Active Earth Engineering Ltd

MW 11-3

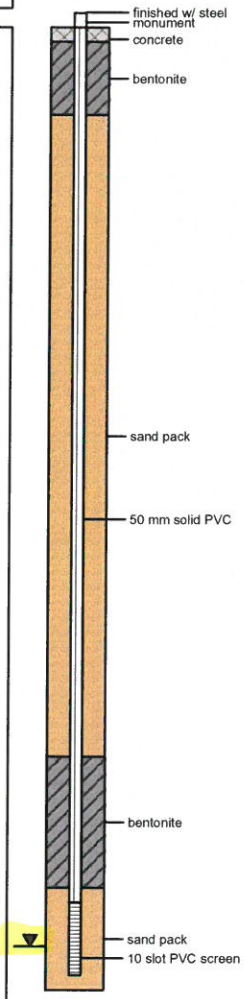
Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

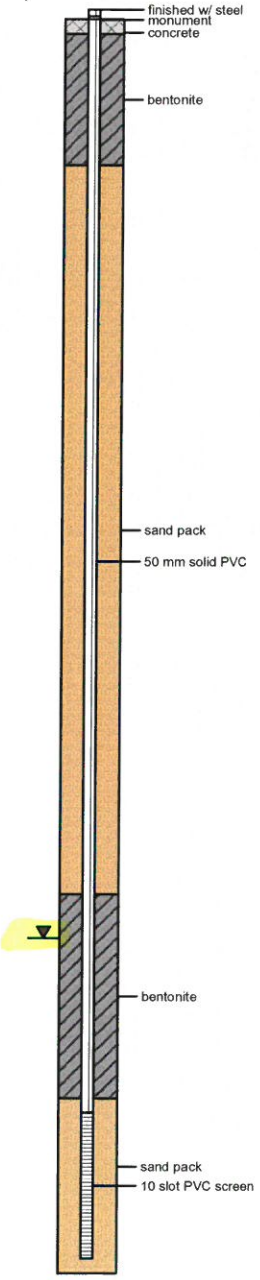
Date Started	: February 17, 2011	Company Rep.	: SB
Date Completed	: February 17, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				GRAVEL, sandy, some cobbles, trace silt, medium brown, moist				
9		GW						
18				wet below 18.29 m				
20				End of hole for MW11-3S				
26				End of hole for MW11-3D				

MW11-3S



MW11-3D



03-25-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\MW 11-3-m.bor

Active Earth Engineering Ltd

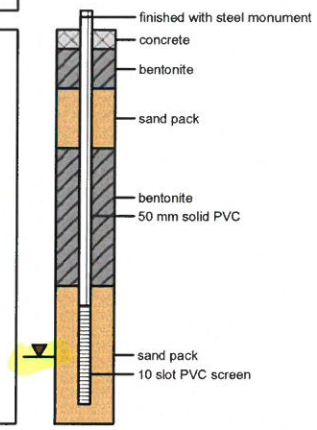
MW 11-5

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		GW		SAND, gravel (subrounded to subangular), occassional rounded cobbles and boulders, brown, moist				
4				wet below 4.58 m				
6				End of hole				



Active Earth Engineering Ltd

MW 11-6

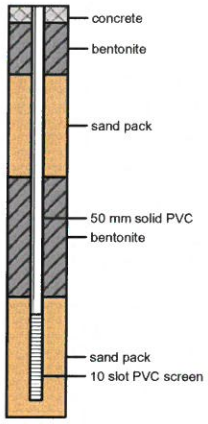
Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

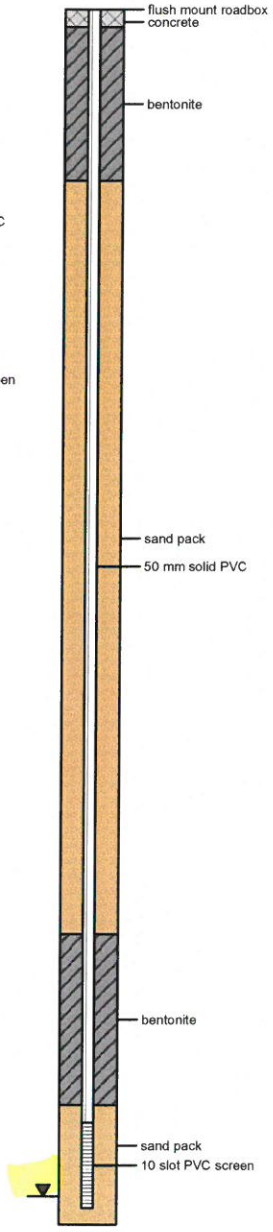
Date Started	: February 21, 2011	Company Rep.	: SB
Date Completed	: February 23, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		GW		SAND (coarse), some subangular gravel, some cobbles and blastrock, brown, moist				
2.44				increased cobbles below 2.44 m				
19.82				wet below 19.82 m				
22				End of hole				

MW11-6S



MW11-6D



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MW 11-7

(Page 1 of 1)

Active Earth Engineering Ltd

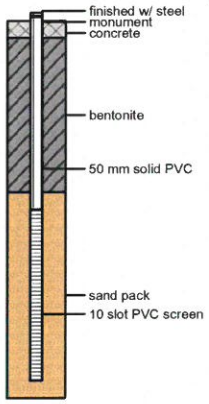
Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

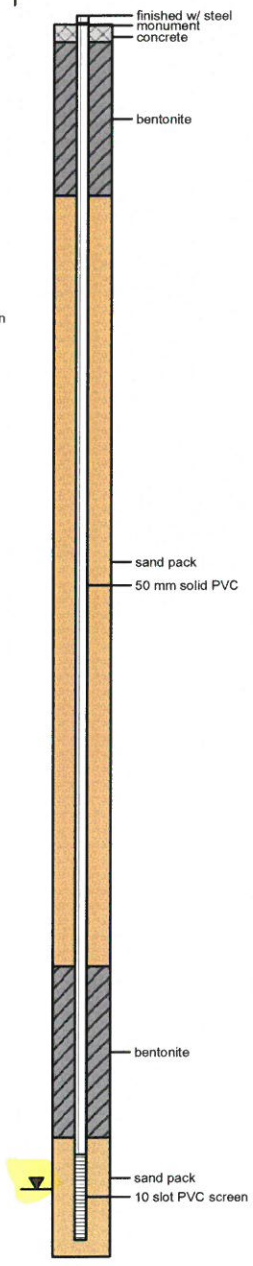
Date Started	: February 18, 2011	Company Rep.	: SB
Date Completed	: February 18, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0								
1		GW		SAND (coarse), some subangular gravel, some cobbles and blastrock, brown, moist				
2								
3				increased cobbles below 2.44 m				
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20				wet below 19.82 m				
21								
22				End of hole				
23								

MW11-7S



MW11-7D



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MW 11-8

Active Earth Engineering Ltd

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: November 21, 2011	Company Rep.	: JB
Date Completed	: November 22, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: JB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type	Monitoring Well
0–25		GW		SAND and GRAVEL, dense moist at 18.29 m End of hole					concrete bentonite sand pack 50 mm solid PVC bentonite sand pack 10 slot PVC screen

Active Earth Engineering Ltd

TP 11-1

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours	Sample Type
0		SM		SILT and SAND, fine to medium grained, some gravel, some ash, some metal debris, trace plastic and glass, trace fabric and ceramic debris, dark brown, medium dense, moist (FILL)	*	1-1/2		grab
		SW		SAND (fine to coarse grained) and GRAVEL (subrounded), trace cobbles, brown-grey, dense, moist (NATIVE)	*	1-3		grab
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-1-m.bor

Active Earth Engineering Ltd

TP 11-2

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SILT and SAND, some gravel, trace ash and metal debris, brown, moist, organics (FILL-NATIVE MIX) root zone from 0.0 m to 0.25 m	*	2-1		grab
		SW		SAND (fine to coarse grained) and GRAVEL, brown, wet (NATIVE)	*	2-2		grab
				End of hole				
1								
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-2-m.bor

Active Earth Engineering Ltd

TP 11-3

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	:
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	:
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		-		ASH and CHARCOAL, some metals debris, trace gravel, trace glass and plastic, damp (FILL)		3-1		grab
		SW		SAND and GRAVEL, some silt, grey-brown, dense, moist, no odour/stain (NATIVE)	*	3-2		grab
1				End of hole				
2								
3								
4								
5								

Active Earth Engineering Ltd

TP 11-4

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		-		ASH and CHARCOAL and SILT (organics), some gravel, trace metal debris, brown to black, moist, no odour (FILL)	*	4-1		grab
		SW		SAND (fine to coarse grained) and GRAVEL, brown-grey, dense, moist, no odour/stain (NATIVE)	*	4-2		grab
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-4-m.bor

Active Earth Engineering Ltd

TP 11-5

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SILT and SAND, fine to medium grained, dark brown, rootletts, organics, moist	*	5-1		grab
		ML		SILT, ash and metal debris, trace glass, red-brown with black pockets, moist, no odour (FILL)				
		SW		SAND (fine to coarse grained) and GRAVEL, brown, medium dense, moist, no stain/odour (NATIVE)	*	5-2		grab
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-5-m.bor

Active Earth Engineering Ltd

TP 11-6

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		-		ASH (woodwaste), some silt and sand, brown and black, no odour (FILL)				
				ASH, metal debris, some glass and woodwaste, trace plastic and iron staining, red with black pockets (FILL)	*	6-1		grab
1								
		-						
2						6-2		grab
3								
		SW		SAND and GRAVEL (angular), grey-brown, wet (NATIVE)	*	6-3		grab
4				End of hole				
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-6-m.bor

Active Earth Engineering Ltd

TP 11-7

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SILT and SAND, some ash and brick debris, some metals debris, trace glass, dark brown, medium dense, moist, no odours (FILL)	*	7-1/2		grab
		SW		SAND, fine to coarse grained, some gravel, trace to some cobbles, brown-grey, dense, damp, no stains/odours (NATIVE)	*	7-3		grab
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-7-m.bor

Active Earth Engineering Ltd

TP 11-8

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		-		ASH and CHARCOAL, some silt (organics), trace to some metal debris and shingles, trace glass, black brown, loose, damp, no odour (FILL)	*	8-1		grab
		SW		SAND and GRAVEL, some cobbles and boulders, brown, dense, moist, no stain/odours (NATIVE)	*	8-2		grab
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-8-m.bor

TP 11-9

Active Earth Engineering Ltd

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SAND (fine to medium grained) and SILT (organics), rootlets, trace gravel, brown, moist, no stain/odour (FILL)		9-1		grab
		-		ASH, woodwaste and asphalt shingles, black, no odour (FILL)	*	9-2		grab
1		SW		SAND (fine to coarse grained) and GRAVEL, trace silt, brown, dense, no stain/odour (NATIVE)	*	9-3		grab
				water at 1.38 m				
				End of hole				
2								
3								
4								
5								

Active Earth Engineering Ltd

TP 11-10

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SAND (fine to coarse grained) and SILT (organics), some gravel and rootletts, some brick, metal, ash, charcoal and concrete debris, loose, moist, no odour (FILL)	*	10-2		grab
		SW		SAND (fine to coarse grained) and GRAVEL, trace cobbles, brown, dense, moist, no stain/odour (NATIVE)	*	10-1		grab
				End of hole				
1								
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-10-m.bor

TP 11-11

Active Earth Engineering Ltd

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SM		SILT (organics) and SAND (fine to medium grained), some gravel, metal, plastic debris and rootlets, trace glass, brown, loose, moist, no stain/odour		11-1		grab
		SW		SAND (fine to coarse grained) and GRAVEL, trace silt, brown, dense, wet (NATIVE)	*	11-2		grab
				water at 0.76 m				
1				End of hole				
2								
3								
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-11-m.bor

Active Earth Engineering Ltd

TP 11-12

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0		SW		SAND and GRAVEL (FILL)				
				CHARCOAL, ASH and METAL DEBRIS, trace glass, red and black banding/pockets, medium dense, no odour (FILL)				
				black ash/charcoal band at 0.30 m to 1.22 m	*	12-1		grab
1		-						
				red/grey metals, ash and glass debris band at 1.52 m to 2.44 m	*	12-2		grab
2								
3		SW		SAND (fine to coarse grained) and GRAVEL (angular), brown-grey, dense, moist, no stain/odour (NATIVE)	*	12-3		grab
				End of hole				
4								
5								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-12-m.bor

Active Earth Engineering Ltd

TP 11-13

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	:	Drilled By	:
Drilling Method	:	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				ASH, CHARCOAL and METAL DEBRIS, some silt, trace glass and plastic throughout, wire pipe, metal canister, small propane tank, steel wheel rims, brown-black, occassional black ash banding, medium dense, moist (FILL)		13-1		grab
1								
2		-						
3					*	13-2		grab
4				water at 3.96 m				
		SW		SAND (fine to coarse grained) and GRAVEL, grey-brown, dense, wet, no stain/odour (NATIVE)	*	13-3		grab
5				End of hole				
6								

03-23-2011 C:\Users\desktop2\Documents\My Dropbox\Projects\346 - Meade Creek Incinerator\Logs\TP 11-13-m.bor

Active Earth Engineering Ltd

SV 11-1

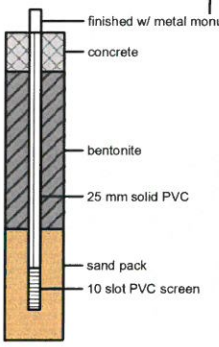
Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

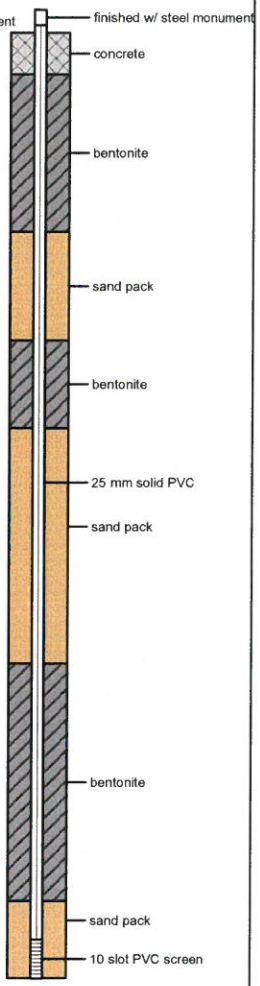
Date Started	: February 16, 2011	Company Rep.	: SB
Date Completed	: February 16, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				ASH (FILL), trace broken glass, ceramics, plastic, metal, wire, some sand, black and orange, moist				
3				GRAVEL (angular), some sand, cobbles, trace clay (NATIVE)				
				End of hole				

SV11-1S



SV11-1D



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Active Earth Engineering Ltd

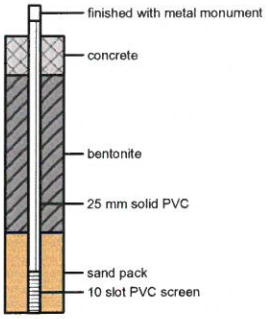
SV 11-2

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 16, 2011	Company Rep.	: SB
Date Completed	: February 16, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				ASH (FILL), trace broken glass, ceramics, plastics, metal, wire, some sand, black and orange, moist				
1				End of hole				
2								
3								
4								
5								



Active Earth Engineering Ltd

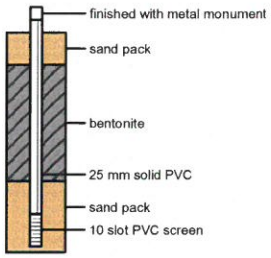
SV 11-3

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				End of hole				
1								
2								



Active Earth Engineering Ltd

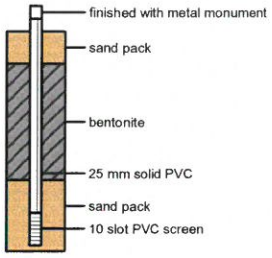
SV 11-4

Meade Creek Incinerator Site
8855 Youbou Road
Lake Cowichan, BC

Project 346

Date Started	: February 15, 2011	Company Rep.	: SB
Date Completed	: February 15, 2011	Lab Analysis	: *indicates sent for analysis
Hole Diameter	: 152 mm	Drilled By	: Drillwell Enterprises Ltd.
Drilling Method	: Air Rotary	Logged By	: SB
Sampling Method	: Grab		

Depth in Meters	Surf. Elev.	USCS	GRAPHIC	DESCRIPTION	Lab Analysis	Sample No.	Soil Vapours ppm	Sample Type
0				End of hole				
1								
2								



SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP1
SURFACE ELEVATION: 204.47 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 / 10 / 100 / 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
		SA1/SA2 (DUP SA1)			**TOPSOIL** Black, dry					204
					ASH black, moist, some plastic, metal, rubber, melted material, cermaic, brick	50				
1		SA3/4(DUP SA3)				30			backfilled	203
2		SA5			**GRAVEL** coarse, some coarse sand, cobbles, light brown, moist	5				202
					End of testpit at 2.5 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP2
SURFACE ELEVATION: 203.94 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**SAND** some gravel, brown, moist					203.94
1		SA6			**ASH** black, moist, some plastic, metal, glass, rubber, paper, melted metal, cobbles, wood, plastic bags, ceramics, styrafoam, brick, shingles, PVC pipe, copper pipe, black, moist	20, 5				203
		SA7								
2		SA8				30			backfilled	202
3		SA9				30				201
4					End of testpit at 4.0 m					200

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP3
SURFACE ELEVATION: 202.01 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv)	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**HOG FUEL** wood chips, brown, moist					202
					ASH black, moist, some plastic, metal, glass, rubber, paper, drywall, shingles, automoble chassis, melted metal					
1		SA10				20				201
		SA11				5			backfilled	
2										200
		SA12				5				
3										199
		SA13				30				
4					trace gravel below 4.0 m End of testpit at 4.1 m					198

1 10 100 1000

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP4
SURFACE ELEVATION: 201.60 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv)	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					TOPSOIL some coarse gravel and hog fuel (wood chips), brown, moist					
1		SA14			**ASH** black, moist, some plastic, metal, glass, rubber, paper, drywall, gyprock, cinderblock, glass	20				201
		SA15				25				
2									backfilled	200
		SA16				30				
3										199
		SA17				10				
					End of testpit at 3.9 m					198

ORGANIC VAPOUR LEVEL (ppmv): 1 | 10 | 100 | 1000

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP5
SURFACE ELEVATION: 202.05 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					TOPSOIL soil with sand and gravel, black-brown, moist					202
		SA18			**ASH** black, moist, large red concrete blocks, drywall, metal pipe, melted plastic, rusted metal, large round boulders, glass, brick, concrete, wood, metal cable	20				
1										201
		SA19				25			backfilled	
2										200
		SA20				25				
3					Auger refusal on a large metal object					199
					End of testpit at 3.2 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

TESTPIT LOG

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT NO: TP6
SURFACE ELEVATION: 203.19 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 / 10 / 100 / 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					TOPSOIL soil, black-brown, moist					203
1		SA21			**ASH** black, moist, some metal (large vehicle parts), melted plastics and glass, chunks of slate, old ceramic electrical components	10				
										202
2		SA22				25			backfilled	
										201
3		SA23			Refusal on obstruction	20				
					End of testpit at 3.2 m					200

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP7
SURFACE ELEVATION: 202.01 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 / 10 / 100 / 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					TOPSOIL black-brown, moist					
					ASH black, moist, shingles (burned and unburned), metal	0				
1		SA24								201
		SA25				10				
2					- less shingles, more large metal automobile parts, styrafoam, ceramic tile and drywall below 2.0 m				backfilled	200
		SA26				15				
3										199
		SA27			- some sand and gravel, medium brown below 3.6m, medium brown	10				
4		SA28				0				198
					End of testpit at 4.2 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP8
SURFACE ELEVATION: 201.51 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**SAND** some gravel, brown, moist					201
1		SA29			**ASH** black, moist, shingles (burned and unburned), pea gravel, metal, drywall, brick, plastic and fabric	5				
2		SA30				5			backfilled	200
3		SA31				5				199
4		SA32			Some sand and gravel below 3.6 m	10				198
					End of testpit at 4.1 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP9
SURFACE ELEVATION: 202.22 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**SAND** some gravel and vegetation, brown, moist					202
1		SA33			**ASH** black, moist, some metal, brick, plastic, boulders, metal, melted plastic, styrafoam, metal automobile parts, black, moist	0				
		SA34				10				201
2									backfilled	
		SA35				5				200
3										
		SA36				0				199
4					End of testpit at 4.1 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

TESTPIT LOG

TESTPIT NO: TP10
SURFACE ELEVATION: 198.30 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	TESTPIT COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					ASH black, moist, some unknown burnt material, some large rounded cobbles and boulders, scrap metal, black, moist					198
		SA37				5				
1									backfilled	197
		SA38			Some sand and gravel below 1.6m	5				
2					End of testpit at 2.2 m					

DRILLING METHOD: Excavator

DRILL DATE: January 26, 2010 LOGGED BY: wm

Notes: ■ GRAB SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH1
SURFACE ELEVATION: 203.60 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**GRAVEL** sandy, angular to subangular gravels, cobbly, loose, medium brown, moist					203
1		SA1								
		SA2								202
2		SA3								
		SA4							backfilled with drill cuttings	201
3										
		SA5/SA6 (DUP SA5)								200
4		SA7/SA8 (DUP SA7)			**SILT** some subangular gravel, cobbly, medium brown, moist					199
5					Auger refusal on cobbles Attempted two additional holes in area. Auger refusal at 5.0m and 5.3m					
		SA9								198
					End of borehole at 5.6 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 23, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH2
SURFACE ELEVATION: 203.75 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					SAND coarse, some subangular gravel, some cobblessome blast rock, brown, moist	0				203
		SA10								
1		SA11				5			backfilled with drill cuttings	
										202
2					Auger refusal on cobbles Attempted one additional hole in area. Auger refusal at 1.8m.					
					End of borehole at 2.4 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 23, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH3
SURFACE ELEVATION: 201.26 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					CONCRETE				roadbox, jplug, cement	201
		SA12			**SAND** some subrounded to subangular gravel, cobbles, brown, moist to wet				bentonite seal	
1									silica sand	200
2		SA13							50 mm 010 slot PVC pipe	199
3										198
4		SA14							backfilled with drill cuttings	
					Auger refusal on cobbles					197
					End of borehole at 4.6 m Well Completion Details: Screened interval from 1.5 m to 3.0 m below surface Elevation at top of pipe (TOP) = m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 23, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: CVRD
PROJECT: Meade Creek Incinerator
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH4
SURFACE ELEVATION: 202.77 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
									stickup, jplug	203
0					Ground Surface					
					SAND coarse subrounded to subangular gravel, occasional rounded cobbles and boulders, brown, moist-wet					202
1		SA15							bentonite seal	
										201
2		SA16								
									silica sand	200
3		SA17								
									50 mm 010 slot PVC pipe	199
4		SA18								
					Auger refusal on cobbles.					
					End of borehole at 4.7 m Well Completion Details: Screened interval from 3.2 m to 4.7 m below surface Elevation at top of pipe (TOP) = m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 23, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH5
SURFACE ELEVATION:

SLR JOB NO: 202.01459.00

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	DEPTH (m)
		SA19			**GRAVEL** sandy, cobbles and boulders, light brown, dry-moist				backfilled with drill cuttings	
					Auger refusal on cobbles. Attempted one additional hole in area. Auger refusal at 0.6m.					
					End of borehole at 0.6 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 23, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd.

CLIENT: CVRD
PROJECT: Meade Creek Incinerator
8855 Youbou Rd
Lake Cowichan, BC

SLR JOB NO: 202.01459.00

BOREHOLE LOG

BOREHOLE NO: BH6
SURFACE ELEVATION: 198.57 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
					Ground Surface				stickup, jplug	199
0					**GRAVEL** sandy, poorly sorted, cobbles, trace clay, medium brown, moist					198
1		SA20								
2		SA21			- coarser below 1.8 m					197
3									bentonite seal	196
		SA22								195
4										
5					- less gravel, consolidated below 4.6 m, moist to wet					194
		SA23								193
6										
									silica sand	192
7										191
8									50 mm 010 slot PVC pipe	190
9										189
10									backfilled with drill cuttings	188
					End of borehole at 10.6 m					

Well Completion Details:
Screened interval from 6.7 m to 9.7 m below surface
Elevation at top of pipe (TOP) = m

DRILLING METHOD: Solid Stem Auger Drilling

Notes: AUGER SAMPLE

DRILL DATE: February 23, 2010 LOGGED BY: wm

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: CVRD
PROJECT: Meade Creek Incinerator
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH7
SURFACE ELEVATION: 202.22 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
									stickup, jplug	
0					Ground Surface					202
					ASH some metal, unknown white material, black and white, moist					
1		SA24								201
					- pieces of fabric at 1.5 - 3.0m				bentonite seal	
2		SA25								200
		SA26								
3										199
4		SA27								198
									50 mm 010 slot PVC pipe	
5										197
		SA28			**SAND** coarse angular gravels, cobbles, loose, brown, wet					
6								▼	GW = 6.01 mbg	196
									backfilled with drill cuttings	
7					Auger refusal on cobbles.					195
					End of borehole at 7.6 m Well Completion Details: Screened interval from 3.0 m to 6.1 m below surface Elevation at top of pipe (TOP) = 203.100 m Groundwater Information: Depth to groundwater from TOP = 6.89 m ()					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 24, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH8
SURFACE ELEVATION: 204.24 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 / 10 / 100 / 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
		SA29			**ASH** trace metal, broken glass, fiberglass, black, moist					204
1		SA30 SA31			**SAND** coarse, angular gravel, cobbles, brown, moist Auger refusal on cobbles				backfilled with drill cuttings	203
2					End of borehole at 2.0 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 24, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH9
SURFACE ELEVATION: 203.45 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
									steel casing, stickup, jplug	204
0					Ground Surface					
					SAND coarse, some angular gravel, cobble, loose, brown, moist					203
1		SA32							bentonite seal	
					- more gravel, wet below 1.5m				silica sand	202
2		SA33							50 mm 010 slot PVC pipe	201
3					Auger refusal on cobbles					
					End of borehole at 3.5 m					200

Well Completion Details:
Screened interval from 1.8 m to 3.4 m below surface
Elevation at top of pipe (TOP) = m

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 24, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH10
SURFACE ELEVATION: 202.77 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**ASH** trace broken glass, ceramics, metal, wire, some sand, black, moist					202
1		SA35								
2		SA36							backfilled with drill cuttings	201
3										200
4		SA37								199
5		SA38			**GRAVEL** angular, some sand, cobbles, trace clay, light brown, moist-wet					198
		SA39			Auger refusal on cobbles					197
					End of borehole at 5.8 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 24, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

SLR Consulting (Canada) Ltd.

SLR JOB NO: 202.01459.00

CLIENT: **CVRD**
PROJECT: **Meade Creek Incinerator**
8855 Youbou Rd
Lake Cowichan, BC

BOREHOLE LOG

BOREHOLE NO: BH11
SURFACE ELEVATION: 201.85 m

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000	BOREHOLE COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
0					**ASH** trace broken glass, ceramics, plastic, metal, wire, some sand, black, moist					201
1		SA40								
		SA41								200
2		SA42								
3									backfilled with drill cuttings	199
		SA43			**GRAVEL** angular, some sand, cobbles, trace clay, some sand, trace clay					198
4										
5		SA44								197
6					Auger refusal on cobbles					196
					End of borehole at 6.1 m					

DRILLING METHOD: Solid Stem Auger Drilling

DRILL DATE: February 24, 2010 LOGGED BY: wm

Notes: AUGER SAMPLE

Sheet 1 of 1

SLR CANADA V5.1 202.01459.00.GPJ SLR_CAN V5.1.GDT 4/21/10

THURBER ENGINEERING LTD.

MEMORANDUM NO.1

To: Elizabeth Lau, P.Eng.
Kerr Wood Liedal

Date: August 23, 2016

From: Paul Wilson, M.Sc., P.Geo.

File: 12102

Review: Kevin Sterne, M.Sc., P.Eng.

Cc:

MEADE CREEK RECYCLING FACILITY
ENVIRONMENTAL SUMMARY

It is a condition of this memorandum that Thurber Engineering Ltd.'s (Thurber's) performance of its professional services is subject to the attached Statement of Limitations and Conditions.

This memo provides a brief summary of the current environmental status of the Meade Creek Recycling Facility and outlines our understanding of the most-likely regulatory process for the site going forward. This memo is based on our review of documents provided by the Cowichan Valley Regional District (CVRD, see below) and communications with both the CVRD and BC Ministry of Environment (MoE) staff. The CVRD is currently proposing to upgrade the existing recycling drop-off facilities and will close the existing ash landfill at the same time.

SITE BACKGROUND

The property at 8855 Youbou Road was historically used as a gravel pit until a municipal waste incinerator facility was constructed under a Department of Lands, Forests, and Water Resources Pollution Control Branch Permit number PA-2844 in 1976. Ash from the incinerator was deposited within the previous gravel pit until 1998. The ash is presently stored within three stockpiles however, a small amount of residual ash is also present on a concrete pad located near the incinerator building. The total volume of landfilled ash waste on site has been estimated by others to be approximately 15,000 m^3. The incinerator was removed in 1999 when the current Meade Creek municipal recycling transfer facility was established on the site.

Several environmental investigations have previously been conducted on the property including the following:

- SLR Consulting (Canada) Ltd. 2010. Stage 1 and 2 Preliminary Site Investigation (PSI) Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Report to the CVRD dated May, 2010.

- Active Earth Engineering Ltd. 2011. Detailed Site Investigation (DSI), Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Report to the CVRD dated March, 2011.

- Active Earth Engineering Ltd. 2012. Screening Level Risk Assessment (SLRA), Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Report to the CVRD dated January, 2012.

The DSI followed up and expanded on the work conducted for the PSI while the SLRA included additional investigations which addressed data gaps within the DSI. We understand that all of these reports were conducted in accordance with the requirements of the *Environmental Management Act* (EMA) and related regulations.

On-site areas of potential environmental concern (APEC) identified by the PSI report included the landfilled incinerator ash stockpiles, a diesel underground storage tank (which was subsequently removed as part of the DSI) and the existing site buildings. However, following the completion of the DSI it was determined that only the ash was contaminated above applicable Contaminated Site Regulations (CSR) Industrial Land Use standards. No other soil, vapour or groundwater contamination was detected on the site by the environmental investigations conducted. The contamination within the ash consists of high concentrations of metals that were demonstrated by toxicity characteristic leachate procedure (TCLP) testing to be “non-leachable” and not a hazardous waste as defined by the BC Hazardous Waste Regulation (HWR). TCLP testing is a standardized test that is used to determine if a soil material is hazardous waste as defined under the HWR. Other potential contaminants within the ash were either not detected or only present in concentrations that are less than the applicable site standards.

The SLRA report included the results of Synthetic Precipitation Leachate Procedure (SPLP) testing that was conducted on a number of ash samples. SPLP testing is typically used to determine if the soil material tested is capable of generating leachate that could exceed CSR numerical standards for surface and groundwater. While the SPLP testing found that several ash samples produced leachate with CSR aquatic life and drinking water metals standards exceedances, as noted above, the direct investigations of in-situ groundwater quality found no CSR standards exceedances on the property, including immediately downgradient of the largest ash pile.

The SLRA report concluded that under current conditions, the environmental / human health risks posed by the ash stockpiles are potentially unacceptable and as such, the site does not currently satisfy the Risk-based standards of the CSR. In order to proceed with a risk-based remediation approach within the CSR regulatory context, a detailed risk assessment for the site would be required to obtain a Certificate of Compliance (CofC). In addition, given the extent of soil metals contamination in excess of the Upper Cap Concentrations, the site would be considered a High Risk Site, meaning the BC MoE would likely be required to review all relevant reports. However, under future site conditions, including the construction of a landfill cap, the SLRA concluded that all evaluated exposure pathways would be incomplete and as such the ash material would pose no unacceptable risks. The SLRA included limited discussion regarding the potential for the on-site management of the ash as landfilled waste as one of the underlying assumptions of the report was that a CofC would be required by the CVRD to facilitate site redevelopment and / or to enable the potential future sale of the property. However, under the current CVRD plans to upgrade the existing recycling centre facilities, a CofC is not required as the ash will be managed as a closed

landfill in accordance with the requirements of the BC MoE landfill regulatory regime (i.e. outside of the provincial CSR process).

On November 20, 2014, the CVRD received written notice from the BC MoE that Permit 2844 had been abandoned. As a result of the permit abandonment, the MoE imposed the following regulatory requirements on the Meade Creek facility:

- Submission of a landfill closure plan to the Director by December 31, 2015.
- Implement the landfill closure plan to the satisfaction of the Director.
- Carry out any additional requirements that the Director imposes respecting restoration of the environment or the control and monitoring of the waste discharged after abandonment.
- Submission of a Site Profile within 10 days before the time the site owner dismantles a building or structure or otherwise decommissions the site.

In June 2016, the CVRD retained Kerr Wood Leidal (and its various sub-contractors, including Thurber) to produce a landfill closure plan for the site and develop plans for the construction of a new recycling transfer station on the property outside the CSR regulatory process.

REGULATORY STEPS

Our understanding of the regulatory requirements related to the development and implementation of the landfill closure plan and Site Profile include the following:

- MoE staff (Alan Leuschen, Authorizations) has indicated that the current draft Landfill Criteria for Municipal Solid Waste (2015) are not strictly applicable to the site but should be used for guidance when developing the closure plan. The original Landfill Criteria from 1993 should also be referenced for guidance.

- The MoE is open to the consideration of a range of closure plan designs and post-closure monitoring specifications / requirements that may deviate from the guidance provided within the Landfill Criteria documents, as long as the derivations can be supported with rational arguments. Performance-based arguments, as well as those based on practical considerations should be acceptable. Examples of potential variations could include capping material type / thickness, property boundary setbacks and final grades, etc. Mr. Leuschen noted that as the post closure monitoring requirements, in particular, may be able to be significantly shorter than the currently recommended 30 year time frame.

- The MoE is open to reviewing a draft version of the closure plan and providing feedback. However, the MoE has advised us that it was unlikely that feedback would be able to be provided before September, 2016.

- Prior to decommissioning any of the site buildings, a completed Site Profile will be required to be submitted to the MoE. We believe that this Site Profile will be filed by the MoE and listed on the Site Registry. It is understood from Vince Hanemayer (Senior Contaminated

Sites Officer) that the Ministry does not normally require the submission of a DSI where a closure plan and post-closure monitoring are required. It is the Ministry's position that closed landfill sites will continue to be managed under a separate Ministry process (i.e. outside of the CSR process) and do not require CSR oversight. However, if a future local government permit for the site is processed and forwarded to the Ministry (i.e. application for rezoning, subdivision or redevelopment etc.), it will be frozen until released by a number of potential processes (under the EMA and CSR) potentially including the issuance of a CofC, which is not being sought at this time.

- Any future discoveries of off-site contamination migration are required to be reported to the Ministry (and adjacent property owners) in accordance with the requirements of the EMA and CSR. As noted previously, no groundwater contamination has been identified on the site by the environmental investigation work conducted on the site to date and as such, the discovery of the migration of contamination beyond the property boundaries is not anticipated.

POTENTIAL DATA GAPS

Our review of the 2011 Active Earth DSI report suggested that no useable groundwater monitoring wells were located immediately downgradient (i.e. northwest of) the largest ash pile. However, the more recent SLRA report included the results of additional groundwater investigations which addressed this apparent data gap. No additional data gaps have been identified.

DISCUSSION

Our review of the available background reports and discussions with Ministry staff indicate that the regulatory process for the Meade Creek site is relatively straight forward. Provision of an acceptable landfill closure plan and Site Profile should satisfy the current outstanding Ministry requirements (based on the 2014 letter) and facilitate the proposed recycling facility redesign and construction. It is our understanding that a CofC will not be required for the site until such a time as future land use changes are proposed (if they ever are) after the landfill monitoring requirements prescribed by the closure plan have been completed.

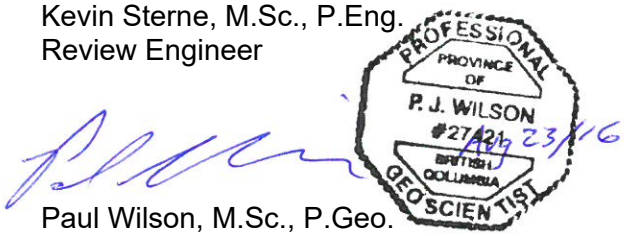
Thurber is currently working on developing a draft landfill closure plan that will address the specific landfill closure process and requirements to be implemented as part of the recycling drop-off facility upgrades. Thurber will also complete a Site Profile for submission to the MoE prior to the demolition of the existing recycling facility's infrastructure.

THURBER

CLOSURE

Please call the undersigned if you wish to discuss

Thurber Engineering Ltd.
Kevin Sterne, M.Sc., P.Eng.
Review Engineer



Paul Wilson, M.Sc., P.Geo.
Environmental Project Manager

Attachment

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept respons bility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

THURBER ENGINEERING LTD.

celebrating 60 YEARS

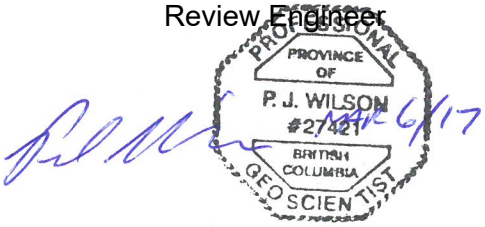
MEADE CREEK ASH LANDFILL
CLOSURE PLAN

Report

to

KERR WOOD LEIDAL

Jay McIntyre, M.A.Sc., P.Eng.
Review Engineer



Date: March 6, 2017
File: 12102

Paul Wilson, M.Sc., P.Geo.
Environmental Project Manager

100, 4396 West Saanich Road, Victoria, BC V8Z 3E9 T: 250 727 2201 F: 250 727 3710
thurber.ca

THURBER

60 YEARS

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THURBER

60 YEARS

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APPENDIX C

1. INTRODUCTION

This report is a formal landfill closure plan for the property at 8855 Youbou Road which is located approximately 2 km west of Cowichan Lake, BC in the Cowichan Valley Regional District (CVRD). The approximate site coordinates are 48° 50' 18.6" N and 124° 5' 26.4" W. The general site location is shown on Drawing 12102-1 in Appendix A.

The property was the site of a municipal solid waste incinerator which was operated by the CVRD under Pollution Control Permit No. PA-2844 from 1976 until the incinerator operations ceased in 1998. The site is currently used as a municipal recycling drop off and transfer facility known as the "Meade Creek Recycling Centre and Garbage Drop-off Depot" (Meade Creek Recycling) which was established in 1999. During the course of the incinerator operations on the site, approximately 14,000 m^3 of ash and other mixed waste material was deposited in three uncovered stockpiles located within the former gravel pit portion of the site. A plan showing the existing site conditions (Drawing 12102-100) is included in Appendix A.

This landfill closure plan report is intended for submission to the BC Ministry of Environment (MoE) following requirements included within a letter to the CVRD dated November 20, 2014. A copy of the MoE letter is provided in Appendix B.

This landfill closure plan will be implemented during 2017 as part of proposed site upgrades to the recycling centre / transfer station facilities.

It is a condition of this report that Thurber Engineering Ltd.'s (Thurber's) performance of its professional services is subject to the attached Statement of Limitations and Conditions. Both the CVRD and the MoE are approved users of this report.

1.1 Professional Statement

The persons who produced, reviewed and signed this report are members of the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) and have demonstrable experience in the fields of contaminated site assessment and remediation and in the development and implementation of landfill closure plans, long term landfill monitoring projects and landfill feasibility studies. Specifically, Mr. Paul Wilson, M.Sc., P.Geo. has 15 years of experience managing contaminated site investigations and remediation projects on Vancouver Island and over 10 years of experience managing landfill assessment, closure and post-closure monitoring projects located on Vancouver Island and in the BC Interior.

Thurber, in developing this closure plan, has relied on reports, plans and topographic surveys that were provided to us by the CVRD but prepared by others, including SLR Consulting (Canada) Ltd., Active Earth Engineering Ltd. and Kerr Wood Leidal (KWL) as listed below.

1.2 Previous Site Investigations

A number of environmental investigation reports have been conducted for the site including the following:

- Stage 1 and 2 Preliminary Site Investigation, Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Prepared for the CVRD, dated May 2010. SLR Consulting Ltd.

- Detailed Site Investigation, Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Prepared for the CVRD, dated March 2011. Active Earth Engineering Ltd.

- Screening Level Risk Assessment, Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Prepared for the CVRD, dated January 2012. Active Earth Engineering Ltd.

- Closure Plan, Meade Creek Recycling Centre, 8855 Youbou Road, Lake Cowichan, BC. Prepared for the CVRD, dated February 2012. Active Earth Engineering Ltd.

We understand that the above reports were produced in accordance with the requirements of the *Environmental Management Act* (EMA) and the *Contaminated Sites Regulations* (CSR).

Information presented in the above listed reports was used in the development of this landfill closure plan. We understand from the Site Registry that all of the above reports were provided to the BC MoE on July 13, 2012. For reference, copies of a selection of environmental investigation summary drawings that were produced by both SLR and Active Earth for the above reports are included in Appendix C. The copies of the full reports have not been appended.

2. SITE CHARACTERISTICS

2.1 Legal

The property consists of a single rectangular lot approximately 2.3 ha in size as shown on Drawing 12102-100 in Appendix A. The legal description for the property is PID 004-289-161, Lot 1, Block 488, Plan 43751, Cowichan Lake District. A copy of the land title is included at the back of Appendix B. The site is currently zoned P-2 “Institutional Zone” which allows for institutional uses which are defined within the CVRD Zoning Bylaw No. 2468 as “a non-profit building or operation which is open to the public or which serves public purposes”.

2.2 Current Site Use, Topography and Surrounding Land Use

The current site layout is shown on Drawing 12102-100 in Appendix A and several of the drawings in Appendix C including the SLR Site Plan Drawing 3. Approximately 20% of the site is gravel-surfaced and utilized as a recycling drop-off facility consisting of a former incinerator building (now used as a recycling drop off area), an office/garage building, dumpsters and a vehicle weigh scale. The remainder of the property is vegetated. Three distinct ash piles are present within the central and northern portions of the site. The largest pile (labelled Ash-1 for this project) is located in the northern portion of the property, a second smaller pile (Ash-2) is located to the west of the current recycling facility while the smallest pile (Ash-3) is located on the west side of the site. A drinking water supply well is located within the eastern portion of the site however, we understand from the CVRD that the well is no longer used to supply drinking water. Testing of the well water in

2010 found that the Canadian Drinking Water Guidelines were met for all parameters analyzed except the aesthetic standard for manganese. The “ponded water” shown adjacent to the western property boundary on SLR Drawing 3 (Appendix C) was a temporary feature that was apparently present during the winter of 2010 when the drawing was produced. There was no sign of ponded water at the location shown during a site visit conducted by Thurber during June 2016 and the current long-time site workers have stated that water rarely if ever ponds at that location in the winter. A water retention pond is proposed for the area as part of the Meade Creek recycling facility upgrades.

The site has an average elevation of about 203 m above sea level and is bound to the east by the public Logging Truck Road and private Teleglobe Canada Road. East of the Teleglobe Canada Road is the new Laketown Ranch music and recreation park development. Vacant treed land bounds the site to the north while a gravel pit (at lower elevation) is present to the west of the site. A small industrial lumber mill bounds the site to the south.

The regional topography slopes gently downward towards the southwest in the direction of Cowichan Lake. Meade Creek flows in a westerly direction as close as 90 m north of the northern site property boundary. A 2.5 m high berm is located immediately to the west of the western property boundary as shown on the SLR Drawing 3. The gravel pit operation to the west of the subject property is at a lower elevation than the subject property.

2.3 Climate

The 1981 to 2010 Canadian Climate Normals for “Lake Cowichan” Station (ID1012055, 2.9 km east of the Meade Creek Recycling Facility) indicate that the area receives an average of 1975.6 mm of rainfall and 72 cm of snowfall per year. The heaviest precipitation months are October through March with greater than 200 mm of precipitation falling each month.

2.4 Geology and Ash Properties

Drilling investigations conducted by SLR and Active Earth identified native soils consisting of well graded sand and gravel with cobbles from ground surface to the maximum depth explored (26.2 m). The SLR report notes that the soils in the vicinity of the site consist of moraine (till) which has a gravelly-sandy (well drained) texture and sand and gravel fluvial deposits associated with the Meade Creek fan are also widespread in the area which tend to be well to rapidly drained.

Bedrock is not known to outcrop on site. Available bedrock geology mapping (Muller, 1980) suggests that the bedrock underlying the thick site soil may consist of Sicker Group volcanic lithologies including fine-grained tuffs to breccias and lava flow deposits.

The stockpiled ash is described as brown to black, silt and sand with significant burned and unburned mixed debris including metal, plastic, brick, drywall, tile, charcoal, glass and cobbles of varying sizes. Large-size debris has been encountered in previous test pit investigations. The ash is present up to a maximum depth (below existing site grades) of approximately 5 m. A small amount of residual ash (<1 m^3) is also located on a concrete pad located at the rear of the existing incinerator building.

Investigations by SLR and Active Earth have found that the ash is contaminated by high levels of metals above applicable CSR Industrial Land (IL) use standards and by hydrocarbons above non-applicable CSR Residential land (RL) use standards as shown on Table 1 below.

Table 1: Summary of Maximum Contaminant Concentrations in Ash

Parameter	Maximum Concentration in Ash (ug/g)	CSR Standard (ug/g)	
		IL	RL
Heavy Extractable Petroleum Hydrocarbon	1,120	5,000	1,000
Antimony	82.5	40	20
Arsenic	152	15	15
Barium	1,080	400	400
Cadmium	20.2	2	2
Chromium	196	95	95
Cobalt	124	300	50
Copper	3,640	250	150
Lead	1,570	2,000	500
Molybdenum	39.4	40	10
Nickel	220	500	100
Tin	270	300	50
Zinc	12,900	450	600

Concentrations of dioxins, furans and polycyclic aromatic hydrocarbons in the ash were found to be below CSR standards.

Results of the Toxicity Characteristic Leaching Procedure (TCLP) testing for metals indicated that the ash is not considered Hazardous Waste as defined by the *Hazardous Waste Regulation* (HWR). However, results of Synthetic Precipitation Leaching Procedure (SPLP) testing conducted on the ash indicated that the ash has a potential to generate leachate that could exceed applicable CSR Generic Numerical Water standards for several metals including aluminum, antimony, cadmium, chromium, copper, lead and zinc. However, as discussed in Section 2.5 below, no groundwater contamination exceeding applicable site standards has been identified by previous investigations of site groundwater quality.

Previous investigations have demonstrated that the contamination on site is restricted to the ash piles as soil samples collected from the native soil immediately beneath and laterally adjacent to the ash piles have not been found to be contaminated (as shown on the Active Earth Figure 4 in Appendix C).

No vapour contamination exceeding applicable site standards was identified within the ash piles. Vapour samples collected from the ash stockpiles on January 30, 2011 contained very low but measureable concentrations of methane (i.e. less than 0.1%) which are significantly less than the

Lower Explosive Limit (LEL) for methane which is 5%. These findings indicate that the ash stockpiles have a low potential to generate significant future methane.

2.5 Hydrology and Hydrogeology

No surface water bodies are located on the Meade Creek Recycling site, however, some temporary ponding of rainwater has occurred along the western property boundary. The nearest surface water is Meade Creek, which is located less than 100 m north of the northern property boundary. Cowichan Lake is located 900 m south of the site.

The site groundwater conditions have been investigated in detail as part of previous environmental reports. Those investigations have revealed that there are two groundwater flow regimes present beneath the site including a shallow, perched groundwater table located 5 m to 7 m below existing site grades within the southern portion of the site and a deeper, regional groundwater table located 18 m to 22 m below existing site grades (as shown on the Active Earth Figure 5 in Appendix C and Drawing 12102-100 in Appendix A).

The perched groundwater flow direction is inferred to be northwesterly towards Meade Creek, while the deeper, regional groundwater flow direction is inferred to be southwesterly towards Cowichan Lake. The top of the shallow groundwater table has been measured to be located within 1 m of the base of the Ash-2 stockpile. It should be noted that no perched groundwater table was identified within in any of the monitoring wells installed within the northern portions of the subject property.

Measured water levels within the southern portion of the site suggest that the perched water table has a relatively steep downward gradient as it flows towards the northwest. This may be indicative of a discontinuity in the confining layer causing the perched water table, or there may be multiple, discontinuous and localized perched water tables above the regional groundwater table.

A rising head test conducted on monitoring well MW11-3D as part of the Detailed Site Investigation report determined a local soil hydraulic conductivity of 5×10^{-6} m/s (i.e. 5×10^{-4} cm/s) in the well which has a screened interval below the regional groundwater table between 24 m and 27 m depth. Assuming an aquifer porosity of 0.3, the regional groundwater flow velocity was estimated from measured hydraulic gradients and hydraulic conductivity and determined to be roughly 50 m/year towards the southwest. Groundwater velocities have not been calculated for the shallow perched groundwater table.

As noted previously, no groundwater contamination exceeding applicable CSR standards has been identified by the multiple environmental investigations conducted on the subject property.

3. REGULATORY FRAMEWORK

Legislation governing waste management in British Columbia includes the *Environmental Management Act* (EMA). The management of solid waste is further regulated by the Landfill Criteria for Municipal Solid Waste (LCMSW) (1993) and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills (1996). The BC MoE has recently issued a draft

second edition of the LCMSW dated September 2015 which, once finalized, will only apply to landfills that receive municipal solid waste after the date of issuance of the criteria. All of these documents were used as guidance to assist in the development of this closure plan.

The draft LCMSW document notes that typically, if the landfill property is not planned to be used for a new purpose in the future, then the landfill closure process and post-closure monitoring and reporting requirements will be regulated under the closure plan developed for the landfill site.

Should the site be redeveloped in the future for a different land use, the site will have to be assessed and remediated within the regulatory framework for contaminated sites in force at the time that the application is made. At the present time, these would include the EMA and CSR.

3.1 Regulatory History

The previous site municipal refuse incinerator and ash landfill operated under Pollution Control Permit No. PA-2844 which was issued on April 3, 1974. On November 24, 2009 the CVRD provided a letter to the BC MoE informing the Ministry that the CVRD had elected to abandon the permit. The MoE later confirmed receipt of the notification to abandon the permit within a letter to the CVRD dated November 20, 2014. Copies of these documents are included in Appendix B. As a result of the permit abandonment, the MoE imposed the following requirements on the CVRD:

- Submission of a landfill closure plan to the Director by December 31, 2015.
- Carry out the landfill closure plan to the satisfaction of the Director.
- Carry out any additional requirements that the Director imposes respecting restoration of the environment or the control and monitoring of the waste discharged after abandonment.
- Submission of a Site Profile a minimum of 10 days before the time the site owner dismantles a building or structure or otherwise decommissions the site.

In June 2016, the CVRD retained KWL and its various sub-contractors (including Thurber) to produce a landfill closure plan for the site and develop plans for the construction of an upgraded recycling transfer station on the property.

The subject property is listed on the BC MoE Site Registry under ID 14157. A copy of the detail report obtained from the Site Registry is included in Appendix B.

4. LANDFILL CLOSURE PLAN

4.1 Future Land Use and General Concept

The site is currently used as a municipal recycling and garbage drop-off depot. The ash generated during the previous site use as a municipal refuse incinerator is currently situated in three vegetation-covered, open-air stockpiles. The future land use is planned to be a reconfigured municipal recycling drop-off and transfer station and a single, covered ash landfill as shown on the attached Drawing 12102-101 in Appendix A.

The upgraded waste transfer station will consist of the following:

- A scale house;
- A usable material drop-off area;
- Paved areas for vehicle traffic and waste segregation and drop-off at an elevated level;
- Concrete block retaining walls to separate high and low lying areas;
- A surface water retention pond;
- Paved areas for waste bins and truck traffic at a lower level; and,
- Landscaped areas.

The concept for the closure of the existing ash landfill will be to consolidate the three existing ash stockpiles (and any ash residuals observed in other areas) into a single location within the northern portion of the subject property (as shown on Drawing 12102-101) and cap the ash material with an engineered cover (Drawing 12102-102).

The draft 2015 LCMSW document notes that the final cover of closed landfills is intended to meet the following objectives:

- Prevent exposure of humans and / or wildlife to municipal solid waste.
- Control infiltration of precipitation.
- Minimize the uncontrolled release of methane to the atmosphere.
- Limit erosion and release of sediment into surrounding surface waters.
- Control the release of odours, and;
- Minimize oxygen infiltration and limit fire risk.

It is also noted within the LCMSW that the final cover shall be compatible with the end use planned for the landfill site. As the ash at the Meade Creek site has been demonstrated to pose a low risk of significant methane and odour generation, the key role of the final cover is to prevent exposure of humans and wildlife, control infiltration of precipitation and limit the erosion and release of sediment.

4.2 Regulatory Requirements

Prior to decommissioning any of the existing site buildings, a completed Site Profile will be submitted to the MoE.

Any future discoveries of off-site contamination migration are required to be reported to the MoE (and adjacent property owners) in accordance with the requirements of the EMA and the CSR.

4.3 Anticipated Total Waste Volume

While Active Earth previously estimated that there is approximately 15,000 m^3 of ash material located on the site in the three current open-air ash stockpiles, KWL's revised estimate of the ash volume (based on a newly completed topographic survey) is approximately 14,000 m^3. KWL's individual stockpile volume estimates are as follows:

Ash 1 Stockpile	11,300 m^3
Ash 2 Stockpile	2,600 m^3
Ash 3 Stockpile	90 m^3
Total Estimate	13,990 m^3

As noted in Section 2.4 above, we understand that a small amount of residual ash (less than 1 m^3) is also present on a small concrete slab at the northwest side of the existing incinerator building.

No new ash will be generated on the site or imported to the site and no other newly deposited materials will be placed within the closed landfill.

It is anticipated (based on the configuration of this landfill closure plan) that approximately 2,690 m^3 of ash from the two smaller stockpiles will need to be relocated to the Ash-1 stockpile located within the northern portion of the site. All ash that is relocated to the final stockpile (landfill) will require compaction in lifts of no more than 300 mm in thickness using several passes with a large tracked bulldozer or excavator. Compaction and shaping of the Ash-1 pile should be monitored and approved by a geotechnical engineer.

Confirmation that all of the ash has been relocated will be obtained through the collection and analysis of soil samples obtained from native soil exposed at each of the previous stockpile locations. The existing footprint of the Ash-1 pile will be altered, which, together with the addition of the ash from the smaller piles, will result in an increase of the height of the Ash-1 stockpile by up to 4.5 m above existing grades.

4.4 Closure Announcements and Signage

The temporary closure of the existing Meade Creek Recycling facility (while the upgrades are being constructed) should be announced using multiple means of communication including announcements on the CVRD website and in local newspapers etc. Signs should also be posted at the site entrance during the course of the site reconfiguration work displaying the following information:

- Site Name;
- Owner and Operator;
- Contact phone number and address for owner and operator;
- Phone number in case of emergency;
- Alternative disposal sites to be used during site reconfiguration; and,
- Anticipated date of facility reopening.

4.5 Cover Design

The three existing ash stockpiles (and any other ash residuals from other portions of the site) will be combined into a single location at the Ash-1 stockpile and contoured to generally meet the landfill closure design shown in Drawing 12102-101 in Appendix B. Drainage will be directed away from the cover with slopes ranging from 4% to 33%. Much of the surface of the landfill cap will

have a general southwesterly aspect to accommodate potential future plans of adding a solar electricity generation project to the surface of the landfill cap.

4.5.1 Cover Design Details

A general description of the landfill cover design and materials specifications are provided below. Design details are also provided on Drawing 12102-102 in Appendix A.

The landfill cover will consist of the following:

- A minimum of 150 mm of suitable vegetated topsoil; overlying
- 300 mm of well-graded 75 mm minus pit run sand and gravel; overlying
- 300 mm of free-draining sand; overlying
- A coated Geosynthetic Clay Liner (GCL) designed for moderate to steep slopes; overlying
- 150 mm of free-draining sand; overlying
- A minimum of 100 mm of well-graded 75 mm minus pit run sand and gravel.

The GCL must have polypropylene (or other approved) geofilm coating applied on at least one side of the GCL. The GCL should have a tensile strength of at least 7 kN/m (MARV) as per ASTM D 6768.

Continuous monitoring by experienced construction management personnel will be required during installation of the cover system to ensure the integrity of the GCL and associated design elements. All aspects of the cover system should be installed in accordance with the requirements of the GCL supplier. The GCL rolls should be handled and stored on site in accordance with manufacturer recommendations.

The intent of the lower pit run sand and gravel layer is to fill in any localized dips or voids in the ash surface and provide consistent support for the overlying sand layer and GCL product. The surface on which the GCL is installed should be smooth and free of wheel ruts, debris, roots, sticks, and rocks larger than 10 mm diameter. The sand surface should be smooth-drum rolled and compacted to at least 90% of Modified Proctor Density, or as directed in the field by the geotechnical engineer.

The GCL rolls should be transported from the storage area using approved lifting equipment. Rolls to be deployed and overlapped as per manufacturer recommendations. Only the amount of GCL that can be installed and covered on the same day should be installed. The GCL should be covered promptly following deployment. The cover soil should be free of rocks greater than 10 mm diameter, as well as any sharp or angular objects, sticks, roots or debris. The cover material should be pushed across the seams in such a way as to prevent the cover material from lodging between the overlapped panel seams.

A minimum sand cover of 300 mm should be maintained at all times between the treads of the construction equipment and the GCL. The maximum allowable ground pressure for construction equipment is 70 kPa (10 psi), or as recommended by the GCL manufacturer. Sudden braking and turning of vehicles over the GCL should be avoided.

The 10 mm minus sand and 75 mm minus sand and gravel cover layers are to be smooth-drum rolled and compacted to at least 90% of Modified Proctor Density, or as directed in the field by the geotechnical engineer. Compaction equipment should be operated parallel to the slope direction and not operated across the slope.

Hydration of the GCL is to be completed following installation in accordance with manufacturer recommendations.

The geomembrane system will extend a minimum of 1 m beyond the limits of the ash at the base around the perimeter of the landfill as shown in the design detail on Drawing 12102-102. The cover's upper sand layer should tie into a layer of free-draining sand located adjacent to the ditch as shown in Typical Detail 2 on Drawing 12102-102.

The following gradation limits are recommended for the granular fill materials.

Table 2: Proposed Material Gradations for Granular Cover Fills

Sieve Size (mm)	Percent Passing	
	75 mm minus Sand & Gravel	10 mm minus Sand
75	100	---
50	70 – 100	---
25	50 – 100	---
10	---	100
4.75	22 – 100	60 - 100
2.36	10 – 85	40 – 100
0.60	---	10 – 60
0.30	---	0 - 40
0.15	---	0 – 20
0.075	2 – 8	0 - 5

4.5.2 Drainage Control

The free-draining sand layer above the landfill cover's upper geotextile is intended to transmit precipitation that infiltrates into the upper soil layers of the landfill cap. The landfill is sloped so that the infiltrating water will not collect on the landfill cover but will be transmitted to the unlined perimeter ditch (see typical detail on Drawing 12102-102) at the base of the landfill beyond the extent of the ash. The ditch will be excavated into the native granular soil which should be sufficiently permeable to allow the water intercepted by the ditch to infiltrate into the ground. However, the ditches should be graded to allow accumulated runoff to flow as indicated into the storm water retention pond designed by KWL as shown on Drawing 12102-101.

4.5.3 Vegetative Cover

Vegetation will be established on the landfill cover. In general, efforts should be made to utilize drought-resistant, native and shallow-rooting plants (i.e. grasses and legumes) and must employ and maintain temporary robust erosion control measures such as surface roughing, coir matting,

mulch and / or hydroseeding until such a time as the vegetative cover becomes sufficiently established. The erosion control measures employed must be effective in preventing the erosion and transport of exposed topsoil and other soil layers which make up the landfill cap.

A seed mixture similar to the following is recommended for the purpose of vegetating the landfill cap:

- 25% Creeping Red Fescue
- 20% Perennial Grass
- 15% Hard Fescue
- 15% Orchard Grass
- 10% Alsike Clover
- 10% White Clover and
- 5% Red Top

To ensure that noxious weeds are not introduced into the soil, the seed mixture is to be consistent with Canada Number 1 Ground Cover Mixture. The application rate should be in accordance with the seed provider's recommendations. The establishment of invasive species such as scotch broom and Himalaya blackberries will be discouraged through an intermittent maintenance program to be developed and implemented by the CVRD.

4.6 Landfill Liner and Leachate Collection Consideration

Consideration was given for the need to provide a base liner for the ash material. While the ash material may have the potential to generate leachate as indicated by the SPLP results, observed groundwater concentrations are a more direct (performance-based) measure of the leachability of the ash. Active Earth noted that although the SPLP results are generally designed to reflect the infiltration of rainwater, the pH of the initial extraction solution used in the testing was less than 5. Active Earth notes that the pH of rainwater on the west coast is generally considered to be greater than 5.6. As a result, it was their opinion (and we agree) that the SPLP results were overly conservative in predicting leachability potential. The previous environmental investigations conducted at the site have not revealed the presence of elevated metals in groundwater under or down gradient of the existing ash stockpiles following approximately 40 years of landfilling and precipitation infiltration. The organic content of the ash is also low and significant microbiologic activity within the ash landfill is not anticipated.

The placement of a permanent impermeable cap over the ash will prevent future infiltration of precipitation. The LCMSW notes that the base liner may be omitted in situations where sufficient unsaturated soil depth is present beneath the base of the waste material. Perched groundwater was not encountered on the northern portion of the site where the ash will be located. The depth to groundwater within the northern portion of the site will be approximately 15 m below the lowest ash level.

4.7 Landfill Gas Management

The *Landfill Gas Management Regulation* only applies to landfills that accept municipal solid waste for disposal on or after January 1, 2009 and have total capacities exceeding 100,000 tonnes. As such, the *Landfill Gas Management Regulation* does not apply to the site. Previous investigations have determined that the ash on site contains little organic material and significant methane production is not occurring. It is our opinion given the nature of the ash material that landfill gas management (including passive landfill gas venting) is not required.

4.8 Vectors and Wildlife

Vectors are a carrier that is capable of transmitting a pathogen from one organism to another such as flies, other insects, rodents and birds. As the ash piles contain little organic material, vectors (and other wildlife such as bears) are not a concern during landfill closure and reconfiguration of the site. However, the future land use of the site as a recycling depot and transfer station may attract vectors and other wildlife. Operational procedures that limit the impact of these concerns will be developed for the reconfigured recycling and transfer centre.

4.9 Access and Fencing

Locked gates will be installed at vehicle access points to prevent unauthorized vehicle access. Perimeter security fencing will be installed both around the perimeter of the property and the perimeter of the landfill to prevent unauthorized access.

4.10 Health, Safety and Soil and Water Management Plans

Site-specific health, safety and soil and water management plans will be developed by the general contractor prior to the initiation of the landfill closure and recycling centre reconfiguration project. The prime concerns to be addressed by the plans will be dust generation control and monitoring and mitigation procedures, soil erosion and runoff prevention and mitigation, soil tracking control procedures, recyclable material recovery procedures (if any), the specification and use of personal protective equipment and the closure of the existing groundwater monitoring wells in accordance with the requirements of the *BC Groundwater Protection Regulation.*

The primary exposure pathways for workers to the contaminated soil are likely to be dust inhalation and inadvertent ingestion during the course of the reconfiguration project. It is anticipated that these exposure pathways will be rendered incomplete by the site-specific health and safety management plan developed by the contractor.

The soil management plan should include provision for the separation and off-site disposal or recycling of large-size or unwieldy debris encountered during the movement of the existing ash material stockpiles into the final landfill configuration. Examples of the types of large debris to be removed include car bodies or other large metal pieces including major appliances, propane tanks and / or large knots of wire cable. Large-size debris should be removed that could hinder the contractor in constructing the ash landfill, result in significant voids within the final landfill stockpile or produce punctures in the overlying landfill geomembrane cover.

The soil management plan should also include provisions for the collection and analysis of confirmatory soil samples from the exposed footprints of the Ash-2 and Ash-3 stockpiles after they are relocated. Any residual soil contamination underlying either stockpile should also be relocated to the Ash-1 stockpile however, the previous environmental site investigations found little to no significant contamination within the native soil underlying the ash stockpiles. Sampling and testing should continue until uncontaminated soil samples are obtained. All soil sample collection and environmental data interpretation should be conducted by a qualified environmental professional following methods recommended by published BC MoE CSR guidance documents.

4.11 Resource Recovery

If economically feasible and approved by the CVRD, the recovery of recyclable material may be conducted by the construction contractor during the movement of the existing ash material stockpiles into the final landfill configuration. If conducted, recyclable material recovery should only be completed in accordance with the soil management plan and health and safety management plans prior to final positioning of the ash fill material.

5. POST-CLOSURE MONITORING

5.1 Surface Inspections

Bi-annual surface inspections focusing on the integrity of the landfill cover and bounding drainage ditches should be conducted for a period of 5 years at which time, the need for continued or reduced monitoring should be reviewed. The surface inspections should be conducted in early October and March of each year. The October inspection should focus on items that could be affected by the oncoming winter rains while the March inspection should focus on any damage arising over the winter. Necessary repairs to the landfill cover or drainage infrastructure should be made promptly.

5.2 Groundwater Monitoring

As most or all of the existing groundwater monitoring wells will likely be damaged or destroyed during the construction of the planned site upgrades, the existing groundwater monitoring wells should be closed in accordance with the requirements of the *BC Groundwater Protection Regulation* as part of the initial phase of construction work. The existing monitoring well locations are shown on the drawings included in Appendix C. We understand that the existing water supply well is being retained for use as part of the new recycling centre upgrades.

Following completion of the construction of the new landfill cap, four new landfill closure groundwater monitoring wells should be installed at the locations shown on the landfill closure Drawing 12102-101 in Appendix A. The wells should be installed with suitable well screens no more than 1.5 m in length, with the top of the screens set 2.0 m below the level of the regional groundwater table as shown in Detail 3 on Drawing 12102-102. Setting the 1.5 m long well screens at the same depth below the groundwater table at each well location will facilitate the comparison of the groundwater quality data obtained to the CSR numerical water standards and

the comparison of the data between the wells. The proposed well configuration will provide one up-gradient well, one down gradient well and two bounding wells based on the measured regional southwestern groundwater flow direction within the northern portion of the site.

Representative samples of the groundwater should be collected from the wells on a bi-annual basis, in October and March of each year, and submitted for analysis of the parameters presented in Table 3 below. All groundwater sample collection and environmental data interpretation should be conducted by a qualified environmental professional following methods recommended by published BC MoE CSR guidance documents.

The depth to groundwater in each monitoring well should be measured at each monitoring event. The appropriate standards for assessing the parameter concentrations in groundwater are the CSR standards for Drinking Water and Aquatic Life Use.

The groundwater monitoring program should be conducted for a minimum period of 5 years at which time, the need for continued or reduced groundwater monitoring should be evaluated by a qualified environmental professional. However, given the lack of apparent impacts to groundwater quality under the existing site conditions, the site improvements presented within this landfill closure plan and the low-organic content nature of the ash material, it is anticipated that a longer-term monitoring program will not be required.

Table 3: Proposed Post-Closure Groundwater Monitoring Parameters

Conventional Parameters	Total and Dissolved Metals		Other Parameters
pH	Aluminum	Manganese	Extractable Petroleum Hydrocarbons
Conductivity	Antimony	Mercury	Dioxins and Furans
Hardness (total)	Arsenic	Molybdenum	
Total Dissolved Solids	Barium	Nickel	
Total Alkalinity	Boron	Potassium	
Bicarbonate Alkalinity	Cadmium	Selenium	
Chloride	Calcium	Silver	
Fluoride	Chromium	Sodium	
Sulphate	Cobalt	Sulphur	
Colour	Copper	Tin	
Nitrate	Iron	Uranium	
Nitrite	Lead	Vanadium	
	Magnesium	Zinc	

5.3 Surface Water Monitoring

There is currently no permanent surface water on the site however, the construction of a lined storm water retention pond is planned as part of the Meade Creek Recycling Facility upgrades (see Drawing 12102-101). The pond will receive water that has runoff the landfill cover via the

perimeter ditch, as well as surface runoff generated from the paved portions of the remainder of the recycling facility. While not a requirement of the landfill closure plan, it is recommended that the CVRD develop and implement a regularly-scheduled surface water quality monitoring program as part of the recycling center's regular operations.

5.4 Landfill Gas Monitoring

The incinerator ash material has a low organic content and has been demonstrated to not generate significant quantities of methane or other organic compounds. As such, the post-closure monitoring of landfill gases is not required.

5.5 Reporting

The results of the bi-annual surface inspection and groundwater program should be presented within a bi-annual report that outlines the methodologies used, QA/QC procedures employed and a summary of the findings and recommendations. The bi-annual groundwater data should be compared to previously collected data so that any trends in groundwater quality can be observed and monitored.

6. CLOSURE AND POST-CLOSURE COSTS

6.1 Closure Costs

Costs for the implementation of the landfill closure plan will be determined by KWL prior to the construction tender process.

6.2 Post-Closure Monitoring Costs

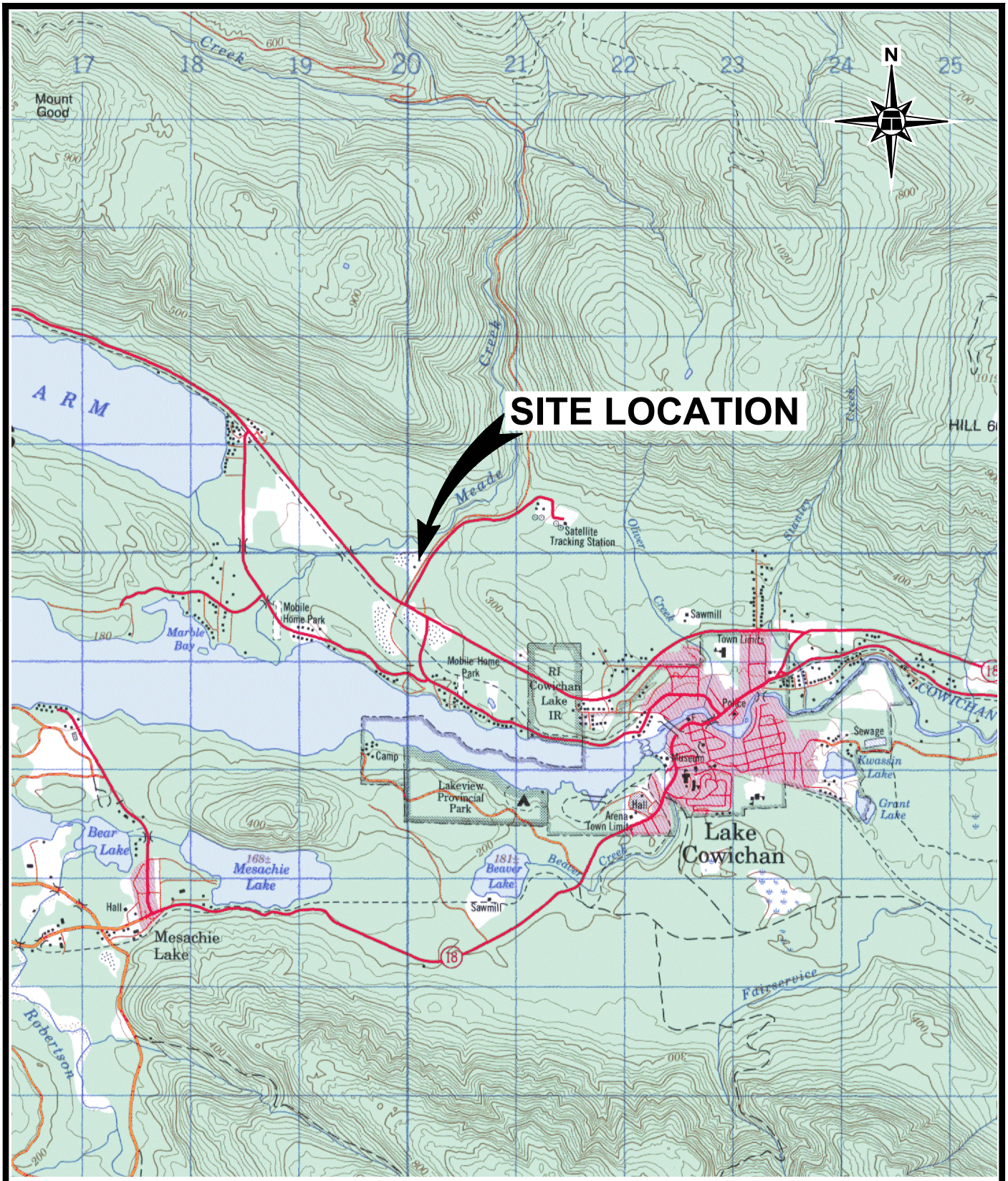
It is anticipated that the costs for a consultant to conduct the monitoring requirements described in Section 5 will be in the order of $15,000 per year for the initial 5-year monitoring period. Subsequent monitoring beyond 5 years, if required, would likely be less.

THURBER

60 YEARS

APPENDIX A

THURBER DRAWINGS



Note: Base image from NTS Map Sheet 92 / C16.

0 500 1000 1500 2000 2500 3000m

SCALE 1:50000

THURBER ENGINEERING LTD.

COWICHAN VALLEY REGIONAL DISTRICT

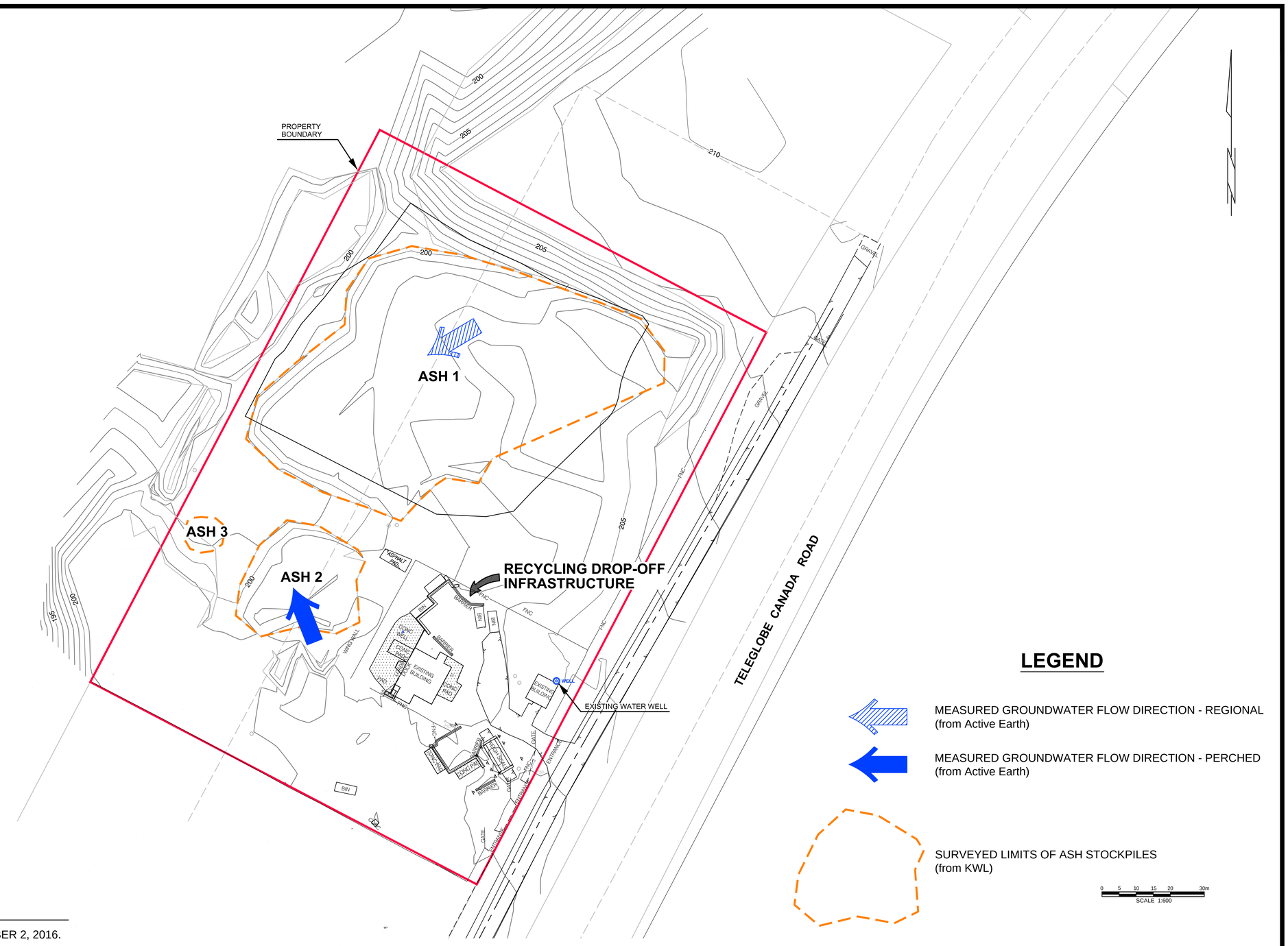
SITE LOCATION MAP

MEADE CREEK RECYCLING FACILITY — LAKE COWICHAN, B.C.

DESIGNED	DRAWN	APPROVED	DATE	SCALE	PROJECT No.	DWG. NO.	REV.
PJW	RRS	BW	JULY 8, 2016	1:50,000	12102 -1		-

TED04597.dwg

Plotted: March 06, 2017



LEGEND

MEASURED GROUNDWATER FLOW DIRECTION - REGIONAL
(from Active Earth)

MEASURED GROUNDWATER FLOW DIRECTION - PERCHED
(from Active Earth)

SURVEYED LIMITS OF ASH STOCKPILES
(from KWL)

NOTES:

1. REVISED BASE PLAN PROVIDED BY KERR WOOD LEIDAL, DECEMBER 2, 2016.

REV.No.	DATE (d/m/y)	BY	DESCRIPTION
A	2/12/2016	PJW	Updated landfill configuration

SEAL

THURBER ENGINEERING LTD.

KERR WOOD LEIDAL

SITE PLAN - EXISTING CONDITIONS

MEADE CREEK LANDFILL CLOSURE PLAN — LAKE COWICHAN, B.C.

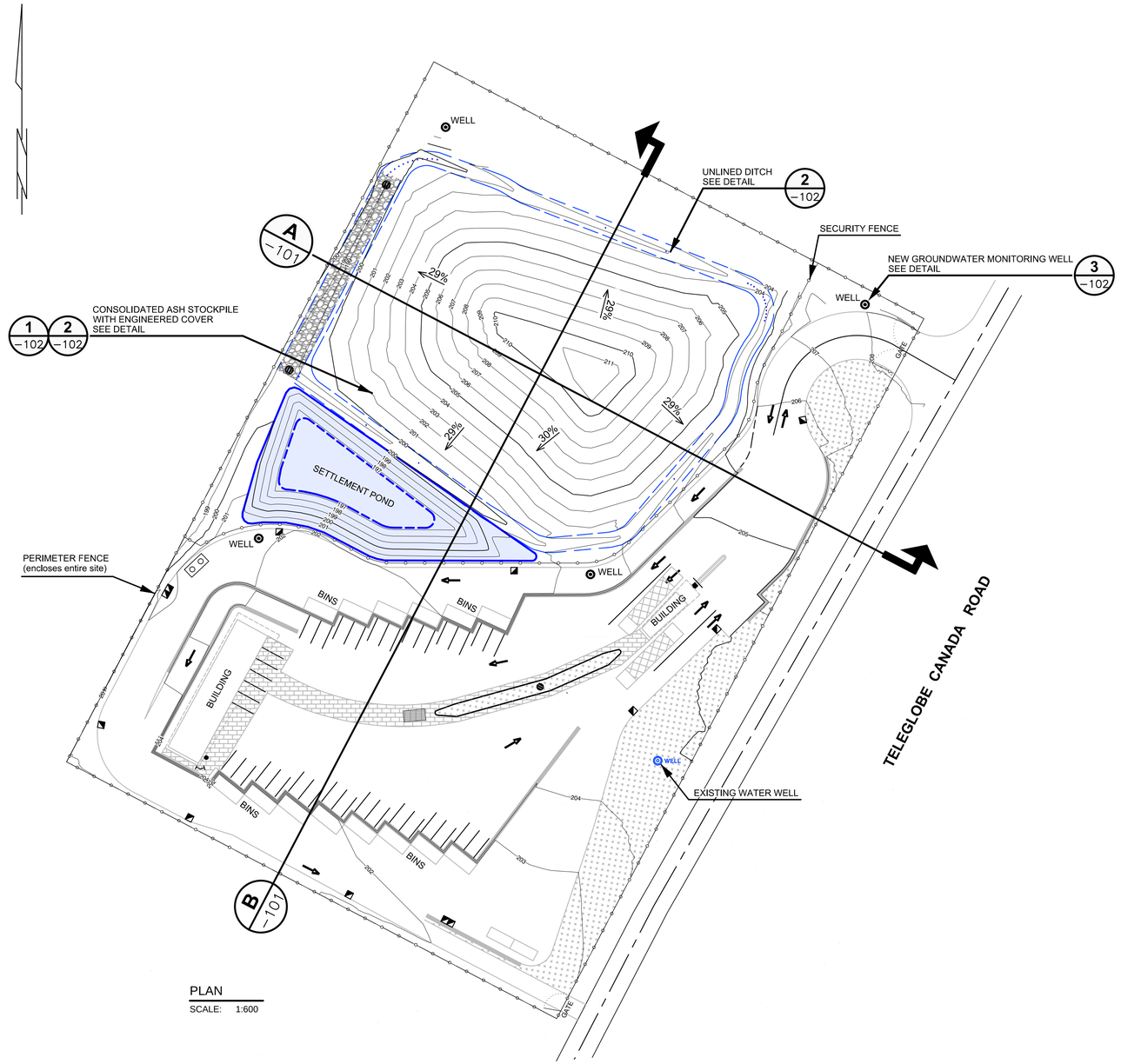
DESIGNED	DRAWN	APPROVED
PJW	RRS	

DATE: NOV. 25, 2016 — SCALE: 1:600

PROJECT No.: 12102 - 100 — DWG. NO. — REV.: A

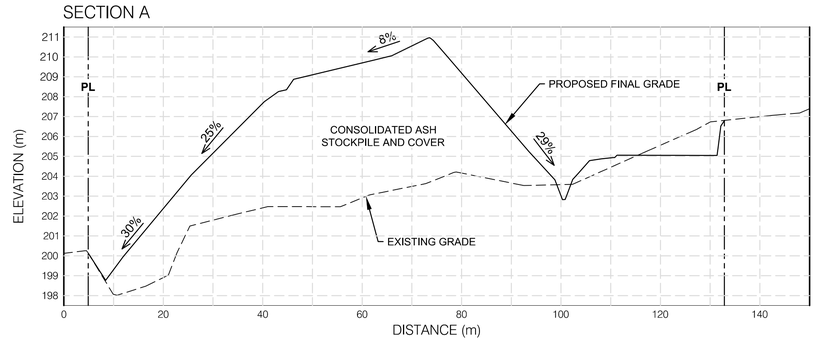
TED04654_UPDATED_REV D.dwg

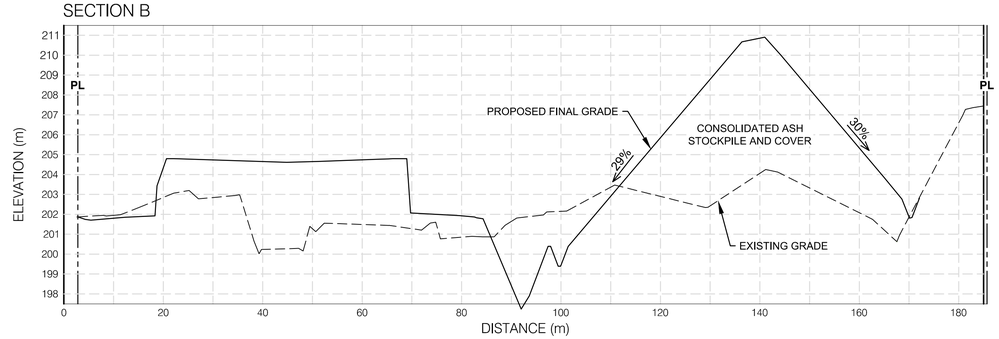
CANCEL PRINTS BEARING EARLIER LETTER



PLAN

SCALE: 1:600





SECTIONS

SCALE: HORIZONTAL: 1:600
VERTICAL: 1:150

0 5 10 15 20 30m
SCALE 1:600

0 2 4 6 8m
SCALE 1:150

NOTES:

1. REVISED BASE PLAN PROVIDED BY KERR WOOD LEIDAL, JANUARY 26, 2017.
2. DRAWING TO BE READ IN CONJUNCTION WITH THURBER REPORT ENTITLED "MEADE CREEK ASH LANDFILL CLOSURE PLAN", DATED NOVEMBER 25, 2016.

REV.No.	DATE (d/m/y)	BY	DESCRIPTION
B	31/01/2017	JDM	Updated landfill configuration
A	2/12/2016	PJW	Updated landfill configuration

SEAL

PROFESSIONAL ENGINEER
D. McINTYRE
BRITISH COLUMBIA
Mar 6/17

THURBER ENGINEERING LTD.

KERR WOOD LEIDAL

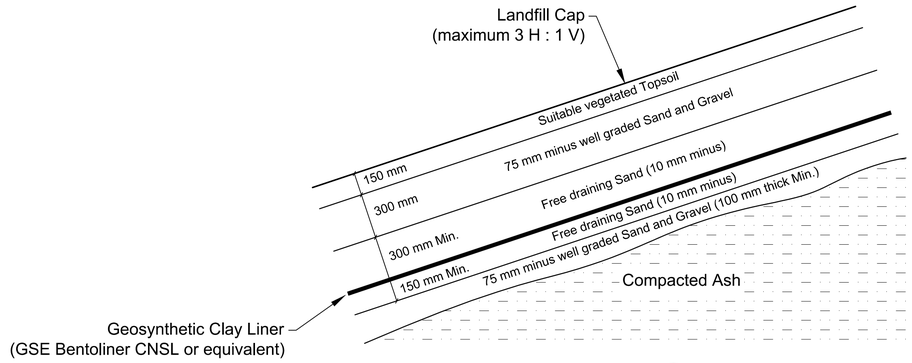
LANDFILL CLOSURE PLAN and SECTIONS

MEADE CREEK LANDFILL CLOSURE PLAN — LAKE COWICHAN, B.C.

DESIGNED	DRAWN	APPROVED
PJW	RRS	
DATE: NOV. 25, 2016	SCALE: AS SHOWN	
PROJECT No. 12102 - 101	DWG. NO.	REV. B

CANCEL PRINTS BEARING EARLIER LETTER

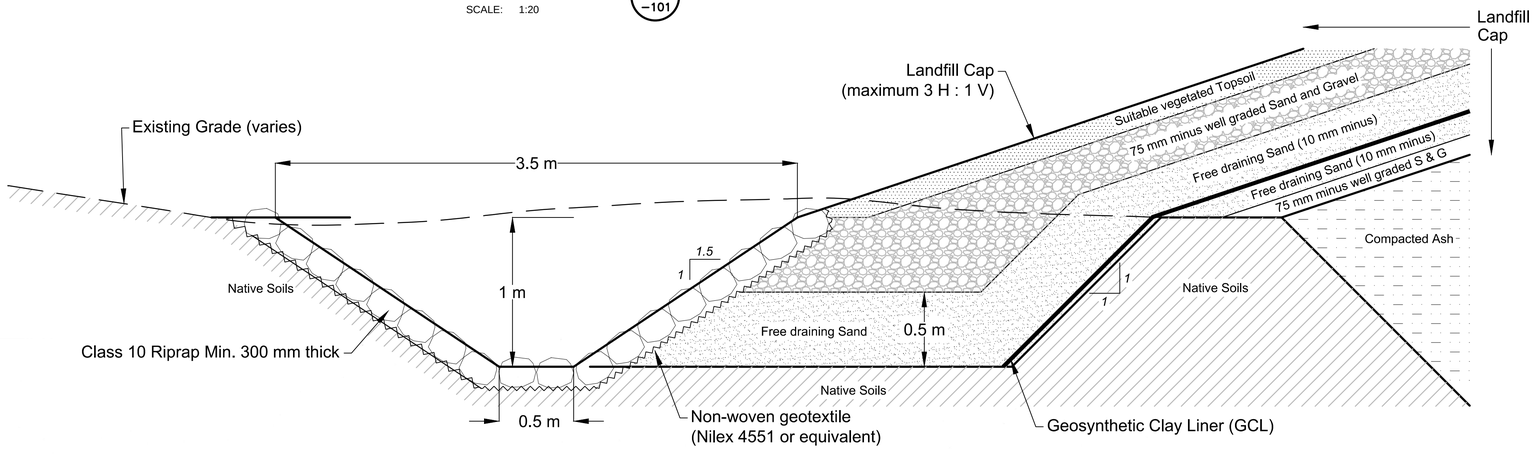
TED04654_UPDATED_REV D.dwg



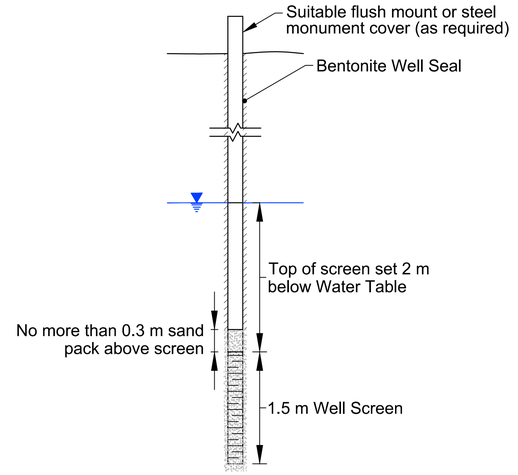
TYPICAL DETAIL 1 –101 LANDFILL CAP
SCALE: 1:20

GENERAL NOTE:

EXISTING GRADE AROUND LANDFILL FOOTPRINT VARIES. DITCH AND LANDFILL CAP TIE-IN DETAIL MAY VARY TO MATCH FIELD CONDITIONS.



TYPICAL DETAIL 2 –101 UNLINED DITCH & LANDFILL CAP TIE-IN
SCALE: 1:20



TYPICAL DETAIL 3 –101 GROUNDWATER MONITORING WELL
SCALE: 1:40

MONITORING WELL DECOMMISSIONING NOTES:

1. All existing groundwater monitoring wells on the Site should be decommissioned under the supervision of a Qualified Professional in accordance with the requirements of the BC Groundwater Protection Regulation.
2. Each monitoring well must be filled throughout its depth with suitable sealants and backfill materials and include a closure plug.
3. All equipment and instrumentation in the well must be removed.
4. Well casings may be left in place and should be cut off at grade.
5. A well decommissioning report describing the deactivation work must be completed in accordance with the requirements of the BC Groundwater Protection Regulation and provided to the CVRD within 30 days of the completion of the well decommissioning.
6. The existing groundwater supply well is not to be decommissioned.

LANDFILL CAP NOTES:

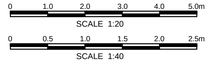
1. Continuous monitoring by experienced construction management personnel will be required during installation of the cover system to ensure the integrity of the Geosynthetic Clay Liner (GCL) and associated design elements. All aspects of the cover system should be installed in accordance with the requirements of the GCL supplier.
2. THE GCL must have polypropylene (or other approved) geofilm coating applied on at least one side of the GCL and should have tensile strength of a least 7 kN/m (MARV) as per ASTM D6768.
3. The GCL rolls should be handled and stored in accordance with manufacturer recommendations.
4. The surface on which the GCL is installed should be smooth and free of wheel ruts, debris, roots, sticks, and rocks larger than 10 mm diameter. The sand surface should smooth-drum rolled and compacted to at least 90% of Modified Proctor Density, or as directed in the field by the Geotechnical Engineer.
5. The GCL rolls should be transported from the storage area using approved lifting equipment. Rolls to be deployed and overlapped as per manufacturer recommendations. Only the amount of GCL that can be installed and covered on the same day should be installed.
6. The GCL should be covered promptly following deployment. The cover soil should be free of rocks greater than 10 mm diameter, as well as any sharp or angular objects, sticks, roots or debris. The cover material should be pushed across the seams in such a way as to prevent the cover material from lodging between the overlapped panel seams.
7. A minimum sand cover of 300 mm should be maintained at all times between the treads of the construction equipment and the GCL.
8. The maximum allowable ground pressure for construction equipment is 70 kPa (10 psi), or as recommended by the GCL manufacturer. Sudden braking and turning of vehicles over the GCL should be avoided.
9. The 10 mm minus sand and 75 mm minus sand and gravel cover layers to be smooth-drum rolled and compacted to at least 90% of Modified Proctor Density, or as directed in the field by the Geotechnical Engineer. Drum rollers to be operated parallel to the slope direction (i.e., not across the slope).
10. Hydration of the GCL to be completed according to manufacturer recommendations.

MATERIALS GRADATION TABLE

SIEVE SIZE (mm)	Percent Passing	
	75 mm Minus SAND and GRAVEL	10 mm Minus SAND
75	100	100
50	70 - 100	100
25	50 - 100	100
10	---	100
4.75	22 - 100	60 - 100
2.36	10 - 85	40 - 100
0.60	---	10 - 60
0.30	---	0 - 40
0.15	---	0 - 20
0.075	2 - 8	0 - 5

NEW MONITORING WELL INSTALLATION NOTES:

1. Four new 2" PVC groundwater monitoring wells should be installed under the guidance of a Qualified Professional at the locations shown on Drawing 12102-101.
2. The wells should be installed with well screens no more than 1.5 m in length, with the top of the screens set 2.0 m below the level of the regional groundwater table as shown in Detail 3 on Drawing 12102-102. Well depths will vary with location but each could be 20 m to 25 m deep.
3. The sand pack around the well screen is not to exceed 1.8 m in length or extend more than 0.3 m above the top of the well screen.
4. Each well should be fitted with either a flush mount road box or steel monument cover (as required), depending on location.
5. A well installation report (including well logs) is required to be submitted to the CVRD no later than 30 days after installation of the wells.



REV.No.	DATE (d/m/y)	BY	DESCRIPTION
E	3/03/2017	PJW	Landfill Cap Notes Revised
D	22/02/2017	PJW	Monitoring Well Decommissioning and Installation Notes added
C	15/02/2017	JDM	Landfill Cap Notes and Materials Gradation Table added
B	31/01/2017	JDM	Updated Landfill Cap
A	2/12/2016	PJW	Updated Landfill Configuration

SEAL

THURBER ENGINEERING LTD.

KERR WOOD LEIDAL

DETAILS

MEADE CREEK LANDFILL CLOSURE PLAN LAKE COWICHAN, B.C.

DESIGNED	DRAWN	APPROVED
PJW	RRS	
DATE	SCALE	
NOV. 25, 2016	AS SHOWN	
PROJECT No.	DWG. NO.	REV.
12102 - 102		E

CANCEL PRINTS BEARING EARLIER LETTER

THURBER

60 YEARS

APPENDIX B

CORRESPONDENCE, LAND TITLE, SITE REGISTRY DETAIL REPORT

ADDRESS ALL COMMUNICATIONS TO:
DIRECTOR, POLLUTION CONTROL BRANCH
WATER RESOURCES SERVICE
PARLIAMENT BUILDINGS
VICTORIA, BRITISH COLUMBIA
V8V 4S5

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

WHEN REPLYING PLEASE STATE
OUR FILE No. 0262100-PA-2844
YOUR FILE No.
TELEPHONE 387-5321

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
POLLUTION CONTROL BRANCH
VICTORIA, BRITISH COLUMBIA

April 3, 1974

DOUBLE REGISTERED

Regional District of Cowichan Valley
300 Brae Road
Duncan, British Columbia

Gentlemen:

LETTER OF TRANSMITTAL

Enclosed herewith is a copy of Pollution Control Permit No. PA-2844 in the name of the Regional District of Cowichan Valley. Your attention is respectfully directed to the conditions outlined in the Permit.

In conjunction with this Permit, you are directed to comply with the following requirements:

A. OPERATION OF THE INCINERATORS

At all times during the operation of the incinerator covered by this Permit, the temperature of the stack gas as measured at a point approved by the Regional Manager shall be a minimum of 1800°F.

B. DISCHARGE MONITORING

(a) Once per incinerator operating hour, measure and record the discharge opacity at the incinerator stack exit in equivalent Ringelmann number. Also, the stack gas temperature shall be recorded when the opacity measurements are made.

(b) The stack gas temperature shall be continuously monitored and recorded on a suitable permanent chart.

(c) Once per month submit:

(i) the data from (a) above
(ii) the daily recorded stack gas temperature charts
(iii) hours of incinerator operation for the previous month.

...2

(d) The need for increased or decreased opacity measurements will be based on the monitoring data submitted as well as any other data obtained by the Pollution Control Branch in connection with this discharge.

C. ODOUR CONTROL

In the event that the proposed incinerator facilities do not adequately control odours, additional discharge treatment works will be required to meet with the approval of the Director of the Pollution Control Branch.

D. ASH DISPOSAL

Maintain the refuse works authorized, as described in Appendix 02 as a Level "C" operation in accordance with the "Operational Guidelines for the Discharge of Refuse on Land" dated October 1971, or as may be otherwise required by the Director from time to time.

E. MAINTENANCE OF WORKS

Inspect regularly the pollution control works and maintain them in good working order. Notify the Director of any malfunction of these works.

F. PLANS

Plans and specifications of the proposed works authorized in Appendix 01 shall be submitted to the Director in duplicate and approval obtained before construction of such works commences. It should be noted that Section (g) of Permit Appendix 01 requires construction to be in accordance with approved plans.

A regular monitoring program of ambient atmosphere may be implemented by the Pollution Control Branch in connection with this discharge.

Once a Permit has been issued and the appeal period has expired, Branch policy provides that the administration of the Permit is carried out by our Regional Manager who acts under these circumstances for the Director. Therefore, all required information respecting this Permit may be submitted to the Regional Manager in lieu of the Director.

Compliance with the terms and conditions of this Permit will be determined through periodic inspections and monitoring. The location of the discharge falls within the bounds of our Coast Region, under the management of Mr. J. W. Thomas, P. Eng., whose offices are located at 1088 Fort Street, Victoria, British Columbia (telephone 387-5321).

This Permit does not authorize entry upon, crossing over, or use for any purpose, of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the Permittee.

...3

The terms and conditions of this Permit may be amended to meet any objectives or guidelines which may be established as a result of the Public Inquiry into Municipal Type Waste Discharges.

The decisions incorporated in this Permit and Letter of Transmittal are subject to appeal in accordance with the provisions of the Pollution Control Act, 1967, provided that initial notice of intent to appeal is given to the Director of Pollution Control within fifteen days from the date of this letter.

Enclosed for your reference is a copy of the Operational Guidelines for the Discharge of Refuse on Land together with a copy of the Pollution Control Act, 1967, as amended, and the Regulations thereto.

Yours very truly,

A. J. Chmelauskas, P.Eng.
Assistant Director
Pollution Control Branch

Encl.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
POLLUTION CONTROL BRANCH

PERMIT

Under the Provisions of the Pollution Control Act, 1967

Regional District of Cowichan Valley

300 Brae Road, Duncan, British Columbia

is hereby authorized to discharge contaminants to the air and the ancillary refuse to the ground

from a municipal refuse incinerator

located 2.5 miles west of the Village of Lake Cowichan

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

This permit has been issued under the terms and conditions prescribed in the attached appendices

01, 02 and A

Assistant *Director, Pollution Control Branch*

Date issued April 3, 19 74

Amendments dated ......, 19......

......, 19......

......, 19......

Permit No. PA-2844

PCB 11—0

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
POLLUTION CONTROL BRANCH

APPENDIX No. 01

to Pollution Control Permit No. PA-2844

(*a*) The discharge of emission(s) into the air applicable to this appendix is from a municipal refuse incinerator (Source or operation) as shown on attached Appendix A.

(*b*) The rate of discharge (dry basis) authorized is:

Maximum 10,000 SCFM Duration one hour/day Frequency once per day

Average daily (based on the operating period) 3000 SCFM - the normal operating period is 10 hours per day.

(*c*) The characteristics of the emission shall be equivalent to or better than

Contaminant	Average daily concentration based on the daily operating period	Maximum Concentration	Duration	Frequency
Opacity	Ringelmann No. 1	Ringelmann No. 2	10% of the daily operating time	

(*d*) The works authorized are a proposed municipal type refuse incinerator and related appurtenances approximately located as shown on the attached Appendix A.

(*e*) The land from which the emission(s) originate and to which this appendix is appurtenant is a six acre site on part of Block 488, parallel to and 66 feet westerly of Lot 1, Plan 23727, Cowichan Lake District

(*f*) Those works authorized and proposed must be completed and in operation when discharge commences.

(*g*) The authority to discharge is contingent upon the authorized works having been constructed as per ~~final construction~~ plans, approved in accordance with the *Pollution Control Act, 1967*.

Date issued April 3, 19 74

Date amended , 19

, 19

Assistant *Director, Pollution Control Branch*

PCB 15— o

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE
POLLUTION CONTROL BRANCH

APPENDIX No. 02

to Pollution Control Permit No. PA-2844

(a) The discharge of refuse applicable to this appendix is to a six acre site on part of Block 488, parallel to and 66 feet westerly of Lot 1, Plan 23727, Cowichan Lake District, approximately as shown on the attached Appendix A.

(b) The quantity of refuse which may be discharged is 3 cubic yards per day.

(c) The type of refuse which may be discharged is domestic refuse incinerator residue
(Municipal, industrial, etc.)

(d) The nature or characteristics of the refuse which may be discharged are ash and incombustibles resulting from the incineration of typical municipal solid waste.

(e) The works authorized are landfill operation as directed approximately located as shown on the attached Appendix A.

(f) The land from which the refuse originates and to which this appendix is appurtenant is the properties within the Regional District of Cowichan Valley and surrounding area.

(g) Those works authorized and proposed must be completed and in operation when discharge commences.

Date April 3, 1974

Amended , 19

Assistant *Director, Pollution Control Branch*

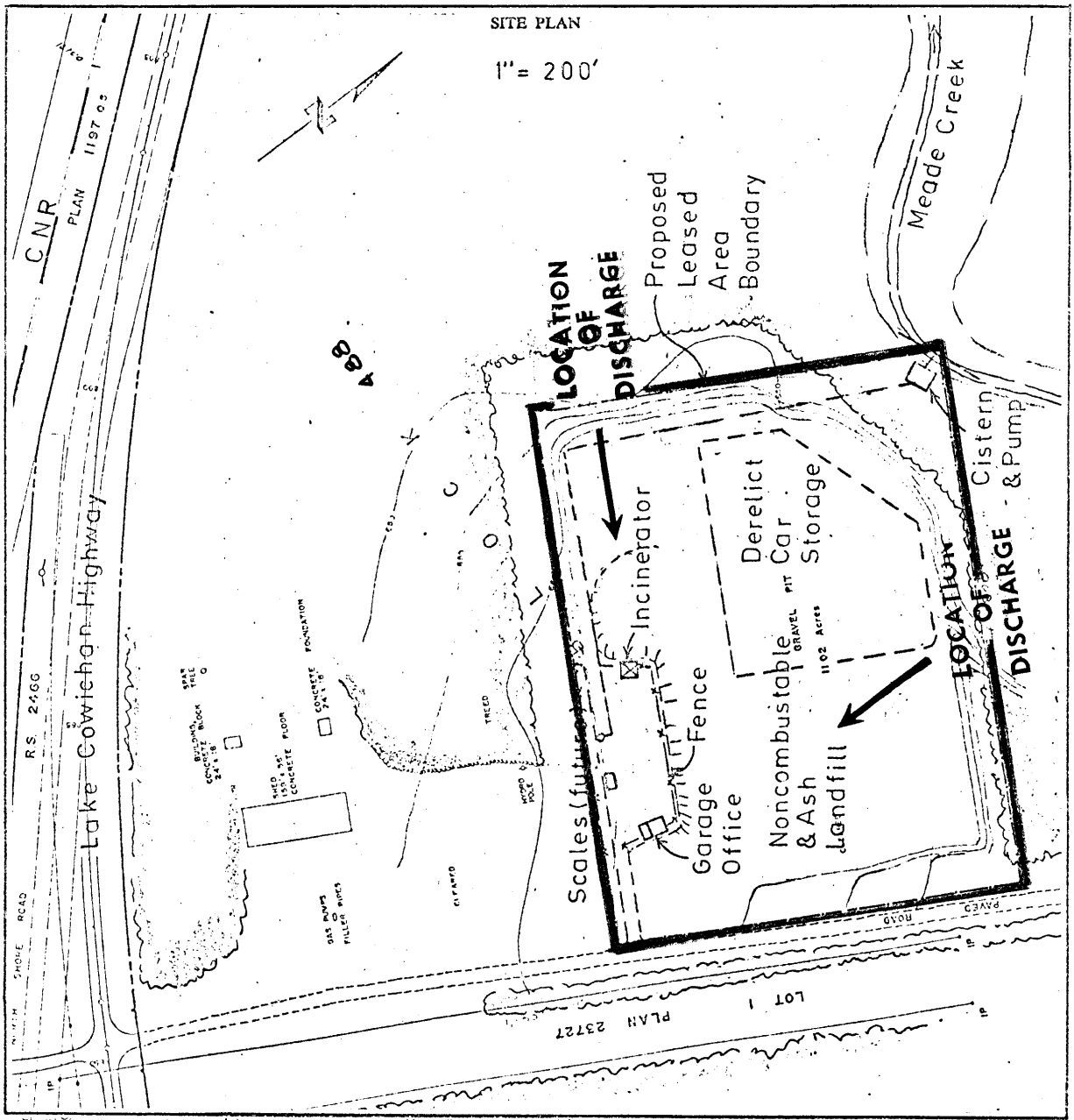
THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

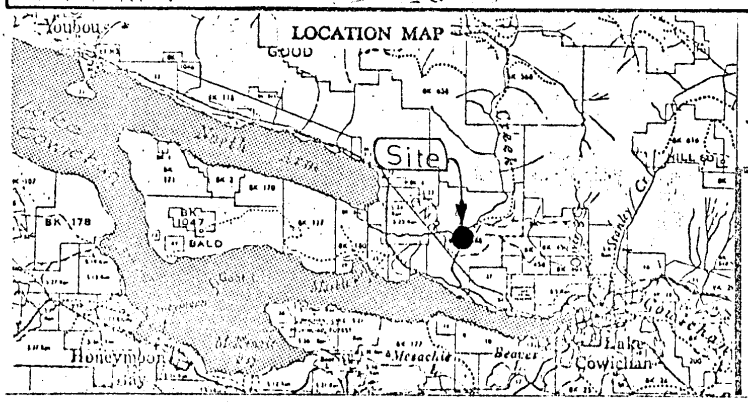
DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES
WATER RESOURCES SERVICE

POLLUTION CONTROL BRANCH

SITE PLAN

1" = 200'





Regional District of Cowichan Valley
(Name of applicant(s))

July 17, 1973 (Date)

J. K. Macaulay
(Signature of applicant(s) or agent)

(FOR OFFICE USE ONLY)

April 3/74 (Date issued)

K. J. Macaulay
Asst. (Director, Pollution Control Branch)

Appendix A to Permit No. PA-2844

PCB 12—0

BRITISH COLUMBIA

November 20, 2014

Tracking Number: 67057
Authorization Number: 2844

COWICHAN VALLEY REGIONAL DISTRICT
175 INGRAM STREET
DUNCAN, BC
V9L 1N8

Dear COWICHAN VALLEY REGIONAL DISTRICT,

Re: Abandonment of a Permit under Section 20 of the *Environmental Management Act*

Your letter of November 24, 2009, advising that you have elected to abandon Permit 2844, on the date of your letter pursuant to Section 20(3) of the *Environmental Management Act*, has been received. It is recognized that you have exercised the right under the subject authorization to discharge waste.

In accordance with Section 20 (5)(b) of the *Environmental Management Act*, the Director hereby imposes the following requirements:

1. By December 31, 2015, submit a landfill closure plan certified by a "qualified professional", to the satisfaction of the Director. For guidance, use the latest current and draft edition(s) of the ministry Landfill Criteria for Municipal Solid Waste. A "qualified professional" means a person who:
   (a) Is an engineer, scientist or technologist specializing in a particular applied science or technology,
   (b) Is registered in British Columbia with a professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and
   (c) Through suitable education, experience, accreditation and knowledge respecting solid waste management and related engineering disciplines for the management of leachate, surface water, storm water, and landfill gas and other specialist disciplines, may reasonably be relied upon to provide advice within his or her area of expertise and to carry out duties or functions in those areas.

2. Carry out the landfill closure plan to the satisfaction of the Director.

3. Carry out any additional requirements that the Director imposes respecting restoration of the environment or the control and monitoring of the waste discharged or the waste that continues to be discharged after abandonment. The Director may also amend the landfill closure plan.

.../2

Ministry of Environment
Environmental Protection Division 2080A Labieux Road
Nanaimo, BC V9T 6J9
Coast Region
Telephone: (250) 751-3100
Facsimile: (250) 751-3103

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

The property is located at 8855 Youbou Road, Lake Cowichan BC, PID 004-289-161, Lot 1, Block 488, Plan 43751, Cowichan Lake District. In accordance with Section 3(3) of the Contaminated Sites Regulation a Site Profile must be submitted not less than 10 days before the time the owner dismantles a building or structure, or otherwise decommissions a site which was used for an industrial or commercial purpose or activity listed in Schedule 2. If you are about to undertake or have undertaken decommissioning of the site, and not submitted a site profile, a site profile must be submitted. The Site Profile and instructions for completion and submission may be accessed at the following link: www.env.gov.bc.ca/epd/remediation/forms/pdf/site_profile.pdf. Further information regarding this process can be accessed at siteprofiles@gov.bc.ca or:

Land Remediation
PO Box 9342
Stn Prov Govt
Victoria BC V8W 9M1
Phone: (250) 387-4441 Fax: (250)387-9935

If you have any questions or concerns, please contact the regional office indicated on this letter.

Yours truly,

Baljeet Mann

Baljeet Mann
for Director, *Environmental Management Act*
Coast Region

CC: Environment Canada
Land Remediation Branch, Victoria

ENCL: None

TITLE SEARCH PRINT 2016-07-22, 13:36:52

File Reference: 12102 Requestor: Paul Wilson

Declared Value $10,000

CURRENT INFORMATION ONLY - NO CANCELLED INFORMATION SHOWN

Land Title District VICTORIA
Land Title Office VICTORIA

Title Number R41944
From Title Number R41942

Application Received 1986-05-27

Application Entered 1986-06-09

Registered Owner in Fee Simple
Registered Owner/Mailing Address: COWICHAN VALLEY REGIONAL DISTRICT
137 EVANS STREET
DUNCAN, BC
V9L 1P5

Taxation Authority NANAIMO/COWICHAN ASSESSMENT AREA

Description of Land
Parcel Identifier: 004-289-161
Legal Description:
LOT 1, BLOCK 488, COWICHAN LAKE DISTRICT, PLAN 43751

Legal Notations
HERETO IS ANNEXED EASEMENT R41946 INTER ALIA OVER PART OF BLOCK 488, COWICHAN LAKE DISTRICT SHOWN ON PLAN 43752

Charges, Liens and Interests
Nature: EXCEPTIONS AND RESERVATIONS
Registration Number: M76300
Registered Owner: ESQUIMALT AND NANAIMO RAILWAY COMPANY
Remarks: A.F.B. 9.693.7434A SECTION 172(3)
DD 135539I
FOR ACTUAL DATE AND TIME OF REGISTRATION SEE ORIGINAL GRANT FROM E & N RAILWAY COMPANY

Nature:	RIGHT OF WAY
Registration Number:	277272G
Registration Date and Time:	1963-04-09 10:53
Registered Owner:	BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
Remarks:	PART OUTLINED IN RED ON PLAN 391RW INTER ALIA

Duplicate Indefeasible Title NONE OUTSTANDING

Transfers NONE

Pending Applications NONE

```
 As of: JUN 19, 2016       BC Online: Site Registry                    16-06-23
                     For: PA82813  THURBER MANAGEMENT LTD.             15:47:25
 Folio: 12102                                                          Page   1
                                Detail Report
SITE LOCATION
       Site ID:      14157                            Latitude:  48d 50m 18.3s
 Victoria File: 26250-20/14157                       Longitude: 124d 05m 27.3s
 Regional File:
        Region: NANAIMO, VANCOUVER ISLAND

 Site Address: 8855 YOUBOU ROAD
         City: LAKE COWICHAN                  Prov/State: BC
  Postal Code:

 Registered: JUL 16, 2012  Updated: NOV 25, 2014  Detail Removed: NOV 25, 2014

 Notations:   2   Participants:   4    Associated Sites:   0
 Documents:   4 Susp. Land Use:   0 Parcel Descriptions:   1

Location Description: LOCATION CONFIRMED USING ICIS ON 16 JULY, 2012

Record Status: UNKNOWN STATUS
 Fee category: UNRANKED

 = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
NOTATIONS

  Notation Type: CASE MANAGEMENT ITEM
 Notation Class: ADMINISTRATIVE
      Initiated: NOV 20, 2014                        Approved: NOV 20, 2014

 Ministry Contact: HANEMAYER, VINCENT (SURREY) C

 Note: LANDFILL PERMIT ABONDONMENT LETTER ISSUED PERMIT NO. 2844
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Notation Type: SITE INVESTIGATION REPORT SUBMITTED
 Notation Class: ADMINISTRATIVE
      Initiated: JUL 13, 2012                        Approved: JUL 13, 2012

 Ministry Contact: HANEMAYER, VINCENT (SURREY) C

 Note: SITE INVESTIGATION AND SCREENING LEVEL RISK ASSESSMENT AND CLOSURE PLAN
 REPORTS
```

= =

SITE PARTICIPANTS

Participant: ACTIVE EARTH ENGINEERING LTD
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: MAR 01, 2011 End Date:

- -

Participant: COWICHAN VALLEY REGIONAL DISTRICT
Role(s): PROPERTY OWNER
Start Date: MAY 10, 2010 End Date:

- -

Participant: HANEMAYER, VINCENT (SURREY) C
Role(s): MINISTRY CONTACT

SITE PARTICIPANTS

Start Date: JUL 13, 2012 End Date:

- -

Participant: SLR CONSULTING (CANADA) LTD
Role(s): ENVIRONMENTAL CONSULTANT/CONTRACTOR
Start Date: MAY 10, 2010 End Date:

= =

DOCUMENTS

Title: CLOSURE PLAN, MEADE CREEK RECYCLING CENTRE, 8855 YOUBOU ROAD, COWICHAN LAKE, BC
Authored: FEB 01, 2012 Submitted: JUL 13, 2012

Participants	Role
ACTIVE EARTH ENGINEERING LTD	AUTHOR
COWICHAN VALLEY REGIONAL DISTRICT	COMMISSIONER

Notes: ELECTRONIC VERSION ONLY

- -

Title: SCREENING LEVEL RISK ASSESSMENT, MEADE CREEK RECYCLING CENTRE, 8855 YOUBOU ROAD, COWICHAN LAKE, BC
Authored: JAN 01, 2012 Submitted: JUL 13, 2012

Participants Role

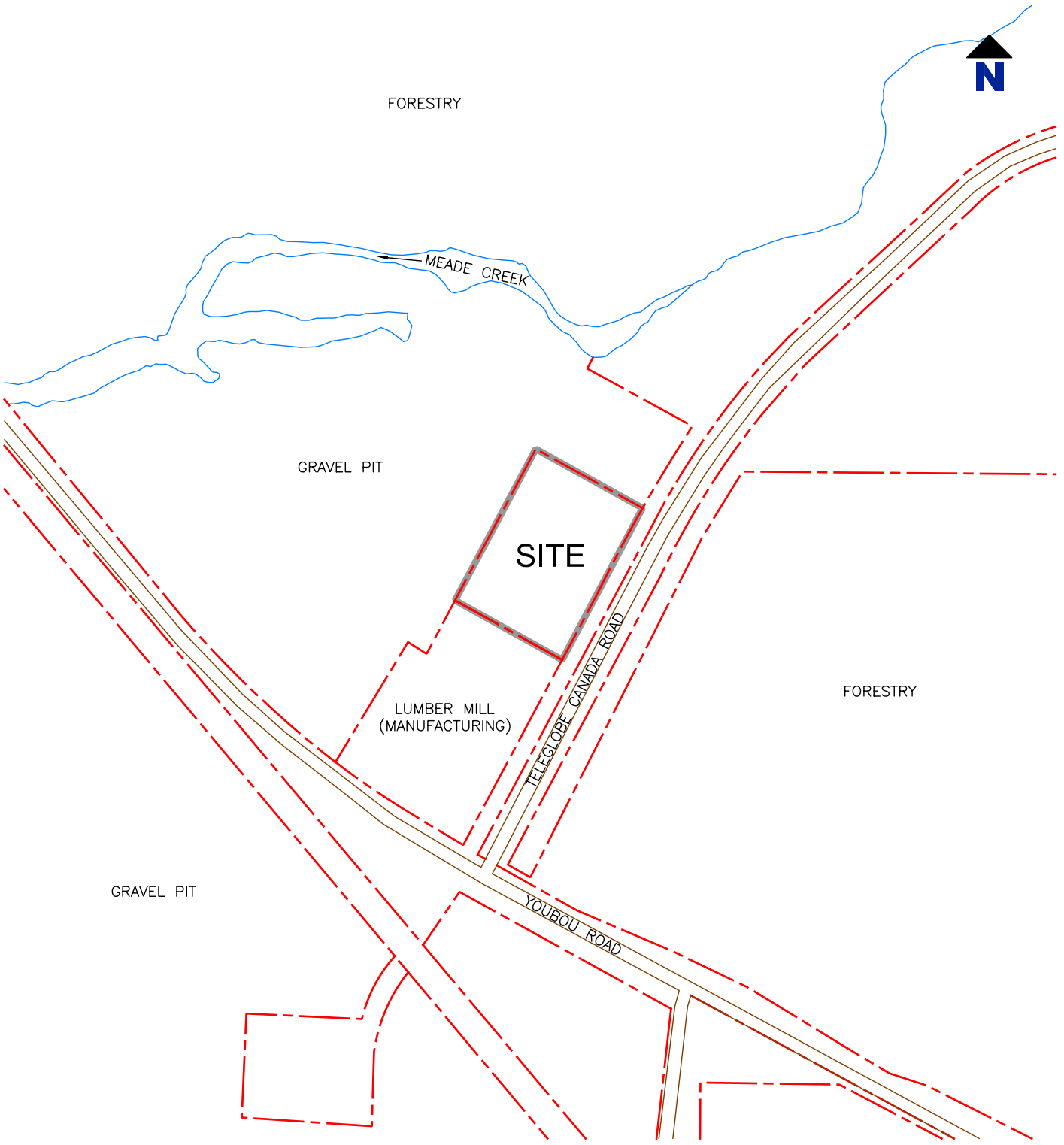
```
 ACTIVE EARTH ENGINEERING LTD                        AUTHOR
 COWICHAN VALLEY REGIONAL DISTRICT                   COMMISSIONER
Notes: ELECTRONIC VERSION ONLY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Title: DETAILED SITE INVESTIGATION, MEADE CREEK RECYCLING CENTRE, 8855
        YOUBOU ROAD, COWICHAN LAKE, BC
              Authored: MAR 01, 2011            Submitted: JUL 13, 2012
 Participants                                        Role
 ACTIVE EARTH ENGINEERING LTD                        AUTHOR
 COWICHAN VALLEY REGIONAL DISTRICT                   COMMISSIONER
Notes: ELECTRONIC VERSION ONLY
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Title: MEADE CREEK RECYCLING CENTRE, 8855 YOUBOU ROAD, COWICHAN LAKE, BC,
        STAGE 1 & 2 PRELIMINARY SITE INVESTIGATION REPORT
              Authored: MAY 10, 2010            Submitted: JUL 13, 2012
 Participants                                        Role
 SLR CONSULTING (CANADA) LTD                         AUTHOR
 COWICHAN VALLEY REGIONAL DISTRICT                   COMMISSIONER
Notes: ELECTRONIC VERSION ONLY
 = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
PARCEL DESCRIPTIONS

  Date Added: JUL 16, 2012                    Crown Land PIN#:
    LTO PID#: 004289161                      Crown Land File#:
   Land Desc: LOT 1, BLOCK 488, COWICHAN LAKE DISTRICT, PLAN 43751
No activities were reported for this site

                              End of Detail Report
```

APPENDIX C

SELECTION OF ENVIRONMENTAL INVESTIGATION SUMMARY DRAWINGS



LEGEND

PROPERTY BOUNDARY

SITE LOCATION

SCALE 1:6000

WHEN PLOTTED AT 11 x 17 PAGE SIZE

0 75 150 300 450 m

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

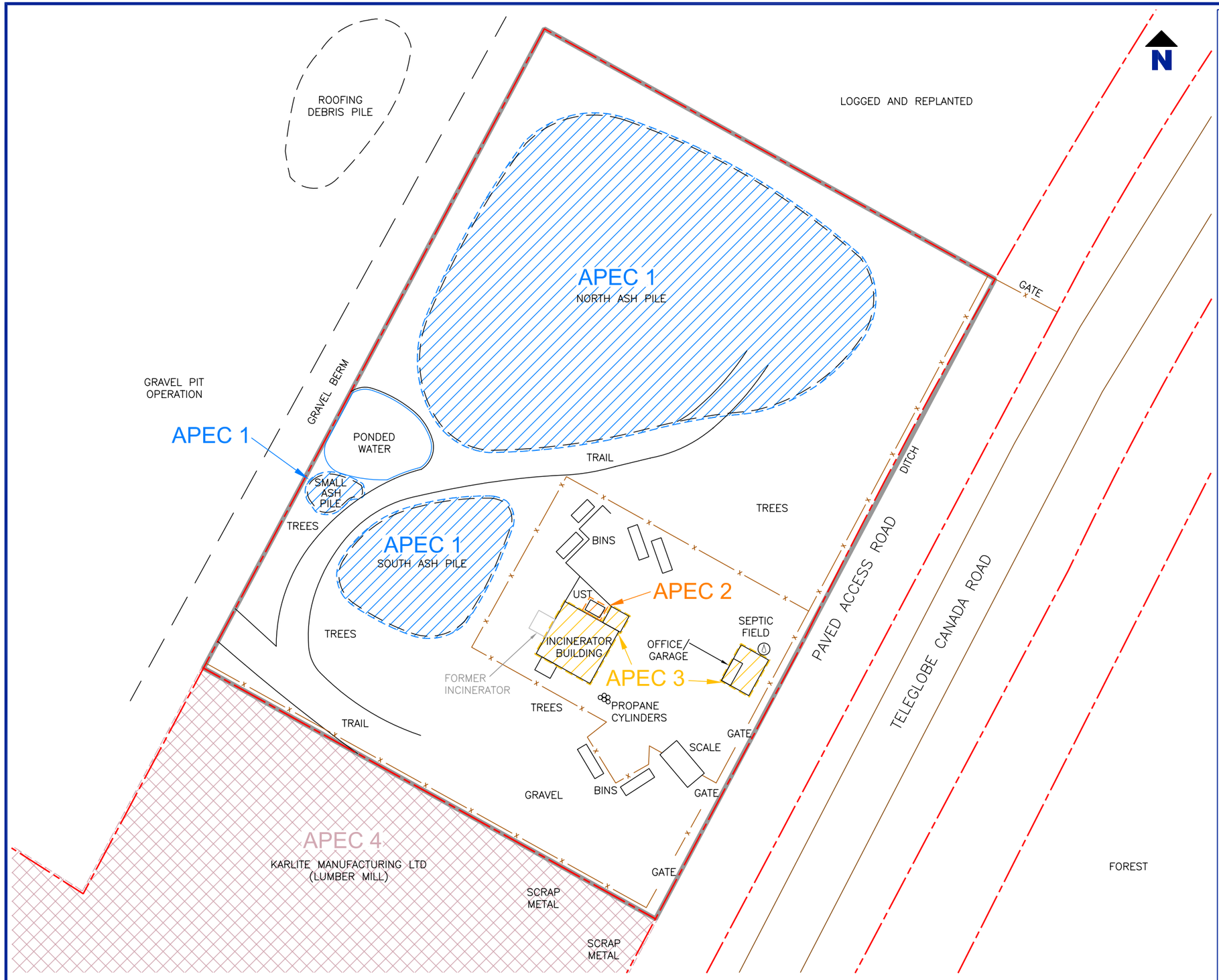
SLR

COWICHAN VALLEY REGIONAL DISTRICT
MEADE CREEK RECYCLING CENTRE
8855 YOUBOU ROAD
LAKE COWICHAN, BC

Report
STAGE 1 AND 2 PRELIMINARY SITE INVESTIGATION

Drawing
SITE AND SURROUNDING LAND USE PLAN

Date January 21, 2010	Scale AS SHOWN	Drawing No. 2
File Name S_202-01459-01-A1-2	Project No. 202.01459.01	



THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

SCALE 1:1000
WHEN PLOTTED AT 11 x 17 PAGE SIZE
0 10 20 40 60 m

NOTES

DRAWING COMPILED FROM COWICHAN VALLEY REGIONAL DISTRICT DRAWING AND HAND SKETCH COMPILED DURING SITE RECONNAISSANCE (JANUARY 13, 2010)

LEGEND

- PROPERTY BOUNDARY
- SITE LOCATION
- FENCE
- FORMER FACILITY/FEATURE
- WATER SUPPLY WELL LOCATION
- APEC 1: INCINERATOR ASH
- APEC 2: DIESEL UST
- APEC 3: HAZARDOUS MATERIALS STORAGE
- APEC 4: OFF–SITE MANUFACTURING FACILITY
- APEC — AREAS OF POTENTIAL ENVIRONMENTAL CONCERN
- UST — UNDERGROUND STORAGE TANK

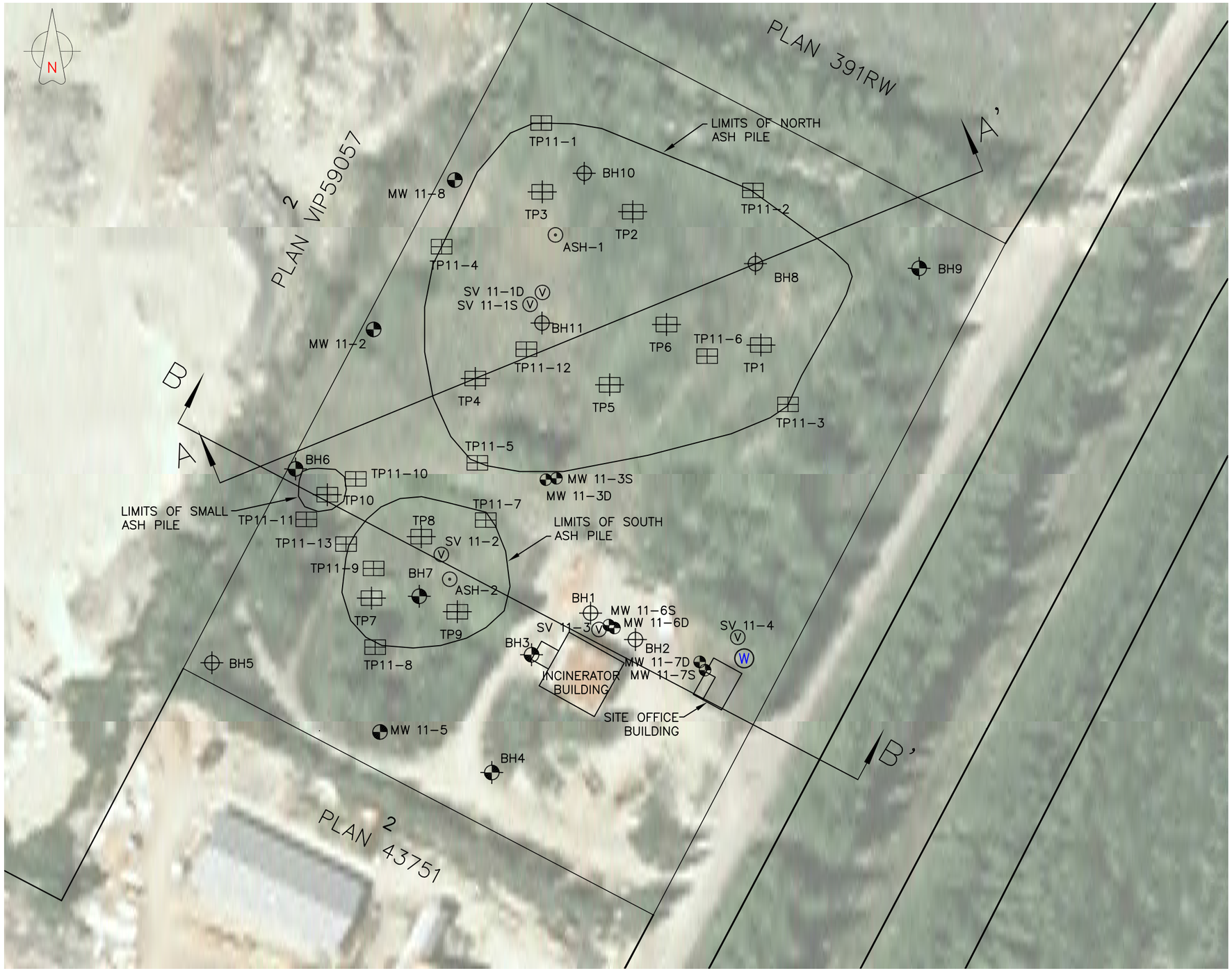
COWICHAN VALLEY REGIONAL DISTRICT
MEADE CREEK RECYCLING CENTRE
8855 YOUBOU ROAD
LAKE COWICHAN, BC

Report: STAGE 1 AND 2 PRELIMINARY SITE INVESTIGATION

Drawing: SITE PLAN

Date: January 21, 2010	Scale: AS SHOWN	Drawing No.: 3
File Name: S_202-01459-01-A1-3	Project No.: 202.01459.01	

SLR



0 30 60
METRES

SCALE 1:1000

LEGEND

- BOREHOLE
- MONITORING WELL
- TEST PIT
- SOIL VAPOUR WELL
- HAND AUGER SAMPLE
- BOREHOLE (BY OTHERS) BH1,2,5,8
- MONITORING WELL (BY OTHERS) BH3,4,6,7,9
- TEST PIT (BY OTHERS) TP2 TO 10
- WATER SUPPLY WELL

REFERENCE DRAWING: SLR – DRAWING NO. 4 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

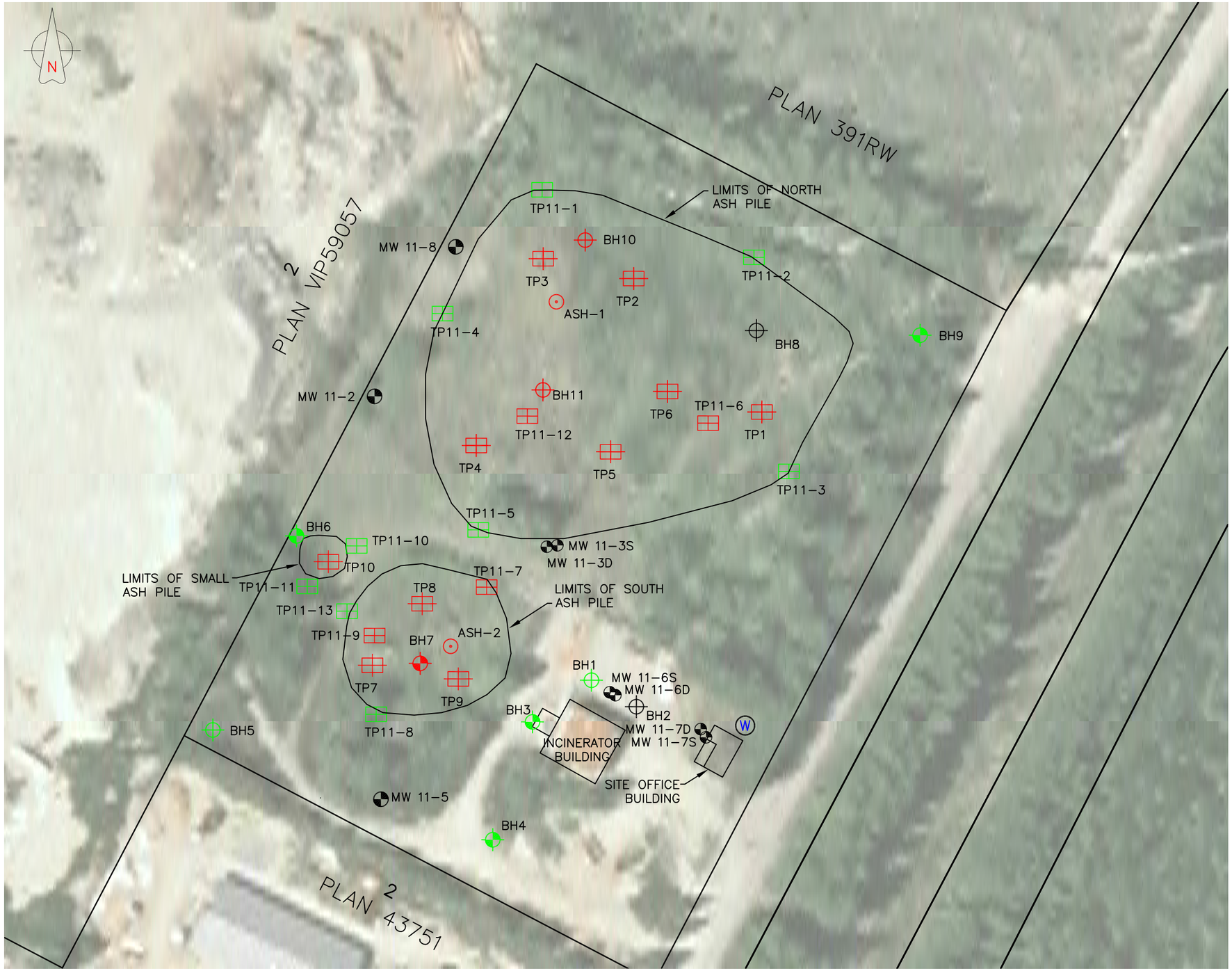
Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE: **SITE PLAN - CURRENT CONDITIONS MEADE CREEK RECYCLING CENTRE**

DWN BY: GM	DWG NAME:	DATE: 2012–01–26	FIGURE 3
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN



0 30 60 METRES

SCALE 1:1000

LEGEND

- BOREHOLE
- MONITORING WELL
- TEST PIT
- SOIL VAPOUR WELL
- HAND AUGER SAMPLE
- MONITORING WELL DESTROYED
- BOREHOLE (BY OTHERS) BH1,2,5,8
- MONITORING WELL (BY OTHERS) BH3,4,6,7,9
- TEST PIT (BY OTHERS) TP2 TO 10
- SOIL VAPOUR WELL (BY OTHERS)
- MONITORING WELL (BY OTHERS) DESTROYED
- WATER SUPPPLY WELL
- CONCENTRATIONS EXCEED THE APPLICABLE CSR STANDARDS
- CONCENTRATIONS MEET THE APPLICABLE CSR STANDARDS

REFERENCE DRAWING: SLR – DRAWING NO. 4 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

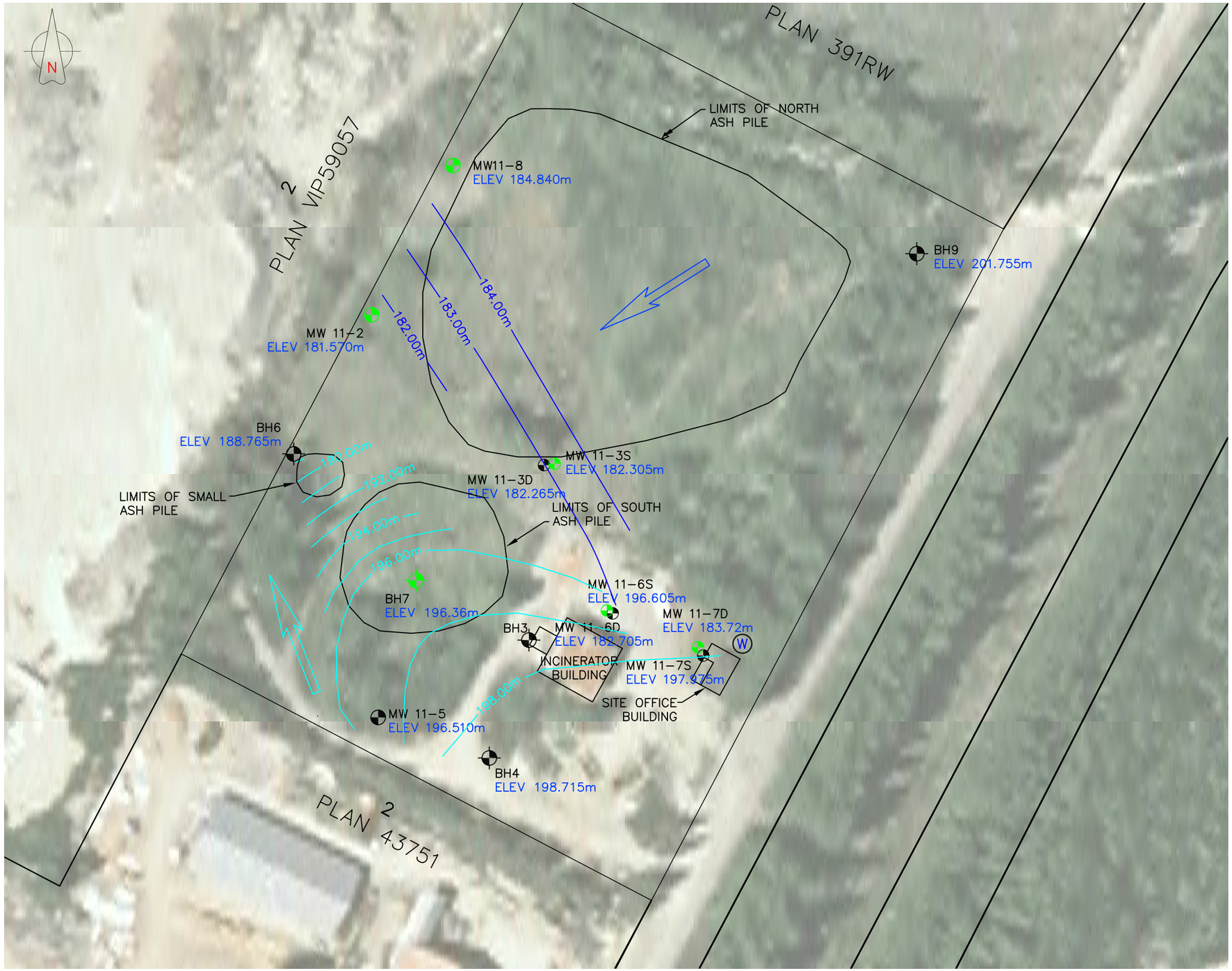
Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE: **SOIL ANALYTICAL RESULTS MEADE CREEK RECYCLING CENTRE**

DWN BY: GM	DWG NAME: 346CP–4	DATE: 2012–02–26	FIGURE 4
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN



0 30 60 METRES

SCALE 1:1000

LEGEND

- MONITORING WELL
- MONITORING WELL (BY OTHERS) BH3,4,6,7,9
- (W) WATER SUPPLY WELL
- CONCENTRATIONS EXCEED THE APPLICABLE CSR STANDARDS
- CONCENTRATIONS MEET THE APPLICABLE CSR STANDARDS
- ELEV X.XXm GROUNDWATER ELEVATION NOV 23, 2011
- GROUNDWATER FLOW DIR. (PERCHED AQUIFER)
- GROUNDWATER FLOW DIR. (DEEP AQUIFER)
- PERCHED AQUIFER EQUIPOTENTIAL LINES
- DEEP AQUIFER EQUIPOTENTIAL LINES

REFERENCE DRAWING: SLR – DRAWING NO. 4 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE: **GROUNDWATER ANALYTICAL RESULTS MEADE CREEK RECYCLING CENTRE**

DWN BY: GM	DWG NAME: 346CP-5	DATE: 2012-01-26	FIGURE 5
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN

0 30 60 METRES

SCALE 1:1000

LEGEND

- (V) SOIL VAPOUR WELL
- (W) WATER SUPPLY WELL
- CONCENTRATIONS MEET THE APPLICABLE CSR STANDARDS WITHOUT ATTENUATION
- CONCENTRATIONS MEET THE APPLICABLE CSR STANDARDS AFTER ATTENUATION FACTORS APPLIED
- CONCENTRATIONS EXCEED THE APPLICABLE CSR STANDARDS AFTER ATTENUATION FACTORS APPLIED

REFERENCE DRAWING: SLR – DRAWING NO. 4 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

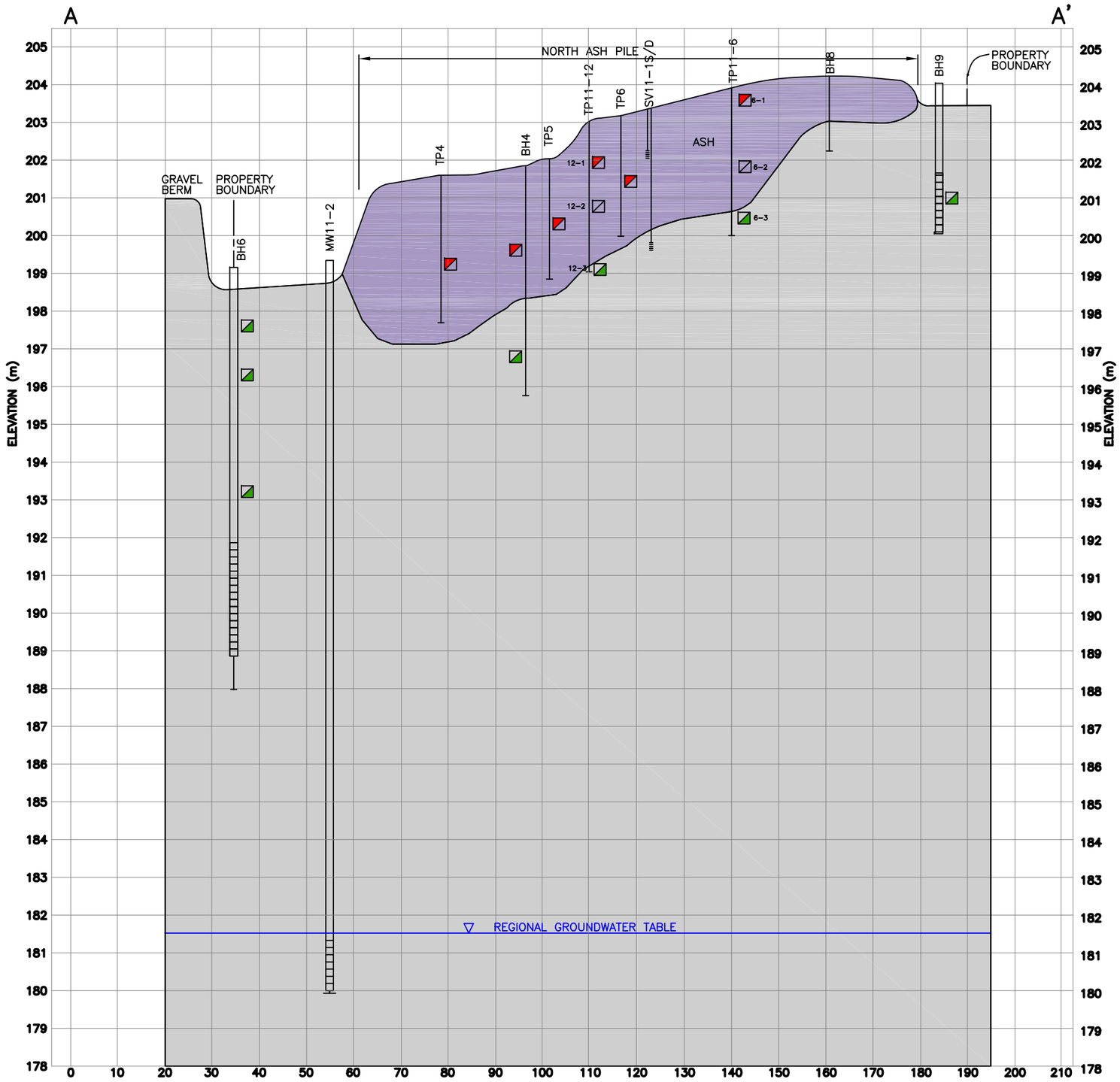
Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE: **SOIL VAPOUR ANALYTICAL RESULTS MEADE CREEK RECYCLING CENTRE**

DWN BY: GM	DWG NAME:	DATE: 2012–01–26	FIGURE 6
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN



LEGEND

- SOIL SAMPLE – CONCENTRATIONS LESS THAN APPLICABLE CSR STANDARDS
- SOIL SAMPLE – CONCENTRATIONS GREATER THAN APPLICABLE CSR STANDARDS
- WELL
- STATIC GROUND WATER LEVEL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE
- ASH (FILL)
- SAND AND GRAVEL (NATIVE SOIL)

REFERENCE DRAWING: SLR – DRAWING NO. 5 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

Active Earth Engineering Ltd

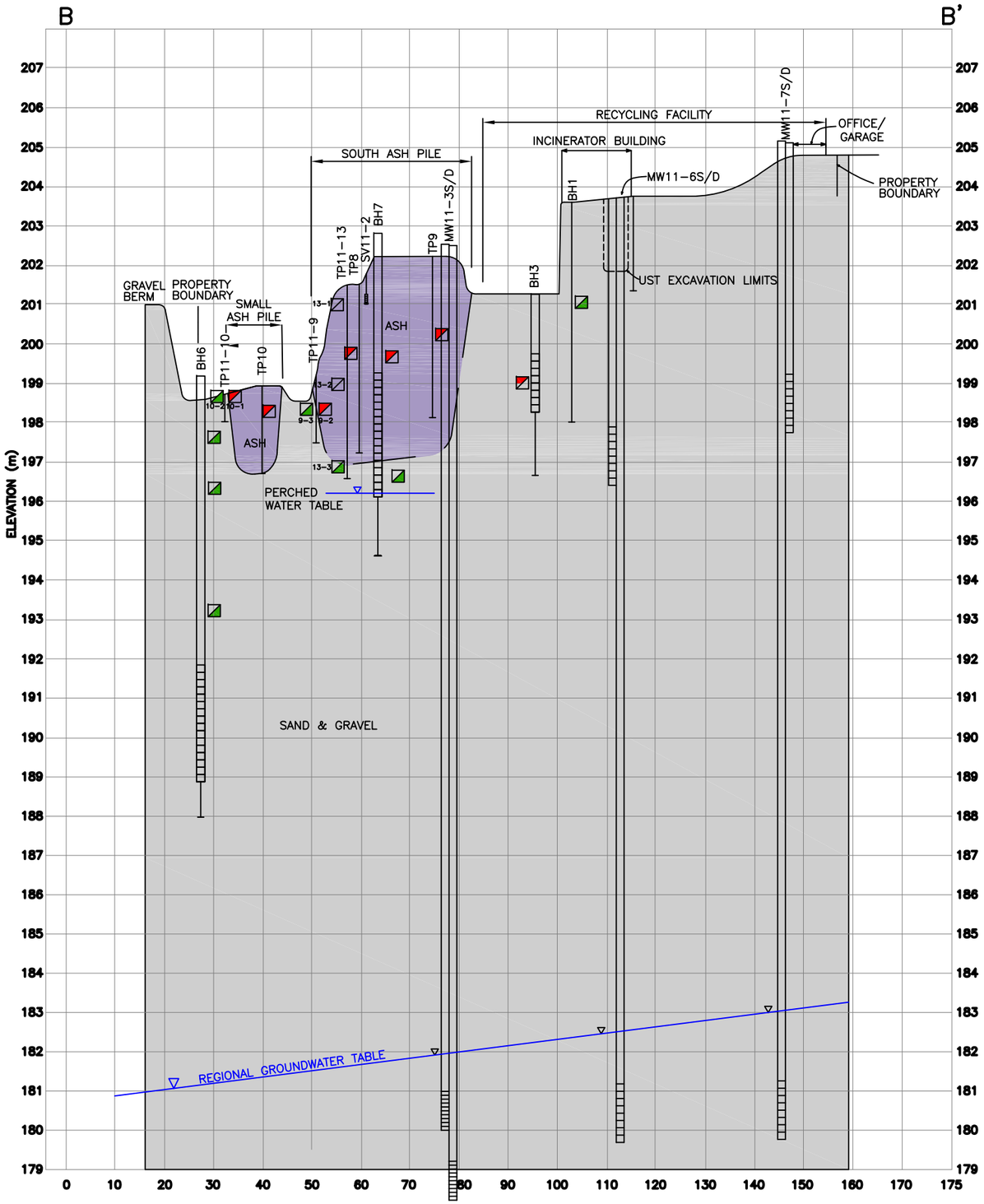
CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE:

SECTION A-A'
MEADE CREEK RECYCLING CENTRE

DWN BY: GM	DWG NAME:	DATE: 2012-01-26	FIGURE 7
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN



LEGEND

- SOIL SAMPLE – CONCENTRATIONS LESS THAN APPLICABLE CSR STANDARDS
- SOIL SAMPLE – CONCENTRATIONS GREATER THAN APPLICABLE CSR STANDARDS
- WELL
- STATIC GROUND WATER LEVEL
- SCREENED INTERVAL
- BOREHOLE OR TESTPIT
- END OF HOLE
- ASH (FILL)
- SAND AND GRAVEL (NATIVE SOIL)

REFERENCE DRAWING: SLR – DRAWING NO. 6 – SAMPLE LOCATIONS PROJECT NO. 202.01459.01

Active Earth Engineering Ltd

CLIENT NAME: CVRD	PROJECT LOCATION: LAKE COWICHAN, BC

TITLE:

SECTION B-B'
MEADE CREEK RECYCLING CENTRE

DWN BY: GM	DWG NAME:	DATE: 2012-01-26	FIGURE 8
CHK'D: MP	PLOT:	CADFILE: 346CP	

PATH: C:\ACTIVE EARTH GM\346\346 CLOSURE PLAN

THURBER ENGINEERING LTD.

celebrating 60 YEARS

February 1, 2017 File: 12102

Kerr Wood Leidal
201 – 3045 Douglas Street
Victoria, BC
V8T 4N2

Attention: Elizabeth Lau, P.Eng.

MEADE CREEK LANDFILL FACILITY
REINFORCED LOCK BLOCK RETAINING WALL

1. Introduction

This memorandum summarizes our analysis results and presents the design for the proposed lock block retaining walls with geogrid reinforcement that will surround the Recycling and drop off area at the south end of the site.

It is a condition of this letter that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions.

2. Geotechnical Recommendations for Retaining Wall Design

As requested, we have conducted a stability analysis of the lock block wall with geogrid reinforcement using SlopeW software. The analysis required an assumption of the strength parameters of the underlying foundation materials. A factor of safety of 1.5 with geogrid can be achieved provided the prepared subgrade soils have a minimum friction angle (ϕ) of 36 degrees.

3. Static Wall Design

The segmental lock block wall has been designed for static loading with an effective surcharge load of 12 kPa for traffic loading behind the wall. The design is applicable to the lock block retaining wall around the Recycling area except for the area along the Recycling Building. This area should be analyzed when building layout and loads are known.

The following assumptions and recommendations pertain to the static design of the wall:

- The wall will be a vertical 3 m high (4 blocks) and the backfill behind the wall will be level.
- In order to provide the required minimum foundation capacity, the base of the wall and reinforced fill zone will be sub-excavated a minimum of 0.5 m below design elevation. All organics and deleterious soils should be removed if present and the subgrade surface compacted with a large vibratory drum roller. The prepared area should extend at least 1.5 m horizontally beyond the front face of the wall. The excavated soils can be re-used as wall foundation material provided they are granular and free draining (less than 5% passing the 0.075 mm sieve).

- The material will be placed in maximum 300 mm thick lifts and compacted to minimum 96% of Modified Proctor maximum density (MPMDD). A minimum 150 mm thick layer of clean 19 mm minus crushed sandy gravel should be placed immediately beneath the concrete blocks and compacted to at least 96% of MPMDD.
- Stratagrid SG350 should be used for the geogrid reinforcement. The long term design strength (LTDS) of these geogrids is 38.9 kN/m.
- Geogrid will be placed above the first three lock-blocks and will have a length equal to the height of the wall. The minimum geogrid length for any wall section is 3.0 m.
- Backfill behind the reinforced zone should be a clean free-draining granular material. Locally excavated soil from the wall construction can be used for this purpose provided it does not contain any organic or other deleterious materials. This fill should also be placed in lifts and compacted to at least 96% of MPMDD.
- The geogrid should be locked into the "lock block" wall tabs by minimal cutting of the grid parallel to the grid strength direction. Alternatively, the grid could be cast into the blocks and then connected with a bodkin connector.
- For the 4 block high section, the lowest block does not need to be rotated 90 degrees to the wall alignment when geogrid reinforcement is utilized.

Based on our stability analysis, global stability with geogrid reinforcement is expected to be greater than 1.5. The attached Figure 1 shows a typical section detail for the reinforced lock block wall.

The proposed wall design has not taken into account seismic loading. We understand that global stability of the wall under seismic loading is not a design consideration; however, we did perform a check and it indicates that the overturning resistance of the topmost row of blocks will be marginal during a design event. If required, we can perform seismic wall design analysis and provide reinforcement options to reduce the potential for overturning of the top blocks.

4. Internal Wall Stability

A check on the internal wall stability was carried out using SRWall (ver. 3.22) from the National Concrete Masonry Association. The results of the internal stability analysis indicate that design criteria are satisfied.

5. Recycling Building

We have not performed a stability analysis of the area where the proposed Recycling Building is to be located at the west end of the drop off area. We will analyze the retaining wall in this area after we have reviewed buildings loads and footing layout and to determine the setback distance for the different types of vehicles to be working near the building.

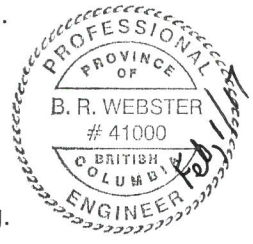
THURBER

60 YEARS

6. Closure

If you have any questions regarding this preliminary assessment, please contact us.

Yours truly,
Thurber Engineering Ltd.
Jay D. McIntyre, M.A.Sc., P.Eng.
Review Engineer



Brian R. Webster, B.Eng., P.Eng.
Project Engineer

Attachment

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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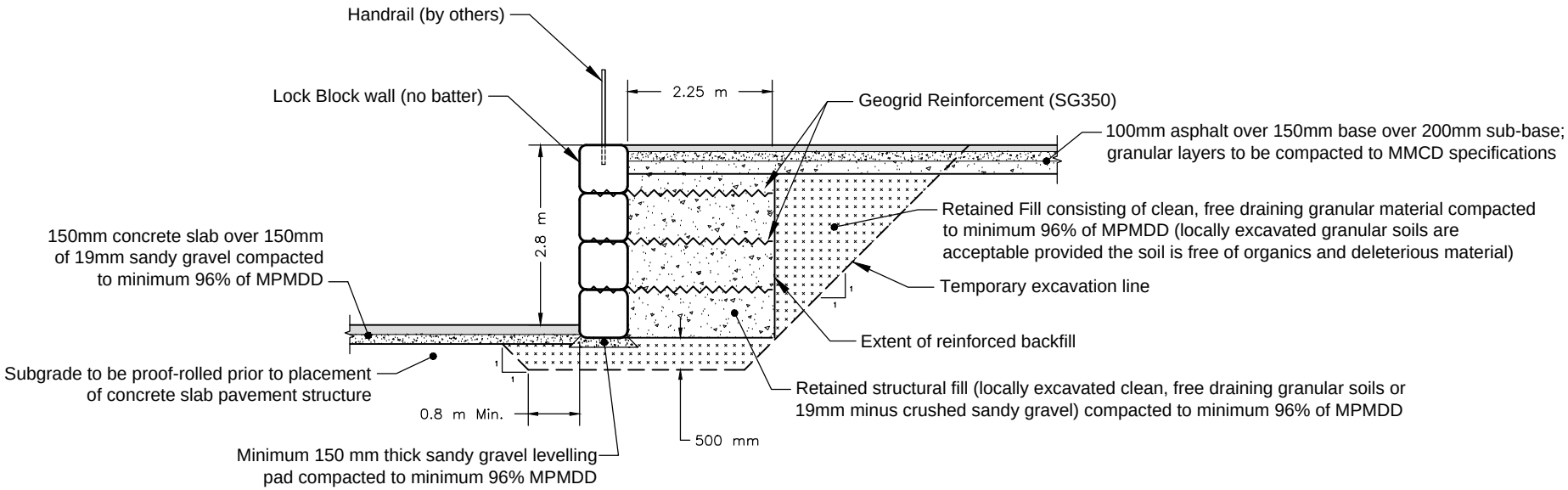
MEADE CREEK RECYCLING FACILITY UPGRADE
REINFORCED LOCK BLOCK WALL SECTION

SCALE 1:100



NOTES:

1. This section should be read in conjunction with our Preliminary Geotechnical Assessment dated August 18, 2016 and our memorandum for the Reinforced Lock Block Retaining Wall dated February 1, 2017.
2. MMCD (Master Municipal Construction Document)
3. MPMDD (Modified Proctor Maximum Dry Density)

FIGURE 1

Client: Kerr Wood Leidal
File No.: 12102
E-File: TED04668.dwg

Date: February 1, 2017