Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

PWGSC/TPSGC Acquisitions Bid
Receiving/Réception des Soumissions
126 Prince William Street/
126, rue Prince William
Suite 14B
Saint John
New Brunswick
E2L 2B6
Bid Fax: (506) 636-4376

SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Public Works Government Services Canada-Bid
Receiving / Réception des soumissions
126 Prince William Street/
126, rue Prince William
Suite 14B
Saint John
New Bruns
E2L 2B6

Title - Sujet Maint. Facility Construction-Fundy	
Solicitation No. - N° de l'invitation EC015-193152/A	**Amendment No. - N° modif.** 002
Client Reference No. - N° de référence du client EC015-193152	**Date** 2019-03-28
GETS Reference No. - N° de référence de SEAG PW-$PWB-013-4426	
File No. - N° de dossier PWB-8-41126 (013)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2019-04-04**	**Time Zone** **Fuseau horaire** Atlantic Daylight Saving Time ADT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Johnston, Edward PWB	**Buyer Id - Id de l'acheteur** pwb013
Telephone No. - N° de téléphone (506) 343-6382 ( )	**FAX No. - N° de FAX** (506) 636-4376
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:**	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	**Delivery Offered - Livraison proposée**
Vendor/Firm Name and Address **Raison sociale et adresse du fournisseur/de l'entrepreneur** **Telephone No. - N° de téléphone** **Facsimile No. - N° de télécopieur**	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) **Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)** **Signature** **Date**	

Canada

Cette modification de l'invitation numéro 2 est soumise et comprend la modification numéro 2 suivante.

La modification qui suit apportée aux documents de soumission entre en vigueur dès maintenant. L'addenda fera partie des documents de contrat.

Toutes autres conditions ne changent pas

Modification numéro 2

1.1 GENERAL

.1 Geotechnical report attached.

1.2 SPECIFICATIONS

.1 Section 01 16 10:

.1 Article 1.2.1; The owner supplied equipment is identified in the "Owner Supplied Equipment Schedule" on drawing M-005.

.2 Section 04 05 12:

.1 Article 2.2.2; Natural grey cement shall be considered acceptable for mortar.

.3 Section 08 11 16:

.1 Article 1.7; A five (5) year warranty shall be acceptable.

.2 Article 2.4; Aluminum extrusions to Aluminum Alloy Association AA6063-T5 anodizing quality.

.4 Section 08 36 13.02:

.1 Sectional Metal Doors; add this section, replacing section 08 36 19.

.5 Section 08 36 19:

.1 Multi-Leaf Vertical Lift Doors; delete this section in its entirety.

.6 Section 08 44 13:

.1 Article 2.3; All aluminum shall be clear anodized finish.

.7 Section 08 80 50:

.1 Article 1.4.3; Shop drawings are not required to be stamped by a P.Eng.

.2 Article 1.6.2; A sample corner assembly of the window will be accepted as a mock-up.

.8 Section 09 30 13:

.1 Article 2.1; Contractor shall base product quality on the upper end of the pricing scale for final selection of product/pattern/colour/quality by architect during product submissions.

.9 Section 22 11 16:

.1 GENERAL: PEX-a Tubing may be used as an alternate to copper piping for Plumbing Water Distribution Systems for DCW, DHW, DHWR and Non-Potable water piping provided the following performance, specification, certification, warranty, and installation procedures are met:

.1 Water Piping and Fittings:

.1 PERFORMANCE: Ratings for Plumbing up to and including 93°C at 551 kPa. PEX-a tubing shall meet ASTM F876, ASTM F877, ASTM F1960 Standard Specification for Cross-Linked Polyethylene (PEX) tubing and fittings. CAN/CSA B137.5 Cross-Linked Polyethylene (PEX) Tubing Systems for Pressure Applications. NSF/ANSI 14, NSF/ANSI 61, CAN/ULC-S101 CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems. CAN/ULC-S102.2 Standard. If pressure drops exceed metal piping estimates for critical path circuits, the PEX tubing must be up-sized appropriately to meet (or not exceed) the specified pressure drop.

.2 PRODUCTS: PEX-a (Engle-method Crosslinked Polyethylene) Piping: PEX tubing shall be manufactured in accordance with ASTM F876, ASTM F877 and CAN/CSA-B137.5. The tube shall be listed to ASTM by an independent third party agency. PEX-a Fittings, Elbows and Tees (½ inch through 2 inch nominal pipe size): ASTM F1960 cold-expansion fitting. PEX-a Fittings (2½ inch through 4 inch nominal pipe size): SDR9 compression type fitting consisting of a double O-ring insert with a compression sleeve tightened around the pipe and insert. Transitions: threaded Brass to PEX-a Transition: one-piece brass fitting with male or female threaded adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring or Brass Sweat to PEX-a – one-piece brass fitting with sweat adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Use dielectric couplings where necessary. Engineered Polymer fittings are acceptable for PEX to PEX connections.

.3 PIPING INSTALLATIONS: Install PEX-a tubing according to manufacturer's recommendations.

.4 HANGERS SUPPORTS AND ANCHORING: Use PEX-a Pipe Support Hangers for horizontal runs, installing hangers for PEX-a piping with the following maximum spacing: Maximum span 8 feet for 1" and above and 6 feet span for ½" and ¾". Follow Manufacturer's guidelines for anchoring to ensure straight pipe runs. For vertical runs use PEX-a Riser Supports, installing CTS riser clamps at the base of each floor and at the top of every other floor for hot water, and for cold water, use clamps at the base and every fourth floor for controlling expansion every 40'. Install mid-story guides between each floor if required by manufacturer's instructions.

.5 CERTIFICATION: Installing contractor shall be factory trained and certified by the PEX manufacturer to install their complete

system. The PEX manufacturer / contractor shall provide proof of certification. The PEX manufacturer shall provide a complete piping network design schematic drawing set with flow and pressure drop calculations clearly shown. This drawing set will provide riser diagrams, indication of PEX piping sizes, flowrates, velocities, and fixture units for engineering review.

.6 SITE VERIFICATION: Factory representatives shall be on site during the installation to verify the proper mounting and installation of the PEX-a tubing with appropriate supports to ensure the piping network is installed as per engineering and manufacturer's instructions.

.7 WARRANTY: PEX-a manufacturer shall provide a non-prorated warranty on the system, covering the PEX-a engineered system (fittings and tubing – same manufacturer) for a duration of 25 years for maintaining a leak-proof seal and the warranty shall provide for repair or replacement of any tube, fittings or connection, which are proven to be defective and consider consequential damages under warranty from the date of installation when installed by a certified installer. Valves and accessories to comply with their published warranties apart from pipe and fittings.

.10 Section 23 31 13.02:

.1 The Nordfab ducting system shall be considered acceptable for the carpentry shop ductwork system complete with the Nordfab system accessories.

.2 The Donaldson-Torit ducting system shall be considered acceptable for the carpentry shop ductwork system complete with the Donaldson-Torit system accessories.

.11 Section 23 34 00:

.1 Article 2.1.9; Add; "Vendor shall quote as an option, cold weather protection appropriate for the site climate conditions". An optional line item has been provided in the tender form.

1.3 DRAWINGS

.1 Civil:

.1 Drawing C-002:

.1 The exterior concrete apron shall extend along the front (east) and side (south) of the building. Concrete apron construction shall be as indicated on structural drawings. The asphalt indicated on drawing C-002 & C-003 shall abut to the edge of the exterior concrete pad.

.2 The 4.0m wide access road is intended to be continuous along the west side of the building and offsets around the dust collector location.

.3 Manhole MH-1; The two (2) existing sanitary services shall be cut at the manhole and the openings into the MH capped or plugged. The existing underground sanitary piping that runs below the new building shall be

removed, the remainder of the existing underground sanitary that will beneath the parking area may remain as “abandoned in place”.

.2 Drawing C-003:

.1 The propane tank shall be complete with concrete pad conforming to “Exterior Pad Detail” indicated on drawing S-002. The overall size of the propane tank is estimated at 1040mm Diameter x 4500mm in length with pad sized accordingly. Final size will be dependant on tank size being provided by propane supplier.

.2 In order to trench for the new electrical work noted on C-003 from the Fire Shed to the Asset Management Building, the general contractor shall temporarily relocate the existing “Kent Mobile Trailer” to accommodate the work and shall reinstate the trailer once electrical work is complete.

.3 The two culverts at the north end of the compound behind the Paint Shop and the Greenhouse require replacement as noted. The depth of the replacement culverts to accommodate the re-shaping of the existing ditching will result in an excavation depth of approximately 3.0m. The contractor shall be responsible for the removal of the trees in the area to accommodate the excavation.

.3 Drawing C-004:

.1 Typical Ditch Detail;

.1 The rip-rap shall be installed at a 2:1 slope.

.2 Architectural:

.1 Drawing A-201:

.1 The exterior concrete apron shall extend along the front (east) and side (south) of the building. Concrete apron construction shall be as indicated on structural drawings.

.2 The window just north of grid 4 along grid E serving the Holding area shall be a Type #10.

.2 Drawing A-202:

.1 Enlarged Plan; the wall between BR WR and Storage room should read Type P3, not Type P4.

.3 Drawing A-401:

.1 The interior concrete block partitions between grids 2 to 4 shall terminate at the underside of the trusses, approximately 3600mm above finished floor.

.4 Drawing A-402:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.5 Drawing A-403:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.6 Drawing A-404:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.7 Drawing A-501:

.1 Details 5 & 8; The Head Receptor is required as indicated to accommodate any deflection/movement in the system.

.8 Drawing A-601:

.1 Door Schedule; Solid Particle Core Doors; add the following;

.1 Solid core to CAN/CSA-O132.2.1.

.1 Construction:

.1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks 7-ply construction.

.2 Solid wood core:

.1 Glued block core with wood edge band.

.2 Framed block glued core.

.3 Framed block nonglued core.

.4 Stile and rail core.

.5 7-ply construction.

.2 Face Panels:

.1 Hardwood; veneer grades: Grade I (Premium)

.3 Adhesive: Type II (Water resistant) For interior doors.

.2 Fabrication of Wood Flush Doors

.1 Vertical edge strips to match face veneer.

.2 Prepare doors for louvres and glazing. Provide hardwood species to match face veneer glazing stops with mitred corners.

.3 Bevel vertical edges of single acting doors 3mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.

.4 Radius vertical edges of double acting doors to 60 mm radius.

.5 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

.3 Frame Type C; Frame shall be 1400mm wide, similar to Type E.

.4 Door Type D100A; The thickness should read 50mm, not 45mm.

.5 Door Type D114B; Glazing for this door shall be Georgian.

.2 Window Elevations;

.1 Window Types 1, 2, 3, 4, 8, 9 &10 shall be in accordance with specification Section 08 50 00.

.2 Window Types 5, 6 &7 shall be in accordance with specification Section 08 44 13.

.3 Window Types 5, 6 &7 shall be complete with tempered glass for the lower pane.

.3 Finish Schedule;

.1 Room 106; revised GB ceiling to read Acoustic Tile ceiling.

.9 Drawing A-701:

.1 Tile Details;

.1 The preformed metal cove applies to ALL washrooms.

.2 For wall tiles that are not available with RE edge, a metal cap shall be used on exposed outside corners, similar to Schiene AE by Schluter.

.3 The waterproof membrane applies to ALL washrooms.

.2 BF WR Floor Tile Detail;

.1 A preformed shower pan complete with ramp is acceptable in lieu of field constructed base.

.3 Structural:

.1 Drawing S-001:

.1 Excavation & Backfill Notes;

.1 Note 6: Standard Proctor dry Density compaction shall comply with the geotechnical report, as a minimum;

.1 Below footings: 98%

.2 Below slabs: 98%

.3 General backfill: 95%

.2 Typical sections and details;

.1 Revise the “Minimum 150mm compacted granular fill – Type 1” to read “Minimum 610mm compacted granular fill – Type 1 in accordance with Geotechnical report”

.2 Drawing S-002:

.1 Typical sections and details;

.1 Revise the “Minimum 150mm compacted granular fill – Type 1” to read “Minimum 610mm compacted granular fill – Type 1 in accordance with Geotechnical report”

.2 The exterior concrete apron shall extend along the front (east) and side (south) of the building.

.3 Drawing S-008:

.1 Details 14 & 15; The interior concrete block partitions between grids 2 to 4 shall terminate at the underside of the trusses, approximately 3600mm above finished floor.

.4 Mechanical:

.1 Drawing M-002:

.1 Perimeter drain tile shall be 150mm diameter with filter sock per addendum #1. Civil drawing C-002 indicates the connection point at the northwest corner of the building where the perimeter drain tile is collected into a 250mm diameter pipe and run to the ditch discharge.

.2 Drawing M-003:

.1 Plumbing Fixture Schedule;

.1 EW-1**;** pedestal mounted, eye wash, 292 mm diameter, orange ABS plastic bowl, two (2) spray heads with fliptop dust cover and filter, powder coated cast aluminum flag handle, 13mm IPS chrome plated brass stay-open ball valve with Teflon seal, schedule 40 galvanized steel furnished with orange polyethylene covers on vertical piping, 32 mm NPT female outlet. Certified to meet ANSI Z358.1 and the National Plumbing Code of Canada.

.1 P-Trap, heavy cast brass adjustable body, with slip nut, 32 mm size, Shallow wall flange and Seamless tubular wall bend.

.2 Emergency Thermostatic Mixing Valve for Eyewash; lead-free brass and stainless steel design, vandal-resistant temperature adjustment, stainless steel sliding piston control device allow cold flow through both the fixed and variable bypass, 13 mm N.P.T. Outlet, positive hot water shut-off, liquid-filled thermostatic motor control mechanism, 29 °C factory set temperature, standard 21 °C - 32 °C temperature range, 26 LPM flow capacity at 207 kPa pressure drop across the valve, 7.57 LPM min. Flow rate, 18 LPM bypass flowrate. Provide shut-offs at emergency mixing valve.

.3 Drawing M-004:

.1 Carpentry Shop 112;

.1 Delete the reference to 400 diameter perforated supply duct. In lieu, supply and install five (5) equally spaced, duct mounted, steel construction, double deflection supply grilles, 22.5-degree deflection on horizontal front blades, opposed blade balancing damper, primed finish to meet the following;

.1 Airflow: 472 L/S

.2 Size: 500mm x 350mm

.3 Noise Criteria: 20 NC maximum

.4 Drawing M-007:

.1 Propane Piping;

.1 The mechanical contractor has the option of supplying and installing the propane gas system with pipe sizing inside of the building, downstream of the regulator, to the appliances based on the 11” W.C. noted in addendum#1, OR the contractor may supply and install the propane gas system with reduced pipe sizing inside of the building at a pressure of 2psi (13.8kPa) to the appliances and supply and install a regulator at each appliance to reduce the appliance pressure to the 11” W.C.

.5 Electrical:

.1 Drawing E-001:

.1 The site plan notes, indicating removal of underground duct bank and wiring, the electrical contractor shall be responsible for the disconnection

and removal of wiring. The general contractor shall be responsible for the removal of the underground duct bank during sitework.

.2 Electrical contractor shall supply and install new wiring from existing HV splitter 7.2/12.47KV to the existing transformer base. New wiring shall be 3 x #2 awg copper, 15kV, concentric neutral, 133% insulation, TRXLPE/PVC and shall be run in existing trench.

.3 Electrical contractor shall connect to the existing HV splitter.

.2 Drawing E-004:

.1 Power riser diagram;

.1 The electrical contractor shall supply and install the 12.47 – 347/600v transformer.

.2 The electrical panels indicated for the Fire Shed shall be new and supplied and installed by the electrical contractor.

END OF SECTION

1.1 GENERAL

.1 Geotechnical report attached.

1.2 SPECIFICATIONS

.1 Section 01 16 10:

.1 Article 1.2.1; The owner supplied equipment is identified in the "Owner Supplied Equipment Schedule" on drawing M-005.

.2 Section 04 05 12:

.1 Article 2.2.2; Natural grey cement shall be considered acceptable for mortar.

.3 Section 08 11 16:

.1 Article 1.7; A five (5) year warranty shall be acceptable.

.2 Article 2.4; Aluminum extrusions to Aluminum Alloy Association AA6063-T5 anodizing quality.

.4 Section 08 36 13.02:

.1 Sectional Metal Doors; add this section, replacing section 08 36 19.

.5 Section 08 36 19:

.1 Multi-Leaf Vertical Lift Doors; delete this section in its entirety.

.6 Section 08 44 13:

.1 Article 2.3; All aluminum shall be clear anodized finish.

.7 Section 08 80 50:

.1 Article 1.4.3; Shop drawings are not required to be stamped by a P.Eng.

.2 Article 1.6.2; A sample corner assembly of the window will be accepted as a mock-up.

.8 Section 09 30 13:

.1 Article 2.1; Contractor shall base product quality on the upper end of the pricing scale for final selection of product/pattern/colour/quality by architect during product submissions.

.9 Section 22 11 16:

.1 GENERAL: PEX-a Tubing may be used as an alternate to copper piping for Plumbing Water Distribution Systems for DCW, DHW, DHWR and Non-Potable water piping provided the following performance, specification, certification, warranty, and installation procedures are met:

.1 Water Piping and Fittings:

.1 PERFORMANCE: Ratings for Plumbing up to and including 93°C at 551 kPa. PEX-a tubing shall meet ASTM F876, ASTM F877, ASTM F1960 Standard Specification for Cross-Linked Polyethylene (PEX) tubing and fittings. CAN/CSA B137.5 Cross-Linked Polyethylene (PEX) Tubing Systems for Pressure Applications. NSF/ANSI 14, NSF/ANSI 61, CAN/ULC-S101 CAN/ULC-S115 Standard Method of Fire Tests of Firestop

Systems. CAN/ULC-S102.2 Standard. If pressure drops exceed metal piping estimates for critical path circuits, the PEX tubing must be up-sized appropriately to meet (or not exceed) the specified pressure drop.

.2 PRODUCTS: PEX-a (Engle-method Crosslinked Polyethylene) Piping: PEX tubing shall be manufactured in accordance with ASTM F876, ASTM F877 and CAN/CSA-B137.5. The tube shall be listed to ASTM by an independent third party agency. PEX-a Fittings, Elbows and Tees (½ inch through 2 inch nominal pipe size): ASTM F1960 cold-expansion fitting. PEX-a Fittings (2½ inch through 4 inch nominal pipe size): SDR9 compression type fitting consisting of a double O-ring insert with a compression sleeve tightened around the pipe and insert. Transitions: threaded Brass to PEX-a Transition: one-piece brass fitting with male or female threaded adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring or Brass Sweat to PEX-a – one-piece brass fitting with sweat adapter and F1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring. Use dielectric couplings where necessary. Engineered Polymer fittings are acceptable for PEX to PEX connections.

.3 PIPING INSTALLATIONS: Install PEX-a tubing according to manufacturer's recommendations.

.4 HANGERS SUPPORTS AND ANCHORING: Use PEX-a Pipe Support Hangers for horizontal runs, installing hangers for PEX-a piping with the following maximum spacing: Maximum span 8 feet for 1" and above and 6 feet span for ½" and ¾". Follow Manufacturer's guidelines for anchoring to ensure straight pipe runs. For vertical runs use PEX-a Riser Supports, installing CTS riser clamps at the base of each floor and at the top of every other floor for hot water, and for cold water, use clamps at the base and every fourth floor for controlling expansion every 40'. Install mid-story guides between each floor if required by manufacturer's instructions.

.5 CERTIFICATION: Installing contractor shall be factory trained and certified by the PEX manufacturer to install their complete system. The PEX manufacturer / contractor shall provide proof of certification. The PEX manufacturer shall provide a complete piping network design schematic drawing set with flow and pressure drop calculations clearly shown. This drawing set will provide riser diagrams, indication of PEX piping sizes, flowrates, velocities, and fixture units for engineering review.

.6 SITE VERIFICATION: Factory representatives shall be on site during the installation to verify the proper mounting and installation of the PEX-a tubing with appropriate supports to ensure the piping network is installed as per engineering and manufacturer's instructions.

.7 WARRANTY: PEX-a manufacturer shall provide a non-prorated warranty on the system, covering the PEX-a engineered system

(fittings and tubing – same manufacturer) for a duration of 25 years for maintaining a leak-proof seal and the warranty shall provide for repair or replacement of any tube, fittings or connection, which are proven to be defective and consider consequential damages under warranty from the date of installation when installed by a certified installer. Valves and accessories to comply with their published warranties apart from pipe and fittings.

.10 Section 23 31 13.02:

.1 The Nordfab ducting system shall be considered acceptable for the carpentry shop ductwork system complete with the Nordfab system accessories.

.2 The Donaldson-Torit ducting system shall be considered acceptable for the carpentry shop ductwork system complete with the Donaldson-Torit system accessories.

.11 Section 23 34 00:

.1 Article 2.1.9; Add; "Vendor shall quote as an option, cold weather protection appropriate for the site climate conditions". An optional line item has been provided in the tender form.

1.3 DRAWINGS

.1 Civil:

.1 Drawing C-002:

.1 The exterior concrete apron shall extend along the front (east) and side (south) of the building. Concrete apron construction shall be as indicated on structural drawings. The asphalt indicated on drawing C-002 & C-003 shall abut to the edge of the exterior concrete pad.

.2 The 4.0m wide access road is intended to be continuous along the west side of the building and offsets around the dust collector location.

.3 Manhole MH-1; The two (2) existing sanitary services shall be cut at the manhole and the openings into the MH capped or plugged. The existing underground sanitary piping that runs below the new building shall be removed, the remainder of the existing underground sanitary that will beneath the parking area may remain as "abandoned in place".

.2 Drawing C-003:

.1 The propane tank shall be complete with concrete pad conforming to "Exterior Pad Detail" indicated on drawing S-002. The overall size of the propane tank is estimated at 1040mm Diameter x 4500mm in length with pad sized accordingly. Final size will be dependant on tank size being provided by propane supplier.

.2 In order to trench for the new electrical work noted on C-003 from the Fire Shed to the Asset Management Building, the general contractor shall temporarily relocate the existing "Kent Mobile Trailer" to accommodate the work and shall reinstate the trailer once electrical work is complete.

.3 The two culverts at the north end of the compound behind the Paint Shop and the Greenhouse require replacement as noted. The depth of the replacement culverts to accommodate the re-shaping of the existing

ditching will result in an excavation depth of approximately 3.0m. The contractor shall be responsible for the removal of the trees in the area to accommodate the excavation.

.3 Drawing C-004:

.1 Typical Ditch Detail;

.1 The rip-rap shall be installed at a 2:1 slope.

.2 Architectural:

.1 Drawing A-201:

.1 The exterior concrete apron shall extend along the front (east) and side (south) of the building. Concrete apron construction shall be as indicated on structural drawings.

.2 The window just north of grid 4 along grid E serving the Holding area shall be a Type #10.

.2 Drawing A-202:

.1 Enlarged Plan; the wall between BR WR and Storage room should read Type P3, not Type P4.

.3 Drawing A-401:

.1 The interior concrete block partitions between grids 2 to 4 shall terminate at the underside of the trusses, approximately 3600mm above finished floor.

.4 Drawing A-402:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.5 Drawing A-403:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.6 Drawing A-404:

.1 Wall sections; refer to “Undisturbed Native Soil” below footings. Revise to read “Refer to Structural drawings”.

.7 Drawing A-501:

.1 Details 5 & 8; The Head Receptor is required as indicated to accommodate any deflection/movement in the system.

.8 Drawing A-601:

.1 Door Schedule; Solid Particle Core Doors; add the following;

.1 Solid core to CAN/CSA-O132.2.1.

.1 Construction:

.1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks 7-ply construction.

.2 Solid wood core:

.1 Glued block core with wood edge band.

.2 Framed block glued core.

.3 Framed block nonglued core.

.4 Stile and rail core.

.5 7-ply construction.

.2 Face Panels:

.1 Hardwood; veneer grades: Grade I (Premium)

.3 Adhesive: Type II (Water resistant) For interior doors.

.2 Fabrication of Wood Flush Doors

.1 Vertical edge strips to match face veneer.

.2 Prepare doors for louvres and glazing. Provide hardwood species to match face veneer glazing stops with mitred corners.

.3 Bevel vertical edges of single acting doors 3mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.

.4 Radius vertical edges of double acting doors to 60 mm radius.

.5 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

.3 Frame Type C; Frame shall be 1400mm wide, similar to Type E.

.4 Door Type D100A; The thickness should read 50mm, not 45mm.

.5 Door Type D114B; Glazing for this door shall be Georgian.

.2 Window Elevations;

.1 Window Types 1, 2, 3, 4, 8, 9 &10 shall be in accordance with specification Section 08 50 00.

.2 Window Types 5, 6 &7 shall be in accordance with specification Section 08 44 13.

.3 Window Types 5, 6 &7 shall be complete with tempered glass for the lower pane.

.3 Finish Schedule;

.1 Room 106; revised GB ceiling to read Acoustic Tile ceiling.

.9 Drawing A-701:

.1 Tile Details;

.1 The preformed metal cove applies to ALL washrooms.

.2 For wall tiles that are not available with RE edge, a metal cap shall be used on exposed outside corners, similar to Schiene AE by Schluter.

.3 The waterproof membrane applies to ALL washrooms.

.2 BF WR Floor Tile Detail;

.1 A preformed shower pan complete with ramp is acceptable in lieu of field constructed base.

.3 Structural:

.1 Drawing S-001:

.1 Excavation & Backfill Notes;

.1 Note 6: Standard Proctor dry Density compaction shall comply with the geotechnical report, as a minimum;

.1 Below footings: 98%

.2 Below slabs: 98%

.3 General backfill: 95%

.2 Typical sections and details;

.1 Revise the "Minimum 150mm compacted granular fill – Type 1" to read "Minimum 610mm compacted granular fill – Type 1 in accordance with Geotechnical report"

.2 Drawing S-002:

.1 Typical sections and details;

.1 Revise the "Minimum 150mm compacted granular fill – Type 1" to read "Minimum 610mm compacted granular fill – Type 1 in accordance with Geotechnical report"

.2 The exterior concrete apron shall extend along the front (east) and side (south) of the building.

.3 Drawing S-008:

.1 Details 14 & 15; The interior concrete block partitions between grids 2 to 4 shall terminate at the underside of the trusses, approximately 3600mm above finished floor.

.4 Mechanical:

.1 Drawing M-002:

.1 Perimeter drain tile shall be 150mm diameter with filter sock per addendum #1. Civil drawing C-002 indicates the connection point at the northwest corner of the building where the perimeter drain tile is collected into a 250mm diameter pipe and run to the ditch discharge.

.2 Drawing M-003:

.1 Plumbing Fixture Schedule;

.1 EW-1**;** pedestal mounted, eye wash, 292 mm diameter, orange ABS plastic bowl, two (2) spray heads with fliptop dust cover and filter, powder coated cast aluminum flag handle, 13mm IPS chrome plated brass stay-open ball valve with Teflon seal, schedule 40 galvanized steel furnished with orange polyethylene covers on vertical piping, 32 mm NPT female outlet. Certified to meet ANSI Z358.1 and the National Plumbing Code of Canada.

.1 P-Trap, heavy cast brass adjustable body, with slip nut, 32 mm size, Shallow wall flange and Seamless tubular wall bend.

.2 Emergency Thermostatic Mixing Valve for Eyewash; lead-free brass and stainless steel design, vandal-resistant temperature adjustment, stainless steel sliding piston control device allow cold flow through both the fixed and variable bypass, 13 mm N.P.T. Outlet, positive hot water shut-off, liquid-filled thermostatic motor control mechanism, 29 °C factory set temperature, standard 21 °C - 32 °C temperature range, 26 LPM flow capacity at 207 kPa pressure drop across the valve, 7.57 LPM min. Flow rate, 18 LPM bypass flowrate. Provide shut-offs at emergency mixing valve.

.3 Drawing M-004:

.1 Carpentry Shop 112;

.1 Delete the reference to 400 diameter perforated supply duct. In lieu, supply and install five (5) equally spaced, duct mounted, steel construction, double deflection supply grilles, 22.5-degree deflection on horizontal front blades, opposed blade balancing damper, primed finish to meet the following;

.1 Airflow: 472 L/S

.2 Size: 500mm x 350mm

.3 Noise Criteria: 20 NC maximum

.4 Drawing M-007:

.1 Propane Piping;

.1 The mechanical contractor has the option of supplying and installing the propane gas system with pipe sizing inside of the building, downstream of the regulator, to the appliances based on the 11" W.C. noted in addendum#1, OR the contractor may supply and install the propane gas system with reduced pipe sizing inside of the building at a pressure of 2psi (13.8kPa) to the appliances and supply and install a regulator at each appliance to reduce the appliance pressure to the 11" W.C.

.5 Electrical:

.1 Drawing E-001:

.1 The site plan notes, indicating removal of underground duct bank and wiring, the electrical contractor shall be responsible for the disconnection and removal of wiring. The general contractor shall be responsible for the removal of the underground duct bank during sitework.

.2 Electrical contractor shall supply and install new wiring from existing HV splitter 7.2/12.47KV to the existing transformer base. New wiring shall be 3 x #2 awg copper, 15kV, concentric neutral, 133% insulation, TRXLPE/PVC and shall be run in existing trench.

.3 Electrical contractor shall connect to the existing HV splitter.

.2 Drawing E-004:

.1 Power riser diagram;

.1 The electrical contractor shall supply and install the 12.47 – 347/600v transformer.

.2 The electrical panels indicated for the Fire Shed shall be new and supplied and installed by the electrical contractor.

END OF SECTION

GEMTEC

Geotechnical Investigation
Proposed Maintenance Garage

Fundy National Park
Alma, New Brunswick
September 21, 2016

Prepared for Hatch
Project No. 5545.65-R01

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

GEMTEC Limited
300 Horseshoe Lake Drive, Suite 303
Halifax, NS
B3S 0B7

tel: 902.832.5999
halifax@gemtec.ca
www.gemtec.ca

20 September, 2016

File: 5545.65 – R01

Hatch
860 Main Street, Suite 700
Moncton, New Brunswick
E1C 1G2

Attention: Mr. Michael Brown

Re: Geotechnical Investigation, Proposed Maintenance Garage
Fundy National Park, Alma, New Brunswick

Enclosed please find our geotechnical report for the above noted project based on the scope of work presented in our proposal. This report was prepared by Anna Shafiq, MASc, PEng, and reviewed by Adrian Thompson, MScE, PEng.

Do not hesitate to contact the undersigned if you have any questions or require additional information.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
Sept 21, 2016
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

Anna Shafiq, MASc, PEng
Geotechnical Materials Engineer
GEMTEC Limited

Adrian Thompson, MScE, PEng
Geotechnical Engineer
GEMTEC Limited

Enclosures

N:\Files\5500\5545.65\Reports\2016aes0914.docx

Geotechnical Investigation
Proposed Maintenance Garage
Fundy National Park, Alma, New Brunswick

Table of Contents

Geotechnical Investigation
Proposed Maintenance Garage
Fundy National Park, Alma, New Brunswick

Appendices

List of Figures

List of Tables

Geotechnical Investigation
Proposed Maintenance Garage
Fundy National Park, Alma, New Brunswick

1.0 Introduction

GEMTEC Limited was retained by Hatch to undertake a geotechnical investigation in support of the proposed maintenance garage located within the maintenance compound of Fundy National Park in Alma, New Brunswick (herein referred to as "the Site"). We understand that the proposed development will consist of an approximately 1,000 m^2 building to be used as a maintenance garage at a grade consistent with the existing surrounding buildings and gravel-covered yard.

The purpose of this investigation was to identify general subsurface conditions at the Site and to provide engineering guidelines on the geotechnical design aspects of the project based on the factual information obtained. This report presents all of our findings and our recommendations for foundation design and general site work and includes recommendations for geotechnical works only. In addition, environmental soil samples were collected with results presented under separate cover.

2.0 Project and Site Description

2.1 Project and Site Description

The Site is located within the maintenance compound in Fundy National Park, located near Alma, New Brunswick. At the time of our investigations, the Site was accessible and developed with a gravel yard and an existing building on the north side of the Site. This existing building will be demolished prior to the construction of the proposed new maintenance garage. The west side of the Site is undeveloped and wooded. The gravel driveway extends beyond the maintenance compound to the south, connecting with Service Road. Office buildings for Fundy National Park's personnel exist to the north and east of the Site and a fueling station was noted across the gravel yard to the east of the Site. The south end of the Site is the historical location of the original maintenance garage, which burned down in 2014.

Borehole locations were advanced at locations selected by the client, with the building footprint. Site elevations and borehole locations were surveyed by GEMTEC Limited using our High Precision GPS equipment on September 19, 2016. Elevations in this report were calibrated with a nearby manhole and catch basin within the maintenance compound. Elevations of these two reference points are provided on the borehole location plan in Figure 1. Ground elevations within the building footprint are within 0.5± meters, sloping slightly south within the proposed building footprint.

2.2 Review of Geology Maps

Surficial mapping indicates that the area of study is covered with blankets (0.5 to 3.0 meters thick) of Late Wisconsinan aged morainal sediments that consist of mainly stony till (more than 35% of clasts pebble-sized and larger), silt, sand, gravel and rubble. (Rampton, V. N., 1984: Surficial Geology, New Brunswick, Map 1594A).

Geological mapping indicates that these overburden soils rest on Mississippian and/or Pennsylvanian-aged red to grey sandstone, conglomerate and siltstone including silicic to mafic volcanic flows, tuffs and related intrusive rocks. (Davies, Hamilton & Potter, 1979).

3.0 Subsurface Investigation

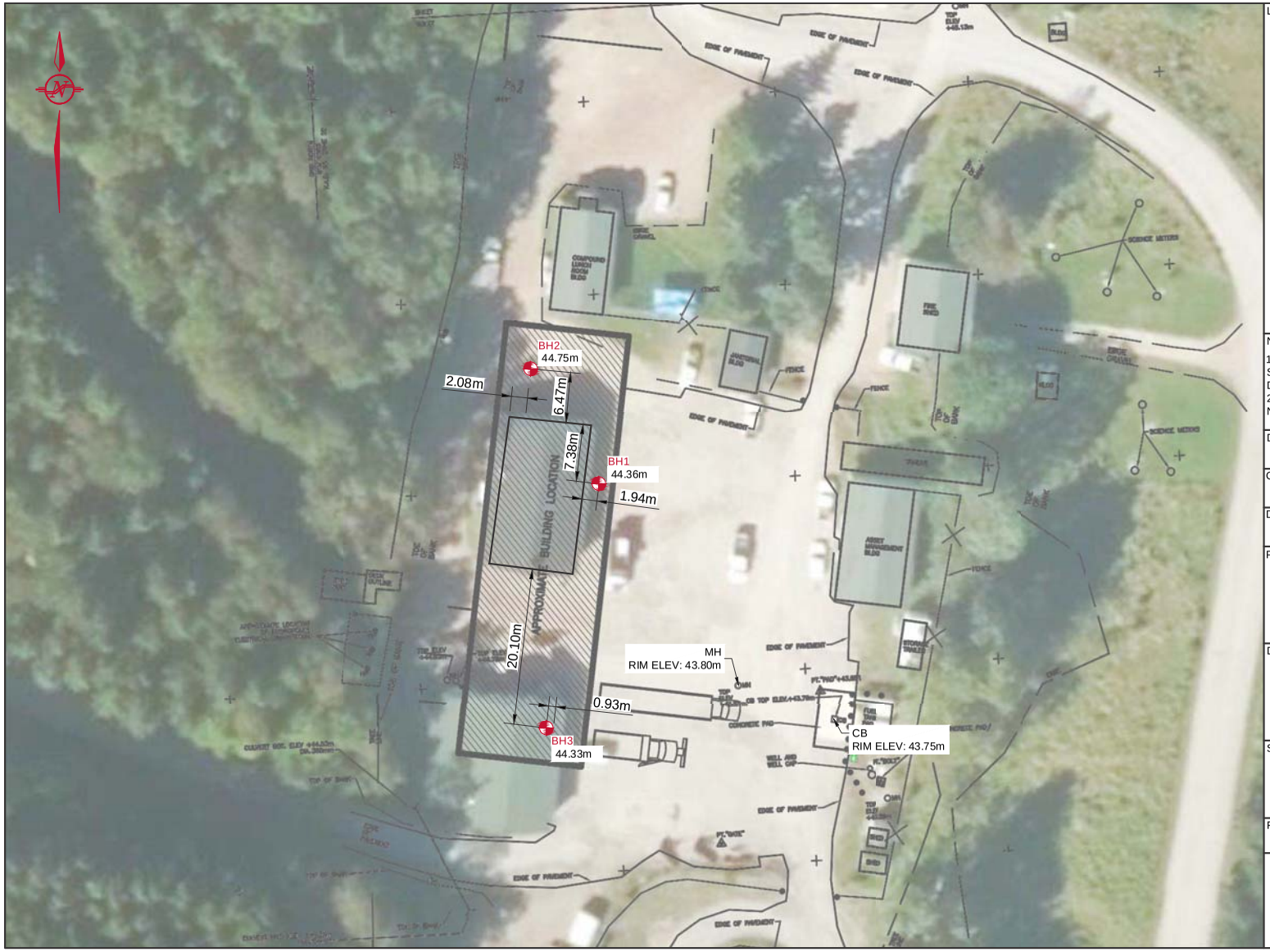
The purpose of this geotechnical investigation was to assess the existing soil, bedrock, and groundwater conditions at the Site. This report contains a general description of the area under investigation, a summary of the field work carried out, and project specific geotechnical recommendations for design and construction. Additionally, select soil samples were collected and submitted for environmental testing. Results of the environmental testing is not included in this report, but rather under separate cover.

Three boreholes (BH16-01 to BH16-03) were advanced at the Site on September 2, 2016 in the presence of a GEMTEC Limited Engineer, at locations previously requested by the client. The boreholes were advanced to depths ranging from 2.34 meters to 5.79 meters below existing surface grade. Bedrock was not encountered at any of the drilled locations. The work was carried out using a track-mounted drill rig, subcontracted and operated by Lantech Drilling Services Inc.

During borehole advancement, overburden soil samples were collected by GEMTEC personnel. Local soil stratigraphy, as well as groundwater conditions were visually catalogued throughout the investigation. Standard Penetration Test (SPT) N[1]-values were recorded throughout overburden soil sampling. Following completion of the field program, laboratory testing was conducted on select samples to verify field classifications.

Descriptive terms and detailed borehole logs are included in Appendix A. Laboratory testing results are included in Appendix B and select Site photos are included in Appendix C.

[1] The number of blows of a 475 Joule free fall hammer required to advance a 50 mm diameter split spoon sampler a distance of 300 mm



Legend

BOREHOLE LOCATION

Note

1. COORDINATE SYSTEM: NEW BRUNSWICK; STEREOGRAPHIC PROJECTION, NAD83 (CSRS) DATUM.
2. THIS SURVEY REFERENCED THE SMARTNET NETWORK.

Drawn By	Checked By
DH	XXX
Calculations By	**Checked By**
---	----

Date: SEPTEMBER 2016

Project: ----

Drawing: PROPERTY LAND USE & ... PLAN

Scale: 1:500

0 10 20 30m

File No.	Drawing	Revision No.
554565	FIGURE 1	1

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

N:\DRAWINGS\5500\5545.65\554565501 REV1.DWG

4.0 Subsurface Conditions

4.1 General

The soil stratigraphy presented in the borehole logs are representative of subsurface conditions at the specific borehole locations only. Boundaries between soil zones on the logs are often not distinct, but rather are transitional and have been interpreted. Subsurface conditions at locations other than the borehole locations may vary from the conditions reported in the borehole logs. The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil involves judgment and GEMTEC does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The soil conditions encountered during this geotechnical investigation generally consist of sand and gravel fill underlain by imported river rock of variable cobble and boulders. Further sand and gravel was observed underlying the encountered boulder layer. A fire, burning down the original maintenance garage that had been located on the south side of the Site being investigated, occurred in 2014. At two borehole locations, BH16-02 and BH16-03, sandier layers were encountered above the cobble and boulder layer that may contain ash or organic material as a result of the historical fire. Further information can be found in the environmental report, under separate cover.

Groundwater seepage was not observed at any of the borehole locations.

A summary of the soil conditions encountered at the Site are presented in Table 1.

Table 1: Summary of Subsurface Conditions

Borehole ID	Borehole Elevation[1] (m)	Borehole Depth (m)	Thickness of Fill (m)	Depth to Boulder Layer[2] (m)	Thickness of Boulder Layer (m)
BH16-01	44.36	5.79	3.10	3.15	0.51
BH16-02	44.75	2.34	2.34	2.34	N/D
BH16-03	44.33	5.79	2.13	2.18	2.39

Notes: [1] Elevations are based on a geodetic datum, referencing a nearby manhole and catch basin.

[2]Depth at which hollow-stem auger hit refusal

N/D = Not Determined

4.2 Surface Gravel

All boreholes were all drilled within the existing gravel parking area. Due to this, the surface layer at all borehole locations was gravel, with an approximate thickness of 50 mm.

4.3 Sand and Gravel Fill

Underlying the surface gravel, brown sand and gravel fill was observed. In conversation with Fundy Park personnel, it was mentioned that this fill was placed during the original development of the surrounding existing buildings and gravel parking area. The fill layer was encountered at all borehole locations and found to have a thickness of approximately 2.5 meters.

While the sand and gravel layer in all three drilled boreholes was brown in colour nearer to the surface, boreholes BH16-02 and BH16-03 had a layer that was more whitish-grey in colour with finer sized particle gradation. This whitish-grey layer was encountered at 0.61 meters below surface grade and was observed to be approximately 0.76 meters thick at both borehole locations.

Laboratory index testing was undertaken on two representative samples of the brown sand and gravel fill layer. In-situ moisture contents were found to be 2.2% and 4.1%. Grain size distribution analysis indicates that the fill is composed of 55% and 64% cobbles and gravel, 37% and 29% sand, and approximately 8% silt and clay sized particles.

Laboratory index testing was also undertaken on two representative samples of the whitish-grey sand and gravel fill layer. In-situ moisture contents were determined to be 2.0% and 3.6%. Grain size distribution analysis indicates that the fill is composed of 39% and 53% cobbles and gravel, 49% and 39% sand, and 13% and 7% silt and clay sized particles.

Based on SPT N-Values that range from 7 to 83, averaging 41, the compactness of the sand and gravel fill can be described as loose to very dense. Field observations and extracted soil samples indicate that the compactness of the sand and gravel fill layer is loose to medium dense with the higher SPT N-Values likely resulting from the split-spoon sampler encountering larger cobble. Site photos, included in Appendix C, provide a visual representation of the cobble brought up at the base of the boreholes.

4.4 Sand

A sand layer of approximately 0.81 meters thick was encountered at BH16-03 that contained only trace amounts of gravel and cobble. The sand layer was brown in colour, speckled with black. SPT N-Value for this layer was 14, or medium dense.

Laboratory index testing was undertaken on one representative sample of the brown sand layer. In-situ moisture content was determined to be 12%. Grain size distribution analysis indicates that the sand is composed of 0.2% cobbles and gravel, 89.3% sand, and 10.5% silt and clay sized

particles.

4.5 Boulder Layer

Large cobbles and boulders were inferred at all three drilled borehole locations at an average depth below surface of 2.6 meters. Due to the inability to auger through the large cobble and boulders encountered, coring was completed to get through this layer. Photos are provided in Appendix C and samples are available for viewing at the Moncton GEMTEC office. The cobble and boulder observed during field work is indicative of a variety of species of rock due to the variance in size, shape, colour and strength.

In conversation with Fundy Park personnel, it was mentioned that river rock was brought in for the development of the pad on which the surrounding existing buildings and gravel parking area situated. The large cobble and boulder layer ranged in thickness from 0.5 to 2.4 meters.

4.6 Sand and Gravel

Underlying the cobble and boulder layer, a second layer of brown sand and gravel was encountered. SPT N-Values ranged from 30 to 49, indicating that the brown sand and gravel underlying the cobble and boulder layer is dense. It is unknown if this material is natural or a fill material.

Laboratory index testing was undertaken on two representative samples of the brown sand and gravel layer. In-situ moisture contents were 6.0% to 6.2%. Grain size distribution analysis indicates that the layer is composed of 30% to 51% cobbles and gravel, 43% to 59% sand, and 6% to 12% silt and clay sized particles.

4.7 Groundwater Seepage

Groundwater seepage was not observed at any of the three borehole locations. Groundwater conditions may vary seasonally, or as a consequence of construction activities in the area. Shallow groundwater seepage may also be locally affected by the presence of underground utility corridors, bedrock conditions, building foundations and/or fill materials.

5.0 Discussions and Recommendations

This section of the report provides engineering guidelines on the geotechnical design and construction aspects of the project based on our interpretation of the borehole information and the project requirements. The information in the following sections is provided for the guidance of the designers and is intended for this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety, and equipment capabilities.

The boreholes advanced at the Site are scattered; therefore soil and bedrock conditions may vary from those determined at the borehole locations. GEMTEC Limited personnel should be contacted immediately if the soil and bedrock conditions encountered during excavations are different than those encountered during the completion of our geotechnical investigation.

The investigation outlined in this report is strictly geotechnical in nature and should not be viewed as an environmental assessment of the site.

5.1 General

We understand that the proposed development will consist of an approximately 1,000 m^2 building to be used as a maintenance garage. GEMTEC was not provided with information regarding the proposed foundations, however we assume the building will be founded on conventional spread footings with a slab-on-grade. Elevation of the proposed development has been assumed to be approximately equivalent of those of the surrounding gravel yard and nearby buildings. It is assumed that the finished floor slab elevation (FFE) will be approximately 44.5 meters, achieved by cutting the north side of the Site by approximately 0.3 meters and building up the south side of the Site by approximately 0.2 meters.

Excavation depths for foundations must be exceeded by 0.61 meters to allow for the placement of structural fill. The area under slab can remain intact with existing material, but must be proof-rolled and approved by a Geotechnical Engineer. Any soft or loose material is to be removed and replaced by approved fill.

Sand and gravel fill material excavated for footing placement may be reinstated and is pre-approved for use as backfill and/or structural fill during construction, provided any cobbles or boulders greater than 100 mm are removed. Debris and/or organics must be removed if encountered.

If our above assumptions are incorrect or if building elevations will differ by greater than 0.5 meters from existing grade, GEMTEC must be consulted to revise recommendations and/or offer comments.

Based on the subsurface conditions observed at the Site, it is our opinion the Site is suitable for construction of the proposed development. Based on the findings of our investigation, we provide the following comments and recommendations:

5.2 Earthworks

Earthworks for this project will involve the excavation of subsoils from within the building footprint to the proposed depth for footing placement, fill placement and general site grading. Loose or weak zones should be replaced with approved granular materials, as per the Geotechnical Engineer's recommendation.

5.2.1 Excavations and Dewatering

- Excavation work for the building and service trenches should be carried out in dry weather using a smooth ditching bucket in order to minimize the disturbance of the subgrade soils.
- Within the proposed building area, the surface gravel should be removed and excavation carried out to the proposed depth for footing placement.
- While groundwater was not observed during borehole advancement, groundwater levels would be expected to fluctuate depending on the season, rainfall events, adjacent site use and construction activities. If required, dewatering may be achieved with the use of trenches and/or a sump and pump system. Sumps should be located so as not to interfere with the placement of structural fill material.
- Footing excavations should be dewatered during excavation and backfilling operations, if groundwater is encountered.
- Properly installed perimeter footing drain tiles should be considered along the exterior foundation walls. This will prevent water from building up within the granular backfill material, which will minimize moisture problems within the building and differential frost heaving between any newly installed fill and previously existing subgrade soils. Perimeter drain tiles, if installed, should be positively discharged away from the building.
- Trenches should be excavated in accordance with the requirements of WorkSafe NB. Trench slopes should be no steeper that WorkSafe NB requirements of one vertical to one horizontal (1V:1H) to within the first 1.2 meters from the bottom of the trench.
- Any debris from the previous buildings encountered during construction must be removed.
- Following demolition of the existing building, the subgrade under the building footprint must be re-compacted to achieve acceptable conditions. GEMTEC should assess the subgrade conditions and conduct testing on the imported material within the footprint of

the proposed building.

5.2.2 Fill Placement and Compaction

- Perimeter frost walls should be backfilled with a clean granular material having less than 10 % fines (percent passing the 0.080 mm sieve size) in order to prevent frost heave. Material excavated from the Site for footing placement is acceptable, provided any cobbles and boulders greater than 100 mm are removed prior to reinstatement. Alternatively, material meeting Class “A” Backfill for Structures (NBDTI Standard Specification for Highway Construction, Table 167-1) would be suitable backfill material. Materials may be presented to the Engineer for consideration.

- **Structural fill** required underneath the footings and slab-on-grade should consist of a clean, well graded, granular material, such as 75 mm minus crushed rock meeting NBDTI subbase specification (as per the latest version of the NBDTI Standard Specifications for Highway Construction), or an approved alternate. Material excavated for from the Site for footing placement is pre-approved for placement as structural fill, provided any cobbles and boulders greater than 100 mm are removed prior to reinstatement. A Geotechnical Engineer should approve the structural fill material before being placed on the Site.

- Any additional **structural fill** required for mass grading may include crushed rock or pit run sand and gravel meeting the requirements of NBDTI Standard Specifications for Highway Construction. A Geotechnical Engineer should review and approve all proposed fill materials prior to use at the Site.

- The lift thickness used during placement of fill must be compatible with the compaction equipment and the material type to ensure the specified density throughout. Typically, lift thicknesses should not exceed 450 mm in loose thickness for mass filing and 300 mm in loose thickness for fill used underneath foundation and slab-on-grade areas and for the backfilling of foundations and services. Structural fill should be compacted to the appropriate percentages of the maximum dry density as determined by the latest version of ASTM D698 (Standard Proctor), presented in Table 2 below. Compaction should be verified in the field with a nuclear density gauge on a regular basis (every one to two lifts). The maximum particle size should be no larger than two thirds of the lift thickness.

Fill materials should be compacted to the percentage of maximum Standard Proctor dry density (as per ASTM D698) as outlined in Table 2. The Engineer should be provided soil samples a minimum of 10 days prior to construction; laboratory testing will be required to determine Standard Proctor values.

Table 2: Summary of Compaction Requirements

Structural Fill Use	Required Percentage of Compaction
Fill under footings & slab-on-grade areas	98%
Fill placed for foundation wall backfill	95%
Fill placed outside of building footprint	95%

5.3 Foundations

- The proposed structure may be safely supported on conventional spread or square footings. A minimum of 0.61 meters of **structural fill**, as outlined in Subsection 5.2.2, is required to be placed and compacted to a minimum of 98% Standard Proctor below foundation areas.

- We recommend an allowable bearing pressure of 150 kPa (3,000 psf) at serviceability limits states (SLS) with expected maximum and differential settlements of 25 and 12 mm, respectively, for footing size up to 1.5 meters. Bearing capacities for other footing sizes (or settlement tolerances) can be provided at your request.

- The subgrade should be proof-rolled with an eight (8) tonne or larger smooth drum vibratory roller during dry weather in the presence of a Geotechnical Engineer, or their representative. Any soft areas detected shall be repaired as per the Engineer's recommendations.

- A Geotechnical Engineer, or their representative, should assess the bottom of the foundation excavation to ensure that satisfactory bearing soils have been reached prior to constructing footings or placing any required structural fill material.

- For frost protection, exterior footings should be founded at least 1.2 meters and 1.5 meters below final grade for a heated and unheated structure, respectively. Isolated, unheated exterior footings should be provided with a minimum of 1.5 meters of earth cover. Alternatively, foundation depths may be reduced if an insulation detail is incorporated in the design. GEMTEC would be pleased to establish an insulation detail upon request.

- Based on our limited investigation and local experience, the site classification for seismic site response may be taken as Site Class D (Table 4.1.8.4.A NBCC 2010).

- A design freezing index of 1,000 Degree C-days may be used for the area.

- Finished surface grades adjacent to the building should be sloped away at a 2% grade for a minimum length of 3 meters.

5.4 Slab on Grade

The subgrade should be proof-rolled with an eight (8) tonne or larger smooth drum vibratory roller during dry weather in the presence of a Geotechnical Engineer, or their representative. Any soft areas detected shall be repaired as per the Engineer's recommendations. All fill required to raise the grade within the slab-on-grade area should be **structural fill** placed and compacted as per Subsection 5.2.2.

The material within the slab-on-grade footprint can remain below the slab-on-grade provided that the contractor can compact the subgrade to sufficient levels to meet the Structural Engineer's subgrade modulus requirement. Confirmation of this can be completed by conducting plate load tests within multiple areas of the building footprint.

Should unsuitable fill soils or debris be observed within the fill at the footing excavations, additional excavation within the slab-on-grade area would be required. The amount would be subject to the Geotechnical Engineer's expertise, building loads, and nature of the unsuitable material.

A typical slab-on-grade make-up is as follows:

- Concrete slab
- Vapour barrier with permeance of less than 0.3 perms
- 300 mm of structural fill
- Approved Subgrade

6.0 Closure

This report has been prepared for the sole benefit of our client, Hatch. The report may not be relied upon by any other person or entity without the express written consent of both GEMTEC Limited and our client, Hatch.

Any use that a third party makes of this report, or any reliance or decisions made based on it, is the responsibility of such third parties. GEMTEC Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

7.0 References

(1) Davies, J.L, Hamilton, J.B, and Potter, R.R. 1979. Department of Natural Resources New Brunswick. Geological Map of New Brunswick. Map NR-1 (2000 Edition). Scale 1:500 000.

(2) Rampton, V.N. 1984. Surficial geology, New Brunswick; Geological Survey of Canada, Map 1594A. Scale 1:500 000.

Appendix A

Descriptive Terms and Detailed Borehole Logs

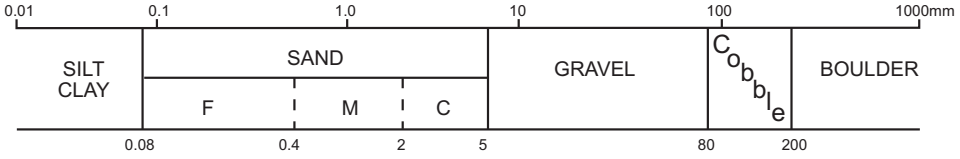
GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

FREDERICTON, MONCTON, BATHURST, GRAND FALLS, SAINT JOHN, NB

DESCRIPTIVE TERMS- BOREHOLE/TEST PIT LOG

SOILS

GRAIN SIZE



DESCRIPTIVE TERMINOLOGY

weight, % of material

0	10	20	35
TRACE	SOME	ADJECTIVE	and > 35% noun > 35% and main fraction
trace clay, etc.	some gravel, etc.	silty, etc.	sand and gravel, etc.

COMPACTNESS gravels, sands, tills

N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50
DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE

CONSISTENCY silt, clay

S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200
CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF

ROCK

RQD	OVERALL QUALITY	FRACTURE SPACING
0 - 25	VERY POOR	VERY CLOSE 20 - 60 mm
25 - 50	POOR	CLOSE 60 - 200 mm
50 - 75	FAIR	MODERATE 200 - 600 mm
75 - 90	GOOD	WIDE 600 - 2000 mm
90 - 100	EXCELLENT	VERY WIDE 2 - 6 m

COMP. STR. MPa	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250
DESCRIPTION	V. WEAK	WEAK	MODERATE	STRONG	V. STRONG

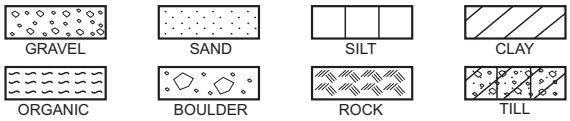
SAMPLE TYPES (location to scale on log)

S	SPLIT TUBE	G	SHOVEL
T	SHELBY TUBE	H	CARVED BLOCK
P	PISTON	K	SLOTTED
F	AUGER	V	IN SITU VANE
W	WASH	NR	NO RECOVERY

ROCK CORES

A(30mm); B(41mm); N(54mm)

LOG SYMBOLS



WELL SYMBOLS

N - standard penetration test; blows by 475 J drop hammer to advance Std. 50mm O.D. split tube 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; vane ⊕ ; penetrometer ■; unconfined ○; Uc unconfined compressive strength

Sr - shear strength, remoulded; vane ⊗ ; penetrometer □

Dd - dry density; t/m^3

W - natural moisture content, percent ✳

PL - plastic limit, percent ⊢—

LL - liquid limit, percent —⊣

ND - non detect, total petroleum hydrocarbons (TPH) not detected in soil

Groundwater Level ⧩ ; Seepage ⧩

Revised Oct, 2009

BHDESCRM-2009.CDR

GEMTEC
Consulting Engineers and Scientists

BOREHOLE LOGS

Client	Hatch Mott MacDonald	Proj No. 5545.65	BOREHOLE BH16-01
Project	Geotechnical Investigation, Proposed Maintenance Garage	Date Drilled 02.Sep.2016	Page 1 of 1
Location	Fundy National Park, Alma, NB		
Ground Level, m 44.36	Datum: Geodetic	Logged By AES	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0	1	S	26	190		0.05 Brown gravel and cobble (GRAVEL PARKING LOT)	44.31
						Brown sandy gravel and cobble (FILL)	
	2	S	16	180			
1						- Sandy gravel, trace silt (AASHTO A-1-a)	
	3	S	9	90			
	4	S	49	280			
2						- Gravel and sand, trace silt (AASHTO A-1-a)	
	5	S	100	120			
						- Increasing cobble and some boulders with depth	
3	6	S	100	100		3.15	41.21
	7	NQ	100%			Purple BOULDER with threads of grey throughout	
						3.66	40.70
	8	S	39	360		Brown SAND and GRAVEL, trace silt	
4							
	9	S	37	420			
5						- Gravel and sand, trace silt (AASHTO A-1-a)	
						5.18	39.18
	10	S	30	340		Brown SAND, some gravel and cobble	
						5.79	38.57
						End of Borehole at 5.79 meters below surface grade Groundwater not observed	

GEMTEC
Consulting Engineers and Scientists

BOREHOLE LOGS

Client	Hatch Mott MacDonald	Proj No. 5545.65	BOREHOLE BH16-02
Project	Geotechnical Investigation, Proposed Maintenance Garage	Date Drilled 02.Sep.2016	Page 1 of 1
Location	Fundy National Park, Alma, NB		
Ground Level, m 44.75	Datum: Geodetic	Logged By AES	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	63	420		Brown sandy silt and gravel, some cobble (FILL)
					0.61 / 44.14	
	2	S	78	420		Whitish-grey SAND, some gravel and cobble
1						- Sand and gravel, some silt (AASHTO A-1-a)
					1.37 / 43.38	
	3	S	83	430		Brownish-grey silty sand and gravel, some broken cobble (FILL)
2	4	S	100	150		- Increasing cobble with depth
					2.34 / 42.41	
						End of Borehole at 2.34 meters below surface grade Groundwater not observed

GEMTEC
Consulting Engineers and Scientists

BOREHOLE LOGS

Client	Hatch Mott MacDonald	Proj No. 5545.65	BOREHOLE BH16-03
Project	Geotechnical Investigation, Proposed Maintenance Garage	Date Drilled 02.Sep.2016	Page 1 of 1
Location	Fundy National Park, Alma, NB		
Ground Level, m 44.33	Datum: Geodetic	Logged By AES	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0	1	S	7	100		0.05 Grey gravel and cobble (GRAVEL PARKING LOT)	44.28
						Brown sandy gravel (FILL)	
						0.61	43.72
	2	S	37	300		Grey sandy gravel and cobble, some silt (FILL)	
1						- Gravel and sand, trace silt (AASHTO A-1-a)	
						1.37	42.96
						Brown SAND with black speckles (organics)	
	3	S	14	400		- Sand, some silt, trace gravel (AASHTO A-2-4)	
2						2.18 - Some gravel and broken cobble	42.15
	4	S	100	30			
	5	NQ		800		Pieces of various kinds, shapes and sizes of cobble and boulder (RIVER ROCK)	
	6	NQ		400			
3						3.05	41.28
	7	S	100	190		Greyish-brown GRAVEL, some sand	
						3.45	40.88
	8	NQ		300		Pieces of various kinds, shapes and sizes of cobble and boulder (RIVER ROCK)	
4						4.57	39.76
	9	S	49	430		Brown gravelly SAND, some cobble	
5						- Gravelly sand, some silt (AASHTO A-1-a)	
	10	S	41	390			
						5.79	38.54
						End of Borehole at 5.79 meters below surface grade Groundwater not observed	

GEOTG 554565.GPJ GEMTEC 2004.GDT 16/09/20

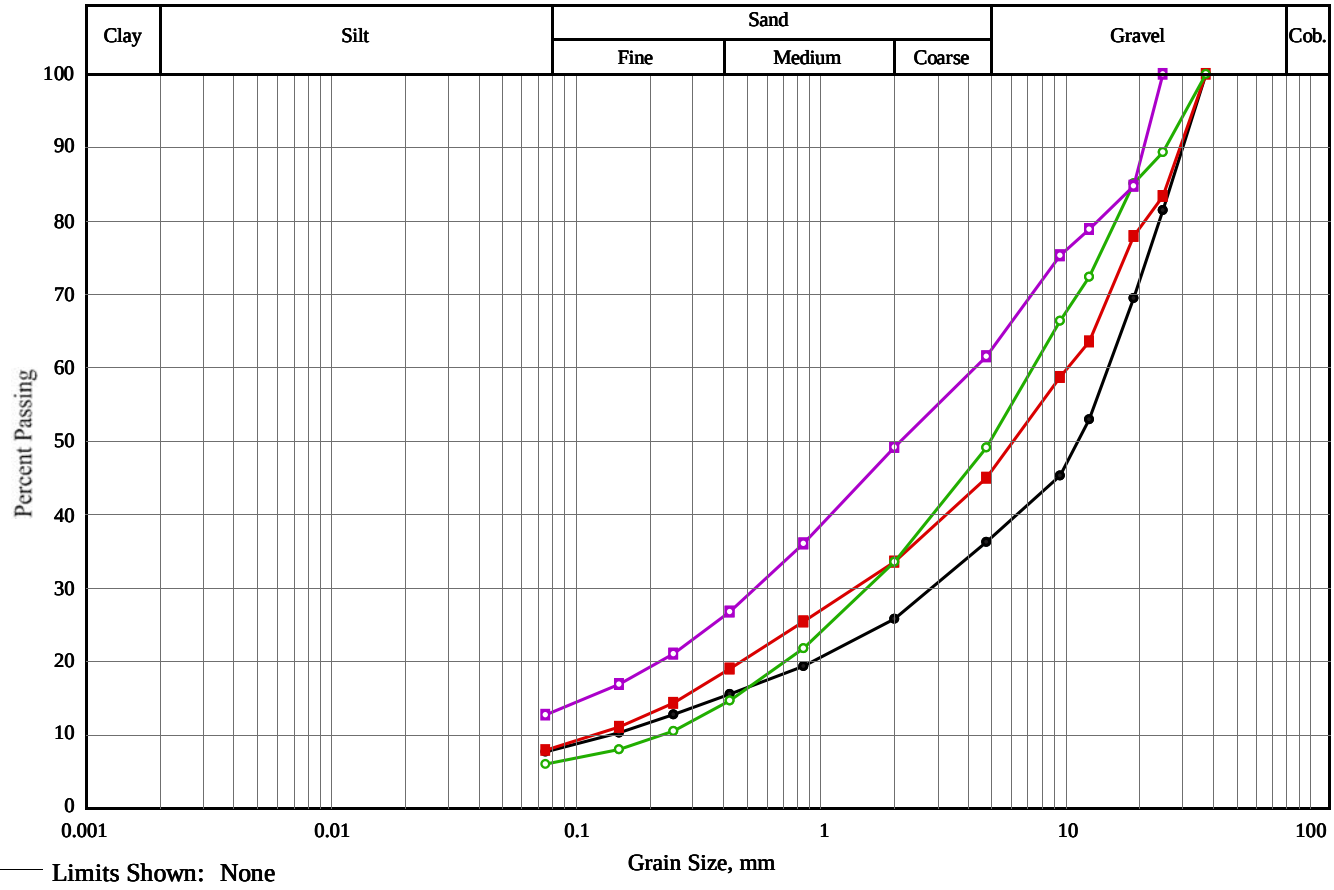
Appendix B

Laboratory Testing Results

GEMTEC
Consulting Engineers and Scientists

Client:	Hatch Mott MacDonald
Project:	Geotechnical Investigation, Fundy Maintenance Garage
Project #:	0554565

Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
		1	2		63.7	28.6	7.7		16/09/07
		1	4		55.0	37.1	7.9		16/09/08
		1	8		50.9	43.1	6.0		16/09/08
		2	2		38.5	48.8	12.7		16/09/08

Line Symbol	Sample Description	AASHTO	D_{10}	D_{15}	D_{50}	D_{85}	% 5-75µm
	Sandy gravel , trace silt	A-1-a	0.14	0.38	11.24	27.01	---
	Gravel and sand , trace silt	A-1-a	0.12	0.27	6.12	26.01	---
	Gravel and sand , trace silt	A-1-a	0.22	0.44	4.92	18.93	---
	Sand and gravel , some silt	A-1-a	---	0.11	2.12	19.08	---

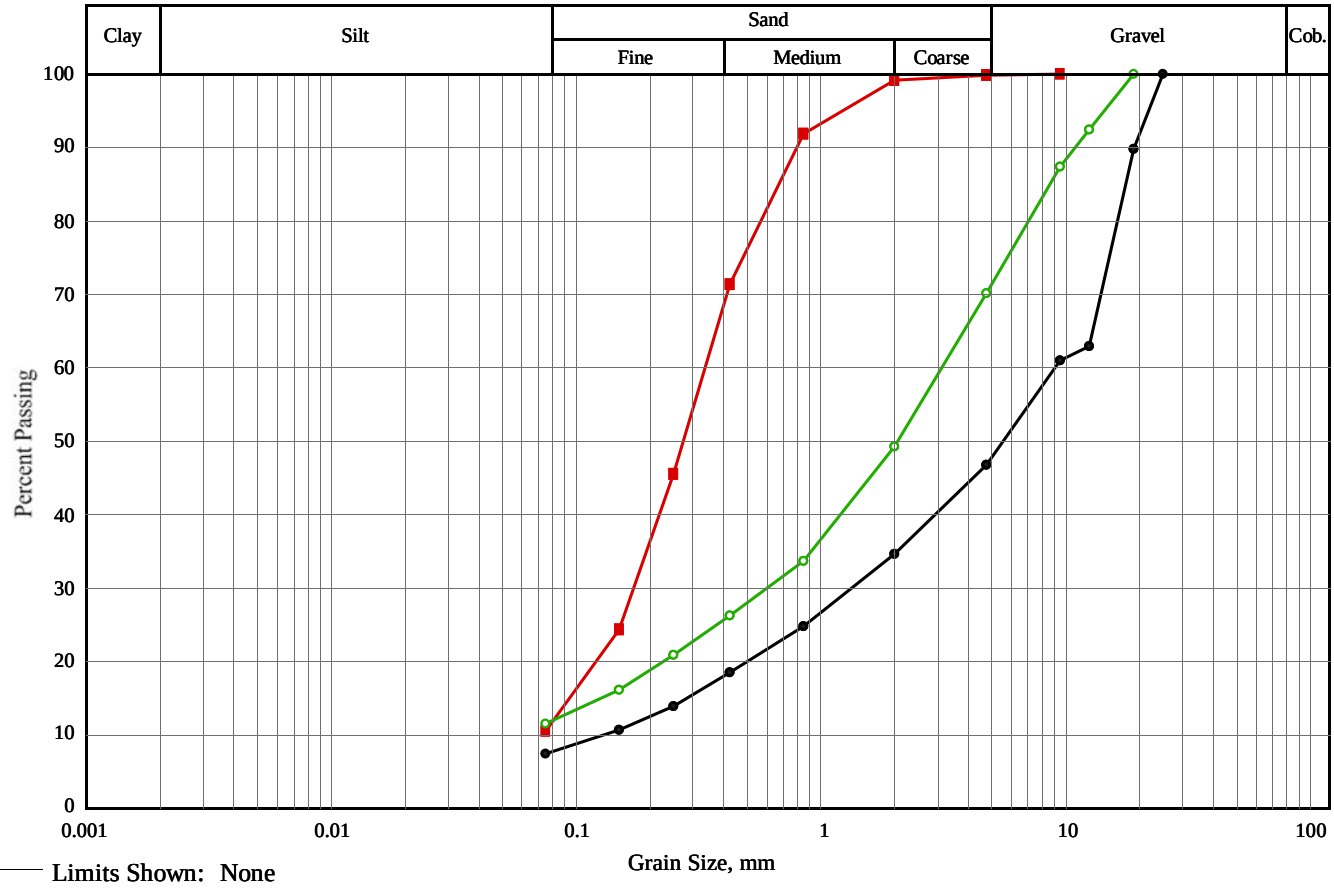
GEMTEC
Consulting Engineers and Scientists

Client: Hatch Mott MacDonald

Project: Geotechnical Investigation, Fundy Maintenance Garage

Project #: 0554565

Soils Grading Chart



Limits Shown: None

Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
		3	2		53.2	39.3	7.4		16/09/08
		3	3		0.2	89.3	10.5		16/09/08
		3	6		29.9	58.6	11.5		16/09/08

Line Symbol	Sample Description	AASHTO	D_{10}	D_{15}	D_{50}	D_{85}	% 5-75µm
	Gravel and sand , trace silt	A-1-a	0.13	0.28	5.56	17.63	---
	Sand , some silt , trace gravel	A-2-4	---	0.09	0.27	0.67	---
	Gravelly sand , some silt	A-1-a	---	0.13	2.06	8.63	---

GEMTEC
Consulting Engineers and Scientists

Client	Hatch Mott MacDonald
Project:	Geotechnical Investigation, Fundy Maintenance Garage
Project #:	0554565

Moisture Content and Density

Borehole: 1	Date/Time Sampled:	16/09/07 3:49:00 PM	Mass of Cont. + Wet Soil, g:	598.70
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	589.70
Sample: 2			Mass of Container, g:	171.56
Description:			Moisture Content, %:	2.15
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	
Borehole: 1	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	911.80
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	882.30
Sample: 4			Mass of Container, g:	163.20
Description:			Moisture Content, %:	4.10
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	
Borehole: 1	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	949.50
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	904.20
Sample: 8			Mass of Container, g:	173.11
Description:			Moisture Content, %:	6.20
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	

GEMTEC
Consulting Engineers and Scientists

Client	Hatch Mott MacDonald
Project:	Geotechnical Investigation, Fundy Maintenance Garage
Project #:	0554565

Moisture Content and Density

Borehole: 2	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	767.40
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	755.60
Sample: 2			Mass of Container, g:	170.22
Description:			Moisture Content, %:	2.02
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	
Borehole: 3	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	454.90
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	444.90
Sample: 2			Mass of Container, g:	166.42
Description:			Moisture Content, %:	3.59
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	
Borehole: 3	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	812.70
Depth:	Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	744.20
Sample: 3			Mass of Container, g:	172.20
Description:			Moisture Content, %:	11.98
			Sample Length, mm:	
			Sample Diameter, mm:	
			Sample Mass, g:	
			Sample Volume, mm³	
			Wet Density, kg/m³	
			Dry Density, kg/m³	

GEMTEC
Consulting Engineers and Scientists

Client	Hatch Mott MacDonald
Project:	Geotechnical Investigation, Fundy Maintenance Garage
Project #:	0554565

Moisture Content and Density

Borehole:	3	Date/Time Sampled:	16/09/08 3:50:09 PM	Mass of Cont. + Wet Soil, g:	1001.10
Depth:		Date/Time Tested:	16/09/08 3:50:09 PM	Mass of Cont. + Dry Soil, g:	954.20
Sample:	6			Mass of Container, g:	168.55
Description:				Moisture Content, %:	5.97
				Sample Length, mm:	
				Sample Diameter, mm:	
				Sample Mass, g:	
				Sample Volume, mm^3	
				Wet Density, kg/m^3	
				Dry Density, kg/m^3	

Appendix C

Select Photos

Looking west toward coal storage.

Looking south where original maintenance garage had been located prior to the 2014 fire.

Looking east toward fuel station.

Visual of the cobble coming up during drilling.

Boulder cored from Borehole 1 (BH16-01).

Cobbles and boulders cored from Borehole 3 (BH16-03).

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 05 50 00 - Metal Fabrications.

.5 Section 08 80 50 - Glazing.

.6 Section 09 91 13 – Exterior Painting.

.7 Section 09 91 23 - Interior Painting.

.8 Division 26: Electrical power supply.

1.2 REFERENCES

.1 The Aluminum Association Inc. (AA).

.1 Aluminum Association Designation System for Aluminum Finishes- DAF 45.

.2 American Society for Testing and Materials, (ASTM).

.1 ASTM A1008/A1008M, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

.2 ASTM D523, Test Method for Specular Gloss.

.3 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-1.105, Quick-Drying Primer.

.2 CGSB 1.181, Coating, Zinc-Rich, Organic, Ready Mixed.

.4 Canadian Standards Association (CSA).

.1 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SYSTEM DESCRIPTION

.1 Design Requirements.

.1 Design exterior door assembly to withstand windload of 1kPa with a maximum horizontal deflection of 1/240 of opening width.

.2 Design door panel assemblies with thermal insulation factor of 2.8 RSI. Excludes panels with glazing.

.3 Design door assembly to withstand minimum 8200 cycles per annum, and 82000 total life cycle.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Submit two copies of WHMIS MSDS – Material Safety Data Sheets. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.2 Shop Drawings:

.1 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.4 Submit copies of manufacturer's field reports.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for overhead door hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 QUALITY ASSURANCE

.1 Company specializing in manufacturing products specified with a minimum of five (5) years documented experience.

1.7 WARRANTY

.1 Provide a written warranty for work of this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation workmanship, for ten (10) years respectively.

1.8 EXTRA MATERIALS

.1 Provide spare parts in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide spare parts for overhead doors as follows:

.1 Door rollers: 4

.2 Weatherstripping: 2 sets

.3 Springs and cables: 2

.3 Store where directed. Identify each part and reference to appropriate door.

Part 2 Products

2.1 MATERIALS

.1 Galvanized steel sheet: commercial quality Z275 zinc coating.

.2 Primer: to CGSB-1-GP-181, for galvanized steel surfaces.

.3 Insulation: to meet design requirements.

.4 Glazing: Plastic glazing, to CAN2-12.12-M79, clear, acrylic sheet, 3.2 mm thick, light transmission of 80% minimum.

.5 Cable: multi-strand galvanized steel aircraft cable.

2.2 DOORS

.1 Fabricate insulated panel doors of interlocking steel sections as indicated.

.2 Fabricate panel frames in a continuous box frame with vertical stiffeners at 600 mm centres.

.3 Install glazing for vision panels. Sizes and number of vision panels as indicated.

.4 Assemble components by means of spot or arc welding or coated rivet system or adhesive and self tapping screws to manufacturer's recommendations.

.5 Apply shop coat of: galvanizing, primer after fabrication of door. Fabricate doors from steel stock.

2.3 HEAVY DUTY INDUSTRIAL HARDWARE

.1 Track: standard/high lift hardware with 75 mm size 2.66 mm core thickness galvanized steel track.

.2 Track Supports: 2.3 mm core thickness continuous galvanized steel angle track supports.

.3 Spring counter balance: heavy duty oil tempered torsion spring with manufacturers standard brackets.

.1 Drum: 133 mm diameter die cast aluminum.

.2 Shaft: 25 mm diameter galvanized steel.

.4 Top roller carrier: galvanized Steel 3.04 mm thick adjustable.

.5 Rollers: full floating grease packed hardened steel, ball bearing size to suit track.

.6 Roller brackets: adjustable, minimum 2.5 mm galvanized steel.

.7 Hinges: heavy duty, secured with rivets on self tapping screws.

.8 Cable: 5 mm diameter galvanized steel aircraft cable.

2.4 ACCESSORIES

.1 Overhead horizontal track and operator supports: galvanized steel, type and size to suit installation.

.2 Track guards: 5 mm thick formed sheet 1500 mm high track guards.

.3 Pusher springs.

.4 Handles.

.1 Selenoid brake.

.2 Handles: No outside operating hardware.

.5 Two horizontal sliding lock bolts on interior.

.6 Weatherstripping.

.1 Sills: double contact, full width extended neoprene weathertstrip.

.2 Jambs and head: extended aluminum and artic grade vinyl weatherstrip to manufacturer's standard.

.7 Finish ferrous hardware items with minimum zinc coating of 300 g/m² to CSA G164.

2.5 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied silicone modified polyester.

.1 Class: F1S

.2 Colour as selected by Owner's Representative from manufacturer's standard range.

.3 Specular gloss: 30 units + 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 25 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:

.1 Outdoor exposure period 1000 hours.

.2 Humidity resistance exposure period 1000 hours.

2.6 OPERATORS

.1 Equip doors for operation by:

.1 Hand, two handles on inside and outside face of door.

.2 Chain hoist with galvanized steel chain.

.2 Cable fail safe device (High lift only).

.1 Able to stop door immediately if cable breaks on door free fall. Braking capacity 500 kg.

2.7 ELECTRICAL OPERATOR

.1 Electrical motors, controller units, remote pushbutton stations, relays and other electrical components: to CSA approval with CSA enclosure.

.2 Power supply: 208 V, 3 phase, 60 Hz.

.1 Motor: 746W (1 HP) 208V, 3 phase

.2 Confirm that door motor size is adequate for O/H door size and weight.

.3 Operation:

.1 Remote pushbutton stations: flush surface mounted, in with "OPEN-STOP-CLOSE" designations on pushbuttons in English.

.2 Cable control: pendant hung control to open, close and stop.

.4 Safety switch: electro-mechanical limit switches for full length of bottom rail of bottom section of door, to stop and reverse door to open position when coming in contact with object on closing cycle or upon failure of any component of the control system. Provide

for an automatic lock-out on the door closing circuit until the failure or damage as been corrected.

.5 For trolley operators:

.1 Attach operator to door with quick release device to disconnect door from operator in event of power failure.

.6 Door speed: 300 mm per second.

.7 Control transformer: for 24V AC control voltage.

.8 Mounting brackets: galvanized steel, size and gauge to suit conditions.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

.1 Install doors and hardware in accordance with manufacturer's instructions.

.2 Rigidly support rail and operator and secure to supporting structure.

.3 Touch-up steel doors with primer where galvanized finish damaged during fabrication.

.4 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment required for door operation.

.5 Lubricate and adjust door operating components to ensure smooth opening and closing of doors.

.6 Adjust weatherstripping to form a weather tight seal.

.7 Adjust doors for smooth operation.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved non-abrasive cleaner.

.4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION