

**SECCRA Community Landfill**

**SUPPLY and INSTALL GEOSYNTHETICS CELL 8a**

**SECCRA Community Landfill**

**219 Street Rd**

**West Grove, PA 19390**

**ADDENDUM No. 1**

**March 29, 2022**

- A. Addendum No. 1** is issued as part of the Contract Document, to inform and/or specify changes, which take precedence over information contained in the original Contract Documents. Unless otherwise specifically noted or specified hereinafter, or shown on drawings or schedules accompanying this Addendum, all work required by this Addendum shall conform to the applicable provisions of the Contract Documents. **It shall be the responsibility of the Respondent to include in their proposal any cost implications of this Addendum. All Respondents are to indicate on the form of proposal submitted by them, acknowledgement of receipt and compliance with the contents of this Addendum No. 1.**
- B.** Any provision in any of the Contract Documents, which may be in conflict or be inconsistent with the contents of this Addendum, shall be void to the extent of such conflict or inconsistency.
- C.** The following clarifications/answers are provided in response to questions provided by potential bidders:
- C.1.** The Owner will provide for survey needs, with 3 business day notice.
  - C.2.** The Contractor is to understand that there will be traffic active in the work area and said traffic will always have the right of way over the Contractor. This may slow production while working in these areas.
  - C.3.** The Owner is providing nothing (manpower, equipment or materials), with the exception of survey and a skid steer to help unload material until the Contractor mobilize onsite. Contractor must provide 48 notice to use the sites skid steer.
  - C.4.** There will be no extra payment for lack of coordination or weather.
  - C.5.** Contractor is to pay for all laboratory testing listed in the Bid Document. The lab must be approved by the Owner.
  - C.6.** A question was asked – is there only 1 layer of 8 oz. geotextile on top of protective cover? Yes, there is only 1 layer of 8 oz. geotextile, it goes between the protective cover and the collection zone.
  - C.7.** A question was asked – what is exhibit C listed in Division 6, the only approved manufacturer is listed in Form 24, it is GSE.
  - C.8.** A question was asked on transmissivity of the geocomposite, please refer to Section 6200- page 06200-2 Items 2.01 A.a. and 2.01 A.b.
  - C.9.** Included in this Addendum is a list of contractors that attended the Supply and Install Geosynthetics Cell 8a mandatory prebid meeting.
  - C.10.** Included in this Addendum is a list of contractors that attended the Earthwork Cell 8a mandatory prebid meeting.

**D.** Remove and replace the following:

- D.1.** Remove Section 5.2 (3 pages) dated 2/22/22, replace with Section 5.2 dated 3/29/22
- D.2.** Remove Section Division 01000 (7 pages) dated 2/22/22, replace with Division 01000 (7 pages) dated 3/29/22
- D.3.** Remove Section 06200 (6 pages) dated 2/22/22, replace with Section 06200 (6 pages) dated 3/29/22
- D.4.** Remove Section 06300 (14 pages) dated 2/22/22, replace with Section 06300 (14 pages) dated 3/29/22
- D.5.** Remove Section 9.9 (4 pages) dated 2/22/22, replace with Section 9.9 (4pages) dated 3/29/22

END ADDENDUM NO. 1

**SIGN-IN SHEET \* PLEASE WRITE CLEARLY**

**Project:** Supply and Install Geosynthetics Cell 8a

**Meeting Date:** 3/16/2022

**Facilitator:** Alan Roman, Roman Consulting, Inc.

**Phone:** (610) 587-9240  
**E-Mail:** romanconsultinginc@gmail.com

Name	Title	Company	Phone	Fax	E-Mail
CURT SNYDER	QA	ROMAN CONSULTING	610-587-2624		forromancon@aol.com
Tim Caffee	ALCO	ALCO	609 468 4084		TIME@ALCOINCUSA.COM
CHRIS WAGNER	ALCO	ALCO	215 370 1511		chrisw@alcoincusa.com
THAVONE DARANIKONE	Supervisor	GCS	262-490-1916		+ daranikone@globalcontainment.com <del>thavone@globalcontainment.com</del>
Nick Batechko	CCI	Cherango Contracting	(607) 741-2210		nrbatechko@cherangocontracting.com
Steve Burn	Site Manager	SECCRA			Steve@seccra.org

**SIGN-IN SHEET \* PLEASE WRITE CLEARLY**

Project: Earthwork Cell 8a

Meeting Date: 3/28/22

Facilitator: Alan Roman, Roman Consulting, Inc.

(610) 587-9240 romanconsultinginc@gmail.com

Name	Title	Company	Phone	Fax	E-Mail
Steve Burn	Site Manager	SECCA			
Brad Jerzi	PM	Berg	484-269-7294		brad@bergconst.com
Lisa Whitehead	Est.	Berg			Lwhiteh@bergconst.com
Steve Heise	Estimator	Allan Myers	410-879-3655		Steve.Heise@allanmyers.com
Brant Callahan	PM	Henderson Group	717-649-8565		bcallagher@hendersongroup.com
Vince Mieda	Estimator	Ruby	717 815 6925		Vince@rubyconst.com
Justin Ranieri	Sr. Estimator	Kinsley Construction	717-815-6920		Jranieri@kinsleyconstruction.com
Booth Halloran	COO	American Exploration @MPC company	215-280-6227		bhalloran@americanexploration.net
Curt Sumpster	COA	RCI	610-587-2621		forroman@rci.com

# SOUTHEASTERN CHESTER COUNTY REFUSE AUTHORITY

## 5.2 GENERAL REQUIREMENTS

No verbal instructions or information to bidders will be binding. The specifications will be considered clear and complete unless written attention is called to any apparent discrepancies or incompleteness thereof before the opening of bids. Should any such written notices be received by SECCRA, these notices will be answered in the form of addenda and issued to all bidders. These addenda shall then be a part of these specifications. All questions regarding the bid should be directed to bids@seccra.org.

Submitted and signed bids will be deemed as conclusive evidence of complete examination of specifications. The making of a bid is an acceptance of the terms and conditions contained in the specifications and the attachments thereto.

Bid Forms are provided in these specifications. These forms must be used in submitting the bid. All pages of the form must be completely filled out and the whole signed by the bidder.

Each bid must be enclosed in a sealed envelope, clearly marked on the outside "SEALED BID: SUPPLY AND INSTALL GEOSYNTHETICS Cell 8a." No Bid may be withdrawn for a period of 60 days after the Bid opening.

As these "Bid Notice", "Instructions to Bidders", "General Conditions", "Technical Specifications", "Check List", and "Bid Form" all refer to each other and together constitute a whole, they must all be returned bound together as when delivered to the Bidder. NO BIDS WILL BE ACCEPTED UNLESS SUBMITTED ON THESE FORMS FURNISHED HEREIN. All bids must be sealed, marked, and delivered in accordance with instructions of these specifications.

Any bidder or bidders finding any discrepancy in or omission from the specifications, or left in doubt as to their meaning, shall notify SECCRA for clarification. Such notification will not obligate SECCRA to change the specifications. SECCRA will notify all bidders, in writing, by addendum, duly issued, of any interpretations made of these specifications or instructions.

Bidders must comply with all the conditions, provisions, and specifications herein and which are hereby made part of the contract.

### PAYMENT

Payment will be made within thirty (30) days of receipt of invoice in duplicate and inspection and acceptance by SECCRA.

OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as provided below. Progress payments will be based on the percent of supplied onsite components. A retainage of each payment will be held by OWNER, as described in the Agreement.

## **SOUTHEASTERN CHESTER COUNTY REFUSE AUTHORITY**

Within five (5) days after the Effective Date of the Agreement, the Contractor shall submit to the Owner: an estimated progress schedule indicating the starting and completion dates of the various stages of work; a preliminary schedule of such Shop Drawings submissions as may be required; and a preliminary schedule of values for all of the Work in sufficient detail to serve as the basis of progress payments during construction.

All progress payments shall be on the basis of the progress of the Work measured by the schedule of values. At least ten days before submission of the first Application for Payment, a conference to be attended by Contractor, Owner and such others as the Owner shall specify, will be held to finalize the preliminary schedule of values submitted by the Contractor. The finalized schedule of values shall be acceptable to Owner as to form and substance. Final payment will be made after inspection and approval of the litter fence by OWNER and ENGINEER.

### **OPENING OF BIDS**

At the time and place fixed for the opening of bids, the Authority will cause to be opened publicly and read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present in person or by representative.

### **EVALUATION OF BIDS**

The Bid Evaluation will be on Total Cost and Contractor experience completing similar projects. The Contractor shall provide evidence of similar work for SECCRA's review.

### **SAFETY**

Contractor is required to provide all O.S.H.A. safety related-devices for the safety of all contractor and non-contractor related personnel. These include signs, barricades, ventilation, etc., as necessary.

### **RESTROOM**

A portable restroom is available beside the access road to the landfill. Contractor must provide additional portable restroom(s) at the job site if applicable.

## **PERSONNEL**

A foreman or supervisor must be on site when contractor or subcontractor personnel are performing work. SECCRA reserves the right to request replacement of any of the Contractors employees, in SECCRA's sole opinion, for betterment of the Project. Replacement shall take place within 24 hours of request.

## **WORK HOURS**

The Contactor is allowed to work Monday to Saturday 7:00 am to 5:00 pm, other hours may be approved by the owner, with 24 hour notice.

**DIVISION 01000****GENERAL REQUIREMENTS****1.1 CONSTRUCTION DOCUMENTS**

The construction documents include all applicable drawings and specifications within these Contract Documents. The intent of these documents is to have the CONTRACTOR include in his price all items to completely finish the work. Any aspects of the Work which are not clearly defined by these specifications shall be governed by the rules of the best prevailing practice in the area of the Work for that class of Work as determined by the ENGINEER.

**1.2 PROJECT AREA**

**1.2.1** The project area for the geosynthetics installation associated with Phase 8A Expansion is indicated on the Drawings. All surveys related to this project shall be performed by a professional land surveyor licensed in the Commonwealth of Pennsylvania at the expense of the OWNER. Any discrepancies between the staked locations and the locations or alignments indicated on the drawings are to be brought to the attention of the OWNER AND/OR CONSTRUCTION MANAGER prior to proceeding with construction.

**1.3 REFERENCES**

Bid Form

**1.4 MEASUREMENT AND PAYMENT****A. GENERAL CONDITIONS****1. Pay Item 1100 - Bonds:**

This item is priced as a lump sum and is to cover the CONTRACTOR'S expense of completely bonding the Work as described within the Contract Documents.

**2. Pay Item 1200 – Mobilization/Demobilization:**

Priced as a lump sum and is to cover the cost to mobilize and demobilize to/from the site all equipment(s), construction crew(s) and general site needs (i.e portable toilets) to completely accomplish the Work as described within the Contract Documents.

**3. Pay Item 1300 – Coordination:**

Priced as a lump sum and is to cover the cost to coordinate with earthwork contractor or other weather related issues. Coordination may include establishing responsibilities for the removal of stormwater accumulated in work areas. There will be no additional payment, nor will a time extension be allowed for work delayed by lack of coordination.



## B. GEOSYNTHETICS

### 1. Pay Item 2100 – Supply & Install Tie-in to Existing Liner

The unit of payment for installation of tie-in of new liner system to existing liner system along boundary of existing Phase 7 shall be by Linear Feet as measured in the horizontal plane with no corrections or additions for slopes. Work covered under this pay item shall include preparation of area, cutting the existing primary liner, welding of the primary and secondary liner, overlapping of the geocomposite and cleanup of the area as shown in the contract drawings (Detail 5/2, and 3/3). This work shall also include efforts to remove a section of the existing Phase 7 intercell berm to promote positive drainage to the Phase 7 leachate collection system and repair of the liner system following removal of the berm (Detail 3/3). All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

### 2. Pay Item 2200 – Supply & Install 80-mil Textured HDPE Secondary Geomembrane

The unit of payment for supply and installation of geomembrane shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, rain flaps, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches (Details 6/2, 1/3, and 2/3); and the break in grade of the subgrade along tie-in (Detail 5/2, and 3/3). This Pay Item is for the secondary geomembrane used as a layer in the liner system which includes the textured geomembrane used on the side slopes and the cell floor. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

### 3. Pay Item 2300 – Supply & Install Geocomposite Drainage Net

The unit of payment for supply and installation of geocomposite drainage net shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, rain flaps, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches (Details 6/2, 1/3, and 2/3); and the break in grade of the subgrade along tie-in (Detail 5/2, and 3/3). This Pay Item is for the geocomposite drainage net used as a leachate detection zone layer within liner system. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

### 4. Pay Item 2400 – Supply & Install Geocomposite Drainage Net for Concentrated Flow Area

The unit of payment for supply and installation of geocomposite drainage net shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, rain flaps, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches (Details 6/2, 1/3, and 2/3); and the break in grade of the subgrade along tie-in (Detail 5/2, and 3/3). This Pay Item is for the geocomposite drainage net used as a leachate detection zone layer within liner

system. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

**5. Pay Item 2500 – Supply & Install 80-mil Textured HDPE Primary Geomembrane**

The unit of payment for supply and installation of geomembrane shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, rain flaps, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches (Details 6/2, 1/3, and 2/3); and the break in grade of the subgrade along tie-in (Detail 5/2, and 3/3). This Pay Item is for the primary geomembrane used as a layer in the liner system which includes the textured geomembrane used on the side slopes and the cell floor. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

**6. Pay Item 2600 – Supply & Install Temporary Rain Flap along floor of Phase 8A**

The unit of payment for supply and installation of the temporary rain flap (Detail 3/2) along the floor of Phase 8A shall be by Linear Feet as measured in the horizontal plane with no corrections or additions for slopes. All work shall include installation placement of material and continual maintenance of the temporary rain flap. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications.

**7. Pay Item 2700 – Supply & Install 2' Perimeter Berm Amendment**

The unit of payment for supply and installation of a 2' perimeter berm amendment (Detail 1/3) shall be by Linear Feet as measured in the horizontal plane with no corrections or additions for slopes. All work shall include installation placement of material and continual maintenance of the temporary rain flap. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications.

**8. Pay Item 2710 – 6" Pipe Boot**

The unit of payment for installation of a 6" pipe boot through the 2' perimeter berm amendment (Detail 4/2) shall be by individual pipe boot. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications.

**9. Pay Item 2800 – Supply & Install 8-oz/sy Non-Woven Geotextile**

The unit of payment for supply and installation of 8-oz/sy non-woven geotextile shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, rain flaps, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches (Details 6/2, 1/3, and 2/3); and the break in grade of the subgrade along tie-in (Detail 5/2, and 3/3). This Pay Item is for the 8-oz/sy non-woven geotextile used as a filter geotextile layer in the liner system. All work

shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

#### **10. Pay Item 2900 – Rain Cover**

The unit of payment for supply and installation of rain cover shall be by Square Yards in-place as measured in the horizontal plane with no corrections or additions for slopes, material in the anchor trench, overlaps, temporary berms, waste, etc. The pay limit shall be to the inside top edge of the anchor trenches; and the break in grade of the subgrade along toe of slope. All work shall be inclusive of all labor, equipment and materials required to perform the work as described in the Technical Specifications and the CQA Plan.

### **1.5 PIPES, CABLES, AND UNDERGROUND STRUCTURES**

It shall be the CONTRACTOR's responsibility to ascertain the location of all pipes, cables and underground structures in the area of the contractor's operation, and to employ the necessary precautions to avoid them during Phase 8A Expansion geosynthetics installation or other work associated with the contract. It shall be the CONTRACTORS responsibility to use Pennsylvania One Call System before any work begins.

If it is established that the work associated with this contract will cause interference with an underground facility or structure, the CONTRACTOR shall so advise the OWNER AND/OR CONSTRUCTION MANAGER. At his discretion, the OWNER AND/OR CONSTRUCTION MANAGER may designate a new location or authorize omission.

### **1.6 PROTECTION OF WORK, PERSONS AND PROPERTY**

The CONTRACTOR shall provide and maintain any barricades, lights or other safety devices necessitated by hazardous conditions, required by local authority, or deemed necessary by the OWNER AND/OR CONSTRUCTION MANAGER representative. Without exception the OWNER is NOT responsible for any damage/repair/replacement of any materials and/or installation, due to action taken or not taken by the CONTACTOR.

### **1.7 PERMITS**

All permits and licenses, relative to CONTRACTOR's equipment and work shall be obtained by CONTRACTOR at his expense including all costs for detailed Engineering, engineering stamps, drawings, testing, certifications, or other items necessary to secure said licenses and permits. This excludes environmental permits (e.g., NPDES Discharge Permit or Air Pollution Permit) and site specific permits (e.g. local).

### **1.8 WATER ENCOUNTERED IN WORK**

CONTRACTOR shall notify OWNER if any water is encountered during excavation or other earthwork activities. No water shall be discharged to surface ditches. Excessive amounts of water (enough to significantly hamper normal construction operations) encountered during excavation activities is to be handled as directed by the OWNER AND/OR CONSTRUCTION MANAGER. This does not apply to surface conditions or surface waters that are allowed to enter open excavations.

**It shall be the Earthwork Contractors responsibility to remove large quantities of accumulated water in work areas with a 3-inch pump. The remainder of the removal of water from work areas with smaller pumps shall be the responsibility of the Geosynthetics Installer. This includes areas where a 3-inch pump can no longer effectively remove water or areas of the liner where mud may have accumulated. Payment for water removal and coordination of this activity with other contractors on site shall be covered under pay item 1300.**

#### **1.9 AUTHORIZED REPRESENTATIVE OF THE OWNER**

“Authorized Representative of the OWNER” shall mean the following individual, who has the authority to execute a Change Order on behalf of the OWNER:

John Robbins, Chairman of the Board of Directors  
c/o Scott Mengle, General Manager  
219 Street Road,  
West Grove, PA 19390  
E-Mail: [Scott@seccra.org](mailto:Scott@seccra.org)  
Phone: (610) 869-2452  
Fax: (610) 869-8064

#### **1.10 ENGINEER**

ENGINEER shall mean the following individual, whom shall be the technical representative of the OWNER:

Patrick Wozinski, P.E.  
BAI Group, Inc.  
366 Walker Drive, Suite 300  
State College, PA 16801  
E-Mail: [pwozinski@baigroupllc.net](mailto:pwozinski@baigroupllc.net)  
Phone: (814) 238-2060  
Fax: (814) 238-7123

#### **1.11 CONSTRUCTION MANAGER**

CONSTRUCTION MANAGER shall mean the following individual, whom shall be representative of the OWNER:

Alan Roman  
Roman Consulting, Inc.  
P.O. Box 106  
Oley, PA 19547  
E-Mail: [roman543@aol.com](mailto:roman543@aol.com)  
Phone: (610) 587-9240

#### **1.12 GENERAL SAFETY CONSIDERATIONS**

- A.** Workers shall be advised of the presence of methane or hydrogen sulfide gas emanating from the natural decomposition of refuse buried at or near the job site and take precautions to ensure the safety of workers and the public.

- B.** Workers shall not be allowed to work alone at any time in an excavation. Work parties of at least two shall be mandatory, with one worker outside of trench. Access to the open trench shall be via ladders spaced no further than 25 feet apart at a minimum (or as required by OSHA). Trenches shall be benched to prevent possible caving in on workers.
- C.** No arc welding shall be permitted in trenches, enclosed areas, or over refuse filled areas unless performed over ground mats or in areas of the site approved by the Safety Monitor and Construction Manager.
- D.** Workmen shall not be permitted to enter excavations where there is an oxygen deficiency (oxygen levels below 19.5% by volume) or a combustible mixture of methane (methane levels between 5 and 15% by volume) without taking precautionary measures.
- E.** All trenches shall be covered or completed at the end of each work day.
- F.** All boreholes shall be completed at the end of each work day.
- G.** Smoking shall be prohibited in or near open excavations and in the vicinity of pipe-laying activities. Smoking is prohibited anywhere onsite except in designated areas.
- H.** Fire extinguishers shall be available and rated at least A, B and C and are at least 10-pound size.
- I.** Landfill gas (LFG) is comprised of approximately equal portions of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) with other trace constituents. It is a product formed by the anaerobic decomposition of refuse. Methane gas is the primary component of natural gas, and is combustive when the methane concentration in air is between 5 and 15 percent by volume. The 5 percent level is called the lower explosive limit (LEL). Below 5 percent, there is insufficient methane for combustion. Above 15 percent, called the upper explosive limit (UEL), there is insufficient oxygen for combustion. However, it is important to note that a concentration of methane above 15 percent is considered at least as dangerous as a concentration between 5 and 15 percent, because as the methane dilutes with air, it will pass through the explosive range. When gas concentrations are low, it is common to express methane concentration as a percentage of the LEL. For example, 100 percent LEL is 5 percent methane in air, and 50 percent LEL is 2.5 percent methane in air. Because the decomposition of buried refuse typically produces methane at concentrations ranging from 40 to 55 percent, methane will always pass through the combustible range as it vents to the atmosphere and dilutes with air. Methane is lighter than air, and will rise in the absence of typical barriers. LFG, being a mixture of methane and carbon dioxide, may be heavier than or lighter than air depending on the specific mixture. LFG may escape from the refuse, both vertically through the landfill cover, and laterally through surrounding soils. LFG moves in response to the pressure buildup within the landfill and through diffusion in the absence of a pressure differential. Diffusive movement nearly always produces explosive range concentrations of methane.

**CONTRACTOR shall cease construction activities or operations when any concentration of methane at or above 10% LEL is present.**

### **1.13 PRECAUTIONS WHEN WORKING ON REFUSE LANDFILLS**

- A.** Workers shall avoid contact with exposed refuse where possible. Irritants or hazardous materials may be present.
- B.** Workers shall not leave open wells or excavations unattended. Open boreholes and excavations must be covered to prevent accidental entry. Wells must be barricaded, flagged, and protected sufficiently to prevent entry of dirt and run off water.
- C.** The CONTRACTOR shall provide such equipment and medical facilities as are necessary to supply basic first aid to anyone who may be injured in connection with the Work. In an event immediate removal and/or hospitalization of site personnel is required the CONTRACTOR shall contact 911.
- D.** The OWNER AND/OR CONSTRUCTION MANAGER may stop the Work if in his sole judgment safety laws, or safe work practices are not being observed; provided, however, that none of the foregoing shall relieve the CONTRACTOR from being fully responsible and liable for meeting all safety laws and safe work practices in connection with the Work nor should the failure of such persons to stop the Work be construed to mean that all safety laws and safe work practices are being met. Notwithstanding the above, the CONTRACTOR is solely responsible for the compliance with safety laws and maintaining safe work practices.

**END OF DIVISION 01000**

**SECTION 06200****GEOCOMPOSITES****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. The Contractor shall furnish all material, labor, tools, supervision, transportation, and installation equipment necessary for the installation of the double-sided geocomposites, as specified herein, and as indicated on the drawings. Work includes the geocomposite associated with the detection zone and the cap system.

**1.02 RELATED SECTIONS**

- A. Exhibit B: CQAQC Plan
- B. Exhibit C: Geosynthetic Manufacturer's Summary and Specifications

**1.03 REFERENCES**

- A. Latest version of American Society for Testing and Materials (ASTM) standards:
  - 1. All ASTM standards relating to this section are indicated in the 'Construction Quality Assurance Plan'.
  - 2. Geosynthetics must comply with the latest version of the Geosynthetic Research Industry (GRI) standards for portions of work referenced to GRI standards in the 'Construction Quality Assurance and Quality Control Plan'.

**1.04 SUBMITTALS**

- A. Within two weeks of Notice of Award, submit a copy of the Manufacturer's quality control manual or other suitable information regarding same.
- B. For materials to be supplied, provide quality control certificates for all rolls received on site. The certificate shall identify the manufacturer, product, lot and roll numbers. In addition, the certification shall identify the results of the manufacturer's tests performed. The tests shall indicate conformance with the requirements outlined in the Construction Quality Assurance and Quality Control (CQAQC) Plan. In addition, the Manufacturer shall certify the minimum properties for the materials provided for the job.
- C. For materials to be supplied, provide copies of results of all manufacturers' tests meeting the minimum frequencies required by Tables 4-1 and 5-2 of the CQAQC

Plan, as well as Part 2 below. These items shall be supplied and approved by the CQA Consultant prior to the materials being shipped to the site.

- D. Provide additional documentation at the request of the CQA Consultant to establish the material's conformance with the Owner's PaDEP Waste Management Permit and other requirements as may be applicable.

### **1.05 DELIVERY AND HANDLING**

- A. Geocomposite rolls shall be shipped and stored in a manner which protects the materials from damage including, but not limited, to exposure to precipitation, sunlight, dirt, debris, chemicals or petroleum products, etc. The geocomposite shall not be exposed to sunlight beyond the manufacturer's recommendations.
- B. CONTRACTOR will unload materials delivered to the site. Provide OWNER with at least 24 hours advance notice prior to the arrival of materials on site.
- C. Store materials at the locations on-site as directed by the Owner or Owner's representative. Store materials such that roll identification tags are visible. Ensure that roll identification tags are not removed from the stored rolls. Rolls without proper labeling may be denied for installation.

## **PART 2 - PRODUCTS**

### **2.01 GEOCOMPOSITE**

- A. Geocomposite shall be manufactured with a geonet core with 6 oz/sy nonwoven geotextile heat bonded to either side. Provide HDPE geocomposite meeting the minimum requirements of Tables 4-1 and 5-2 and other pertinent requirements of the CQAQC Plan. The geocomposite will be required to meet the 100 hour transmissivity requirements as follows:
  - a. Phase 8 Leachate Detection Zone General Floor Condition:  $3.04 \times 10^{-4}$  m<sup>2</sup>/s at Hyd. Gradient of 0.02 and normal stress of 20,691 psf.
  - b. Phase 8 Leachate Detection Zone Concentrated Flow Areas:  $3.77 \times 10^{-3}$  m<sup>2</sup>/s at Hyd. Gradient of 0.02 and normal stress of 20,691 psf.
- B. Only products specified in Exhibit C may be proposed for use on this project.
- C. For material properties not otherwise specified in this Section, the minimum values indicated in the manufacturer's standard product literature shall be achieved.
- D. Each roll shall be shipped with a label indicating the product and manufacturer as well as the roll number, lot number, and roll dimensions. Rolls without proper labeling may be denied for installation.



- E. OWNER's independent testing laboratory shall conduct Quality Assurance sampling and testing on the proposed geocomposite. The laboratory will be testing at the frequencies and for parameters indicated in the CQAQC Plan. Quality Assurance Testing will be conducted to verify that the product achieves the physical/chemical requirements outlined in this Section as well as the minimum properties listed in the manufacturer's product literature. Rolls not meeting minimum specifications as detailed in this Section as well as the Manufacturer's product literature shall be rejected. CONTRACTOR will assist OWNER in the coordination of geosynthetic sampling for QA testing.

## **PART 3 - EXECUTION**

### **3.01 FAMILIARIZATION**

- A. Prior to implementing any of the work described in this Section, the Contractor shall become thoroughly familiar with all portions of the work falling within this Section.
- B. Inspection:
1. Prior to implementing any of the work in this Section, the Contractor shall carefully inspect the previously installed work of other Sections and verify that all work is completed in a manner that allows the Work of this Section to commence without adverse impact.
  2. If the Contractor has any concerns regarding the installed work of other Sections, he/she shall notify the Owner in writing within 48 hours of his site inspection. Failure to inform the Owner or Engineer in writing prior to installation shall be considered as Contractor's acceptance of the related work of all other Sections.
  3. Inspect rolls for evidence of damage or soiling from dirt, debris, etc. Remove from site any rolls which are damaged.

### **3.02 HANDLING AND PLACEMENT**

- A. Geocomposite may not be deployed until all non-installation related quality assurance/quality control tests and requirements have been satisfied.
- B. Do not begin placement of geocomposite without checking with Engineer that the underlying layer of the liner or cap system is completed and all testing, surveying and documentation for the layer has been completed.
- C. Prior to deployment, Contractor shall evaluate the suitability of the subgrade (subbase) for placement of geosynthetics. Contractor shall sign a 'Subgrade Surface Acceptance' Form stating that the subgrade surface has been properly prepared and is ready for the placement of geosynthetics.

- D. Handle geocomposite in a manner that prevents damage. Wash any geocomposite that may have become soiled.
- E. The Contractor shall take any necessary precautions to prevent damage to the geocomposite and underlying layers during placement. Contractor shall remove all foreign materials that may damage either the geocomposite or the underlying component.
- F. In addition to the requirements indicated in this Section, handling and placement shall meet the minimum applicable requirements of the CQAQC Plan. Where standards between these specifications and the CQAQC Plan conflict, the more stringent requirement shall be in effect unless approved otherwise by the Engineer. Bring any discrepancies to the attention of the Engineer.
- G. In general, position and orient rolls in an identical manner as the underlying layer unless approved otherwise by the Engineer. Panels shall be shingled with an upgradient panel placed over the downgradient panel.
- H. Unroll geocomposite in a manner which minimizes wrinkles and minimizes the need to reposition geocomposite once it has been unrolled. After unrolling geocomposite, smooth out wrinkles.
- I. Contractor shall use sandbags or other suitable means to anchor the geocomposite. Sandbags shall be removed from the geocomposite immediately prior to the placement of the next component of the system.
- J. Provide minimum overlap per the requirements of Sections 4 and 5 of the CQAQC Plan.
- K. The Geonet portion of the geocomposite panels shall be overlapped and secured with plastic ties on 5 ft. centers minimum. Butt seams will not be allowed on slopes greater than 20 percent unless otherwise approved by the Engineer. Butt seams shall be tied at 1 ft. maximum intervals with a minimum of 4 ties per seam. While seaming or tying, the underlying geosynthetics shall be protected to the satisfaction of the Engineer.
- L. In the corners of the sideslopes where overlaps between perpendicular drainage net strips are required, an extra layer of drainage net shall be unrolled along the slope and on top of the previously installed drainage nets, from top to bottom of the slope.
- M. Ties shall be of a contrasting color from the geonet.
- N. The geotextile component of the geocomposite shall be seamed in accordance with Section 06100 and the CQAQC Plan. CQA Consultant shall inspect seams for skipped stitches or missed seams. Contractor shall repair seams as directed by CQA Consultant.

- O. Install rolls at the locations indicated on the Drawings.
- P. Each day, record locations of areas covered and geocomposite rolls used. Provide this record to the Engineer upon request.
- Q. The Contractor shall examine the entire geocomposite surface after installation to ensure that no potentially harmful foreign objects are present. The Contractor shall remove any such foreign objects and shall replace any damaged geosynthetics.
- R. Smoking is prohibited on or in the immediate vicinity of geosynthetics.
- S. Shoes shall be of the soft sole variety which will not damage geosynthetics.
- T. Direct contact with the geocomposite shall be minimized. Protect geocomposite with sacrificial pieces or approved equivalent in high traffic areas.
- U. If work occurs after dusk, illumination shall be provided by the Contractor to the satisfaction of the Engineer.
- V. No equipment is allowed on the geocomposite which can damage the geocomposite unless otherwise approved by ENGINEER. Specifically, the CONTRACTOR is required to place rub sheets under all small mechanical equipment brought onto the work area such as portable generators. Movement of generators and other mechanical equipment on top of the geosynthetics shall be performed in a manner which will not damage the liner system. Only rubber tires of generators may come into contact with the liner during movement from one location to another. The CONTRACTOR is responsible for monitoring the equipment at all times to ensure that the equipment remains on rub sheets. Fuel shall be stored outside the limits of the liner. The generator shall be refueled outside of lined areas, either existing or proposed. Excessive heat, leaking hydrocarbons or other detrimental occurrences will not be tolerated.
- W. The Contractor is required to place rub sheets under equipment brought onto the work area as deemed necessary by the Engineer. Excessive heat, leaking hydrocarbons or other detrimental occurrences will not be tolerated.
- X. Repair any geocomposites damaged during or after installation. Repair with geocomposite rolls approved for use on this Project. Repair patches shall extend 12 inches minimum beyond all edges of the defect. Patches shall be secured with ties at 6 inch intervals, minimum.

### **3.04 PRODUCT PROTECTION**

- A. The Contractor shall use all means necessary to protect prior work and materials and completed work of other Sections.

- B. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Engineer at no additional cost to the OWNER.
- C. No smoking shall be allowed on or near the geosynthetic components of this job.
- D. Protect the installation of this Section as directed in other paragraphs of this Section.

### **3.05 REGULATORY CONSTRAINTS**

- A. Representatives of the Pennsylvania Department of Environmental Protection (PaDEP) may visit the site to review progress and or for approvals. Cooperate with these representatives and provide information as requested. Notify Engineer and Owner of any such requests by the Department.

### **3.06 DOCUMENTATION**

- A. Maintain records of geocomposite roll deployment and the location and status of repairs. Provide copies to CQA Consultant upon request.

**END OF SECTION 06200**

## **SECTION 06300**

### **GEOMEMBRANES**

#### **PART 1 - GENERAL**

##### **1.01 DESCRIPTION OF WORK**

- A. The CONTRACTOR shall furnish all material, labor, tools, supervision, transportation, and installation equipment necessary for the installation of geomembranes, as specified herein, and as indicated on the drawings.

##### **1.02 RELATED SECTIONS**

- A. Exhibit B: Form 24 and the CQAQC Plan
- B. Exhibit C: Geosynthetic Manufacturer's Summary and Specifications

##### **1.03 REFERENCES**

- A. Latest version of American Society for Testing and Materials (ASTM) standards:
1. ASTM D 256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
  2. ASTM D 638, Standard Test Method for Tensile Properties of Plastics.
  3. ASTM D 696, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics between -30C and 30C With a Vitreous Silica Dilatometer.
  4. ASTM D 746, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
  5. ASTM D 751, Standard Test Methods for Coated Fabrics
  6. ASTM D 792, Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
  7. ASTM D 882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
  8. ASTM D 1004, Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
  9. ASTM D 1149, Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber.
  10. ASTM D 1204, Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
  11. ASTM D 1505, Standard Test Method for Density-Gradient Technique.
  12. ASTM D 1603, Standard Test Method for Carbon Black in Olefin Plastics.

13. ASTM D 1693, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
  14. ASTM D 3015, Standard Practice for Microscopical Examination of Pigment Dispersion in Plastic Compounds.
  15. ASTM D 4437, Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
  16. ASTM D 5199, Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
  17. ASTM D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
  18. ASTM D 5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
  19. ASTM E 96, Standard Test Methods for Water Vapor Transmission of Materials.
- B. Federal Test Method Standards
1. FTMS 101C Method 2065, Puncture Resistance and Elongation Test

#### **1.04 SUBMITTALS**

- A. Within two weeks of award, a liner installation plan shall be submitted for approval which includes the following information:
1. Method of Installation.
  2. Proposed Schedule.
  3. Proposed Panel Layout indicating:
    - a. Seams oriented parallel to slope.
    - b. Horizontal seams shall not be allowed on side slopes.
    - c. A single, continuous roll shall be used on side slopes which is oriented parallel to slope beginning at the perimeter anchor trench and extending a minimum of 10 ft. onto the floor area.
    - d. Seams shall be minimized in corners and odd-shaped areas to the extent possible.
  4. Inclement Weather Procedures.
  5. Material Delivery Procedures.
  6. Liner System Materials Deployment Procedures.
  7. Procedure for Handling Liner Wrinkles.
  8. Identification and Number of Work Crews.

9. Certificate or other suitable proof that CONTRACTOR is an authorized installer of the Geomembrane Manufacturer's product.
  10. Resumes of personnel who will be assigned to field duty at this site. The resumes shall document geomembrane jobs performed, date, area of geomembrane installed, type of geomembrane and general nature of work performed. The supervisor and master seamer (may be the same person) shall have 2,000,000 sf minimum of HDPE liner seaming experience.
- B. Provide a quality control certificate for each roll received on site. The certificate shall identify the roll number, manufacturer, product, and dimensions. It shall also identify the resin manufacturer and batch number. In addition, the roll certificate shall identify the results of any manufacturer's tests performed on that roll as part of the conformance testing of this Section. The tests and corresponding minimum frequencies are defined in Section 6 of the CQAQC Plan. CONTRACTOR will also assist in the coordination for collection of quality assurance samples for shipment to the QA laboratory.
  - C. Submit a certificate signed by a Manufacturer's representative that states that the geomembrane product meets or exceeds all physical/chemical requirements of this Section 06300 and the CQAQC Plan.
  - D. Submit a statement from the manufacturer that no reclaimed polymer was added to the resin except that polymer recycled during the manufacturing process may be permitted if done with appropriate cleanliness and if the recycled polymer does not exceed 2 percent by weight.
  - E. Submit a statement from the manufacturer that the content of additives, extenders and fillers does not exceed 1 percent by weight, except carbon black content shall be excluded from this calculation.
  - F. Prior to beginning geomembrane deployment, submit to the ENGINEER for approval, a record of calibration for the field tensiometer performed within the last year.
  - G. Prior to Contract Closeout provide warranties as follows:
    1. Material Warranty: The warranty shall be provided by the geomembrane manufacturer, notarized, and warrant the material for a twenty year period. The warranty period shall be calculated on a pro-rata basis from the date of substantial completion.
    2. Installation Warranty: The geomembrane installer shall warrant the installation and seaming for a period of two years. The warranty period shall be calculated on a pro-rata basis from the date of substantial completion.

## **1.05 DELIVERY AND HANDLING**

- A. Geomembrane rolls shall be shipped and stored in a manner which protects the materials from damage including but not limited to exposure to precipitation, sunlight, dirt, debris, chemicals or petroleum products, etc. The geomembrane shall not be exposed to sunlight beyond the manufacturer's recommendations.
- B. CONTRACTOR will unload materials delivered to the site. Provide OWNER with at least 24 hours advance notice prior to the arrival of materials on site.
- C. Store materials at the locations on-site as directed by the OWNER or ENGINEER. Store materials such that roll identification tags are visible. Ensure that roll identification tags are not removed from the stored rolls.

## **PART 2 - PRODUCTS**

### **2.01 GEOMEMBRANE**

- A. Provide geomembrane meeting the requirements of the CQAQC Plan located in Appendix B as depicted on the construction drawings. Geosynthetics must be supplied from manufacturers approved for use at the site, as listed in Appendix C.
- B. For material properties not otherwise specified in this Section, the minimum values indicated in the manufacturer's standard product literature.
- C. Minimum roll width of 22 ft.
- D. Each roll shall be shipped with a label indicating the product and manufacturer as well as the roll number, lot number, and roll dimensions.
- E. Substitutions: Other manufacturers or products beyond those specifically identified in subparagraph 2.01 A above will be considered a Substitution. Substitutions must be approved in writing first by the OWNER and secondly by the Pennsylvania Department of Environmental Protection. The Acceptable Manufacturers and Products have been approved based on requirements outlined in this Section as well as for additional reasons, regulatory or otherwise, which may not be specifically identified herein. All costs associated with such substitution shall be borne by the CONTRACTOR including costs incurred by the OWNER through considering the proposed Substitution. The CONTRACTOR shall reimburse the OWNER for his costs regardless of whether the proposed Substitution is approved or denied. Approval by the OWNER does not guarantee approval by the Pennsylvania Department of Environmental Protection or vice versa. The approval process shall not release the CONTRACTOR from his other obligations under this Contract including time requirements. If approval is denied, the CONTRACTOR shall provide an approved material from an Acceptable Manufacturer as defined in Subparagraph 2.01 A above at no increase in cost to the OWNER.



- F. Installer is hereby notified that OWNER will be conducting his own conformance sampling and testing on the proposed geomembrane. The OWNER will be testing at his own frequency and for parameter he decides. OWNER will be conducting conformance testing to verify that the product achieves the physical/chemical requirements outlined in this Section as well as the minimum properties listed in the manufacturer's product literature. CONTRACTOR will assist in coordination for collection of quality assurance samples for shipment to the QA laboratory.
- G. The named Manufacturers and Products listed in Appendix C do not guarantee that the product is acceptable for this Project. The products must also pass the tests required to be conducted by the Installer/Manufacturer detailed in this Section as well as pass the conformance testing conducted by the OWNER.

## **2.02 Extrudate Rod**

- A. Welding rod shall be HDPE material of the same physical properties used to manufacture the geomembrane. Quality Control testing of weld rods shall exhibit that the material has a density of at least  $0.94 \text{ g/cm}^3$  when tested by ASTM D792 or D1505. Extrudate Rod shall be supplied at no additional cost to OWNER.

## **PART 3 - EXECUTION**

### **3.01 FAMILIARIZATION**

- A. Prior to implementing any of the work described in this Section, the CONTRACTOR shall become thoroughly familiar with all portions of the work falling within this Section.
- B. Inspection:
1. Prior to implementing any of the work in this Section, the CONTRACTOR shall carefully inspect the previously installed work of other Sections and verify that all work is completed in a manner that allows the Work of this Section to commence without adverse impact.
  2. If the CONTRACTOR has any concerns regarding the installed work of other Sections, he/she shall notify the OWNER in writing within 48 hours of his site inspection. Failure to inform the OWNER or ENGINEER in writing or installation of geomembrane will be considered as CONTRACTOR's acceptance of the related work of all other Sections.
  3. Inspect rolls of geomembrane for evidence of damage or soiling from dirt, debris, etc. Remove from site any rolls which are damaged or soiled.

### 3.02 HANDLING AND PLACEMENT

- A. Do not begin placement of geomembrane until PaDEP approval has been received by the OWNER for the underlying layer of the liner system.
- B. Geomembranes may not be deployed until all preliminary quality assurance/quality control issues have been satisfied.
- C. Handle geomembranes in a manner that prevents damage.
- D. The CONTRACTOR shall take any necessary precautions to prevent damage to the geomembrane and underlying layers during placement.
- E. Position and orient rolls in accordance with the Panel Layout Drawing unless approved otherwise by the ENGINEER. Panels shall be shingled with an upgradient panel placed over the downgradient panel in order to facilitate drainage and prevent damage to the underlying surface from precipitation. Where possible, shingle panels in the direction of prevailing winds.
- F. Unroll geomembrane in a manner which minimizes wrinkles and minimizes the need to reposition geomembrane once it has been unrolled. After unrolling geomembrane, smooth out wrinkles. Any wrinkles exceeding four inches in height shall be repaired to the satisfaction of the ENGINEER.
- G. Install rolls at the locations indicated on the Drawings.
- H. Rolls placed on the side slopes where grade is approximately 25 percent shall be placed parallel to slope and extend 10 ft. minimum onto the Cell Floor. No horizontal seams shall be allowed on the side slopes.
- I. At the tie-ins to existing Fields, the secondary liner shall be seamed with the existing temporary berm intact.
- J. Seam and overlap geomembranes in accordance with paragraph 3.03 below.
- K. Each day, record locations of areas covered and geomembrane rolls used. Provide this record to the ENGINEER.
- L. Secure geomembranes with sandbags, or approved equivalent. Such sandbags shall be installed during placement and shall remain until replaced with an overlying component of the liner system. It is the CONTRACTOR's responsibility to provide a sufficient quantity of sandbags or approved equivalent to prevent uplifting by winds. CONTRACTOR shall assume all risk from damage to geomembrane by wind.
- M. The geomembrane shall not exhibit signs of trampolining daylight hours.

- N. The CONTRACTOR shall examine the entire geomembrane surface after installation to ensure that no potentially harmful foreign objects are present. The CONTRACTOR shall remove any such foreign objects and shall replace any damaged geomembrane.
- O. Smoking is prohibited on or in the immediate vicinity of geosynthetics.
- P. Shoes shall be of the soft sole variety which will not damage the geomembrane.
- Q. Direct contact with the geomembrane shall be minimized. Protect geomembrane with sacrificial pieces of geomembrane or approved equivalent in high traffic areas.
- R. No equipment is allowed on the geomembrane which can damage the geomembrane. Motorized vehicles shall not be allowed on the geosynthetics unless otherwise approved by ENGINEER. Specifically, the CONTRACTOR is required to place rub sheets under all small mechanical equipment brought onto the work area such as portable generators. Movement of generators and other mechanical equipment on top of the geomembrane shall be performed in a manner which will not damage the geomembrane. Only rubber tires of generators may come into contact with the liner during movement from one location to another. The CONTRACTOR is responsible for monitoring the equipment at all times to ensure that the equipment remains on rub sheets. Fuel shall be stored outside the limits of the liner. The generator shall be refueled outside of lined areas, either existing or proposed. Excessive heat, leaking hydrocarbons or other detrimental occurrences will not be tolerated.

### 3.03 SEAMS AND OVERLAPS

- A. The CONTRACTOR shall provide a minimum of 5 inch overlap of geomembrane panels for double fusion welding and 3 inches for extrusion welding.
- B. Do not allow moisture and other contaminants from building up between the geomembrane panels.
- C. All panels shall be welded to adjacent panels via double fusion welds or extrusion welds. Solvents or adhesives are prohibited.
- D. Installer shall make the following welding and related equipment available on-site at all times.
  - 1. Double fusion welders: Automated, vehicle-mounted and equipped with gauges displaying wedge temperature setting, actual wedge temperature, and device speed. Device shall provide a seam with two parallel welds separated by an air space capable of being pressure tested for leaks. The Installer shall verify the pressure settings of the drive rollers prior to each seaming period.

2. Extrusion welders: Equipped with gauges which display pre-heat and nozzle temperatures.
  3. Grinders: High-speed (10,000 rpm), 4 ½ inch side grinder or orbital grinder with 80-grit discs.
  4. Vacuum Box: Device shall have mounted pressure gauge capable of reading the spans required for seam approvals specified herein. The vacuum box shall have a clear viewing window and shall not damage the geomembrane.
  5. Tensiometer: calibrated and capable of determining shear and peel adhesion strengths in pounds per inch. The tensiometer shall be automated and have a direct digital readout.
  6. Die Cutter: Capable of cutting 1 inch by 6 inch coupons from geomembrane for destructive testing.
  7. Gauges and compressors necessary for seam air pressure testing. Gauges will have capacity to read pressures up to 40 psi. The compressor shall be of a type to avoid over-pressurization of seams.
  8. Leisters: Leisters shall be of a type that does not have potential to damage the geosynthetics. Blowtorches or similar open-flame leisters will not be acceptable.
- E. Prior to seaming, extrusion welders shall be purged until all heat degraded extrudate is removed from the barrel.
- F. Field panels shall be seamed immediately after placement. Seaming of a placed panel to the previously placed panel shall begin before seaming can begin on the opposite side to a new panel. Welding shall occur such that the welding of a particular panel to the previously deployed panel proceeds prior to welding on the opposite side to the panel placed after the particular panel.
- G. Trial Seam testing shall be conducted on fragment pieces of the same geomembrane being used for the component being installed. Trial seam testing shall be completed for each seamer at the beginning of each seaming period or every 5 hrs, whichever is shorter. In addition, trial seam testing shall also be performed whenever the equipment is shut down, the operator changes or the ambient temperature changes more than 18°F as measured 18 inches above the liner surface. Trial seam testing shall be performed for each seamer with the specific seaming apparatus he/she will be using during that specific time period. Furthermore, a trial seam will be required for each seam type (i.e. smooth/smooth, smooth/textured, textured/textured). The following also applies:
1. Trial seams shall be conducted at the same environmental conditions as exist at the installation area.
  2. Test material preparation shall be the same as for the actual liner seaming procedures with the exception that all overlaps shall be approximately 4 inches.

3. Fusion weld samples shall be at least 3 feet long and 1 foot wide with the seam centered lengthwise.
  4. Extrusion weld samples shall be at least 10 feet long and 1 foot wide with the seam centered lengthwise.
  5. The Installer shall cut four adjoining specimens from the sample via a die cutter at a location chosen by the ENGINEER. Two of the specimens shall be tested for shear strength and two for peel strength in accordance with ASTM D4437. Each specimen must achieve the applicable strength requirement and fail via Film Tear Bond (FTB). If any specimen fails, the tests must be repeated. If any test specimen fails the second time, the seaming equipment and seamer shall be rejected until the deficiencies are corrected and two consecutive trial seam tests can be achieved.
  6. Trial seam testing shall be conducted in the presence of the ENGINEER.
  7. Each passing trial seam sample shall be cut in half with one retained by the Installer and one by the ENGINEER.
- H. For extrusion welding, grinding shall occur no more than 10 minutes prior to welding. Grind geomembrane surfaces in accordance with manufacturer's recommendations, except the depth of grinding may not reduce the thickness of the parent geomembrane more than 10 percent. In addition, where possible grind perpendicular to the seam direction.
- I. Fishmouths or wrinkles existing at the panel seam shall be cut along the ridge to achieve a flat overlap between the panels. The cut area shall then be repaired. All areas having insufficient overlap shall use a cap strip which extends a minimum of 6 inches beyond the incision in all directions. Repair procedures are as outlined below.
- J. Seaming shall occur through the anchor trench.
- K. Provide necessary equipment to dewater areas when necessary. Dewatering techniques shall not damage installed work and shall meet the satisfaction of the ENGINEER or OWNER.
- L. Seam the secondary geomembrane to the primary geomembrane in the anchor trench and wherever the primary geomembrane is not otherwise welded to the primary geomembrane in an adjacent disposal area.
- M. If fusion seaming is likely to damage underlying layers of the liner system, the ENGINEER may require a protective layer of plastic (rubsheet) or approved equivalent be used beneath fusion seaming.
- N. If required in anchor trenches, plywood or an approved equivalent shall be provided directly beneath the seam to provide support. The CONTRACTOR may elect to do this. Additionally, the ENGINEER may require this item at his discretion.

- O. If seaming occurs after dusk, illumination shall be provided by the Installer to the satisfaction of the engineer.
- P. Temporary bonding shall be used only in a manner which does not damage the geomembrane. The temperature at the nozzle of spot seaming equipment shall be controlled so as to not damage the geomembrane.
- Q. Unless authorized by the ENGINEER, no seaming shall occur at temperatures below 40°F. The ENGINEER will not authorize seaming at these lower temperatures until the Installer submits a plan for installing and seaming at temperatures below 40°F and certifies that the method will achieve results equivalent to those performed at temperatures above 40°F. The plan must be approved by the ENGINEER and meet his complete satisfaction.
- R. Seaming may not occur during periods of precipitation.

### **3.04 NON-DESTRUCTIVE TESTING REQUIREMENTS**

- A. The full length of all welds shall be non-destructively tested by the Installer in the presence of the ENGINEER. All welds must successfully pass the non-destructive testing requirements.
- B. Non-destructive testing of fusion welds shall be by air pressure tests as detailed below.
- C. Non-Destructive testing of extrusion welds shall be by vacuum testing as detailed below.
- D. Vacuum testing shall be in accordance with ASTM D5641 or as amended by the following procedures:
  - 1. The vacuum box shall achieve and maintain a test pressure of minus 5 psig minimum.
  - 2. A soapy solution shall be applied to the seam so that it is thoroughly wet when tested.
  - 3. Prior to testing an area, a strip of geomembrane approximately 12 inches by 48 inches or larger, depending on the size of the box, centered over the seam shall be wetted with a soapy solution. The soapy solution shall not be of a quality which is detrimental to the liner system.
  - 4. Place box over the wetted area such that wetted area extends beyond the test limits of the box.
  - 5. Close the bleed valve and open the vacuum valve.
  - 6. Examine the test area for the formation of bubbles for a period of 10 to 15 seconds.

7. If bubbles appear in a manner which indicates a leak, mark the seam for repair.
  8. If no bubbles appear, close the vacuum valve and open the bleed valve and move to an adjacent area with a minimum of 3 inch overlap.
  9. Equipment for testing shall be supplied by the Installer and the viewing box shall allow a clear view of the seam.
- E. Air testing of double track fusion welds shall be in accordance with ASTM D5820 or as amended by the following procedures:
1. Both ends of the seam must be sealed prior to testing.
  2. Inflation of seam may be via manual pump or by motor driven pump approved by the ENGINEER. The air test gauge must be equipped with a pressure readout and must achieve a minimum test pressure of 30 psi. The pump shall be placed on a cushion to protect the geomembrane during testing.
  3. Inflate seam to a pressure between 24 and 30 psi. Once test pressure is achieved, inflation of seam shall cease.
  4. The pressure must be sustained for 5 minutes with a pressure drop less than or equal to 3 psi. If the pressure requirement is achieved, cut opposite end of air channel to verify that test was conducted on the entire seam segment (i.e., no seam blockage). If either of these requirements are not achieved, the following applies:
    - a. Installer shall check that both ends of the seam are properly sealed and that the testing apparatus is in proper working order. The Installer shall then retest the seam.
    - b. If the seam fails again, the Installer shall visually check the seam to locate the flaw. If the flaw is located, the Installer may choose to non-destructively test the seam on either side of the flaw and place a cap strip over all seams which do not pass.
    - c. If the flaw cannot be located, the Installer may elect to cut the seam into segments and non-destructively test each segment. All segments which do not pass the non-destructive tests shall be capped.
    - d. The Installer may choose to cap an entire seam.
    - e. All cap strips shall pass vacuum box testing.
  5. Equipment for testing shall be supplied by the installer.
- F. If a seam cannot be non-destructively tested by either vacuum box or air pressure methods, the seam shall be tested in accordance with the blunt probe/impact test.
- G. Repair damage in the geomembrane caused by non-destructive test methods in accordance with Paragraph 3.06.

### 3.05 DESTRUCTIVE TESTING

- A. Destructive testing shall occur as the work progresses.
- B. Destructive tests will occur at least every 500 lineal feet of seam at a location chosen by the ENGINEER. The ENGINEER may select additional segments for testing at his discretion.
- C. The Installer shall cut the sample from the location indicated by the ENGINEER.
- D. Prior to collecting a sample for laboratory testing, the Installer shall cut two 1 inch by 12 inches samples from locations 4 ft. apart along the seam for field testing. The seam shall be centered within the 12 inch length.
- E. Using the tensiometer supplied by the Installer, test samples for shear strength and peel strength in accordance with ASTM D4437. A passing test is achieved when failure is by FTB and achieves a strength greater than or equal to those specified in GRI Test Method GM19. Non-FTB breaks will not be acceptable.
- F. If both samples pass, collect a sample 12 inches wide by 42 inches along the seam from the area between the two field samples. Cut the sample into three subsamples 12 inches wide by 14 inches long and distribute one each to the Installer, the ENGINEER and the OWNER. The ENGINEER will use his sample for laboratory sampling. The OWNER will archive his sample.
- G. If either of the field samples fail or if the laboratory sample fails the following procedure shall be used:
  - 1. Reconstruct the seam between two passing adjacent destructive sample test locations, or
  - 2. Trace the seaming path in both directions to an intermediate location at least 10 ft. from the point of failure and test according to the above procedures beginning with Subparagraph D. If field and laboratory tests pass, the seam shall be capped between the passing area and the original failing area. A passing location must be located on both sides of the original failing destructive test location in order that the failure is bounded.
  - 3. If sampling fails on either side, the process must be repeated until a passing condition is located and the original failing condition is bounded.
  - 4. Repairs shall be conducted in accordance with Paragraph 3.06.
  - 5. The ENGINEER will coordinate laboratory testing. The CONTRACTOR will be responsible for laboratory costs including but not limited to testing and shipping to the approved laboratory.
  - 6. CONTRACTOR shall reimburse OWNER for additional laboratory and shipping costs required as a result of a failing laboratory destructive test.



- H. Repair damage to the geomembrane as a result of destructive test methods in accordance with Paragraph 3.06.

### 3.06 REPAIRS

- A. All defects in the liner system shall be repaired. Defects include but are not limited to holes, penetrations, blisters, undispersed raw materials, or other abnormalities caused by manufacturing, storage, installation, weather, destructive and non-destructive testing, etc.
- B. Repair holes, tears, undispersed raw materials, contamination by foreign matter, and related defects by patching. Patches shall be round or oval with minimum corner radii of 3 inches.
- C. Spot seaming (beading) may be used to repair small, localized flaws unless directed otherwise by the ENGINEER.
- D. Capping shall be used to repair large lengths of failed seams. Care shall be taken to avoid water or gas accumulation between the sheets in areas requiring large patches.
- E. All surfaces shall be clean and dry at the time of the repair.
- F. All seaming equipment, procedures, materials and techniques used for repairs shall be approved by the ENGINEER.
- G. Repairs shall extend at least 6 inches beyond the edge of the defect.
- H. Prepare the surface around the area to be repaired and seam the area using the applicable procedures detailed in Paragraph 3.03 above for extrusion welding.
- I. Capping shall be used to repair large lengths of failed seams.
- J. A patch/cap will be required at intersections where three or more panels come together.
- K. Repaired seams shall be non-destructively tested as specified in Paragraph 3.04.
- L. Depending upon the length and nature of the repair, the ENGINEER may require destructive testing as specified in Paragraph 3.05 as well.
- M. The Installer will not receive additional compensation for repairs and any associated testing.

### 3.07 PRODUCT PROTECTION

- A. The CONTRACTOR shall use all means necessary to protect prior work and materials and completed work of other Sections.
- B. In the event of damage, the CONTRACTOR shall immediately make all repairs and replacements necessary, to the approval of the CQA Consultant and at no additional cost to the Company.
- C. No smoking shall be allowed on or near the geosynthetic components of this job.
- D. Protect the installation of this Section as directed in other paragraphs of this Section.

### **3.08 REGULATORY CONSTRAINTS**

- A. Regulatory approval is required for each layer of the liner. This will require a Pennsylvania Department of Environmental Protection (PaDEP) representative to visually examine the completed secondary and primary liners, or sections thereof, before work on the next layer may begin.
- B. The Installer shall work with the ENGINEER and OWNER to receive PaDEP approval. The Installer shall give OWNER as much advance notice as possible of when a layer will be completed and ready for regulatory approval in order that the OWNER or ENGINEER can make the necessary arrangements. OWNER or ENGINEER shall make all contacts with the regulators. Installer shall not make contact with regulators in connection with this project unless specifically authorized by the OWNER.

### **3.09 DOCUMENTATION**

- A. Maintain records of geomembrane roll deployment and the location and status of repairs, destructive test locations, etc. Provide copies to ENGINEER upon request.

**END OF SECTION 06300**

**BID FORM**

For: SUPPLY AND INSTALL GEOSYNTHETICS Cell 8a

SOUTHEASTERN CHESTER COUNTY REFUSE AUTHORITY  
219 Street Road  
West Grove, PA 19390

Attention: Mr. Scott Mengle

Gentlemen:

In conformity with the specifications as prepared by Southeastern Chester County Refuse Authority, 219 Street Road, West Grove, Pennsylvania 19390 and after an examination of these Bid Documents, the undersigned submits this bid.

It is hereby certified that the undersigned is (are) the only person(s) interested in this bid as principal or officer, and that this proposal is made without collusion with any person, firm or corporation. The undersigned further guarantees that, if awarded a contract, the bidder will furnish and deliver all materials and perform all labor, tools, tests, and services required to execute, in an expeditious, substantial and workmanlike manner, the requirements of and in accordance with the specifications, to the complete satisfaction and acceptance of SECCRA.

It is understood that SECCRA reserves the right to reject any or all bids, or parts thereof, or items therein and to waive technicalities. It is further understood that competency and responsibility of bidders will receive consideration before the award of the contract.

Bidder submits this bid with the understanding that the materials and/or services will be delivered on or before the date stated in this proposal and that the time for the delivery of the materials and/or services shall be considered as of the essence of this contract. It is further understood, however, that any extension of time, regardless of cause, beyond the agreed date, must be requested by letter from the supplier and any extension must be granted by letter from SECCRA prior to same becoming effective.

The Bidder agrees not to assign this bid or any rights or interests thereunder without the written consent of SECCRA.

The undersigned acknowledges receipt of the following addenda, and the cost, if any, of such revisions has been included in the bid sum:

ADDENDUM NO. \_\_\_\_\_ DATED \_\_\_\_\_

ADDENDUM NO. \_\_\_\_\_ DATED \_\_\_\_\_

**BID FORM (continued)**

The undersigned Bidder proposes and agrees, if this Bid is accepted, to perform and furnish all the Work as specified in the Bidding Documents within the Contract Times indicated in this Bid and in accordance with all other terms and conditions of the Bidding Documents for the prices written below:

SUPPLY AND INSTALL GEOSYNTHETICS Cell 8a

Project:

Item No.	Description See Section 6.1 for detail	Unit Type	Units	Cost per unit	Bid price
1100	Bonds	1	E.A.		
1200	Mob/Demob/Field General Conditions, etc.	1	E.A.		
1300	Coordination	1	E.A.		
2100	Supply & Install Tie-in to Existing Liner	1,100	L.F.		
2200	Supply & Install 80-mil Textured HDPE Secondary Geomembrane	31,000	S.Y.		
2300	Supply & Install Geocomposite Drainage Net	31,000	S.Y.		
2400	Supply & Install Geocomposite Drainage Net for Concentrated Flow Area	3,800	S.Y.		
2500	Supply & Install 80-mil Textured HDPE Secondary Geomembrane	31,000	S.Y.		
2600	Supply & Install Temporary Rain Flap along floor of Phase 8A	2,000	L.F.		
2700	Supply & Install 2' Perimeter Berm Amendment	250	L.F.		
2710	6" Pipe Boot	2	E.A.		
2800	Supply & Install 8-oz/sy Non-Woven Geotextile	31,000	S.Y.		
2900	Rain Cover	9,250			
	<b>TOTAL BID</b>				

Contract time shall be 160 calendar days from Notice to Proceed, but no later than 10/1/22.

Firm Name \_\_\_\_\_  
 Contact Person \_\_\_\_\_  
 Address \_\_\_\_\_  
 Telephone \_\_\_\_\_  
 Authorized Signature(s) \_\_\_\_\_

\_\_\_\_\_ Print \_\_\_\_\_ Print

**EQUIPMENT RATES**

**Project Name: SUPPLY AND INSTALL GEOSYNTHETICS Cell 8a**

The following Equipment Rates shall be used to adjust the actual value of the subcontract and as a basis for any additional work. These Equipment Rates shall include all normal routine maintenance (labor & materials), fuel, taxes, insurances, overhead and profit.

DESCRIPTION	(\$) Hourly Rate	(\$) Daily Rate	(\$) Weekly Rate	(\$) Monthly Rate
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
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_____	_____	_____	_____	_____
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_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**MATERIAL SUPPLIERS**

**Project Name:** SUPPLY AND INSTALL GEOSYNTHETICS Cell 8a

**SUBCONTRACTOR LIST**

Please list below all material suppliers who will be supplying more than two thousand dollars (\$2,000.00) of material to this project. Failure to furnish this information will affect payment under this contract.

<b><u>Name/Address</u></b>	<b><u>Telephone</u></b>	<b><u>Material Supplied</u></b>	<b><u>Value</u></b>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____