Addendum No. 1

New Hanover County
Cell 9&10A County Bid No. 20-0052

Issued August 30, 2019

The bid date has not changed and remains September 10, 2019 at 2:00 p.m. in accordance with the bid documents. Addendum No. 1 includes the following items:

- Revised Spec Section 00300
- Revised Spec Section 01030
- Revised Spec Section 01200
- Revised Spec Section 11300
- FIGURE 1
- Revised Drawings (Bound separately)

Drawing Sheets 5 and 6 have been revised to fix an error in the width of the Gravel Haul Road to match Section A on Sheet 8. Sheet 9 has been revised to update Detail 6 Liner System Tie-in Detail.

1. **There is no Item # for “Gravel Access Road” in Section B of the Bid Form. Please clarify.**

   Gravel Access Road has been assigned line item #8 and the following items have been renumbered, see the revised Spec Section 00300.

2. **Bid Item D6 “Cell 7 Cleanout Extensions” does not have a detail in the plans. Please clarify the scope of work for this item.**

   Please see Spec Section 01025 - Measurement and Payment Part 3.D as well as Detail 1 on Sheet 11 and Detail 3 on Sheet 13. Currently the Cell 7 Cleanouts have a screw-on cap that doesn’t meet the Counties needs and the cleanouts are only inches above grade. For the Cell 7 Cleanout Extension the cleanouts need to be extended to meet the dimensions shown in Detail 1 on Sheet 11 and the caps shall be removed and replaced with Access Cover Plates as shown on Detail 3 on Sheet 13.

3. **There are two Item #6s in Section F of the Bid Form. Please clarify.**

   Dual Wall Fittings and Valves has been assigned line item #7 and the following items have been renumbered, see the revised Spec Section 00300.

4. **Does the dual wall force main need to be videoed?**
No, the force main does not need to be video inspected, only the leachate collection lines within the cell require video inspection and jet cleaning.

5. Does debeading the interior of the pipe apply to the dual wall force main?

Yes, however debeading will only be required on the 10” inner pipe not on the 14” outer pipe.

6. Will air testing be allowed on the outer pipe of the dual force main in lieu of hydrostatic testing?

Pressure testing will not be required on the 14” outer pipe of the dual wall force main.

7. Can you provide an overview map showing the new dual force main route in reference to the landfill cells?

Please see Figure 1 below.

8. Sheet 15 of the plans shows proposed grades, a gravel road & what appears to be storm drain piping along the new dual force main route. Is this work to be included in the scope of work for Cells 9 & 10A? If so, please provide additional information for bidding (quantities, sizes, details, etc.).

No, that work is not a part of the construction for Cells 9 & 10A, but will likely be completed by others during the Cell 9 & 10A construction project.

9. Per Section 01200, Page 1, states Contractor shall record the Pre-Construction meeting and each Progress meeting. Will this remain intact or will it be changed by ADDENDUM per the pre-con announcement made making it the Site Engineer’s responsibility?

The contractor will still record the meeting but as shown in revised Spec Section 01200 there is no longer a requirement for the contractor to provide meeting minutes. Meeting minutes for each meeting will be created by the Engineer.

10. Safety Equipment requirement under section 01030 Page 3 concerning SHALL BE MADE available by Contractor at the job site in quantities sufficient to cover the Contractor’s Construction Crew. (Items a through q.) As I stated in the pre-con will this be addressed via ADDENDUM, as it is not something that a normal GC would have readily available on a recurring basis.

The equipment is now only required if it is relevant to the type of work being performed as shown in revised Spec Section 01030.

NOTE: THIS ADDENDUM MUST BE ACKNOWLEDGED IN YOUR BID PACKAGE IN ACCORDANCE WITH THE SPECIFICATIONS.

END OF ADDENDUM No. 1
SECTION 00300

BID FORM

Proposal For

NEW HANOVER COUNTY
SOUTH PROPERTY CELL 9 & 10A CONSTRUCTION
BID NUMBER #20-0052

Submitted: ___________, 2019

New Hanover County
Department of Environmental Management
3002 Highway 421 North
Wilmington, North Carolina 28401

Sir or Madam:

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal, as principal or principals, is or are named herein and that no other person than herein mentioned has any interest in the Proposal of the Contract to which the work pertains; that this Proposal is made without connection or arrangement with any other person, company, or parties making a bid or proposal and that the Proposal is in all respects fair and made in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the Work and that from personal knowledge and experience, or that he has made sufficient test holes and/or other subsurface investigations to fully satisfy himself that such site is a correct and suitable one for this Work and he assumes full responsibility therefore; that he has examined the Drawings and Specifications for the Work and from his own experience or from professional advice that the Drawings and Specifications are sufficient for the Work to be done and he has examined the other Contract Documents and all addenda relating thereto, and that he has satisfied himself fully, relative to all matters and conditions with respect to the Work to which this Proposal pertains.

The Bidder proposes and agrees, if this Proposal is accepted, to contract with New Hanover County Board of County Commissioners (Owner) in the form of Contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, and labor and to perform the Work specified in the Proposal and other Contract Documents.
The Bidder further proposes and agrees to comply in all respects with the time limits for commencement and completion of the work within the days stated below and as stated in the Contract Form.

<table>
<thead>
<tr>
<th>Item of Project</th>
<th>Substantial Completion from NTP</th>
<th>Final Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell 9</td>
<td>210 days</td>
<td>30 Additional Days</td>
</tr>
<tr>
<td>Cell 10A &amp; Force Main</td>
<td>270 days</td>
<td>30 Additional Days</td>
</tr>
</tbody>
</table>

The Bidder further agrees that the deductions for liquidated damages, as stated in the Contract Form, constitute fixed, agreed, and liquidated damages to reimburse the Owner for additional costs to the Owner resulting from the work not being completed to substantial completion and/or final completion within the time limit stated in the Contract Form.

The Bidder further agrees to execute a Contract and furnish satisfactory Performance and Payment Bonds, each in the amount of one hundred percent of the Contract price, and the required Certificates of Insurance, within ten consecutive calendar days after written notice being given by the Owner of the award of the Contract, and the undersigned agrees that in case of failure on his part to execute the said Contract and Performance and Payment Bonds within the ten consecutive calendar days after the award of the Contract, the bid guarantee accompanying his bid and the money payable thereon shall be paid to the Owner as liquidation of damages sustained by the Owner; otherwise, the bid guarantee shall be returned to the undersigned after the Contract is signed and the Performance and Payment Bonds are filed.

The undersigned agrees to accept in full compensation therefor the total of the lump sum prices and extended unit prices items named in the following schedule (estimating worksheet). It is understood that the unit prices quoted or established for a particular item are to be used for computing the amount to be paid to the Contractor, based on the quantities actually constructed as determined by the applicable measurement and payment portion of these specifications.

Bidder’s General Contractors License No. __________________

Bidder’s Utilities License No. __________________

__________________________________________________________
Name of Bidder and/or Representative

1. BASE BID PROPOSAL:

The undersigned as BIDDER, hereby declares that the only person or persons interested in the Bid as Principal or Principals is, or are, named herein and that no other person that is herein
Having become completely familiar with the local conditions affecting the cost of Work at the place where Work is to be executed, and having carefully examined the site conditions as they currently exist, and having carefully examined Bidding and Contract Documents prepared by: SCS Engineers, PC and titled CELL 9 & 10A CONSTRUCTION together with any Addenda to such Bidding Documents as listed hereinafter, the undersigned hereby proposes and agrees to provide all labor, materials, plant, equipment, transportation and other facilities as necessary, but which may not be separately itemized and to execute all of the Work described by the aforesaid Bidding and Contract Documents for the lump sum consideration of:

Words _______________________________________

Dollars $ ____________________________, said amount being hereinafter referred to as the Base Bid or Base Bid Proposal.

2. Each BIDDER shall fill out and complete the Estimating Worksheet in this Section and submit the appropriate number of copies as part of the Bid. The purpose of the Worksheet is to give each BIDDER the approximate magnitude of the Work required and a basis for uniform comparison of Bids. OWNER does not express, imply or guarantee that the actual amount of Work to be accomplished will correspond to the quantities given, if any. The BIDDERs must assume that the quantities, if indicated, are not accurate and therefore, the BIDDERs must satisfy themselves by personal examination of the location of Work; estimate the quantity of the Work based on the Bid Drawings, Specifications, and any Addendum, thereafter; and by such other means as they may choose, as to the actual conditions and requirements of the Work and the accuracy of the estimate of the Engineer. The BIDDER shall not, at any time after the submission of Bid, dispute any such statement or estimate of the Engineer nor assert that there has been any misunderstanding in regard to the nature or amount of the Work to be done.

The BIDDER may modify the quantities given in the Worksheet if required. Quantities, if listed on the Worksheet are for in-place materials and do not account for settlement, waste, overlaps, volume changes or unusable portions of the materials or products installed. The General section contains a miscellaneous item for BIDDERs to add any cost for Work items not identified on the worksheets, but required by the Contract Documents and Plans. This Contract is a combination of LUMP SUM items and UNIT PRICE items.

Any increase or decrease in the quantities listed in the Worksheet and shown on the Drawing, for any item, shall not be regarded as sufficient grounds for an increase or
decrease in the price of that item, nor total price of the Contract, nor in the time allowed for the completion of the Work, except as provided in the Contract Documents. The OWNER reserves the right to delete portions of the Work, or add to the Work, as OWNER deems necessary and shall have the right to use the BIDDER's unit prices in these Bid Schedules as a basis of negotiation if a change in the quantity of Work occurs.

TRENCH SAFETY COMPLIANCE

1. The bidder acknowledges the existence of Federal/State trench safety standards and the requirements established therein.

2. The bidder further acknowledges that the standards follow the Federal excavation safety standards set forth at 29 CFR Part 1926, Subpart P.

3. The bidder will comply with all applicable trench safety standards, during all phases of the work, if awarded the contract, and will ensure that all subcontractors also comply with the Act.

4. The bidder will consider the geotechnical information available from the Owner, from its own sources, and all other relevant information in its design of the trench safety system it will employ on the subject project. The bidder acknowledges that the Owner is not obligated to provide such information, that he is not to rely solely on such information if provided, and that he is solely responsible for the selection of the data on which he relies in designing said safety system, as well as for the system itself.

5. The bidder acknowledges that included in the Total Price in the Bid Form are costs for complying with the trench safety standards that are in effect as of the date of award of this agreement. The undersigned further identifies the costs to be $10.00.

6. The amount in Item A.11 herein includes the following Trench Safety Compliance Methods and the units of each safety measure.

<table>
<thead>
<tr>
<th>Trench Safety Compliance Method</th>
<th>Unit (LF,SY)</th>
<th>Estimated Quantity</th>
<th>Unit Cost</th>
<th>Extended Cost</th>
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<td>A.</td>
<td>____________</td>
<td>__________</td>
<td>__________</td>
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<tr>
<td>B.</td>
<td>____________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
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<tr>
<td>C.</td>
<td>____________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
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<tr>
<td>D.</td>
<td>____________</td>
<td>__________</td>
<td>__________</td>
<td>__________</td>
</tr>
</tbody>
</table>
7. Acceptance of the bid to which this certification and disclosure applies in no way represents that the Owner or its representatives have evaluated or determined that the above costs are adequate to comply with the applicable trench safety requirements, nor does it in any way relieve the undersigned of his sole responsibility for complying with all applicable safety requirements.
## New Hanover County Secure Landfill Bid Form

### Cell 9 & 10A Construction Project

**REVISED AUGUST 2019**

### ESTIMATING WORKSHEET

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>DESCRIPTION</th>
<th>ESTIMATED QUANTITY</th>
<th>UNITS</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
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<td><strong>A. General (Applies to Cell 9 &amp; 10A Construction)</strong></td>
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<td>Demobilization</td>
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<td>Contractor's Field Office</td>
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<td>Engineer's Field Office</td>
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<td>13</td>
<td>Miscellaneous</td>
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**Subtotal A:**

### B. Site Work - Cell 9 & 10A

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<th>ITEM #</th>
<th>DESCRIPTION</th>
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<td>CY</td>
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<td>3</td>
<td>Stockpile Unsuitable Soil</td>
<td>10,000</td>
<td>CY</td>
<td></td>
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<td>4</td>
<td>Subgrade Preparation</td>
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<td>CY</td>
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<tr>
<td>5</td>
<td>Topsoil/Sod</td>
<td>8,000</td>
<td>SY</td>
<td></td>
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<tr>
<td>6</td>
<td>Seed/Mulch</td>
<td>4840</td>
<td>SY</td>
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<td>7</td>
<td>Miscellaneous Clearing, Grubbing and Stripping</td>
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<td>AC &amp; SY</td>
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<td>8</td>
<td>Gravel Access Road</td>
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<td>9</td>
<td>Gravel Haul Road</td>
<td>575</td>
<td>LF</td>
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<td>10</td>
<td>Erosion Control/Silt Fence</td>
<td>1500</td>
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**Subtotal B:**

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New Hanover County Secure Landfill  
Cell 9 & 10A Construction Project  

**REVISED AUGUST 2019**  
**July 2019**
### C. Liner System Installation - Cell 9 & 10A

<table>
<thead>
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<th></th>
<th>Description</th>
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<th>Unit</th>
<th>Description</th>
<th>Quantity</th>
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<td>1</td>
<td>GCL</td>
<td>169,000</td>
<td>SY</td>
<td>60 Mil HDPE Primary Liner</td>
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<td>2</td>
<td>60 Mil HDPE Secondary Liner</td>
<td>86,000</td>
<td>SY</td>
<td>Temporary Liner Flap</td>
<td>5260</td>
<td>SY</td>
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<td>3</td>
<td>Collection Geocomposite</td>
<td>85,000</td>
<td>SY</td>
<td>Drainage Sand Layer (24”)</td>
<td>52,000</td>
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<td>4</td>
<td>Rain Tarp</td>
<td>29,420</td>
<td>SY</td>
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**Subtotal C:**

### D. Leachate Collection System - Cell 9 & 10A

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<th>Unit</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
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<tr>
<td>1</td>
<td>12” HDPE Header Piping</td>
<td>520</td>
<td>LF</td>
<td>8” HDPE Lateral Piping</td>
<td>4,200</td>
<td>LF</td>
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<td>2</td>
<td>4” Toe Drain</td>
<td>660</td>
<td>LF</td>
<td>4” HDPE Transducer Piping</td>
<td>1</td>
<td>LS</td>
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<tr>
<td>3</td>
<td>8” HDPE Cleanout</td>
<td>8</td>
<td>LS</td>
<td>Cell 7 Cleanout Extensions</td>
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<td>LS</td>
</tr>
<tr>
<td>4</td>
<td>12” HDPE Cleanout 24” HDPE Collection Riser</td>
<td>1</td>
<td>LS</td>
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<td>5</td>
<td>Valve and Appurtenances (associated piping, valving)</td>
<td>1</td>
<td>LS</td>
<td>8-oz Non-Woven Geotextile</td>
<td>7,870</td>
<td>SY</td>
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<td>6</td>
<td>Rounded River Rock</td>
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<td>LS</td>
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**Subtotal D:**

### E. Stormwater/Erosion Control Piping and Structure Systems - Cell 9 & 10A

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<th>Description</th>
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<th>Description</th>
<th>Quantity</th>
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<td>18-inch RCP</td>
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<td>Precast Drop Inlet</td>
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<td>2</td>
<td>Mitered End Sections</td>
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### F. Leachate Pumping System - Cell 9 & 10A

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<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Description</th>
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<td>Electrical Services and Control Panels</td>
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<td>Leachate Collection Pump and Spare</td>
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<td>LS</td>
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<td>Quantity</td>
<td>Unit</td>
<td>Rate</td>
<td>Amount</td>
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<td>------</td>
<td>------</td>
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</tr>
<tr>
<td>3</td>
<td>Stormwater Pump Cell 9 Dual Wall Force</td>
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<td>LS</td>
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<td>5</td>
<td>Main Extension</td>
<td>720</td>
<td>LF</td>
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<tr>
<td>6</td>
<td>New Dual Wall Force Main</td>
<td>2150</td>
<td></td>
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<tr>
<td></td>
<td>Dual Wall Fittings and Valves</td>
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<td>LS</td>
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<td></td>
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<tr>
<td>7</td>
<td>Valves, Meters, and Tie-Ins</td>
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<td>LS</td>
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<td>8</td>
<td>Training and Testing</td>
<td>1</td>
<td>LS</td>
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**Subtotal E:**

**Total For Cell 9 & 10A:**
Note: The Bid comparisons for selection of CONTRACTOR will be determined by total of bid items A-E as determined by the County.

Acknowledgement is hereby made of the following Addenda received since issuance of Plans and Specifications:

Addendum No._______ Dated:_______ Addendum No._______ Dated:_______

Addendum No._______ Dated:_______ Addendum No._______ Dated:_______

Addendum No._______ Dated:_______ Addendum No._______ Dated:_______

Addendum No._______ Dated:_______ Addendum No._______ Dated:_______

Attached hereto is a cashier's check on the _____________________________ Bank of

____________________________________ or Bid Bond for the sum of

_______ Dollars(__________________), made payable to New Hanover County, North

Carolina.

____________________________________ L.S.
(Name of Bidder) (Affix Seal)

____________________________________ L.S.
(Signature of Officer)

____________________________________ L.S.
(Title of Officer)

Address:____________________________________________________________

City:_______________________________________________________________

State:______________________________________________________________

The full names and residences of persons and firms interested in the foregoing bid, as principals, are as follows:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Name of the executive who will give personal attention to the work:

________________________________________________________________________

Attach list of subcontractors as required by Article 11.4.C of Instruction to Bidders.
QUALIFICATIONS QUESTIONNAIRE

The undersigned warrants the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

1. How many years has your organization been in business as a General Contractor?

2. Describe and give the dates and owners of the last two projects that you have completed similar in type, size, and nature as the one proposed?

3. Have you ever failed to complete work awarded to you? If so, where and why?

4. Name three individuals or corporations for which you have performed similar work and to which you refer:

5. Have you personally inspected the site of the proposed Work? Describe any anticipated problems with the site and your proposed solutions?

6. Will you subcontract any part of this Work? If so, describe which portions:

7. Please list the names and addresses of the subcontractors to be used. Additional information may be required in accordance with the Instructions to Bidders, Item 10.8 and Item 3.4.

8. What equipment do you own that is available for the Work?
9. What equipment will you purchase for the Work?

10. What equipment will you rent for the Work?

11. The following is given as a summary of the Financial Statement of the undersigned: (List Assets and Liabilities and use insert sheet if necessary.)

12. State the true and exact, correct, and complete name under which you do business.

   BIDDER IS: ________________________________

   CORPORATION, SOLE PROPRIETORSHIP, PARTNERSHIP

   ________________________________(SEAL)
   (Individual's Signature)

   ________________________________(SEAL)
   (Individual's Name)

doing business as: ________________________________

   Business Address:

   _______________________________________

   _______________________________________

   Phone No.: ________________________________

END OF SECTION
SECTION 01030

SPECIAL PROVISIONS

PART 1 - GENERAL

1.01 UTILITIES

A. The Contractor is responsible for providing any water, power, and sanitary facilities required at the site for the performance of the Work in accordance with the Contract Documents.

1.02 PERMITTING

A. The Contractor shall obtain all Federal, State, County and local permits as required.

1.03 ENVIRONMENTAL PROTECTION

A. The Contractor is specifically cautioned on the following items:

1. Excavations in and Around Landfills: All excavations shall be confined to the immediate area of the work for which the excavation is required.

2. Environmental Constraints:
   a. Dust Control: Trucked water or calcium chloride shall be used if necessary to prevent dust.
   b. Odors: Excavated materials causing odors shall be trucked to an area for disposal as designated by the Owner. Emphasis shall be given to the reduction of any other circumstances causing odors.
   c. Explosion Protection: The Contractor shall be responsible for enforcing all explosion protection precautions according to the National Landfill Gas Committee Health and Safety Guidelines.
   d. Fire Control: The Contractor shall be responsible for fire control and submit a safety plan and fire control procedures (to which he will adhere during the entire Contract time) to the Engineer for review. The plan will address in detail those items listed in paragraph 1.04 of this section.
   e. Litter: The Contractor shall be required to control, collect, and truck all litter excavated or exposed by the Work to an on-site disposal area as directed by the Owner.
f. Fuel Containment: The Contractor shall provide for any temporary fuel stations for the operation of the equipment for this project. All tanks must have secondary containment consistent with current regulations to avoid impacting the site groundwater and soils.

3. Landfill Construction Procedures: Contractor operations shall not interfere with work performed by others.

1.04 SAFETY

A. Trench Safety - The Contractor shall comply with all of the requirements presented in the 0300 Section regarding trench safety. FAILURE TO COMPLY WITH THE REQUEST IN THIS SECTION SHALL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

B. Work In and Around Landfills: All work shall be done in accordance with State and local requirements and OSHA Safety and Health Standards 29 CFR and shall conform to the Landfill Gas Division of the Solid Waste Association of North American (SWANA) A Compilation of Landfill Gas Field Practices and Procedures, most current version.

1. General

The Occupational Safety and Health Act (OSHA) of 1970 impose a duty on employers to furnish a safe and healthful job environment for all employees. The employees are required to comply with safety rules and regulations applicable to their activities and conduct. Employers have the obligation not only to eliminate recognized hazards and to comply with national safety and health standards, but also to provide information and training to create the necessary awareness on the part of the employees.

Landfill safety requires more than the common sense safety procedures common to all industry. Bacterial decomposition of trash results in the formation of methane, a colorless, odorless, explosive gas that together with other volatile materials evolves into the atmosphere and migrates through the soil into surrounding areas. Air quality studies consistently show that concentrations of potentially hazardous substances (OSHA "Priority Pollutants) in the ambient air in the vicinity of solid waste landfills are well below threshold limits. However, in confined or enclosed areas on or adjacent to landfills, dangerous concentrations of combustible and possibly toxic gases may accumulate. Oxygen depletion may also occur in these areas of confinement; therefore, safety procedures should be followed at all times.

2. Safety Equipment
Workers engaged in construction or maintenance of landfill gas (LFG) facilities should wear protective safety equipment as follows:

a. Hard hats, if near moving mechanical equipment.

b. Steel-toed, shoes or rubber boots with steel shank.

c. Safety glasses or face shields, as appropriate.

d. Protective gloves (rubber or plastic would work if working with wet solid waste or where exposure to leachate/condensate is expected).

e. Hearing protection, depending on noise level of work environment.

The following safety equipment shall be made available by Contractor at the job site in quantities sufficient to cover the Contractor’s construction crew if they are relevant to the type of work being performed. Should they become relevant during the project, the CONTRACTOR will make them available at the site in quantities sufficient to cover the CONTRACTOR’s construction crew prior to starting that work:

a. Clean water, soap and paper towels.

b. First aid kit, eye wash station, stretcher, and blanket.

c. Fire extinguisher (2) - 20:A-80:BC.

d. No smoking signs.

e. Acid vapor and particulate masks for all personnel.

f. Parachute-type harnesses (2) and safety lines (for use in excavations, manholes, etc.).

g. Self-contained breathing apparatus.

h. Methane/oxygen indicator.

i. Hydrogen sulfide indicator (Draeger Tubes).

j. Additional monitoring equipment for toxic vapors and aerosols.

k. Barricades.
l. Covers for excavations that will remain open at end of working day.

m. Air-moving equipment that can provide ventilation if working in sub-standard air environment (trenches, condensate drain pits, etc.).

n. Fire blanket.

o. Organic vapor masks.

p. Construction equipment equipped with vertical exhaust or spark arrestors if within 2 feet of ground.

q. Flagging, traffic markers, and florescent orange safety vests for use when working around operating equipment or near public roadways.

3. Personal Health and Hygiene

a. Personal safety and the safety of fellow workers require that all employees are mentally alert and in good general health. No alcohol or drugs are permitted. Smoking is prohibited on the landfill site except in designated areas. No worker should handle excavated solid waste without wearing gloves. Parts of the body accidentally exposed to waste, leachate or condensate should be washed with soap and water immediately.

b. An annual medical examination also is recommended for workers whose activities include daily exposure to solid waste or LFG. Any cut or abrasion should be treated immediately as the chance of infection is high when working on a landfill. A tetanus shot and hepatitis B shot is recommended at specified intervals for all personnel involved in site construction.

c. Avoid contact with unfamiliar plants or those known to be hazardous growing on the landfill.

d. Animals, snakes, spiders, and other insects should be avoided. Be particularly careful around vaults and valve boxes.

e. The address, phone number, and location map of the local hospital and medical emergency room shall be prominently posted. In addition, the phone number of an ambulance and fire department/rescue unit should be posted.
f. Wash hands prior to eating and before leaving work area.

4. Landfill Safety Procedures

a. As a general rule LFG work shall be performed by a team composed of a minimum of two (2) people. In situations where hazards are minimal, and where it's necessary to allow an individual to work alone, another responsible individual must be aware of the lone workers task and scheduled time of completion/return, and if possible monitor the individual’s progress.

b. When working on (or within 1,000 feet of) an active or completed solid waste disposal area, be alert to the existence of (or potential for) hazardous conditions, i.e., the presence of LFG. The distance of 1,000 feet is used by some authorities as the maximum distance LFG will migrate through soils under average conditions. Migration distance, however, may be greater through underground conduits, or where surface conditions interfere with normal venting.

Hazards that might occur could be one or more of the following:

1) Fires may start spontaneously from exposed and/or decomposing solid waste.

2) Fires and explosions may occur in confined or enclosed spaces from the presence of methane gas.

3) LFG may cause an oxygen deficiency in underground trenches, vaults, conduits, and structures.

4) Hydrogen sulfide (H₂S) may be present. H₂S is a colorless, very flammable gas which, in low concentrations, has an offensive odor described as that of rotten eggs. H₂S, however, quickly numbs the olfactory senses so that reliance upon the sense of smell can lead to a very dangerous condition and even cause virtually instant death.

5) Sudden subsidence or collapse of the landfill surface.

c. A confined space is defined as a space where existing ventilation is insufficient to remove dangerous air contamination and/or oxygen deficiency, and where ready access/egress to escape, provide aid and to remove a disabled employee is difficult. In the case of
flammable gases, such as methane, a hazardous concentration is defined as any concentration greater than 20 percent of the lower atmosphere containing less than 19.5 percent oxygen by volume (Cal-OSHA). In the absence of positive ventilation, a mixture of 5 percent LFG in air will exceed both of these limits.

d. Vaults and ditches greater than 3 feet and other non-ventilated confined spaces should not be entered unless tested for explosive concentrations, oxygen deficiency and H₂S levels. Air blowers or fans should be available for positive ventilation. Self-contained breathing apparatus or supplied-air masks must be used when entering areas containing hazardous and/or oxygen deficient atmospheres. "Chemical" cartridge respirators can be used for gaseous contaminants (not H₂S) if oxygen concentration is satisfactory. Mechanical filter respirators should be used only for protection against particulate matter.

e. Fires or explosions in confined spaces require a source of ignition. Smoking is strictly forbidden except in designated areas. Non-sparking and/or explosion proof tools should be used in vaults, trenches, or other enclosed areas. Positive ventilation is required in construction shacks or other structures on or near a landfill. Temporary structures on the landfill surface should be constructed on blocks or other supports with a ventilated area under the main floor. Construction equipment should be equipped with vertical exhaust and spark arrestors.

f. Hydrogen sulfide gas is always present in LFG in some concentrations, generally below 100 parts per million (ppm), in LFG. It is unlikely that hazardous concentrations of H₂S will build up (see Table 1) except in vaults or other confined spaces where oxygen deficiency may be a major hazard. However in special circumstances, where there is a natural or manmade presence of gypsum along with high moisture, for example, very high (lethal) concentration levels of H₂S gas could be encountered under certain circumstances. Personnel must be trained for, and alert to, these possibilities. Gas masks are not effective against H₂S and fresh air breathing equipment is required.

g. Employees who wear beards shall not work in areas where air masks or respirators may be necessary. Other employees should not use stand-by people wearing beards. All employees should be fit-tested on the respirator that they will wear in order to assure a
proper facepiece seal against the face. Fit-testing should reoccur at least annually.
TABLE 1

PHYSIOLOGICAL RESPONSE TO VARIOUS CONCENTRATIONS OF HYDROGEN SULFIDE

<table>
<thead>
<tr>
<th>Response</th>
<th>Concentration/PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable concentration for Prolonged exposure</td>
<td>10</td>
</tr>
<tr>
<td>Slight symptoms after several hours.</td>
<td>70-150</td>
</tr>
<tr>
<td>Maximum concentrations for one hour without serious consequences</td>
<td>170-300</td>
</tr>
<tr>
<td>Dangerous after exposure of one-half to one hour.</td>
<td>400-700</td>
</tr>
</tbody>
</table>

NOTES:

1. Most landfills do not have H₂S in concentrations greater than 10 PPM. However, concentrations up to 250 PPM have been measured.
2. In many cases, laboratories do not know how to properly analyze for H₂S. Draeger tube check analyses are generally more accurate than most laboratories.

5. Safety Procedures for Trenching and Pipe Installation
   a. Excavation permits and shoring may be required for excavations deeper than 4 to 5 feet (into which workers will enter). Check state regulations as standards and requirements vary.
   b. One person, with the sole responsibility of assuring the observance of all safety procedures, should be present at all times during construction. This person should be trained in the use of all the recommended safety equipment.
   c. Smoking is prohibited within 50 feet of the construction area. No smoking on the landfill except in designated areas.
   d. Prior to the entry of workers into an excavation deeper than 3 feet, and periodically during their work, the atmosphere in the excavation should be tested. If there are any doubts regarding
safety, no worker shall be allowed to enter the excavation without at least a half-face or full-face OV/AG mask. If there is an oxygen deficiency, a concentration of any constituent with poor warning properties at a level greater than its TLV, or a concentration of hydrogen sulfide greater than 10 ppm, a positive pressure SCBA or supplied air respirator with 5 minute emergency escape bottle should be used. If a combustible mixture of methane is present, further precautionary measures shall be taken; entry should be forbidden until the methane concentration is acceptable and at least below 1.0 percent by volume in air, or 20 percent of the LEL. If workers are not equipped with supplied air or pressure-demand SCBAs, then entry should be forbidden until the methane concentration is below 0.1 percent by volume in air, unless the Maximum Use Limitation (Mul) of the APR is greater. Workers required to work on an emergency basis, in any environment at or above the IDLH (the level immediately dangerous to life and health as declared and published by NIOSH) for any constituent component in the working environment, should be outfitted in pressure-demand SCBAs.

e. No worker should be allowed to work alone at any time in or near the excavation. Another worker should be present, beyond the area considered to be subject to the possible effects of LFG.

f. Periodically during construction the work area should be monitored for levels of methane and hydrogen sulfide.

g. No worker should handle excavated solid waste without wearing appropriate work gloves.

h. Construction equipment should be equipped with a vertical exhaust at least 5 feet above grade and with spark arrestors.

i. Electrical motors, if used in the excavation area, shall be explosion-proof or non-sparking, totally enclosed fan cooled (TEFC); and electrical controls should be explosion-proof or intrinsically safe and meet the requirements for Class I, Division 2, Group D, (Methane), rated equipment in accordance with the National Electric Code (NEC).

j. No welding should be permitted in, on, or immediately near the excavation area, unless previously and continuously monitored for methane and other combustible gases.
k. Soil should be stockpiled near the excavation, to be used to smother any solid waste combustion should it occur.

l. Solvent cleaning, gluing, or bonding of pipe should be performed to the extent possible, outside the trench. An organic vapor respirator shall be worn by persons using PVC solvents or glues. Personnel using solvent and cement shall be familiar with the appropriate materials safety data sheets for those products.

m. Forced ventilation may be required for workers who must work in trenches deeper than 3 feet. Air blowers and fans may be used for positive ventilation. Dilution ventilation may address either an explosive gas hazard or a hazardous chemical health hazard. The amount of air required for ventilation must be determined based on the concentrations of explosive LFG or hazardous chemical constituents, the LEL for methane or the TLVs for the hazardous chemical constituents in question, the volume to be protected, ambient conditions, and an appropriate safety factor. These calculations should be performed by a qualified individual.

n. During piping assembly, all valves should be closed immediately after installation.

o. As construction progresses, all valves should be closed as installed to prevent the migration of gases through the pipeline and gas collection system.

p. All piping shall be capped at the end of each working day.

6. General Construction/Maintenance

a. When using alternating-current powered power tools, a portable ground-fault current interrupter (GFCI) should be used.

b. When welding near gas recovery process equipment, suitable procedures and precautions should be employed including:

1) Processing a "hot work" permit. (A self-issued serial numbered permit is required in many states.)

2) Designate a specific, dedicated individual, by name, as a fire watch.

3) Verify that explosive concentrations are not present using an explosimeter.
4) Have adequate fire extinguishers (20:A-80:BC) and fire blankets on hand.

5) Sandbag all drains.

6) Provide the appropriate purge and inert blanket on process equipment and piping.

7) Procedures for safe welding and purging of process equipment are available from the American Petroleum Institute (API).

7. Field Sampling for Health and Safety

a. The following instruments will remain at the job and be continuously employed by a qualified person:

   1) H₂S chemical reagent diffusion tube indicator or direct reading instrument.

   2) Oxygen Analyzer

   3) CGA (methane analyzer).

b. CGAs and other electronic portable monitoring instruments should be rated explosion-proof or intrinsically safe. It is also recommended that they be Factory Mutual rated.

c. It is important that any site always be initially characterized so that correct information can be available to make appropriate decisions about personnel exposure safety.

d. To accomplish Item C, a gas sample should be collected prior to the beginning of work or as soon as possible, and should be analyzed for volatile organic chemicals. If historical information or preliminary field screening indicate a need, the sample should also be analyzed for heavy metals capable of volatizing, acid gases, and other inorganic compounds. Proper instructions and close coordination with the laboratory are important to properly characterize the gas. Several composite samples will provide a more uniform representation of LFG at the site. Several non-composited samples, may however, provide a better indication of peak concentrations and show chemicals which would not be indicated in the composite samples.
e. Monitoring for vinyl chloride, benzene, or other constituent chemicals may also need to be conducted during drilling operations. A written record of monitoring should be maintained daily.

8. Respiratory Protection

a. All employees who may be required to wear respirators shall be trained in the proper use of respirators. Such individuals will have an appropriate physical examination for use of respirators. Each individual will be approved by a qualified physician for such respirator use. All personnel who wear respirators shall come under the jurisdiction of their employer's written respiratory protection program, and will follow and be knowledgeable about the program. Personnel will be individually fit-tested wearing their assigned respirator. Fit-testing should be performed annually.

b. Persons with interfering facial hair shall not be permitted in areas where respiratory protection equipment is required; i.e., beards are prohibited.

c. Permanent damage to the eyes (cornea) from acid gases and particulates may result if contact lenses are worn. Therefore, wearing contact lenses on site shall be prohibited. Those persons shall have prescription spectacle inserts installed in their respiratory protective equipment.

d. All NIOSH procedures and guidelines for respirator selection and use should be adhered to. Only equipment certified by NIOSH in its most recent certified equipment list will be used. APRs with chemical cartridges can only be used for acid gas/organic solvent vapors under the following conditions:

1) If the oxygen concentration is satisfactory.
2) If the chemical contaminants have been identified.
3) The concentrations are monitored.
4) The chemical filter cartridges are effective in removing the contaminants.
5) The cartridges are approved for such use (by NIOSH).
6) The contaminants have good warning properties.
If all of the above conditions cannot be satisfied, then Level B protection using positive-pressure SCBAs or supplied air is required. APRs with chemical cartridges/canisters will not be used for protection in environments containing constituents which have poor warning properties, and which are at or above, or can reasonably be expected to be near, at, and/or above the limitation of the protection factor (PF) for the respirator. The maximum working environment shall be determined by multiplying the PF for the type of respirator by the TLV for the chemical substance under consideration, (MUC = PF X TLV). A list of PFs is shown in Table 2.

e. Positive-pressure SCBA or supplied-air full-face masks shall be used when entering areas containing oxygen-deficient atmospheres, unknown atmospheres, or atmospheres considered to be at or above IDLH levels. Personnel (with appropriate SCBA apparatus) will not enter IDLH environments without emergency justification by and acceptance of a site safety manager or responsible project manager. An emergency is constituted by an already existing life threatening situation.

f. The length of time an APR canister or cartridge is effective in removing hazardous material from the ambient air will depend on the type and concentration of hazardous material in the air and the level of effort required for a worker to accomplish his assigned tasks. The higher the breathing rate, the more frequently canisters will need to be replaced. These maximum operating periods vary according to manufacturer, so it will be necessary to monitor the total usage of cartridges and canisters during all work requiring a respirator.

### TABLE 2

**TABLE OF RESPIRATORY PROTECTION EQUIPMENT PROTECTION FACTORS**

<table>
<thead>
<tr>
<th>Type of Air Purifying Respirator</th>
<th>Protection Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-face APR</td>
<td>10</td>
</tr>
<tr>
<td>Full-face APR</td>
<td>100</td>
</tr>
<tr>
<td>When employed for protection from benzene. See Note 1.</td>
<td>50</td>
</tr>
<tr>
<td>When employed for protection from vinyl chloride using vinyl chloride rated specific canister with a 4 hour service life. See Notes 2 and 3.</td>
<td>25</td>
</tr>
<tr>
<td>Positive-Pressure SCBA or supplied air-line respirators</td>
<td>10,000</td>
</tr>
</tbody>
</table>

NOTES:


3: Because respirator cartridges/canisters meeting the service life requirements listed in 29 CFR1910.1017 (g) are not normally available, work involving vinyl chloride concentrations above the action level of 0.5 ppm will require use of pressure-demand SCBAs.

9. Special Conditions

Certain types of work may present unusual problems at certain sites with special conditions. Examples include the following:

a. For protection against infectious waste, a coated Tyvek or Sentex suit, appropriate gloves and boots, and a NIOSH-approved respirator with a high-efficiency particulate filter (HEPA) incorporated in the mask canister or cartridge, are suggested. Personnel should avoid or minimize contact with any waste, and be cautioned about possible contact with sharp objects such as needles. The HEPA filter may be combined with an OV/AG cartridge or canister.

b. For protection against gas vapors while drilling or while working around an open well casing, a NIOSH-approved full-face air-purifying respirator with an OV/AG canister including a HEPA filter may be necessary. The Saranex or Tyvek suit is also required. Also, appropriate gloves and boots. Appropriate measures may be taken to prevent heat stress.

c. For protection from asbestos fibers, the minimum required includes a respirator with a HEPA filter and a Tyvek suit. The Tyvek suit may either be coated or uncoated. Special regulations exist for asbestos, for complete requirements see the Asbestos Standard, 29 CFR 1910.1001.
d. A determination may need to be made regarding whether additional protection will be required, if significant levels of vinyl chloride or benzene (or other more toxic chemicals) are found during characterization. The action levels for vinyl chloride and benzene are one-half of 1 ppm. The maximum threshold limit value of benzene or vinyl chloride to which workers may be exposed over an 8-hour period is 1 ppm. The maximum concentration of vinyl chloride to which workers may be exposed in any given period is 5 ppm. If higher levels of vinyl chloride are found, respiratory protection levels may need to be adjusted to Level B (SCBA or supplied air) if engineering controls cannot reduce these levels. Because vinyl chloride and benzene are both regulated carcinogens, it is imperative and required that exposure be limited where at all possible; if not, then exposure must be reduced to the minimum possible extent through appropriate respiratory protection (i.e., vinyl chloride and benzene exposure should be held to zero whenever possible). For the Vinyl Chloride Standard, see 29 CFR 1910.1017. For the Benzene Standard, see 29 CFR 1910.1028.

e. Special compliance requirements apply for personnel who must work with potential exposure to certain chemicals including vinyl chloride, benzene, and asbestos above action levels. Compliance requirements may vary with each compound and by state, but will likely include:

1) Mandatory training
2) Medical record keeping
3) Exposure monitoring, and record keeping
4) Certifications
5) Specific protective equipment requirements

10. Shoring and Bracing

a. No person shall enter any trench five feet or more in depth unless that trench has been shored, braced, sloped, or other provisions made to prevent cave-in. Shoring shall be engineered by a qualified and licensed civil or structural engineer or engineering geologist. Drawings, specifications, and calculations shall be signed by Contractor’s engineer.
b. Special consideration must be given to the less stable conditions represented by refuse in comparison with compacted soil. Refuse must be considered more prone to instability that may cause slope or side wall failure. This is due to the high void ratio, irregularity of material composing the refuse, and a typically lesser degree of compaction than soil.

11. Safety Management

   a. No safety program can be effective without management support and interest. It is recommended that all companies involved in the LFG industry initiate a safety program for the protection of the health and safety of the personnel involved.

   b. Safety procedures shall be reviewed with all workers to insure that they are aware of requirements and safety concerns.

   c. The Safety Officer shall be adequately qualified to insure that they are aware of requirements and safety concerns.

   d. Weekly meetings shall be held to review unsafe acts.

   e. Unsafe acts shall be stopped if discovered by the Safety Officer.

   f. Required safety equipment shall be on-site and shall be checked to verify completeness and function.

   g. Contracts for landfill gas testing, construction or operation should include a safety procedure clause.

   h. All employees on the job site should sign a document of their awareness of their work environment.

   i. Appropriate local authorities (fire department, air quality, etc.) should be notified prior to drilling or flaring.

   j. A safety checklist should be maintained at the job site.

12. NOTE THAT THE COUNTY HAS A HEALTH AND SAFETY DOCUMENT THAT THE CONTRACTOR WILL BE REQUIRED TO REVIEW AND ENDORSE.

END OF SECTION
SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The ENGINEER shall schedule and administer a preconstruction meeting, periodic progress meetings, and specially called meetings throughout the progress of the work. The ENGINEER shall:

   a. Prepare agenda for meetings
   b. Make physical arrangements for meetings
   c. Preside at meetings
   d. Provide Meeting Minutes

2. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

3. The CONTRACTOR shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules. CONTRACTOR shall record the Pre-Construction meeting and each Progress meeting in their entirety, and shall provide the Engineer the recording electronically, having good quality and clarity, and a typed transcript of the minutes of each meeting. The recording shall be provided for download via a link to an ftp or other file storage site acceptable to the Engineer. The link will be created and provided to the Engineer within 5 days of the progress meeting and will remain active from the time of creation to 6 months after final completion of the project. The ENGINEER will provide a copy of the minutes of each progress meeting shall be available forty-eight (48) hours before the next scheduled meeting.

B. Related Requirements Described Elsewhere:

1. Construction Schedules: Section 01310

2. Shop Drawings, Working Drawings, and Samples: Section 01340

3. Project Record Documents: Section 01720
1.02 PRECONSTRUCTION MEETING

A. A preconstruction meeting shall be scheduled for no later than five (5) days after date of Notice to Proceed (NTP). Alternatively, the NTP may be issued at the preconstruction meeting.

B. Location: The Owner's office.

C. The Contractor shall provide, to the Engineer and the Client, shop drawing submittals for the material data sheets and any exceptions to the spec for each layer of the bottom liner system during the preconstruction meeting.

D. Attendance:
   1. Owner's representative
   2. Engineer and his professional consultants
   3. Resident project representative
   4. Contractor's superintendent
   5. Major subcontractors
   6. Major suppliers
   7. Utilities
   8. Others as appropriate including representatives from NCDEQ will be invited

E. Suggested Agenda:
   1. Distribution and discussion of:
      a. List of major subcontractors and suppliers
      b. Projected schedules
   2. Critical work sequencing: Relationships and coordination with other contracts and/or work.
   3. Major equipment deliveries and priorities.
   4. Project coordination: Designation and responsible personnel.
   5. Procedures and processing of:
a. Field decisions
b. Proposal requests
c. Submittals
d. Change orders
e. Applications for payment

6. Submittal of Shop Drawings, project data and samples.


8. Procedures for maintaining Record Documents.

9. Use of premises:
   a. Office, work and storage areas.
   b. Owner's requirements.
   c. Access and traffic control.

10. Construction facilities, controls and construction aids.

11. Temporary utilities.


13. Check of required Bond and Insurance certifications.

14. Completion time for contract and liquidated damages.

15. Request for extension of contract time.

16. Request for a weekly job meeting for all involved.

17. Security Procedures


19. Guarantee on completed work.

20. Equipment to be used.

21. Staking of work.
22. Project inspection
23. Labor requirements.
24. Laboratory testing of material requirements.
25. Inventory of material stored on site provisions.
27. Posting of signs.
28. Pay request submittal dates.
29. Equal opportunity requirements.

1.03 PROGRESS MEETINGS

A. Schedule regular periodic meetings. The progress meetings will be held every thirty (30) days or less with the first meeting thirty (30) days after the preconstruction meeting or thirty (30) days or less after the date of Notice to Proceed.

B. Hold called meetings as required by progress of the work.

C. Location of the meetings: Project field office of Contractor.

D. Attendance:

1. Engineer and his professional consultants as needed.
2. Contractor
3. Owner's representative
4. Resident project representative
5. Subcontractors as appropriate to the agenda.
6. Suppliers as appropriate to the agenda.
7. Others as appropriate.

E. Suggested Agenda:

1. Review approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress schedule during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
12. Pending changes and substitutions.
13. Review proposed changes for:
   a. Effect on Construction Schedule and on completion date.
   b. Effect on other contracts of the Project.
14. Other business.
15. Construction schedule.
16. Critical/long lead items.

F. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.

G. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340. The submittal log shall clearly indicate what has been submitted, its stage in the approval process and the anticipated submittal dates of all remaining submittals.
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SPECIFICATION SECTION 11300
SECTION 11300

PUMPS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. The WORK specified in this section consists of furnishing one leachate collection pump and spare and one stormwater pump with associated materials and equipment; and installing the leachate pumping systems including one collection submersible and one stormwater pump, pipe connections, flow meters, sampling ports, and related equipment which should be fully tested and in operating conditions as shown on the Drawings and Specifications.

1.02 QUALITY ASSURANCE

A. Unit Responsibility: The pumps, motors, control elements, carriage, discharge hose, and appurtenances shall be supplied by the pump supplier to assure unit responsibility. The pump supplier shall have experience in providing complete systems and equipment for leachate removal.

B. Pumps and motors shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

C. The CONTRACTOR shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the OWNER of any discrepancy before performing the work.

D. Factory Tests: Pumps shall be tested by the manufacturer or a nationally recognized testing agency in compliance with Hydraulic Institute Standards. The pump supplier shall perform the following tests on each pump before shipment from the factory. Certified test results shall be submitted to the OWNER.

1. Meg the pump to check for insulation breaks or moisture.

2. Run the pump dry for a minimum of five minutes to ensure integrity of mechanical seal and oil lifter. Also check rotation of electric motor in both directions.

E. Parts Stocking Program: The pump supplier shall provide the owner the following spare parts which should be retained on the landfill site for use as necessary.
Spare Power Cable – 75 feet in length (Includes cable entrance and gland fittings).
Spare Transducer – 75 feet of signal cable (Transducer is to be surge suppressed).

F. Each submittal for equipment, components or system components shall be accompanied by an “Equipment Warranty and Certification Form.” The form shall be duly executed by an authorized principal of the manufacturer warranting and certifying that the equipment and system components proposed meets or exceeds the specifications, is suitable for its intended purpose and will provide satisfactory performance at the design criteria specified. In the event that the manufacturer is not the supplier, an authorized principal of the supplier shall also execute the equipment warranty and certification form.

1.03 SUBMITTALS

A. The CONTRACTOR shall provide shop drawings prepared by the manufacturer and submit to the engineer for review prior to the manufacture of the proposed equipment. The shop drawings shall include outline dimensions and external connection diagrams. A list of components, pump performance curve showing performance from shutoff to run out as well as a copy of the manufacturers warranty shall be included with each submittal. The manufacturer shall provide to the contractor the required number of submittals at no extra cost to the contractor. In addition the shop drawings shall include the following:

1. Full description and schematic of mechanical seal design, operation and protection devices, including oil lifter design and operation.

2. Full description and schematic of motor cable entrance. Must indicate anti wicking device as well as cable strain relief design.

3. Comprehensive two dimensional CAD drawing of the panel exterior as viewed from the front and side. Must also include complete control panel interior layout showing location of panel component parts as well as full electrical schematic of control panel operation.

4. Must include manufacturer’s warranty which shall be a minimum of two years from date of installation of the pump, and controls.
B. Operating Instruction: For the pump furnished under this section, the contractor shall submit operation and maintenance manuals. At a minimum these manuals shall include:

1. General – equipment function, description, normal and limiting operating characteristics.
2. Installation instructions.
3. Operation instructions – start up procedure, normal operating conditions, and emergency and normal shutdown procedures.
4. Lubrication and maintenance instructions (if any).
5. Troubleshooting guide.
6. Suggested parts that should be held on site as spares that are non mandatory and in addition to the parts listed in section 1.02, Section E of this specification.
7. Drawings – cross sectional views, assembly and wiring diagrams.

C. Factory Performance Test Data: A qualified technician from the factory shall be provided for one day to instruct representatives of the owner and the engineer on proper operation and maintenance. With the permission of the owner, this work may be conducted in conjunction with the inspection of the installation and system start up per Section 3 of this specification. If during start up there is an equipment failure due to the pump manufacturers design or fabrication of the equipment, additional services shall be provided at no additional cost to the owner. No factory ‘representative’ shall complete the start up. The technician should be a direct employee of the manufacturer who has had first hand dealings with the equipment through its production at the factory.

D. Certifications: The contractor shall furnish the engineer with a written certification signed by the manufacturer that the equipment has been properly installed and is free from stress imposed by piping or mounting bolts. The form should indicate that all equipment has been operated without fault under load conditions and that satisfactory operation has been obtained.

1.04 MANUFACTURER’S SERVICES
A. The CONTRACTOR shall obtain the services of the manufacturer's representative experienced in the installation, adjustment, and operation of the equipment specified. The representative shall supervise the installation, adjustment, and testing of the equipment.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver a complete system to include all parts listed in submittal sent to engineer.

B. Store in a weather tight building or suitable covering to protect against damage of any nature.

C. Handle during delivery, storage and installation in a manner to prevent damage of any nature.

1.06 WARRANTY AND GUARANTEES

A. The supplier of the leachate removal system will provide all warranty services against defects in material and workmanship for a period of 24 months from the date of start up and OWNER’s final inspection and acceptance to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the OWNER.

PART 2 – PRODUCTS

2.01 PUMPS

A. The contractor shall furnish and install complete leachate pumping systems for Cell 9 & 10A. The leachate collection pump shall be manufactured by Sligo Systems. The model of pump for the Cell 9 collection zone to be supplied will be a Sligo Systems Series 3-10-4 unit with a 4-inch discharge, 100 ft power lead, sufficient additional power lead to connect the breakout to the control panels located across the perimeter road, and 100 ft stainless steel plastic coated lifting cable configured for sideslope riser installation. The Stormwater Pump will be a Sligo Systems Series 3-10-4 unit with a 4-inch discharge, 100 ft power lead, sufficient additional power lead to connect the breakout to the control panels located across the perimeter road, and a lifting connection for extraction of the pump from the stormwater collection piping unit. This pump will be operated by a float switch system. Sufficient discharge hose to reach from the piping unit to the stormwater drop inlet at the northeast corner of Cell 9.

B. The submersible pumps:
1. The pumps should be capable of handling raw leachate.

2. The pumps may use a two stage impeller capable of obtaining the required flow and head. The impellers shall be fabricated from ASTM A532 93d, class 3 type A high chrome steel.

3. The pumps must be capable of running dry continuously without damaging the rotating assembly, seal bearings, or motor.

4. The pump must be capable of ingesting and passing solid matter including silt, sand, sediment, HDPE shavings as well as rock particles that may be flushed through the system periodically.

5. The pump shall include a motor cable entrance with an anti-wicking block created by a break in the power cable insulation to prevent liquid migration into the motor housing in the event that the power cable is damaged. Hermetically sealed designs are insufficient. The cable entrance shall include a rubber boot that accommodates differences in thermal expansion between the epoxy potting compound and the motor housing. A limited compression tightening plate shall be used to compress and seal this rubber boot to the motor housing. The rubber boot shall incorporate a strain relief feature that limits the cable bending radius and prevents the conductors from being damaged or cyclically fatigued.

6. The pump shall be manufactured out of cast iron with an ASTM rating of class 35, A48.

7. Dual inside mechanical seals with silicon carbide face shall be used to prevent pumped liquid from entering the motor. The seals shall be contained within an oil filled seal chamber. No contact with the pumped liquid is permitted. An oil lifter must be used to ensure that both seal faces are continuously cooled and lubricated by the oil. With the pump running dry, the seals must be capable of operating for at least one hour without damage.

8. The pump shaft shall be supported by double shielded, permanently lubricated, high temperature C3 ball bearings with a minimum B10 life of 60,000 hours. Shaft bearing designs that require lubrication via the pumped liquid are not acceptable.

9. The pumps shall be fabricated for use in a 24” SDR-11 riser pipe application and must be able to move through the HDPE pipe a distance of at least 50 feet. The pumping unit shall be enclosed in an engineered polymer skid to enable the pump to slide down the
riser pipe and negotiate bends without hanging up on seams or any riser pipe imperfections. The polymer skid will use no moving parts. Wheels shall not be used as a means to send the pump down the riser pipe.

10. No built in check valve inside the pump will be permitted. Check valves shall be 304 stainless steel, dual plate, wafer style and located on the discharge hose assembly and easily accessible for maintenance. If a check valve is to be located at the pump discharge, the valve should be bored with a 3/16” bleed hole that will allow the discharge line to be emptied prior to removing the pump for maintenance.

C. Pump and motor capacity shall meet the following requirements:

<table>
<thead>
<tr>
<th></th>
<th>Cell 9 Collection &amp; Stormwater</th>
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<tbody>
<tr>
<td>Model</td>
<td>3-10-4</td>
</tr>
<tr>
<td>Pumps Required</td>
<td>2*</td>
</tr>
<tr>
<td>Operating Duty Point</td>
<td>320 gpm @ 52 ft TDH</td>
</tr>
<tr>
<td>Maximum Motor Hp</td>
<td>10</td>
</tr>
<tr>
<td>Voltage</td>
<td>230</td>
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<tr>
<td>Phase</td>
<td>3</td>
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<tr>
<td>Frequency, Hertz</td>
<td>60</td>
</tr>
<tr>
<td>Panel Source</td>
<td>New Panel</td>
</tr>
</tbody>
</table>

* One pump shall be installed and the second pump shall be stored on site as a back-up

2.04 CONTROL PANEL

A. The new Cell 9 control panel shall be used to operate the Sligo Systems Series 3-10-4 and the 3-10-4 stormwater pump. The intent of the panel operation is to provide two panels constructed of 316 Stainless Steel with conduits, junction boxes, terminal boxes, also constructed of 316 Stainless Steel. All operating switches and readout devices will be installed in the exterior door to avoid excessive opening of the panels. The set point controller will be housed in a separate 12” x 10” x 8” stainless steel enclosure and the conduit connecting it to the main control panel will be provided an explosion-proof seal. The set point controller will be a Devar Inc., model 322 duplex controller. Power supplies will be RHINO encapsulated models. A Class I Division 2 model No. PS24-300D to power the level controller, floats, and/or transducers will be installed. 316 Stainless Steel junction boxes will be at the top of berm near the pump risers (see electrical drawing). Terminal strips in the junction boxes will be Allen Bradley model 1492-CA1. Each pump will be turned on when its specific on level setpoint is reached and turned off when its specific off level setpoint is reached.
The control panel system will provide level control and include motor starters, breakers, overload protection devices and circuit breakers (fuses will not be used as primary protection devices). Panel will provide protection against phase loss and rapid cycle protection; phase loss detection is to be accomplished by means of a phase failure relay, and short cycle prevention is provided by a time delay relay when floats are incorporated into the system operation. The panel will include lightning protection as per panel manufacturer’s recommendation. Panel will include an intrinsically safe barrier for level sensor connection. A low voltage control circuit and power transformer shall be provided if necessary. A thermostat will be included for interior temperature control of the panel body. Power feed to the panel will be 4 wire, 230VAC, 3 phase, 60 Hz. Panel shall be UL699 listed and labeled.

B. Cell 9 Control Scheme:

1. Primary – Level sensor control as detailed above.
2. Pump failure to start to go to alarm.
3. Switches will be On, Off, or Auto
4. The control panel shall be equipped with a NEMA 4 (watertight), red and blue colored beacons on top of the panel that will flash if the pump fails to start when called on.
5. **Motor Starters are to be NEMA type.**

**Note: A PLC will not be used and no major components of the IEC type will be acceptable**

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Action</th>
<th>Beacon</th>
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<tr>
<td>High Sump Level</td>
<td>—</td>
<td>Red</td>
</tr>
<tr>
<td>Over/Under voltage</td>
<td>Stop pumps until corrected</td>
<td>Red</td>
</tr>
<tr>
<td>Loss of phase</td>
<td>Stop pumps until corrected</td>
<td>Red</td>
</tr>
<tr>
<td>Motor amp draw over</td>
<td>—</td>
<td>Blue</td>
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<tr>
<td>maintenance limit</td>
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### 2.05 SUBMERSIBLE LEVEL SENSOR

A. Submersible level sensor lead shall be a minimum of 75’ long. Additional length will be required to tie breakout box at the top of berm to the control panel.

B. The transducer shall provide a 4-20Ma signal corresponding with 0-138” of liquid level above the sensor face.

C. The transducer shall control the pump based upon control levels as directed by the engineer. The pumps shall be activated at the ON setpoint and continue to run until the OFF setpoint is reached.
2.06 ELECTROMAG FLOW METER

A. The flow meter shall be capable of handling raw leachate and be a Sligo Systems Model 8705 flow tube with an integral mount 8732E transmitter as manufactured by Rosemount-Emerson Process Management or approved equal. Flow tube and hardware to be constructed of stainless steel.

B. Be designed to fit a 4” discharge line. Connection to flowmeter shall be achieved via a 150lb ANSI flanged configuration.

C. Be capable of operation with a minimum of 2 times pipe diameter upstream and no straight pipe limitations downstream of the meter to achieve maximum accuracy.

D. Utilize a electromagnetic design to measure and record flow rates and volumetric total. Flowmeters that utilize moving parts (such as paddlewheel or turbine style) to measure and record flow rates will not be acceptable.

E. Have an accuracy of ± .25% full scale.

F. Operate off 24VDC, and be capable of transmitting a 4-20mA flow signal, a pulsed totalizer signal and incorporate a full HART protocol data and diagnostics capability.

G. Incorporate a 2-line 16 character backlit display with through-the-glass buttons (or equivalent) to allow set up and programming while the unit remains sealed. Display shall be lockable to prevent non-authorized users from making changes.

H. Incorporate diagnostic feature for fault alarms.

I. Be capable of detecting ‘empty pipe’, forward or reverse flow and net totalization.

J. Allow user defined presets for damping and low-flow cutoff.

2.07 PUMP RETRIEVAL CABLE

A. Retrieval cable should be a minimum of 3/8” diameter and made of stainless steel.

B. Cable shall be attached to the top of the Sligo Systems pump in a secure manner as to facilitate its removal from the riser pipe assembly.
2.08 BREAKOUT BOXES

A. CONTRACTOR to supply five (5) separate 316 stainless steel electrical breakout/junction boxes with the following performance, design and construction criteria:

B. Breakout/Junction Boxes shall:

1. Be incorporated into the power, flowmeter, and level/pressure transducer cabling system to ensure that no gas migration occurs from the sump into the control panel.

2. Meet NEMA 4X standards.

3. Have a hinged front door and pad-lockable quick release latches to facilitate easy access. Screws to secure the front of the breakout box will not be acceptable.

4. All exposed fittings and fixtures will be stainless steel.

5. Electrical terminal connections inside the box must be DIN rail mounted. Multiple terminal strips will not be acceptable. Each terminal must be able to be separated from the rest without the need to replace the complete connector strip.

6. All conduit connections between the breakout boxes to the main control panel must be completely “sealed off” with an epoxy based potting compound to prevent gas migration into the control panel.

PART 3 – EXECUTION

3.01 PUMP INSTALLATION

A. Pumping equipment and appurtenances shall be installed in the position indicated and in accordance with the manufacturer's written instructions. All appurtenances required for a complete and operating pumping system shall be provided, including but not limited to such items as piping, conduit, valves, wall sleeves, wall pipes, concrete foundations, anchors, grouting, pumps, starters, power supply, and controls.

3.02 FIELD TESTING AND ADJUSTING EQUIPMENT

A. Field supervisor: The manufacturer will furnish a suitably qualified technician to inspect the completed installation, make necessary adjustments and instruct operating personnel in the proper care and
operation of the equipment, prior to the final acceptance of the pumping station. No distributor, representative or agent acting on behalf of the manufacturer shall be approved to complete start up services. This task must be reviewed and completed by a direct employee of the manufacturer.

B. Field Test: When the pumping facility is complete and ready for operation, then the station shall be inspected and tested for compliance to the contract documents. Test of equipment shall be made by the contractor in the presence of the engineer, electrical sub contractor, equipment manufacturer and the owner. The equipment tests shall include, but will not be limited to the following:

1. Pumps and motors: Pumps shall be run dry to ensure their run dry compatibility as well as being run in the sump under 'wet' conditions. A determination shall be made of the pumping capacity. Performance of the pumps shall meet the specified criteria when field tested.

2. Electrical: Readings shall be made of the voltage and amperage draw and recorded on the manufacturers start up form. This form should be kept by the manufacturer, Engineer, Contractor and Owner for future reference.

3. Controls: Control primary elements shall be tested to determine satisfactory performance for starting and stopping at the proper liquid levels. Pump sequence and alarm functions will also be tested.

4. Equipment: Equipment shall be operated to determine that the pump is located in the correct position in the riser assembly. A check will be conducted to ensure that there is no overloading of the pump or any overheating in any of the controls. A check will be conducted for any abnormal vibration that may be evident in the discharge plumbing. Pump will be raised and reset to ensure correct placement in riser pipe.

5. Inspection: An inspection of all mechanical and electrical equipment, controls, piping, valves, fittings, brackets, mountings, seals, conduit, painting and component features shall be made while the station is being tested to determine performance and compliance with design requirements and the specification.

6. Structure: The station shall be inspected for performance, structural soundness and water tightness.

7. Repairs, adjustments and replacement: The contractor shall make any and all necessary repairs, adjustments and replace any component parts until performance has been demonstrated to the
satisfaction of the engineer. The contractor shall bear the cost of any repair, adjustment and replacement.

8. Pump and Controls manufacturer must submit to the engineer for review a full synopsis outlining occasions where the pump assembly has been:

   i. Run dry without damage.
   
   ii. Operated under conditions whereby solids at least 3/8” have been passed through the pump assembly without degrading the pump performance or damaging the pump or motor assembly.

The pumps, control panel, flow meters and break out boxes shall be supplied by one manufacturer.
Table 11300

EQUIPMENT WARRANTY AND CERTIFICATION FORM

Project: New Hanover County Secure Landfill

Project No.: 

The undersigned hereby attests that he has examined all the referenced project drawings and specifications and hereby warrants and certifies that the equipment, component, or system he proposes to furnish and deliver meets or exceeds the contract specification, is suitable for its intended purpose and installation, and will provide satisfactory performance at the design criteria specified. This warranty shall be in addition to and not in lieu of all other warranties, express and implied.

Equipment: 

Manufacturer: 

Address: 

By: 

Type Name and Title: 

(Seal) 

(Signature/Date) 

Equipment Warranty and Certification must be signed by a Principal Person (President, Vice-President, etc.) of the equipment manufacturer. In the event the manufacturer is not the Supplier, than a Principal Person of the Supplier must also sign this form.

By: 

(Type Name and Title) 

(Seal) 

(Signature/Date) 

END OF SECTION
FIGURE 1 – FORCE MAIN LAYOUT
NEW HANOVER COUNTY
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SECURE LANDFILL
SOUTH PROPERTY EXPANSION
CELL 9 & 10A CONSTRUCTION

NEW HANOVER COUNTY, NORTH CAROLINA
AUGUST 2019

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APPROX. 10'
LIMIT OF WASTE
BOTTOM LINER SYSTEM
SEE DETAIL

TEMPORARY ISOLATION BERM

EDGE OF PRIMARY AND SECONDARY LINER TO BE WELDED TOGETHER CREATING WATER TIGHT SEAL ALONG ENTIRE EDGE.

SOLID WALL
PERFORATED
PIPE

DRAINAGE SAND

8" PERFORATED HDPE PIPE

±100'
GRADE TO DRAIN AWAY FROM PROJECT AREA

SECTION A
NOT TO SCALE

TEMPORARY ISOLATION BERM AND HAUL ROAD

BERM TOP ELEVATION 23'
TEMPORARY ISOLATION BERM

NOT IN CONTRACT

SECTION B
NOT TO SCALE

TEMPORARY ISOLATION BERM AND HAUL ROAD

TEMPORARY LAYER FLAT HORIZONTAL TRACTOR TRACT

8" PERFORATED HDPE PIPE

LIMIT OF WASTE
DRAINAGE SAND

DRAINAGE SAND

12" GRAVEL

NC DOT ABC

8oz WOVEN GEOTEXTILE

TO BE SEEDED 2%

EXISTING GROUND

1'

3'

ELEV. 16'

ELEV. 16'

TO BE SEEDED 2%

SECTION C
NOT TO SCALE

TEMPORARY ISOLATION BERM

LIMIT OF WASTE
DRAINAGE SAND

DRAINAGE SAND

12" GRAVEL

NC DOT ABC

8oz WOVEN GEOTEXTILE

TO BE SEEDED 2%

EXISTING GROUND

1'

3'

ELEV. 16'

ELEV. 16'
NOT TO SCALE

LEACHATE COLLECTION HEADER DETAIL
NOTE TO WORK

ANCHOR TRENCH DETAIL
NOTE TO WORK

TEMPORARY LINER FLAP ANCHOR TRENCH DETAIL
NOTE TO WORK

BOTTOM LINING SYSTEM WITH ADDITIONAL LAYER OF 60-MIL LINER DETAIL
NOTE TO WORK

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NOTE TO WORK

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NOTE TO WORK

TEXURED 60-MIL HDPE SECONDARY LINER

TEXTURED 60-MIL HDPE PRIMARY LINER

TEXTURED 60-MIL HDPE GCL

TEXTURED 60-MIL HDPE DETECTION COMPOSITE

TEXTURED 60-MIL HDPE GCL MATERIAL

TEXURED 60-MIL HDPE SECONDARY LINER WEDGE WELD

TEXURED 60-MIL HDPE PRIMARY LINER WEDGE WELD

COMPACTED SUBGRADE

COMPACTED TRENCH

GEOCOMPOSITE SECONDARY LINER

GEOCOMPOSITE PRIMARY LINER

GEOCOMPOSITE DETECTION COMPOSITE

GEOCOMPOSITE EXISTING GCL

24" DRAINAGE SAND

24" ROUNDED RIVER ROCK

24" DRAINAGE SAND

24" ROUNDED RIVER ROCK

NOTES:
1. LINER LAYERS SHOWN EXAGGERATED FOR CLARITY.
2. TEES TO BE FABRICATED TO ALLOW INVERTS OF 8" LATERALS/CLEANOUTS TO MATCH MANHOLE RECEPTION OF THE 4" TOE DRAIN.
3. SLOPE TOE DRAIN FROM HIGH POINT 12" BELOW ANCHOR TRENCH TURNDOWN ELEVATION MINUS THREE FEET.
4. header/lateral collection pipe pattern extended at high point 12" below anchor trench turndown point elevation.
5. EXISTING WEDGE WELD CUTO BACK EXISTING PRIMARY LINER.
6. SEE DETAIL 99 FOR INVERT ELEVATION OF THE 4" TOE DRAIN.
7. see detail 99 for inverts of 8" laterals/cleanouts to match manhole reception of the 4" toe drain.
8. 2' TEES TO BE FABRICATED TO ALLOW INVERTS OF 8" LATERALS/CLEANOUTS TO MATCH MANHOLE RECEPTION OF THE 4" TOE DRAIN.
9. see detail 99 for invert elevation of the 4" toe drain.
10. 2' TEES TO BE FABRICATED TO ALLOW INVERTS OF 8" LATERALS/CLEANOUTS TO MATCH MANHOLE RECEPTION OF THE 4" TOE DRAIN.
11. see detail 99 for invert elevation of the 4" toe drain.
12. header/lateral collection pipe pattern extended at high point 12" below anchor trench turndown point elevation.
13. EXISTING WEDGE WELD CUTO BACK EXISTING PRIMARY LINER.
14. SEE DETAIL 99 FOR INVERT ELEVATION OF THE 4" TOE DRAIN.
15. use 6 oz/yd nonwoven geotextile drainage sand layer.
16. SOD.
17. see detailed 4 for invert elevation of 4" toe drain.
18. use 6 oz/yd nonwoven geotextile drainage sand layer.
19. header/lateral collection pipe pattern extended at high point 12" below anchor trench turndown point elevation.
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70. use 6 oz/yd nonwoven geotextile drainage sand layer.
71. header/lateral collection pipe pattern extended at high point 12" below anchor trench turndown point elevation.
72. EXISTING WEDGE WELD CUTO BACK EXISTING PRIMARY LINER.
73. SEE DETAIL 99 FOR INVERT ELEVATION OF THE 4" TOE DRAIN.
74. use 6 oz/yd nonwoven geotextile drainage sand layer.
ROUNDED RIVER ROCK DETECTION LAYER
SUMP AREA
3:1
ROUNDED RIVER ROCK COLLECTION LAYER
SUMP AREA
3:1

BOTTOM LINING SYSTEM WITH ADDITIONAL LAYER OF 60-MIL LINER
SEE DETAIL

ACCESS COVER PLATE
SEE DETAIL
ACCESS COVER PLATE CONNECTION
BOLT ON SS HANDLE

4" HDPE
8" APPROX.
DOUBLE WALL CONTAINMENT PIPE AND LEACHATE FORCEMAIN

2" SDR 21 HDPE
AIR VENT PIPE
SOD

PRIMARY LEACHATE RISER SECTION
NOT TO SCALE

TOP OF BERM
SEE DETAIL

BOTTOM LINER SYSTEM
FLEXIBLE HOSE (BY PUMP MFR.)

RISER SIDE EXIT. QUICK DISCONNECT (BY PUMP MFR.)
24" SDR 11 HDPE
SOLID WALL LEACHATE COLLECTION PUMP RISER TO LEACHATE SUMP

4" HDPE TRANSDUCER CARRIER W/ 4" CAP (BOTH ENDS)
4" HDPE TRANSDUCER CARRIER PIPE (TYP.)
6" GALV. STEEL BOLLARD FILLED WITH CONCRETE, PAINTED OSHA SAFETY YELLOW.
PULLEY MOUNTED ON TOP

CONCRETE
6' ±6'
SUPPORT PIPE AS NECESSARY
24" SDR 11 HDPE PERFORATED COLLECTION RISER PIPE
SEE DETAIL

BID SET
NEW HANOVER COUNTY
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
5210 U.S. HIGHWAY 421 NORTH
WILMINGTON, NORTH CAROLINA 28429

SOUTH PROPERTY
CONSTRUCTION OF CELL 9 & 10A

NOTES:
1. ALL CONTROL PANELS, PIPING, BOLTS, FLANGES, NUTS, FITTINGS, VALVES, ETC. TO BE STAINLESS STEEL OR HDPE AS NOTED.

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NOTE:
1. TEE TO BE FABRICATED SO ALL PIPE INVERTS MATCH.
2. CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE JET AND VIDEO WILL CROSS THE FITTING IN BOTH DIRECTIONS.
3. ALL HDPE PIPE WELDS WILL HAVE THE WELD BEAD REMOVED FROM THE INSIDE OF THE PIPE. INCLUDING ALL FITTINGS.

8" ELBOW TO BE FIELD FABRICATED TO MATCH SIDE SLOPE GRADE.

CONCRETE SHALL NOT COVER WELDS OR FLANGES.
24" HDPE PRIMARY COLLECTION SUMP RISER TOP OF BERM 3:1 HDPE TEE UNION HDPE BALL VALVE BUSHING HDPE PIPE GROUND ELEVATION 10" SDR 17 HDPE INNER SINGLE WALL PIPE 2" PVC CONDUIT WITH PUMP CONTROL WIRES ACCESS COVER PLATE (TYP.) SEE SHEET E-101 FOR DETAILS ELECTRICAL PANEL FABRICATED STAND-OFF MOUNTING AS REQUIRED TO PRIMARY COLLECTION/PUMP 2" HDPE PRIM. FOR STORM METER, 4" HDPE PRIM. FOR COLLECTION METER 3:1 BREAKOUT BOX 1 POWER TO PRIMARY (COLLECTION) PUMP POWER TO STORM PUMP TRANSDUCER WIRING TO STORM SUMP WIRING TO STORM METER 3:1 BREAKOUT BOX 2 BREAKOUT BOX 3 14" SDR 26 DOUBLE WALL CONTAINMENT PIPE CONNECT TO COLLECTION POWER METER - PROVIDE NIPPLE LENGTH EQUIVALENT TO 2X PIPE DIAMETER MINIMUM ON UPSTREAM SIDE OF METER SEAL-OFF FITTINGS (SEE SPECIFICATION FOR EPOXY BASED POTTING COMPOUND) FLANGE CONNECTION 6" MIN. 4" TRANSDUCER CARRIER CONNECT TO COLLECTION TRANSDUCER WIRING 90° HDPE ELBOW HDPE TEE TRUE UNION BALL VALVE FROM LANDFILL SUMP PUMP EYE BOLT FOR PULL-UP CABLE INSIDE RISER FLEXIBLE HOSE BY PUMP MANUFACTURER 24" SDR 11 HDPE SOLID WALL RISER (COLLECTION) 3:1 RISER SIDE EXIT QUICK DISCONNECT (BY PUMP MFR.) BOLT ON S.S. HANDLE (TYP.) HDPE CONDUIT WITH PUMP CONTROL WIRES 3:1 PRIMARY LEACHATE PIPING SECTION LEACHATE PUMP RISER DETAIL LEACHATE PUMP RISER DETAIL PRIMARY LEACHATE PIPING SECTION DOUBLE WALL FORCE MAIN WYE AND CLEANOUT DETAIL DOUBLE WALL CONTAINMENT PIPE AT VALVE LOCATION 14" DOUBLE WALL CONTAINMENT PIPE AT VALVE LOCATION NOTE: 1. ALL ELECTRICAL HARDWARE, CONTROL PANELS, CONDUIT, FITTINGS, BOXES, ETC. TO BE STAINLESS STEEL. 2. ALL LEACHATE PIPING, FORCE MAIN, VALVES, ETC. TO BE HDPE. 3. TRANSOM VIEWS TO SCALE. 4. ALL DRAWINGS TO BE READ FROM LEFT TO RIGHT. 5. ALL ELECTRICAL PIPING TO BE READ FROM TOP TO BOTTOM. 6. ALL SORBS TO BE READ FROM TOP. 7. ALL VIEWS TO BE READ FROM LEFT TO RIGHT. 8. ALL SORBS TO BE READ FROM TOP. 9. ALL DRAWINGS TO BE READ FROM LEFT TO RIGHT. 10. ALL ELECTRICAL PIPING TO BE READ FROM TOP TO BOTTOM. 11. ALL LEACHATE PIPING, FORCE MAIN, VALVES, ETC. TO BE HDPE.
**STORM WATER COLLECTION SYSTEM DETAIL**

**NOT TO SCALE**

1. **BOLLARDS** TO BE INSTALLED AROUND NEW CLEANOUTS OR WHERE THEY HAVE BEEN DAMAGED/REMOVED BY CONTRACTOR. COORDINATE WITH ENGINEER FOR FINAL LOCATION.
2. **CAREFULLY EXCAVATE AREA FOR BOLLARD INSTALLATION IN ORDER NOT TO DAMAGE PIPE OR EXISTING STRUCTURES.**
3. **"EOL" OR "FORCE MAIN" TO BE PAINTED IN BLACK LETTERS 2" HIGH ON THE SIDE OPPOSITE THE LINER OR FORCE MAIN DEPENDING ON USE.
4. **FOR MECHANICAL SLICING METHOD (24" RISER SIMILAR)**
5. **SEAL STEEL BOLLARD PLATE WITH 4" EPOXY PAINTED OSHA SAFETY YELLOW.**

**THE SIDE OPPOSITE THE LINER.**

**NOT TO SCALE**

1. **ON THE SOUTH AND WEST SIDES OF CELLS 9 AND 10A**
2. **"EOL" TO BE PAINTED IN BLACK LETTERS 2" HIGH ON THE SIDE OPPOSITE THE LINER.**

**NOT TO SCALE**

1. **ACCESS COVER PLATE**
2. **PIPE PERFORATION PATTERN**
3. **ACCESS COVER PLATE CONNECTION**
4. **SILT FENCE BARRIER**
5. **DROP INLET**
6. **GRANULAR ACCESS ROAD**
7. **HEADER/LATERAL COLLECTION PIPE PERFORATION PATTERN**
8. **BOLLARD DETAIL**
9. **STORM WATER DETENTION**

**NOTES:**

1. **USE GEOTEXTILE A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE POSTS AND WALL AND WASHER.**
2. **USE WIRE A MINIMUM OF 32" IN WIDTH AND FASTEN ADEQUATELY TO THE POSTS AND WALL AND WASHER.**
3. **USE HDPE FLANGE A MINIMUM OF 24" IN DIAMETER AND WASHER.**
4. **NOTE:**
5. **CRESCENT STRUCTURAL FILL**
6. **COMPACTION STRUCTURAL FILL**
7. **GRADE**
8. **GRADE**
9. **GRADE**
10. **GRADE**

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**NEW HANOVER COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**

**NORTH CAROLINA CORPORATE LICENSE NO. C-1837**

**STEARNs, CONRAD AND SCHMIDT**

**SCS ENGINEERS, PC**

**3922 COCONUT PALM DRIVE, SUITE 102, TAMPA, FL 33619**

**PH (813) 621-0080  FAX NO. (813) 623-6757**

**CONSULTING ENGINEERS**

**WILMINGTON, NORTH CAROLINA 28429**
NOTES:
1. THRUST BLOCKS WILL BE USED AT EACH CHANGE IN DIRECTION ALONG THE PATH OF THE FORCEMAIN, AT EACH CLEANOUT.
2. BOLLARDS TO BE SET EVERY 100 FEET WHERE NECESSARY.
3. WHERE NECESSARY FITTINGS TO BE ORDERED TO MEET FIELD REQUIREMENTS.
4. WHERE NECESSARY FITTINGS TO BE ORDERED TO MEET FIELD REQUIREMENTS.
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GRADE BREAK STA = 0+00.00
ELEV = 12.00

FORCE MAIN WYE AND CLEANOUT

ELEV = 5.00

GRADE BREAK STA = 0+98.14
ELEV = 5.00

CONST 66' - 14" D.C. HDPE SDR - 26

GRADE BREAK STA = 1+94.43
ELEV = 3.73

NEW 14" D.C. HDPE SDR-26 FORCEMAIN

5.7
45° 14" D.C. HDPE SDR 26 EL

SEE DETAIL

FORCEMAIN CLEANOUT AND OF EXISTING TEE APPROXIMATE LOCATION

3.2%
16.7
40

SEE SHEET 15

201' - 14" D.C. HDPE SDR - 26

30° EL

30° 14" D.C. HDPE SDR 26 EL

SOUTH PROPERTY

ELEV = 8.04
GRADE BREAK STA = 0+33.62

ELEV = 11.27
GRADE BREAK STA = 6+51.21
ELEV = 5.00
GRADE BREAK STA = 8+53.28
ELEV = 11.38
GRADE BREAK STA = 10+23.41
ELEV = 20
GRADE BREAK STA = 14+11

THRUST BLOCK (TYP)
NOTES:
1. THRUST BLOCKS WILL BE USED ANYWHERE A BEND GREATER THAN 22 DEGREES IS USED, VERTICAL OR HORIZONTAL.
2. BOLLARDS TO BE SET EVERY 100 FEET ALONG THE PATH OF THE FORCE MAIN, AT EACH CHANGE IN DIRECTION AND AT EACH CLEANOUT.
3. WHERE NECESSARY FITTINGS TO BE ORDERED TO MEET FIELD REQUIREMENTS.
4. END OF FORCE MAIN TO COME ABOVE GROUND AND ENTER THE POND ABOVE THE LINER AND SHALL LAY ON THE LINER DOWN THE SLOPE.
5. A RUB SHEET WILL BE CLAMPED TO THE FORCE MAIN WITH A STAINLESS STEEL CLAMP TO PREVENT ANY DAMAGE TO THE POND LINER FROM THE PIPE.