Municipality of Cumberland

Contract Documents and Specifications for Downtown Infrastructure Renewal Project

Type of Document
Final

Project Name
Downtown Infrastructure Renewal Project
Springhill, Nova Scotia

Project Number
Exp: HFX-00235652-A0
Municipality of Cumberland: P-MCC-1702

Prepared By: Stacy Muise, P.Eng.

Reviewed By: Municipality of Cumberland

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2017-04-12

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.1 Invitation to Tender		
.2 Information to Tenderers	00 21 00	
.3 Tender Form	00 41 43	
.4 Form of Agreement	00 53 43	
.5 Applicable Specifications		
Definitions	00 71 00	00 71 00 ss
General Conditions of the Civil Work Contract	00 72 45	00 72 45 ss
Supplementary General Conditions	00 73 00	
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Number	Title
GA-100	GENERAL ARRANGEMENT
C-100	PLAN AND PROFILE CHURCH STREET STA. 0+000 TO 0+180
C-101	PLAN AND PROFILE CHURCH STREET STA. 0+180 TO 0+360
C-102	PLAN AND PROFILE CHURCH STREET STA. 0+360 TO 0+540
C-103	PLAN AND PROFILE CHURCH STREET STA. 0+540 TO 0+720
C-104	PLAN AND PROFILE CHURCH STREET STA. 0+720 TO 0+905
C-200	PLAN AND PROFILE VICTORIA STREET STA. 0+000 TO 0+160
C-201	PLAN AND PROFILE VICTORIA STREET STA. 0+160 TO 0+320
C-202	PLAN AND PROFILE VICTORIA STREET STA. 0+320 TO 0+460
C-300	PLAN AND PROFILE ELM STREET STA. 0+000 TO 0+160
C-301	PLAN AND PROFILE ELM STREET STA. 0+160 TO 0+320
C-302	PLAN AND PROFILE ELM STREET STA. 0+320 TO 0+452
C-400	PLAN AND PROFILE PIONEER STREET STA. 0+000 TO 0+150
C-401	PLAN AND PROFILE PIONEER STREET STA. 0+150 TO 0+310
C-500	PLAN AND PROFILE MECHANIC STREET STA. 0+000 TO 0+160
C-501	PLAN AND PROFILE MECHANIC STREET STA. 0+160 TO 0+320
C-502	PLAN AND PROFILE MECHANIC STREET STA. 0+320 TO 0+430
C-600	PLAN AND PROFILE CHAPEL STREET STA. 0+000 TO 0+150
C-601	PLAN AND PROFILE CHAPEL STREET STA. 0+150 TO 0+300
C-602	PLAN AND PROFILE CHAPEL STREET STA. 0+300 TO 0+410
C-700	PLAN AND PROFILE PLEASANT STREET STA. 0+000 TO 0+160
C-701	PLAN AND PROFILE PLEASANT STREET STA. 0+160 TO 0+300
C-702	PLAN AND PROFILE PLEASANT STREET STA. 0+300 TO 0+420
C-800	PLAN AND PROFILE ST JAMES STREET STA. 0+000 TO 0+120
C-801	PLAN AND PROFILE ST JAMES STREET STA. 0+120 TO 0+265
C-900	PLAN AND PROFILE PRINCESS STREET STA. 0+000 TO 0+140
C-901	PLAN AND PROFILE PRINCESS STREET STA. 0+140 TO 0+300
C-902	PLAN AND PROFILE PRINCESS STREET STA. 0+150 TO 0+300
C-1000	MISCELLANEOUS SECTIONS AND DETAILS

.7 Geotechnical Investigation Report by **exp** Services Inc.

.8 Addenda

PROJECT NAME: Downtown Infrastructure Renewal Project

LOCATION: Springhill, Nova Scotia

OWNER: Municipality of Cumberland

ENGINEER: **exp** Services Inc.

1. Tender Submission

.1 Submit completed Tender Form for above project in sealed envelope marked as follows:

TENDER

for

Downtown Infrastructure Renewal Project
P-MCC-1702

TO

Mr. Justin Waugh-Cress, P.Eng.
Director, Engineering and Operations
Municipality of Cumberland
1395 Blair Lake Road
Upper Nappan, N.S. B4H 3Y4

2. Tender Closing /Opening

.1 Tender period will close on **Friday, May 5th, 2017** at 2:00 p.m., local time in the Upper Nappan Service Centre, 1395 Blair Lake Road, Upper Nappan, Nova Scotia. Tenders will be publicly opened at the time of closing.

3. Document Deposit

.1 There is no document deposit.

4. Accuracy of Referencing

.1 Indexing and cross-referencing are for convenience only.

5. Conditions of Tendering

.1 Take full cognizance of content of all Contract Documents in preparation of Tender. Refer to Section 00 41 43 – Tender Form, Subsection 3.9 for a complete list of Contract Documents.

6. Tenderer to Investigate

.1 Tenderer will be deemed to have familiarized themselves with existing site and working conditions and all other conditions which may affect performance of the contract. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.

.2 There will be a non-mandatory **site meeting Thursday, April 20th, 2017** at 12:00pm. Group will meet in the Springhill Service Centre parking lot, 43 Main Street, Springhill, NS.

7. Clarification and Addenda

.1 Notify Engineer not less than 4 working days before Tender Closing of omissions, errors or ambiguities found in Contract Documents. If the Engineer considers that correction, explanation or interpretation is necessary; a written addendum will be issued. All addenda will form part of Contract Documents.
Contact: Stacy Muise 902-453-5555

.2 Confirm in tender that all addenda have been received.

8. Preparation of Tender

.1 Complete Tender Form provided with Project Documents in ink or by typewriter. Tender all items and fill in all blanks. Have corrections initialed by person signing Tender.

.2 Any provisional item added to the Tender Form has been identified as not being necessary for this project and

the decision to proceed with any such item will be contingent on bid price versus available budget. The final decision to proceed with these item(s) will be by the Owner and the Engineer.

9. Taxes

.1 Include all taxes in prices except Harmonized Sales Tax (HST) in tender unit prices. Add HST in the amount of 15% at the indicated location on the Schedule of Quantities and Unit Prices in the Tender Form.

.2 The Contractor will indicate on each application for payment, as a separate amount, the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for the payment under the Contract and will therefore not affect the Contract Price.

10. Tender Security

.1 Provide Tender Security in the amount of ten percent (10%) of the tendered price with tender in the form of a Certified Cheque payable to Owner or Bid Bond on CCDC Form 220.

11. Contract Security

.1 Contract security will be required in the form of a bond or, as an alternate at the Owner’s sole discretion, a certified cheque or an irrevocable letter of credit may be accepted. IF a bond is to be used, include in the Tender a Consent of Surety by a firm legally entitled to do work in Nova Scotia and whose worth, over and above its present liabilities, is greater than the total amount of the bonds provided. Contract Security shall be submitted within 14 days of award of Contract and shall include a Performance Bond and a Labour and Materials Bond, each in the amount of fifty percent (50%) of the Tender Price. The cost of the bonds shall be

borne by the Tenderer. Certified cheques or letters of credit shall be for fifteen percent (15%) of the contract value and made payable to the Owner.

12. Insurance

.1 Refer to Section 00 72 45, General Conditions, subsection GC11.1 – INSURANCE, for insurance required.

13. Form of Agreement

.1 The Form of Agreement, which will form the basis of the contract, is attached for information purposes only at this stage. No action is required during the tender process.

14. Return of Tender Security

.1 Tender Security will be returned to:

.1 All except the three lowest acceptable Tenderers within 7 days of Tender Opening.

.2 Two remaining unsuccessful Tenders within 7 days of date of Award.

.3 Successful Tenderer following receipt by Owner of executed Agreement, specified Contract Security, and Insurance documents.

15. Amendment or Withdrawal of Tender

.1 Tenders may be amended or withdrawn by sealed letter. Amendment or withdrawal must be Verified by registered letter post marked prior to date and time of closing.

.2 Amendment of individual unit prices is the only acceptable price amendment. Amendments shall not disclose either original or revised total price.

.3 Head amendment or withdrawal as follows:

"(Amendment)/ (Withdrawal) of **Tender for "Downtown Infrastructure Renewal Project"**. Sign and seal as required for Tender, and submit at address given for receipt of Tenders prior to time of Tender Closing.

16. Informal or Unbalanced Tenders

.1 Tenders which, in the opinion of the Owner, are considered to be informal or unbalanced may be rejected at the owner's discretion. The Owner reserves the right to waive formality and technicality.

17. Right to Accept Reject any Tender

.1 The Owner reserves the right to: reject all tenders or any tender; not necessarily accept the lowest tender price; waive any irregularities, formalities, informalities or technicalities; and to accept or reject any offer whatsoever as considered by the owner to be in its best interest.

.2 The Owner reserves right to evaluate all aspects of a tender. The Owner reserves the right to assess the contractors and his subcontractors capabilities to complete the work; to deliver a high quality built project; to complete the project on time and within the budget; and to assess these and other relevant factors along with price in selecting the contractor and defining the overall cost of the project.

.3 The Owner reserves the right to accept or reject all or any tenders based on the Owner's sole assessment of the adequacy of the bidders proposed work plan.

.4 Award of the tender will be subject to gaining all regulatory approvals and permits.

18. Safety Certification

.1 Construction site safety is the responsibility of the Contractor. The

Contractor shall name and appoint a site safety supervisor to coordinate and ensure appropriate construction and WHMIS safety procedures are observed and followed on the construction site. All work will be conducted in strict compliance with the NS OH&S Act and Regulations.

.2 Submit with Tender, a copy of Tenderer's current and valid letter of Good Standing issued jointly by the Nova Scotia Construction Safety Association and the Province of Nova Scotia Department of Labour.

.3 Out of province companies shall submit, with their Tender, a current and valid Letter of Good Standing from their province of origin, or from a recognized Safety Association which utilizes and external audit element.

.4 Out of province companies may obtain a Letter of Good Standing from Nova Scotia Construction Safety Association upon submission of documentation verifying training and compliance with the NS OH&S Act and Regulations.

.5 In any event, out of province Tenderers will have to satisfy the Nova Scotia Construction Safety Association in respect to their safety status prior to being awarded a contract.

19. Clearance Letter from Workers Compensation Board

.1 Submit with Tender, a copy of Tenderer's current valid clearance letter, issued by the Workers Compensation Board of Nova Scotia.

20. Units of Measurement

.1 This is a metric unit project. Metric units of measure take precedence over

imperial units. Where conflicts may arise, notify the Engineer for clarification. No Claims for compensation due to conflicting units will be considered.

---------- END 00 21 00 ----------

1. SALUTATION:

.1 To: Municipality of Cumberland
Upper Nappan Service Centre
1395 Blair Lake Road, Upper Nappan, NS, B4H 3Y4

.2 For: Downtown Infrastructure Renewal Project
Springhill, Nova Scotia
Canada

.3 From: _____

2. TENDERER DECLARES:

.1 That this tender was made without collusion or fraud.

.2 That the proposed work was carefully examined.

.3 That the Tenderer was familiar with local conditions.

.4 That Contract Documents and Addenda No. ___ to ___ inclusive were carefully examined.

.5 That all the above were taken into consideration in preparation of this Tender.

3. TENDERER AGREES:

.1 To enter into a contract to supply all labour, material and equipment and to do all work necessary to construct the Work as described and specified herein for the unit prices stated in Subsection 4 hereunder, Schedule of Quantities and Unit Prices.

.2 That the Estimated Contract *Price* shall be the sum of the products of the tendered unit prices times the estimated quantities in Subsection 4 hereunder.

.3 That this Tender is valid for acceptance for sixty (60) days from Tender Closing.

.4 That measurement and payment for items listed in Subsection 4 hereunder shall be in accordance with corresponding items in Section 01 22 00 Measurement and Payment.

.5 To provide evidence of ability and experience within seven (7) days of request, including: experience in similar work, work currently under contract, senior supervisory staff available for the project, equipment available for use on the Work, and financial resources. The Owner reserves the right to reject any staff proposed for use on this project.

.6 To execute in triplicate the Agreement and forward same together with the specified contract security and insurance documents to the Owner within fourteen (14) days of written notice of award.

.7 That failure to enter into a formal Contract and give specified insurance documents and contract security within time required will constitute grounds for forfeiture of certified cheque or enforcement of bid bond.

.8 That if certified cheque is forfeited, Owner will retain difference in money between amount of Tender and amount for which Owner legally contracts with another party to perform the Work and will refund balance, if any, to Tenderer.

.9 That the Contract Documents include:

.1 Refer to Section 00 10 00 – Project Documents for a complete list of Contract Documents.

.10 That the work under this contract shall start as soon as possible. The Contractor shall mobilize on site within two (2) weeks from the date of award. A construction schedule shall be prepared to show a continuous and concentrated effort to complete the work. Close adherence to the schedule is a requirement of this Contract and coordination with Owner’s Personnel is a requirement of this Contract when establishing the schedule. Start-up shall also be contingent on receiving all pertinent approvals from regulatory authorities.

.11 That the Owner reserves the right to: reject all tenders or any tender; not necessarily accept the lowest tender; waive any irregularities, formalities, informalities or technicalities; and to accept or reject any offer whatsoever as considered by the owner to be in its best interest.

The Owner reserves the right to evaluate all aspects of a tender. The owner reserves the right to assess the Contractor’s and his Subcontractor’s capabilities to complete the work; to deliver a high quality built project; to complete the project on time and within the budget; and to assess these and other relevant factors along with price in selecting the contractor

and defining the overall cost of the project.

The information provided in section Supplementary Tender Information will be used in making such evaluations. As such, the Contractor must provide complete and accurate Supplementary information. The Owner reserves the right to pursue leads arising from investigation of the supplementary information or request additional supplementary information from the contractor.

.12 Prior to submitting tender, Contractor to complete submission checklist attached at the end of this section.

4. SCHEDULE OF QUANTITIES AND UNIT PRICES

Item No.	Description	Unit of Measurement	Estimated Quantity	Unit Price	Total Price
	SCHEDULE A – Church Street				
	EARTHWORK				
3A.	Mass Excavation and Embankment - Common	m^3	1500		
	WATER MAIN SYSTEM				
11A.	Pipe				
	.1 150mm dia.	m	860		
12A.	Fire Hydrants, Leads And Valves	Each	4		
14A.	Direct Buried Valves				
	.1 100mm dia.	Each	1		
	.2 150mm dia.	Each	8		
	.3 250mm dia.	Each	2		
15A.	Services				
	.1 Set of Fittings	Each	51		
	.2 Service Pipe	m	200		
16A.	Connections to Existing Main	Each	5		
	SANITARY SEWER SYSTEM				
21A.	Pipe				
	.1 200mm dia. PVC	m	680		
23A.	Manholes				
	.1 1050mm dia. Concrete	Each	10		
24A.	Services	Each	51		
25A.	Connections to Existing Main	Each	2		

26A.	Closed Circuit Television Inspection	Each	680		

STORM SEWER

31A.	Pipe				
	.1 200mm dia. PVC	m	40		
	.2 300mm dia. PVC	m	265		
32A.	Manholes				
	.1 1050mm dia. Concrete	Each	3		
33A.	Catch Basins				
	.1 1050mm dia. Concrete	Each	7		
35A.	Services	Each	17		
36A.	Connections to Existing Main	Each	1		
38A.	Closed Circuit Television Inspection	Each	305		

STREET CONSTRUCTION

51A.	Gravel				
	.1 75mm Type 1 (Road)	m^2	5200		
	.2 225mm Type 2 (Road)	m^2	5400		
	.3 150mm Type 1 (Sidewalk)	m^2	540		
53A.	Asphalt Concrete				
	.1 50mm Type C	m^2	5050		
	.2 50mm Type B	m^2	5050		
54A.	Concrete Curb and Gutter	m	665		
55A.	Asphalt Sidewalk				
	.1 50mm Thick	m^2	543		
63A.	Re-grade/Reinstate Driveways	Each	51		
64A.	Relocate Signs	Each	10		

LANDSCAPING

70A.	Topsoil and Sod	m^2	1500		
71A.	Topsoil and Seed	m^2	3000		
76A.	Tree Removal	Each	10		

ADDITIONAL ITEMS

80A.	Trench Excavation - Rock (Provisional)	m^3	1700		
81A.	Trench Excavation – Unsuitable Material (Provisional)	m^3	300		
82A.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	300		
86A.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90A.	Silt Fence	LS	100%		
92A.	Straw or Hay Cover	LS	100%		

Item No.	Description	Unit of Measurement	Estimated Quantity	Unit Price	Total Price
SCHEDULE B – Victoria Street					
EARTHWORK					
3B.	Mass Excavation and Embankment - Common	m^3	700		
WATER MAIN SYSTEM					
11B.	Pipe				
	.1 150mm dia. PVC	m	405		
12B.	Fire Hydrants, Leads And Valves	Each	2		
14B.	Direct Buried Valves				
	.1 100mm dia.	Each	1		
	.2 150mm dia.	Each	3		
	.3 250mm dia.	Each	2		
15B.	Services				
	.1 Set of Fittings	Each	21		
	.2 Service Pipe	m	80		
16B.	Connections to Existing Main	Each	6		
SANITARY SEWER SYSTEM					
21B.	Pipe				
	.1 200mm dia. PVC	m	390		
23B.	Manholes				
	.1 1050mm dia. Concrete	Each	5		
24B.	Services	Each	21		
25B.	Connections to Existing Main	Each	3		

26B.	Closed Circuit Television Inspection	Each	390		

STORM SEWER

31B.	Pipe				
	.1 200mm dia. PVC	m	25		
	.2 250mm dia. PVC	m	235		
32B.	Manholes				
	.1 1050mm dia. Concrete	Each	3		
33B.	Catch Basins				
	.1 1050mm dia. Concrete	Each	6		
35B.	Services	Each	21		
36B.	Connections to Existing Main	Each	1		
38B.	Closed Circuit Television Inspection	Each	260		

STREET CONSTRUCTION

51B.	Gravel				
	.1 75mm Type 1 (Road)	m^2	2700		
	.2 225mm Type 2 (Road)	m^2	2900		
	.3 150mm Type 1 (Sidewalk)	m^2	175		
53B.	Asphalt Concrete				
	.1 50mm Type C	m^2	2520		
	.2 50mm Type B	m^2	2520		
54B.	Concrete Curb and Gutter	m	710		
55B.	Asphalt Sidewalk				
	.1 50mm Thick	m^2	175		
63B.	Re-grade/Reinstate Driveways	Each	21		
64B.	Relocate Signs	Each	10		

LANDSCAPING

70B.	Topsoil and Sod	m2	800		
71B.	Topsoil and Seed	m2	1600		
76B.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80B.	Trench Excavation - Rock (Provisional)	m^3	700		
81B.	Trench Excavation – Unsuitable Material (Provisional)	m^3	280		
82B.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	280		
86B.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90B.	Silt Fence	LS	100%		
92B.	Straw or Hay Cover	LS	100%		

SCHEDULE C – Elm Street

EARTHWORK

3C.	Mass Excavation and Embankment - Common	m^3	800		

WATER MAIN SYSTEM

11C.	Pipe				
	.1 150mm dia. PVC	m	390		
12C.	Fire Hydrants, Leads And Valves	Each	1		
14C.	Direct Buried Valves				
	.1 150mm dia.	Each	5		
15C.	Services				
	.1 Set of Fittings	Each	18		
	.2 Service Pipe	m	90		
16C.	Connections to Existing Main	Each	4		

SANITARY SEWER SYSTEM

21C.	Pipe				
	.1 200mm dia. PVC	m	360		
23C.	Manholes				
	.1 1050mm dia. Concrete	Each	5		
24C.	Services	Each	18		
25C.	Connections to Existing Main	Each	4		
26C.	Closed Circuit Television Inspection	Each	360		

STORM SEWER

31C.	Pipe				
	.1 200mm dia. PVC	m	20		
	.2 250mm dia. PVC	m	175		

32C.	Manholes .1 1050mm dia. Concrete	Each	2		
33C.	Catch Basins .1 1050mm dia. Concrete	Each	5		
35C.	Services	Each	18		
36C.	Connections to Existing Main	Each	1		
38C.	Closed Circuit Television Inspection	Each	195		

STREET CONSTRUCTION

51C.	Gravel .1 75mm Type 1 (Road)	m^2	2500		
	.2 225mm Type 2 (Road)	m^2	2700		
	.3 150mm Type 1 (Sidewalk)	m^2	182		
53C.	Asphalt Concrete .1 50mm Type C	m^2	2330		
	.2 50mm Type B	m^2	2330		
54C.	Concrete Curb and Gutter	m	605		
55C.	Asphalt Sidewalk .1 50mm Thick	m^2	182		
63C.	Re-grade/Reinstate Driveways	Each	18		
64C.	Relocate Signs	Each	5		

LANDSCAPING

70C.	Topsoil and Sod	m^2	900		
71C.	Topsoil and Seed	m^2	1800		
76C.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80C.	Trench Excavation - Rock (Provisional)	m^3	700		
81C.	Trench Excavation – Unsuitable Material (Provisional)	m^3	230		
82C.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	230		
86C.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90C.	Silt Fence	LS	100%		
92C.	Straw or Hay Cover	LS	100%		

SCHEDULE D – Pioneer Street

EARTHWORK

3D.	Mass Excavation and Embankment - Common	m^3	700		

WATER MAIN SYSTEM

11D.	Pipe				
	.1 150mm dia. PVC	m	275		
12D.	Fire Hydrants, Leads And Valves	Each	1		
14D.	Direct Buried Valves				
	.1 150mm dia.	Each	1		
15D.	Services				
	.1 Set of Fittings	Each	12		
	.2 Service Pipe	m	60		
16D.	Connections to Existing Main	Each	3		

SANITARY SEWER SYSTEM

21D.	Pipe				
	.1 200mm dia. PVC	m	220		
23D.	Manholes				
	.1 1050mm dia. Concrete	Each	4		
24D.	Services	Each	12		
25D.	Connections to Existing Main	Each	3		
26D.	Closed Circuit Television Inspection	Each	220		

STORM SEWER

31D.	Pipe				
	.1 200mm dia. PVC	m	5		
	.2 250mm dia. PVC	m	65		

32D.	Manholes .1 1050mm dia. Concrete	Each	1		
33D.	Catch Basins .1 1050mm dia. Concrete	Each	2		
35D.	Services	Each	12		
36D.	Connections to Existing Main	Each	1		
38D.	Closed Circuit Television Inspection	Each	70		

STREET CONSTRUCTION

51D.	Gravel .1 75mm Type 1 (Road)	m^2	1600		
	.2 225mm Type 2 (Road)	m^2	1800		
	.3 150mm Type 1 (Sidewalk)	m^2	196		
53D.	Asphalt Concrete .1 50mm Type C c/w Milling	m^2	1440		
	.2 50mm Type B	m^2	1440		
54D.	Concrete Curb and Gutter	m	425		
55D.	Asphalt Sidewalk .1 50mm Thick	m^2	196		
63D.	Re-grade/Reinstate Driveways	Each	12		
64D.	Relocate Signs	Each	5		

LANDSCAPING

70D.	Topsoil and Sod	m^2	560		
71D.	Topsoil and Seed	m^2	1200		
76D.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80D.	Trench Excavation - Rock (Provisional)	m^3	500		
81D.	Trench Excavation – Unsuitable Material (Provisional)	m^3	160		
82D.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	160		
86D.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90D.	Silt Fence	LS	100%		
92D.	Straw or Hay Cover	LS	100%		

SCHEDULE E – Mechanic Street

EARTHWORK

3E.	Mass Excavation and Embankment - Common	m^3	800		

WATER MAIN SYSTEM

11E.	Pipe				
	.1 150mm dia. PVC	m	380		
12E.	Fire Hydrants, Leads And Valves	Each	1		
14E.	Direct Buried Valves				
	.1 150mm dia.	Each	2		
15E.	Services				
	.1 Set of Fittings	Each	25		
	.2 Service Pipe	m	125		
16E.	Connections to Existing Main	Each	4		

SANITARY SEWER SYSTEM

21E.	Pipe				
	.1 200mm dia. PVC	m	390		
23E.	Manholes				
	.1 1050mm dia. Concrete	Each	5		
24E.	Services	Each	25		
25E.	Connections to Existing Main	Each	4		
26E.	Closed Circuit Television Inspection	Each	390		

STORM SEWER

31E.	Pipe				
	.1 200mm dia. PVC	m	15		
	.2 250mm dia. PVC	m	150		
32E.	Manholes				
	.1 1050mm dia. Concrete	Each	2		

33E.	Catch Basins .1 1050mm dia. Concrete	Each	4		
35E.	Services	Each	25		
36E.	Connections to Existing Main	Each	1		
38E.	Closed Circuit Television Inspection	Each	165		
	STREET CONSTRUCTION				
51E.	Gravel .1 75mm Type 1 (Road)	m^2	2800		
	.2 225mm Type 2 (Road)	m^2	3000		
	.3 150mm Type 1 (Sidewalk)	m^2	182		
53E.	Asphalt Concrete .1 50mm Type C c/w Milling	m^2	2715		
	.2 50mm Type B	m^2	2715		
54E.	Concrete Curb and Gutter	m	665		
55E.	Asphalt Sidewalk .1 50mm Thick	m^2	182		
63E.	Re-grade/Reinstate Driveways	Each	25		
64E.	Relocate Signs	Each	5		
	LANDSCAPING				
70E.	Topsoil and Sod	m^2	800		
71E.	Topsoil and Seed	m^2	1600		
76E.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80E.	Trench Excavation - Rock (Provisional)	m^3	700		
81E.	Trench Excavation – Unsuitable Material (Provisional)	m^3	100		
82E.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	100		
86E.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90E.	Silt Fence	LS	100%		
92E.	Straw or Hay Cover	LS	100%		

SCHEDULE F – Chapel Street

EARTHWORK

3F.	Mass Excavation and Embankment - Common	m^3	700		

WATER MAIN SYSTEM

11F.	Pipe				
	.1 150mm dia. PVC	m	345		
14F.	Direct Buried Valves				
	.1 150mm dia.	Each	2		
15F.	Services				
	.1 Set of Fittings	Each	16		
	.2 Service Pipe	m	80		
16F.	Connections to Existing Main	Each	4		

SANITARY SEWER SYSTEM

21F.	Pipe				
	.1 200mm dia. PVC	m	375		
23F.	Manholes				
	.1 1050mm dia. Concrete	Each	4		
24F.	Services	Each	16		
25F.	Connections to Existing Main	Each	4		
26F.	Closed Circuit Television Inspection	Each	375		

STORM SEWER

31F.	Pipe				
	.1 200mm dia. PVC	m	15		
	.2 250mm dia. PVC	m	180		
32F.	Manholes				
	.1 1050mm dia. Concrete	Each	3		
33F.	Catch Basins				
	.1 1050mm dia. Concrete	Each	4		

35F.	Services	Each	16		
36F.	Connections to Existing Main	Each	1		
38F.	Closed Circuit Television Inspection	Each	195		

STREET CONSTRUCTION

51F.	Gravel				
	.1 75mm Type 1 (Road)	m^2	2600		
	.2 225mm Type 2 (Road)	m^2	2800		
	.3 150mm Type 1 (Sidewalk)	m^2	196		
53F.	Asphalt Concrete				
	.1 50mm Type C	m^2	2495		
	.2 50mm Type B	m^2	2495		
54F.	Concrete Curb and Gutter	m	635		
55F.	Asphalt Sidewalk				
	.1 50mm Thick	m^2	196		
63F.	Re-grade/Reinstate Driveways	Each	16		
64F.	Relocate Signs	Each	5		

LANDSCAPING

70F.	Topsoil and Sod	m^2	1600		
71F.	Topsoil and Seed	m^2	3200		
76F.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80F.	Trench Excavation - Rock (Provisional)	m^3	600		

81F.	Trench Excavation – Unsuitable Material (Provisional)	m^3	240		
82F.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	240		
86F.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90F.	Silt Fence	LS	100%		
92F.	Straw or Hay Cover	LS	100%		

SCHEDULE G – Pleasant Street

EARTHWORK

3G.	Mass Excavation and Embankment - Common	m^3	900		

WATER MAIN SYSTEM

11G.	Pipe				
	.1 150mm dia. PVC	m	365		
12G.	Fire Hydrants, Leads And Valves	Each	1		
14G.	Direct Buried Valves				
	.1 150mm dia.	Each	2		
15G.	Services				
	.1 Set of Fittings	Each	22		
	.2 Service Pipe	m	90		
16G.	Connections to Existing Main	Each	4		

SANITARY SEWER SYSTEM

21G.	Pipe				
	.1 200mm dia. PVC	m	375		
23G.	Manholes				
	.1 1050mm dia. Concrete	Each	4		
24G.	Services	Each	22		
25G.	Connections to Existing Main	Each	4		
26G.	Closed Circuit Television Inspection	Each	375		

STORM SEWER

31G.	Pipe				
	.1 200mm dia. PVC	m	15		
	.2 375mm dia. PVC	m	200		
32G.	Manholes				
	.1 1050mm dia. Concrete	Each	2		

33G.	Catch Basins .1 1050mm dia. Concrete	Each	4		
35G.	Services	Each	22		
36G.	Connections to Existing Main	Each	1		
38G.	Closed Circuit Television Inspection	Each	215		

STREET CONSTRUCTION

51G.	Gravel .1 75mm Type 1 (Road)	m^2	2400		
	.2 225mm Type 2 (Road)	m^2	2500		
	.3 150mm Type 1 (Sidewalk)	m^2	189		
53G.	Asphalt Concrete .1 50mm Type C	m^2	2250		
	.2 50mm Type B	m^2	2250		
54G.	Concrete Curb and Gutter	m	500		
55G.	Asphalt Sidewalk .1 50mm Thick	m^2	189		
63G.	Re-grade/Reinstate Driveways	Each	22		
64G.	Relocate Signs	Each	5		

LANDSCAPING

70G.	Topsoil and Sod	m^2	800		
71G.	Topsoil and Seed	m^2	1600		
76G.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80G.	Trench Excavation - Rock (Provisional)	m^3	500		
81G.	Trench Excavation – Unsuitable Material (Provisional)	m^3	160		
82G.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	160		
86G.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90G.	Silt Fence	LS	100%		
92G.	Straw or Hay Cover	LS	100%		

SCHEDULE H – St. James Street (Provisional)

EARTHWORK

3H.	Mass Excavation and Embankment - Common	m^3	500		

WATER MAIN SYSTEM

11H.	Pipe				
	.1 200mm dia. PVC	m	240		
12H.	Fire Hydrants, Leads And Valves	Each	2		
14H.	Direct Buried Valves				
	.1 150mm dia.	Each	2		
15H.	Services				
	.1 Set of Fittings	Each	9		
	.2 Service Pipe	m	40		
16H.	Connections to Existing Main	Each	2		

SANITARY SEWER SYSTEM

21H.	Pipe				
	.1 200mm dia. PVC	m	225		
23H.	Manholes				
	.1 1050mm dia. Concrete	Each	1		
24H.	Services	Each	9		
25H.	Connections to Existing Main	Each	2		
26H.	Closed Circuit Television Inspection	Each	225		

STORM SEWER

31H.	Pipe				
	.1 200mm dia. PVC	m	10		
	.2 375mm dia. PVC	m	120		

32H.	Manholes .1 1050mm dia. Concrete	Each	1		
33H.	Catch Basins .1 1050mm dia. Concrete	Each	1		
35H.	Services	Each	9		
36H.	Connections to Existing Main	Each	1		
38H.	Closed Circuit Television Inspection	Each	130		

STREET CONSTRUCTION

51H.	Gravel .1 75mm Type 1 (Road)	m^2	1600		
	.2 225mm Type 2 (Road)	m^2	1800		
53H.	Asphalt Concrete .1 50mm Type C	m^2	1505		
	.2 50mm Type B	m^2	1505		
54H.	Concrete Curb and Gutter	m	495		
63H.	Re-grade/Reinstate Driveways	Each	9		
64H.	Relocate Signs	Each	5		

LANDSCAPING

70H.	Topsoil and Sod	m^2	500		
71H.	Topsoil and Seed	m^2	1000		
76H.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80H.	Trench Excavation - Rock (Provisional)	m^3	300		

81H.	Trench Excavation – Unsuitable Material (Provisional)	m^3	200		
82H.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	200		
86H.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90H.	Silt Fence	LS	100%		
92H.	Straw or Hay Cover	LS	100%		

SCHEDULE I – Princess Street (Provisional)

EARTHWORK

3I.	Mass Excavation and Embankment - Common	m^3	900		

WATER MAIN SYSTEM

11I.	Pipe				
	.1 200mm dia. PVC	m	160		
	.2 350mm dia. PVC	m	160		
14I.	Direct Buried Valves				
	.1 200mm dia.	Each	3		
	.2 350mm dia.	Each	3		
15I.	Services				
	.1 Set of Fittings	Each	15		
	.2 Service Pipe	m	75		
16I.	Connections to Existing Main	Each	4		

SANITARY SEWER SYSTEM

21I.	Pipe				
	.1 200mm dia. PVC	m	175		
23I.	Manholes				
	.1 1050mm dia. Concrete	Each	3		
24I.	Services	Each	15		
25I.	Connections to Existing Main	Each	5		
26I.	Closed Circuit Television Inspection	Each	175		

STORM SEWER

31I.	Pipe				
	.1 200mm dia. PVC	m	10		
32I.	Manholes				
	.1 1050mm dia. Concrete	Each	1		

36I.	Connections to Existing Main	Each	1		
38I.	Closed Circuit Television Inspection	Each	10		

STREET CONSTRUCTION

51I.	Gravel				
	.1 75mm Type 1 (Road)	m^2	2500		
	.2 225mm Type 2 (Road)	m^2	2600		
	.3 150mm Type 1 (Sidewalk)	m^2	280		
53I.	Asphalt Concrete				
	.1 50mm Type C	m^2	2420		
	.2 50mm Type B	m^2	2420		
54I.	Concrete Curb and Gutter	m	155		
55I.	Asphalt Sidewalk				
	.1 50mm Thick	m^2	280		
63I.	Re-grade/Reinstate Driveways	Each	15		
64I.	Relocate Signs	Each	5		

LANDSCAPING

70I.	Topsoil and Sod	m2	1600		
71I.	Topsoil and Seed	m2	3200		
76I.	Tree Removal	Each	5		

ADDITIONAL ITEMS

80I.	Trench Excavation - Rock (Provisional)	m^3	500		
81I.	Trench Excavation – Unsuitable Material (Provisional)	m^3	200		

82I.	Replacement of Unsuitable Material with Selected Site Material (Provisional)	m^3	200		
86I.	Traffic Control	LS	100%		

ENVIRONMENTAL PROTECTION

90I.	Silt Fence	LS	100%		
92I.	Straw or Hay Cover	LS	100%		

SUMMARY

SUB TOTAL – SCHEDULE A		$_____
SUB TOTAL – SCHEDULE B		$_____
SUB TOTAL – SCHEDULE C		$_____
SUB TOTAL – SCHEDULE D		$_____
SUB TOTAL – SCHEDULE E		$_____
SUB TOTAL – SCHEDULE F		$_____
SUB TOTAL – SCHEDULE G		$_____
SUB TOTAL – SCHEDULE H		$_____
SUB TOTAL – SCHEDULE I		$_____
SUB TOTAL – CONTINGENCY	$ 600,000	

TOTAL SUMMARY

ESTIMATED CONTRACT PRICE (EXCLUDING HST)	$_____
ADD HARMONIZED SALES TAX (15%)	$_____
TOTAL PRICE	$_____
TENDERER'S HST REGISTRATION NO.	_____

5. COMPLETION TIME

.1 Tenderer agrees to complete the Work within _____ weeks of written notification of award.

6. SIGNATURES*

DATED THIS _____ DAY OF _____ , 20 _____.

[Seal]

_____
Name of Firm Tendering

_____
Signature of Signing Officer

_____ _____
Witness Name and Title (Printed)

_____ _____
Witness Signature of Signing Officer

_____
Name and Title (Printed)

_____
Company Address

_____
Telephone No.

_____
Fax No.

*NOTE: Tenders submitted by or on behalf of any Corporation must be signed and sealed in the name of such Corporation by a duly authorized officer or agent.

7. SUPPLEMENTARY TENDER INFORMATION:

.1 List of Subcontractors:

._____.

._____.

._____.

._____.

._____.

._____.

List all subcontractors. The provision of the subcontractor list is an undertaking by the contractor to use the listed subcontractor on the project. Obtain the Engineer's approval to add or delete named subcontractors from the above list after the tenders have closed.

.2 List of all Equipment type that will be used on the project together with marked-up operated hourly rates including operator and also marked-up hourly labour rates - to assess resources applied to the project and establish charge-out rates if extra work is required.

Attach a separate sheet with this information

8. SUPPLEMENTARY INFORMATION

If requested, provide the following additional information prior to award.

.1 Financial references

.2 Project references - last three projects undertaken, plus two relevant projects complete with contact information

.3 List of material and equipment suppliers - incorporated into the work

.4 List of key personnel, title, experience

---------- END 00 41 43 ----------

PRIOR TO SUBMITTING TENDER, ENSURE THE FOLLOWING HAVE BEEN COMPLETED:

1. Has the Form of Tender been signed, sealed And witnessed? Y / N

2. Has the required bid bond or certified cheque Been enclosed: Y / N

3. Has the Agreement to Bond (signed and Sealed by surety) been enclosed? Y / N

4. Have all schedules in the Form of Tender Been completed? Y / N

5. Has all addenda been acknowledged? Y / N

6. Has the Completion Time (in weeks) been completed? Y / N

7. Has the Supplementary Tender Information (sub-contractors, equipment, rates) been enclosed? Y / N

---------- END 00 41 43A ----------

This Agreement made on the ___ day of _____ in the year 2017

BY AND BETWEEN

Municipality of Cumberland

Hereinafter called the "Owner"

and

hereinafter called the "Contractor"

The Owner and the Contractor agree as follows:

ARTICLE A1 – THE WORK

The Contractor shall:

.1 Perform the Work required by the Contract Documents for the **Downtown Infrastructure Renewal Project** located in **Springhill, Nova Scotia** for which the agreement has been signed by the parties, and for which **exp Services Inc.** is acting as and is hereinafter called the "Engineer",

And

.2 do and fulfill everything indicated by this Agreement, and

.3 commence the Work by the _____day of_____, 2017 and attain Substantial Performance of the work as certified by the Engineer by the __day of _____, ___.

ARTICLE A2 – AGREEMENTS AND AMENDMENTS

The Contract supersedes all prior negotiations, representations or agreements, either written or oral, relating in any manner to the work, including the bidding documents that are not expressly listed in Article A3 of the Agreement.

ARTICLE A3 – CONTRACT DOCUMENTS

The following is an exact list of the Contract Documents referred to in subsection 1.1 of this Agreement and as defined in subsection 6 of Section 00 71 00 DEFINITIONS. This list is subject to subsequent amendments in accordance with the provisions of the Contract Documents.

.1 Standard Specifications for Municipal Services ("The Blue Book") – Latest Edition.

.2 Project Documents (section numbers are found in the NSRBA "Blue Book: ***ss*** are supplementary specifications contained within this document)

	Section	**Section Number**	**Supplementary Specification**
.1	**Invitation to Tender**		
.2	**Information to Tenderers**	00 21 00	
.3	**Tender Form**	00 41 43	
.4	**Form of Agreement**	00 53 43	
.5	**Applicable Specifications:**		
	Definitions	00 71 00	00 71 00 ss
	General Conditions of The Civil Work Contract	00 72 45	00 72 45 ss
	Supplementary General Conditions	00 73 00	
	General Requirements	01 10 00	01 10 00 ss
	Measurement and Payment	01 22 00	01 22 00 ss

Environmental Protection	01 57 00	01 57 00 ss
Concrete	03 30 00	
Metal Fabrication	05 50 00	
Erosion and Sediment Control	31 15 53	
Earthwork	31 20 00	31 20 00 ss
Asphalt Concrete Paving	32 12 16	
Walks, Curbs and Gutters	32 16 00	
Chain Link Fence	32 31 00	
Planting of Trees, Shrubs and Groundcover	32 90 00	
Topsoiling & Finish Grading	32 91 19	
Seeding and Sodding	32 92 00	
Reinstatement	32 98 00	
Water main	33 11 00	
Sanitary Sewers	33 31 00	
Precast Manholes, Catch Basins and Structures	33 39 00	
Storm Sewers and Culverts	33 40 00	
Standard Details	39 00 00	

.6 Drawings

Number	Title
GA-100	GENERAL ARRANGEMENT
C-100	PLAN AND PROFILE CHURCH STREET STA. 0+000 TO 0+180
C-101	PLAN AND PROFILE CHURCH STREET STA. 0+180 TO 0+360
C-102	PLAN AND PROFILE CHURCH STREET STA. 0+360 TO 0+540
C-103	PLAN AND PROFILE CHURCH STREET STA. 0+540 TO 0+720
C-104	PLAN AND PROFILE CHURCH STREET STA. 0+720 TO 0+905
C-200	PLAN AND PROFILE VICTORIA STREET STA. 0+000 TO 0+160
C-201	PLAN AND PROFILE VICTORIA STREET STA. 0+160 TO 0+320
C-202	PLAN AND PROFILE VICTORIA STREET STA. 0+320 TO 0+460
C-300	PLAN AND PROFILE ELM STREET STA. 0+000 TO 0+160
C-301	PLAN AND PROFILE ELM STREET STA. 0+160 TO 0+320
C-302	PLAN AND PROFILE ELM STREET STA. 0+320 TO 0+452

C-400	PLAN AND PROFILE PIONEER STREET STA. 0+000 TO 0+150
C-401	PLAN AND PROFILE PIONEER STREET STA. 0+150 TO 0+310
C-500	PLAN AND PROFILE MECHANIC STREET STA. 0+000 TO 0+160
C-501	PLAN AND PROFILE MECHANIC STREET STA. 0+160 TO 0+320
C-502	PLAN AND PROFILE MECHANIC STREET STA. 0+320 TO 0+430
C-600	PLAN AND PROFILE CHAPEL STREET STA. 0+000 TO 0+150
C-601	PLAN AND PROFILE CHAPEL STREET STA. 0+150 TO 0+300
C-602	PLAN AND PROFILE CHAPEL STREET STA. 0+300 TO 0+410
C-700	PLAN AND PROFILE PLEASANT STREET STA. 0+000 TO 0+160
C-701	PLAN AND PROFILE PLEASANT STREET STA. 0+160 TO 0+300
C-702	PLAN AND PROFILE PLEASANT STREET STA. 0+300 TO 0+420
C-800	PLAN AND PROFILE ST JAMES STREET STA. 0+000 TO 0+120
C-801	PLAN AND PROFILE ST JAMES STREET STA. 0+120 TO 0+265
C-900	PLAN AND PROFILE PRINCESS STREET STA. 0+000 TO 0+140
C-901	PLAN AND PROFILE PRINCESS STREET STA. 0+140 TO 0+300
C-902	PLAN AND PROFILE PRINCESS STREET STA. 0+150 TO 0+300
C-1000	MISCELLANEOUS SECTIONS AND DETAILS

.7 Geotechnical Investigation Report by **exp** Services Inc.

.8 Addenda

ARTICLE A4 - CONTRACT PRICE

.1 The Estimated Contract Price is the sum of the products of the estimated quantities multiplied by the appropriate Unit Prices in the Tender Form *excluding* the amount of Harmonized Sales Tax.

.2 The Estimated Contract Price is $_____.

.3 All amounts shall be in Canadian funds and exclude value added taxes.

.4 The amounts shall be subject to adjustment as provided in the Contract Documents.

ARTICLE A5 - PAYMENT

.1 The Owner shall pay the Contractor in Canadian funds for the performance of the Contract.

.2 The Owner shall make monthly payments on account to the Contractor for the Work performed, as certified by the Engineer, subject to a 10% holdback.

.3 The amount of the monthly payments shall be calculated as follows:

.1 The quantity for each pay item on which actual work has been performed shall be measured.

.2 For each Unit Price item this quantity shall be multiplied by the applicable Unit Price as provided in the Tender Form.

.3 For each lump sum item, multiply the percent complete by the value of the lump sum item.

.4 The total value of work completed for the payment period shall be calculated by adding the total of the products for all pay items from subsection 5.3.2 and 5.3.3 of this section.

.5 The amount of the monthly payment shall be determined by deducting the 10% holdback and the total of all previous payments from the total value of such completed work as determined under subsection 5.3.4 of this section.

.6 To the amount calculated above, the Harmonized Sales Tax will be added.

.4 The payment period shall be the last day of each month.

.5 Upon Substantial Performance of the Work as certified by the Engineer the Owner shall pay to the Contractor the holdback monies then due in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC 5.8 - PAYMENTS OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK.

.6 Upon Total Performance of the Work as certified by the Engineer the Owner shall pay to the Contractor the balance of monies then due in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC5.10 - FINAL PAYMENT.

.7 In the event of loss or damage occurring where payment becomes due under the property and boiler insurance policies, payment shall be made to the Contractor in accordance with the provisions of Section 00 72 45 - General Conditions, subsection GC 11.1 - INSURANCE.

.8 If the Owner fails to make payments to the Contractor as they become due under the terms of the Contract, interest shall be payable as follows:

.1 The annual interest rate applicable to the contract is 2% compounded semi-annually.

.2 Interest shall be calculated on the overdue balance from the due date.

ARTICLE A6 - RECEIPT OF AND ADDRESSES FOR NOTICES

.1 Communications in writing between the parties or between them and the Engineer shall be considered to have been received by the addressee on the date of delivery if delivered by hand or registered post to the individual, or to a member of the firm, or to an officer of the corporation for whom they are intended, or if sent by regular post, to have been delivered within five (5) working days of the date of mailing when addressed as follows:

.1 The Owner at:

Municipality of Cumberland
Attn: Mr. Justin Waugh-Cress, P.Eng.
1395 Blair Lake Road
Upper Nappan, NS, B4H 3Y4
Phone: (902) 667-2313
Facsimile: (902) 667-1352

.2 The Contractor at:

.3 The Engineer at:

exp Services Inc.
90 Lovett Lake Court, Suite 401
Halifax, Nova Scotia
B3S 0H6
Phone: (902) 453-5555
Facsimile: (902) 429-5457

ARTICLE A7 - QUANTITIES AND MEASUREMENT

.1 The quantities shown in Section 00 41 43 Tender Form - Schedule of Quantities and Unit Prices are estimated.

.2 Measurement for the actual quantities used to determine payments and Contract Price shall be in accordance with Section 01 22 00 - Measurement and Payment.

ARTICLE A8 - SUCCESSION

The aforesaid Contract Documents are to be read into and form part of the Agreement and the whole shall constitute the Contract between the parties and subject to law and the provisions of the Contract Documents shall be to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

ARTICLE A9 - RIGHTS AND REMEDIES

.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.

.2 No action or failure to act by the Owner, Engineer, or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

ARTICLE A10 - TIME

.1 Time shall be construed as of the essence of the Contract.

.2 The Contractor agrees to complete the work on or before the completion time set out in the Tender Form and defined in paragraph 1.3 of this Agreement, which date is hereinafter referred to as the Time of Completion.

.3 The Contractor acknowledges and agrees that the Time of Completion was a factor of the Owner when awarding the Contract.

.4 Failure by the Contractor to meet the Time of Completion may result in an assessment against the Contractor of $500 per calendar day past the Time of Completion, as Liquidated Damages. The assessment is the agreed estimate of damages to the Owner, not a penalty, which assessment is the estimated cost to the Owner of continuing the Contract beyond the Time of Completion.

IN WITNESS WHEREFOR the parties hereto have executed this Agreement under their respective corporate seals and by the hands of their proper officers thereunto duly authorized.

SIGNED, SEALED AND DELIVERED
In the presence of:

OWNER

Name of Owner

WITNESS

Signature

Name and title of Person Signing

Signature

Signature

Name and title of Person Signing

Name and Title of Person Signing

CONTRACTOR

Name of Contractor

WITNESS

Signature

Name and Title of Person Signing

Signature

Signature

Name and title of Person Signing

Name and title of Person Signing

N.B. Where legal jurisdiction, local practice or Owner or Contractor requirements calls for (a) proof of authority to execute this document, attach such proof of authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign the Agreement for and on behalf of the corporation or partnership; or (b) the affixing of a corporate seal, this Agreement should be properly sealed.

----------END 00 53 43----------

SUPPLEMENTARY SPECIFICATIONS

20. Substantial Performance of the Work

Delete Clause 20. And replace with the following:

Substantial Performance of the Work is as defined in the lien legislation applicable to the place of work. To be ready for use, complete sidewalk, curb and road reinstatement and the site tidied up and landscaping growth established and is so certified by the Engineer/Owner.

Add Clause 28. Provisional/Contingency Items, as follows:

28. Provisional/Contingency Items

Provisional/Contingency Items means the pay items in the Tender Form to pay for possibly unexpected situations, which might be encountered and does not form part of the contract price until approved by the Engineer/Owner.

Add Clause 29. Total Performance of the Work as follows:

29. Total Performance of the Work

Total Performance of the Work means that all the work of the contract, change orders and deficiencies have been completed and are so certified by the Engineer/Owner.

---------- END 00 71 00 ss ----------

INTENT .1 The Work of this Contract is governed by, and is to be constructed in accordance with the most recent edition of, Standard Specifications for Municipal Services, developed and published by the Nova Scotia Road Builders Association and Consulting Engineers Nova Scotia Joint Committee on Contract Documents, except as modified herein.

.2 Supplementary Specifications modify and take precedence over the specification sections to which they refer.

GC 1.1 CONTRACT DOCUMENTS

Delete Clause 1.1.8 and replace with the following:

1.1.8 The *Contractor* will be provided four (4) copies of the Project Documents. The cost of reproducing and handling additional copies of the Project Documents, if requested, will be paid for by the Contractor.

GC 3.11 SHOP DRAWINGS

Refer to SECTION 01 10 00 ss GENERAL REQUIREMENTS for Shop Drawing submittal requirements.

GC 5.4 BASIS OF PAYMENT FOR COST PLUS WORK

5.4.1 The following percentages are the allowances for overhead and profit on the value of cost-plus work, including equipment, labour and materials:

.1	By the General Contractor	10%
.2	By the General Contractor on Sub-Contractors	5%
.3	By Sub-Contractors	5%

Items such as company taxes, insurance, duties, bonding, payroll burden, utilities, private and company vehicles and the like are deemed contract overhead and will not be considered separately for mark-up.

5.4.2 Rates for machinery and equipment for cost plus work, referred to in the Standard GC 5.4.1

Clause, shall be that provided in the Tender Form.

Add Clause 5.13 Documents Required at Holdback Release

GC 5.5 APPLICATIONS FOR PROGRESS PAYMENT

Add clause 5.5.7 as follows:

5.5.7 The Contractors application shall show the total progress made to date and the progress on the last claim; the claimed progress being the difference. The application shall show the total amount claimed and the amount claimed for the progress made. The claim for payment shall indicate the total holdback to date and the holdback made on the payment claimed. HST shall apply to the amount of payment after the holdback is removed.

GC 5.6 PROGRESS PAYMENT

5.6.1 Replace "5 *Working Days*" with "20 *Working Days*".

5.6.2 Replace "5 *Working Days*" with "20 *Working Days*".

GC 5.7 SUBSTANTIAL PERFORMANCE OF THE WORK

5.7.2 Replace "15 *Working Days*" with "21 *Working Days*".

5.7.3 Add the following:

If the work is agreed to be substantially complete then the certificate shall reflect the date on which the application was made.

Add clause 5.7.5 as follows:

5.7.5 The Engineer will review the Contractors comprehensive list of items to be completed or corrected (deficiency list). If the list is found to be incomplete, a finding that the project is substantially complete may be withheld until a comprehensive deficiency list is established to the satisfaction of the Consultant. If the Engineer generates a list of deficiencies, the Engineer shall value each item

based on experience. The Engineer may also ask the Contractor for information necessary to establish values for items on the deficiency list. If the Contractor disputes the value of any item, then the Contractor must submit a detailed cost estimate for the value of each item in accordance with GC 5.4 for the Cost Plus Work or otherwise agreed upon with the Engineer. The value of deficiencies may be withheld from payment of the holdback money.

GC 5.8 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

5.8.3 Replace "5 *Working Days*" with "10 *Working Days*".

Add clause 5.8.6 and 5.8.7 as follows:

5.8.6 If, within 60 days after the issue by the Engineer of the Certificate of Substantial Performance, the Contractor has not corrected all deficiencies, the Owner will retain sufficient money to cover the cost of completing the said deficiencies, as determined by the Engineer, in addition to holding monies retained in accordance with the Contract and subject to appropriate legislation of Nova Scotia.

5.8.7 Notwithstanding the provisions of the preceding paragraphs, a warranty holdback in the amount of two and a half percent (2.5%) of the final contract price shall be retained by the Owner until the expiry of the warranty period of 12 months from the date of substantial completion of work. This amount will be released within 21 days following the expiry of the warranty period, provided that the Contractor has fulfilled all of the requirements of the contract.

GC 5.10 FINAL PAYMENT

5.10.2 Replace "15 *Working Days*" with "21 *Working Days*".

Add GC 5.13 as follows:

GC 5.13 DOCUMENTS REQUIRED AT HOLDBACK RELEASE

At each time the contractor applies for release of holdback (GC 5.7 to 5.10 inclusive), he shall provide the following

documentation. Release of holdback will be subject to receipt of the documentation:

- Statutory Declaration (CCDC Document 9A)
- Bonding company acknowledgement and statement of bond status.
- Statutory Declaration by deed search of any liens filed on the Owner's property from work of the contract.
- Nova Scotia Construction Safety Association letter of good standing
- Worker's Compensation letter of good standing
- Statement of all outstanding claims against the contract which precede the date of holdback application. Outstanding claims not listed at the date of Release application will later be rejected.

GC 6 CHANGES

Further to Section 00 71 00 Clause 21, add Clause 6.4 Supplemental Instructions as follows:

GC 6.3b SUPPLEMENTAL INSTRUCTIONS

Supplemental Instructions (SIs) are written instructions issued by the Engineer for the purpose of recording clarifications or interpretations of the Contract Documents or giving direction resulting from field conditions. SIs are subject to the provisions of the Contract Document and unless stated in the SI and specifically co-authorized by the Client, will not affect the terms and conditions of the Contract. Should the Contractor believe a change in the contract price or Time of Completion is required as a result of an SI, he shall submit to the Engineer within five (5) days of the date of issuance of the Supplemental Instruction an itemized proposal but if SI work will take place before the five days, the Contractor shall notify the Engineer that a price or time change is indicated at least one (1) working day before proceeding with the work. If the proposal is accepted by the Owner, the Supplemental Instruction will be superseded by a Change Order.

GC 6.7 QUANTITY VARIATION

6.7.2 change 15% to 25%

Add Clause 6.7.6

6.7.6 Should it be determined that a change in the contract time is required solely as a result of quantity variation(s), the time extension shall not form the basis of a claim. The contract unit price or re-negotiated unit price is deemed to be compensation in full for any changes in contract time.

GC 10.1 TAXES AND DUTIES

Add Clause .3 and .4 as follows:

.3 The Contractor shall pay the Harmonized Sales Tax (HST), with respect to its obligation under the Contract.

.4 The Owner may be applying for a refund of the tax paid on goods and services qualifying for tax exemption. The Contractor shall provide all relevant documents to the Owner so as to enable the Owner to recover all applicable taxes. The Contractor shall assist the Owner in every way to complete these dealings in a reasonable period of time.

GC 10.2 LAWS, NOTICES, PERMITS AND FEES

10.2.3 Include obtaining utility permits (phone, power, etc.) and their fees, license, inspections, certificates, co-ordination, scheduling and costs in the tender price & the scope of work. Where a utility or agency requires that an application be made by the Owner, advise the Owner sufficiently far in advance so as not to delay the work and thereafter act as the Owner’s agent in scheduling and co-ordinating the utility/agency with those of the work. Co-ordinate and pay for adjustment of utility poles and their supports, if required for the purposes of the work, with/to the utility having jurisdiction. Carry ongoing utility costs until Substantial Performance.

Add Clause 10.2.9

.9 The Contractor shall schedule his work in accordance with permits issued and any stipulations contained therein. The Contractor shall notify the Owner and the Engineer of any restrictions placed on the work schedule by such permits. The Contractor shall notify the Engineer of any difficulty in obtaining permits and their impact on the schedule. Notification to the Engineer does not relieve the Contractor of his obligations.

Add Clause 10.2.10

.10 A permit application has been submitted to NSTIR for approval. Construction start-up is contingent on receiving said approval. Construction cannot commence until NSTIR approval has been received. There shall be no just cause for additional compensation from the Owner to the Contractor due to delays from regulatory authorities approvals.

Add Clause 10.2.11

.11 The Contractor shall pay the NSTIR permit fee as prescribed by NSTIR (typically a percentage of the contract value). This fee will be refundable after 1 year of substantial completion provided the Contractor has completed the work described under this contract to NSTIR standards.

GC 11.1 INSURANCE

Add Clause 11.1.1.6 as follows:

11.1.1.6 The Contractor shall add the Owner and Engineer as joint insured parties (co-insured) in the insurance policies.

GC 11.2 CONTRACT SECURITY

Add Clause 11.2.3 as follows:

11.2.3 The Contractor shall provide to the Owner the bonding as specified in Section 00 21 00 Information to Tenderers.

GC 12.1 INDEMNIFICATION

Add to clause 12.1.1 the following: The indemnification shall cover both the Federal and Provincial governments as funding agencies.

GC 12.3 WARRANTY

Add clause 12.3.7 as follows:

12.3.7 Equipment warranty: all equipment shall be warrantied by the manufacturer for a period of 12 months from the date of successful commissioning and placing in service.

---------- END 00 72 45 ss ----------

2. SUMMARY OF WORK

Delete Clause .1 and replace with the following:

.1 The work generally includes, but is not limited to the items listed in the Invitation to Tender.

.2 Provisional items as may become evident during the course of the project.

3. SCHEDULING AND CO-ORDINATION

Delete Clause .3 and replace with the following:

.3 Engineer will carry out necessary tests and inspections. Contractor will take measurements required for record drawings. Refer to Clause 8. “Record Drawings” of this Section.

Add the following:

.5 The work is taking place in a downtown setting with residences and other facilities adjoining the work area. The Contractor is to work closely with the property owners, the Municipality, the Construction Inspector and the Engineer to schedule and carry out the work so as to minimize disruption to regular activities and maintain access to all residential properties. Contractor shall respect the surrounding area.

4. SETTING OUT THE WORK

Delete .2 and replace with the following:

.2 Survey markers and Nova Scotia Survey Monuments are shown on the drawings together with the project bench-mark. No greater level of information will be provided to the Contractor. The Contractor shall provide his own surveyor to layout and level the work. Field layout is paramount and the

Contractor must keep control at all times on locations and layout.

Add .4

.4 The Contractor shall take all measurements and record all information before and after changes in construction for determination of quantities for measurement where applicable. All such information shall be provided to the Engineer for his review and acceptance before proceeding to the next stage.

5. EXISTING SITE CONDITIONS

Add the following:

.4 Do not remove nor disturb survey monuments, iron bars, round iron pipes and stakes representing property boundaries and locations which may be encountered during the execution of the work, without written permission from the Engineer. Replace all disturbed monuments unless written permission for such removal is granted by the Engineer.

.5 The existence and location of rocks, shrubs, trees and signs are not guaranteed. Contractor to verify in the field prior to commencing work and notify the Engineer of any errors or omissions. Utility pole relocations, where applicable, will be conducted by the appropriate utility.

.6 Maintain the integrity of all ditches and culverts and flow paths encountered during the execution of the work. Existing ditches, culverts or flow paths shall not be blocked, filled or prevented from providing proper drainage.

.7 The Contractor shall indemnify and save harmless the Owner and Engineer against damages for consequential loss and against any claim made against the Owner or the Engineer by the owner of any main, line,

conduit, or other such structures or utility, in any way caused by the operations of the Contractor in the performance of this Contract.

.8 Take videos and photographs to record the condition of the work sites adequately prior to and during construction. Share the evidence with the Engineer, the Authorities and the Municipality, when and as requested.

.9 Carefully dig exploratory holes to determine locations and depths of buried infrastructure, where applicable, which may affect the work of the contract. Dig these holes sufficiently far in advance of the work so as to permit proper planning and scheduling of the work.

6. PROJECT MEETINGS

Add .2 and .3 as follows:

.2 Allow for bi-weekly meetings, or if the situation warrants more frequent meetings, as called for by the Engineer.

.3 The Contractor’s Project Manager and Foreman shall attend site meetings, which may be on-site or at the Municipal office. Sub-contractors shall allow for bi-weekly meetings but may not attend the meetings at the discretion of the Engineer.

7. SUBMITTALS

7.1 Shop Drawings

Replaces .4 as follows:

.4 Submit six (6) copies of shop drawings to the Engineer for review. Engineer will mark up three (3) drawings for return to the Contractor. Contractor to make copies as he requires, from the returned shop drawings.

add 7.7 as follows:

7.7 Project Documentation

.1 On award of the project, submit the following to the Engineer:
- environmental protection plan.
- traffic control plan.
- detailed project schedule and work plan.

.2 Submit shop drawings for:
- Manholes
- Catchbasins
- Frames, Grates and Covers
- Valves and Fire Hydrants

8. RECORD DRAWINGS

Delete .1 and .2 and replace with the following:

.1 Obtain data necessary to prepare record drawings.

.2 Do not bury pipework and appurtenances or other portions of the Work until the necessary record measurements have been taken. Incorporate elevations and ties to existing infrastructure in the record drawings.

Add .3 as follows:

.3 Maintain one separate set of drawings on site. These drawings shall be reserved exclusively as record drawings. Have these drawings marked up daily to record any alterations made during construction to the contract drawings. Transmit these drawings to the Engineer at substantial Completion. The submission of an acceptable set of record drawings to the Engineer is a condition of issuance of Substantial Performance. The Contractor will be

supplied with a separate set of drawings specifically for the purpose of keeping records.

Add .4 as follows:

.4 All record information will be collected by the Resident Inspector on behalf of the Engineer and the Owner.

9. QUALITY CONTROL

Add Paragraph .8 as follows:

.8 The expense of additional tests required due to defective work or under-strength concrete shall be borne by the Contractor.

Add Paragraph .9 as follows:

.9 Owner (the Municipality of Cumberland) will pay for and schedule all materials testing during the course of construction. The Contractor shall coordinate with the Owners representative (Engineer or Site Inspector) in advance of work so that proper scheduling can take place.

10. TEMPORARY FACILITIES

Delete requirements of Clause 10.2

Add Paragraph .5 as follows:

.5 Carry ongoing utility costs until Substantial Performance (if applicable).

---------- END 01 10 00ss----------

GENERAL

Unit prices are full compensation for the work necessary to complete each item in the Contract and in combination for all work necessary to complete the Work as a whole.

For storm sewer system, include all of the following as required: supply and installation of infrastructure, protection of existing trees, grubbing, common excavation, common trenching, shoring, dewatering, bedding, backfilling, compaction, disposal of surplus common, full reinstatement of surface features, reinstatement of landscaping, and all incidentals required for completed works.

For water systems, the Municipality will provide materials and labour for temporary water and conduct all temporary water line commissioning…this shall not be accounted for in the Contractors bid. Upon award, the Contractor shall provide a detailed workplan and schedule two weeks in advance of construction start-up so that the Municipality can complete this work. Should the Contractor make changes to this workplan and schedule during construction, the Municipality shall not be penalized for delays due to installation of temporary water infrastructure.

Municipality will be responsible for commissioning the new water lines. This includes filling, pressure testing and decontaminating the lines, including bacteriological testing.

All measurements shall be along a horizontal plane unless otherwise indicated. Quantities listed in Section 00 41 43 are based on placed and compacted material and truck counts will not be an allowed form of measurement.

All materials testing during construction shall be coordinated between the Contractor and the Engineer. The cost of materials testing will be the responsibility of the Owner.

NSTIR Work Within Highway Right-of-Way Permit will be the responsibility of the Owner (the Municipality) including the permit cost. The Contractor shall not include this in their bid.

The numbers of the items described below correspond to the numbers of the items in Section 00 41 43, subsection 4 – Schedule of Quantities and Unit Prices (for all schedules).

33. Catch Basin

Unit of Measurement: Each

Includes: excavation, gravel bed, supply and installation of the pre-cast structure(s), connection of pipes, supply and installation of frame and grate, backfill and reinstatement of disturbed surface.

54. Concrete Curb and Gutter

Unit of Measurement: Metre (m)

Includes: concrete curb/gutter, including excavation common, supply and placing base gravels and backfill.

55. Asphalt Sidewalk

Unit of Measure: Square Metre (m^2)

Method of Measure: slope measure of indicated area.

Includes: All clearing, grubbing, surface removals, excavation, supply and installation of asphalt, adjustments to existing medians, boulevards, stairs and walkways and all ancillaries required for completed sidewalks.

63. Regrade/Reinstate Driveways

Unit of Measurement: Each

Includes: work to adjust curb profile, additional joints, work to adjust sidewalk and grass slopes, apron, blending and feathering to existing driveway surfaces, supply, place and compact adjusted portion of driveway with matched materials and concrete ramp to match road grades.

64. Relocate Signs

Unit of Measurement: Each

Includes: removal of existing signs and boxes, installation of base and post, mounting/replacement of existing or new sign on new base and post (assume all new for bidding).

76. Tree Removal

Unit of Measurement: Each

Includes: complete removal of trees and shrubs as indicated on the plans including hauling away from the site and disposal in accordance with NS Environment regulations. Coordination with the property owner, the Municipality and the Engineer is required prior to completing this task.

86. Traffic Control

Unit of Measurement: Lump Sum (LS)

Includes: all traffic control required associated with the project, in accordance with the Manual of Uniform Traffic Control Devices Latest Edition (or approved equivalent). Contractor shall allow for this item for the full duration of the project and shall not claim extra due to construction schedule lags.

PROVISIONAL ITEMS (only as directed by the Engineer)

Note, for Provisional Items:

Measurement and payment for the listed items will be in accordance with its item number in the Standard Specifications SECTION 01 22 00 Measurement and Payment or 01 22 00ss noted above.

Provisional items are indicated as such in the Tender Form (Section 00 41 43). Completion of St. James Street and Princess Street (Schedule H and I respectively) is entirely provisional and may or may not be completed as part of this contract. The Municipality reserves the right to accept or reject Schedule H and I and the Contractor shall not adjust unit rates throughout the contract (Schedules A through G) as a result.

---------- END 01 22 00 ss ----------

6. Permits and Approvals

Replace 6.1 with the following:

.1 Review and comply with all conditions contained in permits and/or approvals from regulatory authorities.

Add new clauses as follows:

7. Tree and Plant Protection

Add the following:

.1 Replace ornamental trees, plants, vegetation, sod and any planters, that are removed or damaged by the Contractor's operations unless designated for removal by the Engineer or the contract documents. Conduct a pre-construction video inspection to establish the pre-existing conditions prior to construction.

8. Protection of Property

.1 Contractors shall indentify and protect property not designated for removal. Contractors shall restore and make good all damages as a result of the failure to protect or construction activities.

---------- END 01 57 00 ss----------

PART 3 – EXECUTION

3.1 Excavation

Delete Clause .1 and replace with the following:

.1 Excavate all types of materials to lines and elevations indicated and as necessary for construction. If grounds at indicated elevations are not sound, excavate until sound natural ground is reached.

Add Clause 3.12 Site Preparation, Excavation and Earthworks as follows:

3.12 Site Preparation, Excavation and Earthworks

.1 Excavate to lines, grades, elevations and depths indicated on the Drawings. If grounds at indicated elevations are not sound, excavate until sound natural ground is reached.

.2 Maintain excavations free of water while work is in progress. Protect open excavations against flooding and damage due to surface runoff. Dispose of water in an environmentally-acceptable manner and in accordance with applicable codes-of-practice.

.3 Earthworks inspections, to confirm that methods and materials are in compliance with project specifications will be carried out by the Engineer. Provide assistance and access as required for inspections. Do not cover materials requiring inspections without reasonable prior notice.

.4 All work shall be in compliance with the recommendations made in the attached Geotechnical Investigation Report by **exp** Services Inc.

---------- END 31 20 00ss----------

Municipality of Cumberland

Geotechnical Investigation For
Downtown Infrastructure Renewal Project, Springhill, NS

Type of Document:
Final

Project Name:
Downtown Infrastructure Renewal Project, Springhill, NS

Project Number:
exp HFX-00235652-A0

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Date Completed:
2017-02-03

Legal Notification

This report was prepared by **exp** Services Inc. for the account of **The Municipality of Cumberland.**

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Exp** Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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Borehole Logs
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exp Quality System Checks	
Project No.: HFX-00235652-A0	Date: February 03, 2017
Type of Document: Final	Revision No.: 0
Prepared By: Patrick Sloan, EIT Jamie Harper, P.Eng.	
Reviewed By: Brian Walker, P.Eng.	



1 Introduction

Exp Services Inc. (**exp**) was retained by the Municipality of Cumberland to carry out the design of upgrades to the municipal services in downtown Springhill, and to develop tender drawings and specifications. As part of this work, **exp** conducted a geotechnical investigation along the streets where potable water, storm sewer and sanitary sewer infrastructure upgrades were proposed. This work was carried out to determine the sub-surface conditions in the area of the proposed upgrades. Of particular interest was confirming the potential presence of bedrock at shallow depth, which may be encountered in excavations during construction for the new municipal infrastructure.

2 Site Description

The streets that encompass the area investigated include:

- Church Street
- Victoria Street
- Elm Street
- Pioneer Street
- Mechanic Street
- Chapel Street
- Pleasant Street
- St. James Street, and
- Princess Street

Boreholes were drilled at approximately equal spacing along these streets, which are all located south of Main Street. Residential and commercial properties are located along the streets comprising the work area.

In the area included in the current investigation, the ground surface generally rises to the south, away from Main Street. There is approximately 45 m of relief over the project site, with elevations at the boreholes ranging from a low of 151.1 m at BH-01 to a high of 197.2 m at BH-27.

3 Fieldwork

The borehole investigation took place from October 13 to 14, 2016. A total of 27 boreholes ranging in depth from 1.1 m to 2.7 m below ground surface were conducted with a truck-mounted drill rig, supplied and operated by Nova Drilling Inc.

The borehole investigation was conducted under the supervision of **exp** staff, who logged the sub-surface stratigraphy and collected representative soil samples.

3.1 Investigation Methodology

The locations of all boreholes were located in the field by **exp** staff, to provide representative coverage and to avoid underground and overhead utilities. **Exp** worked with the Municipality to confirm that underground utilities were not present at the borehole locations. This is provided as general information only. Third parties should

make their own inquiries with local authorities to confirm the presence or absence of utilities.

During the drilling program, representative soil samples were attained from the 50 mm diameter split spoon sampler during Standard Penetration Tests (SPT), conducted ahead of the solid stem drill augers when necessary. A preliminary assessment of particle size, density, moisture and colour was recorded for each soil sample in the field.

Bedrock coring operations were not conducted during the current investigation, so the presence of bedrock was inferred during drilling operations. Bedrock is known to be relatively shallow in the general area, and the depth to bedrock was inferred in the boreholes based on samples of fragmented bedrock returned in the SPT sampler, the action of the drill rig during augering and bulk samples of bedrock fragments sampled from the auger flights.

The general site arrangement and location of the boreholes are shown on the attached plans, labelled Figure 01.

3.2 Sample Storage and Lab Testing

Soil samples were reviewed in the laboratory by an **exp** lab staff and checked by a senior engineer in order to confirm descriptions and soil boundaries. Representative samples from different soil strata were selected for laboratory analysis. The following tests were carried out:

- Moisture Content tests were conducted on 8 soil samples.
- Sieve tests were conducted on 8 soil samples to classify the soil strata.
- Atterberg Limits testing was conducted on 1 sample to classify the fines (Silt/Clay)

The results of all geotechnical laboratory tests are summarized in attached Table 1 and copies of all test results have been included in Appendix 1.

Table 1- SUMMARY OF LABORATORY TEST RESULTS

CLIENT Municipality of Cumberland

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia

PROJECT No. HFX-00235652-A0

TESTING:

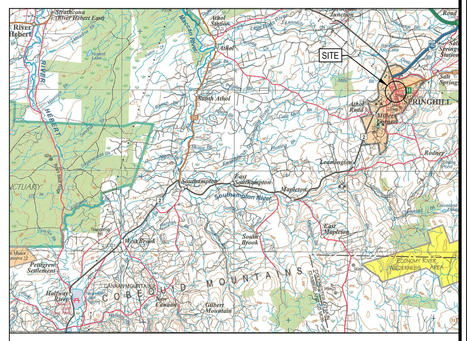
Moisture Content:	8
Atterberg Limits:	1
Sieve Analysis:	8
Hydrometer Test:	0
UCS:	0

Soil Deposit	Borehole/Sample	Depth (m)	Water Content (%)	Atterberg Limits			Sieve Analysis			UCS (MPa)
				Liquid Limit	Plastic Limit	Plasticity Index	Gravel (%)	Sand (%)	Fines (%)	
Fill	BH-01/SS - 2	0.6	18.1				24.2	50.2	25.6	
Fill	BH-06/SS - 2	0.6	20.0				19.8	50.4	29.8	
Fill	BH-16/SS - 2	0.6	11.3				18.0	63.2	18.8	
Till	BH-03/SS - 5	2.4	17.9	37.9	20.3	17.6	8.3	28.1	63.6	
Till	BH-17/SS - 3	1.0	9.3	38.0	20.0	18.0	42.3	26.1	31.6	
Till	BH-18/SS - 5	2.4	8.5	38.0	20.0	18.0	29.4	30.4	40.2	
Till	BH-21/SS - 5	2.4	11.1	38.0	20.0	18.0	28.1	29.6	42.3	
Till	BH-26/SS - 3	1.0	16.0	38.0	20.0	18.0	16.1	46.4	37.5	

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Canada
http://www.exp.com

M:\HFX-00235652-A0\60 PROJECT EXECUTION\60.1 CAD\FIGURES\FIGURE 1
JUSTIN TRETHEWEY
2/16/2017 3:43 PM





KEYPLAN

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No.	Issue	Date

LEGEND:

BORE HOLE LOCATION BH-01

No.	Revision	Date

PRELIMINARY

Professional Seal(s)

Drawn By:	JNT
Dwg Standards Ckd By:	
Designed By:	BAW
Design Checked By:	
Scale:	1:2500

Project Title

DOWNTOWN INFRASTRUCTURE RENEWAL PROJECT - SPRINGHILL COMMUNITY

Dwg. Title

BORE HOLE LOCATION PLAN

Project No. HFX-00235652-A0

Dwg. No. **FIG. 1**

Rev. No. 0

exp Services Inc. © 2017
A1

4 Surface and Sub-Surface Conditions

4.1 Summary of Conditions

The general stratigraphy encountered on the site included the following:

- Asphalt Pavement Surface
- Granular Fill (SM)
- Native Glacial Till (CL to GC)
- Inferred Sandstone Bedrock

It was noted that the quality of the granular materials beneath the asphalt pavements was not generally in keeping with current pavement structure design standards. If present, distinct base and sub-base gravel layers were not obvious in the boreholes. The fines contents were relatively high and debris (pieces of brick) was common within this layer.

The depth to bedrock varied over the area investigated, but was generally shallow in the east/southeast portion of the project area where the elevation of the ground surface was highest.

A summary of the thicknesses of the various strata encountered during the investigations are provided below in Table 2. Detailed borehole logs are provided in Appendix 2, and summary descriptions of the soil strata are given below in subsequent paragraphs. Fence diagrams, illustrating subsurface profiles along the streets investigated, are provided in Appendix 3.

It should also be noted that the soil stratigraphy detailed on the borehole logs and in the descriptions of sub-surface conditions is only valid at the location where the boreholes were conducted. Soil stratigraphy should be expected to vary between borehole locations.

Table 2: Summary of Sub-Surface Stratigraphy

Borehole ID	Approximate Thickness of Asphalt Pavement (mm)	Thickness of Granular Fill (m)	Thickness of Native Glacial Till (m)	Depth to Inferred Bedrock (m)
BH-01	200	0.3	2.3	-*
BH-02	130	0.3	1.7	2.1
BH-03	200	0.5	2.1	-
BH-04	230	0.3	1.5	2.0
BH-05	230	0.3	2.2	-
BH-06	150	0.3	2.3	-

Borehole ID	Approximate Thickness of Asphalt Pavement (mm)	Thickness of Granular Fill (m)	Thickness of Native Glacial Till (m)	Depth to Inferred Bedrock (m)
BH-07	230	1.3	1.2	-
BH-08	130	0.9	1.7	-
BH-09	230	0.2	2.3	-
BH-10	130	0.4	2.2	-
BH-11	150	0.4	1.6	2.1
BH-12	230	0.2	2.3	-
BH-13	50	0.5	2.2	-
BH-14	100	0.4	2.3	-
BH-15	180	0.3	2.3	-
BH-16	180	0.7	1.8	2.7
BH-17	200	0.4	0.4	1.0
BH-18	130	0.8	1.8	-
BH-19	200	0.4	1.4	2.0
BH-20	130	0.3	1.1	1.5
BH-21	150	0.3	2.3	2.7
BH-22	180	0.3	1.6	2.1
BH-23	200	0.1	0.6	0.9
BH-24	130	0.2	0.6	0.9
BH-25	150	0.2	0.5	0.8
BH-26	200	0.1	1.2	1.5
BH-27	200	0.7	-	0.9

* Bedrock not encountered before termination of Borehole.

4.2 Surficial and Sub-Surface Strata

4.2.1 Asphalt Pavement

Asphalt pavement was encountered at the surface of all boreholes and varied in thickness from approximately 50 mm to 230 mm.

It should be noted that it is not possible to determine the asphalt pavement layer thickness in boreholes precisely, due to their relatively small size and 'smearing' of the edges by the augers as the pavement is penetrated.

4.2.2 Granular Fill

A layer of granular fill was encountered beneath the asphalt pavement in all the boreholes. It was visually described as ranging from 'Silty, Gravelly Sand' to 'Sand with some Silt and Gravel'. Under the Unified Soil Classification System (USCS), the deposit was described as 'Silty Sand with Gravel (SM)''. The soil's relative density

varied from loose to compact, it was generally dry to moist, and was brown to red brown to grey to black in colour.

The fill was found to contain various types of debris (brick fragments, coal, wood) as well as various types of aggregate from various rock sources. The granular fill encountered may represent the base and sub-base gravel component of the pavement structure but these layers could not be distinguished, so the layer description has been generalized as granular fill.

4.2.3 Native Glacial Till

Native Glacial Till was encountered below the granular fill in all boreholes except BH-27, where the granular fill extended down to bedrock. It was visually described as ranging from 'Sandy, Gravelly Clay' to 'Sand and Clay with some Gravel'. Under USCS classification the deposit ranged from 'Sandy Lean Clay (CL)' to 'Clayey Gravel with Sand (GC)'. The soil's density varied from stiff to hard (loose to dense when intermixed with gravel), it was moist, and reddish brown in color.

4.2.4 Sandstone Bedrock (Inferred)

The Sandstone Bedrock surface was found to be undulating and generally encountered at shallow depth in the east/southeast portion of the area investigated, from Mechanic Street east to Princess Street. The depth to bedrock ranged from 0.8 m in BH-25 to over 2.7 m, where bedrock was not encountered within the maximum depth investigated in several boreholes.

Visual inspections retrieved from split spoon samples and spoils from auger flights indicated brown to grey, weathered Sandstone. The quality and competency of the bedrock was variable, ranging from highly weathered to a soil-like state in areas where the bedrock unit could be penetrated during SPT sampling, to more competent sections where SPT testing was refused and augering was required to penetrate the unit.

4.2.5 Groundwater

Groundwater was not encountered in any of the boreholes conducted during the current investigation. It should be noted that groundwater conditions should be expected to vary seasonally and in response to recent precipitation events.

5 Discussion and Recommendations

We understand that the proposed infrastructure upgrades will include complete replacement of the potable water mains, storm and sanitary sewers on the nine streets comprising the project area. Water mains will be constructed at a minimum depth of 1.8 m below grade. The depth of storm and sanitary services will vary along the alignments but are generally expected to extend to depths ranging from approximately 1.5 m and 3.0 m.

Given the burial depths required for the proposed infrastructure upgrades, it is anticipated that bedrock will be encountered during trench excavations. Excavation of bedrock may not be required where new infrastructure alignments allow existing trenches to be re-used. However, given the narrow nature of the streets involved, the need to re-align some services, and minimum separations between adjacent services, the need to excavate bedrock should be anticipated by contractors.
We anticipate that excavation in areas where highly weathered and fractured bedrock are encountered may be accomplished with large suitably equipped excavators. Removal of more competent bedrock will likely require ripping and/or mechanical rock breaking. It should be noted that specific direction regarding suitable methods of excavation cannot be given. The information provided above is intended as factual, general information only, and third parties must make their own judgements on the equipment required to perform the required excavation and backfill operations.

5.1 Site preparation

After excavation to design subgrade elevations, the exposed surface should be compacted and proof rolled prior to the placement of any backfill or piping. This work should be done in the presence of a qualified geotechnical inspector.

Any local soft or wet areas that exhibit excessive displacement during proof-rolling will require over-excavation and replacement with approved fill to achieve a competent base for pipe works and backfills. The excavations should be advanced to the depths directed by the geotechnical inspector, and backfilled in compacted lifts with approved fill to the satisfaction of the geotechnical inspector.

The use of coarse rock fill or Clear Stone with a separator fabric may be required in any areas with large quantities of groundwater to effectively replace the over-excavated areas. This type of fill would be helpful in providing a competent base for subsequent backfilling and compaction, where fills may be placed below water and large lift thicknesses are required before compaction can be done above groundwater levels.

5.2 Re-Use of Existing Materials and Imported Fills

It is anticipated that select portions of excavated fill and native till will be suitable for re-use as ‘Selected Backfill’ in accordance with the Standard Specifications for Municipal Services. However, removal of oversized particles and organic materials in the existing granular fill should be anticipated. None of the in-situ materials are expected to meet requirements for ‘Sand’, ‘Clear Stone’ or ‘Gravels’.

This information is provided as general information only and it should be noted that these results are based on limited sample sizes attained in the current geotechnical investigation and are only representative of the materials sampled at the specified borehole locations. Additional testing, in accordance with tender documents and the Standard Specifications will be required during construction to confirm the suitability for re-use. Third parties must make their own assessment of the feasibility of processing subgrade materials for re-use during construction.

It should be noted that existing fine grained soils will be difficult to work with in wet and cold conditions. These materials cannot be compacted with typical construction equipment when above their optimum Proctor moisture content. These types of soils should only be used for backfill when they are within 1 percent to 2 percent of their optimum Standard Proctor moisture content and can be compacted to the values given below in Section 5.4.2.

Re-use of these types of materials will require protection from exposure to water and freezing conditions. Construction activities should be coordinated with expected weather patterns and may be delayed during periods of precipitation and freezing conditions.

All stockpiles should be protected from excessive moisture. Any stockpiled materials containing excessive moisture should be disposed of off-site or dried prior to use in construction.

5.3 Environmental Controls and Protection of Constructed Work

The overburden soils that will be exposed during construction are erodible. Temporary erosion prevention measures and sedimentation control features should be included in construction, in accordance with the Standard Specification and NSDEL's "Erosion and Sedimentation Control Handbook For Construction Sites". Stockpiles should be protected from erosion and excessive moisture.

Constructed works should be sealed and sloped to prevent the infiltration of surface water. The grade of the completed ground surface on the site should be sloped such that surface water is diverted to surface water control features.

5.4 Backfilling

All fill should be placed in lifts consistent with the abilities of the compaction equipment being employed, and compacted to the densities specified in the Standard Specifications and project tender documents. Each lift of fill should be tested to confirm compaction prior to placing the next lift of fill.

5.5 Excavations and Groundwater Control

The sides of excavations extending to a depth greater than 1.2 m should be sloped at a maximum of 1H:1V or an engineered shoring system should be provided. The ground surface around excavations should be sloped to divert surface water from flowing into excavations.

We anticipate that the control of water in excavations should be able to be accomplished with typical sump and pump techniques. Wherever feasible, the base of excavations should be shaped to drain to one or more sumps, as required to provide a continuously dry bottom for construction and avoid soil softening at the base of the excavations.

Collected water containing sediment should be processed through siltation bags or similar, to reduce sediment content to acceptable levels, prior to discharge to natural watercourses or storm sewers.

6 Closure

This report has been prepared to assist in the design of the proposed renewal of downtown infrastructure. If any uncommon details are included in the final design of the proposed work, the geotechnical engineer should be consulted. Similarly, if conditions different from those detailed on the borehole logs are noted during construction, the engineer should be notified to allow reassessment of any design assumptions, if necessary.

Appendix 1 –
Geotechnical Laboratory Test Results

Table 1- SUMMARY OF LABORATORY TEST RESULTS

CLIENT Municipality of Cumberland

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia

PROJECT No. HFX-00235652-A0

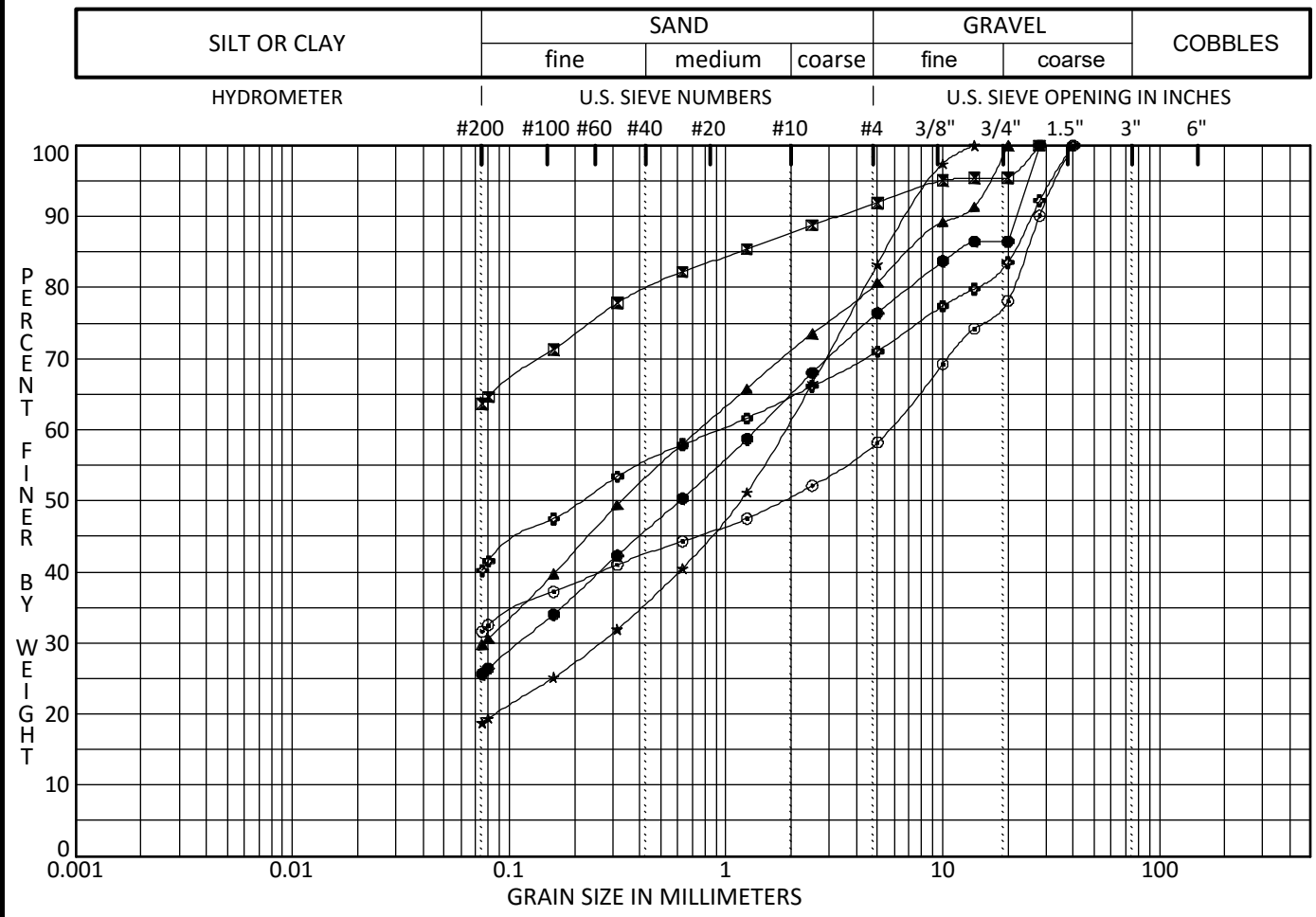
TESTING:

Moisture Content:	8
Atterberg Limits:	1
Sieve Analysis:	8
Hydrometer Test:	0
UCS:	0

Soil Deposit	Borehole/Sample	Depth (m)	Water Content (%)	Atterberg Limits			Sieve Analysis			UCS (MPa)
				Liquid Limit	Plastic Limit	Plasticity Index	Gravel (%)	Sand (%)	Fines (%)	
Fill	BH-01/SS - 2	0.6	18.1				24.2	50.2	25.6	
Fill	BH-06/SS - 2	0.6	20.0				19.8	50.4	29.8	
Fill	BH-16/SS - 2	0.6	11.3				18.0	63.2	18.8	
Till	BH-03/SS - 5	2.4	17.9	37.9	20.3	17.6	8.3	28.1	63.6	
Till	BH-17/SS - 3	1.0	9.3	38.0	20.0	18.0	42.3	26.1	31.6	
Till	BH-18/SS - 5	2.4	8.5	38.0	20.0	18.0	29.4	30.4	40.2	
Till	BH-21/SS - 5	2.4	11.1	38.0	20.0	18.0	28.1	29.6	42.3	
Till	BH-26/SS - 3	1.0	16.0	38.0	20.0	18.0	16.1	46.4	37.5	

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GRAIN SIZE DISTRIBUTION



	BH	SAMPLE	DEPTH(m)	Classification (USCS)	WC%	LL	PL	PI	Cc	Cu
●	BH-01	SS - 2	0.6	SILTY SAND with GRAVEL SM	18.1					
⊠	BH-03	SS - 5	2.4	SANDY LEAN CLAY CL	17.9	37.9	20.3	17.6		
▲	BH-06	SS - 2	0.6	SILTY SAND with GRAVEL SM	20.0					
★	BH-16	SS - 2	0.6	SILTY SAND with GRAVEL SM	11.3					
⊙	BH-17	SS - 3	1.0	CLAYEY GRAVEL with SAND GC	9.3	38.0	20.0	18.0		
✿	BH-18	SS - 5	2.4	CLAYEY SAND with GRAVEL SC	8.5	38.0	20.0	18.0		

	BH	SAMPLE	DEPTH(m)	D60	D30	D10	%Gravel	%Sand	%Fines	Soil Deposit
●	BH-01	SS - 2	0.6	1.38	0.111		24.2	50.2	25.6	Fill
⊠	BH-03	SS - 5	2.4				8.3	28.1	63.6	Till
▲	BH-06	SS - 2	0.6	0.75	0.076		19.8	50.4	29.8	Fill
★	BH-16	SS - 2	0.6	1.86	0.261		18.0	63.2	18.8	Fill
⊙	BH-17	SS - 3	1.0	5.60			42.3	26.1	31.6	Till
✿	BH-18	SS - 5	2.4	0.93			29.4	30.4	40.2	Till

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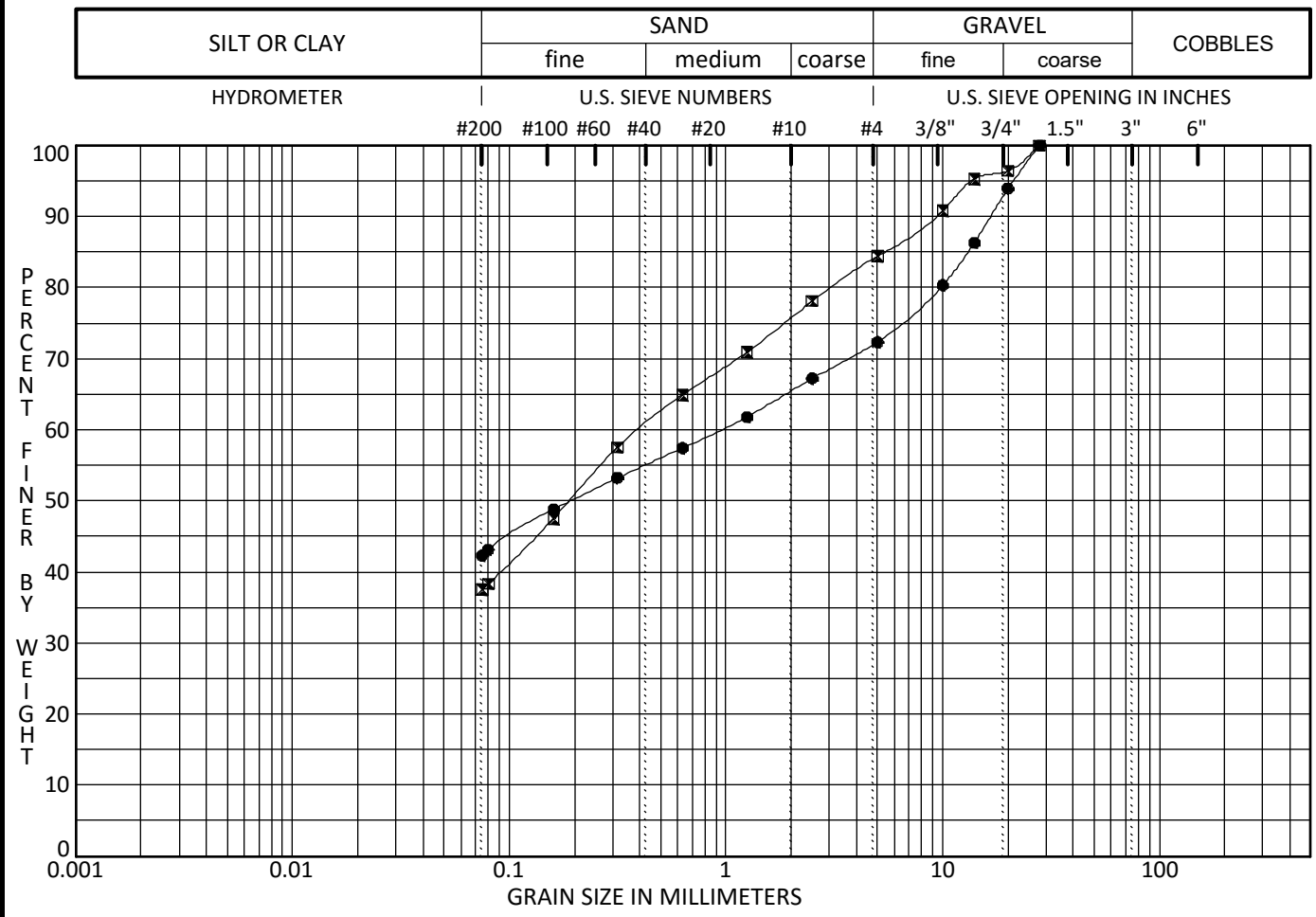
CLIENT Municipality of Cumberland

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia

PROJECT No. HFX-00235652-A0

ADI HALIFAX DOUBLE GRAIN SIZE DISTR. IW Rev: 5/24/12 DOWNTOWN SPRINGHILL LOGS.GPJ DATA ENTRY.GDT 2/6/17 Printed by: WalkerB

GRAIN SIZE DISTRIBUTION



	BH	SAMPLE	DEPTH(m)	Classification (USCS)	WC%	LL	PL	PI	Cc	Cu
●	**BH-21**	**SS - 5**	**2.4**	**CLAYEY SAND with GRAVEL SC**	**11.1**	**38.0**	**20.0**	**18.0**		
⊠	**BH-26**	**SS - 3**	**1.0**	**CLAYEY SAND with GRAVEL SC**	**16.0**	**38.0**	**20.0**	**18.0**		

	BH	SAMPLE	DEPTH(m)	D60	D30	D10	%Gravel	%Sand	%Fines	Soil Deposit
●	**BH-21**	**SS - 5**	**2.4**	**0.94**			**28.1**	**29.6**	**42.3**	**Till**
⊠	**BH-26**	**SS - 3**	**1.0**	**0.40**			**16.1**	**46.4**	**37.5**	**Till**

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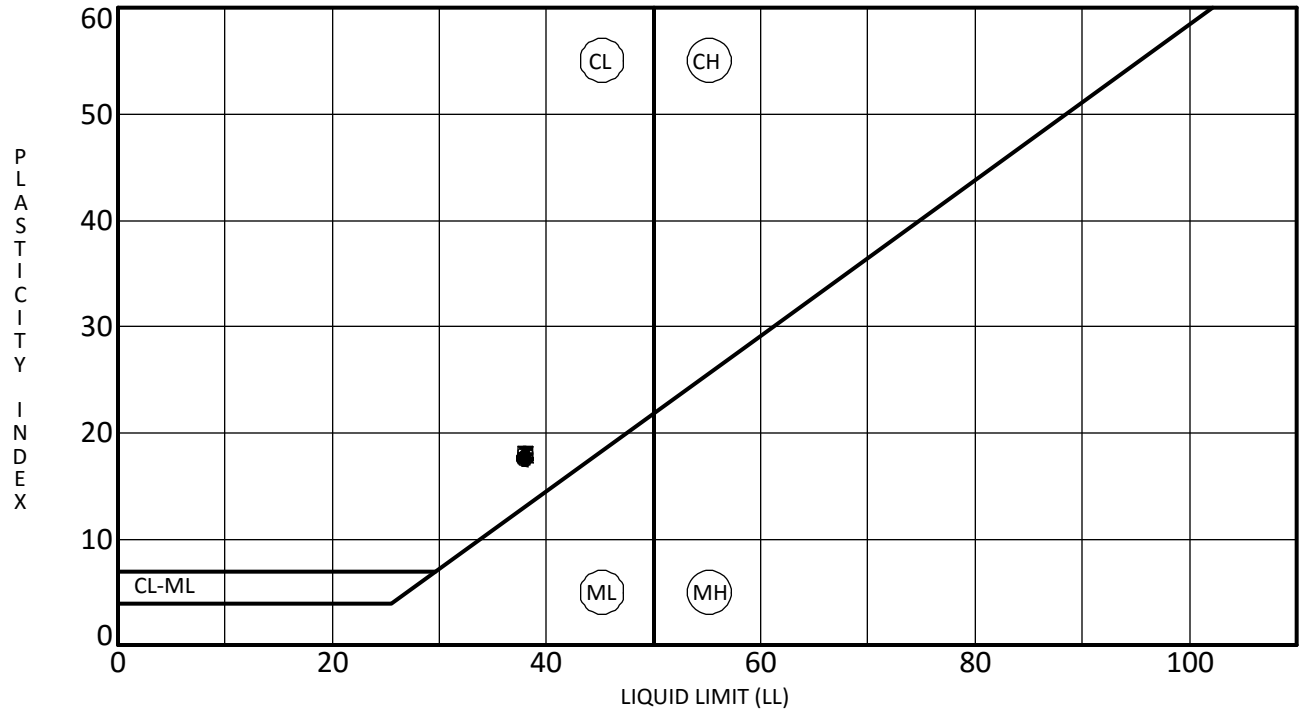
CLIENT Municipality of Cumberland

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia

PROJECT No. HFX-00235652-A0

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PLASTIC LIMITS



	BH	SAMPLE	DEPTH(m)	LL	PL	PI	Fines	Classification
●	**BH-03**	**SS - 5**	**2.4**	**38**	**20**	**18**	**63.6**	**FINES CLASSIFY AS CL**
⊠	**BH-17**	**SS - 3**	**1.0**	**38**	**20**	**18**	**31.6**	**FINES CLASSIFY AS CL**
▲	**BH-18**	**SS - 5**	**2.4**	**38**	**20**	**18**	**40.2**	**FINES CLASSIFY AS CL**
★	**BH-21**	**SS - 5**	**2.4**	**38**	**20**	**18**	**42.3**	**FINES CLASSIFY AS CL**
⊙	**BH-26**	**SS - 3**	**1.0**	**38**	**20**	**18**	**37.5**	**FINES CLASSIFY AS CL**

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CLIENT Municipality of Cumberland

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia

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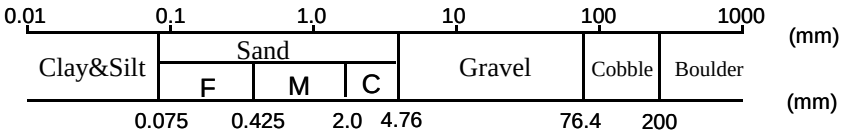
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Appendix 2 –
Descriptive Terms Used on Borehole Logs
Borehole Logs

Descriptive Terms - Borehole and Test Pit Logs

Soils

Grain Size



Compactness (gravel, sand, tills)

N, Range	0 - 4	4 - 10	10 - 30	30 - 50	>50
Density	V. Loose	Loose	Compact	Dense	V. Dense

Consistency (silt, clay)

S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200
Consistency	V. Soft	Soft	Firm	Stiff	V. Stiff

Rock

RQD	**Overall Quality**	**Fracture Spacing**
0 - 25	Very Poor	< 50 mm Very Close
25 - 50	Poor	50 - 300 mm Close
50 - 75	Fair	0.3 - 1 m Moderate
75 - 90	Good	1 - 3 m Wide
90 - 100	Excellent	> 3 m Very Wide

Comp. Str., MPa	0.25 - 1	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250	> 250
Description	Extremely Weak	Very Weak	Weak	Medium Strong	Strong	Very Strong	Extremely Strong

Sample Types (location to scale on log)

SS	Split Spoon	**B**	Shovel (bulk)
T	Shelby Tube	**H**	Carved Block
P	Piston	**V**	In Situ Vane
F	Auger	**NR**	No Recovery
W	Wash		

Rock Cores: BQ (36.5mm), NQ (47.6mm), HQ (63.5mm)

Notation and Symbols

N - N-value from standard penetration test; blows by 475 J drop hammer to advance std. 50mm O.D. split spoon sampler 0.3m

RQD - percent of core consisting of hard, sound pieces in excess of 100mm long (excluding machine breaks)

Recovery - sample recovery expressed as percent or length

S	- shear strength, kPa	**PL**	- plastic limit, percent
Sr	- shear strength, remoulded	**LL**	- liquid limit, percent
Dd	- dry density, t/m^3	▼	- groundwater level
W	- natural moisture content, percent	▽	- seepage

SYMBOLS AND TERMS USED ON THE BOREHOLE AND TEST PIT RECORDS

Soil Description

Behavioral properties (i.e., plasticity, permeability) take precedence over particle gradation in describing soils.

Terminology Describing Soil Structure

Desiccated	Having visible signs of weathering by oxidation of clay minerals,
Fissured	Having cracks and, hence, a blocky structure
Varved	Composed of regular alternating layers of silt and clay
Stratified	Composed of alternating layers of different soil type, e.g., silt and sand
Well Graded	Having wide range in grain size and substantial amounts of all
Uniformly Graded	Predominantly of one grain size

Terminology used for describing soil strata based upon the proportion of individual particle sizes present:

Trace, or occasional	Less than 10%
Some	10–20%
Adjective (e.g., silty or sandy)	20–35%
And (e.g., silt and sand)	35–50%

The standard terminology to describe cohesionless soils includes the relative density, as determined by laboratory test or by the Standard Penetration Test "N"-value: the number of blows of 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2-inch (50.8 mm) O.D. splitspoon sampler one foot (305 mm) into the soil.

Relative Density	"N" Value	Relative Density %
Very Loose	<4	<15
Loose	4–10	15–35
Compact	10–30	35–65
Dense	30–50	65–85
Very Dense	50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by in-situ vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Undrained Shear Strength

Consistency	kips/sq. ft.	kPa	"N" Value
Very Soft	<0.25	<12.5	<2
Soft	0.25–.50	12.5–25	2–4
Firm	0.5–1.0	25–50	4–8
Stiff	1.0–2.0	50–100	8–15
Very Stiff	2.0–4.0	100–200	15–30
Hard	>4.0	>200	>30

BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-01

DATES of BORING Oct 13, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY mm	N-VALUE OR RQD	OTHER TESTS
0	151.1								
		ASPHALT PAVEMENT			AS	1			
	150.9	FILL Silty Sand with Gravel (SM) with trace brick debris, loose, dry, brown.							
	150.7	Sandy Lean Clay (CL) with some sand seams and some cobbles increasing with depth, stiff to very stiff, moist, brown to red brown.			SS	2	305	8	WC SVE
1					SS	3	533	24	
					SS	4	330	22	
2					SS	5	203	20	
	148.4								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa

20 40 60 80

W_P W W_L

Water Content & Atterberg Limits

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-02
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	166.0								
	165.9	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM), compact, dry, black.			AS	1			
	165.6								
		Sandy Lean Clay (CL) with some sand seams and occasional sandstone cobbles, stiff to hard, moist, reddish brown.			SS	2	279	14	
1					SS	3	406	16	
					SS	4	432	31	
2	163.9								
		Inferred Bedrock Grey weathered Sandstone			SS	5	356	53	
	163.3								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-03

DATES of BORING Oct 13, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY mm	N-VALUE OR RQD	OTHER TESTS
0	171.2								
	171.0	ASPHALT PAVEMENT			AS	1			
		FILL Silty Sand with Gravel (SM) with some brick debris, compact, dry, black to brown.			SS	2	483	17	
	170.6	Sandy Lean Clay (CL) with occasional cobbles and weathered sandstone fragments increasing with depth, stiff to very stiff, moist to saturated, dark brown to red brown.			SS	3	508	13	
1					SS	4	559	24	
2		Sand layer at 2.3 m Depth.			SS	5	533	28	WC SVE ATT
	168.5	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa

20 40 60 80

W_P W W_L

Water Content & Atterberg Limits

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-04
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	170.5								
		ASPHALT PAVEMENT			AS	1			
	170.2								
		FILL Silty Sand with Gravel (SM), compact, dry, black to dark brown.							
	169.9				SS	2	356	18	
		Sandy Lean Clay (CL) with some sand seams and some weathered sandstone cobbles increasing with depth, stiff becoming very stiff at depth, moist to wet, dark brown to red brown.							
1					SS	3	305	8	
					SS	4	305	30	
2	168.4								
	168.3	Inferred Bedrock							
		Grey weathered Sandstone End of Borehole @ 2.1 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-05
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY mm	N-VALUE OR RQD	OTHER TESTS
0	170.2								
	169.9	ASPHALT PAVEMENT			AS	1			
	169.6	FILL Silty Sand with Gravel (SM) with trace wood and brick debris and trace coal pieces, loose, dry, black to dark brown.			SS	2	381	6	
1		Sandy Lean Clay (CL) with some sand seams and some weathered sandstone cobbles increasing with depth, firm to very stiff, moist, reddish brown.			SS	3	356	14	
2					SS	4	432	20	
					SS	5	457	28	
	167.4	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-06
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	OTHER TESTS
	169.4						mm		
0		ASPHALT PAVEMENT							
	169.3	FILL Silty Sand with Gravel (SM) with a layer of coal pieces, loose, dry, brown.			AS	1			
	168.9	Sandy Lean Clay (CL) with some sand seams and some weathered sandstone cobbles throughout, firm to very stiff, moist to wet, red brown to grey brown.			SS	2	406	7	WC SVE
1					SS	3	533	6	
					SS	4	559	25	
2					SS	5	356	23	
	166.7	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-07
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	OTHER TESTS
	156.5						mm		
0		ASPHALT PAVEMENT			AS	1			
	156.2	FILL Silty Sand with Gravel (SM) with some brick debris and occasional cobbles increasing with depth, loose to compact, dry to moist, brown.			SS	2	330	16	
1					SS	3	51	8	
	154.9	Clayey Gravel with Sand (GC) with some cobbles, loose to compact, moist, red brown.			SS	4	51	6	
2					SS	5	203	18	
	153.7	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-08
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	157.0						mm		
0	156.9	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with some brick debris and some weathered sandstone fragments with depth, compact, moist to wet, brown to reddish brown.			AS	1			
					SS	2	305	10	
1	156.0	Clayey Gravel with Sand (GC) with some sand seams and some cobbles, compact, wet to saturated, red brown.			SS	3	356	20	
					SS	4	406	14	
2					SS	5	381	14	
	154.3	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-09

DATES of BORING Oct 13, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES: TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	OTHER TESTS
0	171.6								
	171.3	ASPHALT PAVEMENT			AS	1			
	171.2	FILL Silty Sand with Gravel (SM) with coal fragments, loose, dry, brown.							
		Clayey Gravel with Sand (GC) with some sand seams, and some cobbles increasing with depth, loose becoming dense with depth, moist, brown to red brown.			SS	2	356	6	
1					SS	3	381	18	
					SS	4	508	31	
2					SS	5	533	46	
	168.8								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa: 20 40 60 80

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-10
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	159.4						mm		
0	159.2	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with some cobbles, loose, dry to wet, brown.			AS	1			
	158.8								
		Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles increasing with depth, loose to compact, moist, brown to red brown.			SS	2	483	5	
1					SS	3	279	16	
					SS	4	152	27	
2					SS	5	229	23	
	156.6								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-11
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	163.3						mm		
0		ASPHALT PAVEMENT							
	163.2	FILL Silty Sand with Gravel (SM) with some brick debris, compact, moist, brown.			AS	1			
	162.8	Clayey Gravel with Sand (GC) with occasional cobbles, compact, moist, brown to orange brown.			SS	2	305	11	
1					SS	3	203	15	
					SS	4	178	20	
2	161.2	Inferred Bedrock Brown to grey weathered Sandstone			SS	5	584	44	
	160.6	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-12
DATES of BORING Oct 13, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	174.7						mm		
0		ASPHALT PAVEMENT			AS	1			
	174.4	FILL Silty Sand with Gravel (SM), loose, dry, brown.							
	174.2	Clayey Gravel with Sand (GC) with some sand seams and some cobbles increasing with depth, loose becoming dense with depth, wet, brown to red brown.			SS	2	254	4	
1					SS	3	483	19	
					SS	4	512	30	
2					SS	5	305	31	
	171.9	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-13

DATES of BORING Oct 14, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY mm	N-VALUE OR RQD	OTHER TESTS
0	164.5								
	164.4	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with some coal fragments, loose dry, grey to brown.			AS	1			
	163.9								
		Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles increasing with depth, loose to compact, moist, brown to red brown.			SS	2	279	6	
1					SS	3	305	10	
					SS	4	381	22	
2					SS	5	356	27	
	161.7								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa

20 40 60 80

10 20 30 40 50 60 70 80 90

W_P W W_L

Water Content & Atterberg Limits

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

△ Unconfined Compression Test

□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-14
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	OTHER TESTS
	164.2						mm		
0	164.1	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with some brick debris and some sandstone fragments, compact, dry to moist, brown to grey brown.			AS	1			
	163.7	Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles, compact becoming very dense with depth, moist to saturated, brown to red brown.			SS	2	305	12	
1					SS	3	279	16	
					SS	4	279	31	
2					SS	5	229	54	
	161.5	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-15
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	169.0								
		ASPHALT PAVEMENT							
	168.8				AS	1			
		FILL Silty Sand with Gravel (SM), dry, compact, dark brown.							
	168.6								
		Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles, compact, moist, red brown.			SS	2	356	10	
1					SS	3	305	18	
					SS	4	0	17	
2					AS	5			
	166.3								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-16
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	170.5								
	170.3	ASPHALT PAVEMENT			AS	1			
		FILL Silty Sand with Gravel (SM) with some brick debris, compact, moist, brown.			SS	2	406	24	WC SVE
	169.6								
1		Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles, loose to compact, moist, red brown.			SS	3	356	6	
2					SS	4	330	12	
					SS	5	381	14	
	167.8								
		End of Borehole @ 2.7 m Depth on Inferred Bedrock.							
3									

Undrained Shear Strength, kPa
20 40 60 80
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-17
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	OTHER TESTS
	183.1						mm		
0		ASPHALT PAVEMENT			AS	1			
	182.9	FILL Silty Sand with Gravel (SM), loose, dry to moist, brown to orange brown.			SS	2	381	8	
	182.4	Clayey Gravel with Sand (GC) with some sand seams and occasional cobbles, loose to very dense, moist to wet, red brown.			SS	3	381	58/ 4"	WC SVE ATT
1	182.1	Inferred Bedrock Grey weathered Sandstone			AS	4			
					AS	5			
2					AS	6			
	180.3	End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-18
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	172.6								
	172.5	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with occasional cobbles and brick debris increasing with depth, compact, dry to moist, dark brown.			AS	1			
					SS	2	152	14	
	171.7								
1		Clayey Sand with Gravel (SC) with some sand seams and occasional cobbles, trace organics in spots, compact to dense, moist, red brown.			SS	3	102	18	
					SS	4	51	28	
2					SS	5	279	47	WC SVE ATT
	169.9								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-19
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	175.2						mm		
0		ASPHALT PAVEMENT			AS	1			
	175.0	FILL Silty Sand with Gravel (SM) with some brick pieces, compact, dry to moist, brown.							
	174.7	Clayey Sand with Gravel (SC) with some sand seams, coal debris, and occasional cobbles, compact to very dense, moist, red brown to grey.			SS	2	381	11	
1					SS	3	127	15	
					SS	4	533	60	
	173.3								
2		Inferred Bedrock							
	173.1	Grey weathered Sandstone End of Borehole @ 2.1 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-20
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	188.2								
	188.1	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM) with some brick debris and occasional cobbles, loose to compact, dry to moist, dark brown.			AS	1			
	187.8								
		Clayey Sand with Gravel (SC) with some sand seams and occasional cobbles, compact, moist, red brown.			SS	2	508	10	
1					SS	3	254	50/ 2"	
					AS	4			
	186.7								
		Inferred Bedrock Grey weathered Sandstone			AS	5			
2									
					AS	6			
	185.5								
		End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-21

DATES of BORING Oct 14, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	NUMBER	RECOVERY mm	N-VALUE OR RQD	OTHER TESTS
0	176.9								
	176.7	ASPHALT PAVEMENT			AS	1			
		FILL Silty Sand with Gravel (SM), compact, dry to moist, brown to reddish brown.							
	176.4	Clayey Sand with Gravel (SC) with some sand seams and occasional cobbles, compact, moist to wet, red brown.			SS	2	432	10	
1					SS	3	356	24	
2					SS	4	559	20	
					SS	5	381	23	WC SVE ATT
	174.2 174.1	Inferred Bedrock Grey weathered Sandstone End of Borehole @ 2.7 m Depth.							
3									

Undrained Shear Strength, kPa

20 40 60 80

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-22

DATES of BORING Oct 14, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES: TYPE	NUMBER	RECOVERY	N-VALUE OR RQD	OTHER TESTS
	181.8						mm		
0		ASPHALT PAVEMENT			AS	1			
	181.6	FILL Silty Sand with Gravel (SM) with some coal pieces, compact, dry to moist, brown.							
	181.3	Clayey Sand with Gravel (SC) with some sand seams and occasional cobbles, compact to dense, moist, red brown to grey to greenish brown.			SS	2	483	11	
1					SS	3	483	23	
					SS	4	381	40	
2	179.6	Inferred Bedrock Grey weathered Sandstone			SS	5		50/ 1"	
	179.4	End of Borehole @ 2.3 m Depth.							
3									

Undrained Shear Strength, kPa

20 40 60 80

W_P W W_L

Water Content & Atterberg Limits

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-23
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	193.1								
		ASPHALT PAVEMENT			AS	1			
	192.9	FILL Silty Sand with Gravel (SM), loose, dry to moist, brown.							
	192.8	Clayey Sand with Gravel (SC) Silty Sand with with some Gravel, trace organics and occasional cobbles, loose, moist, red brown.			SS	2	330	4	
1	192.2	Inferred Bedrock Grey weathered Sandstone			SS	3	51	50/ 3"	
	192.0	End of Borehole @ 1.1 m Depth.							
2									
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-24
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	190.7						mm		
0	190.6	ASPHALT PAVEMENT							
		FILL Silty Sand with Gravel (SM), dry, dark brown.			AS	1			
	190.4	Clayey Sand with Gravel (SC) with some sand seams and occasional sandstone cobbles, very loose, moist, red brown.			SS	2	254	3	
	189.8	Inferred Bedrock							
1	189.6	Brown weathered Sandstone			SS	3	0	50/ 3"	
		End of Borehole @ 1.1 m Depth.							
2									
3									

Undrained Shear Strength, kPa
20 40 60 80
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-25
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	196.3								
	196.2	ASPHALT PAVEMENT			AS	1			
	196.0	FILL Silty Sand with Gravel (SM), dry, brownish black.							
		Clayey Sand with Gravel (SC) with some sand seams and occasional sandstone cobbles, very dense, dry, red brown.			SS	2	356	55	
	195.5	Inferred Bedrock Brown weathered Sandstone							
1					AS	3			
					AS	4			
2	194.2	End of Borehole @ 2.1 m Depth.							
3									

Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test
□ Field Vane Test ■ Remoulded

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BOREHOLE RECORD

CLIENT Municipality of Cumberland — PROJECT No. HFX-00235652-A0

LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia — BOREHOLE No. BH-26

DATES of BORING Oct 14, 2016 — WATER LEVEL — DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
							mm		
0	186.8								
		ASPHALT PAVEMENT			AS	1			
	186.6								
	186.5	FILL Silty Sand with Gravel (SM), dry, dark brown.							
		Clayey Sand with Gravel (SC) with some sand seams and occasional sandstone cobbles, compact to very dense, wet, red brown.			SS	2	508	10	
1					SS	3	381	65/ 2"	WC SVE ATT
					AS	4			
	185.3								
		Inferred Bedrock Grey weathered Sandstone			AS	5			
	185.0								
		End of Borehole @ 1.8 m Depth.							
2									
3									

Undrained Shear Strength, kPa

20 40 60 80

W_P W W_L

Water Content & Atterberg Limits

Dynamic Penetration Test, blows/0.3m ★

Standard Penetration Test, blows/0.3m ●

10 20 30 40 50 60 70 80 90

△ Unconfined Compression Test

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BOREHOLE RECORD

CLIENT Municipality of Cumberland
PROJECT No. HFX-00235652-A0
LOCATION Downtown Infrastructure Renewal Project, Springhill, Nova Scotia
BOREHOLE No. BH-27
DATES of BORING Oct 14, 2016
WATER LEVEL
DATUM CVGD

DEPTH (m)	ELEV. (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES N-VALUE OR RQD	SAMPLES OTHER TESTS
	197.2						mm		
0		ASPHALT PAVEMENT			AS	1			
	197.0	FILL Silty Sand with Gravel (SM) with some sandstone fragments at depth, compact, moist, brown to grey.			SS	2	305	22	
	196.2	Inferred Bedrock Grey weathered Sandstone			SS	3	102	36	
1									
					SS	4	0	7	
2	195.0	Inferred Bedrock Grey Shale			SS	5	127	67/ 3"	
	194.9	End of Borehole @ 2.3 m Depth.							
3									

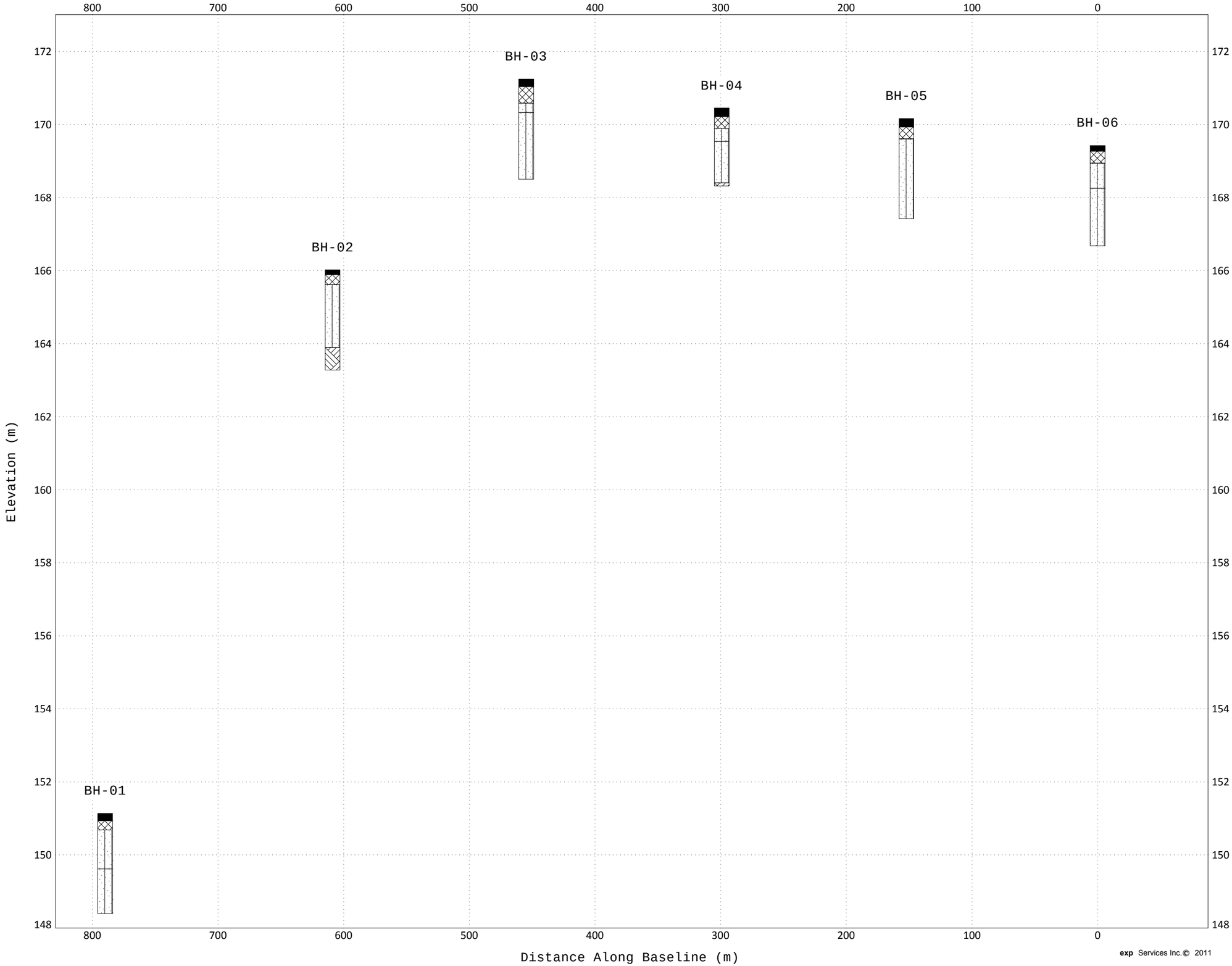
Undrained Shear Strength, kPa
20 40 60 80
W_P W W_L
Water Content & Atterberg Limits
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
10 20 30 40 50 60 70 80 90

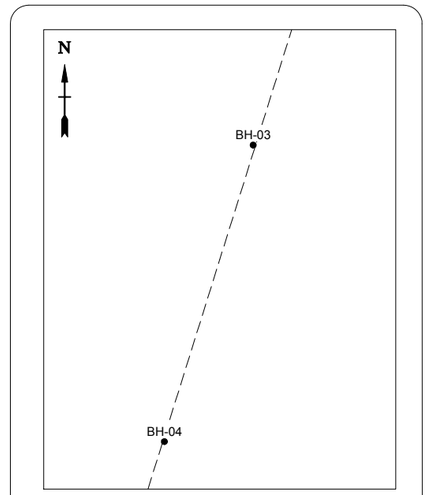
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Appendix 3
Fence Diagrams (Subsurface profiles)





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- Fill
- Sand and Silt
- Bedrock

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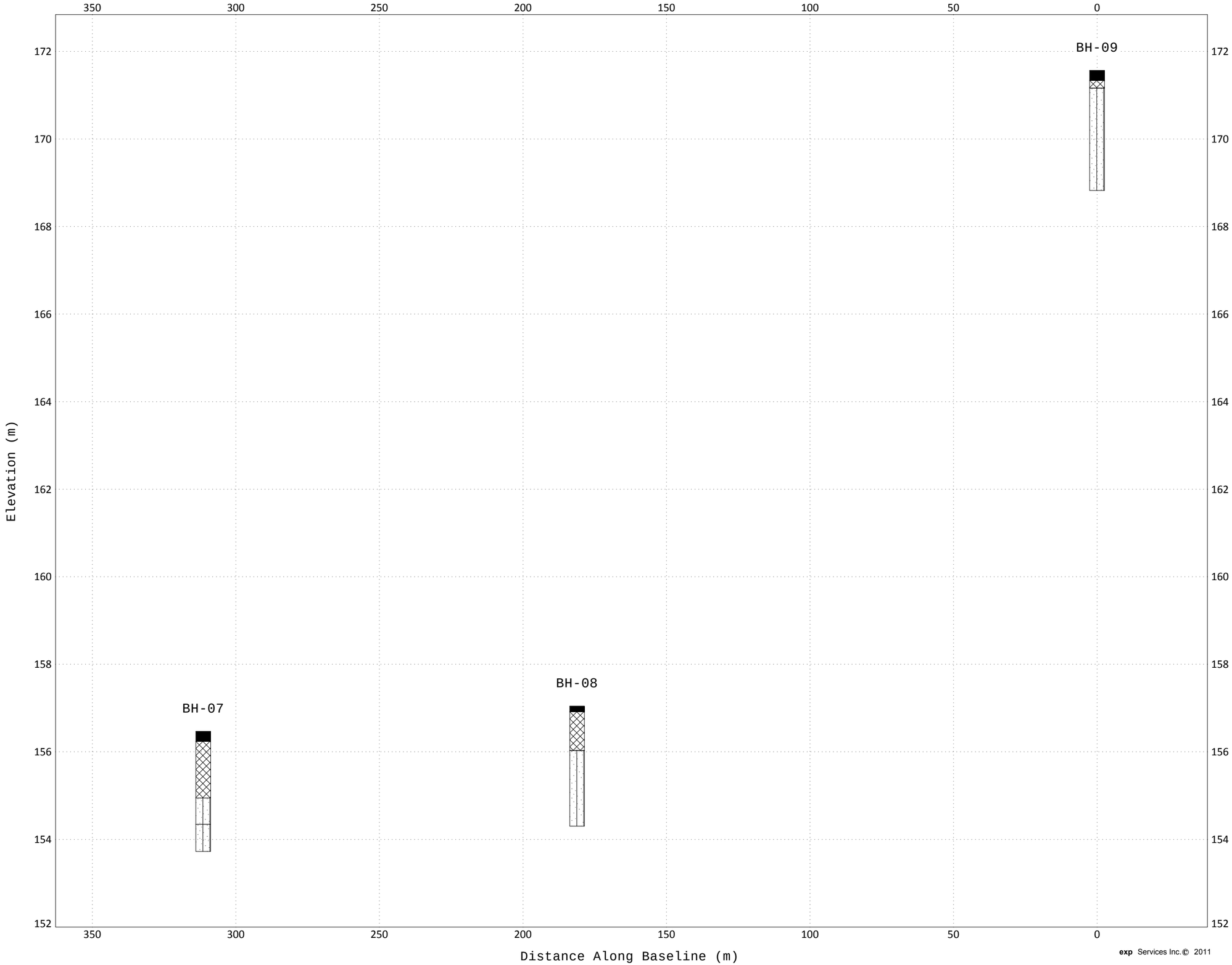
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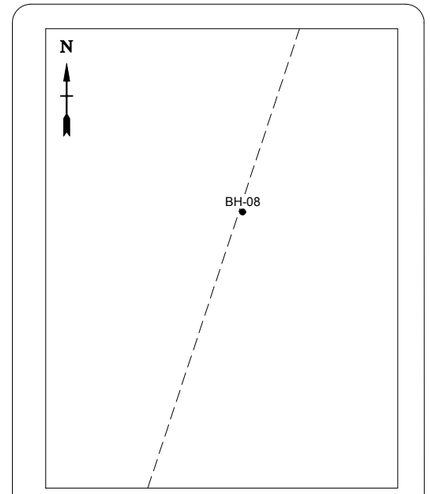
Fence Diagram
Church Street

Project No.	
HFX-00235652-A0	
Dwg. No.	Date Printed
Fence Num. 1	Dec 20, 2016
Scale	
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Asphalt

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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Victoria Street

Project No. HFX-00235652-A0

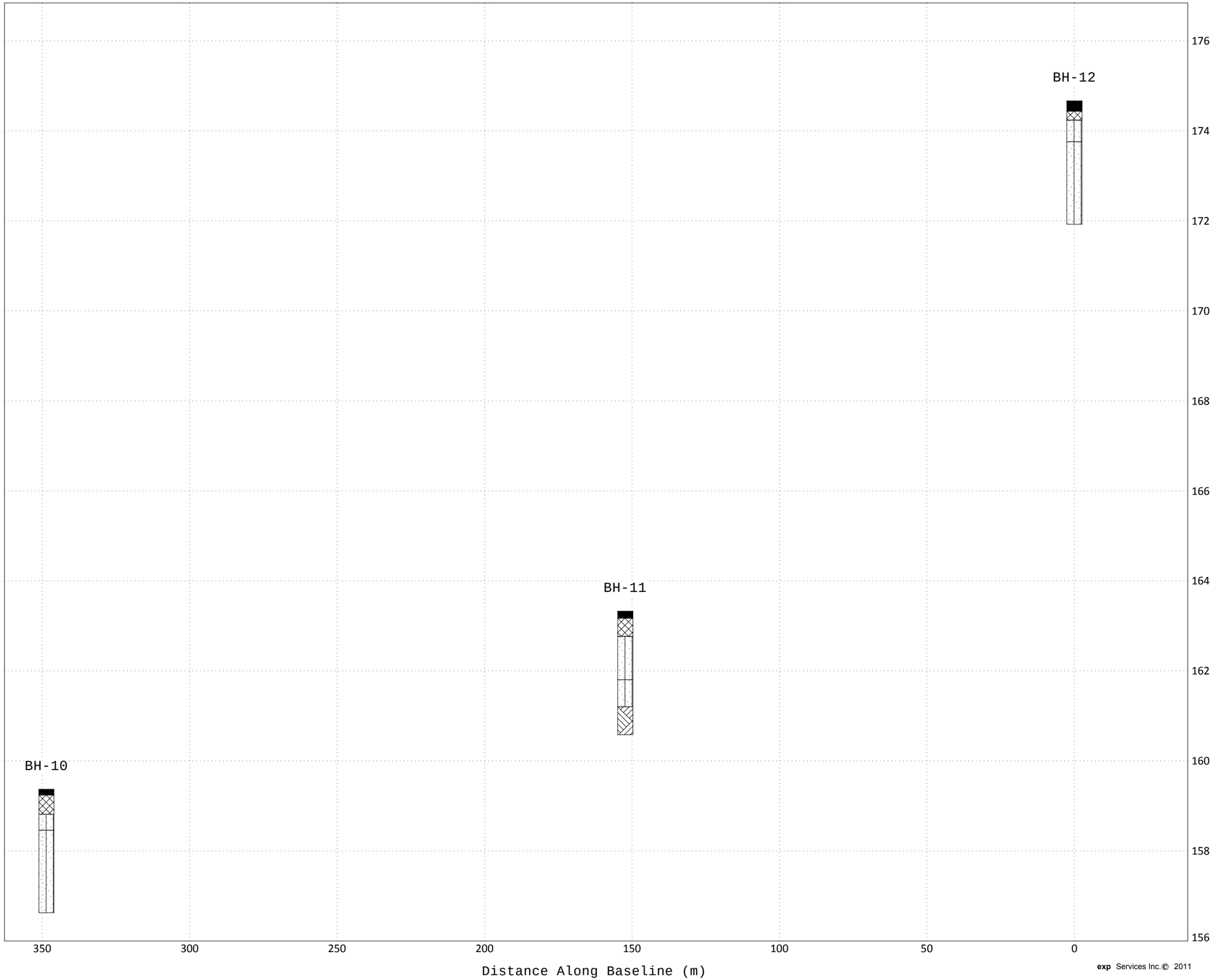
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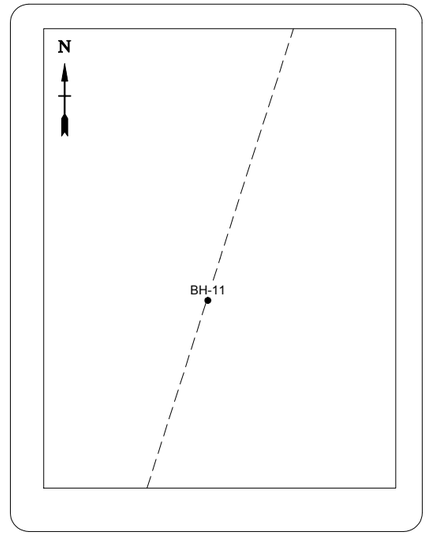
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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Elm Street

Project No. HFX-00235652-A0

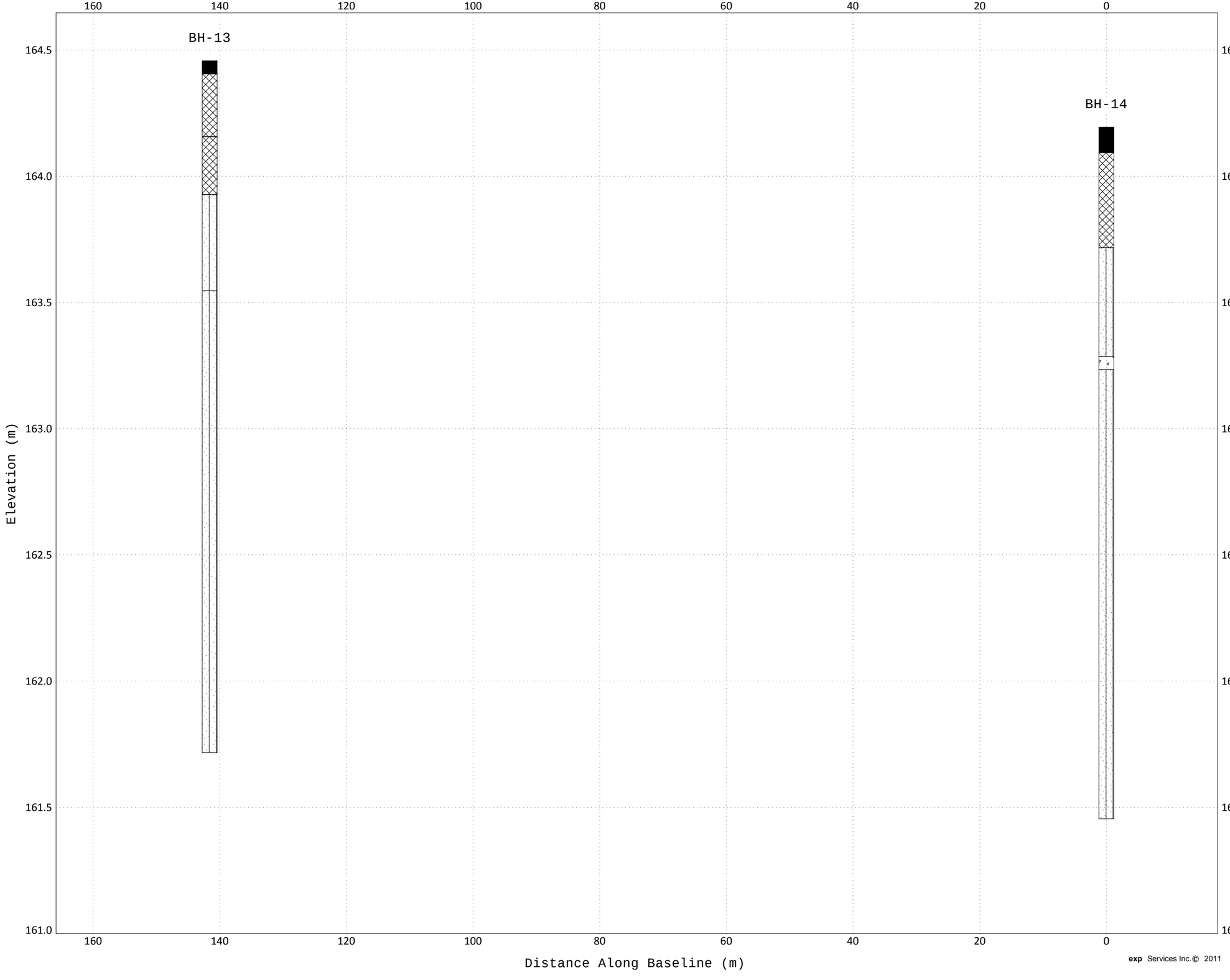
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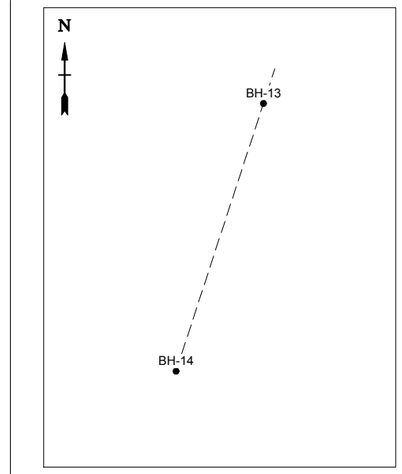
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- Gravel

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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Pioneer Street

Project No. HFX-00235652-A0

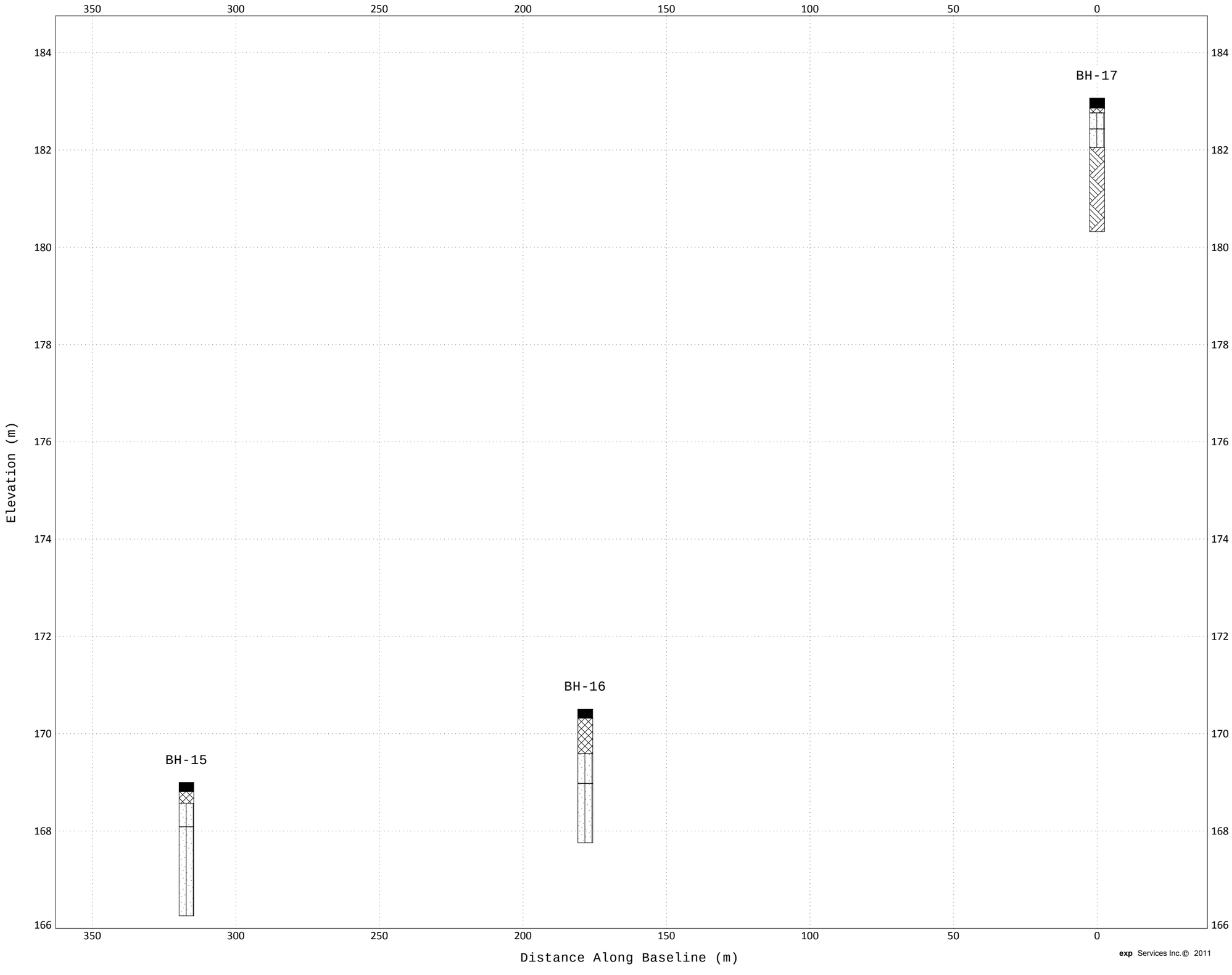
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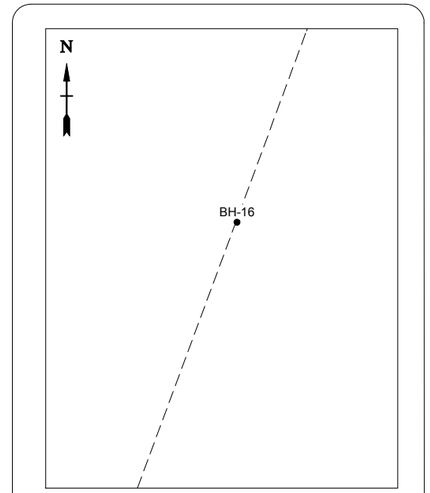
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- Bedrock

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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Mechanic Street

Project No. HFX-00235652-A0

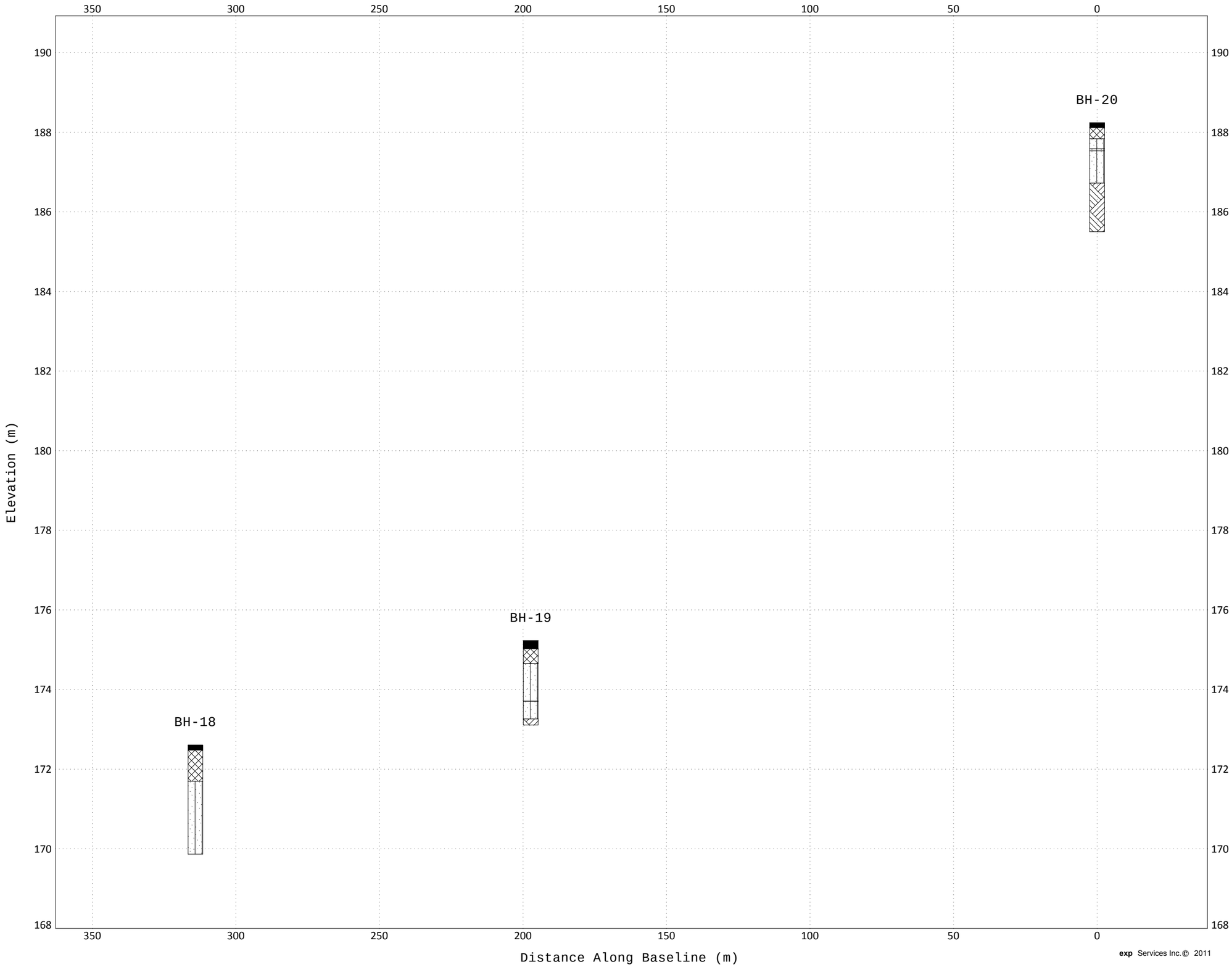
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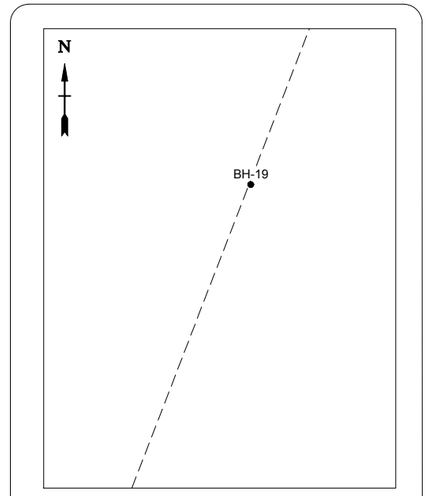
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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Chapel Street

Project No. HFX-00235652-A0

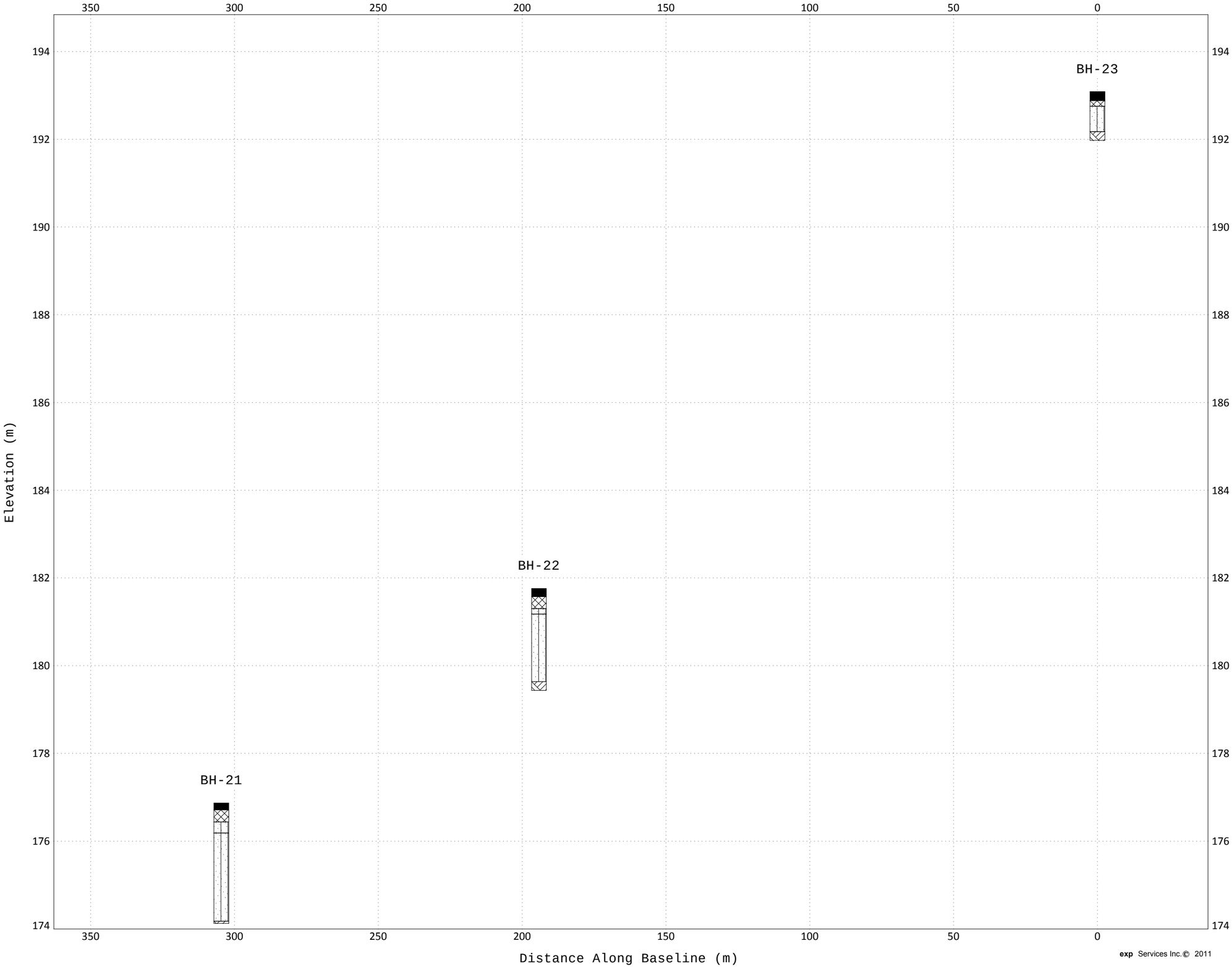
Dwg. No. Fence Num. 6

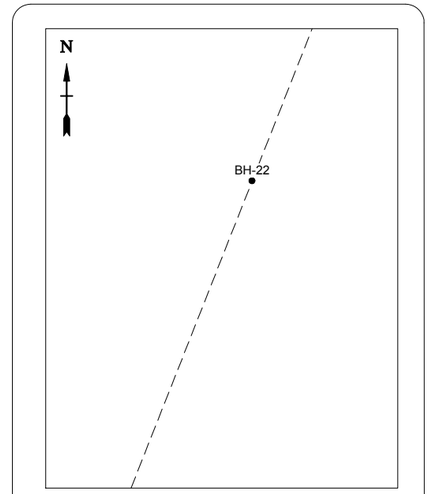
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- Bedrock

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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Pleasant Street

Project No. HFX-00235652-A0

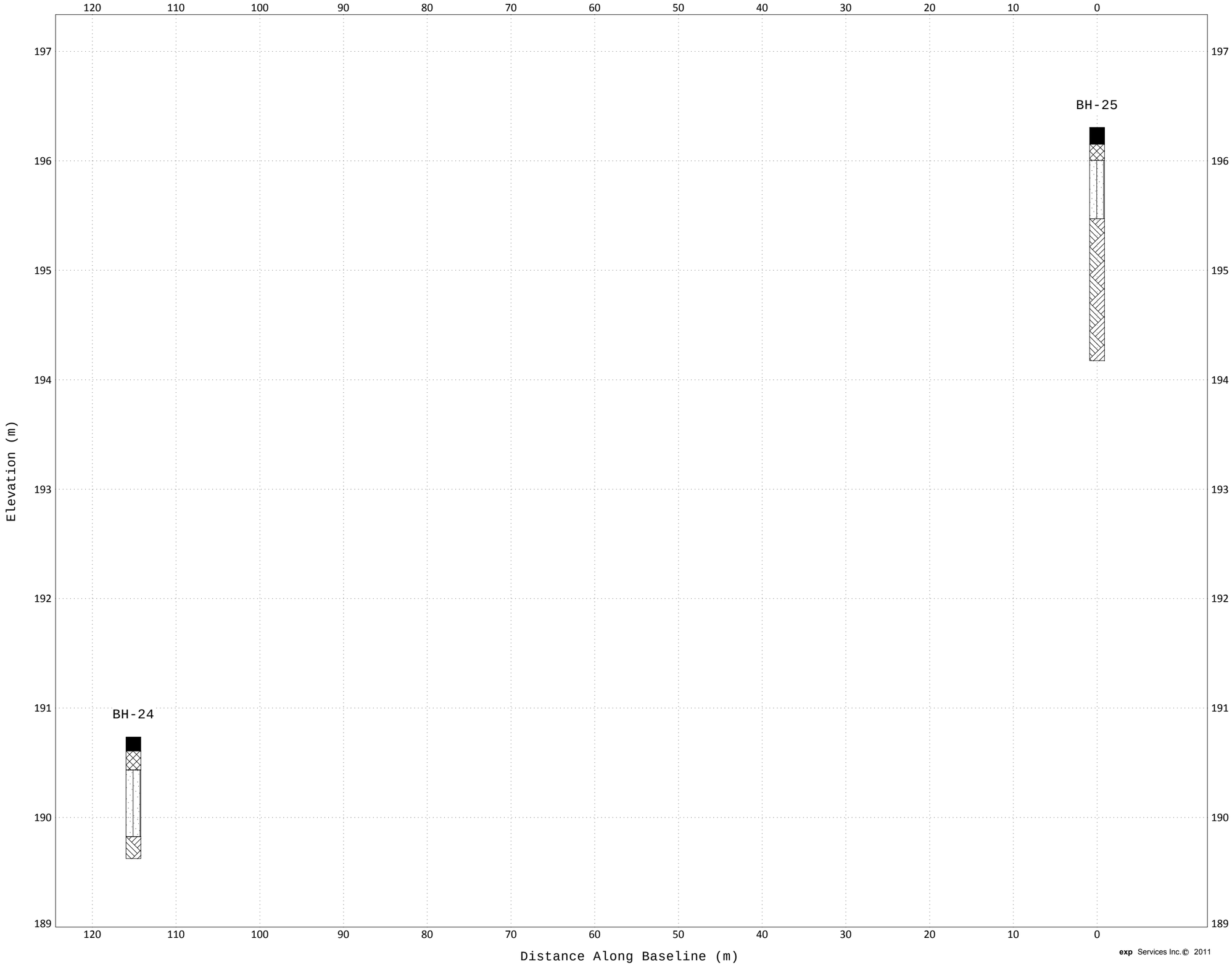
Dwg. No. Fence Num. 7

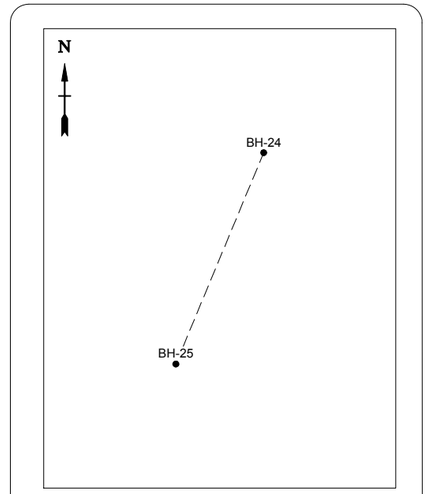
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FOR INFORMATION ONLY

- Asphalt
- Fill
- Sand and Silt
- Bedrock

exp Services Inc.

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BUILDINGS · EARTH & ENVIRONMENT · ENERGY · INDUSTRIAL · INFRASTRUCTURE · SUSTAINABILITY

Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
St. James Street

Project No. HFX-00235652-A0

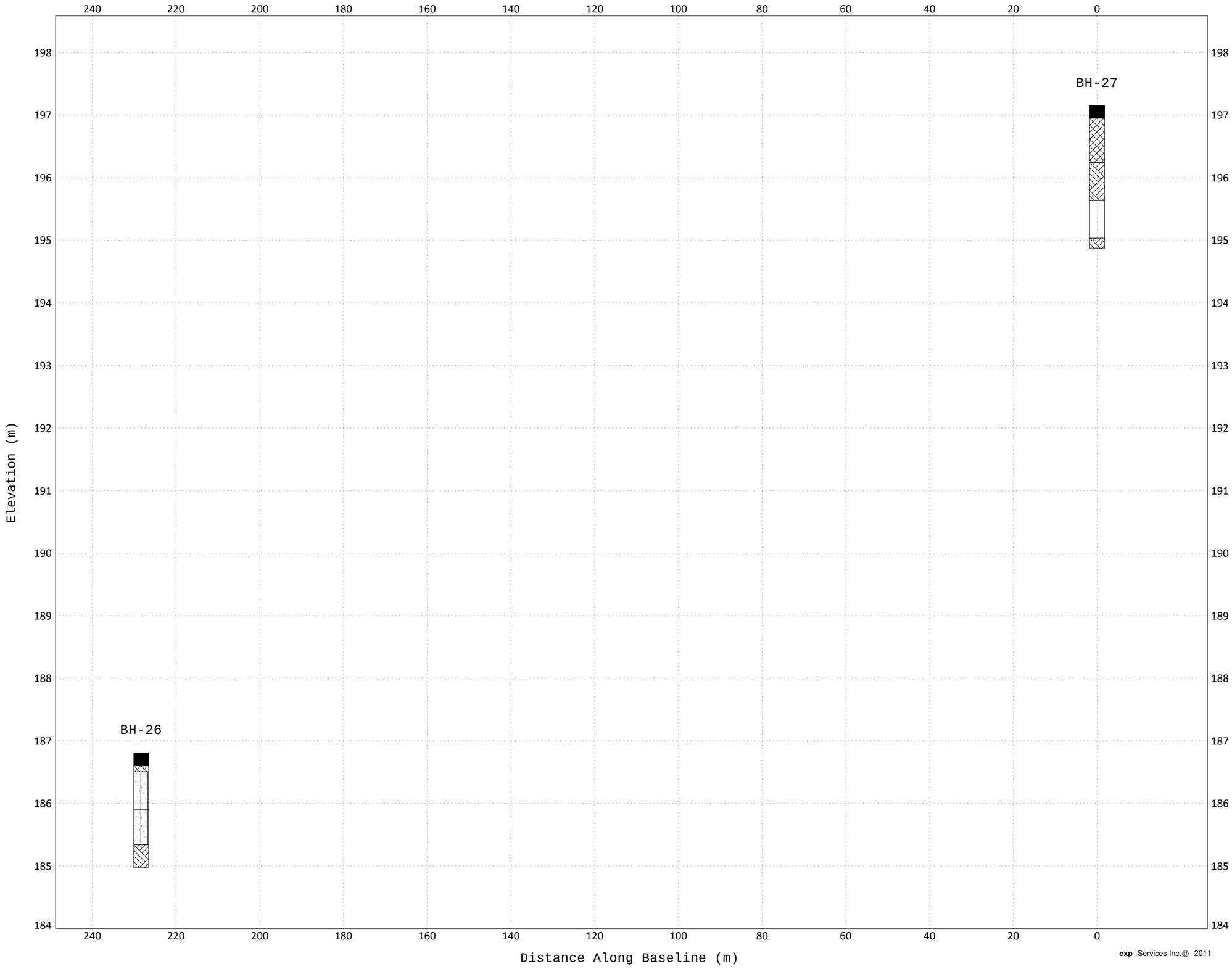
Dwg. No. Fence Num. 8

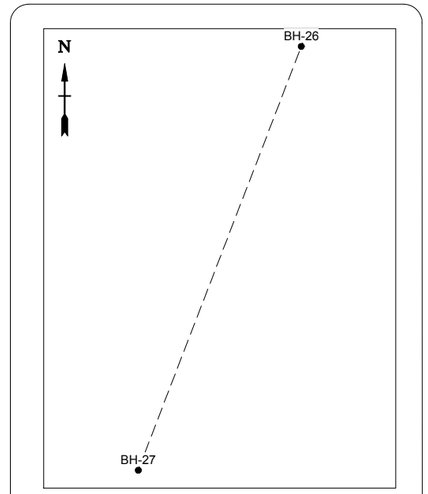
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FOR INFORMATION ONLY

- Asphalt
- Fill
- Sand and Silt
- Bedrock
- Air - empty space (void)

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Project Title

Downtown Infrastructure Renewal Project,
Springhill, Nova Scotia

Dwg. Title

Fence Diagram
Princess Street

Project No.	
HFX-00235652-A0	
Dwg. No.	Date Printed
Fence Num. 9	Dec 20, 2016
Scale	
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