



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Public Works and Government Services Canada
ATB Place North Tower
10025 Jasper Avenue
Edmonton
Alberta
T5J 1S6
Bid Fax: (780) 497-3510

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 and Government Services Canada
Northern Contaminated Site Program
ATB Place North Tower
10025 Jasper Avenue
Edmonton
Alberta
T5J 1S6

Title - Sujet Garden River Remediation	
Solicitation No. - N° de l'invitation EW699-171528/A	Amendment No. - N° modif. 008
Client Reference No. - N° de référence du client PARKS EW699-171528	Date 2017-02-06
GETS Reference No. - N° de référence de SEAG PW-\$NCS-003-10933	
File No. - N° de dossier NCS-6-39181 (003)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2017-02-17	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Bilous, Isabelle	Buyer Id - Id de l'acheteur ncs003
Telephone No. - N° de téléphone (780) 782-8714 ()	FAX No. - N° de FAX (780) 497-3510
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

Solicitation No. – N° de l'invitation
EW699-171528/A

Amd. No. – N° de la modif
008

Buyer ID – ID de l'acheteur
ncs003

Client Ref No. – N° de réf/ du client
PARKS EW699-171528

File No. – N° du dossier
NCS-6-39181

This amendment is raised to modify Solicitation EW699-171528/A as follows:

1) REVISED CLOSING DATE OF:
02:00 PM MST on 2017-02-17

2) Change to the Specification

Delete Section 31 32 19.01 Geosynthetic Clay Liner (GCL) **in its entirety and replace** with the attached Section 31 32 19.01, dated 2017-02-03.

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

Part 1 General

1.1 SECTION INCLUDES

- .1 Supply and installation of Geosynthetic Clay Liner (GCL) in the base liner system of Cell A.

1.2 RELATED SECTIONS

- .1 Section 31 12 10 Cell A Construction Requirements.
- .2 Section 31 12 15 Removal of Waste from Old Dump.
- .3 Section 31 32 19.02 HDPE and LLDPE Geomembrane.
- .4 Section 31 32 19.03 Geotextile.

1.3 REFERENCES

- .1 Society for Testing and Materials International (ASTM)
 - .1 ASTM D5261-92(2003), Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.
 - .2 ASTM D5887-09, Standard Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens using a Flexible Wall Permeameter.
 - .3 ASTM D5888-06, Standard Guide for Storage and Handling of Geosynthetic Clay Liners.
 - .4 ASTM D5890-06, Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners.
 - .5 ASTM D5891-02, Standard Test Method for Fluid Loss of Clay Mineral Component of Geosynthetic Clay Liners.
 - .6 ASTM D5993-99(2004), Standard Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners.
 - .7 ASTM D6072-09, Standard Practice for Obtaining Samples of Geosynthetic Clay Liners.
 - .8 ASTM D6243-09, Standard Test Method for Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method.
 - .9 ASTM D6496-RevA, Standard Test Method for Determining Average Bonding Peel Strength Between Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners.
 - .10 ASTM D6766-09, Standard Test Method for Evaluation of Hydraulic Properties of Geosynthetic Clay Liners Permeated with Potentially Incompatible Liquid.
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- .11 ASTM D6768-04, Tensile Strength of Geosynthetic Clay Liners.

1.4 SUBMITTALS

- .1 All submittals are to be made to the Departmental Representative. Submittals are to be in accordance with Section 01 33 00.
- .2 At least 90 days prior to delivery of the GCL to the site:
- .1 Submit qualifications of the GCL Manufacturer. The GCL manufacturer selected for use on this project shall have successfully produced at least 1,000,000 square metres of needle-punched thermally reinforced GCL.
 - .2 Product details of GCL to be provided, including minimum average roll values from Manufacturer's testing for all parameters listed in Table 31 32 19.01-1.
 - .3 Manufacturer's letter of certification that GCL to be supplied is in conformance with specification, signed by the quality control manager.
 - .4 Name, location, and contact information of laboratory independent of GCL manufacturer to be used for independent laboratory conformance testing of GCL.
 - .5 Submit GCL sample to Departmental Representative. Sample shall be obtained and packaged in accordance with ASTM D6072. Sample is to be full width by 1 m long.
 - .6 Submit written certification that components and the finished GCL are in compliance with this Specification and including certification that the GCL production includes continuous inspection for broken needles using full-width metal detector, and removal by hand or in-line full width magnet.
- .3 At least 60 days prior to delivery of the GCL to the site:
- .1 Results of independent laboratory conformance testing for parameters in Table 31 32 19.01-1 at a minimum frequency of one set of tests from GCL rolls intended for use for this project.
 - .2 Shop drawings. Indicate installation layout, sequence, dimensions and details, including fabricated and field seams, anchor trenches and protrusion details where applicable. Installation shall generally be from high to low to minimize pre-mature hydration by rain and surface runoff.
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- .3 Submit qualifications of the GCL Installer. The GCL installer shall have successfully installed not less than 200,000 m² of GCL in the last 5 years.
- .4 On each delivery of GCL to site:
 - .1 Shipment packing list.
 - .2 Bill of lading.
 - .3 Roll identification numbers.
 - .4 Manufacturer's letter of certification that each roll in shipment is in conformance with specification, signed by the quality control manager.
 - .5 Physical properties sheet with manufacturer's tests and frequency in accordance with this Specification, signed by the quality control manager.

1.5 METHOD OF PAYMENT

- .1 Payment for supply and placement of GCL shall be according to the area that is actually covered by GCL after installation according to the limits and grades shown in the Drawings. If the final limits and grade are changed by the Departmental Representative the area for payment shall be based on the revised limits and grade. Materials constructed beyond the final limits and grades as specified shall not be measured for payment. The tendered unit prices shall include:
 - .1 supply of GCL;
 - .2 delivery, handling, and storage on-site;
 - .3 assistance to the Engineer in collecting GCL samples prior to or during installation;
 - .4 moving materials from on-site storage areas to the installation area;
 - .5 all surface preparation required prior to installation;
 - .6 all labour and equipment for installation including overlap, and bentonite placement;
 - .7 all repair work;
 - .8 any material wastage;
 - .9 installer's quality control testing; and
 - .10 any materials, labour, equipment, or other expense necessary for the supply and installation of geomembranes in accordance with Drawings and Specifications.
 - .2 Payment for all submittals and independent laboratory conformance testing of the GCL shall be on a Lump Sum basis.
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Part 2 Products

2.1 MATERIALS

- .1 The GCL product supplied to the project shall be in full accordance with the requirements of Table 31 32 19.01-1: GEOSYNTHETIC CLAY LINER PROPERTIES.
- .2 The GCL is to be needle-punched thermally reinforced and comprise of a uniform layer of granular sodium bentonite encapsulated between 2 non-woven geotextiles. The top layer is a staple fiber non-woven geotextile while the bottom layer is a scrim reinforced nonwoven geotextile. The needle-punched fibres are thermally fused to the scrim reinforced non-woven geotextile to enhance the reinforcing bond.
- .3 No glues, adhesives or other non-mechanical bonding processes shall be used in lieu of the needle-punch process.
- .4 The minimum acceptable dimensions for the GCL panels shall be 4.7 m wide and 45 m long unless smaller dimensions are agreed to by the Departmental Representative.
- .5 A 300 mm overlap line and a 375 mm match line shall be imprinted on both edges of the upper geotextile component of the GCL to assist in installation overlap quality control. Lines shall be printed as continuous dashes in easily observable, waterproof, non-toxic ink.
- .6 The separate components and finished GCL shall comply with the properties, test methods and testing frequencies given in this Specification. Material which does not comply will be replaced at the Contractor's expense.

Part 3 Execution

3.1 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle the GCL be in accordance with ASTM D 5888 and the manufacturer recommendations.
 - .2 Contact manufacturer prior to shipment to determine the correct unloading methods and equipment if different from the pre-approved and specified methods.
 - .3 GCL delivered to the site shall be free from blisters, undispersed raw material, striations, any physical damage or contamination by foreign matter. Rolls exhibiting damage shall be marked and set aside for closer examination during deployment. Minor rips and tears in the plastic packaging shall be repaired with moisture resistant tape prior to being placed in storage to prevent moisture damage.
 - .4 GCL rolls not indicated on GCL manufacturing quality control certificates will not be accepted.
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- .5 Stockpile and maintain rolls in a dry condition in a flat location area away from high-traffic.
- .6 Do not store rolls outside on the ground; store on pallets or elevated structures.
- .7 Protect the GCL from moisture, direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents during unloading and storage.
- .8 Store GCL rolls no higher than three to four rolls high, as recommended by the manufacturer, or limited to the height at which the handling apparatus may be safely handled by installation personnel. Situate stacks or tiers of rolls in a manner that prevents sliding or rolling by "choking" the bottom layer of rolls.
- .9 Do not stack rolls on uneven or discontinuous surfaces in order to prevent bending, deformation, damage to the GCL or cause difficulty inserting the core pipe.
- .10 Use additional tarp or plastic sheet over the stacked rolls to provide extra protection for GCL material stored outdoors.
- .11 Store bagged bentonite material tarped and next to GCL rolls unless other more protective measures are available. Store bags on pallets or other suitably dry surface to prevent pre-hydration.
- .12 The presence of free-flowing water within the packaging shall be cause for rejection of that roll.
- .13 Clearly mark each roll with the following information:
 - .1 Manufacturer.
 - .2 Product type and width of roll.
 - .3 Total weight of roll.
 - .4 Type of GCL material.
 - .5 Production Lot Number and individual Roll Number.

3.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan
- .3 Fold up metal banding, flatten and place in designated area for recycling

3.3 SUBGRADE CONDITIONS

- .1 Maintain area of installation free of water and snow accumulation.
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- .2 Replace soft and wet supporting materials.
- .3 Sub-grade Preparation - The finish of the sub-grade materials to be prepared and made suitable for the placement of GCL material.
- .4 The surface upon which the GCL material will be installed shall be inspected and certified by the Contractor and the Departmental Representative to be in accordance with the requirements of this specification.
- .5 Site specific compaction requirements shall be followed in accordance with the project drawings and specification of the subgrade materials where applicable. Equipment used in the handling and installation of GCL shall not damage the subgrade.
- .6 The subgrade surfaces shall be smooth and free of any debris, vegetation, roots, sticks, sharp rocks, or other deleterious materials larger than 50 mm as well as free of any voids, large cracks of standing water or ice.
- .7 Directly prior to deployment of the GCL, the sub-grade shall be final-graded to fill remaining voids or desiccation cracks, and proof-rolled to eliminate sharp irregularities or abrupt elevation changes. The surfaces to be lined shall be maintained in this smooth condition.
- .8 The sub-grade shall be inspected by the Departmental Representative prior to GCL placement.
- .9 Subsequent to the Departmental Representative's approval, it shall be the Contractor's responsibility to indicate to the Departmental Representative any change in the sub-grade condition that could cause it to be out of compliance with any of the requirements of this section or the project specification.

3.4 GCL HANDLING

- .1 GCL shall be supported during handling to ensure worker safety and prevent damage to the liner. Under no circumstances shall the rolls be dragged, lifted from one end, lifted with only the forks of a lift truck or pushed to the ground from the delivery vehicle.
 - .2 The Contractor shall verify that proper handling equipment will be used. The equipment shall not pose any danger to installation personnel or risk of damage or deformation to the liner material itself. Provided that it is demonstrated to be suitable, handling equipment may include, but not limited to, the following:
 - .1 Spreader Bar Assembly - A spreader bar assembly shall include both a core pipe or bar and a spreader bar beam.
 - .2 Stinger - a stinger is a rigid pipe or rod with one end directly connected to a forklift or other handling equipment. If a stinger is used, it should be fully inserted to its full length into the roll to prevent excessive bending of the roll when lifted.
 - .3 Roller Cradles - Roller cradles consist of two large diameter rollers spaced approximately 75mm apart which both support the GCL roll and allow it to freely
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unroll. The use of roller cradles shall be permitted if the rollers support the entire width of the GCL roll.

- .4 Straps - Straps may be used to support the ends of spreader bars but are not recommended as the primary support mechanism. As straps may damage the GCL where strapped around the roll and generally do not provide sufficient uniform support to prevent roll bending or deformation, great care must be exercised when this option is used.

3.5 INSTALLATION

- .1 GCL Placement - GCL shall be placed in general accordance with the shop drawings and procedures specified below, or modified to account for site specific conditions upon approval of the Departmental Representative.
 - .1 Where possible, all slope panels shall be installed parallel to the maximum slope while panels installed in flat areas require no particular orientation.
 - .2 The GCL may be deployed on slopes by pulling the material from a suspended roll, or securing a roll end into an anchor trench and unrolling each panel as the handling equipment slowly moves backwards.
 - .3 Deployment on flat areas shall be conducted in the same manner as that for the slopes, however, care should be taken to minimize "dragging" the GCL. Slip-sheet may be used to facilitate positioning of the liner while ensuring the GCL is not damaged from underlying sources.
 - .4 The contractor shall only install as much GCL that can be covered at the end of the day. No GCL shall be installed when rain is anticipated before the GCL can be covered and protected adequately.
 - .5 Trimming of the GCL shall be done with great care such that fugitive clay particles do not come into contact with drainage materials.
 - .2 Joining - Adjacent GCL are to be joined by overlapping according to the following:
 - .1 Installers are to overlap GCL edges such that the minimum overlap guideline is covered and match line is not covered, thus ensuring a minimum of 300 mm overlap.
 - .2 Overlap seams shall be a minimum of 600 mm on panel ends.
 - .3 Place loose granular bentonite between panels at a rate of 0.40 kg/m of seam, or as directed by Departmental Representative.
 - .4 Overlaps shall be free of wrinkles, folds or "fish-mouths".
 - .5 GCL ends should be overlapped such that the upstream GCL is over the downstream GCL at the overlap (i.e. "shingled").
 - .3 Damage Repair - Prior to cover material placement, damage to the GCL shall be identified and repaired by the Contractor. Damage is defined as any rips or tears in the geotextiles, delamination of geotextiles or a displaced panel.
 - .1 Rip and Tear Repair (Flat Surfaces) – Rips or tears may be repaired by completely exposing the affected area, removing all foreign objects or soil, and by then placing a patch cut from unused GCL over the damage (damaged material may be left in place), with a minimum overlap of 300 mm on all edges.
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- .2 Accessory bentonite shall be placed between the patch edges and the repaired material at a rate of 0.4 kg/m of edge spread in a continuous 150 mm fillet.
- .3 Rip and Tear Repair (Slopes) - Damaged GCL material on slopes shall be repaired by the same procedures above; however, the edges of the patch shall also be adhered to the repaired liner with an adhesive to keep the patch in position during backfill or cover operations.
- .4 Panels - Displaced panels shall be adjusted to the correct position or orientation. The adjusted panel shall then be inspected for any geotextile damage or bentonite loss. Damage shall be repaired by the above procedure.
- .5 Premature Hydration - If the GCL is prematurely hydrated, Contractor shall notify the Departmental Representative for a site specific determination as to whether the material is acceptable.
- .6 Covering:
 - .1 GCL shall not be covered until it has been inspected by the Departmental Representative.
 - .2 GCL shall be covered in a timely manner to reduce the potential for damage due to unconfined hydration of the GCL. It is essential that GCL installation be rapidly followed by installation of the geomembrane, geotextiles, and granular drainage layer.
 - .3 The cover materials shall be placed such that both the GCL and the underlying subgrade are not damaged.
 - .4 No GCL shall be left exposed overnight.
 - .5 The GCL shall be covered before a rainfall or snow event occurs.
 - .6 The uncovered edge of GCL panels shall be protected at the end of the working day with a waterproof sheet which is secured adequately with ballast.
 - .7 Protect installed liner from displacement, damage or deterioration before, during and after placement of material layers.

Part 4 Quality Control/Quality Assurance

4.1 CONTRACTOR'S QUALITY CONTROL

- .1 Manufacturer and installer shall participate in and conform to items and requirements as outlined in this specification.
 - .2 Tests and inspections performed by GCL manufacturer shall at a minimum be in accordance with the requirements in this Specification.
 - .3 Independent laboratory conformance testing for parameters in Table 31 32 19.01-1 at a minimum frequency of one set of tests from GCL rolls intended for use for this project.
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Table 31 32 19.01-1: GEOSYNTHETIC CLAY LINER PROPERTIES

Geosynthetic Clay Liner Properties	Test Method	Minimum Test Frequency	Required Value
Geotextile			
Cap – Nonwoven Mass per Unit Area	ASTM D5261	20,000 sq. m	200 g/m ² MARV ⁽¹⁾
Carrier - Scrim Nonwoven Mass per Unit Area	ASTM D5261	20,000 sq. m	200 g/m ² MARV ⁽¹⁾
Bentonite Properties			
Swell Index	ASTM D5890	50,000 kg	24 ml/2g min.
Fluid Loss	ASTM D5891	50,000 kg	18 ml max.
Moisture Content	ASTM D4643	50,000 kg	12% max.
Finished GCL Properties			
Bentonite Mass Per Unit Area ⁽²⁾	ASTM D5993	4,000 sq. m	3.7 kg/m ² MARV
Moisture Content	ASTM D5993	4,000 sq. m	35% max.
Tensile strength, (machine direction)	ASTM D6768	4,000 sq. m	4 kN/m MARV
Peel Strength	ASTM D6496	4,000 sq. m	360 N/m MARV
Permeability ⁽³⁾	ASTM D5887	25,000 sq. m	5 x 10 ⁻¹¹ m/s max
GCL Durability Permeability (35 kPa) ⁽⁴⁾	ASTM D6766	One	1 x 10 ⁻⁸ m/s max
GCL Durability Permeability (500 kPa) ⁽⁴⁾	ASTM D6766 (mod)	One	5 x 10 ⁻¹⁰ m/s max
Internal Shear Strength ⁽⁵⁾	ASTM D6243	One	24 kPa Typical

Notes:

1. MARV = Minimum average roll value.
2. Mass of bentonite is measured after oven drying per the stated method.
3. Permeability to be tested under an effective confining stress of 35 kPa and hydraulic gradient of 20 using deionized water.
4. Value represents GCL permeability after permeation with a 0.1 M calcium chloride solution (11.1 g CaCl₂ in 1 litre water); for termination see GRI-GCL3.
5. Typical peak value for specimen hydrated for 24 hours and sheared under a 9.6 kPa normal stress.

END OF SECTION